GOLDER

REPORT

Evaluation of Surface Water Quality

SME Report for Evaluation of Cause: Upper Fording River Westslope Cutthroat Trout Population Decline

Submitted to:

Teck Coal Limited

Submitted by:

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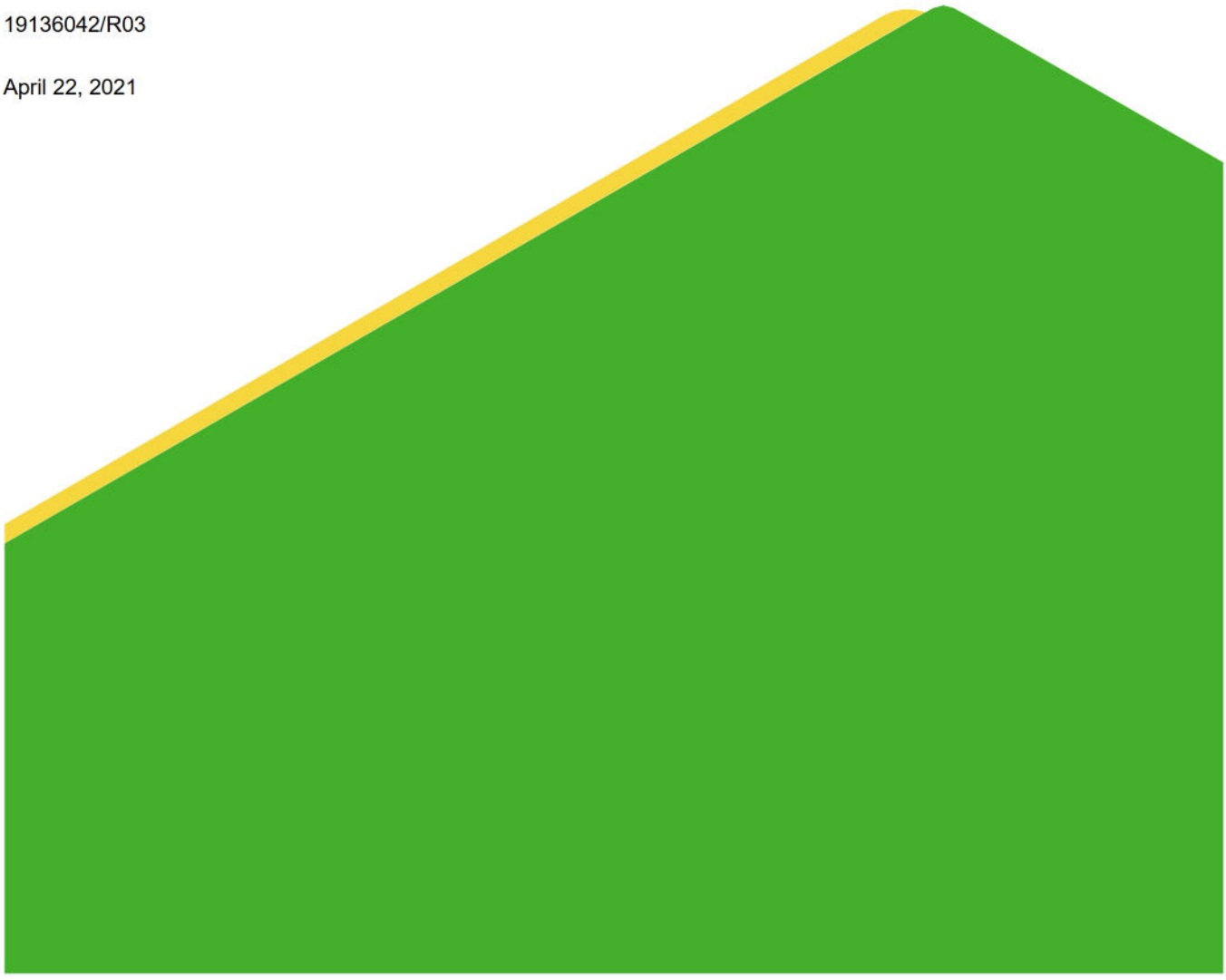

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Executive Summary

Golder Associates Ltd. (Golder) was retained by Teck Coal Limited (Teck Coal) to provide the following evaluation of the potential contribution of surface water quality in the upper Fording River watershed to the Westslope Cutthroat Trout (WCT; *Oncorhynchus clarkii lewisi*) population decline.

The objective of this report is to evaluate the potential role of surface water quality in the WCT decline, considering potential acute or chronic effects and potential nutrient enrichment effects. This assessment compiled existing surface water quality, tissue chemistry, and acute and chronic toxicity testing data from the upper Fording River to characterize the conditions to which WCT were exposed in the decline window (defined herein as September 1, 2017 to September 30, 2019) and how these conditions may have changed relative to prior conditions. These site-specific data were interpreted within the context of relevant and reliable toxicology information and combined with available information on WCT movement and habitat use in the upper Fording River watershed.

The general approach to assessing potential effects of surface water quality was first to identify constituents with the potential to affect fish (e.g., those exceeding a water quality guideline or toxicological screening value) and then to evaluate how concentrations of those constituents varied spatially and temporally in terms of the magnitude of potential stress to WCT. The greater the magnitude of the potential stress, and the more the potential stressor overlapped with WCT distributions in time and in space, the stronger was the evidence that the constituent may have contributed to or been the sole cause of the population decline. Evidence of a potential effect was also interpreted to be stronger if concentrations of the constituent were higher in the decline window than they had been previously, indicating that stress to WCT may have been increasing over time.

The evaluation of potential effects of water quality relied on published toxicological data, which for some constituents was based on laboratory testing with sensitive early life stages (embryos and alevins) of standard test species such as rainbow trout. These data are directly relevant to evaluating potential effects on early life stages of WCT, which are present in the upper Fording River from mid-May to August. Where information on sensitivity of juvenile or adult life stages was available, this was also considered. However, for some constituents it was necessary to adopt toxicological data from early life stage testing to evaluate potential effects to juveniles and adults. Because early life stages tend to be relatively sensitive to water quality relative to other life stages (Environment Canada 1998), the assessment may over-estimate potential effects to juveniles and adults for those constituents.

To account for how the spatial distribution of WCT across the upper Fording River watershed changes seasonally for different life stages, the evaluation of water quality considered both the spatial extent and timing of exposure to potential stressors. Information was incorporated from the fish periodicity table for WCT in the upper Fording River (EoC Team 2020), reflecting the timing of life stages, and spatiotemporal fish use information from telemetry studies (Cope et al. 2016), reflecting the spatial distribution of different life stages in different seasons. Although Cope et al. (2016) reported high site fidelity and repeated patterns of habitat use by WCT in the upper Fording River, it is possible that conditions occurred during the decline window that may have affected movement patterns. The assessment discusses uncertainty associated with adopting information collected in the telemetry study (in 2012 through 2015) to estimate the distribution of fish in the decline window.

Potential effects were evaluated quantitatively on a constituent-by-constituent basis by characterizing the magnitude of potential stress to WCT. Species-specific and site-specific screening values were derived in accordance with BC ENV (2019a) definitions of acute and chronic effects. These screening values were designed to more specifically characterize the potential for effects to sensitive fish species under conditions in the upper

Fording River watershed and refine the assessment of the magnitude of that potential stress. Magnitude of potential effects was characterized as negligible potential for effects (below guidelines), no chronic effects to fish (below level 1 screening values), potential low-level effects (between level 1 and level 2 screening values), potential moderate-level effects (between level 2 and level 3 screening values), or potential high-level effects (above level 3 screening values).

When multiple constituents were greater than a screening value, consideration was given to the number of constituents with concentrations above screening values and the potential for effects of those constituents to interact. Acute and chronic toxicity monitoring data were included as a supporting line of evidence to further evaluate potential combined effects of all water quality constituents to sensitive early life stages in laboratory testing. Watershed-specific toxicity monitoring results indicate potential effects associated with the mixture of constituents measured in surface water samples, and thereby help to reduce uncertainty related to potential mixture-related effects of multiple water quality constituents.

For selenium, which is a bioaccumulative substance, the assessment focused on measured selenium concentrations in WCT and their benthic invertebrate prey. Tissue selenium concentrations provide a direct and spatially comprehensive characterization of dietary exposure of WCT and how it has changed over time that inherently accounts for different bioaccumulation conditions that may occur in different areas. Evaluating these concentrations relative to effects benchmarks for WCT provides a site-specific and species-specific assessment of potential effects of selenium.

For potential nutrient enrichment effects, total phosphorus (the limiting nutrient for productivity) was evaluated relative to federal trophic status categories and site-specific productivity information.

Detailed methods for how each type of potential effect was assessed are provided in their respective sections. The requisite conditions for water quality to have contributed to or caused the WCT decline were conceptually the same for all types of potential effect. The requisite condition for water quality to have contributed to the WCT decline was any indication of a potential effect within the decline window at a time and location where fish could also have been present. The requisite condition for water quality to have caused the WCT decline was an indication of a high-level potential effect that could have affected a large fraction of the WCT population, either by being widespread or by occurring at a time and location that overlapped with large numbers of fish.

Overall conclusions for potential acute effects, chronic effects, and nutrient effects of surface water quality are provided in the bullets below. Following this, findings for potential chronic effects are presented by season, describing how results overlap spatially and temporally with fish use information calculated by the EoC Team (2021) using data from Cope et al. (2016).

- **Acute effects**. Water quality data and acute toxicity testing with rainbow trout provided little to no indication of potential acute effects. Potential acute effects of low dissolved oxygen were identified for one sample from Turn Creek (November 2018), one sample from Fording River station FR_FRCP1 (December 2018), and three samples from Fording River station RG_UFR1 upstream of mining (February 2019). Potential acute effects of dissolved oxygen in these five samples met the requisite conditions to contribute to the WCT decline via effects to juveniles and adults (but not early life stages which are present from mid May to late August), but not to be the sole cause.
- **Chronic effects**. Seven constituents were identified as potential chronic stressors in one or more samples collected in the decline window (lithium, nitrate, nitrite, selenium, sulphate, TDS, and dissolved oxygen). Water quality in most areas indicated no chronic effects or a potential for up to low-level effects of a single constituent (although there may be different constituents in different seasons) that could have contributed to

the WCT decline; these areas accounted for most of the recorded fish use in each season. In some localized areas, notably some mine-affected tributaries and Fording River mainstem station FR_FRCP1 in fall and winter, water quality indicated a potential for up to high-level effects of multiple constituents. At FR_FRCP1, this was supported by chronic toxicity test results with early life stages of fish. The available information from telemetry studies and the localized spatial extent of these areas generally indicate that a small proportion of the population could have overlapped with these conditions. Based on this information, chronic effects of water quality met the requisite conditions to contribute to the WCT decline via effects to all life stages, but not to be the sole cause.

- **Nutrient effects**. Water quality data and site-specific relationships between total phosphorus and productivity indicated little to no evidence of nutrient enrichment effects. Nutrient enrichment did not meet the requisite conditions to contribute to or cause the WCT decline.

The sections below integrate assessment results across the upper Fording River watershed by season, describing how results overlap spatially and temporally with fish use information collected by Cope et al. (2016). For each season, a table is provided that summarizes assessment results for each of the Fording River segments (ordered from upstream to downstream) and tributaries. Percentages shown in these tables reflect the proportional fish use of each segment in the indicated season. Colour shading indicates the worst-case magnitude of potential effects indicated by water quality in the segment in that season. Chronic toxicity testing results are also shown for winter, spring, and summer-fall; this testing is conducted with early life stages of fish (embryos-alevins), which are not present in winter in the upper Fording River. Therefore, chronic toxicity testing results for winter should be interpreted as indicative only, given that early life stages of WCT do not occur in winter.

Summary of Potential Chronic Effects to WCT in Winter

Table ES-1 integrates assessment results and fish use information related to potential chronic effects of water quality on WCT in winter. Results for adults and juveniles are discussed in the bullets below, focusing on areas with recorded fish use:

- In areas representing approximately 53% of adult fish use in winter, concentrations of water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values. These results indicate negligible potential for effects or no chronic effects to fish.

- In two areas representing approximately 43% of adult fish use in winter, concentrations of most water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values but potential low-level effects were identified for a single constituent (nitrite in S9 and TDS in S6). In both S9 and S6, these conditions represent a change relative to pre-September 2017 conditions. In S9, potential low-level effects were identified for nitrite at FR_FR1, located in the middle part of S9 representing few fish in winter (3.4%). In S6, potential low-level effects were identified for TDS at FR_FRRD, located in the northern part of S6. At other stations in S6, one of which (FR_FRABCH) is near the largest congregation of overwintering fish, no chronic effects were identified.

- In two areas representing approximately 4% of adult fish use in winter (S11 and S7), concentrations of one or more water quality constituents indicated a potential for up to high-level effects. In S11, this was due to dissolved oxygen measurements at biological monitoring station RG_UFR1 in February 2019 that indicated a potential for acute effects; S11 represents few fish in winter (1.5%). In S7, this is due to dissolved oxygen, sulphate, and TDS concentrations indicating potential high-level effects at FR_FRCP1 in 2018 (sulphate/TDS) and 2019 (sulphate/TDS and dissolved oxygen [December 2018]). In both S11 and S7, these conditions represent a change relative to pre-September 2017 conditions. At other stations in S7 (FR_FR3 and FR_FR4), which are located in the northern part of S7, concentrations of water quality and tissue selenium indicated no chronic effects or a potential for low-level effects of tissue selenium on growth (but not survival).

- Chronic toxicity testing indicated up to high-level effects at FR_FRCP1 in S7 (rainbow trout and fathead minnow), low-level (rainbow trout) to moderate-level (fathead minnow) effects at FR_FRABCH in S6, and moderate-level effects (fathead minnow only) at GH_FR1 in S1. At FR_FRCP1 and FR_FRABCH, responses in one or more tests were higher than observed prior to the decline window. In FR_FRCP1 tests, the strongest evidence for causation in winter was for sulphate/TDS, although microbes and nitrate were also identified as possible contributors. In FR_FRABCH and GH_FR1 tests, no water quality constituent was identified as a potential cause of observed responses in winter. This testing is conducted with early life stages of fish (embryos-alevins), which are not present in winter in the upper Fording River.

Table ES-1: Winter Results for the Decline Window Compared to Relative Fish Use

Segment	Area Description	Relative Fish Use (Percentages) Compared to Results for Water Quality and Tissue Selenium (Colours) [1]	Chronic Toxicity Testing [2]
		Adults/ Juveniles	Early Life Stages
Mainstem Fording River			
S11	*Headwaters*	**1.5%**	—
S10	*upstream Henretta Creek*	2.3%	within regional NR
S9	~300 m ds Clode to ~400 m us Henretta	**3.4%**	—
S8	us Kilmarnock to ~300m ds Clode	20%	—
S7	~1.5 km us Porter to us Kilmarnock	**2.7%**	**RBT: high; FHM: high**
S6	Chauncey Creek to ~1.5 km us Porter	**40%**	RBT: low; **FHM: mod**.
S5	S4 to Chauncey	2.7%	—
S4	~20 m us Ewin to S5	2.3%	—
S3	~800 m ds Dry to ~20 m us Ewin	2.3%	—
S2	us Greenhills to ~800 m ds Dry	4.2%	—
S1	Josephine Falls to ds Greenhills	7.6%	RBT: mod.; FHM: in NR
Tributaries			
S9	*Henretta Creek*	0%	—
S6	*Chauncey Creek*	0%	—
S9	Henretta Creek	12%	—
S9	Fish Pond Creek	0%	—
S9	Clode Creek	**0%**	—
S7	Kilmarnock Creek	0%	—
S7	Swift Creek	0%	—
S6	Porter Creek	**0%**	—
S3	LCO Dry Creek	0%	—
S2	Greenhills Creek	0%	—

Notes: '—' = no applicable data for the corresponding station and season; mod = moderate; FHM = fathead minnow; RBT = rainbow trout; NR = response was within the normal range of responses observed in Elk Valley reference waters.
Shading indicates the worst-case magnitude from screening across constituents and stations: below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Underline and bold indicates that the magnitude of potential effects was higher in the decline window than pre-September 2017 conditions for at least one constituent and station.
Italics indicates reference segment or tributary.
(1) Fish use percentages, which were calculated by EoC Team (2021), are based on the multi-year telemetry study in the upper Fording River (Cope et al. 2016).
(2) Chronic toxicity tests were conducted with early life stages (embryo-alevin) of fathead minnow (FHM) or rainbow trout (RBT). In the upper Fording River, early life stages of WCT are not present in the winter.

Summary of Potential Chronic Effects to WCT in Spring

Table ES-2 integrates assessment results and fish use information related to potential chronic effects of water quality on WCT in spring. Results for adults and juveniles are discussed in the bullets below, focusing on areas with recorded fish use:

- In areas representing approximately 58% of adult fish use in spring, concentrations of water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values. These results indicate negligible potential for effects or no chronic effects to fish.
- In two areas representing approximately 7% of adult fish use in spring (S3 and lower Henretta Creek [including Henretta Lake]), concentrations of water quality constituents were below long-term WQGs and/or level 1 screening values. In each of these areas, potential low-level effects on growth (but not survival) were identified for tissue selenium, although this a conservative interpretation because the level 1 benchmark is an unbounded no-effects concentration for Yellowstone Cutthroat Trout.
- In four areas representing approximately 34% of adult fish use in spring (S6, S4, Clode Creek, Kilmarnock Creek), concentrations of one or more constituents indicated a potential for up to moderate-level effects. In S6 and S4, this was due to potential moderate-level effects on growth (but not survival) of juvenile fish related to invertebrate selenium at one lentic station. All other water quality constituents and tissue selenium measurements in S6 and S4 indicated no chronic effects, except for TDS at FR_FRRD (S6) which indicated a potential for low-level effects. In Clode and Kilmarnock creeks, up to moderate-level effects were identified for multiple constituents; the magnitude of potential effects was within the range observed pre-September 2017, except for sulphate in Clode Creek.

Results for early life stages are discussed in the bullets below, focusing on areas with recorded fish use in spring:

- In areas representing approximately 31% of recorded redds, concentrations of water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values. These results indicate negligible potential for effects or no chronic effects to fish.
- In areas representing approximately 66% of recorded redds (S4 to S8), concentrations of most water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values. Potential low-level effects were identified in one or more years in S4 and S5 (selenium), S6 (nitrate, selenium, TDS, and dissolved oxygen depending on the station), S7 (selenium), and S8 (nitrate and selenium). In S6 to S8, the magnitude of potential effects was higher than observed pre-September 2017. Combined effects of multiple constituents are not expected in these segments in spring because potential low-level effects of a single constituent were identified for a station and year (although there may be different constituents at different stations).
- In areas representing approximately 2% of recorded redds (Clode and Greenhills creeks), up to high-level effects were identified for multiple constituents. The magnitude of potential effects was within the range observed pre-September 2017, except for sulphate in Clode Creek.
- Chronic toxicity testing indicated up to moderate-level effects in rainbow trout testing at FR_FRABCH in S6 and GH_FR1 in S1, but not in fathead minnow testing. Responses at FR_FRCP1 in S7 were within the range typically observed in Elk Valley reference waters. In all tests, responses in the decline window were within the range observed pre-September 2017. No water quality constituent was identified as a potential cause of observed responses in spring. This testing is conducted with early life stages of fish (embryos-alevins).

Table ES-2: Spring Results for the Decline Window Compared to Relative Fish Use

Segment	Area Description	Relative Fish Use (Percentages) Compared to Results for Water Quality and Tissue Selenium (Colours) [1]		Chronic Toxicity Testing [2]
		Adults/ Juveniles	Early Life Stages	Early Life Stages
Mainstem Fording River				
S11	*Headwaters*	0.8%	0%	—
S10	*upstream Henretta Creek*	6.9%	0%	within regional NR
S9	~300 m ds Clode to ~400 m us Henretta	10%	12%	—
S8	us Kilmarnock to ~300m ds Clode	20%	**12%**	—
S7	~1.5 km us Porter to us Kilmarnock	3.1%	**1.3%**	within regional NR
S6	Chauncey Creek to ~1.5 km us Porter	**22%**	**47%**	RBT: mod.; FHM: in NR
S5	S4 to Chauncey	3.8%	3.2%	—
S4	~20 m us Ewin to S5	5.4%	2.6%	—
S3	~800 m ds Dry to ~20 m us Ewin	3.8%	0.6%	—
S2	us Greenhills to ~800 m ds Dry	9.2%	9.1%	—
S1	Josephine Falls to ds Greenhills	4.6%	1.3%	RBT: mod.; FHM: in NR
Tributaries				
S9	*Henretta Creek*	0%	0%	—
S6	*Chauncey Creek*	0%	0%	—
S9	Henretta Creek	3.1%	1.3%	—
S9	Fish Pond Creek [3]	0.8%	1.3%	—
S9	Clode Creek	**6.2%**	**1.3%**	—
S7	Kilmarnock Creek	0.8%	0%	—
S7	Swift Creek	0%	**0%**	—
S6	Porter Creek	**0%**	**0%**	—
S3	LCO Dry Creek	0%	5.8%	—
S2	Greenhills Creek	0%	0.6%	—

Notes: '—' = no applicable data for the corresponding station and season; mod = moderate; FHM = fathead minnow; RBT = rainbow trout; NR = response was within the normal range of responses observed in Elk Valley reference waters.
Shading indicates the worst-case magnitude from screening across constituents and stations: below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Underline and bold indicates that the magnitude of potential effects was higher in the decline window than pre-September 2017 conditions for at least one constituent and station.
Italics indicates reference segment or tributary.
(1) Fish use percentages, which were calculated by EoC Team (2021), are based on the multi-year telemetry study in the upper Fording River (Cope et al. 2016).
(2) Chronic toxicity tests were conducted with early life stages (embryo-alevin) of fathead minnow (FHM) or rainbow trout (RBT). In the upper Fording River, early life stages of WCT are present from mid-May to late August.
(3) Percentages are not shaded because no water quality data were available for Fish Pond Creek in the spring.

Summary of Potential Chronic Effects to WCT in Summer-Fall

Table ES-3 integrates assessment results and fish use information related to potential chronic effects of water quality on WCT in summer-fall. Results for adults and juveniles are discussed in the bullets below, focusing on areas with recorded fish use:

- In areas representing approximately 83% of adult fish use in summer-fall, concentrations of water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values. These results indicate negligible potential for effects or no chronic effects to fish.
- In areas representing approximately 7% of adult fish use in summer-fall (S9), concentrations of water quality constituents were below long-term WQGs and/or level 1 screening values. Potential low-level effects on growth (but not survival) of juvenile fish were identified related to invertebrate selenium at FR_FR1 in 2018, although this a conservative interpretation because the level 1 benchmark is an unbounded no-effects concentration for Yellowstone Cutthroat Trout. The magnitude of potential effects from invertebrate selenium at FR_FR1 was higher in the decline window than it had been previously. Other invertebrate selenium concentrations measured in mainstem S9 in summer-fall were below the level 1 benchmark.
- In areas representing approximately 10% of adult fish use in summer-fall (S7), concentrations of one or more water quality constituents indicated a potential for up to high-level effects. This is based on sulphate and TDS concentrations measured at FR_FRCP1 in 2018, which represented a change relative to pre-September 2017. At other stations in S7 (FR_FR3 and FR_FR4), which are located in the northern part of S7, concentrations of water quality and tissue selenium indicated no chronic effects except for tissue selenium at FR_FR4 and RG_SCOUTDS in 2019 which indicated a potential for low-level effects on growth (but not survival). This a conservative interpretation because the level 1 benchmark is an unbounded no-effects concentration for Yellowstone Cutthroat Trout.

Results for early life stages in are discussed in the bullets below, focusing on areas with recorded fish use:

- In areas representing approximately 21% of recorded redds, concentrations of water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values. These results indicate negligible potential for effects or no chronic effects to fish.
- In areas representing approximately 75% of recorded redds (S6, S8, S9, lower Henretta Creek, Fish Pond Creek), concentrations of most water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values. At all of these locations, potential low-level effects were identified for dissolved oxygen. At S6 station FR_FRABCH in 2017, a potential for combined effects of nitrate and dissolved oxygen was identified.
- In areas representing approximately 3% of recorded redds (S7, Clode Creek, Kilmarnock Creek), up to moderate-level effects (Clode and Kilmarnock creeks) or up to high-level effects (S7) were identified for multiple constituents. At each of these locations, the magnitude of potential effects in the decline window was higher than pre-September 2017 for one or more constituents.
- Chronic toxicity testing indicated up to high-level effects in fathead minnow testing at FR_FRCP1 in S7, and this represented a change relative to pre-September 2017 testing. Responses at FR_FRABCH in S6 and GH_FR1 in S1 were within the range typically observed in Elk Valley reference waters. This testing is conducted with early life stages of fish (embryos-alevins).

Table ES-3: Summer-Fall Results for the Decline Window Compared to Relative Fish Use

Segment	Area Description	Relative Fish Use (Percentages) Compared to Results for Water Quality and Tissue Selenium (Colours) [1]		Chronic Toxicity Testing [2]
		Adults/ Juveniles	Early Life Stages	Early Life Stages
Mainstem Fording River				
S11	*Headwaters*	0.3%	0%	—
S10	*upstream Henretta Creek*	6.7%	0%	within regional NR
S9	~300 m ds Clode to ~400 m us Henretta	**7.0%**	**12%**	—
S8	us Kilmarnock to ~300m ds Clode	12%	**12%**	—
S7	~1.5 km us Porter to us Kilmarnock	**10%**	**1.3%**	**FHM: high**
S6	Chauncey Creek to ~1.5 km us Porter	16%	**47%**	within regional NR
S5	S4 to Chauncey	7.8%	3.2%	—
S4	~20 m us Ewin to S5	9.0%	2.6%	—
S3	~800 m ds Dry to ~20 m us Ewin	7.7%	0.6%	—
S2	us Greenhills to ~800 m ds Dry	7.3%	9.1%	—
S1	Josephine Falls to ds Greenhills	6.2%	1.3%	within regional NR
Tributaries				
S9	*Henretta Creek*	0%	**0%**	—
S6	*Chauncey Creek*	0.3%	0%	—
S9	Henretta Creek	9.7%	**1.3%**	—
S9	Fish Pond Creek	0%	1.3%	—
S9	Clode Creek	**0%**	**1.3%**	—
S7	Kilmarnock Creek	**0%**	**0%**	—
S7	Swift Creek	**0%**	**0%**	—
S6	Porter Creek	0%	0%	—
S3	LCO Dry Creek	**0%**	5.8%	—
S2	Greenhills Creek	**0%**	**0.6%**	—

Notes: '—' = no applicable data for the corresponding station and season; FHM = fathead minnow; NR = response was within the normal range of responses observed in Elk Valley reference waters.
Shading indicates the worst-case magnitude from screening across constituents and stations: below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Underline and bold indicates that the magnitude of potential effects was higher in the decline window than pre-September 2017 conditions for at least one constituent and station.
Italics indicates reference segment or tributary.
(1) Fish use percentages, which were calculated by EoC Team (2021), are based on the multi-year telemetry study in the upper Fording River (Cope et al. 2016).
(2) Chronic toxicity tests were conducted with early life stages (embryo-alevin) of fathead minnow (FHM). In the upper Fording River, early life stages of WCT are present from mid-May to late August.

Study Limitations

This report was prepared for the exclusive use of Teck Coal Limited. Any use that a third party may make of this report, or any reliance on or decisions made based on it, is the responsibility of the third parties. We disclaim responsibility for consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

We have relied in good faith on information provided by others as noted. We assume that the information provided is factual and accurate. We accept no responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of omissions, misinterpretations or fraudulent acts of persons interviewed or contacted.

The services performed as described in this report were conducted in a manner consistent with the level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions, subject to the time limits and financial and physical constraints applicable to the services. The content of this report is based on information collected during our investigation, our present understanding of site conditions, the assumptions stated in this report, and our professional judgement in light of such information at the time of this report. This report provides a professional opinion and, therefore, no warranty is expressed, implied, or made as to the conclusions, advice and recommendations offered in this report. This report does not provide a legal opinion regarding compliance with applicable laws. With respect to regulatory compliance issues, it should be noted that regulatory statutes and the interpretation of regulatory statutes are subject to change. The findings and conclusions of this report are valid only as of the date of the report. If new information is discovered in future work, or if the assumptions stated in this report are not met, Golder Associates should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

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Acronyms and Abbreviations

Acronym	Definition
BC	British Columbia
BC ENV	British Columbia Ministry of Environment and Climate Change Strategy
CAS	Chemical Abstracts Service
CCME	Canadian Council of Ministers of the Environment
COPC	constituent of potential concern
decline window	between September 2017 and September 2019
DOC	dissolved organic carbon
dw	dry weight
EC_{10}	10% effect concentrations
EC_{20}	20% effects concentrations
EC_{50}	50% effect concentrations
ECCC	Environment and Climate Change Canada
EPH	extractable petroleum hydrocarbons
EVWQP	Elk Valley Water Quality Plan
FEQG	federal water quality guideline
FRO	Fording River Operations
GHO	Greenhills Operations
Golder	Golder Associates Ltd.
ID	identification
LAEMP	local aquatic effects monitoring program
LCO	Line Creek Operations
LOEC	lowest observed effect concentration
N	nitrogen
No.	number
NOEC	no observed effect concentration
NR	normal range
NTU	nephelometric turbidity units
ORP	oxidation reduction potential
p	probability
PAH	polycyclic aromatic hydrocarbon
PNECs	predicted no effect concentrations
RAEMP	regional aquatic effects monitoring program
SME	Subject Matter Expert
TDS	total dissolved solids
Teck Coal	Teck Coal Limited
TEH	total extractable hydrocarbons
TOC	total organic carbon
TP	total phosphorus
US EPA	United States Environmental Protection Agency
vs.	versus

Acronym	Definition
WCT	Westslope Cutthroat Trout
WCT decline	Westslope Cutthroat Trout population decline
WQG	water quality guideline

Units of Measure

Unit	Definition
%	percent
mg/L	milligrams per litre
mg/kg	milligrams per kilogram
µg/L	micrograms per litre
<	less than
>	more than
g/L	grams per litre
mg-N/L	milligrams per litre as nitrogen
m	metre
vol%	percent volume
µS/cm	microSiemens per centimetre
mV	millivolt
≤	less than or equal to
°C	degrees Celsius
ha	hectare

READER'S NOTE

What is the Evaluation of Cause and What is Its Purpose?

The Evaluation of Cause is the process used to investigate, evaluate and report on the reasons the Westslope Cutthroat Trout population declined in the upper Fording River between fall 2017 and fall 2019.

Background

The Elk Valley is located in the southeast corner of British Columbia (BC), Canada. It contains the main stem of the Elk River (220 km long) and many tributaries, including the Fording River (70 km long). This report focuses on the upper Fording River, which starts 20 km upstream from its confluence with the Elk River at Josephine Falls. The Ktunaxa First Nation has occupied lands in the region for more than 10,000 years. Rivers and streams of the region provide culturally important sources of fish and plants.

The upper Fording River watershed is at a high elevation and is occupied by only one fish species, a genetically pure population of Westslope Cutthroat Trout *(Oncorhynchus clarkii lewisi)* — an iconic fish species that is highly valued in the area. This population is physically isolated because Josephine Falls is a natural barrier to fish movement. The species is protected under the federal Fisheries Act and the Species at Risk Act. In BC, the Conservation Data Center categorized Westslope Cutthroat Trout as "*imperiled or of special concern, vulnerable to extirpation or extinction."* Finally, it has been identified as a priority sport fish species by the Province of BC.

The upper Fording River watershed is influenced by various human-caused disturbances including roads, a railway, a natural gas pipeline, forest harvesting and coal mining. Teck Coal Limited (Teck Coal) operates the three surface coal mines within the upper Fording River watershed, upstream of Josephine Falls: Fording River Operations, Greenhills Operations and Line Creek Operations.

Monitoring conducted for Teck Coal in the fall of 2019 found that the abundance of Westslope Cutthroat Trout adults and sub-adults in the upper Fording River had declined significantly since previous sampling in fall 2017. In addition, there was evidence that juvenile fish density had decreased. Teck Coal initiated an *Evaluation of Cause* process. The overall results of this process are reported separately (Evaluation of Cause Team, 2021) and are supported by a series of Subject Matter Expert reports such as this one. The full list of SME reports follows at the end of this Reader's Note.

Evaluation of Cause

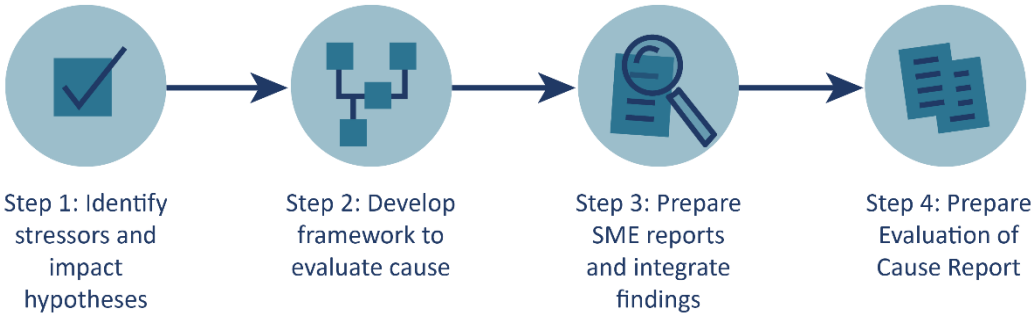
Following identification of the decline in the Westslope Cutthroat Trout population, Teck Coal initiated an Evaluation of Cause process. The overall results of this process are reported in a separate document (Evaluation of Cause Team, 2021) and are supported by a series of Subject Matter Expert reports.

The report that follows this Reader's Note is one of those Subject Matter Expert Reports.

Building on and in addition to the Evaluation of Cause, there are ongoing efforts to support fish population recovery and implement environmental improvements in the upper Fording River.

How the Evaluation of Cause was Approached

When the fish decline was identified, Teck Coal established an *Evaluation of Cause Team* (the Team), composed of *Subject Matter Experts* and coordinated by an Evaluation of Cause *Team Lead.* Further details about the Team are provided in the Evaluation of Cause report. The Team developed a systematic and objective approach (see figure below) that included developing a Framework for Subject Matter Experts to apply in their specific work. All work was subjected to rigorous peer review.



Conceptual approach to the Evaluation of Cause for the decline in the upper Fording River Westslope Cutthroat Trout population.

With input from representatives of various regulatory agencies and the Ktunaxa Nation Council, the Team initially identified potential stressors and impact hypotheses that might explain the cause(s) of the population decline. Two overarching hypotheses (essentially, questions for the Team to evaluate) were used:

- Overarching Hypothesis #1: The significant decline in the upper Fording River Westslope Cutthroat Trout population was a result of a single acute stressor[1] or a single chronic stressor[2].
- Overarching Hypothesis #2: The significant decline in the upper Fording River Westslope Cutthroat Trout population was a result of a combination of acute and/or chronic stressors, which individually may not account for reduced fish numbers, but cumulatively caused the decline.

The Evaluation of Cause examined numerous stressors in the UFR to determine if and to what extent those stressors and various conditions played a role in the Westslope Cutthroat Trout's decline. Given that the purpose was to evaluate the cause of the decline in abundance from 2017 to 2019[3], it was important to identify stressors or conditions that changed or were different during that period. It was equally important to identify the potential stressors or conditions that did not change during the decline window but may, nevertheless, have been important constraints on the population with respect to their ability to respond to or recover from the stressors. Finally, interactions between stressors and conditions had to be considered in an integrated fashion. Where an *impact hypothesis* depended on or may have been exacerbated by interactions among stressors or conditions, the interaction mechanisms were also considered.

[1] Implies September 2017 to September 2019.

[2] Implies a chronic, slow change in the stressor (using 2012–2019 timeframe, data dependent).

[3] Abundance estimates for adults/sub-adults are based on surveys in September of each year, while estimates for juveniles are based on surveys in August.

The Evaluation of Cause process produced two types of deliverables:

1) **Individual Subject Matter Expert (SME) reports** (such as the one that follows this Note): These reports mostly focus on impact hypotheses under Overarching Hypothesis #1 (see list, following). A Framework was used to align SME work for all the potential stressors, and, for consistency, most SME reports have the same overall format. The format covers: (1) rationale for impact hypotheses, (2) methods, (3) analysis and (4) findings, particularly whether the requisite conditions[4] were met for the stressor(s) to be the sole cause of the fish population decline, or a contributor to it. In addition to the report, each SME provided a summary table of findings, generated according to the Framework. These summaries were used to integrate information for the Evaluation of Cause report. Note that some SME reports did not investigate specific stressors; instead, they evaluated other information considered potentially useful for supporting SME reports and the overall Evaluation of Cause, or added context (such as in the SME report that describes climate (Wright et al., 2021).

2) **The Evaluation of Cause report** (prepared by a subset of the Team, with input from SMEs): This overall report summarizes the findings of the SME reports and further considers interactions between stressors (Overarching Hypothesis #2). It describes the reasons that most likely account for the decline in the Westslope Cutthroat Trout population in the upper Fording River.

Participation, Engagement & Transparency

To support transparency, the Team engaged frequently throughout the Evaluation of Cause process. Participants in the Evaluation of Cause process, through various committees, included:

Ktunaxa Nation Council
BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development
BC Ministry Environment & Climate Change Strategy
Ministry of Energy, Mines and Low Carbon Innovation
Environmental Assessment Office

Citation for the Evaluation of Cause Report

When citing the Evaluation of Cause Report use:

Evaluation of Cause Team. (2021). *Evaluation of Cause — Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited by Evaluation of Cause Team.

[4] These are the conditions that would need to have occurred for the impact hypothesis to have resulted in the observed decline of Westslope Cutthroat Trout population in the upper Fording River.

Citations for Subject Matter Expert Reports

Focus	Citation for Subject Matter Expert Reports
Climate, temperature, and streamflow	Wright, N., Greenacre, D., & Hatfield, T. (2021). *Subject Matter Expert Report: Climate, Water Temperature, Streamflow and Water Use Trends. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited. Prepared by Ecofish Research Ltd.
Ice	Hatfield, T., & Whelan, C. (2021). *Subject Matter Expert Report: Ice. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Ltd. Report Prepared by Ecofish Research Ltd.
Habitat availability (instream flow)	Healey, K., Little, P., & Hatfield, T. (2021). *Subject Matter Expert Report: Habitat availability. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited by Ecofish Research Ltd.
Stranding – ramping	Faulkner, S., Carter, J., Sparling, M., Hatfield, T., & Nicholl, S. (2021). *Subject Matter Expert Report: Ramping and stranding. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited by Ecofish Research Ltd.
Stranding – channel dewatering	Hatfield, T., Ammerlaan, J., Regehr, H., Carter, J., & Faulkner, S. (2021). *Subject Matter Expert Report: Channel dewatering. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited by Ecofish Research Ltd.
Stranding – mainstem dewatering	Hocking M., Ammerlaan, J., Healey, K., Akaoka, K., & Hatfield T. (2021). *Subject Matter Expert Report: Mainstem dewatering. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Ltd. by Ecofish Research Ltd. and Lotic Environmental Ltd. Zathey, N., & Robinson, M.D. (2021). *Summary of ephemeral conditions in the upper Fording River Watershed. In Hocking et al. (2021). Subject Matter Expert Report: Mainstem dewatering. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Ltd. by Ecofish Research Ltd. and Lotic Environmental Ltd.
Calcite	Hocking, M., Tamminga, A., Arnett, T., Robinson M., Larratt, H., & Hatfield, T. (2021). *Subject Matter Expert Report: Calcite. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Ltd. by Ecofish Research Ltd., Lotic Environmental Ltd., and Larratt Aquatic Consulting Ltd.

Focus	Citation for Subject Matter Expert Reports
Total suspended solids	Durston, D., Greenacre, D., Ganshorn, K & Hatfield, T. (2021). *Subject Matter Expert Report: Total suspended solids. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited. Prepared by Ecofish Research Ltd.
Fish passage (habitat connectivity)	Harwood, A., Suzanne, C., Whelan, C., & Hatfield, T. (2021). *Subject Matter Expert Report: Fish passage. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Ltd. by Ecofish Research Ltd. Akaoka, K., & Hatfield, T. (2021). Telemetry Movement Analysis. In Harwood et al. (2021). *Subject Matter Expert Report: Fish passage. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Ltd. by Ecofish Research Ltd.
Cyanobacteria	Larratt, H., & Self, J. (2021). *Subject Matter Expert Report: Cyanobacteria, periphyton and aquatic macrophytes. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited. Prepared by Larratt Aquatic Consulting Ltd.
Algae / macrophytes	
Water quality (all parameters except water temperature and TSS [Ecofish])	Costa, EJ., & de Bruyn, A. (2021). *Subject Matter Expert Report: Water quality. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited. Prepared by Golder Associates Ltd. Healey, K., & Hatfield, T. (2021). *Calculator to assess Potential for cryoconcentration in upper Fording River.* In Costa, EJ., & de Bruyn, A. (2021). *Subject Matter Expert Report: Water quality. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited. Prepared by Golder Associates Ltd.
Industrial chemicals, spills and unauthorized releases	Van Geest, J., Hart, V., Costa, EJ., & de Bruyn, A. (2021). *Subject Matter Expert Report: Industrial chemicals, spills and unauthorized releases. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited. Prepared by Golder Associates Ltd. Branton, M., & Power, B. (2021). *Stressor Evaluation – Sewage.* In Van Geest et al. (2021). *Industrial chemicals, spills and unauthorized releases. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited. Prepared by Golder Associates Ltd.

Focus	Citation for Subject Matter Expert Reports
Wildlife predators	Dean, D. (2021). *Subject Matter Expert Report: Wildlife predation. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited. Prepared by VAST Resource Solutions Inc.
Poaching	Dean, D. (2021). *Subject Matter Expert Report: Poaching. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited. Prepared by VAST Resource Solutions Inc.
Food availability	Orr, P., & Ings, J. (2021). *Subject Matter Expert Report: Food availability. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited. Prepared by Minnow Environmental Inc.
Fish handling	Cope, S. (2020). *Subject Matter Expert Report: Fish handling. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited. Prepared by Westslope Fisheries Ltd.
	Korman, J., & Branton, M. (2021). *Effects of capture and handling on Westslope Cutthroat Trout in the upper Fording River: A brief review of Cope (2020) and additional calculations.* Report prepared for Teck Coal Limited. Prepared by Ecometric Research and Azimuth Consulting Group.
Infectious disease	Bollinger, T. (2021). *Subject Matter Expert Report: Infectious disease. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited. Prepared by TKB Ecosystem Health Services Ltd.
Pathophysiology	Bollinger, T. (2021). *Subject Matter Expert Report: Pathophysiology of stressors on fish. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited. Prepared by TKB Ecosystem Health Services Ltd.
Coal dust and sediment quality	DiMauro, M., Branton, M., & Franz, E. (2021). *Subject Matter Expert Report: Coal dust and sediment quality. Evaluation of Cause – Decline in upper Fording River Westslope Cutthroat Trout population.* Report prepared for Teck Coal Limited. Prepared by Azimuth Consulting Group Inc.
Groundwater quality and quantity	Henry, C., & Humphries, S. (2021). *Subject Matter Expert Report: Hydrogeological stressors. Evaluation of Cause - Decline in upper Fording River Westslope Cutthroat Trout population.* Report Prepared for Teck Coal Limited. Prepared by SNC-Lavalin Inc.

Section 1.0: Introduction

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Teck Coal Limited (Teck Coal) to provide the following evaluation of the potential contribution of surface water quality to the Westslope Cutthroat Trout (WCT; *Oncorhynchus clarkii lewisi*) population decline in the upper Fording River watershed. For brevity, the upper Fording River WCT population decline is referred to hereafter as the "WCT decline" and the time period within which the WCT decline occurred (between September 2017 and September 2019) is referred to as the "decline window".

1.1 General Introduction

This document is one of a series of Subject Matter Expert (SME) reports that support the overall Evaluation of Cause into the upper Fording River WCT decline (EoC Team 2021). For general information, see the preceding Reader's Note.

1.2 Report-Specific Introduction

The stressor investigated in this report is surface water quality. As discussed in the preceding Reader's Note, the EoC is investigating potential acute and chronic effects of each stressor (Hypothesis #1), and then looking at how those stressors may have acted in combination (Hypothesis #2). This report evaluates potential acute and chronic effects of water quality, considering individual constituents and combinations of constituents. Accordingly, the impact hypotheses defined herein are expressed in terms specific to water quality. Interactions between water quality and other types of stressors are considered in the integration chapter (EoC Team 2021).

Pathways for potential effects of water quality, and a brief summary of the requisite conditions for surface water quality to have contributed to or caused the WCT decline, are discussed in Section 1.2.1. SME reports covering other environmental media are summarized in Section 1.2.2. The dataset of water quality and related information supporting this assessment is discussed in Section 1.2.3. The authors and their qualifications are introduced in Section 1.2.4.

1.2.1 Pathways Evaluated and Requisite Conditions

The assessment herein evaluates potential effects of mine-influenced water quality on WCT in three ways:

Potential acute and chronic effects of mine-influenced water quality at the point of release are assessed in Section 2.0. This section assesses mine-influenced water quality prior to mixing into surface waters, which represents the highest[5] constituent concentrations in surface waters to which WCT could potentially be exposed. However, releases of mine-influenced water also represent highly localized conditions because most such releases mix with surface water immediately or within a short distance of the point of release. WCT exposure to such conditions is not expected to be sustained or widespread but could occur to fish that enter sediment ponds or spend time immediately adjacent to a point of release. Water quality data and acute testing data from mine-influenced water at the point of release were used to support this evaluation. Some releases of mine-influenced water are reflected in groundwater quality, which is evaluated in detail in Henry and Humphries (2021).

Potential acute and chronic effects of surface water quality in fish accessible waters are assessed in Section 3.0. This section assesses surface water quality and resulting tissue selenium concentrations after mine-influenced releases are mixed into surface waters. Water quality data, tissue selenium data, and chronic toxicity testing data from fish accessible locations throughout the upper Fording River were used to support this evaluation. The

[5] For dissolved oxygen, potential stress to WCT would be associated with low concentrations, not high concentrations. For concision, this report will sometimes use generic language associating potential stress with high concentrations (e.g., greater than water quality guidelines), with the understanding that the language should be reversed for dissolved oxygen.

assessment herein focuses on chemical water quality parameters. Two physical water quality parameters of relevance to fish are evaluated in detail elsewhere: total suspended solids is evaluated in Ganshorn et al. (2021) and temperature is evaluated in Wright et al. (2021).

Potential nutrient enrichment effects of surface water quality are assessed in Section 4.0. This section assesses surface water nutrient concentrations in terms of their potential to cause enrichment-related effects such as nuisance algal growth. Nutrient concentration data from fish accessible locations were used to support this evaluation. Potential nutrient enrichment effects on algae are evaluated further in Larratt and Self (2021) and patterns of benthic invertebrate abundance (which could be stimulated by nutrients) are evaluated in Orr and Ings (2021).

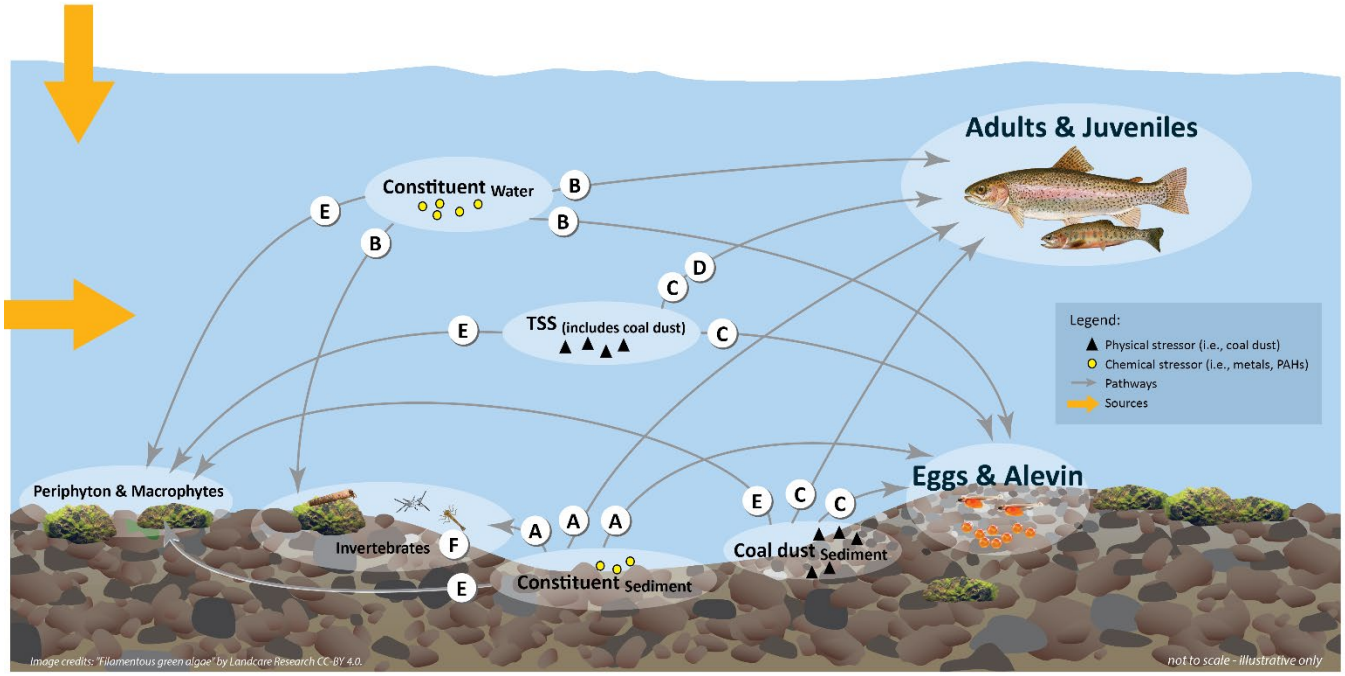
Detailed methods for how each pathway was assessed are provided in the indicated sections. For all three pathways, the requisite conditions for water quality to have contributed to or caused the WCT decline were conceptually the same. The requisite condition for water quality to have contributed to the WCT decline was any indication of a potential effect within the decline window at a time and location where fish could also have been present. The requisite condition for water quality to have caused the WCT decline was an indication of a potential high-level effect that could have affected a large fraction of the WCT population, either by being widespread or by occurring at a time and location that overlapped with large numbers of fish. The greater the magnitude of the potential effect, and the more the potential effect overlapped with fish in time and space, the stronger was the evidence that water quality may have contributed to or caused the WCT decline.

Assessment results from Section 2.0 (potential acute and chronic effects of mine-influenced water quality at the point of release), Section 3.0 (potential acute and chronic effects of mine-influenced water quality in fish accessible waters), and Section 4.0 (potential nutrient enrichment effects) are integrated in Section 5.0 by river segment. Section 5.0 provides a detailed discussion of how results overlap spatially and temporally with fish use information calculated by EoC Team (2021) using data collected by Cope et al. (2016).

1.2.2 Other Environmental Media

This SME report evaluates the role of surface water quality constituents and considers tissue concentrations of selenium. Other SME reports cover the remaining environmental media. Figure 1 lays out the relationships between the various SME reports and illustrates where readers can learn about the remaining pathways and media not evaluated herein.

Figure 1: Relationships Between This Report and Other SME reports That Evaluate Chemical Constituents



Notes: A is evaluated in DiMauro et al. (2021), B in this report, C in Ganshorn et al. (2021), D in Bollinger (2021), E in Larratt and Self (2021), and F is in Orr and Ings (2021). Source: modified from DiMaruro et al. (2021).

1.2.3 Information Used in This Assessment

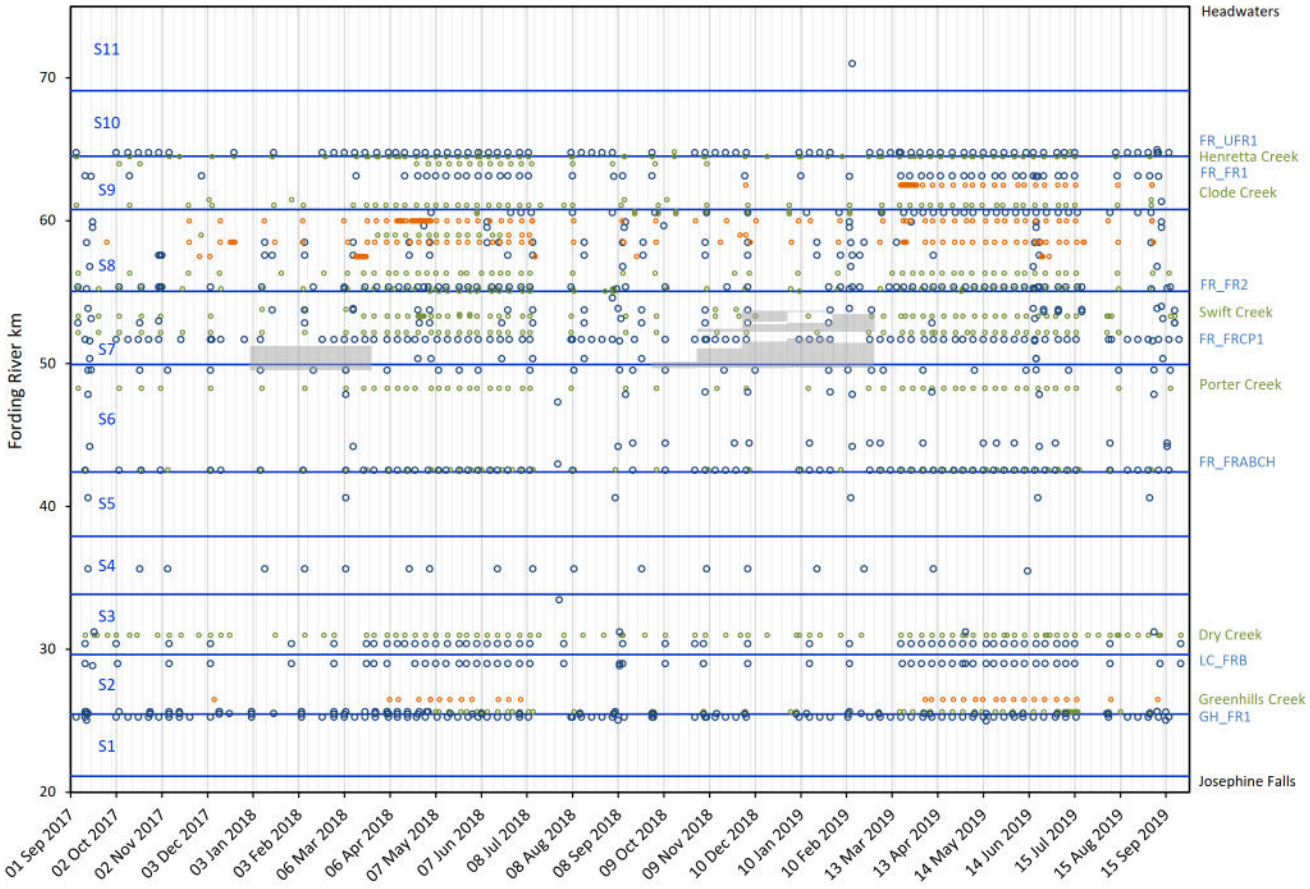
The assessment of surface water quality presented herein relied on existing water quality, tissue chemistry, and acute and chronic toxicity testing data to characterize the conditions to which WCT were exposed in the decline window and how this may have changed relative to prior conditions. These site-specific data were interpreted within the context of relevant and reliable toxicology information and combined with available information on WCT movement and habitat use in the upper Fording River watershed to evaluate the pathways described in Section 1.2.1.

Water quality monitoring is conducted at dozens of locations throughout the upper Fording River watershed, including both points of release and locations distributed along the mainstem Fording River and its tributaries. Water quality monitoring occurs monthly at most locations and more frequently at certain times of year, as depicted for the decline window on Figure 2. Each symbol on Figure 2 represents a water quality sample collected from the mainstem Fording River (blue symbols), a fish accessible tributary (green symbols), or a point of release of mine-influenced water (orange symbols). Figure 2 shows the spatial distribution of sampling locations throughout the segments of the upper Fording River watershed (Y-axis) and the temporal distribution of sampling events through the decline window (X-axis). Drying reaches are depicted to provide context for locations and times when water quality samples could not be collected, or at locations and times when water quality samples were collected but the resulting chemistry in the mainstem Fording River reflects unmixed tributary water.[6]

[6] In addition to drying reaches depicted based on field surveys, level logger information at FR_FRCP1SW (river km 50.3) indicated dry conditions that started earlier (mid December 2017 or mid September 2018) than indicated by surveys. There is also a northern drying section near FR_FR1 that was not surveyed in the decline window; however, in surveys conducted in 2019 and 2020, drying occurred between November 2019 and April 2020, extending up to ~0.9 km between river km 62 and 63 (Zathey and Robinson 2020). For context, this drying reach is located just downstream of mainstem station FR_FR1 (river km 63.1).

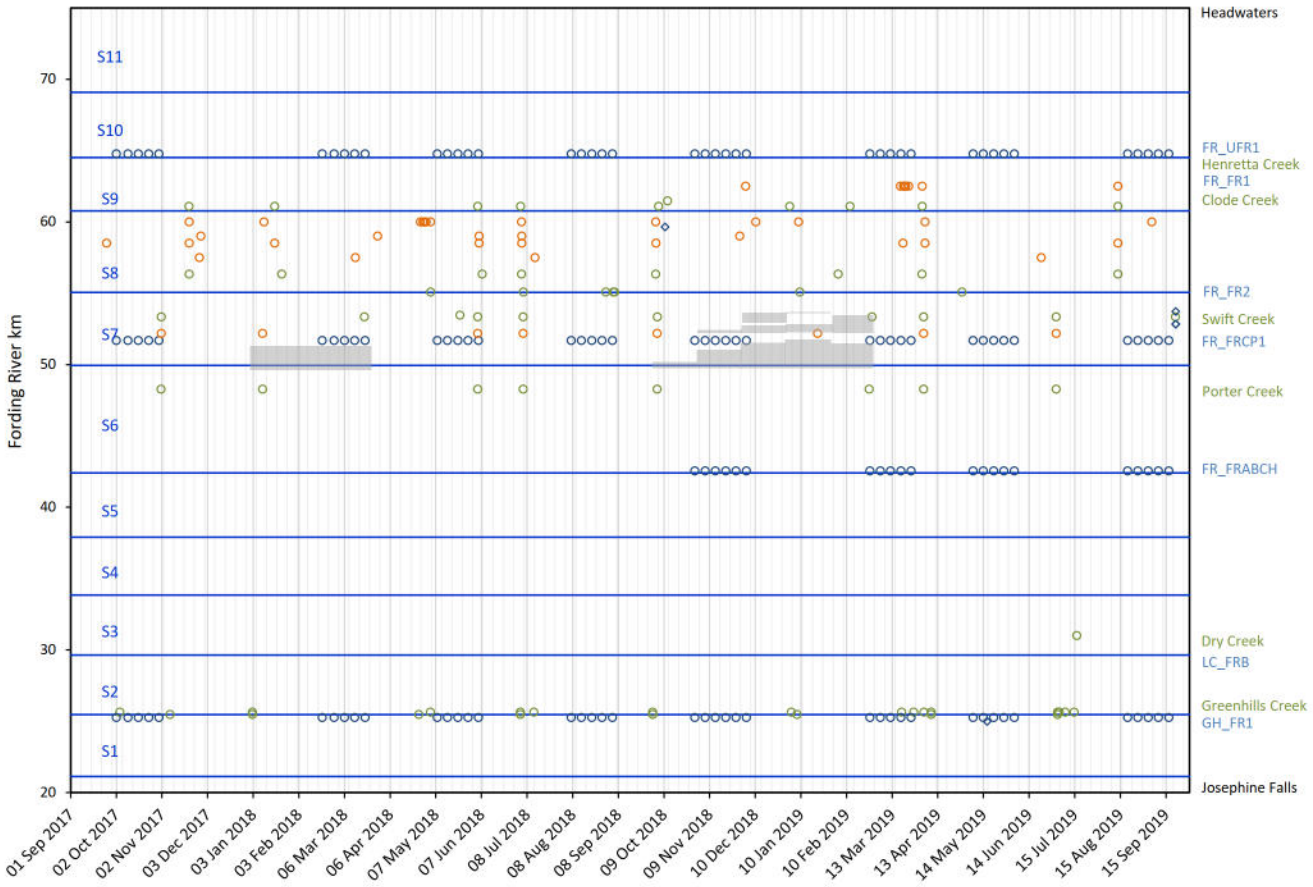
Similar overviews of data are provided for acute and chronic toxicity monitoring (Figure 3) and tissue selenium monitoring (Figure 4). Toxicity testing is conducted as specified in Permit 107517, with acute testing generally occurring quarterly at points of release and chronic testing occurring quarterly or semi-annually at specified monitoring locations. Routine tissue selenium monitoring occurs in September of each year and data have also been collected in other months under special programs. Maps of monitoring locations are provided in Sections 2.0 and Section 3.0.

Figure 2: Spatiotemporal Coverage of Surface Water Samples Collected in the Decline Window



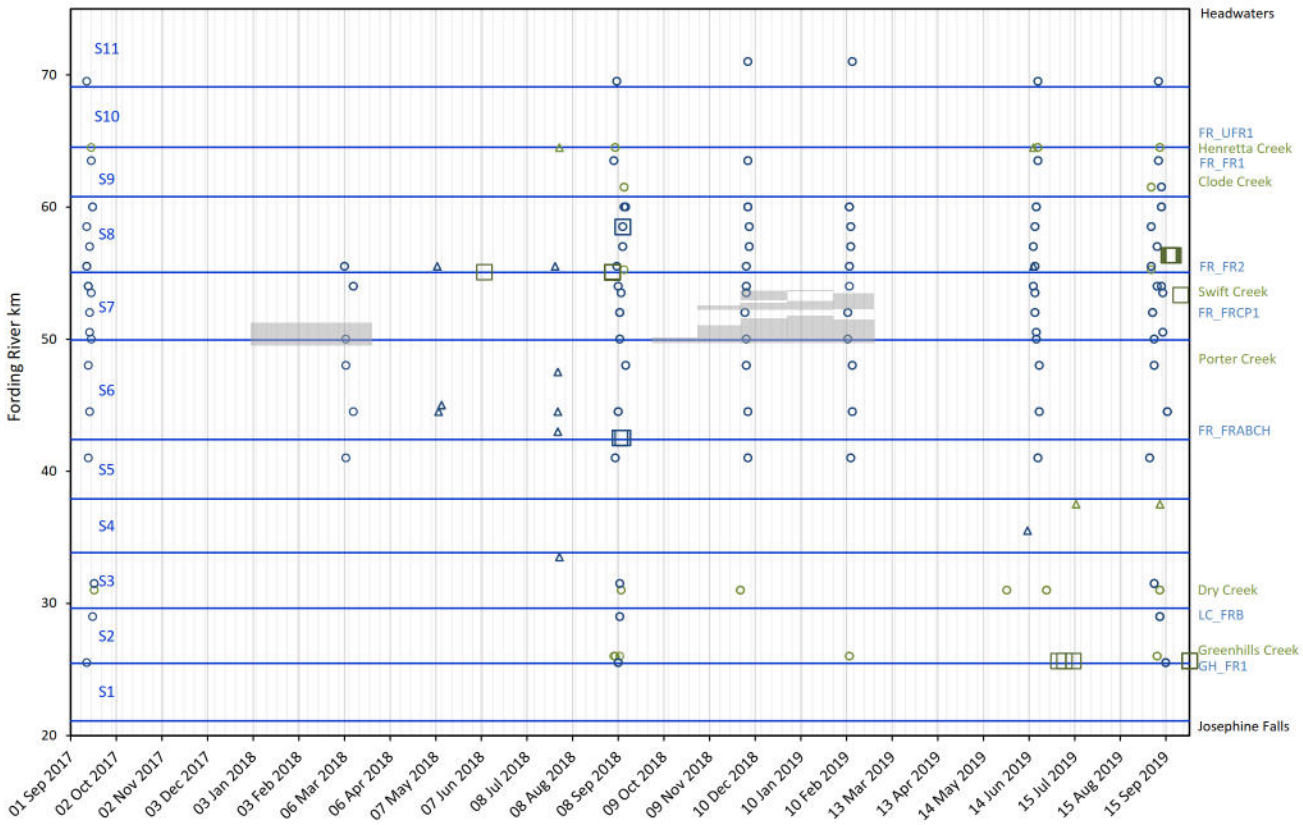
Notes: km = kilometer. Symbol colour indicates mainstem Fording River (blue), fish accessible tributary (green), or release location that is not accessible to fish (orange). Horizontal lines depict river segments used in the Cope et al. (2016) WCT population monitoring. Minor vertical lines are shown for every 7 days. Shading depicts the extent and timing of southern drying reaches from Zathey and Robinson (2021). As discussed in Section 2.0, some releases are conveyed as surface water via channels to the mainstem Fording River; channels that have fish accessible portions are shown as green symbols.

Figure 3: Spatiotemporal Coverage of Acute and Chronic Toxicity Testing Conducted in the Decline Window



Notes: km = kilometer. Symbol colour indicates mainstem Fording River (blue), fish accessible tributary (green), or release location that is not accessible to fish (orange). For the mainstem Fording River, chronic (○) and acute (◇) toxicity testing was conducted; for chronic tests, each cluster of five symbols indicates one test (see Section 3.2.3.3 for more details). For tributaries and release locations, acute toxicity testing was conducted. Horizontal lines depict river segments used in the Cope et al. (2016) WCT population monitoring. Minor vertical lines are shown for every 7 days. Shading depicts the extent and timing of southern drying reaches from Zathey and Robinson (2021). As discussed in Section 2.0, some releases are conveyed as surface water via channels to the mainstem Fording River; channels that have fish accessible portions are shown as green symbols.

Figure 4: Spatiotemporal Coverage of WCT and Invertebrate Tissue Samples Collected in the Decline Window



Notes: km = kilometer. Symbol colour indicates mainstem Fording River (blue) or fish accessible tributary (green). Symbol type indicates the type of tissue sample: WCT muscle or egg (□), invertebrate from lotic station (○), or invertebrate from lentic station (Δ) (see Section 3.2.3.2 for more details). Horizontal lines depict river segments used in the Cope et al. (2016) WCT population monitoring. Minor vertical lines are shown for every 7 days. Shading depicts the extent and timing of southern drying reaches from Zathey and Robinson (2021). As discussed in Section 2.0, some releases are conveyed as surface water via channels to the mainstem Fording River; channels that have fish accessible portions are shown as green symbols.

Figure 2 to 4 show that the spatial and temporal distribution of available monitoring data in the decline window is both extensive (occurring in many places) and intensive (occurring frequently). However, it is possible that water quality conditions could have occurred between sampling locations or between sampling events that were not captured in the available dataset. For example, short-term changes to water quality could occur during periods of rapid ice formation in winter when it has been speculated that a phenomenon known as *cryoconcentration* could occur under some localized conditions (Golder 2020a).[7] Another example is related to water flows. During low flows, there is less water available to dilute in-stream concentrations, potentially resulting in higher in-stream concentrations. Potential limitations in spatiotemporal coverage and other factors affecting the interpretation of water quality are discussed in Sections 2.3.3, 3.3.3, and 4.3.2.

[7] Cryoconcentration is the incremental increase in water quality concentrations that can occur when ice forms, leaving behind dissolved constituents in a smaller volume of water. The magnitude of potential cryoconcentration is directly related to the proportion of total water volume that freezes.

To evaluate potential stress to fish from water quality, the assessment presented herein relied on the available state of the science in environmental toxicology. Many constituents evaluated herein are well studied, with up-to-date water quality guidelines and available site-specific and/or literature information to support a robust assessment on a constituent-by-constituent basis. Uncertainty in available effects information was addressed in part by incorporating information from site-specific and species-specific studies and by focusing the assessment on the lowest (most sensitive) effects data from relevant and reliable studies on the most sensitive fish species and life stages. Less well studied is how fish can be affected by multiple constituents together in a mixture, which is a complex and actively evolving field in toxicology. The assessment considered the potential for mixture interactions in interpreting the constituent-by-constituent assessment and supplemented this assessment with results of acute and chronic toxicity monitoring that directly tested potential mixture effects at locations with some of the highest concentrations of mine-related constituents. Potential mixture interactions are discussed further in Section 3.3.2.9 and uncertainty associated with potential mixture interactions is discussed in Section 3.3.3. Combined effects of multiple stressors are also discussed in Bollinger (2021).

1.2.4 The Authors

The authors' qualifications to conduct this work are outlined below.

Emily-Jane Costa, M.Sc., has eight years of experience in the areas of aquatic health risk assessment, environmental assessment, and aquatic toxicology. She has worked on numerous aquatic health assessments and water quality-related investigations for Teck Coal in the Elk Valley, including the Elk Valley Water Quality Plan, the 2019 Implementation Plan Adjustment, and chronic toxicity testing programs.

Dr. Adrian de Bruyn, Ph.D., R.P.Bio., has 17 years of experience in the areas of environmental monitoring and assessment, risk assessment, investigation of contaminant fate and effects, and the statistical analysis of environmental data. He has worked on numerous environmental assessments and investigations throughout Canada and abroad, extending from northern Canada to southern Australia. Dr. de Bruyn is one of the leading selenium scientists in Canada, and in this capacity has taken a lead technical role in the aquatic component of complex environmental assessments for Teck Coal in the Elk Valley.

1.3 Objective

The objective of this report is to evaluate the potential role of surface water quality in the WCT decline, considering potential acute or chronic effects and potential nutrient enrichment effects. The report focuses on water quality within the decline window and evaluates whether conditions could have contributed to or caused the WCT decline.

The focus of the assessment presented herein is on potential acute and chronic effects of chemical constituents of water quality. Other aspects of the potential role of water quality are discussed in several other SME reports. Potential physical effects of water quality are evaluated elsewhere for total suspended solids (Ganshorn et al. 2021) and temperature (Wright et al. 2021). Potential effects associated with industrial chemicals and spills are evaluated in Van Geest et al. (2021). Potential effects of water quality are also considered in assessments of monitoring data for periphyton (Larratt and Self 2021) and benthic invertebrates (Orr and Ings 2021). The potential role of water quality stress in exacerbating other forms of physiological stress (e.g., low temperature) is evaluated in Bollinger (2021). Groundwater quality is evaluated in Henry and Humphries (2021). Sediment quality and coal dust are evaluated in DiMauro et al. (2021).

1.4 Approach

The approach for the assessment of potential acute or chronic effects was to first compare all available water quality data collected in the decline window to established water quality guidelines (WQGs) to identify constituents that could have contributed to stress to aquatic life. Following this screening step, for constituents with concentrations above generic WQGs, a more refined assessment was conducted that considered species-specific and site-specific information to evaluate in more detail the likelihood of each constituent contributing to or causing the WCT decline. Constituents that do not have a WQG were evaluated and carried forward to a refined assessment if warranted based on that evaluation. Details of the comparison to WQGs are provided in Section 1.4.1. An overview of the more refined approach is provided below for evaluating potential direct effects of water quality constituents (Section 1.4.2) and for bioaccumulated selenium (Section 1.4.3). Toxicity testing data were evaluated as a supporting line of evidence for the refined approach (Section 1.4.2). The approach for the assessment of potential nutrient enrichment effects is summarized in Section 1.4.4.

1.4.1 Screening with Water Quality Guidelines

Surface water quality was first compared to WQGs, which are generic values intended to identify constituents that could contribute to acute (short term) or chronic (long term) stress to aquatic life. Applying WQGs as a first screening step helped confirm that constituents that could have contributed to direct effects to WCT were identified in the assessment. Constituents for which all measured concentrations were less than WQGs were concluded to have no potential to contribute to or cause the WCT decline. Constituents for which one or more measured concentrations were greater than WQGs were carried forward to the more refined assessment outlined in Sections 1.4.2 and 1.4.3.

The definitions of acute and chronic used in this evaluation follow BC Ministry of Environment and Climate Change Strategy (BC ENV) guidance for WQG development (BC ENV 2019a):

- A potential for acute effects was identified if a constituent was above short-term WQGs, which are “intended to protect aquatic organisms against severe effects such as lethality due to short-term intermittent and/or transient exposures to contaminants (e.g., spill events; infrequent releases of short-lived/non-persistent substances)” (BC ENV 2019a). Short-term WQGs are derived by BC ENV using 50% effect concentrations (EC_{50}) from acute testing. Survival is the most common endpoint in these derivations.
- A potential for chronic effects was identified if a constituent was above long-term WQGs, which are “intended to be protective of all forms of aquatic life (all species, all life stages including multi-generational) from lethal and negative sublethal effects over indefinite exposures” (BC ENV 2019a). Long-term WQGs are derived by BC ENV using the most appropriate effect concentration representing a no-effects threshold, which is most commonly applied as a 10% effect concentration (EC_{10}) from chronic toxicity tests. Survival, growth, and reproduction are the most common endpoints in these derivations. Long-term WQGs for the protection of aquatic life are intended to provide generic protection of the most sensitive species and life stages under indefinite exposure. If concentrations of a constituent are lower than WQGs, then it is expected that aquatic life in general will not be harmed.

WQGs were compiled from provincial and federal jurisdictions in Canada, with preference given to BC WQGs where available. Appendix A, Table A-1 shows long-term and short-term WQGs derived by BC ENV and the Canadian Council of Ministers of the Environment (CCME), as well as long-term federal environmental quality guidelines (FEQGs), and predicted no effect concentrations (PNECs) derived by Environment and Climate Change Canada (ECCC). The last two columns in Table A-1 shows the values used for the assessment conducted herein. WQGs derived by BC ENV were used preferentially because BC ENV develops guidelines to

be specifically protective of aquatic life in BC. If a BC WQG was not available, guidelines derived by CCME or ECCC were used. For some constituents, no guidelines were available from BC ENV, CCME, or ECCC. These constituents were handled on a case-by-case basis, as described in the detailed methods sections (Sections 2.2.3 and 3.2.3.1).

1.4.2 Refined Assessment for Constituents Above Water Quality Guidelines

The goal of the refined assessment was to use species-specific and site-specific information to improve the ability to characterize potential effects to WCT. The approach for the refined assessment reflects standard practice for environment assessment and risk assessment, in that attention was placed on the likelihood that effects could have occurred as a result of exposure to measured concentrations of the constituent in water. For all constituents except selenium (discussed further in Section 1.4.3), the assessment presented herein evaluated constituent concentrations in water, consistent with approaches taken to develop provincial and federal WQGs (Section 1.4.1). Some of the water quality constituents evaluated herein have also been monitored as concentrations in aquatic biota (discussed in Minnow and Lotic 2020) and/or sediment (discussed in DiMauro et al. 2021).

The guiding principle for the refined approach was adopted from federal guidance for risk assessment (Fisheries and Oceans Canada 2011; US EPA 1992), which states that “risk does not exist unless: (1) the stressor has an inherent ability to cause effects; and (2) it is coincident with or in contact with the ecological component long enough and at sufficient intensity to elicit the identified adverse effect(s)”. With respect to (1), constituents with concentrations above generic WQGs do not necessarily indicate a potential for effects to WCT. Therefore, the refined approach applied more species-specific and site-specific screening values that were derived in accordance with BC ENV (2019a) definitions of acute and chronic effects. These screening values were designed to more specifically characterize the potential for effects to sensitive fish species under conditions in the upper Fording River watershed and refine the assessment of the magnitude of that potential stress. With respect to (2), the refined approach considered how concentrations overlapped with the distribution of WCT in time and in space (discussed further below). The greater the magnitude of the potential stress, and the more the potential stressor may have overlapped with WCT in time and in space, the stronger was the evidence that the constituent could have contributed to or been the cause of the WCT decline. Evidence of a potential effect was also interpreted to be stronger if concentrations of the constituent were higher in the decline window than they had been previously, indicating that stress to WCT may have been increasing over time.

The evaluation of potential effects of water quality relied on published toxicological data, which for some constituents was based on laboratory testing with sensitive early life stages (defined herein as embryos and alevins) of standard test species such as rainbow trout. These data are directly relevant to evaluating potential effects on early life stages of WCT, which are present in the upper Fording River from mid-May to August. Where information on sensitivity of juvenile or adult life stages was available, this was also considered. However, for some constituents it was necessary to adopt toxicological data from early life stage testing to evaluate potential effects to juveniles and adults. Because early life stages tend to be relatively sensitive to water quality (Environment Canada 1998), the assessment may over-estimate potential effects to juveniles and adults.

To account for how the spatial distribution of WCT across the upper Fording River watershed changes seasonally for different life stages, the evaluation of water quality considered both the spatial extent and timing of exposure to potential stressors. Information was incorporated from the fish periodicity table for WCT in the upper Fording River (Table 1), reflecting the timing of life stages, and spatiotemporal fish use information from telemetry studies (Cope et al. 2016), reflecting spatial distribution of different life stages in different seasons. Percent fish use was calculated by the EoC Team (2021) using telemetry data collected by Cope et al. (2016) for adults in winter

(Figure 5), spring (Figure 6), and summer-fall (Figure 7) and redds in spring (Figure 8), reflecting the seasonality of spatial distribution. On Figure 5 to Figure 8, percent fish usage is shown for each river segment (referred to herein as Segment 1 [S1] to Segment 11 [S11]) and tributary by counting all scans of radio-tagged fish, or observed redds, and dividing by the total scanned fish over a three year period between 2012-2015.

Although Cope et al. (2016) reported high site fidelity and repeated patterns of habitat use by WCT in the upper Fording River, it is possible that conditions occurred during the decline window that may have affected movement patterns. The assessment discusses uncertainty associated with adopting information collected in the telemetry study (in 2012 through 2015) to estimate the distribution of fish in the decline window.

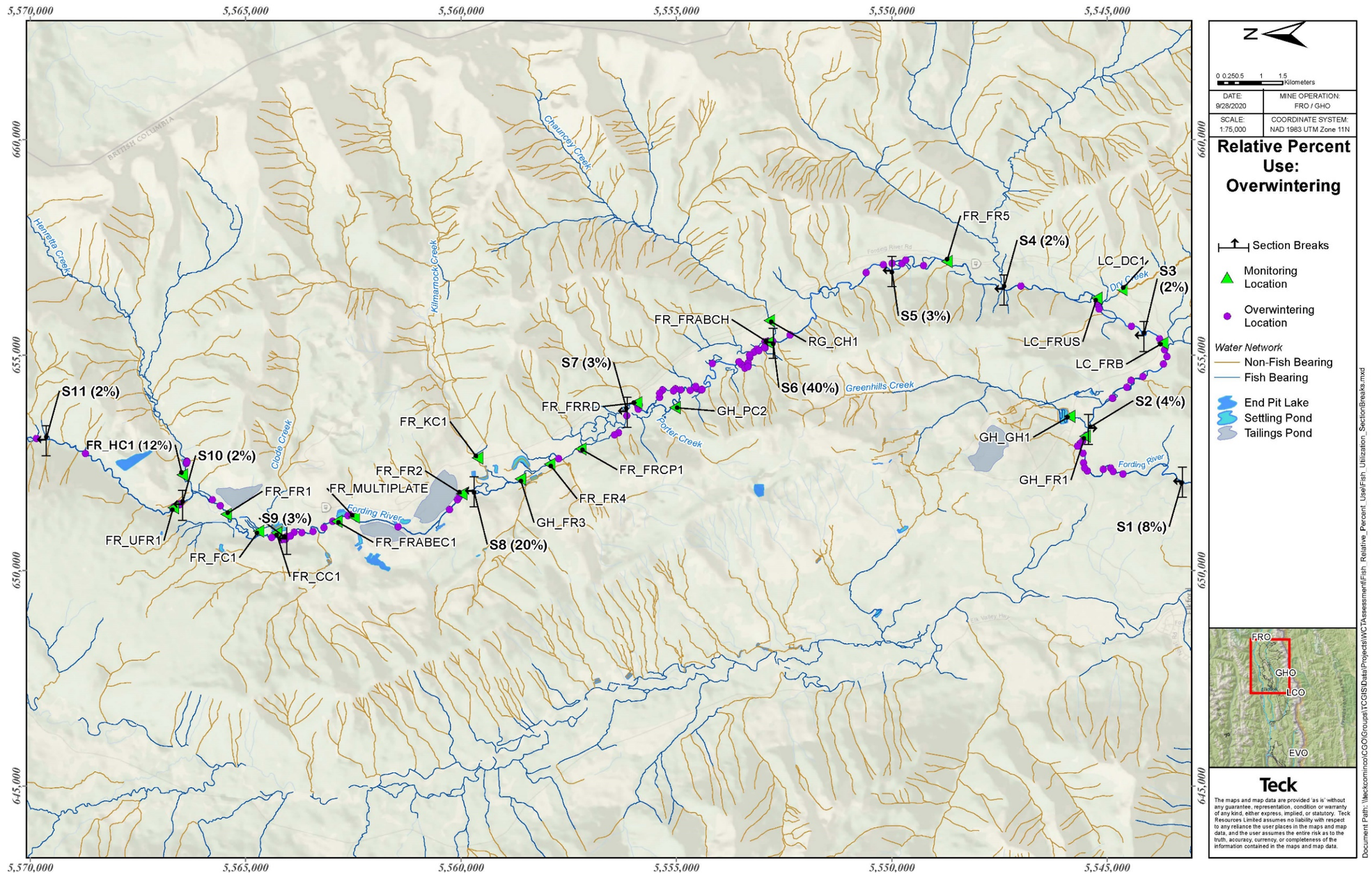
Table 1: Westslope Cutthroat Trout Periodicity Table for the Upper Fording River

Life Stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Spawning migration				■	■							
Spawning					■	■	■					
Incubation (egg & alevin)					■	■	■	■				
Summer rearing (≥7°C)							■	■	■			
Overwintering migration									■	■		
Overwintering	■	■	■								■	■

Potential effects were evaluated quantitatively on a constituent-by-constituent basis. When multiple constituents were greater than a WQG or screening value (which tended to be a localized condition), consideration was given to the number of constituents with concentrations above screening values and the potential for effects of those constituents to interact (methods in Section 3.2.5.1.4 and results in Section 3.3.2.9). Acute and chronic toxicity monitoring data were reviewed as a supporting line of evidence to further evaluate potential combined effects of all water quality constituents to sensitive early life stages in laboratory testing. Toxicity monitoring results indicate potential effects associated with the mixture of constituents measured in surface water samples, and thereby help to reduce uncertainty related to potential mixture-related effects of multiple water quality constituents.

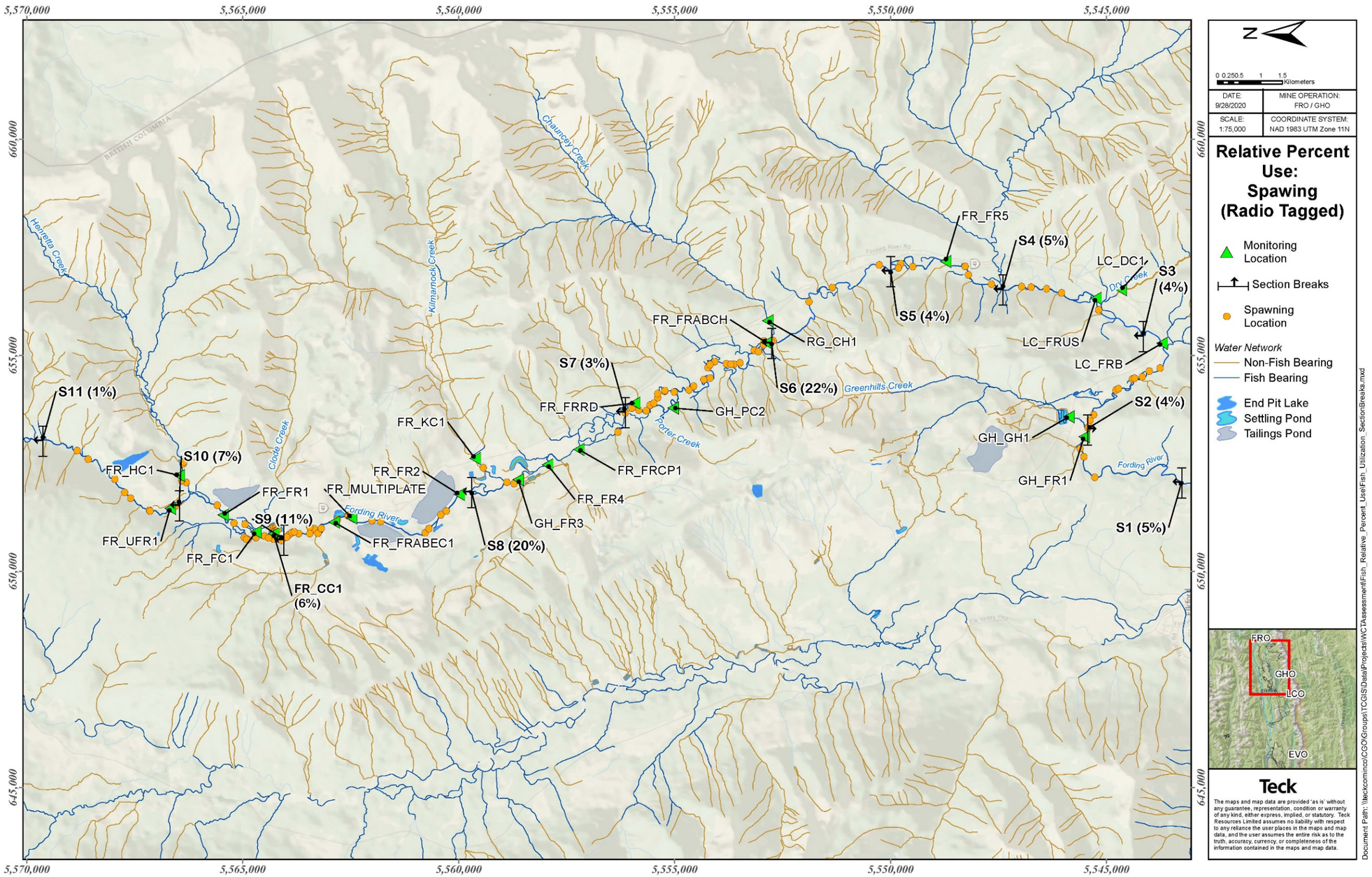
The potential for acute and chronic effects of surface water quality is evaluated separately for mine-influenced water at the point of release (Section 2.0) and surface waters accessible to fish (Section 3.0) because these situations represent different exposure scenarios for WCT. Most releases of mine-influenced water represent localized exposures that typically would only occur to fish that enter mine sediment ponds or spend time immediately adjacent to a point of release, whereas surface waters accessible to fish represent chronic exposure conditions.

Figure 5: Distribution of Adult WCT in the Upper Fording River in Winter (Calculated by EoC Team 2021 using Data Collected by Cope et al. 2016)



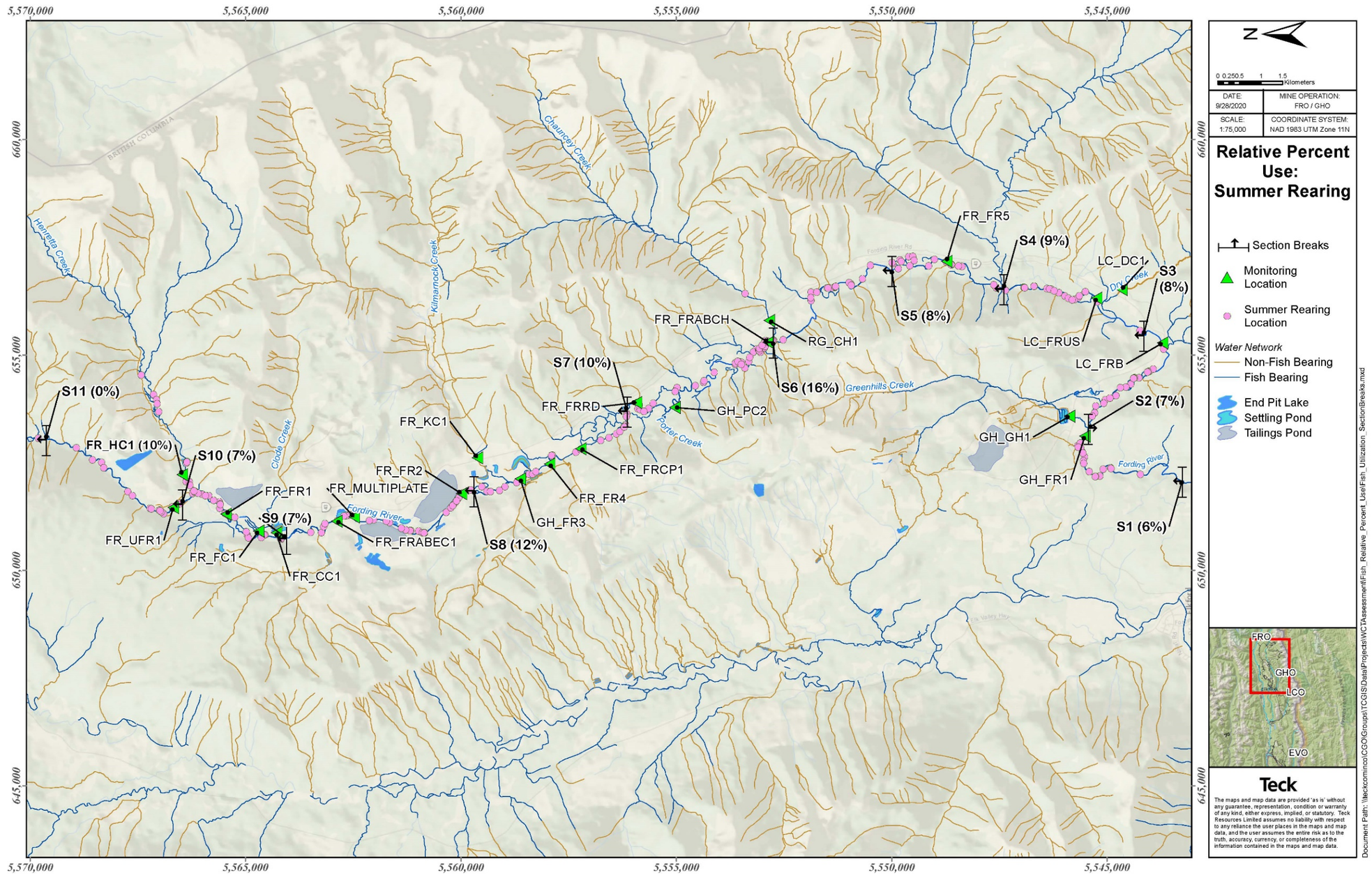
Note: fish distribution and relative percent fish use were developed by EoC Team (2021) based on the information provided in the 2012-2016 WCT population study (Cope et al. 2016). Relative percent fish usage is provided for each river segment or tributary by counting all scans of radio tagged fish and dividing by the total scanned fish over a three-year period between 2012-2015. The percentage of fish use represents the total number of fish that were tagged, not the whole estimated population of adult and sub adult fish in the upper Fording River.

Figure 6: Distribution of Adult WCT in the Upper Fording River Watershed in Spring (Calculated by EoC Team 2021 using Data Collected by Cope et al. 2016)



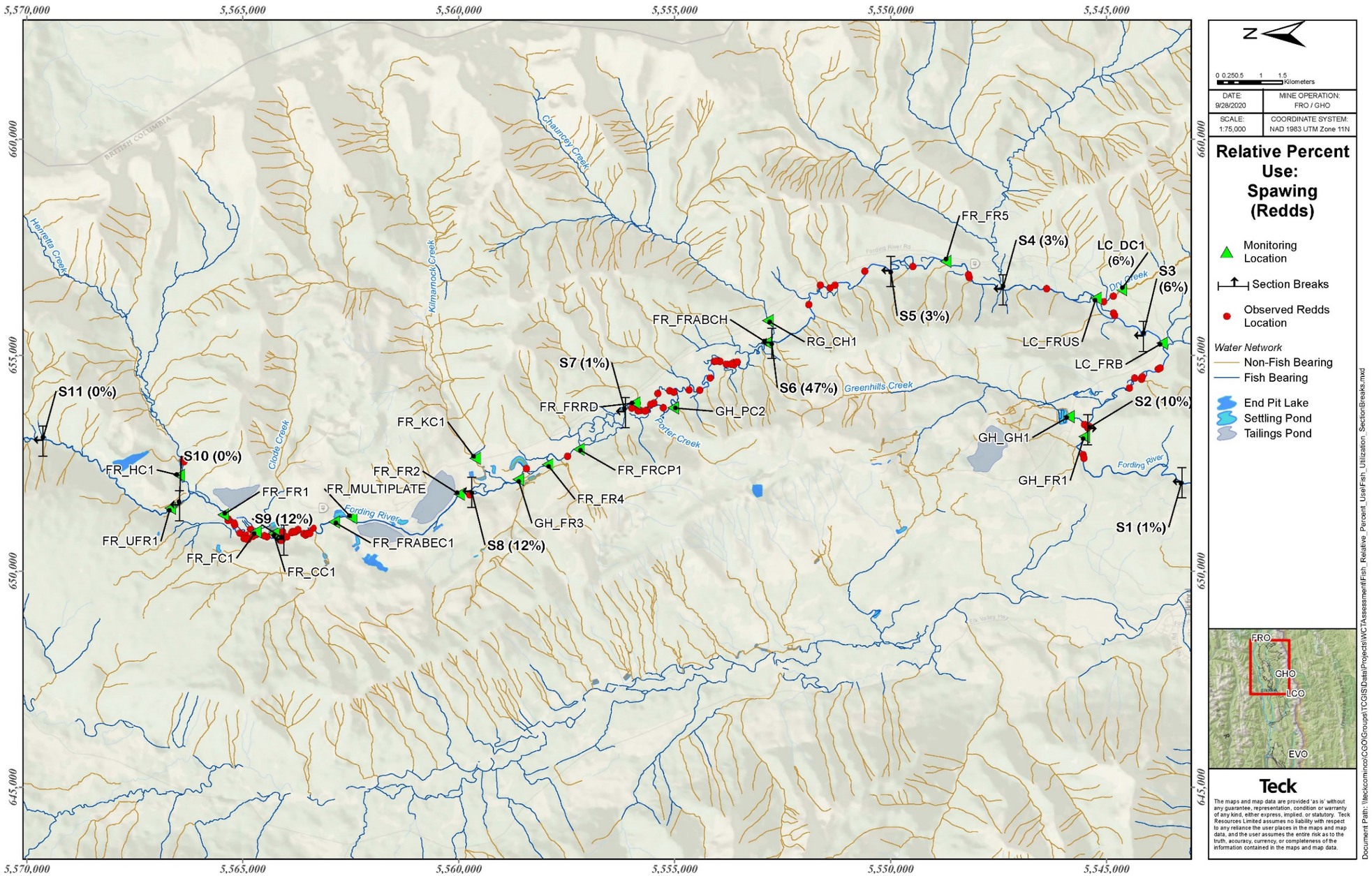
Note: fish distribution and relative percent fish use were developed by EoC Team (2021) based on the information provided in the 2012-2016 WCT population study (Cope et al. 2016). Relative percent fish usage is provided for each river segment or tributary by counting all scans of radio tagged fish and dividing by the total scanned fish over a three-year period between 2012-2015. The percentage of fish use represents the total number of fish that were tagged, not the whole estimated population of adult and sub adult fish in the upper Fording River.

Figure 7: Distribution of Adult WCT in the Upper Fording River Watershed in Summer-Fall (Calculated by EoC Team 2021 using Data Collected by Cope et al. 2016)



Note: fish distribution and relative percent fish use were developed by EoC Team (2021) based on the information provided in the 2012-2016 WCT population study (Cope et al. 2016). Relative percent fish usage is provided for each river segment or tributary by counting all scans of radio tagged fish and dividing by the total scanned fish over a three-year period between 2012-2015. The percentage of fish use represents the total number of fish that were tagged, not the whole estimated population of adult and sub adult fish in the upper Fording River.

Figure 8: Distribution of WCT Redds in the Upper Fording River Watershed in Spring (Calculated by EoC Team 2021 using Data Collected by Cope et al. 2016)



Note: fish distribution and relative percent fish use were developed by EoC Team (2021) based on the information provided in the 2012-2016 WCT population study (Cope et al. 2016). Relative percent fish usage is provided for each river segment or tributary by counting all observed redds and dividing by the total number of observed redds over a three-year period between 2012-2015. The percentage of fish use represents the total number of observed redds, not the whole estimated population of redds in the upper Fording River.

1.4.3 Refined Assessment for Selenium

Selenium is distinct from the other water quality constituents considered in this evaluation because it is widely understood to be a bioaccumulative substance, in that it is disproportionately accumulated in biota relative to concentrations in water. Selenium can cause effects to sensitive species and life stages when bioaccumulated concentrations exceed tissue-based thresholds for effect. The exposure route and mode of effects of selenium are distinct from the other water quality constituents, for which potential effects are evaluated by considering direct exposure to aqueous concentrations. Effects via direct exposure to aqueous selenium can occur, but chronic effects via accumulation in tissues occur at concentrations orders of magnitude lower than those associated with direct effects (Janz et al. 2010; BC MOE 2014; US EPA 2016). As a result of these differences, selenium assessment is undertaken using different approaches from other water quality constituents.

The approach taken in the refined assessment of selenium follows the scientific community's current understanding of selenium fate and toxicology, as summarized by Chapman et al. (2010), BC ENV (BC MOE 2014), the United States Environmental Protection Agency (US EPA 2016), and ECCC (2017). These summaries align on a conceptual model of pathways of potential exposure to selenium in the aquatic environment, sensitive receptor taxa, and relevant effects endpoints. Key elements of the conceptual model relevant to the present evaluation are discussed below. Additional discussion of selenium toxicology and potential interactions with fish health is provided in Bollinger (2021).

Selenium occurs in a variety of chemical forms that are actively taken up from water into algae and periphyton-based biofilms at the base of aquatic food webs. The magnitude of this uptake can vary greatly under different conditions for a number of reasons. Notably, uptake relative to concentrations in water declines as aqueous selenium concentrations increase (Conley et al. 2011; de Bruyn et al. 2013; Lo 2014; Van Geest et al. 2016; DeForest et al. 2016), which is thought to reflect the physiological regulation of selenium by algae and other taxa (Janz et al. 2010; Young et al. 2010). Uptake is also lower in lotic (flowing-water) environments, where inorganic forms of selenium predominate, compared to lentic (still-water) environments that facilitate the formation of organic forms of selenium (Simmons and Wallschläger 2005; Chapman et al. 2010; Orr et al. 2012). Selenium in lotic waters occurs predominantly as the inorganic form selenate, which has comparatively low bioavailability that is inhibited by the presence of sulphate (Williams et al. 1994; Bailey et al. 1995; Riedel and Sanders 1996; Fournier et al. 2010; Brix et al. 2001; Lo et al. 2012; Van Geest et al. 2016). To account for the variation in selenium uptake in response to these and other factors, the selenium assessment considered site-specific patterns of bioaccumulation and resulting concentrations in sensitive organisms.

Following uptake from water at the base of the food web, selenium is transferred to higher trophic levels by feeding. Exposure of fish is dominated by dietary uptake (Stewart et al. 2010). Dietary selenium is accumulated in fish tissues and transferred to eggs during egg provisioning (Janz et al. 2010), which can cause effects to embryo-larval survival and development when egg concentrations exceed effects thresholds (Janz et al. 2010; Stewart et al. 2010). A review of mechanisms and the pathology of embryonic effects of selenium is provided in Bollinger (2021). A secondary exposure route for fish is via direct dietary exposure of juveniles, with the potential to result in effects on juvenile growth and survival when dietary concentrations exceed effects thresholds (Janz et al. 2010).[8] Selenium effects studies reflect this route of exposure and mode of effects by reporting effects data as selenium concentrations in eggs or fish diet. These tissue-based effects concentrations can then be translated into associated aqueous concentrations such as WQGs or site-specific criteria by applying a bioaccumulation model.

[8] Hermanutz et al. (1992, 1996; analysis corrected by Tao et al. 1999; data re-analyzed by US EPA 2016) reported mortality of adult bluegill sunfish (*Lepomis macrochirus*) after 8- to 11-month exposure to 10 µg/L or 30 µg/L sodium selenite. However, effects were not observed in this study in a "recovering" experimental stream with no further aqueous selenite dosing but still-elevated dietary exposure resulting in fish ovary selenium concentrations as high as 55 mg/kg dw. This pattern of response suggests that effects were related not to selenium bioaccumulated via the normal dietary pathway, but to direct, long-term exposure to high concentrations of aqueous sodium selenite. McIntyre et al. (2008) similarly reported mortality of juvenile bluegill sunfish after 182 days in treatments containing 10 µg/L or 20 µg/L sodium selenite. In the Elk Valley, selenite typically accounts for less than 1% of total selenium, occurring in the upper Fording River at concentrations near 0.1 µg/L. Therefore, the results of these studies were not considered relevant to the present evaluation. US EPA (2016; Table 6.2) summarizes studies of other fish species reporting no effects of chronic selenium exposure on survival of juvenile and adult fish.

To account for the large variation in selenium bioaccumulation across different aquatic environments in BC, the BC WQG for aqueous selenium was derived to consider worst-case conditions such as those that can occur in lakes and reservoirs, with the expectation that the WQG would provide a relatively larger margin of safety for the protection of aquatic life in streams and rivers (BC MOE 2014). In addition to the aqueous selenium value, interim BC WQGs are available for fish diet and fish muscle and final BC WQGs are available for fish egg/ovary and whole body. Generic guideline values for water and fish tissues have also been derived by ECCC (2017) and US EPA (2016) and analogous generic values have been derived in the scientific literature (DeForest et al. 2012, 2017). The tissue-based values summarized in Table 2 are independent of aquatic habitat conditions because they focus directly on concentrations in tissues, avoiding the confounding influence of varying bioaccumulation. However, values in Table 2 are intended to be generic screening values that identify a potential for effects to the most sensitive fish species, in some cases incorporating an uncertainty factor.

Table 2: Generic and Site-specific Tissue-Based Values for Selenium

Source	Dietary Concentration (mg/kg dw)	Muscle (M) or Whole Body (WB) Concentration (mg/kg dw)	Egg or Ovary Concentration (mg/kg dw)
British Columbia Water Quality Guideline for the Protection of Aquatic Life (BC MOE 2014)	4 (interim)	4 (M or WB)	11
Environment and Climate Change Canada Predicted No-Effect Concentration (ECCC 2017)	n/a	6.7 (M)	14.7
United States Aquatic Life Ambient Water Quality Criteria (US EPA 2016)	n/a	8.5 (M) 11.3 (WB)	15.1
Species Sensitivity Distribution Evaluation (DeForest et al. 2012)	n/a	n/a	20
Elk Valley Water Quality Plan Level 1 Benchmarks (Teck Coal 2014)	11	15.5 (M)	25

Notes: n/a = not available.

In addition to the generic WQG values, Table 2 also presents site-specific and species-specific benchmark values developed for the Elk Valley (Teck Coal 2014). These benchmarks were developed through a year-long process of consultation with a technical advisory committee with representation including BC ENV, ECCC, the Ktunaxa Nation Council, US EPA, and Montana Department of Environmental Quality. Tissue-based benchmarks for early life stage effects to WCT were derived from the combined data from two site-specific reproductive effects studies (Rudolph 2008; Nautilus and Interior Reforestation 2011). Dietary benchmarks for juvenile growth effects were derived from a feeding study with a sensitive surrogate fish species (Hamilton et al. 1990) and validated by comparison to a long-term feeding study of Yellowstone Cutthroat Trout (Hardy et al. 2010). Aqueous selenium benchmarks were then derived by applying a site-specific bioaccumulation model to translate the tissue-based concentrations into associated aqueous concentrations (Teck Coal 2014). Steps were taken throughout benchmark development to identify, reduce, and account for uncertainty by incorporating margins of safety, and Teck Coal has undertaken follow-up studies to validate both the tissue-based benchmarks and the bioaccumulation model.

As discussed above for other constituents, the assessment of selenium presented herein first screens water quality and tissue selenium data against generic WQG values and then proceeds to a more refined assessment using site-specific information, which for selenium is accomplished by focusing on measured selenium concentrations in WCT and their benthic invertebrate prey in monitoring areas throughout the upper Fording River watershed. Tissue selenium concentrations provide a direct and spatially comprehensive characterization of dietary exposure of WCT and how it has changed over time. Evaluating these concentrations relative to species-specific effects benchmarks provides a reliable assessment of potential effects.

In addition to evaluating potential effects of bioaccumulated selenium, the potential for selenium to cause acute toxicity to fish was also considered by comparing aqueous selenium concentrations to acute screening values for fish (Section 2.0). Aqueous screening values for selenium were derived for both selenate and selenite, reflecting potential differences in acute toxicity of these two selenium species.

1.4.4 Assessment of Nutrients

Nitrogen in the form of nitrate is relatively abundant in Elk Valley waters, and phosphorus is usually identified as the limiting nutrient. This means that phosphorus is the water quality constituent that could control the rate at which algae and aquatic plants grow. Productivity can be controlled by many factors in addition to nutrients, including flow cycles, light, substrate characteristics, temperature, and growing season length (Minnow 2017, Minnow 2020b). Larratt and Self (2021) evaluate potential effects of other factors on primary productivity in the upper Fording River watershed.

In consideration of the above, total phosphorus (TP) was the water quality constituent used herein to evaluate potential nutrient enrichment (also called *eutrophication*). The assessment of TP is distinct from the other water quality constituents considered in this evaluation because phosphorus is non-toxic to aquatic organisms at levels and forms present in the environment (CCME 2004). Thus, an evaluation of direct acute or chronic effects is not appropriate for TP. Instead, in alignment with CCME (2004), TP concentrations were assessed with respect to potential changes to productivity. As discussed above for other constituents, the assessment of TP presented herein first screens water quality data against generic trophic status categories from federal guidance documents and then proceeds to a more refined assessment using site-specific information. For TP, the refined assessment is accomplished by comparing water quality data against a site-specific screening value derived from previous studies of the relationship between productivity and TP in Elk Valley waters.

1.5 Document Layout

The remaining sections of this report are organized as follows:

- **Section 2.0**: evaluation of potential acute and chronic effects of surface water quality in releases of mine-influenced water (i.e., at the point of release, prior to mixing into surface waters). Water quality data and acute testing data were used to support this evaluation.
- **Section 3.0**: evaluation of potential acute and chronic effects of surface water quality in fish accessible waters (i.e., after the mine-influenced releases assessed in Section 2.0 enter surface waters). Water quality data, tissue selenium data, and chronic toxicity testing data were used to support this evaluation.
- **Section 4.0**: evaluation of potential nutrient enrichment effects. Nutrient concentration data from fish accessible locations were used to support this evaluation.
- **Section 5.0**: integration of assessment results by river segment, describing how results overlap spatially and temporally with fish use information calculated by EoC Team (2021) using data collected by Cope et al. (2016).
- **Section 6.0**: summary of findings, including the framework table to evaluate cause.

Section 2.0: Evaluation of Potential Acute and Chronic Effects of Water Quality in Releases of Mine-Influenced Water

2.0 EVALUATION OF POTENTIAL ACUTE AND CHRONIC EFFECTS OF WATER QUALITY IN RELEASES OF MINE-INFLUENCED WATER

This section assesses the quality of mine-influenced water at the point of release, prior to mixing into surface waters. Water quality at release locations represents localized exposure conditions. Some releases infiltrate to ground and may travel via groundwater pathways to the mainstem Fording River. Other releases are conveyed as surface water via channels to the mainstem Fording River. Channels that have fish accessible portions are also assessed in Section 3.0.

2.1 Description of and Rationale for Impact Hypothesis

The impact hypothesis is: *Did exposure to releases of mine-influenced water quality contribute to or cause the WCT decline?*

This impact hypothesis addresses the widely accepted concept in toxicology that constituents in water can cause direct effects to fish in short-term exposures such as may occur at an immediate point of release of mine-influenced water, or in long-term exposures such as may occur at surface water locations with more consistent use by fish. This concept is embodied in provincial and federal frameworks for the regulation of water quality as short-term and long-term guidelines. Releases of mine-influenced water could have contributed to or caused the WCT decline if fish were exposed to conditions in which concentrations of one or more constituents was higher than a threshold for effects.

2.2 Methods

The following sections provide an overview of the assessment methods (Section 2.2.1), a description of the spatial boundaries (Section 2.2.2), and a summary of data used in the assessment (Section 2.2.3). The approach to identify potential water quality stressors is provided in Section 2.2.4. The approach to evaluate the potential for releases of mine-influenced water to contribute to or cause the WCT decline is provided in Section 2.2.5.

2.2.1 Overview

Mine-influenced water quality data collected in the decline window were compared to short-term and long-term WQGs to identify constituents that could have contributed to or caused the WCT decline. The evaluation of measured water quality was supplemented with a review of acute toxicity monitoring data for rainbow trout[9] to evaluate whether there was evidence of an effect of water quality to fish species in laboratory testing. Toxicity monitoring results indicate potential effects associated with the mixture of constituents measured in surface water samples, and thereby help to reduce uncertainty related to potential mixture-related effects of multiple water quality constituents.

Constituents with concentrations above short-term WQGs were identified as potential acute stressors and carried forward to further evaluate the potential for acute effects. Potential acute effects were evaluated by comparing water quality data to acute screening values derived from published effects data for rainbow trout and by compiling rainbow trout acute toxicity monitoring data. The results of the analysis presented in Appendix B, which compares acute toxicity values for WCT and rainbow trout, indicates that rainbow trout is a reasonable surrogate to evaluate potential effects to WCT.

[9] Permit 107517 (Section 7.2), issued under the *Environmental Management Act* in November 2014, requires that effluent must not cause greater than 50% mortality in 96-hour rainbow trout single concentration toxicity tests.

Constituents with concentrations above long-term WQGs were identified as potential chronic stressors. These screening results were reviewed on a location-by-location basis to evaluate the potential for chronic exposure of WCT. If a chronic exposure pathway was identified, then the constituents were carried forward to evaluate the potential for chronic effects in Section 3.0. If a chronic exposure pathway was not identified, the locations and constituents at those locations were not carried forward for further evaluation of potential chronic effects.

2.2.2 Spatial Boundaries

The assessment included all monitored mine-influenced water that was discharged into fish accessible areas in the decline window. Monitoring data from 19 locations were included (Figure 9). Three permitted discharge locations from Permit 107517 (FR_HP1, FR_MS1, and FR_3PIT) have not discharged since 2013 (Roughead 2020). Two other release locations (FR_TP1 and RG_FRSC1) were not sampled in the decline window. As discussed in Henry and Humphries (2021), subsurface connections through bedrock from pits were not included because 1) there are long travel times from pits to surface water, and 2) not all pits store water (e.g., Lake Mountain Pit).

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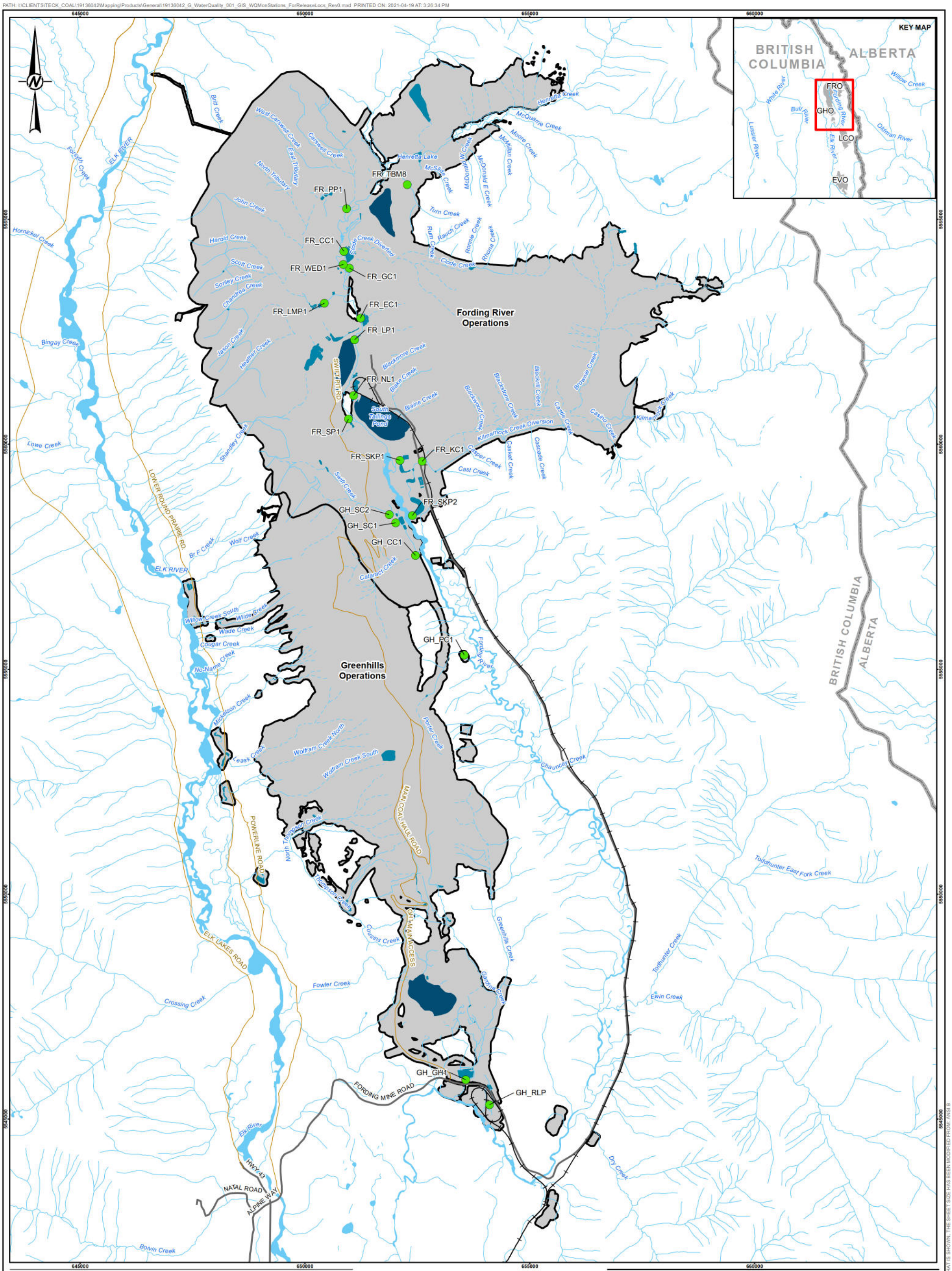

LEGEND

- WATER QUALITY MONITORING STATION
- RAILWAY
- ROAD - PAVED
- ROAD - UNPAVED
- SURFACE FLOW WATERCOURSE
- SUBSURFACE FLOW WATERCOURSE
- BRITISH COLUMBIA - ALBERTA BORDER
- C-2 PERMIT BOUNDARY
- WASTE WATER/SEDIMENT POND
- TAILINGS POND
- WATERBODY

0 1,500 3,000
1:80,000 METRES

REFERENCE(S)
HYDROGRAPHY AND ROADS OBTAINED FROM TECK COAL LIMITED. BASE DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT
TECK COAL LIMITED

PROJECT
EVALUATION OF SURFACE WATER QUALITY—SME REPORT FOR EVALUATION OF CAUSE: UPPER FORDING RIVER WESTSLOPE CUTTHROAT TROUT POPULATION DECLINE

TITLE
WATER QUALITY MONITORING STATIONS FOR RELEASE LOCATIONS

CONSULTANT
GOLDER

YYYY-MM-DD	2021-04-19
DESIGNED	JC
PREPARED	DR
REVIEWED	EJC
APPROVED	AdB

PROJECT NO.	CONTROL	REV.	FIGURE
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2.2.3 Data Summary

2.2.3.1 Water Quality

Measured water quality and acute toxicity testing results were provided by Teck Coal. Teck Coal houses these data in their Environmental Quality Information System (EQuIS). As discussed in Teck Coal's annual water quality report (e.g., Teck Coal 2020), Teck Coal has established a Quality Assurance/Quality Control (QA/QC) program to promote the collection of high-quality environmental data. Teck Coal has developed protocols and procedures to collect representative samples and to minimize the potential for deterioration and contamination of samples before laboratory analysis (e.g., see Teck Coal 2020).

The data provided by Teck Coal were relied upon for the analyses conducted herein, and no formal or thorough data quality review was conducted. However, when processing the data, the following issues were noted and resolved prior to conducting analyses:

- Field blanks and field duplicates (115 samples; Attachment A, Table A2) were identified as sample codes or types with "FB", "FD", or "FB-HG". Teck Coal confirmed that these samples were blanks or duplicates, and they were excluded from the dataset.
- Duplicated entries (43 cases; Attachment A, Table A3) were flagged when a station had two entries on the same date with different sample codes and/or sample IDs. In all cases, one or more constituents had identical values in the two entries. When this occurred, per agreement with Teck Coal, the entries were resolved such that constituents with identical values were included once per sample date.
- Duplicate analyses were noted where two different entries were encountered for the same station, date, sample code, and constituent. The maximum value was used to be conservative, except for dissolved oxygen, for which a minimum value was used.
- A small number of values outside theoretical limits were noted: 1) dissolved oxygen at FR_LP1 on 8 March 2019 (result = 1,190 mg/L); 2) field pH at GH_PC1 on 15 November 2019 (result = 119); 3) field pH at FR_SP1 on 15 November 2019 (result = 157.5); and 4) field pH at FR_LP1 on 15 November 2019 (result = 151.7). These results were excluded from the analysis because they were outside theoretical limits.
- Constituents not relevant to effects of water quality were noted: cation-anion balance, depth to water function, ion balance, major anion sum, major cation sum, pin height, daily flow, instantaneous flow, staff gauge height, and unknown parameters from Brooks laboratory. These entries were removed.

An important challenge in interpreting trends in water quality data was changes to method detection limits over time. Where results were reported as below the detection limit, the full detection limit was used for statistical analyses conducted herein. No effort was made to adjust the dataset to remove anomalous or historically high detection limits. Elevated detection limits for constituents would potentially result in more constituents screening in based on elevated DLs. In the case of chloride for which elevated detection limits have been identified, elevated detection limits were replaced with the lowest detection limit in the dataset (0.5 mg/L) for nitrite screening to avoid underestimating potential effects (see Section 2.2.4).

After accounting for the adjustments listed above, the number of samples per year by station is summarized in Table 3. The list of constituents included field parameters, conventional parameters, major ions, nutrients, total and dissolved metals, polycyclic aromatic hydrocarbons (PAHs), volatile organics, and selenium species (Appendix A, Table A4).

Table 3: Water Quality Samples by Station and Year at Release Locations (September 2017 to September 2019)

Segment	Description	Water Quality Station	2017 (Sep-Dec)	2018 (Jan-Dec)	2019 (Jan-Sep)	Total
S9	Turn Creek	FR_TBM8	2	18	0	20
	Post Sed. Pond Decant	FR_PP1	0	1	47	48
	Clode Settling Pond Decant	FR_CC1	4	27	25	56
S8	West Exfiltration Ditch	FR_WED1	0	6	3	9
	Grassy Creek	FR_GC1	0	7	3	10
	Lake Mountain Sediment Pond Decant	FR_LMP1	2	51	26	79
	Eagle Settling Pond Decant	FR_EC1	1	18	0	19
	Liverpool Sed. Pond Decant	FR_LP1	7	25	28	60
	North Loop Settling Pond Decant	FR_NL1	2	15	3	20
	Smith Ponds Decant	FR_SP1	4	25	24	53
S7	South Kilmarnock Settling Pond Decant 1	FR_SKP1	0	15	2	17
	Kilmarnock Cr. D/S of Rock Drain	FR_KC1	5	26	23	54
	South Kilmarnock Settling Pond Decant 2	FR_SKP2	0	2	0	2
	Swift Creek Sed. Pond Decant	GH_SC1	5	29	27	61
	Swift Creek Sed. Pond Bypass	GH_SC2	0	5	0	5
	Cataract Creek Sed. Pond Decant	GH_CC1	5	25	26	56
S6	Porter Creek Sed. Pond Decant	GH_PC1	5	25	23	53
S2	Greenhills Rail Loop Pond	GH_RLP	1	12	18	31
	Greenhills Creek Sed. Pond Decant	GH_GH1	4	37	37	78
		Total	47	369	315	731

Notes: Stations ordered from upstream to downstream. Number refers to the total number of unique sample codes at each station in each year and month range. For 2017 and 2019, the number of samples is based on months in the decline window.

Appendix A, Table A4 shows the number of samples and detection frequency by constituent and unit for the decline window. For this timeframe, there were 137 combinations of constituents and units. The total of 137 includes constituents that appear under several lists and/or several units. The appendices of this report include data for all measured constituents.

There was a subset of constituents that were not carried forward for discussion because one or more of the following was true within the decline window (Appendix A, Table A4):

- Concentrations were never detected at any stations (31 constituents). This occurred for major ions (sulphide and hydrogen sulphide), nutrient parameters (biochemical oxygen demand), dissolved metals (beryllium, bismuth, tin, titanium), PAHs (all except phenanthrene and 2-methylnaphthalene), and volatile organics (Extractable Petroleum Hydrocarbons [C10 - C19]). For the constituents in this list with WQGs, detection limits were below WQGs. These constituents were interpreted to have negligible potential for effect to WCT and were not carried forward. Many of these constituents are also considered in the following bullets (i.e., are not toxicants or are considered in the evaluation of TDS).
- Constituents that are not normally considered to be acutely toxic to aquatic life (8 constituents). These were oxidation reduction potential (lab and field), total organic carbon (TOC), dissolved organic carbon (DOC), colour, methylmercury, total phosphorus, and ortho-phosphate. For TOC and DOC, the BC WQGs for the protection of aquatic life are intended to prevent reductions in primary productivity and increasing susceptibility to other toxicants such as metals (BC MOE 2001a). The first component (primary productivity)

is addressed in the evaluation of potential nutrient enrichment (Section 4.0) and the second component (susceptibility to toxicants) is addressed in WQGs where relevant (e.g., as an ameliorating factor of copper toxicity in the short-term and long-term BC WQGs). For colour, the US EPA and BC WQGs indicate the rationale for the guideline is aesthetic considerations (US EPA 1986). For methylmercury, the BC WQG for the protection of aquatic life is intended to prevent chronic bioaccumulation of mercury in tissue and not direct acute effects (BC MOE 2001b). Total phosphorus is evaluated in Section 4.0.

- Concentrations were reported for selenium species (8 constituents). Selenium species themselves are not direct toxicants at the concentrations evaluated herein, and therefore were assessed through their combined contribution to total aqueous selenium and tissue selenium concentrations.
- Constituents that were assessed as TDS (18 constituents). Conductivity, hardness, alkalinity, and major cations were not assessed individually; rather, their combined effect was considered through the assessment of TDS.
- Constituents that are assessed in a separate report (5 constituents). This applied to temperature, turbidity (field and lab), and total suspended solids (field and lab) (Ganshorn et al. 2021; Wright et al. 2021).
- Constituents that were assessed in a different form (3 constituents). Total Kjeldahl nitrogen was assessed separately as ammonia (USGS 2000). Acidity was assessed separately as pH. Dissolved oxygen (%) was assessed using units of mg/L to align with BC WQGs.

2.2.3.2 Acute Toxicity Testing

Teck Coal conducts acute toxicity testing of water samples at authorized discharge locations in the Elk Valley. Test organisms and procedures used in the program follow the requirements outlined in Permit 107517 Section 7.2. An overview of this program is provided in Table 4.

Table 4: Summary of Quarterly Acute Toxicity Tests Conducted to Satisfy Permit 107517

Test Species	Test Duration [days]	Endpoints	Test Protocol
Rainbow trout *Oncorhynchus mykiss*	4	Mortality, stressed	Environment Canada (2000a) single concentration test
Water flea *Daphnia magna*	2	Mortality, immobility	Environment Canada (2000b) single concentration test

For the Evaluation of Cause conducted herein, acute toxicity testing results from the decline window for rainbow trout were provided by Teck Coal. Effects data from rainbow trout tests were included in this summary because they are expected to be directly relevant to assessing potential effects to WCT. Acute testing results for invertebrates, which are discussed in Teck Coal's annual water quality monitoring reports, are not summarized herein because *Daphnia magna* is not directly relevant to assessing potential effects to fish. Orr and Ings (2021) evaluate potential indirect effects to WCT via changes to benthic invertebrate abundance as a food source.

The number of acute rainbow trout toxicity tests per year is summarized by station in Table 5.

Table 5: Rainbow Trout Toxicity Tests by Station and Year at Release Locations (September 2017 to September 2019)

Segment	Description	Water Quality Station	2017 (Sep-Dec)	2018 (Jan-Dec)	2019 (Jan-Sep)	Total
S9	Post Sed. Pond Decant	FR_PP1	0	1	7	8
	Clode Settling Pond Decant	FR_CC1	1	4	4	9
S8	Lake Mountain Sediment Pond Decant	FR_LMP1	1	9	3	13
	Eagle Settling Pond Decant	FR_EC1	1	4	0	5
	Liverpool Sed. Pond Decant	FR_LP1	2	4	3	9
	North Loop Settling Pond Decant	FR_NL1	1	2	1	4
	Smith Ponds Decant	FR_SP1	1	4	3	8
S7	South Kilmarnock Settling Pond Decant 1	FR_SKP1	0	5	2	7
	South Kilmarnock Settling Pond Decant 2	FR_SKP2	0	1	0	1
	Swift Creek Sed. Pond Decant	GH_SC1	1	4	4	9
	Cataract Creek Sed. Pond Decant	GH_CC1	1	4	3	8
S6	Porter Creek Sed. Pond Decant	GH_PC1	1	4	3	8
S2	Greenhills Creek Sed. Pond Decant	GH_GH1	1	5	9	15
		Total	11	51	42	104

Notes: Stations ordered from upstream to downstream. For 2017 and 2019, the number of samples is based on months in the decline window.

2.2.4 Identification of Potential Stressors

Water quality constituents in releases of mine-influenced water with maximum concentrations greater than short-term WQGs were identified as potential acute stressors. If no approved short-term WQG was available, a working WQG was used. Long-term WQGs were used for comparison if no approved or working short-term WQG was available. Where WQGs were dependent on a modifying factor (e.g., hardness), the comparison was conducted using the sample-specific modifying factor. If the sample-specific modifying factor was outside of the range for the WQG, then the modifying factor was constrained to be within the range of the WQG. For example, if the sample-specific hardness was 300 mg/L as $CaCO_3$ and the guideline range extends to a hardness of 250 mg/L as $CaCO_3$, then a hardness of 250 mg/L as $CaCO_3$ was used to calculate the guideline. For constituents without WQGs, constituents were identified as potential acute stressors if the maximum concentration in the decline window was greater than previous measurements in samples that did not cause effects to rainbow trout in acute testing in the Elk Valley.

For nitrite screening (for which WQGs are dependent on chloride), approximately half (47%) of the sample-specific chloride concentrations had non-detect values that were greater than 2 mg/L. These elevated non-detect chloride values have the potential to increase false negatives in the nitrite screening because the nitrite WQG is dependent on chloride concentrations, with the minimum WQG value based on chloride concentrations below 2 mg/L. [10] To address this, non-detect chloride concentrations were assigned a value of 0.5 mg/L, which is equal to the lowest detection limit for the dataset. This adjustment is considered conservative because it increases the potential for false positives in the nitrite screening.

[10] The BC WQGs for nitrite are based on chloride concentrations in a step-wise function, with WQGs assigned based on the following chloride concentrations: <2 mg/L chloride, 2 to 4 mg/L, 4 to 6 mg/L, 6 to 8 mg/L, 8 to 10 mg/L, and >10 mg/L.

For metals, the fraction associated with the WQG (dissolved or total) was assessed. Nickel was carried forward for further evaluation because previous work in the Elk Valley has indicated that the working BC WQG may not be protective of chronic effects to sensitive aquatic life. This finding is consistent with more recent guidelines developed for nickel (e.g., in the European Union) that have identified lower effect concentrations for nickel. Bromide and TDS lack BC WQGs but are known toxicants to aquatic life and were therefore carried forward for further evaluation. Constituents with maximum measured concentrations lower than short-term WQGs were concluded not to have potential to cause acute effects to WCT and were not carried forward as acute stressors. Constituents identified as potential acute stressors were carried forward for further assessment.

Water quality constituents in releases of mine-influenced water with maximum concentrations greater than long-term WQGs were reviewed on a location-by-location basis to evaluate the potential for chronic exposure. If a chronic exposure pathway was identified at the point of release, then constituents at that location were carried forward to evaluate the potential for chronic effects in Section 3.0. If a chronic exposure pathway was not identified, then constituents at that point of release were not carried forward for further evaluation of potential chronic effects.

2.2.5 Evaluation of Requisite Conditions

The requisite condition for releases of mine-influenced water to contribute to the WCT decline was any indication of a potential acute or chronic effect at a monitored point of release per the definitions provided in Section 1.4. This requisite condition was evaluated by screening water chemistry data from the decline window at points of release (Section 2.2.5.1), reviewing acute fish testing conducted in the decline window (Section 2.2.5.2), and evaluating the potential for chronic exposure at each point of release (Section 2.2.5.3). To aid in the assessment of potential acute stressors, Teck Coal provided Golder with temporal plots showing concentrations of these constituents in individual samples over time (2012 to 2019) for stations where the acute stressor was identified.

If an indication of a potential acute or chronic effect was identified, then the result was investigated further to evaluate potential overlap with fish in time and in space. The more overlap may have occurred, the stronger was the evidence that exposure to releases of mine-influenced water may have contributed to the WCT decline.

The requisite condition for releases of mine-influenced water to cause the WCT decline was an indication of acute or chronic effects that could have affected a large fraction of the WCT population, either by being widespread or by occurring at a time and location that overlapped with large numbers of fish, as described seasonally for adults and redds in Cope et al. (2016). The more potential effects overlapped with fish in time and space, the stronger was the evidence that exposure to releases of mine-influenced water may have caused the WCT decline.

2.2.5.1 Comparison to Acute Screening Values

Maximum concentrations of each potential acute stressor were compared to acute screening values for rainbow trout that were obtained, where available, from previous assessments conducted in the Elk Valley. Screening values in those assessments were obtained from a review of toxicity literature, regulatory values from BC and other jurisdictions, and toxicity databases such as United States Environmental Protection Agency's ECOTOX. Acute screening values and the scientific rationale for their derivation are summarized in Appendix C. These screening values provide individual constituent concentrations in water below which acute effects are not expected in rainbow trout per the definition provided in Section 1.4.

2.2.5.2 Review of Acute Testing for Rainbow Trout

Acute testing conducted in the decline window was summarized to assess whether there was evidence of acute effects on rainbow trout of discharges of mine-influenced water. Acute toxicity monitoring results can be used to identify potential effects associated with the mixture of constituents measured in surface water samples, and thereby help to reduce uncertainty related to potential mixture-related effects of multiple water quality constituents.

Test results were reviewed to identify tests with percent response greater than 10%. According to the Environment Canada (2000a) test protocol for rainbow trout, a test is valid if the control response is less than or equal to 10%. Responses up to 10% in these tests are consistent with normal test variability and do not provide reliable evidence of acute effects to test organisms.

2.2.5.3 Evaluation of Chronic Exposure Pathways

For each point of release of mine-influenced water, a review was conducted of the physical nature of the release (e.g., groundwater versus surface water) and whether fish could be in direct contact with mine-influenced water at that location for extended periods of time. If the release infiltrates to ground or mixes with surface water immediately after release, then no chronic pathway was identified for the corresponding location. For these locations, potential acute effects of unmixed conditions are assessed in Section 2.3 and potential chronic effects to mixed conditions downstream of the point of release are assessed in Section 3.0. If the release is to a fish accessible channel with no mixing, then potential chronic exposure to unmixed mine-influenced water was considered possible and potential chronic effects were assessed in Section 3.0. For these locations, information was reviewed to evaluate the likelihood of chronic exposure, considering the extent of fish access, types of fish habitat present, and potential or documented fish use.

2.3 Findings

2.3.1 Identification of Potential Acute and Chronic Stressors

Potential Acute Stressors

Acute screening results are presented in Appendix D, Table D1. The following 15 constituents had measured concentrations greater than short-term WQGs or alternative values (as discussed in Section 2.2.3.2) in one or more samples: pH, dissolved oxygen, sulphate, nitrate, nitrite, aluminum, beryllium, chromium, iron (dissolved and total), lithium, mercury, selenium, uranium, and zinc. Three of the 15 constituents were not assessed further based on the following rationale:

- pH was not carried forward for further assessment because it was within the long-term BC WQG range of 6.5 to 9, except for 1 of 622 field measurements and 1 of 363 lab measurements collected in the decline window. For field pH, the sample was collected from GH_PC1 on 15 January 2019 (pH = 9.1). The lab pH measurement for this sample (8.2) was within the WQG range. For lab pH, the sample was collected from FR_GC1 on 7 November 2018 (pH = 5.7). The field pH measured on the same day (7.9) was within the WQG range. Based on the above information, pH was considered to have negligible potential for acute or chronic effects.
- Aluminum was below the short-term BC WQG of 0.1 mg/L (for pH greater than 6.5) and iron (dissolved) was below the short-term BC WQG of 1 mg/L, except for 1 of 359 samples collected in the decline window. This sample was collected from FR_LMP1 on 29 April 2018. No effects were observed in an acute test conducted on the same day at that location, which indicates that despite being above a short-term WQG, these constituent concentrations did not cause acute effects to rainbow trout.

The remaining 12 constituents were carried forward for further assessment in Section 2.3.2.1. It should be noted that only six of these constituents had concentrations that did not meet short-term WQGs (dissolved oxygen, nitrate, nitrite, iron, uranium, zinc); the remaining constituents did not have acute WQGs but were carried forward based on comparison to alternative chronic WQGs (as discussed in Section 2.2.3.2).

An additional five constituents that did not have WQGs were not carried forward for further evaluation because maximum concentrations of these constituents in the decline window were equal to or lower than previous measurements in samples that did not cause effects to rainbow trout in acute testing in the Elk Valley.[11] These constituents were:

- Silicon: Maximum total silicon concentration (30.7 mg/L) occurred at FR_LMP1 on 26 April 2018. Rainbow trout acute tests conducted with water collected on this day resulted in zero mortality.
- 2-Mehtylnapthalene: The maximum concentration (0.035 µg/L) occurred at FR_CC1 on 2 April 2019. Rainbow trout 96-hour single concentration acute tests were conducted with water collected on this day and resulted in zero mortality.
- Extractable Petroleum Hydrocarbons (EPH C19-C32) and Sum of EPH (C10-C19 and C19-C32): Maximum concentrations of C19-C32 (0.51 mg/L) and sum of C10-C19 and C19-C32 (0.51 mg/L) were identical and occurred at FR_NL1 on 27 June 2019. Identical concentrations of these two constituents indicate that all the Sum of EPH is composed entirely of C19-C32. Although no toxicity testing was conducted for this sample, a higher concentration of C19-C32 (0.59 mg/L) was recorded at GH_SC2 on 4 April 2012 that did not result in acute effects to rainbow trout.
- Total Extractable Hydrocarbons (TEH 10-30): Maximum concentration (0.65 mg/L) occurred at FR_NL1 on 27 June 2019. Although no toxicity testing was conducted during this sampling event, a higher concentration of TEH10-30 (1.47 mg/L) was recorded at GH_SC2 on 4 April 2012 that resulted in zero mortality in rainbow trout 96-hour single concentration acute toxicity tests.

Based on the results presented above, 12 constituents with maximum concentrations greater than a WQG or alternative value and three additional constituents (bromide, nickel, TDS [constituents lacking WQGs or for nickel, a chronic WQG that may not be protective of chronic effects]) were carried forward as potential acute stressors. Nickel was carried forward only because there is no acute WQG, not because of any indication of acute effects. These constituents are discussed further in Section 2.3.2.1; time-series plots are provided in Appendix D that show measured concentrations in individual samples collected between 2012 and 2019.

Potential Chronic Stressors

Chronic screening results are presented in Appendix D, Table D1. The following 20 constituents had measured concentrations greater than long-term WQGs (or less than, for dissolved oxygen) in one or more samples collected in the decline window: pH, dissolved oxygen, fluoride, sulphate, nitrate, nitrite, ammonia, and 13 metals (aluminum, beryllium, cadmium, chromium, cobalt, copper, iron, lead, lithium, mercury, selenium, uranium, and zinc). For 7 of the 20 constituents, concentrations were below long-term WQGs except for 1 sample (pH, ammonia, aluminum, lead) or 2 samples (cobalt, copper, zinc). Three additional constituents (bromide, nickel, TDS [constituents lacking WQGs or for nickel, a chronic WQG that may not be protective of chronic effects]) were also identified as potential chronic stressors. The potential for chronic exposure at release locations is evaluated in Section 2.3.2.3.

[11] Other constituents that did not have WQGs were not evaluated further based on the rationale provided in Section 2.2.3.1.

2.3.2 Were the Requisite Conditions Met?

2.3.2.1 Comparison to Acute Screening Values

Maximum concentrations of potential acute stressors were less than acute screening values (or greater than, in the case of dissolved oxygen; Table 6) with the exception of two samples for dissolved oxygen. Samples with dissolved oxygen less than acute screening values were collected from Cataract Creek (GH_CC1) on 14 August 2019 (4.3 mg/L) and Turn Creek (FR_TBM8) on 7 November 2018 (1.8 mg/L). These results were interpreted as follows:

- The sample from Cataract Creek had a dissolved oxygen concentration below the acute screening value for buried embryos/alevins (5 mg/L) but above the screening value for other life stages (3.1 mg/L). Because there was no fish access to Cataract Creek in the decline window, buried embryo/alevins were not present and therefore were not exposed to this dissolved oxygen concentration. Based on the lack of an exposure pathway for this sensitive life stage, dissolved oxygen is not interpreted to have potentially caused acute effects at this location.
- The sample from Turn Creek had a dissolved oxygen concentration below the acute screening values for buried embryos/alevins and for other life stages, indicating that acute effects could occur to fish that were exposed to these conditions. The other 16 samples collected from Turn Creek in the decline window had dissolved oxygen concentrations above the short-term WQG (range: 8.6 to 13 mg/L). There is uncertainty regarding whether fish would be exposed to these conditions, given that no fish have been captured or observed in Turn Creek sampling (Lotic 2018; Robinson 2020). In addition, Turn Creek has been characterized as an ephemeral creek; it is unknown whether water levels in November 2018 were high enough to support fish use at the time of the dissolved oxygen measurement. Field observations from the sampling event indicated very cold temperatures and very low flow. Even if water levels were high enough, the proportion of fish that could be exposed to this condition is expected to be low based on telemetry data. Specifically, Turn Creek is located in S9 which had low fish use in winter (3.4%) in the mainstem Fording River.

Based on these screening results, acute effects would not be expected for most release locations and constituents per the definition of acute effects in Section 1.4.1. Acute effects could not be ruled out for dissolved oxygen in Turn Creek. Thus, the requisite condition to contribute was met for dissolved oxygen in one location (Turn Creek). However, the evidence that dissolved oxygen contributed to the decline was interpreted to be weak because of uncertainty regarding fish access and a lack of documented fish use. Therefore, requisite conditions were met for releases of mine-influenced water to contribute via acute effects but not to cause the WCT decline.

Table 6: Maximum Measured Water Quality at Release Locations (September 2017 to September 2019)

Constituent	Unit	Short-term WQG[a]	Rainbow Trout Acute Screening Values[b]	95th Percentile Concentration (5th Percentile for Dissolved Oxygen)	Maximum Concentration (Minimum for Dissolved Oxygen)	Maximum Hazard Quotient for Acute Screening Value[b]	% of Samples Greater Than:	
							Short-Term WQG	Acute Screening Value
Dissolved oxygen[c]	mg/L	5.0 to 9.0	3.1 to 5.0	7.4	1.8	1.7	18	0.3
Total Dissolved Solids	mg/L	No guideline	5,000	3,301	3,770	0.75	—	0
Bromide	mg/L	No guideline	1,000	<0.25	0.61	0.0006	—	0
Sulphate[d]	mg/L	128-429 (LT)	9,900	1,861	2,050	0.21	53	0
Nitrate	mg-N/L	32.8	381	89	150	0.39	19	0
Nitrite[e]	mg-N/L	0.06 - 0.6	0.81 - 16	0.11	1	0.35	6	0
Beryllium	µg/L	0.13 (LT)	380	<0.04	0.53	0.0014	3	0
Chromium	µg/L	1 (LT)	100	0.74	25	0.25	3	0
Iron (total)	µg/L	1,000	53,600	341	8,350	0.16	2	0
Lithium	µg/L	122 (LT)	158,000	198	415	0.003	10	0
Mercury	µg/L	0.01 (LT)	150	<0.005	<0.1	0.00067	2	0
Nickel[f]	µg/L	NA [e]	20,800	51	102	0.005	0	0
Selenium	µg/L	2 (LT)	4,200	628	1,270	0.3	98	0
Uranium	µg/L	33	4,000	21	38	0.01	0.28	0
Zinc	µg/L	33-341[d]	38-427[f]	40	132	0.35	0.28	0

WQG = water quality guideline; LT = long-term. Shaded cells indicate concentrations above the screening value or below the screening value for dissolved oxygen.

Notes: Constituents with maximum concentrations greater than the short-term WQG are provided in this table. Maximum measured concentrations are compared to WQGs for all constituents in Appendix D.

Concentrations are in milligrams per litre (mg/L), milligrams per litre as nitrogen (mg-N/L) or micrograms per litre (µg/L).

(a) Short-term WQG provided, unless long-term (LT) WQG is indicated. WQGs are provided in Appendix A, Table A1.

(b) Screening values are provided in Appendix C.

(c) Screening value is a minimum. The lower end of the range applies when embryo/alevin life stages are present (15 May to 31 August), whereas the upper end of the range applies for all other life stages.

(d) Guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (113 to 2,870 mg/L).

(e) Guideline and screening value are chloride dependent. The range shown is based on the chloride concentration range observed in the dataset (<0.5 to 52 mg/L).

(f) Guideline for total nickel is not shown because previous work in the Elk Valley has indicated that the working BC WQG may not be protective of chronic effects to sensitive aquatic life.

(g) Screening value is dependent on hardness and dissolved organic carbon. The range shown is based on the hardness range observed in the dataset (113 to 2,870 mg/L) and dissolved organic carbon observed in the dataset (<0.5 to 9.5 mg/L).

2.3.2.2 *Review of Acute Testing for Rainbow Trout*

Acute testing results for rainbow trout are tabulated in Appendix D, Table D2. Percent mortality was 0% in 96 of 104 tests conducted in the decline window. In the remaining tests, percent mortality was either 10% (7 of 104 tests) or 20% (1 of 104 tests). These results indicate that mine-influenced water at tested release locations did not cause acute effects per the definition provided in Section 1.4. According to the Environment Canada (2000a) test protocol for rainbow trout, a test is valid if the control response is less than or equal to 10%; therefore, responses up to 10% in these tests are consistent with normal test variability and do not provide reliable evidence of acute effects to test organisms.

As indicated in Section 2.2.5.2, acute toxicity testing is conducted with surface water samples collected ‘as is’; thus, the results of this testing indicate potential effects associated with the mixture of constituents present in surface water samples. The lack of acute toxicity in these mixtures reduces uncertainty related to potential mixture-related effects of multiple water quality constituents.

Available acute testing results indicate that requisite conditions were not met for releases of mine-influenced water to contribute to or cause the WCT decline via acute effects.

2.3.2.3 Evaluation of Potential Chronic Exposure

Table 7 summarizes information about characteristics of the release for each location, for example noting whether the release is via groundwater versus surface water, and provides an interpretation regarding the potential for WCT to have chronic exposure to such conditions. Rationale for this interpretation is as follows:

- For 8 of 19 locations, no chronic exposure pathway was identified because the release either infiltrates to ground (FR_NL1, GH_RLP) or mixes with surface water immediately after release (FR_PP1, FR_LMP1, FR_EC1, FR_LP1, FR_KC1, GH_CC1). For these locations, potential acute exposure to unmixed conditions is assessed in Section 2.3 and potential chronic exposure to mixed conditions downstream of the point of release is assessed in Section 3.0.
- For the remaining 11 of 19 locations (FR_TBM8, FR_CC1, FR_WED1, FR_GC1, FR_SP1, FR_SKP1, FR_SKP2, GH_SC1, GH_SC2, GH_PC1, GH_GH1), surface water is released into a fish accessible channel with no mixing. A chronic exposure pathway would be operable at these locations at times when fish are present. These locations were assessed for potential chronic effects in Section 3.0. The likelihood and potential spatial extent of chronic exposure at each location is discussed in the following bullets:
  - Turn Creek (FR_TBM8) is an ephemeral channel with a 474 m segment that is assumed to be fish accessible (Golder 2018), although this reach was dry during a sampling program in September 2017 and no fish were captured or observed in surveys (Lotic 2018; Robinson 2020). A chronic exposure pathway is possible for Turn Creek, although no fish use has been documented. The fish accessible reach of Turn Creek represents 0.58% of fish habitat in the upper Fording River watershed.
  - Clode Creek (FR_CC1) is a 172 m channel that extends from a fish exclusion structure at the decant of the Clode Sediment Pond to the upper Fording River (Faulkner et al. 2021). The entire channel is accessible to fish, with documented fish use in spawning and summer rearing seasons (Cope et al. 2016). Clode Creek represents 0.33% of fish habitat in the upper Fording River watershed.
  - West Exfiltration Ditch (FR_WED1) is a 284 m channel fed by a combination of groundwater from the upper Fording River and exfiltration from Clode Sediment Pond. The entire channel is accessible to fish (Faulkner et al. 2021), with use recorded for adults, juveniles, and fry (Robinson 2020). West Exfiltration Ditch represents 0.011% of fish habitat in the upper Fording River watershed.
  - Grassy Creek (FR_GC1) is a 236 m channel fed by exfiltration from Clode Sediment Ponds. The entire channel is accessible to fish (Faulkner et al. 2021), with documented use by fry (Robinson 2020). Grassy Creek represents 0.027% of fish habitat in the upper Fording River watershed.
  - Smith Ponds Channel has an assumed length of 253 m that extends from a hanging culvert downstream of the Smith Ponds (FR_SP1) to the Fording River. In the decline window, fish access to this channel was intermittent due to a fish fence in place from September 2018 to spring 2019 (Faulkner et al. 2021). This channel represents 0.16% of fish habitat in the upper Fording River watershed (Faulkner et al. 2021).
  - Kilmarnock Creek has two seasonally wetted channels that receive discharge from the Phase 1 (FR_SKP1) or Phase 2 Sediment Pond (FR_SKP2). The Phase 1 channel extends approximately 200 m to its confluence with a side channel of the Fording River; this channel was accessible to fish prior to the installation of a fish fence in September 2018 (Faulkner et al. 2021). The Phase 2 channel consists of

30 m of riprap followed by 175 m of channel to its confluence with the Fording River; this channel is accessible to fish (Faulkner et al. 2021). These channels represent 0.10% of fish habitat in the upper Fording River watershed. Kilmarnock Creek was identified by Cope et al. (2016) as a high-density spawning location.

- Swift Creek (GH_SC1, GH_SC2) has a main channel (22 m) and a side channel (325 m) that are accessible to fish in the Fording River. In the decline window, fish access to these reaches was intermittent due to a fish fence that was in place from October 2018 to spring 2019 (Faulkner et al. 2021). These reaches represent 0.067% of fish habitat in the upper Fording River watershed.
- Porter Creek (GH_PC1) has a 260 m reach that extends from the Porter Creek Sediment Pond to the Fording River. The entire reach is accessible to fish (Faulkner et al. 2021). This reach represents 0.17% of fish habitat in the upper Fording River watershed.
- Greenhills Creek (GH_GH1) has a 260 m reach that extends from the Greenhills Sediment Pond to the upper Fording River. The entire reach is accessible to fish. This reach represents 0.25% of fish habitat in the upper Fording River watershed. Greenhills Creek was identified by Cope et al. (2016) as a high-density spawning location.

Table 7: Evaluation of Potential Chronic Exposure Pathways at Release Locations

Segment	Description	Teck Coal Water Quality Station	Type of Release	Chronic Pathway for Unmixed Conditions? (1)
S9	Turn Creek	FR_TBM8	Surface water	Possible
	Post Sed. Pond Decant	FR_PP1	Surface water	No
	Clode Settling Pond Decant	FR_CC1	Surface water	Yes
S8	West Exfiltration Ditch	FR_WED1	Surface water	Yes
	Grassy Creek	FR_GC1	Surface water	Yes
	Lake Mountain Sediment Pond Decant	FR_LMP1	Surface water	No
	Eagle Settling Pond Decant	FR_EC1	Surface water	No
	Liverpool Sed. Pond Decant	FR_LP1	Surface water	No
	North Loop Settling Pond Decant	FR_NL1	Groundwater	No
	Smith Ponds Decant	FR_SP1	Surface water	Yes (seasonal)
S7	South Kilmarnock Settling Pond Decant Phase 1	FR_SKP1	Surface water	Yes (seasonal)
	Kilmarnock Cr. D/S of Rock Drain	FR_KC1	Surface water	No
	South Kilmarnock Settling Pond Decant Phase 2	FR_SKP2	Surface water	Yes (seasonal)
	Swift Creek Sed. Pond Decant	GH_SC1	Surface water	Yes (intermittent)
	Swift Creek Sed. Pond Bypass	GH_SC2	Surface water	Yes (intermittent)
	Cataract Creek Sed. Pond Decant	GH_CC1	Surface water	No
S6	Porter Creek Sed. Pond Decant	GH_PC1	Surface water	Yes
S2	Rail Loop Pond	GH_RLP	Groundwater	No
S1	Greenhills Creek Sed. Pond Decant	GH_GH1	Surface water	Yes

Notes: Stations ordered from upstream to downstream. Number refers to the total number of unique sample codes at each station in each year. Names per applicable permits. Sed. = Sediment
(1) Preceding text provides rationale for each designation.

2.3.3 Data Gaps and Uncertainty

Key sources of uncertainty in the evaluation of releases of mine-influenced water are:

- **Rainbow trout as a surrogate for WCT**. The evaluation of potential acute effects for WCT relied on acute testing results and acute screening values for a surrogate species, rainbow trout. This uncertainty is reduced by the analysis presented in Appendix B, which indicated that the congeneric WCT and rainbow trout have similar sensitivity to the six constituents for which acute toxicity data were identified for both species. There remains uncertainty in the application of this finding to other constituents.
- **Combined effects of multiple constituents.** Because the evaluation of releases of mine-influenced water evaluated potential acute effects for individual constituents, there is uncertainty in whether combined effects of multiple constituents may have occurred. This uncertainty is reduced by the review of acute testing results from 104 tests conducted within the decline window that indicated no acute effects. Potential mixture effects are discussed further in Section 3.3.2.9.
- **Data gaps.** It cannot be confirmed that the available dataset captured peak concentrations of all constituents. This uncertainty is partially offset by:
  - The robustness of Teck Coal's surface water quality monitoring program, with many stations being sampled monthly or quarterly, and some of those months being sampled weekly. Acute toxicity testing was conducted as specified in Permit 107517, with testing typically occurring quarterly at points of release. The robustness of these programs is depicted on Figure 2 (surface water) and Figure 3 (toxicity testing), which show that the spatial and temporal distribution of available monitoring data is both extensive (occurring in many places) and intensive (occurring frequently). In the decline window, the dataset for release locations included 731 discrete water quality sampling events and 104 acute tests with rainbow trout.
  - Van Geest et al. (2021) evaluated reported spills in the decline window, with no spills meeting the requisite conditions for causation or contribution[12].
  - Benthic invertebrate communities, which integrate water quality over roughly an annual period, were sampled in the fall of both 2018 and 2019 in the upper Fording River and generally did not show any significant changes compared to previous years of survey (Minnow and Lotic 2020).

  Nevertheless, even with this uncertainty partially offset, it is possible that water quality conditions could have occurred between sampling locations or between sampling events that were not captured in the available dataset.
- **Chronic exposure pathways**. Information at point of release was assessed in this section, and information in fully mixed locations was assessed in Section 3.0. Higher concentrations could occur in some areas between the point of release and the fully mixed monitoring location (i.e., an initial dilution zone). There are seven release locations that this uncertainty applies to, two of which infiltrate to ground (FR_NL1, GH_RLP]

[12] As discussed in Van Geest et al. (2021), two spills to ground could not be ruled out as potential contributors because no relevant water chemistry samples were collected for these events. Evidence for contribution was interpreted to be weak given that the spills occurred in the lower end of the watershed (Greenhills Operations) and at the end of the decline window (August 2019). In addition, for one of these spills, the spill material is expected to dilute in intermediate watercourses. Thus, the role of these spills in the decline was interpreted to be negligible to minor with uncertainty dependent on the spilled material.

and six of which mix with surface water after release (FR_PP1, FR_LMP1, FR_EC1, FR_LP1, GH_CC1).[13] These releases occur in S9, S8, S7, and S2. For the locations that infiltrate to ground, the spatial extent of initial dilution zones at these release locations is uncertain but some mixing would be expected prior to resurfacing. For the surface water releases, GH_CC1 has a monitoring location nearby the discharge (mainstem station FR_FRCP1, which is 0.5 km downstream). For the other surface water releases (FR_PP1, FR_LMP1, FR_EC1, FR_LP1), mainstem station FR_FR2 is the most frequently monitored station downstream, which is between 2.8 km (from FR_LP1) and 6.2 km (from FR_PP1) from the points of release; additional mainstem stations (e.g., FR_MULTIPLATE and FR_FRNTP; 0.36 to 3.4 km from points of release) are located between these releases and FR_FR2, but these two additional stations are monitored less frequently.

- **Constituents that were assessed as TDS**. Components of TDS were not assessed individually; rather, their combined effect was considered through the assessment of TDS. Screening values for TDS were derived with the recognition of the major components of TDS in the Elk Valley (sulphate and its counter-ions [mainly calcium], with relative low proportions of halides). Thus, the interpretation of potential effects of TDS assumes that these screening values accurately reflect the major ion composition measured at points of release. This uncertainty is partially offset by the acute toxicity testing data for rainbow trout, which did not indicate acute effects in any sample regardless of the sample-specific composition of TDS.
- **Screening values**. Screening values were derived from laboratory testing with naïve organisms (without prior exposure) and conditions that are typically aligned with those specified in the protocol (e.g., dissolved oxygen or temperature within a specified range). The application from a controlled laboratory setting to field conditions remains an uncertainty, although this is partially offset by the alignment in the interpretation of water chemistry and acute toxicity testing results.

2.3.4 Concluding Summary and Strength of Evidence

Concentrations of all constituents except dissolved oxygen were below acute screening values for rainbow trout, indicating that acute effects to fish would not be expected. Although the screening values are less conservative than WQGs (where they exist), the strength of evidence is still considered high because the maximum hazard quotients for these constituents were low (0.0006 to 0.39, except for TDS which was 0.75). For TDS, the maximum concentration (3,770 mg/L) was measured in a sample collected from GH_CC1 on 25 February 2019; although no toxicity testing was conducted for this sample, a similar concentration of TDS (3,640 mg/L) was recorded at the same station on 21 January 2019 that did not result in acute effects to rainbow trout (0% mortality).

Potential acute effects were identified for dissolved oxygen in one sample collected from Turn Creek in winter. Thus, the requisite condition to contribute via acute effects was met for one constituent and location. However, the evidence that this one sample contributed to the decline was interpreted to be weak because of uncertainty regarding fish access in winter, a lack of documented fish use in Turn Creek, and, based on telemetry data, a low proportion of adult WCT that were in the adjacent mainstem Fording River of S9 in winter (3.4%). The evaluation of acute water quality stressors was supported by the review of acute testing with rainbow trout, which indicated no acute effects within the decline window.

[13] FR_KC1 was assessed in Section 3.0 because it has a longer sampling frequency relative to FR_SKP1 and FR_SKP2.

Concentrations of 20 constituents were above long-term WQGs in releases of mine-influenced water. For 8 of 19 locations, no chronic exposure pathway was identified because the release infiltrates to ground or mixes with surface water immediately after release. For these locations, because no chronic exposure pathway was identified, chronic effects were ruled out. For the remaining locations, surface water is released into a fish accessible channel with no mixing. Potential chronic effects in the channels downstream of these release locations are assessed in Section 3.0.

Based on the above results, releases of mine-influenced water quality met the requisite conditions to contribute but not to cause the WCT decline.

2.4 Preliminary Evaluation of Cause

For most releases of mine-influenced water in the upper Fording River watershed, the only operable exposure scenario was potential acute exposure at the point of release. Evidence that acute exposure to unmixed mine-influenced water may have contributed to the WCT decline was weak. There was one constituent and location (dissolved oxygen in Turn Creek) for which potential acute effects were identified, and at this location, there was low potential for exposure of fish to such conditions. The role of acute exposure to mine-influenced water in the WCT decline was concluded to be negligible.

A potential for chronic exposure to unmixed mine-influenced water was identified at several locations. The potential for chronic effects at these locations is assessed in Section 3.0.

Section 3.0: Evaluation of Potential Acute and Chronic Effects of Water Quality in Fish Accessible Waters

3.0 EVALUATION OF POTENTIAL ACUTE AND CHRONIC EFFECTS OF WATER QUALITY IN FISH ACCESSIBLE WATERS

This section assesses water quality in fish accessible waters, after the mine-influenced releases assessed in Section 2.0 enter surface waters. As discussed in Section 2.0, there are some mine-influenced releases that are conveyed as surface water via fish-accessible channels to the mainstem Fording River; this section assesses unmixed surface water quality at these locations. At other fish accessible locations, this section assesses mine-influenced releases after mixing into surface water.

This assessment relies on monitoring data collected throughout the upper Fording River watershed that represent the range of chronic exposure conditions for WCT.

3.1 Description of and Rationale for Impact Hypothesis

The impact hypothesis is: *Did exposure to surface water quality in fish accessible waters contribute to or cause the WCT decline?*

This impact hypothesis addresses the widely accepted concepts in toxicology that constituents in water can cause effects to fish either directly as a function of exposure to the constituent in water or indirectly via bioaccumulation (such as for selenium) or through effects on the fish's habitat (such as for nutrients). These concepts are embodied in provincial and federal frameworks for the regulation of water quality as guidelines and permit limits, which include water concentration-based values, tissue-based values for bioaccumulative substances such as selenium, and trophic status classification criteria for nutrients. Surface water quality in fish accessible waters could have contributed to or caused the WCT decline if fish were exposed to conditions in which concentrations of one or more constituents was higher than a threshold for effects.

3.2 Methods

The following sections provide an overview of the assessment approach (Section 3.2.1), spatial boundaries (Section 3.2.2) and monitoring data (Section 3.2.3) used for the assessment, and details of the approach to screening water quality data and evaluating temporal patterns (Section 3.2.4) and the analysis of requisite conditions for water quality, tissue selenium, and chronic toxicity data (Section 3.2.5).

3.2.1 Overview

The evaluation of potential effects of water quality in fish accessible waters was conducted using surface water quality data, tissue selenium data, and chronic toxicity monitoring data.

Water quality data were first evaluated to identify constituents that could have contributed to or solely accounted for the WCT decline. As described in Section 1.4, the evaluation of water quality was a tiered approach that began with a comparison to WQGs to identify constituents that could have contributed to stress to sensitive aquatic life. This initial step included all surface water samples collected in the decline window from fish accessible waters of the upper Fording River. Applying these values first helped to identify all constituents that might have contributed to effects to WCT.

The assessment then proceeded to apply a more refined approach that considered site-specific and species-specific information and that evaluated spatial and temporal trends in water quality. As discussed in more detail in Section 3.2.3.1, the refined approach focused on 25 stations with a sufficiently long sampling history and sampling frequency to support a detailed analysis of spatial and temporal trends.

The refined assessment answered the following questions:

- Were concentrations in the decline window greater than a threshold for effects to WCT, indicating a potential for effects?
- Were fish exposed to higher concentrations in the decline window than previously, indicating worsened conditions? Exposure to higher concentrations could occur because concentrations increased over time or because fish distribution changed in the decline window in a way that increased exposure to water quality stress.

An answer of 'yes' to one or both questions indicates that there is a potential that the constituent could have contributed to or caused the WCT decline and warranted further evaluation to characterize the strength of evidence for contribution or causation.

The comparison to chronic screening values was generally interpreted to provide the most direct test of whether individual water quality constituents could have contributed to or caused the WCT decline. However, increasing concentrations for multiple constituents, even if those constituents remained below screening values, was also interpreted as contributing evidence for an increasing potential for water quality to contribute to overall stress for WCT.

The following attributes were considered for the evaluation of strength of evidence for contribution or causation:

- Magnitude. How high was the concentration relative to a screening value and/or was it higher than previous conditions? Concentrations higher than a screening value would indicate a potential water quality stress that may have affected WCT. If these concentrations were also higher than previous conditions, this finding would support water quality as a potential direct contributor to or cause of the WCT decline. However, even if these concentrations were not higher than previous conditions, water quality could still be supported as contributing to the WCT decline by affecting the resilience of the population to tolerate other stressors.
- Spatial extent. How widespread within the upper Fording River watershed were concentrations greater than a screening value (e.g., as a percent of the total habitat area) or were increasing trends apparent, and how much did these conditions overlap with the spatial distribution of WCT? This attribute addresses the consideration discussed in Section 1.4.2 that the potential for effects of a stressor is proportional to exposure to that stressor. A widespread exposure condition is more likely to contribute to a population-level effect than a localized condition. Conversely, a condition that occurred in a relatively small area could have a disproportionate effect if it overlapped with a congregation of fish.
- Timing and duration. How long were concentrations above a screening value or did the increasing trend last, and how did the timing correspond to the occurrence of fish life stages indicated by the periodicity table and spatiotemporal fish use information? This attribute addresses a similar consideration to that outlined in the preceding bullet for spatial extent.

Tissue selenium data were also evaluated in a tiered approach, first by comparison to generic tissue guidelines and then by a more refined approach that considered site-specific and species-specific information. The refined approach applied tissue-based effects benchmarks that were specifically designed to characterize the potential for selenium to affect WCT under conditions in the Elk Valley. Selenium tissue concentrations are the most reliable basis to evaluate potential effects of selenium to fish (Section 1.4.3). Therefore, in the event of misalignment between the evaluation of aqueous selenium and the evaluation of tissue selenium, the results for tissue selenium were relied upon preferentially. As discussed in Section 1.4.3, selenium is distinct from the other water quality constituents considered in this evaluation because it is a bioaccumulative substance that can cause effects to

sensitive species and life stages when bioaccumulated concentrations exceed tissue-based thresholds for effect. The exposure route and mode of effects of selenium are distinct from the other water quality constituents, for which potential effects are evaluated by considering direct exposure to aqueous concentrations. Following the approach taken in generic WQGs and the site-specific conclusions of Windward (2015), the evaluation herein for constituents other than selenium focused on water quality, rather than tissue chemistry.[14]

Chronic toxicity monitoring data were reviewed to evaluate whether there was evidence of an effect of Fording River water quality to fish embryos and alevins in laboratory testing. Chronic toxicity monitoring results provide a measure of potential effects associated with the mixture of constituents measured in surface water samples, and thereby help to reduce uncertainty related to potential mixture-related effects of multiple water quality constituents. This monitoring relies on sensitive laboratory test species (rainbow trout and fathead minnow) but is assumed to reflect potential effects on early life stages of any fish species, including WCT. It was necessary to assume that these data also characterize potential effects to juveniles and adults. Because juveniles and adults are often less sensitive than embryos and larvae, there is uncertainty and potential conservatism in interpreting chronic toxicity monitoring results to indicate potential effects to adult and juvenile fish.

3.2.2 Spatial Boundaries

Spatial boundaries for the initial screening against WQGs encompassed all fish accessible locations in the upper Fording River watershed at which surface water samples were collected in the decline window. This screening included 86 fish accessible stations representing both unmixed surface water quality (at 11 mine-release locations identified in Section 2.3.2.3 as having a potential chronic pathway) and mixed surface water quality (at 75 additional stations).

The initial screening was followed by a more refined assessment at 15 monitoring stations on the Fording River mainstem and 10 fish accessible tributary stations (Figure 10; see Section 3.2.3.1 for a summary of data and Table 8 for a list of stations). These 25 stations were the focus of the more refined assessment against requisite conditions because they have a longer sampling history and higher sampling frequency relative to other stations in the upper Fording River watershed. This long-term monitoring dataset allowed for a detailed analysis of spatial and temporal trends with consistent sampling throughout the decline window and in prior years. The 25 stations encompass key habitat areas identified in WCT population monitoring (e.g., Henretta Pit Lake[15], Segment S6 of the Fording River upstream of Chauncey Creek) and align with stations sampled under the regional aquatic effects monitoring program (RAEMP; Minnow 2018), local aquatic effects monitoring programs (LAEMPs; Minnow and Lotic 2020), and the chronic toxicity monitoring program (Golder 2020b). Conditions at these 25 stations were confirmed to adequately represent the range of conditions throughout the upper Fording River watershed by comparing to screening results for all monitored locations (as discussed above). The 25 stations included in the refined assessment had the same list of constituents identified as potential chronic stressors and the same maximum measured concentrations of those constituents as the full list of all monitored stations.[16]

[14] Windward (2015) evaluated potential effects to fish in the Elk Valley from dietary metal concentrations and tissue selenium and mercury concentrations. Windward (2015) identified five constituents (cadmium, chromium, mercury [diet only], selenium [diet and tissue], and vanadium) with 95th percentile concentrations higher than fish benchmark values; each constituent was then investigated further, including consideration of the uncertainty in the benchmarks, magnitude of benchmark exceedance, and evidence of mine-related exceedances. For constituents other than selenium, Windward (2015) concluded that future monitoring and assessments should focus on lines of evidence other than tissue (water, sediment, and biological data). For selenium, Windward (2015) recommended continued monitoring and assessment of tissue concentrations.

[15] Water quality station FR_HC1, which is located on Henretta Creek approximately 100 m downstream from Henretta Lake, was used to evaluate potential effects of water quality in Henretta Lake.

[16] Exceptions are a single measured dissolved oxygen concentration in Turn Creek (discussed in Section 2.3.2.1) and values measured on one day in February 2019 in the Fording River upstream of mining (RG_UFR1); for both of these sampling events, the field notes indicated

In addition to water quality monitoring, tissue selenium monitoring in the decline window was conducted at 22 of 25 water quality stations included in the refined assessment[17] plus an additional 6 mainstem stations, 1 tributary station, and 9 lentic areas (see Section 3.2.3.2 for a summary of data). Chronic toxicity monitoring was conducted at four of the water quality stations shown on Figure 10 (FR_UFR1, FR_FRCP1, FR_FRABCH, GH_FR1; see Section 3.2.3.3 for a summary of data).

Most portions of mainstem and tributary habitat in the upper Fording River watershed are assumed to have fish access and use by WCT in one or more seasons. Exceptions are segments of tributaries upstream of barriers to fish movement, such as exist on Chauncey Creek, Swift Creek, Cataract Creek, Kilmarnock Creek, and Dry Creek; segments that are not accessible to the upper Fording River WCT population are not assessed herein. Fish access to Swift Creek was also restricted from October 2018 to freshet 2019 by a fish fence at the mouth of the creek; although access to Swift Creek was intermittent in the decline window, Swift Creek was included in the assessment conducted herein. Similarly, fish access to Kilmarnock Creek Phase 1 discharge channel was also restricted after September 2018 due to a fish fence which was installed at the confluence with the Fording River Side Channel. Fish movement and fish access considerations are discussed in detail in Hardwood et al. (2021) and Faulkner et al. (2021).

very cold conditions with thick ice and/or slushy conditions. In addition, water quality was variable between Clode Creek (included in the refined assessment) and Grassy Creek (for which too few data were available for the refined assessment), even though both creeks are fed by water from Clode Settling Pond. Maximum nitrate and lithium concentrations reported for Grassy Creek were sometimes higher than in Clode Creek. Based on the small size and limited fish use of these creeks, and their similarity in water quality otherwise, this variability is not expected to materially affect the overall conclusions of the assessment.

[17] The 3 of 25 stations in the refined assessment that did not have tissue selenium data collected in the decline window were lower Henretta, Chauncey, and Porter creeks.

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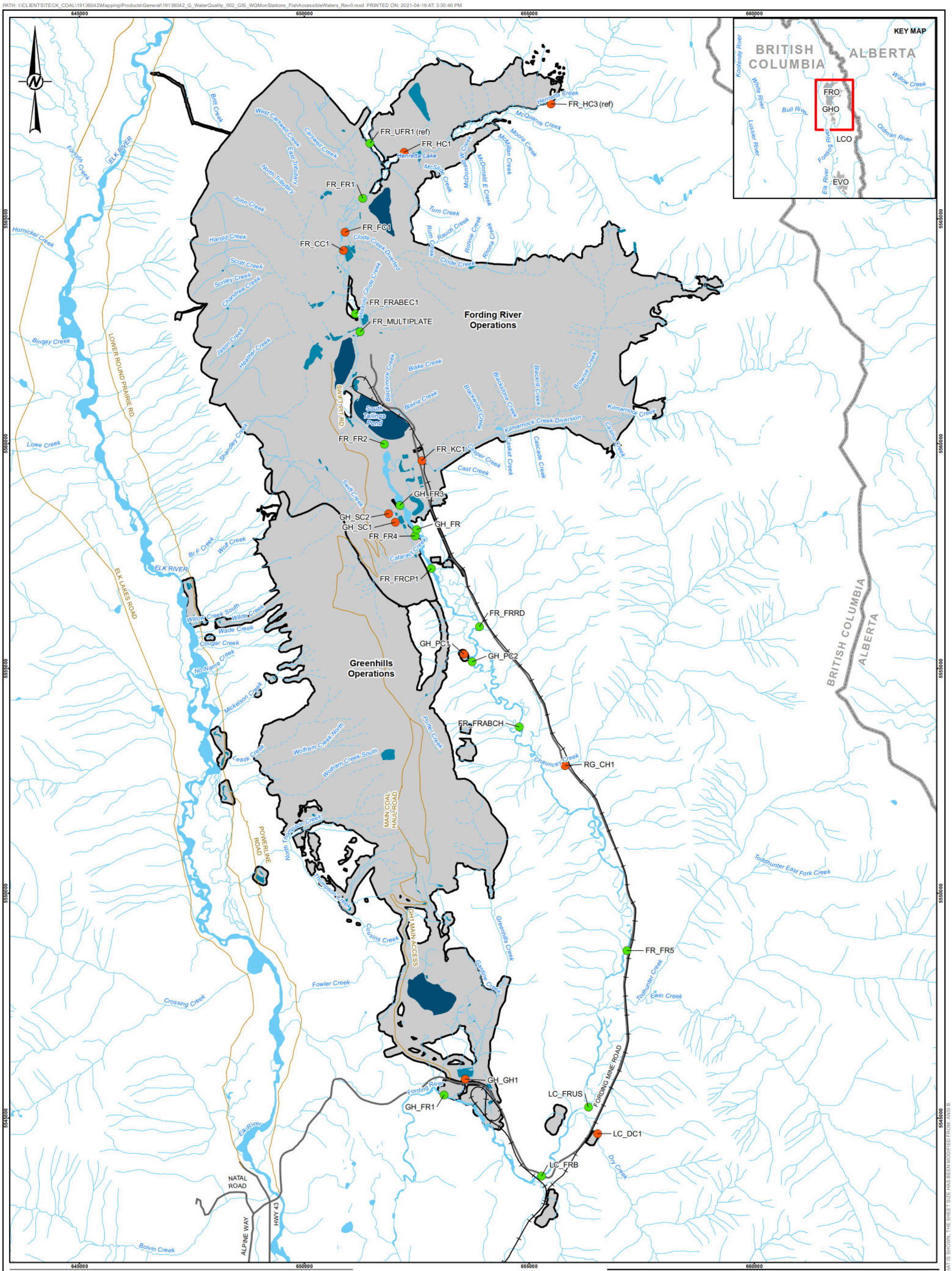

LEGEND

- RAILWAY
- ROAD - PAVED
- ROAD - UNPAVED
- SURFACE FLOW WATERCOURSE
- SUBSURFACE FLOW WATERCOURSE
- BRITISH COLUMBIA - ALBERTA BORDER
- C-2 PERMIT BOUNDARY
- WASTE WATER/SEDIMENT POND
- TAILINGS POND
- WATERBODY

WATER QUALITY MONITORING STATIONS

- MAINSTREAM FORDING RIVER
- TRIBUTARIES

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PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT
TECK COAL LIMITED

PROJECT
EVALUATION OF SURFACE WATER QUALITY—SME REPORT FOR EVALUATION OF CAUSE: UPPER FORDING RIVER WESTSLOPE CUTTHROAT TROUT POPULATION DECLINE

TITLE
WATER QUALITY MONITORING STATIONS FOR FISH ACCESSIBLE WATERS

CONSULTANT
GOLDER

YYYY-MM-DD	2021-04-19
DESIGNED	JC
PREPARED	DR
REVIEWED	EJC
APPROVED	AdB

PROJECT NO.	CONTROL	REV.	FIGURE
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3.2.3 Data Summary

3.2.3.1 Water Quality

Water quality data for all surface water monitoring locations were provided by Teck Coal. Teck Coal houses these data in their Environmental Quality Information System (EQuIS). As discussed in Teck Coal's annual water quality report (e.g., Teck Coal 2020), Teck Coal has established a Quality Assurance/Quality Control (QA/QC) program to promote the collection of high-quality environmental data. Teck Coal has developed protocols and procedures to collect representative samples and to minimize the potential for deterioration and contamination of samples before laboratory analysis (e.g., see Teck Coal 2020).

The data provided by Teck Coal were relied upon for the analyses conducted herein, and no formal or thorough review of data quality was conducted. However, when processing data for the 25 stations included in the refined assessment, the following issues were identified and resolved prior to conducting analyses:

- Field blanks and field duplicates (115 samples; Attachment A, Table A2) were identified as sample codes or types with "FB", "FD", or "FB-HG". Teck Coal confirmed that these samples were blanks or duplicates, and they were excluded from the dataset.
- Duplicated entries (48 cases; Attachment A, Table A3) were flagged because the station had two entries on the same date with different sample codes and/or sample IDs. In all cases, one or more constituents had identical values in the two entries. When this occurred, per agreement with Teck Coal, the entries were resolved such that constituents with identical values were included once per sample date.
- Mismatch of chemical name and unit (2 cases) occurred for: 1) a field dissolved oxygen measurement collected from GH_PC2 on 27 April 2015 (units in vol%); and 2) a field oxidation reduction potential (ORP) measurement collected from GH_FR1 on 4 February 2013 (units in µS/cm). Based on direction from Teck Coal, these units were changed to mg/L for the dissolved oxygen measurement and millivolts (mV) for the ORP measurement.
- Duplicate analyses. Where two different entries were encountered for the same station, date, sample code, and constituent, the maximum value was used to be conservative (except for dissolved oxygen, for which a minimum value was used). For example, sample code GH_CC1_WS_2014-06-02_N had two entries for lab turbidity: 0.52 nephelometric turbidity units (NTU) and 0.7 NTU. The higher of these values (0.7 NTU) was used.
- Values outside of theoretical limits (3 cases) occurred for: 1) dissolved oxygen at FR_FRCP1 on 14 August 2018 (result = 1,060 mg/L); 2) dissolved oxygen at FR_FRCP1 on 7 August 2018 (result = 865%); and 3) field pH at FR_HC3 on 18 June 2012 (result = 200.9). These results were excluded from the analysis because they were outside of theoretical limits.
- Constituents not relevant to effects of water quality. These were: cation-anion balance, depth to water function, ion balance, major anion sum, major cation sum, pin height, daily flow, instantaneous flow, staff gauge height, and unknown parameters from Brooks laboratory. These entries were removed.

An important challenge in interpreting trends in water quality was changes to method detection limits over time. Where results were reported as below the detection limit, the full detection limit was used for the evaluation conducted herein. No effort was made to adjust the dataset to remove anomalous or historically high detection limits. Elevated detection limits for constituents would potentially result in more constituents screening in based on elevated DLs. In the case of chloride for which elevated detection limits have been identified, elevated detection limits were replaced with the lowest detection limit in the dataset (0.5 mg/L) for nitrite screening to avoid underestimating potential effects (see Section 3.2.4.1).

After accounting for the above adjustments, the number of samples per year by station is summarized in Table 8. The list of constituents included field parameters, conventional parameters, major ions, nutrients, total and dissolved metals, PAHs, volatile organics, and selenium species (Appendix A, Table A5).

Table 8: Water Quality Samples by Station and Year for the Refined Assessment

Description	Teck Coal Water Quality Station(s)	2012	2013	2014	2015	2016	2017	2018	2019	Total	Decline Window
Mainstem Fording River											
u/s Henretta Cr. and FRO (reference)	*FR_UFR1*	27	30	27	42	36	39	35	39	275	76
d/s Henretta Cr.	FR_FR1	18	51	21	34	22	24	18	25	213	43
d/s North Greenhills Diversion	FR_FRABEC1	15	58	3	5	10	1	0	0	92	0
Multiplate Culvert	FR_MULTIPLATE	15	47	5	5	21	3	11	4	111	15
u/s Kilmarnock Cr.	FR_FR2	28	92	30	35	29	37	26	35	312	60
d/s Kilmarnock & u/s Swift Cr.	FR_FR3, FR_SWFTCRBRDG[a]	1	18	3	3	4	1	12	5	47	16
d/s Swift Cr., u/s Cataract Cr.	FR_FR4, GH_FR[b]	25	49	27	27	13	8	10	4	163	16
d/s Cataract, u/s Porter	FR_FRCP1	0	0	0	44	38	38	40	49	209	87
u/s Porter	FR_FRRD	0	0	1	29	13	17	13	12	85	26
d/s Porter Cr., u/s Chauncey Cr.	GH_PC2	24	29	30	28	0	0	10	2	123	12
u/s Chauncey Creek	FR_FRABCH	0	1	0	12	10	16	31	41	111	72
d/s Chauncey Cr., u/s Ewin Cr.	FR_FR5	16	14	10	16	13	13	13	3	98	19
Fording River u/s Dry Creek	LC_FRUS	0	2	21	9	0	1	1	6	40	8
d/s Dry Cr., u/s GHO	LC_FRB	8	10	17	12	12	11	26	39	135	65
d/s GHO and Greenhills Cr.	GH_FR1	25	28	26	35	41	42	55	42	294	101
Tributaries											
Henretta Creek (reference)	*FR_HC3*	27	10	3	18	26	33	25	26	168	52
Chauncey Creek (reference)	*RG_CH1*	14	16	26	26	22	13	24	26	167	51
Henretta Creek	FR_HC1	25	60	26	28	28	29	25	27	248	53
Fish Pond Creek	FR_FC1	7	11	4	1	3	6	1	0	33	2
Clode Creek	FR_CC1	26	49	46	34	27	28	27	28	265	56
Kilmarnock Creek	FR_KC1	38	28	26	26	28	28	26	28	228	54
Swift Creek	GH_SC1-2	26	30	27	37	28	32	34	41	255	66
Porter Creek	GH_PC1	25	29	28	28	28	31	25	26	220	53
LCO Dry Creek	LC_DC1	10	11	34	32	31	62	38	87	305	127
Greenhills Creek	GH_GH1[c]	25	36	36	31	29	32	37	44	270	78

Notes: Mainstem and tributary stations are ordered from upstream to downstream. Number refers to the total number of unique sample codes at each station in each year. d/s = downstream; u/s = upstream

(a) Referred to as FR_FR3 in the remainder of the report.

(b) Referred to as FR_FR4 in the remainder of the report.

(c) Station GH_GH1 (decant to the settling pond) was used instead of GH_GH2 (in-stream station downstream of the settling pond) because there are no sources of dilution between the two locations and the sampling frequency was higher in the decline window at GH_GH1 (78 samples) compared to GH_GH2 (33 samples).

Appendix A, Table A5 shows the number of samples and detection frequency by constituent and unit for samples collected from the refined station list in the decline window. For this timeframe, there were 149 combinations of constituents and units. The total of 149 includes constituents that appear under several lists and/or for several units.

The appendices of this report include results for all measured constituents and stations. There was a subset of constituents that were not carried forward for evaluation in the body of this report because one or more of the following was true for the decline window (Appendix A, Table A5):

- Concentrations were never detected at any station (41 constituents). This occurred for conventional parameters (hydroxide alkalinity and hydroxide), major ions (carbonate), nutrients (biological oxygen demand), total metals (bismuth, tellurium, thorium, tungsten), dissolved metals (beryllium, bismuth, mercury, silver, tin, titanium), PAHs (all except phenanthrene and 2-methylnaphthalene), and volatile organics (all). For the constituents in this list with WQGs, detection limits were below WQGs except for one mercury sample (discussed in Section 3.3.1.1). These constituents were interpreted to have a negligible potential for effect on WCT and were not carried forward. Many of these constituents are also considered in the following bullets (i.e., are not toxicants or are considered in the evaluation of TDS).
- Constituents that are not normally considered to be toxicants to aquatic life (13 constituents). These were acidity, ORP (lab and field), Total Kjeldahl nitrogen, total organic carbon (TOC), DOC, total phosphorus, ortho-phosphate, colour, and total/dissolved silicon. For TOC and DOC, the BC WQGs for the protection of aquatic life are intended to prevent reductions in primary productivity and increasing susceptibility to other toxicants (e.g., metals). The first component (primary productivity) was covered in the evaluation of potential nutrient enrichment (Section 4.0) and the second component (susceptibility to toxicants) was captured in WQGs and benchmarks where relevant (e.g., as an ameliorating factor of copper toxicity in the short-term and long-term BC WQGs). Total phosphorus and ortho-phosphate were also evaluated in Section 4.0.
- Concentrations were reported for individual selenium species (8 constituents). Selenium species themselves are not expected to cause direct effects at the concentrations reported herein, and therefore were assessed through their combined contribution to total aqueous selenium and tissue selenium concentrations. Individual selenium species were not carried forward.
- Constituents that were assessed as TDS (19 constituents). Conductivity and specific conductance, hardness, alkalinity (total, bicarbonate, carbonate, hydroxide), and major cations were assessed via their combined contribution to TDS.
- Constituents that are being assessed elsewhere (5 constituents). This applied to temperature, turbidity (field and lab), and total suspended solids (field and lab) (see Ganshorn et al. [2021] and Wright et al. [2021]).
- Constituents represented twice (2 constituents). This applies to dissolved oxygen and sulphide. Dissolved oxygen was assessed in units of milligrams per litre (mg/L) instead of units of percent because mg/L aligns with that used for BC WQGs. Sulphide was assessed instead of hydrogen sulphide because the BC WQG is for sulphide.
- Concentrations were measured in too few samples to assess potential effects (7 constituents). This occurred for total metals (cesium, rubidium, sulphur, zirconium; 1 sample) and PAHs (2-methylnaphthalene and phenanthrene; 9 samples, with 1 detected concentration). Total tin and total titanium were not assessed further because concentrations were detected in 1% of samples.

Table 9 lists the constituents that were assessed in the evaluation of potential effects of surface water quality. For metals, both the total and dissolved fractions were carried forward for analysis. Interpretation of potential effects was based on the fraction (dissolved or total) associated with WQGs.

Table 9: Constituents Assessed for Potential Effects at Fish Accessible Stations (All Stations Combined)

Constituent	Unit	Decline Window	
		Count	% Detect
Field Measured			
pH	-	1,078	100%
Dissolved oxygen	mg/L	1,075	100%
Conventional Parameters			
pH	-	878	100%
Total dissolved solids	mg/L	877	100%
Major Ions			
Bromide	mg/L	878	2%
Chloride	mg/L	878	47%
Fluoride	mg/L	878	96%
Sulphate	mg/L	878	100%
Sulphide	mg/L	190	5%
Nutrients and Biological Indicators			
Nitrate	mg-N/L	879	99%
Nitrite	mg-N/L	878	70%
Total ammonia	mg-N/L	878	83%
Total Metals			
Aluminum	mg/L	878	78%
Antimony	mg/L	878	69%
Arsenic	mg/L	878	78%
Barium	mg/L	878	100%
Beryllium	mg/L	877	3%
Boron	mg/L	878	29%
Cadmium	mg/L	878	98%
Chromium	mg/L	878	79%
Cobalt	mg/L	878	32%
Copper	mg/L	878	11%
Iron	mg/L	878	65%
Lead	mg/L	878	15%
Lithium	mg/L	878	97%
Manganese	mg/L	878	98%
Mercury	mg/L	874	34%
Methyl mercury	mg/L	134	16%
Molybdenum	mg/L	878	100%
Nickel	mg/L	878	78%
Selenium	mg/L	879	100%
Silver	mg/L	878	4%
Strontium	mg/L	878	100%
Thallium	mg/L	878	23%
Uranium	mg/L	878	100%
Vanadium	mg/L	878	22%
Zinc	mg/L	878	26%
Dissolved Metals			
Aluminum	mg/L	877	13%
Antimony	mg/L	877	62%
Arsenic	mg/L	877	40%
Barium	mg/L	876	100%
Boron	mg/L	877	24%
Cadmium	mg/L	877	90%
Chromium	mg/L	877	33%
Cobalt	mg/L	877	21%
Copper	mg/L	877	5%
Iron	mg/L	877	4%
Lead	mg/L	877	1%
Lithium	mg/L	877	97%
Manganese	mg/L	876	90%
Molybdenum	mg/L	877	100%

Table 9: Constituents Assessed for Potential Effects at Fish Accessible Stations (All Stations Combined)

Constituent	Unit	Decline Window	
		Count	% Detect
Nickel	mg/L	877	73%
Selenium	mg/L	878	100%
Strontium	mg/L	877	100%
Thallium	mg/L	877	17%
Uranium	mg/L	877	100%
Vanadium	mg/L	877	6%
Zinc	mg/L	877	31%

mg-N/L = milligrams per litre as nitrogen;% detect = percent of samples above the method detection limit.

3.2.3.2 Tissue Selenium

Teck Coal collects tissue selenium data from the upper Fording River watershed as part of several monitoring programs, including LAEMPs and RAEMPs, as well as opportunistic sampling. Tissue selenium data were summarized for benthic invertebrates and WCT from the sources below.

For benthic invertebrates, Minnow provided Golder with invertebrate selenium concentrations measured between 2012 and 2019 at lotic and lentic stations.[18] These data are provided in Appendix A, Table A6. From September 2012 to September 2019, 473 benthic invertebrate tissue samples were collected (Figure 11; Table 10); most of these samples (375 of 473) were collected in the decline window. Invertebrate selenium concentrations were used to assess potential effects on growth of WCT (see Section 3.2.5.2). Invertebrate tissue sampling has been relatively consistent over time; thus, the dataset for invertebrate selenium concentrations supports a reliable assessment of trends over time.

[18] Invertebrate tissue samples collected from Henretta Lake in February 2019 were not used herein because of elevated uncertainty in the reliability of reported data. These samples were analyzed by two laboratories (TrichAnalytics and ALS), and a consistent disparity in results between laboratories prompted an interlaboratory evaluation study. The interlaboratory study identified an issue of reduced data quality for certain sample types, including those collected in Henretta Lake in February 2019.

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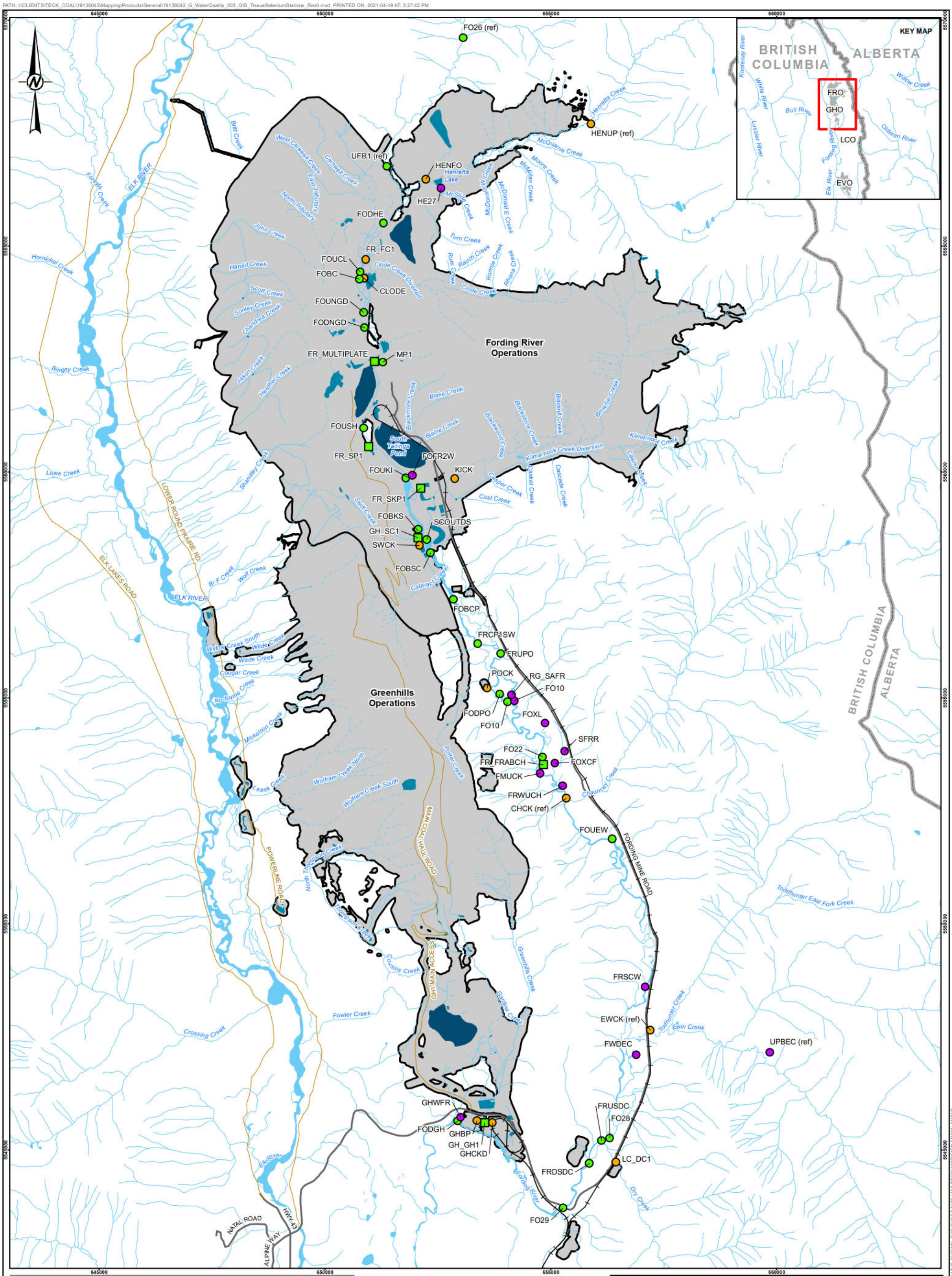

LEGEND

- RAILWAY
- ROAD - PAVED
- ROAD - UNPAVED
- SURFACE FLOW WATERCOURSE
- SUBSURFACE FLOW WATERCOURSE
- BRITISH COLUMBIA - ALBERTA BORDER
- C-2 PERMIT BOUNDARY
- WASTE WATER/SEDIMENT POND
- TAILINGS POND
- WATERBODY

TISSUE SELENIUM STATIONS

- INVERTEBRATE LENTIC
- INVERTEBRATE MAINSTEM
- INVERTEBRATE TRIBUTARY
- WTC MAINSTEM

0 1,500 3,000
1:80,000 METRES

REFERENCE(S)

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PROJECT
EVALUATION OF SURFACE WATER QUALITY—SME REPORT FOR EVALUATION OF CAUSE: UPPER FORDING RIVER WESTSLOPE CUTTHROAT TROUT POPULATION DECLINE

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PREPARED	DR
REVIEWED	EJC
APPROVED	AdB

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25mm
0

Table 10: Number of Benthic Invertebrate Tissue Samples Collected from 2012 to 2019

Biological Monitoring Area	Teck Coal Water Station Code	Winter		Spring					Summer-Fall						
		2018	2019	2013	2014	2015	2018	2019	2012	2014	2015	2016	2017	2018	2019
Lotic Mainstem Stations															
FO26	*FR_UFR1*							3	3		1	1	1	3	3
UFR1	*FR_UFR1*	3	3												
FODHE	FR_FR1	3						3	1		1		1	3	3
FOUCL	RG_FOUCL														3
FOBC	-			1		1									
FOUNGD	RG_FOUNGD	3	3					3	1		2		1	3	3
FODNGD	FR_FRABEC1	3	3					3					1	3	3
MP1	FR_MULTIPLATE	3	3					3	1		1		1	3	3
FOUSH	FR_FRNTP, RG_FOUSH	3	3					3	1		1		1	3	3
FOUKI	FR_FR2	6	3					3	1		1	1	3	3	3
FOBKS	GH_FR3	6	1					3	1		1		3	3	3
SCOUTDS	RG_SCOUTDS														3
FOBSC	FR_FR4, GH_FR	3						3	1		1		1	3	3
FOBCP	FR_FRCP1	3	3					3	1		1	1	1	5	5
FRCP1SW	FR_FRCP1SW							3					1		3
FRUPO	FR_FRRD	4	3					3					1	3	3
FO10 [1]	-				1						4				
FODPO	GH_PC2	4	3					3	1		1	1	1	3	3
FO22	FR_FRABCH	4	3					3	1		1		1	5	5
FOUEW	FR_FR5	4	3					3	1		1	1	1	3	3
FO28	LC_FRUS								1	1	1	1	2	3	5
FRUSDC	-									1					
FRDSDC	-									1					
FO29	LC_FRB			1	1	1			1		1	1	1	3	5
FODGH	GH_FR1								1		1	1	1	5	5
Lotic Tributary Stations															
HENUP	FR_HC3							3	1			1	1	3	3
CHCK	RG_CH1			1	1				1						
EWCK	-								1						
HENFO	FR_HC1								1		1				
FR_FC1	FR_FC1													1	1
CLODE	FR_CC1													1	1
KICK	FR_KC1								1		1			1	1
SWCK	GH_SC1-2								1		1				
POCK	GH_PC1								1		1				
LC_DC1	LC_DC1	5						8	1	1	1	1	2	3	5
GHBP	-		3											3	3
GHCKD	GH_GH1								2		1			3	1
Lentic Stations															
UPBEC	-							3							3
HE27	-						3	3	1		3				
FOFR2W	-						6	3	1						
FO10 [1]	-								3						
RG_SAFR [2]	-						3								
FOXL	-								3		3				
SFRR	-						3								
FOXCF	-						6								
FMUCK	-										3				
FRWUCH	-						3								
FRSCW	-							3							
FWDEC	-						3				3				
GHWFR	-										3				

'-' indicates no corresponding water quality station. Blank cells indicate no samples were collected for the corresponding station, year, and season. Years shaded grey indicate one or more samples in the corresponding year and season could have been collected between September 2017 and September 2019.

Notes: Winter is defined as 15 October to 31 March, spring is defined as 1 April to 15 July, and summer-fall is defined as 16 July to 15 October; these ranges generally align with WCT periodicity (see Section 3.2.5.1.2 for rationale). [1] FO10 was lentic prior to 2013, and lotic from 2013 onwards due to the 2013 flood. In spring 2015, three samples were collected from FO10 and one sample was collected from (2) Samples were originally labelled as being collected from FO10, but the station was corrected to RG_SAFR per direction from Minnow Environmental.

For WCT, Minnow provided muscle data collected from biological monitoring programs in 2018; all other WCT data were provided by Teck Coal from opportunistic sampling conducted between 2017 and 2019.[19] Data collected in the decline window are provided in Appendix A, Table A7. In the decline window, 90 WCT tissue samples were collected (Figure 11; Table 11; 87 muscle and 3 ovary). This includes 59 muscle samples collected in 2018 (16 from the mainstem Fording River and 43 from Kilmarnock Creek), 28 muscle samples collected in 2019 (9 from Smith Ponds, 9 from Swift Creek, and 10 from lower Greenhills Creek), and 3 ovary samples collected in 2019 from lower Greenhills Creek. Historical WCT tissue data (i.e., those collected prior to the decline window) were not compiled herein because fish sampling has not been consistent over time and space. Historical sampling targeted sediment ponds, and more recently Teck Coal has improved their fish exclusion efforts from these locations. Therefore, the dataset does not support a reliable assessment of trends over time across the upper Fording River watershed, either by comparison to the historical dataset (prior to the decline window) or by comparison between years in the decline window (2018 versus 2019). This is not considered a data gap because invertebrate selenium concentrations (for which a trend assessment can be conducted) are a reliable indicator of selenium exposure for fish.

WCT tissue samples collected in 2018 were considered more representative of the overall distribution of fish in the upper Fording River watershed because 2018 sampling included mainstem stations, whereas 2019 did not. This interpretation is based on the spatiotemporal fish use information from the telemetry study (EoC Team 2021 using data collected by Cope et al. 2016), which found that most adult fish reside in the mainstem Fording River (between 88% and 90% depending on the season) relative to tributaries (between 10 and 12% depending on the season). This interpretation is further supported by the fact that mainstem stations sampled in 2018 were in S8 (FR_MULTIPLATE) and S6 (FR_FRABCH); combined, these segments accounted for 59% of adult fish use in winter, 28% of adult fish use in summer, and 42% of fish use in spring.

Table 11: Selenium Concentrations in WCT Muscle and Ovary Samples Collected in the Decline Window

Segment	Water Station Code	Year	Month	Number of Muscle Samples
Lotic Mainstem				
8	FR_MULTIPLATE	2018	Sep	8
6	FR_FRABCH	2018	Sep	8
Lotic Tributary				
8	FR_SP1 (Smith Ponds Decant)	2019	Sep	9
7	FR_SKP1 (Kilmarnock)	2018	June	1
			Sep	42
	GH_SC1 (Swift)	2019	Sep	1
			Oct	8
2	GH_GH1 (Greenhills)	2019	Jul	3 (and 3 ovary)
			Oct	7

[19] WCT tissue samples collected from Henretta Lake in February 2019 were not used herein. These samples were analyzed by two labs (Trich and ALS), and the disparity was the impetus for an interlab study.

3.2.3.3 Chronic Toxicity Testing

Teck Coal conducts quarterly and semi-annual chronic toxicity testing of water samples at compliance points in the Elk Valley. Test organisms and procedures used in the quarterly and semi-annual testing program follow the requirements outlined in Permit 107517 Section 9.8(ii). An overview of this program is provided in Table 12.

Table 12: Summary of Quarterly and Semi-Annual Toxicity Tests Conducted to Satisfy Section 9.8(ii) of Permit 107517

Test Species	Test Duration [days]	Endpoint(s)	Test Protocol	Number of Replicates per Test	Frequency of Testing
Rainbow trout *Oncorhynchus mykiss*	30	Survival, viability (including deformities), length, weight, behaviour[(a)]	Environment Canada (1998) embryo-alevin test	4	Semi-annual
Fathead minnow *Pimephales promelas*	28 days post-hatch[(b)]	Survival, hatch, length, biomass, normal development	US EPA (1996) and ASTM (2013)	4	Quarterly (2015-2018); semi-annual (2019)
Water flea *Ceriodaphnia dubia*	7 ± 1	Survival and reproduction	Environment Canada (2007a)	10	Quarterly
Green alga *Pseudokirchneriella subcapitata* [(c)]	3	Cell yield (growth inhibition)	Environment Canada (2007b)	8 (reference and control); 4 (test sites)	Quarterly
Amphipod *Hyalella azteca*	28	Survival and growth	Modified from US EPA (2000), as described in Norberg-King et al. (2014)	5	Semi-annual

(a) The behaviour endpoint documents unusual behaviours. Permit 107517 also includes hatching as an endpoint. Hatch rate is not part of the Environment Canada (1998) protocol. However, the survival endpoint provides an appropriate measure of successful hatch, since the test is terminated shortly following hatch (Golder 2020b).
(b) Test duration is from <24-hour eggs until the organisms reach 28 days post-hatch. Total test duration is usually between 30 and 32 days (Golder 2020b).
(c) Recently reclassified as *Raphidocelis subcapitata*.

For the Evaluation of Cause conducted herein, chronic testing results between 2015 and 2019 were summarized from Golder (2020b) for fish species. Fish effects data from tests with rainbow trout and fathead minnow were included in this summary because they are expected to be directly relevant to assessing potential effects of a mixture of constituents to WCT. Chronic testing results for invertebrates and algae discussed in Golder (2020b) are not summarized herein because these test species are not directly relevant to assessing potential effects to fish. Orr and Ings (2021) evaluates potential indirect effects to WCT via changes to benthic invertebrate abundance as a food source.

Annual interpretive reports (e.g., Golder 2020b) contain detailed methods and results for testing between 2015 and 2019. In each annual report, responses are categorized based on effect size and comparison to typical responses in reference waters up to and including the year of that annual report (see Section 3.3.2.8 for more details). A causation assessment is then conducted to identify water quality constituents that potentially contributed to adverse responses. Components used in the causation assessment are toxicity identification evaluations (TIEs)[20], comparison of water quality data against WQGs and EVWQP benchmarks, Spearman rank order correlations between test responses and water quality constituents, and graphical analysis, which are used in combination to identify potential contributors to adverse responses.

[20] TIE is a laboratory procedure used to isolate and identify causative constituents.

Aside from water quality constituents contributing to adverse responses, microbial or fungal growth has also been identified as a common cause of adverse responses in fish tests. Microbial interferences were first identified by Nautilus (the testing laboratory) in 2015 fathead minnow tests. Nautilus showed that toxicity tests in site water collected from the Elk Valley, including Fording River reference water, showed effects to survival that were consistently different than survival of test organisms in the laboratory control water, and that samples collected from sites downstream of mine operations did not consistently show effects greater than upstream reference sites. Nautilus conducted a TIE and attributed these results to fungi or other microbes in the test. Such effects have been termed sporadic mortality phenomenon.[21]

In subsequent rounds of testing for the chronic toxicity monitoring program, microbial interferences have been documented for fathead minnow and rainbow trout. When the microbial-related effects have been sufficiently pronounced, the testing laboratory has identified these tests in the formal laboratory report. For both species, the uncertainty related to microbial growth has been substantially reduced through the use of copper amendments to site water.[22] However, even with copper amendments, the laboratory continues to identify microbial interferences (albeit to a reduced frequency) in chronic fish tests. Understanding of how to interpret evidence of microbial effects continues to evolve through the ongoing testing programs and integrated evaluations conducted by Teck Coal for annual reporting. Sporadic microbial observations noted in some historical laboratory reports are now being re-evaluated to further understand the potential role of microbes in more tests than had previously been linked to potential microbial artefacts. Thus, although the fish tests are a useful line of evidence for evaluating effects of a mixture of water quality constituents, chronic toxicity testing results should be reviewed in consideration of this potential confounding factor.

Fish results were summarized from annual interpretive reports for the four stations in the upper Fording River watershed that are included in the chronic toxicity monitoring program. All four of these stations are located on the mainstem Fording River (reference station FR_UFR1 and three stations downstream of mining: FR_FRCP1, GH_FR1, and FR_FRABCH; shown on Figure 12). The following information from Golder (2020b) is provided herein:

- To summarize results by fish species, plots showing mean results over time were included in Section 3.3.2.8 for each endpoint with a statistically significant effect relative to one or more reference waters. Fording River stations and Elk Valley reference stations are shown on these plots. Eight sampling events occurred in the decline window: Q4 2017, Q1 to Q4 2018, and Q1 to Q3 2019.
- To illustrate the evaluation of concentration-response relationships in the annual reports, plots showing mean early life stage survival (the most relevant endpoint for the evaluation of cause) relative to four constituents (nitrate, sulphate, TDS, and lithium) were included in Section 3.3.2.8. Nitrate, sulphate, and TDS were selected because they were identified as a potential cause of observed responses in one or more fish tests conducted in the decline window. Lithium was included as an example of a constituent that was assessed herein but was not identified as a potential cause of toxicity. Tests with microbial interferences identified by the laboratory are not shown on these plots to avoid obscuring potential relationships with the plotted constituent.

[21] Effects are associated with mortalities that generally occur beginning on day 4 of the 7-day test with this species; this age is equivalent to day 6 of the 28-day test, which starts with an earlier life-stage. Effects associated with this phenomenon are generally associated with a high degree of between-replicate variability, as has been observed in tests with samples from the Elk Valley.

[22] Per the 18 January 2019 amendment to Permit 107517, fathead minnow and rainbow trout tests in 2019 were conducted in copper-amended water to curtail growth of microbes in site water; this test revision incorporates the outcome of previous investigations of anomalous responses (i.e., sporadic mortality phenomenon).

- To summarize results by test site, plots showing categorized test responses over time (2015 to 2019) were included in Appendix A. The symbols on each plot indicate whether the test endpoint was categorized as no (circle), possible (diamond), or likely (triangle) adverse response, as assigned in each annual interpretive report (see Appendix A for more details). A causation assessment was then conducted to identify potential contributors to adverse responses. For tests categorized as possible or likely adverse response, symbols are annotated where a potential toxicant was identified in the annual interpretive report.

3.2.4 Initial Review of Water Quality Data

3.2.4.1 Identification of Potential Stressors

Water quality data collected in the decline window were evaluated using a tiered approach to identify potential acute and chronic stressors, starting first with a comparison to WQGs for the protection of aquatic life and then proceeding to a more refined assessment using screening values[23] for fish to identify constituents with the potential to result in effects to WCT. The rationale for this tiered approach is discussed in Section 1.4. Details are provided in the following subsections.

Comparison to Water Quality Guidelines

Maximum concentrations of constituents measured in the decline window were compared to short-term and long-term WQGs for the protection of aquatic life (Appendix A, Table A1). For constituents with WQGs dependent on a modifying factor such as chloride (e.g., nitrite) or hardness (e.g., cadmium), sample-specific modifying factors were used to calculate the WQG. If the sample-specific modifying factor was outside of the range for the WQG, then the modifying factor was constrained to be within the range of the WQG. For example, if the sample-specific hardness was 300 mg/L as $CaCO_3$ and the guideline range extends to a hardness of 250 mg/L as $CaCO_3$, then a hardness of 250 mg/L as $CaCO_3$ was used to calculate the guideline.

For nitrite screening (for which WQGs are dependent on chloride), approximately 26% of the sample-specific chloride concentrations had non-detect values that were greater than 2 mg/L. These elevated non-detect chloride values have the potential to increase false negatives in the nitrite screening because the nitrite WQG is dependent on chloride concentrations, with the minimum WQG value based on chloride concentrations below 2 mg/L.[24] Non-detect chloride concentrations were assigned a value of 0.5 mg/L, which is the lowest detection limit for the dataset. This adjustment is considered conservative because it increases the potential for false positives in the nitrite screening.

Results of this screening were interpreted as follows:

- Constituents with maximum concentrations less than a short-term WQG were concluded not to have the potential to cause acute effects to aquatic life per the definition in Section 1.4 and were not carried forward as potential acute stressors.
- Constituents with maximum concentrations greater than a short-term WQG were evaluated further by comparison to acute screening values for fish (see Section 2.2.5.1 and Appendix C for details). This refined evaluation was conducted in consideration of the potential sensitivity of fish relative to the aquatic species reflected in the short-term WQG. Constituents with maximum concentrations less than an acute screening value for fish were concluded not to have the potential to cause acute effects to WCT.

[23] Throughout this report, the term ‘screening value’ refers collectively to effects benchmarks derived in the Elk Valley Water Quality Plan (Teck Coal 2014) for cadmium, nitrate, sulphate, and selenium and values derived from the literature for other constituents.

[24] The BC WQGs for nitrite are based on chloride concentrations in a step-wise function, with WQGs assigned based on the following chloride concentrations: <2 mg/L chloride, 2 to 4 mg/L, 4 to 6 mg/L, 6 to 8 mg/L, 8 to 10 mg/L, and >10 mg/L.

- Constituents with maximum concentrations less than a long-term WQG were concluded not to have the potential to cause chronic effects to aquatic life. As discussed in Section 1.4, long-term WQGs are intended to provide generic protection for the most sensitive species and life stages of aquatic life under indefinite exposure, and thus it was not necessary for the purpose and scope of the present assessment to know the exact details of the species present at a given location. If concentrations of a constituent are lower than WQGs, then it is expected that aquatic life in general will not be harmed. Following this interpretation, concentrations less than a long-term WQG were concluded to indicate negligible effects to WCT, whereas concentrations greater than a long-term WQG warranted a more refined evaluation of the potential for effects to WCT.
- Constituents with maximum concentrations greater than a long-term WQG were evaluated further by comparison to chronic screening values for fish. Bromide and TDS were also carried forward for further evaluation because they are known to be stressors to aquatic life that do not have long-term WQGs. Nickel was carried forward for further evaluation because previous work conducted for Teck Coal in the Elk Valley has indicated that the WQG may not be protective of effects of nickel to the most sensitive species of aquatic life; for nickel, this finding is consistent with more recent guidelines (e.g., in the European Union) that have identified lower effect concentrations for nickel compared to the BC WQG.

Comparison to Chronic Screening Values

Chronic screening values were derived to identify a potential for effects to sensitive species and life stages of fish. For cadmium, selenium, sulphate, and nitrate, the level 1 fish benchmarks derived in the Elk Valley Water Quality Plan (EVWQP) were adopted as screening values. The level 1 benchmarks were derived from site-specific and published chronic testing relevant to the Elk Valley, with a focus on endpoints such as survival, growth, or reproduction for sensitive fish species. Level 1 benchmarks reflect a potential for low-level chronic, sublethal effects (approximately 10% effect size) on the most sensitive species and life stages. Concentrations lower than a level 1 benchmark were interpreted to represent no chronic effects to fish, following CCME (2007) and BC ENV (2019a) guidance that defines the threshold level for “no negative effects” as 10% or less. The level 1 benchmarks for cadmium, nitrate, selenium, and sulphate, and the scientific rationale for their derivation, are summarized in Section 3.2.5.1.1.

For constituents other than cadmium, nitrate, selenium, and sulphate, level 1 screening values were derived from the literature for the lowest available relevant and reliable chronic effects values for the most sensitive species and life stages of fish. Screening values were derived to represent a level of interpretation comparable to the level 1 benchmarks derived in the EVWQP. Measured concentrations lower than the level 1 screening value were interpreted to represent no chronic effects to WCT. In selecting screening values, data were reviewed from provincial and federal guidance or criteria documents and from available reports in the primary literature. Level 1 screening values and the scientific rationale for their derivation are summarized in Section 3.2.5.1.1.

Constituents with maximum concentrations lower than a level 1 screening value were interpreted to represent no chronic effects to fish and were not evaluated further. Constituents with measured concentrations greater than the level 1 screening value were identified as potential chronic stressors and assessed further as described in Section 3.2.5.

3.2.4.2 Temporal Patterns

Potential temporal trends in water quality constituents were evaluated through three main lines of evidence:

- Did the maximum concentration in the period of record (2012 to 2019) occur in the decline window?
- Is the average concentration higher in the decline window relative to previous years?
- Is there an increasing trend from 2012 to 2019?

In cases where a constituent met the criteria to answer 'yes' to one or more of the questions outlined above, it was interpreted as evidence that potential stress to WCT from that constituent may have been increasing over time. This finding alone does not necessarily indicate that the constituent contributed to or was solely responsible for the observed response in the WCT decline. Rather, as described in the integration methods below, these findings are considered alongside the screening results to inform an overall interpretation.

The three lines of evidence for potential temporal patterns were evaluated through a combination of visual assessment of plots and statistical analysis of the available data. Plots of individual sample data and annual mean values for each constituent at each monitoring station were used to visually assess temporal trends and cross-check the results of the statistical analyses described below.

Temporal Patterns in Maximum Concentrations

Maximum concentrations of each constituent[25] at each station were compared between the decline window and the period prior to September 2017. The magnitude of difference was calculated as the maximum in the decline window divided by the maximum pre-September 2017. These ratios were tabulated for each constituent at each station. To aid in visual assessment across constituents and stations, gradient shading was used to indicate the intensity of the magnitude from ≤1 (no colour) to 2 (dark blue). This range was selected to show a gradient that captures most variation in the magnitude without extreme values influencing the shading. Magnitude values greater than 2 were assigned the darkest blue.

Temporal Patterns in Average Concentrations

For each constituent and station, monthly average concentrations were compared using a two-way analysis of variance with factors for time period (decline window vs. pre-September 2017) and month. Concentrations were $\log_{10}$-transformed to normalize and stabilize residual variance for parameters amenable to such transformation (ORP, temperature, turbidity, and chronic toxicity monitoring results contain zeroes and thus are not amenable to log-transformation). Analysis of variance and post-hoc comparisons were performed using the aov() and TukeyHSD() functions in the stats package of R version 3.6.2.

The magnitude of difference between average values in the decline window and the period prior to September 2017 was estimated by exponentiation of the Tukey's post-hoc test estimate for the log-transformed data. This calculation yields a ratio of the estimated average value in the period of interest to the estimated average value in the period prior to September 2017. These ratios are tabulated for each constituent at each station. To aid in visual assessment across constituents and stations, gradient shading was used to indicate the intensity of the magnitude from ≤1 (no colour) to 2 (dark blue). This range was selected to show a gradient that captures most variation in the magnitude without extreme values influencing the shading. Magnitude values greater than 2 were assigned the darkest blue. Values were only shaded in cases where a significant difference (p <0.05) was observed in the Tukey's post-hoc pairwise comparison test.

[25] For brevity, the assessment refers throughout to "maximum" concentrations, but for dissolved oxygen the focus is on minimum concentrations and for pH both maximum and minimum concentrations were assessed.

Trends Over Time

For each constituent and station, trends were evaluated to test whether concentrations significantly increased from 2012 to 2019. The trend analysis was performed using monthly concentrations for each constituent and station. A linear regression for the monthly average concentration versus the date was performed for each constituent at each station using the lm() function in the stats package of R version 3.6.2. As described in the section above, concentration data were log_{10}-transformed prior to analysis for parameters amenable to such transformation. Significant increasing trends were identified as those with a positive significant slope (p <0.05).

The magnitude of trends was expressed as annual percent change by multiplying the slope of the log transformed data by 365 (for the number of days per year) and then exponentiating. Estimated annual percent changes are tabulated for each constituent at each station. To aid in visual assessment across constituents and stations, gradient shading was used to indicate the intensity of significant increasing trends from a 0% annual change (no colour) to a 50% annual change (dark blue). This range was selected to show a gradient that captures most variation in the magnitude without extreme values influencing the shading. Estimated annual increases greater than 50% were assigned the darkest blue. Values were only shaded in cases where a significant increasing trend (slope estimate p <0.05) was observed for the regression.

Integrated Interpretation of Temporal Patterns

For each of the three lines of evidence for temporal patterns, raw results were summarized by constituent and station in appendices to this report. In the main body of this report, results for each line of evidence are summarized two ways: 1) by constituent as the percent of mainstem or percent of tributary stations showing evidence of temporal trends; and 2) by station as the percent of constituents showing evidence of temporal trends. For the summary by constituent, the screening outcomes from Section 3.2.3.2 were also compiled to allow for constituents to be grouped according to temporal trends and comparison to WQGs and screening values.

Spatial extent was summarized as the percentage of stations exhibiting a trend. For example, a temporal pattern at one of 14 stations was summarized as 7% of stations showing a change. The associated percentage of aquatic habitat was considered in the next stage of the assessment (Section 3.2.5), in which constituents carried forward for the detailed evaluation of potential chronic effects were presented in tables that consider spatial extent (concentrations summarized by station), temporal extent (concentrations summarized by year and season), and magnitude (concentrations screened against toxicological benchmarks).

3.2.5 Evaluation of Requisite Conditions

The requisite conditions to contribute to or cause the WCT decline are described in Section 3.2.5.1 (water quality), Section 3.2.5.2 (tissue selenium), and Section 3.2.5.3 (chronic toxicity testing). For water quality, there are subsections that describe the approach to derive and interpret screening values to inform magnitude ratings (Section 3.2.5.1), present the water quality results by station (Section 3.2.5.1.2), and summarize the water quality results across the upper Fording River watershed (Section 3.2.5.1.3). Section 3.2.5.1.3 also discusses the approach to evaluate how concentrations greater than screening values overlapped with fish distribution in time and space. The requisite conditions for water quality are described in Section 3.2.5.1.4.

3.2.5.1 Water Quality

3.2.5.1.1 Derivation and Interpretation of Chronic Screening Values

The general approach to deriving and interpreting fish screening values is described in the bullets below. The interpretation of fish screening values informed the magnitude rating for the requisite conditions (see Section 3.2.5.1.4). There were five magnitude ratings: negligible (concentrations below WQGs), no chronic effects

to fish (concentrations below level 1 screening values), potential low magnitude effects (concentrations between level 1 and level 2 screening values), potential moderate magnitude effects (concentrations between level 2 and level 3 screening values), and potential high magnitude effects (concentrations above level 3 screening values).

- Level 1 screening values were derived to indicate conditions below which no chronic effects to fish are expected. Level 1 screening values were preferentially based on 10% effects concentrations (EC_{10}) for chronic, sublethal effects to the most sensitive species and life stages of fish, following BC ENV (2019a) and CCME (2007) guidance that the threshold level for "no negative effects" is 10% or less, and US EPA (1999) guidance that EC_{10} values are rarely statistically significant from the control treatment. If the maximum measured concentration of a constituent was greater than a level 1 screening value, additional screening values were obtained as described below.
- Level 2 screening values were derived to indicate a potential for chronic, low-magnitude effects to fish. Level 2 screening values were preferentially based on 20% effects concentrations (EC_{20}) for chronic, sublethal effects to the most sensitive species and life stages of fish. An effect size of 20% was selected because, after EC_{10} values, EC_{20} values are the next preferred statistical endpoint to include in chronic WQG derivations by BC ENV (2019a) and CCME (2007). A critical effect size of 20% is consistent with rationale provided by US EPA (1999, 2013), Mebane (2010), and Suter et al. (1995) to describe a level of effect that is likely to result in statistically significant effects relative to a control in laboratory testing but is not likely to result in changes to populations in the environment. Concentrations between level 1 and level 2 screening values were interpreted to represent a potential for low-level effects but are not expected to exhibit population-level effects.
- Level 3 screening values were derived to indicate a potential for chronic, higher-magnitude effects to fish. Level 3 screening values were preferentially based on 50% effects concentrations (EC_{50}) for chronic effects to the most sensitive species and life stages of fish. Concentrations between the level 2 and level 3 screening values were interpreted to represent a potential for moderate-level effects that could result in changes to population abundance if a sufficient portion of the population was affected. Concentrations greater than a level 3 screening value were interpreted to represent a potential for high-level effects and a greater likelihood that changes to population abundance could occur if a sufficient portion of the population was affected.

Screening values and the scientific rationale for their derivation are provided in Table 13 (cadmium, nitrate, selenium[26], sulphate) and Table 14 (other constituents). For cadmium, nitrate, selenium, and sulphate, the fish benchmarks derived in the EVWQP were adopted as screening values. For other constituents, screening values were derived from the literature for the lowest available relevant and reliable chronic effects values for the most sensitive species and life stages of fish. Tissue selenium benchmarks are summarized in Section 3.2.5.2.

For some constituents, effects data were only available from testing with fish early life stages (i.e., embryos and alevins), and it was necessary to assume that these data also reflect potential effects to juveniles and adults. Full and partial life-cycle tests with several fish species and a variety of chemicals indicate that the early developmental stages are often equally or more sensitive to aquatic contaminants than adults (Environment Canada 1998). Because juveniles and adults are often less sensitive than embryos and larvae, there is uncertainty and potentially conservatism in the assessment of potential effects to juvenile and adult fish presented herein.

[26] Benchmarks for tissue selenium are provided in Section 3.2.5.2.

Table 13: Benchmarks Specific to Fish for Elk Valley Water Quality Plan Constituents

COPC	Benchmark or Screening Value			Rationale
	Level 1	Level 2	Level 3	
Cadmium (dissolved)	Hardness-dependent (µg/L dissolved Cd): $10^{(0.83 \times Log\ (Hardness)-b)}$ Equation valid 3.4 to 285 mg/L as $CaCO_3$.			Cadmium benchmarks were derived in the EVWQP (Teck Coal 2014) as hardness-dependent values expressed as an equation. The level 1 benchmark was derived using the lowest effect concentration for fish reported in Annex G of the Elk Valley Water Quality Plan (EVWQP; Teck Coal 2014), which was a lowest observed effect concentration (LOEC) for rainbow trout (*Oncorhynchus mykiss*) growth from a 62-day test with early life stages (embryo-alevin-fry). For example, at a hardness of 160 mg/L as $CaCO_3$, the equation results in a level 1 benchmark of 0.65 µg/L.
	b = 2.02	Not derived	Not derived	
Nitrate	Hardness-dependent for early life stages (mg/L as N): $10^{(1.0003 \times Log(hardness)-b)}$ Equation valid up to 500 mg/L as $CaCO_3$			Nitrate benchmarks were derived in the EVWQP (Teck Coal 2014) as hardness-dependent values expressed as an equation. Benchmarks were derived from the concentration causing a 10% effect (EC_{10}) (level 1), causing a 20% effect (EC_{20}) and causing a 50% effect (EC_{50}) (level 2) for 39-day embryo-alevin development (percent swim-up) effects to rainbow trout in Fording River water (Annex F of Teck Coal 2014). For example, at a hardness of 360 mg/L as $CaCO_3$, the equation results in the following benchmarks: level 1 = 16 mg/L nitrate as N, level 2 = 21 mg/L nitrate as N, and level 3 = 48 mg/L nitrate as N.
	b = 1.35	*b = 1.22*	*b = 0.87*	
Selenium	70 µg/L	187 µg/L	Not derived	Selenium reproduction benchmarks were derived in the EVWQP (Teck Coal 2014) from an integrated assessment of reproductive effects on populations of sensitive fish species. The adopted benchmarks were those derived to be protective of reproductive effects on westslope cutthroat trout (*Oncorhynchus clarkii lewisi*). As detailed in the EVWQP (Teck Coal 2014), WCT benchmarks are reproductive EC_{10} (level 1), EC_{20} (level 2), and EC_{50} (level 3) values from a site-specific and species-specific dose-response relationship for WCT (percent survival at swim-up). In egg tissue, the benchmark concentrations are 25 mg/kg dw (level 1), 27 mg/kg dw (level 2), and 33 mg/kg dw (level 3). These tissue-based effects concentrations were then translated into associated aqueous concentrations by applying a site-specific bioaccumulation model.
Sulphate	499 mg/L	674 mg/L	1,173 mg/L	Sulphate benchmarks were derived in the EVWQP (Teck Coal 2014). Benchmarks reflect the geometric mean of two independent rainbow trout 21- to 28-day embryo-alevin development (percent swim-up) studies (Annex F of Teck Coal 2014).

Notes: µg/L = micrograms per litre; mg/L = milligrams per litre; $CaCO_3$ = calcium carbonate; Cd = cadmium; EC_{10} = concentration causing a 10% effect; EC_{20} = concentration causing a 20% effect; EC_{50} = concentration causing a 50% effect; EVWQP = Elk Valley water quality plan; LOEC = lowest observed effect concentration; N = nitrogen; NO3-N = Nitrate as nitrogen.

Table 14: Screening Values Specific to Fish for Constituents Not Included in the Elk Valley Water Quality Plan

COPC	Benchmark or Screening Value			Rationale
	Level 1	Level 2	Level 3	
Bromide	7.8 mg/L	Not derived	Not derived	Flury and Papritz (1993) compiled chronic toxicity data for bromide. Chronic toxicity data was available for 13 aquatic species (five species of fish, seven invertebrate species, and one amphibian species). The lowest effect concentration for fish was selected as the level 1 screening value: a 124-day reproduction NOEC of 7.8 mg/L for the guppy *Poecilia reticulata*. Rainbow trout were similarly sensitive with a 90-day growth NOEC of 8 mg/L. Because the level 1 screening value is based on NOEC values, there is elevated uncertainty and potentially conservatism in the interpretation of potential effects.
Chromium (VI)	10 µg/L	Not derived	Not derived	ECCC (Environment and Climate Change Canada) compiled, reviewed, and ranked chronic toxicity data for chromium (VI) to generate a SSD with 24 species (8 fish species, eight invertebrate taxa, seven algae/aquatic plant taxa, and one amphibian taxa). The level 1 screening value, which is approximately the 10th percentile of the Environment Canada (2018) SSD, is equal to the 8-month NOEC of 10 µg/L for brook trout (the lowest chronic value for fish in the SSD; Benoit 1976). Because the level 1 screening value is based on a NOEC value, there is elevated uncertainty and potentially conservatism in the interpretation of potential effects.
Dissolved oxygen (minimum values)	Early life stages: 9 mg/L Other life stages: 6 mg/L	Early life stages: 8 mg/L Other life stages: 5 mg/L	Early life stages: 7 mg/L Other life stages: 4 mg/L	The BC MOE approved minimum WQG for dissolved oxygen (DO) is dependent on the fish life stages present. If buried embryo/alevin life stages are present, then the minimum WQG is 11 mg/L. For all other life stages, the minimum WQG is 8 mg/L. These guidelines align with the "no impairment" category that US EPA (1986) identified for waters with salmonids. US EPA (1986) compiled and analyzed DO data for several fish species and used qualitative descriptors to describe four levels of risk for early life stages of salmonids and other life stages of salmonids: ■ No impairment: Representing nearly maximal protection of fishery resources (aligns with the BC guideline) ■ Slight impairment: Representing a high level of protection of important fishery resources, risking only slight impairment of production in most cases (adopted as level 1 screening value) ■ Moderate impairment: Protecting the persistence of existing fish populations but causing considerable loss of production (adopted as level 2 screening value) ■ Severe impairment: For low level protection of fisheries of some value but whose protection in comparison with other water uses cannot be a major objective of population control (adopted as level 3 screening value) For early life stages, screening values were set equal to 9 mg/L (level 1; slight impairment), 8 mg/L (level 2; moderate impairment), and 7 mg/L (level 3; severe impairment). For juvenile and adult life stages, screening values were set equal to 6 mg/L (level 1; slight impairment), 5 mg/L (level 2; moderate impairment), and 4 mg/L (level 3; severe impairment). For juveniles and adults, the slight, moderate, and severe impairment values are associated with approximately 10%, 20%, and 40% growth impairment, respectively. For both life stages, the impairment levels assumed a 3 mg/L differential between interstitial concentrations and overlying water.
Lithium	253 µg/L	342 µg/L	570 µg/L	Golder (2020c) compiled, reviewed, and ranked chronic toxicity for total lithium. Relevant and reliable chronic toxicity data were available for three fish species, two invertebrate species, and one plant species. A concentration-response curve was fit for the lowest fish endpoint in the lithium dataset: larval fathead minnow growth (Kszos et al. 2003). The level 1 screening value was is equal to the concentration causing 10% inhibition (IC_{10}) on larval growth (253 µg/L). The level 2 screening value was equal to the concentration causing 20% inhibition (IC_{20}) of fathead minnow growth of 342 µg/L, and the level 3 screening value was equal to the concentration causing 50% inhibition (IC_{50}) of fathead minnow growth of 570 µg/L. Kszos et al. (2003) reported no effects to larval survival at nominal lithium concentrations of 500 µg/L.

Table 14: Screening Values Specific to Fish for Constituents Not Included in the Elk Valley Water Quality Plan

COPC	Benchmark or Screening Value			Rationale
	Level 1	Level 2	Level 3	
Nickel	Hardness-, DOC-, and pH-dependent (µg/L): $10^{(\log(b)- 0.763\times(\log(103)-\log(\text{hardness})) - 0.073\times(\log(0.5)-\log(\text{DOC}))+0.242\times(7.4-\text{pH}))}$ Equation valid for 80 to 320 mg/L as $CaCO_3$, 1 to 5 mg/L DOC, and 7.0 to 8.1 pH			Nickel toxicity data summarized by the EU (2008) indicate that fish are less sensitive than invertebrates, with effects concentrations more than an order of magnitude higher than those calculated for sensitive invertebrate species. EU (2008) identified median hatching time for zebrafish as the lowest reliable effect concentration for fish. Fathead minnow survival was a similarly sensitive endpoint, with EU (2008) reporting normalized effect concentrations for fathead minnow survival being 8% higher than those reported for zebrafish. The zebrafish study did not measure aqueous nickel concentrations, mortality was high in the control treatment, and there is greater uncertainty in the relevance of the test endpoint (hatch time). In comparison, the fathead minnow study reported measured aqueous nickel concentrations, control mortality was low, and the survival endpoint was considered relevant. For these reasons, the fathead minnow data were relied upon to develop screening values for fish using the following approach. Fathead minnow survival data for day 32 (the longest test duration in study) and water chemistry were compiled from the European Union (EU) website[27]; nickel concentrations were log-transformed prior to analyses. A logistic concentration-response curve was fit using US EPA toxicity relationship analysis program (TRAP) (version 1.3) to estimate the following effects concentrations (± 95% confidence limits): Lethal Concentration for 10% of the population (LC_{10}) = 88 µg/L (43–177), Lethal Concentration for 20% of the population (LC_{20}) = 134 µg/L (80–225), and Lethal Concentration for 50% of the population (LC_{50}) = 278 µg/L (210–367). MLR (multiple linear regression) was used to model the simultaneous effect of three water chemistry constituents (hardness, DOC, and pH) on nickel toxicity, as follows. ■ Appendix G.3 of EU (2008) contains data matrices for nickel Biotic Ligand Model (BLM) estimates. The rainbow trout matrices, which were the only matrices reported for fish, were used in the MLR analysis to represent the effect of modifying factors on nickel toxicity to fish (EU 2008). Values within the matrix are EC10 on rainbow trout that have been predicted by the BLM using the coordinate water quality constituents as inputs for the model. Estimates were generated using the nickel BLMs described by De Schamphelaere et al. (2006). ■ BLM-derived EC10 estimates for rainbow trout were compiled for three pH values (7, 7.5, 8.1), three DOC values (1, 3, 5 mg/L), and 13 hardness values (80 to 320 mg/L as CaCO3) (total n = 117). Estimates associated with lower hardness (<80 mg/L as CaCO3) and higher DOC (>5 mg/L) were not compiled because these chemistries were outside the typical range observed in Elk Valley waters. ■ Stepwise linear regression methods were used for the MLR analysis. Hardness and DOC were log-transformed prior to running the MLR to stabilize residual variance and linearize the slopes. No transformation was done for pH because pH is a log-transformed variable. The MLR model without interactions of independent variables was determined to be the most appropriate model form and showed good agreement with the BLM. The slopes for the model without interactions were 0.763 (log hardness), 0.073 (log DOC), and -0.242 (pH). Slopes for hardness, DOC, and pH from the MLR were used to describe how the concentration-response curve for fathead minnow survival would be adjusted as a function of these variables by converting the LC_{50} value from the test water chemistry to a target hardness, DOC, and pH. The resulting hardness-, DOC-, and pH-dependent curve for fathead minnow survival was used to estimate response sizes for sensitive fish species. The level 1 screening value corresponds to a 10% effect; the equation shown can be used to estimate effects based on site-specific hardness, DOC, and pH (e.g., Elk Valley conditions). This equation applies for hardness of 80 to 320 mg/L as $CaCO_3$, DOC of 1 to 5 mg/L, and pH of 7.0 to 8.1.
	b = 88	Not derived	Not derived	

[27] https://echa.europa.eu/registration-dossier/-/registered-dossier/15544/6/2/3/?documentUUID=6f17e5cd-3390-4c00-bff8-1ff25f66b019. EU (2008) reported the following test conditions: hardness = 103 mg/L as $CaCO_3$, DOC of 0 mg/L, and pH = 7.4. For the purpose of the analysis, DOC was set equal to 0.5 mg/L which is the method detection limit in most commercial laboratories.

Table 14: Screening Values Specific to Fish for Constituents Not Included in the Elk Valley Water Quality Plan

COPC	Benchmark or Screening Value			Rationale
	Level 1	Level 2	Level 3	
Nitrite	Chloride-dependent (mg/L as N): $10^{(\log(b) - 0.829 \times (\log(1) - \log(chloride)))}$ Equation valid for 0.84 to 450 mg/L chloride; extended equation to lower chloride values			Golder (2020c) compiled, reviewed, and ranked chronic toxicity data for nitrite. Relevant and reliable chronic toxicity data, which were available for eight fish species, one invertebrate species, and one plant species. Toxicity data were normalized for the toxicity modifying effect of chloride. A concentration-response curve was fit for the lowest fish endpoint in the nitrite dataset: juvenile rainbow trout growth (Kroupová et al. 2008)). The level 1 screening value is equal to the EC_{10} of the 28-day juvenile rainbow trout growth test of 0.045 mg/L as N. Using the same dataset, the level 2 screening value is equal to the EC_{20} of 0.072 mg/L as N and the level 3 screening value is equal to the EC_{50} of 0.16 mg/L as N. The equation provided can be used to adjust to site-specific chloride conditions. Kroupová et al. (2008) reported no effects to juvenile survival at nitrite concentrations of 0.15 mg/L as N (i.e., no effects to survival at concentrations approximately equal to the level 3 screening value for growth effects).
	b = 0.045	*b* = 0.072	*b* = 0.16	
Total Dissolved Solids (TDS)	1,000 mg/L	2,000 mg/L	3,000 mg/L	Golder and Nautilus (2013) evaluated sulphate toxicity to rainbow trout in Fording River waters. The program was designed to assess how the toxicity of sulphate may change in very hard waters and whether the overall ionic content of the water may induce a toxic effect. Therefore, Golder and Nautilus (2013) tested two TDS mixtures to assess how overall ionic content and the associated ionic mixture could affect sulphate toxicity: 1) Fording River water which is representative of most locations, and 2) Fording River supplemented with alkalinity (which results in higher bicarbonate) to be representative of conditions in a subset of tributaries, including Kilmarnock Creek. Total alkalinity was ~184 mg/L in the first mixture (average across all treatments) and ~218 mg/L in the second mixture (average across all treatments. Sulphate was introduced into all of the test solutions as calcium sulphate and magnesium sulphate in a calcium-to-magnesium ratio that is comparable to that observed in the Fording River. Therefore, TDS effect concentrations from this study are site-specific and representative of the ionic composition in the upper Fording River watershed. Golder and Nautilus (2013) reported that survival and normal swim-up was the most sensitive endpoint in rainbow trout embryos, yielding an EC_{20} for TDS of approximately 1,000 mg/L. Reliable IC_{10} values could not be calculated for this dataset, so Golder and Nautilus (2013) recommended use of IC_{20}. Kimmel and Argent (2009) suggest a range of 2,000 to 3,000 mg/L TDS as a threshold for changes to fish communities in streams receiving coal mine discharge. The lower end of this range was selected as the level 2 screening value for fish. Hammer et al. (1975) reported that freshwater species start to disappear when TDS levels exceed 3,000 mg/L. This concentration was selected as the level 3 screening value for all life stages.
Uranium	352 µg/L	Not derived	Not derived	Golder (2020c) compiled, reviewed, and ranked chronic toxicity data for uranium to generate an SSD with fifteen species (five fish species, five invertebrates species, three algae/aquatic plant species). Concentration-response data were compiled for the lowest fish endpoint in the SSD: rainbow trout egg viability (Vizon SciTec Inc. 2004). The rainbow trout egg viability test was conducted at 6 and 61 mg/L as $CaCO_3$ hardness; however, CCME (2011) calculated a geometric mean of the two tests and found hardness did not ameliorate toxicity for this species. Therefore, results from both tests were pooled to fit a curve and estimate effect concentrations. The level 1 screening value is equal to the EC_{10} of the 30-day rainbow trout egg viability test using a geomean of the 6 and 61 mg/L as $CaCO_3$ hardness tests (352 µg/L).

Notes: µg/L = micrograms per litre; mg/L = milligrams per litre; BC = British Columbia; BC MOE = British Columbia Ministry of the Environment; BLM = biotic ligand model; $CaCO_3$ = calcium carbonate; DOC = dissolved organic carbon; DO = dissolved oxygen; EC_{10} = concentration causing a 10% effect; EC_{20} = concentration causing a 20% effect; EC_{50} = concentration causing a 50% effect; ECCC = Environment and Climate Change Canada; EU = European Union; IC_{10} = concentration causing 10% inhibition; IC_{20} = concentration causing 20% inhibition; IC_{50} = concentration causing 50% inhibition; LC_{10} = concentration causing 10% lethality; LC_{20}= concentration causing 10% lethality; LC_{50} = concentration causing 50% lethality; MLR = Multiple Linear Regression; N = nitrogen; NOEC = no observed effect concentration; SSD = species sensitivity distribution; TDS = total dissolved solids; TRAP = Toxicity Relationship Analysis Program; US EPA = United States Environmental Protection Agency; WQG = Water Quality Guideline.

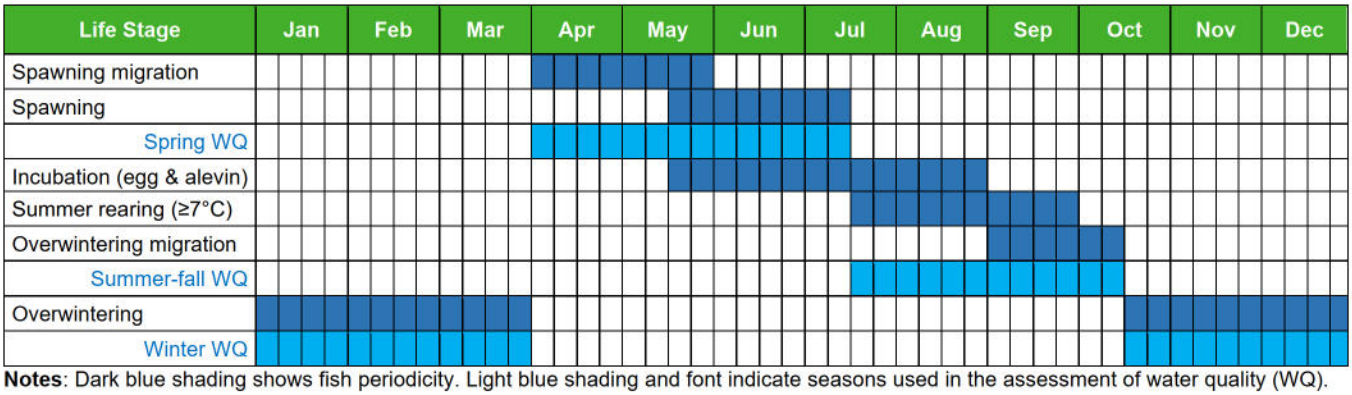
3.2.5.1.2 Tabular Presentation of Water Quality Screening Results

To aid in the visual assessment of spatial and temporal trends, water quality screening results for the 25 stations in the refined assessment were compiled into tables with stations in rows (ordered from upstream to downstream) and screened concentrations (across years) in columns. Concentrations in these tables were shaded according to the comparison to screening values: lower than level 1 = green, level 1 to level 2 = blue, level 2 to level 3 = yellow, and greater than level 3 = orange. The maximum monthly average constituent concentration was reported for each year (2012 to 2019) and season (winter, spring, and summer-fall), for a total of 21 columns. The years align with the long-term WCT monitoring dataset in the upper Fording River, and the seasons generally align with exposure windows and spatial distribution of WCT (Table 15), as follows:

- **Winter**: 16 October to 31 March: This season aligns with the overwintering window. Early life stages are not expected to be present.
- **Spring**: 1 April to 15 July. This season aligns with spawning migration and spawning and overlaps with the first half of incubation. Early life stages could be present in the latter half of spring (beginning mid May).
- **Summer-fall**: 16 July to 15 October. These seasons align with summer rearing and overwintering migration and overlaps with the second half of incubation. Early life stages could be present in early summer.

Spatial and temporal trends are visually depicted as colour patterns in the tabular presentation of water quality screening results. For example, if the colour shifts from blue on the left to orange on the right, this would indicate worsening conditions over time. Conversely, if colours remain relatively consistent from left to right, this would indicate a lack of temporal trend. This format also permits a visual evaluation of the spatial extent of concentrations greater than screening values by comparing across adjacent rows.

Table 15: Water Quality Seasons in Comparison to Fish Periodicity Table



Notes: Dark blue shading shows fish periodicity. Light blue shading and font indicate seasons used in the assessment of water quality (WQ).

3.2.5.1.3 Spatial Summaries of Water Quality Screening Results

At the bottom of each table presenting water quality, screening results were summarized spatially by the proportion of habitat area assigned each magnitude category. These summaries are provided to support a spatially integrated evaluation of conditions across the upper Fording River watershed. These rows calculate the total proportion of assessed habitat that was assigned each colour (no effects, low, moderate, or high). Habitat areas were provided by Teck Coal. This approach characterizes the spatial distribution of surface water quality conditions across the watershed.

The habitat areas provided by Teck Coal were developed for subunits (reaches) that align with biological monitoring stations. In the mainstem Fording River, there were 22 subunits for habitat areas and 15 water quality stations included in the refined assessment. Thus, there were seven mainstem subunits that had habitat area assigned but did not have a corresponding water quality station. When this occurred, the maximum concentration observed at adjacent stations (upstream and downstream) was used in the screening tables; such extrapolated concentrations are shown in grey font in the screening tables. For example, the subunit for biological monitoring station RG_SCOUTDS is located between water quality stations FR_FR3 and FR_FR4; therefore, in the tabular summarizes, the subunit for RG_SCOUTDS was assigned the maximum concentration at FR_FR3 and FR_FR4 for the corresponding year and season. This approach is considered conservative because it assumes worst-case conditions from adjacent subunits. Assumed concentrations were used in these seven subunits so that the spatial distribution of surface water quality could be characterized across the watershed (i.e., by estimating the proportion of assessed habitat that was assigned each magnitude rating).

Spatial summaries are provided for each constituent, showing at a glance the results of the water quality assessment for each constituent. These summary rows provide a simple way to evaluate overall conditions that facilitates comparisons among seasons and years by tracking how these proportions compare between the decline window and previous years. To aid in visual assessment of the summaries, gradient shading was used to indicate the percentage of habitat with each magnitude rating from 0% (no colour) to 100% (dark blue).

In addition, results were summarized in consideration of the spatiotemporal overlap with WCT distribution using percent fish use from EoC Team (2021) using data collected by Cope et al. (2016) (see Section 1.4.2). These summaries are provided to incorporate differential fish use of segments of the upper Fording River and its tributaries across seasons. This qualitative summary characterizes how surface water quality conditions overlapped with expected WCT distributions in time and in space and addresses potential aggregates of fish being affected in a small area, such as overwintering aggregations recorded in Fording River upstream of Chauncey Creek (represented by water quality at FR_FRABCH) and Henretta Lake (represented by water quality FR_HC1). An integrated summary of results by river segment is provided in Section 5.0. In Section 5.0 (integration of results by river segment), only measured concentrations were relied upon (i.e., assumed concentrations at the seven subunits were not considered).

In addition to the tabular summaries, time-series plots are shown for stations that represent high fish use in each season. These plots, which were prepared by Teck Coal, show monthly average concentrations.

3.2.5.1.4 Requisite Conditions

The requisite condition for water quality to contribute to the WCT decline was an indication of potential effects to fish within the decline window of any magnitude at any spatial scale. The greater the magnitude of potential effects, and the more that potential effects overlapped with WCT in space and time, the stronger was the evidence that the constituent may have contributed to the WCT decline. Evidence of contribution was also greater in proportion to the number of constituents that were higher in the decline window than they had been previously, the spatial extent of increased concentrations, and whether those constituents were also greater than screening values.

The requisite condition for water quality to cause the WCT decline was an indication of potential effects of high magnitude that broadly overlapped with WCT in time and space. The greater the magnitude of potential effects, and the more that potential effects overlapped with WCT in space and time, the stronger was the evidence that the constituent may have caused the WCT decline. Evidence of causality was also greater in proportion to the number of constituents that were higher in the decline window than they had been previously, the spatial extent of increased concentrations, and whether multiple constituents were greater than level 2 (moderate magnitude) or

level 3 (high magnitude) screening values. Operationally, this is defined as at least 50% of the fish overlapping with conditions that include at least one constituent at concentrations that could cause a high-level effect or multiple constituents that could cause a moderate-level effect. Low-level effects alone, even if for multiple constituents, would not be expected to be able to cause a population decline.

The requisite conditions for water quality to contribute or cause the WCT decline were quantitatively evaluated on a constituent-by-constituent basis. Qualitative consideration was then given to the number of constituents with concentrations above screening values and the potential for those constituents to interact. This part of the assessment was qualitative because mixture effects is not a quantitatively understood field in toxicology, particularly for the combination of water quality stressors identified herein. For the qualitative discussion, the mechanisms of effects were summarized for each constituent and consideration was given to the potential for interactions (Section 3.3.2.9). Constituents with similar mechanisms of effect may exhibit additive or partially additive effects, such that overall effects may represent a sum or partial sum of effects associated with individual constituents. Constituents with dissimilar mechanisms of effect are more likely to exhibit independent effects. Synergistic (i.e., effects greater than the sum of effects associated with individual constituents) and antagonistic (i.e., effects less than the effects associated with individual constituents) interactions tend to be rare (Kortenkamp et al. 2009), with the exception of the well-known antagonistic effect hardness or chloride ions have on the toxicity of constituents such as nitrite, nitrate, and sulphate.

When considering potential mixture effects, sulphate and TDS screening results were combined by taking the highest magnitude result for each season and year. The rationale for this approach is as follows. Effects associated with TDS are generally understood to be related at least in part to osmotic stress. The potential for elevated TDS to result in effects is dependent on the total concentration of all of the major ions contained in solution (i.e., TDS) and on their relative abundance (Weber-Scannell and Duffy 2007). The major constituents of TDS in the upper Fording River are sulphate and its counter-ions (mainly calcium), which typically exhibit lower toxicity than other TDS mixtures (Mount et al. 1997; Mount et al. 2019). Therefore, potential effects from sulphate and TDS are not expected to be additive. Rather, the contribution of TDS to sulphate effects is inherent in the sulphate benchmarks, and the contribution of sulphate to TDS effects is inherent in the TDS screening values. This conclusion is supported by the sulphate and TDS screening results (see Section 3.3.2), which show a similar pattern with respect to potential effects. Because of this site-specific association of TDS with sulphate, TDS and sulphate are essentially two ways of looking at the same stressor. Therefore, the evaluation of mixture effects considered herein considered sulphate and TDS as one stressor.

To support the discussion on the potential for combined effects of multiple constituents, constituent-specific screening results were compiled into the same table format described in Section 3.2.5.1.2, with stations in rows (ordered from upstream to downstream) and screening results (across years) in columns. Cells in this table indicated one of the following: <WQG = all constituents had concentrations below the long-term WQG, <L1 = one or more constituents had concentrations above the long-term WQG but all constituents were below the level 1 screening value, or detailed screening results for only those constituents with concentrations above the level 1 screening value (e.g., NO3: L1-L2). Cells with “<WQG” were not shaded. For cells with one or more constituents above the long-term WQG, gradient shading was used to indicate the number of constituents above the long-term WQG from light blue (<L1 grouping) to dark blue.

3.2.5.2 Tissue Selenium

Selenium concentrations in benthic invertebrate and WCT tissue collected from the upper Fording River watershed were compared to BC WQG and tissue benchmarks from the EVWQP to evaluate potential effects to WCT. For both benthic invertebrates and fish, data were initially compared to interim BC WQGs for invertebrate tissue (4 mg/kg dry weight [dw]) and fish muscle (4 mg/kg dw). Following this, data were compared to benchmarks developed in the EVWQP. Tissue selenium benchmarks and the scientific rationale for their derivation are provided in Table 16.

Table 16: Benchmarks Specific to Fish for Tissue Selenium

Tissue Type	Benchmark (mg/kg dw)			Rationale
	Level 1	Level 2	Level 3	
Benthic invertebrates	11	18	33	Dietary selenium benchmarks were derived in the EVWQP to evaluate potential effects to juvenile fish growth. For the upper Fording River, the level 1 benchmark is equal to an unbounded no observed effect concentration (NOEC) for effects of dietary selenium on survival and growth of juvenile cutthroat trout (Hardy et al. 2010). Hardy et al. (2010) conducted a 2.5-year laboratory feeding study and reported 99% survival and growth similar to control fish in juvenile Yellowstone cutthroat trout fed a dietary selenium concentration of 11.2 mg/kg dw, which was the highest concentration tested. As discussed in the EVWQP (Teck Coal 2014), the level 1 benchmark is conservative because no effects were observed at the highest dietary concentration in the Hardy et al. (2010) study. The level 2 benchmark is a lowest observed effect concentration (LOEC) for growth of chinook salmon larvae; dietary exposure to 18 mg/kg dw resulted in a 22% reduction in weight (Hamilton et al. 1990). As discussed in Teck Coal (2014), no survival effects were observed for chinook salmon at the dietary concentration of 18 mg/kg dw, but significant effects were observed at higher concentrations (37% reduction in survival at dietary concentration of 35.4 mg/kg dw). The level 3 benchmark is a LOEC for growth of Sacramento splittail (Teh et al. 2004). As discussed in Teck Coal (2014), there was no significant effect on splittail survival at the dietary concentration of 26 mg/kg dw, but significant effects were observed at higher concentrations (34% mortality at the dietary concentration of 57.6 mg/kg dw).
WCT	Egg: 25 Muscle: 15.5	Egg: 27 Muscle: 16.9	Egg: 33 Muscle: 20.8	Egg selenium benchmarks were derived in the EVWQP to evaluate potential effects to WCT reproduction. As detailed in the EVWQP (Teck Coal 2014), WCT benchmarks are reproductive EC10 (level 1), EC20 (level 2), and EC50 (level 3) values from a site-specific and species-specific dose-response relationship for WCT. In egg tissue, the benchmark concentrations are 25 mg/kg dw (level 1), 27 mg/kg dw (level 2), and 33 mg/kg dw (level 3). Muscle data were compared to estimated reproductive effects concentration derived by converting EVWQP benchmarks (expressed as egg concentrations) to equivalent muscle concentrations. Using the relationship observed between selenium in egg and muscle in WCT (Nautilus 2011), benchmarks for egg tissue were converted to a muscle equivalent of 15.5 mg/kg dw (level 1), 16.9 mg/kg dw (level 2), and 20.8 mg/kg dw (level 3).

Notes: mg/kg dw = milligrams per kilogram dry weight; ECx = concentration associated with x% effect; EVWQP = Elk Valley Water Quality Plan (Teck Coal 2014); LOEC = lowest observed effect concentration; NOEC = no observed effect concentration; WCT = westslope cutthroat trout.

The interpretation of tissue benchmarks is consistent with that presented in Section 3.2.5.1 for aqueous benchmarks, except that the level 1 dietary benchmark for juvenile fish is an unbounded NOEC. Therefore, there is uncertainty regarding whether concentrations above the level 1 benchmark for juvenile fish could affect WCT.

The requisite condition for tissue selenium concentrations to contribute to the population decline was an indication of a potential for individual-level effects of any magnitude at any spatial scale. The more stations showed a potential for effects, the stronger was the evidence that selenium may have contributed to the WCT decline.

The requisite condition for tissue selenium concentrations to cause the population decline was an indication of potential widespread effects of moderate to high magnitude. The greater the magnitude of potential effects, and the more stations that showed effects, the stronger was the evidence that selenium may have caused the WCT decline. Evidence of causality was also greater in proportion to the number of stations that were higher in the decline window than they had been previously and the spatial extent of increased concentrations. Operationally, this is defined as at least 50% of the fish overlapping with conditions that could cause a high-level effect.

3.2.5.3 Chronic Toxicity Testing

Chronic toxicity testing results were summarized from all tests with fish early life stages using water samples collected from upper Fording River watershed stations. These data supplement the constituent-by-constituent assessment provided above by directly measuring potential combined effects of all constituents present in Fording River water.

As discussed in Golder (2020b) and summarized in Section 3.2.3.3, rainbow trout and fathead minnow early life stage tests are susceptible to microbial effects in test conducted with reference and mine-exposed site waters. A subset of tests with adverse responses in upper Fording River samples were flagged by the toxicology laboratory as being consistent with effects caused by microbes. For these tests, there is elevated uncertainty as to whether part or all of the response is a microbial artifact unrelated to water quality.

The requisite condition for chronic testing data to indicate that water quality contributed to the WCT decline was an indication of an adverse response at any station, with emphasis placed on results that were below the typical range of responses observed in reference waters from the Elk Valley. The more stations showed adverse responses, or the more that such responses overlapped with WCT in time and space, the stronger was the evidence of a contribution to the WCT decline. Evidence of contribution was also greater in proportion to the number of responses that were higher in the decline window than they had been previously. As discussed in Section 2.3.2.1, fish early life stages tend to be more sensitive to water quality than older life stages. Therefore, the test responses evaluated herein are most directly relevant to potential effects on early life stages, which occur during the periods indicated on Table 1. Effects on early life stages could plausibly contribute to observed declines in abundance of juvenile fish, but the interpretation of these effects with respect to adult fish is less certain and likely conservative.

The requisite condition for chronic testing data to indicate that water quality caused the WCT decline was an indication of high-magnitude effects in mine-exposed surface waters relative to reference waters that could have affected a large fraction of the WCT population, either by being widespread or by occurring at a time and location that overlapped with large numbers of fish. Evidence of causality was also greater in proportion to the number of responses that were higher in the decline window than they had been previously. The more potential effects overlapped with fish in time and space, the stronger was the evidence that exposure to releases of mine-influenced water may have caused the WCT decline. Operationally, this is defined as at least 50% of the fish overlapping with conditions indicative of high-level effects. Low-level effects alone, even if for multiple stations, would not be expected to be able to cause a population decline.

3.3 Findings

The following section describes the results of water quality screening and trend analysis (Section 3.3.1). Constituents identified as potential stressors are discussed relative to requisite conditions in Section 3.3.2. Results for tissue selenium data and chronic toxicity monitoring data are also presented in the same section. Results are integrated by river segment in Section 5.0.

3.3.1 Initial Review of Water Quality Data

3.3.1.1 Identification of Potential Stressors

Measured concentrations in the decline window are compared to short-term and long-term BC WQGs in Appendix E, Table E1 (all fish accessible stations) and Table E2 (25 stations included in the refined assessment). The following sections identify potential acute and chronic stressors based on the full dataset in Table F1.

Potential Acute Stressors

For most constituents with short-term WQGs, all measured concentrations were less than short-term WQGs, indicating negligible potential of these constituents to contribute to or cause the WCT decline (Appendix E).

Six constituents had one or more measured concentrations in the decline window that were greater than the short-term WQG. Measured concentrations greater than the short-term WQG were reviewed to evaluate the potential for these constituents to cause acute effects to WCT. Results of this review were as follows:

- **pH**. pH outside the short-term BC WQG range of 6.5 to 9 occurred in 3 of 1,564 field measurements and 2 of 1,253 lab measurements collected in the decline window. Field pH samples outside the BC WQG were collected from LC_DC1 (17 September 2017; pH = 9.2), GH_PC1 (15 January 2019; pH = 9.1), and RG_FODHE3 (5 September 2018; pH = 9.2). Lab pH measurements for these two samples were within the BC WQG (pH = 8.5, 8.2, and 8.3, respectively). The two lab measurements outside of the WQG range were collected from FR_FLD (5 December 2018 [pH = 5.4] and 7 November 2018 [pH = 5.7]). The field pH measurement for 5 December 2018 was 7.81 (no field measurement was provided for the 7 November 2018 sample). pH was not retained as a potential stressor because only five samples were outside of the WQG range, the samples were disconnected spatially and temporally, and the corresponding measurement (either field or conventional) was within the WQG range. Based on the discussion above, pH was concluded to have negligible potential for acute effects to WCT.
- **Dissolved oxygen**. Dissolved oxygen concentrations below the minimum short-term BC WQG occurred in 96 of 1,562 samples collected in the decline window. These samples were collected from 11 mainstem stations (FR_FR1, FR_FRABCH, FR_FRCP1, FR_FRDSCC1, FR_FRRD, FR_MULTIPLATE, FR_UFR1, RG_FOBC, RG_FOBK, RG_FOBS, RG_UFR1) and 13 tributary stations (FR_CC1, FR_GC1, FR_HC1, FR_HENSEEP1, FR_KC1, FR_SP1, FR_TBMD, FR_WED1, GH_GH1, GH_GH2, GH_GH5, GH_SC1, LC_DC1). For 91 of these 96 samples, dissolved oxygen was above the acute screening values described in Section 2.0 and Appendix C, indicating that dissolved oxygen would not be expected to cause acute effects. The remaining five samples were collected from FR_FRCP1 on 4 December 2018 (2.7 mg/L), Turn Creek station FR_TBMD on 7 November 2018 (1.8 mg/L), or the biological monitoring station RG_UFR1 in the Fording River headwaters upstream of mining on 14 February 2019 (1.7, 1.8, and 2.1 mg/L). Dissolved oxygen was identified as a potential acute stressor in these five samples, which are discussed further in Section 3.3.2.7 (FR_FRCP1 sample) and Section 5.0 (all five samples).
- **Nitrate**. Nitrate concentrations greater than the short-term BC WQG occurred in 73 of 1,254 samples, which were collected from FR_CC1 (27 samples), FR_FRRD (three samples), FR_GC1 (nine samples), FR_HENSEEP1 (one sample), FR_KC1 (23 samples), FR_OXBDSSKP1POOL3 (one sample), FR_SKP1 (eight samples), and RG_FRUPO (one sample). Nitrate in these samples was below the acute screening value described in Section 2.0 and Appendix C. Therefore, nitrate would not be expected to cause acute effects to WCT.

- **Nitrite**. Nitrite concentrations greater than the chloride-dependent short-term BC WQG (0.06 to 0.6 mg/L as N) occurred in 8 samples collected from FR_CC1. There is elevated uncertainty in this screening result because the chloride concentration in these samples was below an elevated detection limit (<2.5 mg/L). If the full detection limit was used, then nitrite concentrations would be below the short-term BC WQG. As discussed in Section 2.0, potential acute effects at FR_CC1 were ruled out because nitrite concentrations were below acute screening values for rainbow trout. Therefore, nitrite would not be expected to cause acute effects to WCT.
- **Aluminum**. Dissolved aluminum concentrations greater than the pH-dependent short-term BC WQG (0.029 to 0.1 mg/L) occurred in 6 of 1,243 samples collected in the decline window. These samples were collected from FR_UFR1 (19 March 2019; 0.11 mg/L), FR_FR2 (23 May 2019; 0.11 mg/L), FR_FRABCH (23 May 2019; 0.16 mg/L), LC_FRB (7 May 2018; 0.27 mg/L), LC_FRDSDC (7 May 2018; 0.33 mg/L), and LC_DC1 (7 May 2018; 0.11 mg/L). None of these concentrations exceed the US EPA (2018) acute aluminum criterion, which was derived from a larger dataset of information and an updated understanding of modifying effects of pH, hardness, and DOC. The comparison to the more recently derived acute criterion indicates that acute effects of aluminum would not be expected to any aquatic life. Therefore, aluminum would not be expected to cause acute effects to WCT.
- **Iron**. Total iron was above the short-term BC WQG (1 mg/L) in 5 of 1,251 samples collected in the decline window, and dissolved iron was above the short-term BC WQG (0.35 mg/L) in 3 of 1,243 samples collected in the decline window. These samples were collected from FR_FRABCH on 9 May 2018 (total iron = 1.89 mg/L), FR_FRCP1 on 15 May 2018 (total iron = 2 mg/L), GH_FR1 on 30 April 2018 (total iron = 1.1 mg/L), LC_FRDSDC on 7 May 2018 (dissolved iron = 0.61 mg/L), LC_FRDSDC on 15 May 2018 (total iron = 1.35 mg/L), and RG_FRWUCH (total iron = 1.22 mg/L; dissolved iron = 0.37 mg/L), and LC_FRB on 7 May 2018 (dissolved iron = 0.51 mg/L). These concentrations are either below the ECCC (2019) draft long-term FEQG, which reflects modifying effects of pH and DOC, or are approximately equal to the draft FEQG (1.9 mg/L for FR_FRABCH sample and 1.8 mg/L for FR_FRCP1 sample). The comparison to the more recently derived long-term FEQG indicates a negligible potential for chronic effects of iron, meaning that acute effects would also be ruled out. Therefore, iron was concluded to have negligible potential for acute effects to WCT.

Based on the screening results presented above, no constituents were identified as potential acute stressors except dissolved oxygen in five samples. Potential acute effects of dissolved oxygen at FR_FRCP1 in December 2018 are discussed further in Section 3.3.2.7 and potential acute effects of dissolved oxygen in all five samples are discussed further in Section 5.0.

Potential Chronic Stressors

Comparison to Water Quality Guidelines

For most constituents, all measured concentrations were below long-term WQGs in the decline window, indicating negligible potential for chronic effects to aquatic life (Appendix E).

The following 15 constituents had one or more measured concentrations greater than a long-term WQG in the decline window: pH, dissolved oxygen, fluoride, sulphate, nitrate, nitrite, aluminum, cadmium, chromium, copper, iron, lithium, mercury, selenium, and uranium. As discussed in Section 3.2.4.1, bromide, nickel, and TDS were also carried forward for further assessment.

Review of Concentrations Greater than Water Quality Guidelines

Measured concentrations greater than a long-term WQG were reviewed to evaluate the potential for these constituents to cause chronic effects to WCT, including a comparison of maximum measured concentrations to level 1 screening values for fish (Table 17). Results of this review were as follows:

- **pH**. As discussed above in regards to potential acute stressors, pH outside the long-term BC WQG range of 6.5 to 9 (note: this is the same as the short-term WQG) occurred for 3 of 1,564 field measurements and 2 of 1,253 lab measurements collected in the decline window. Following the discussion provided for potential acute stressors, pH was concluded to have a negligible potential for chronic effects to WCT.
- **Aluminum**. Dissolved aluminum greater than the pH-dependent long-term BC WQG (0.01 to 0.05 mg/L) occurred in 6 of 1,243 samples collected in the decline window. These samples were collected from FR_UFR1 (19 March 2019; 0.11 mg/L), FR_FR2 (23 May 2019; 0.11 mg/L), FR_FRABCH (23 May 2019; 0.16 mg/L), LC_FRB (7 May 2018; 0.27 mg/L), LC_FRDSDC (7 May 2018; 0.33 mg/L), and LC_DC1 (7 May 2018; 0.11 mg/L). None of these concentrations exceeded the US EPA (2018) chronic aluminum criterion, which was derived from a larger dataset of information and an updated understanding of modifying effects of pH, hardness, and DOC. The comparison to the more recently derived chronic criterion indicates negligible potential for chronic effects of aluminum. Therefore, aluminum was concluded to have negligible potential for chronic effects to WCT.
- **Iron**. Total iron concentrations were approximately equal to the pH- and DOC-dependent FEQG (range: 0.17 to 3.78 mg/L) in 2 of 1,251 samples collected in the decline window. These samples were collected from FR_FRCP1 (15 May 2018; iron = 2 mg/L, FEQG = 1.8 mg/L) and FR_FRABCH (9 May 2018; 1.89 mg/L, FEQG = 1.88 mg/L). Iron was not retained as a potential chronic stressor because the two samples were approximately equal to the FEQG, indicating negligible potential for chronic effects to WCT.
- **Fluoride**. Fluoride was above the interim CCME WQG (0.12 mg/L)[28] in 82% of samples collected in the decline window (range: <0.02 to 0.44 mg/L). None of these concentrations exceeded a chronic effects benchmark of 1.94 mg/L that was derived by MacPherson et al. (2014) to be conservatively protective of aquatic life, including fish. Therefore, fluoride was concluded to have negligible potential for chronic effects to WCT.
- **Mercury**. Mercury was approximately equal to the long-term BC WQG (0.01 µg/L) in 2 of 1,250 samples collected in the decline window. These samples were collected from FR_HENSSEEP1 on 6 June 2018 (0.0105 µg/L) and from FR_TBM8 on 16 May 2018 (0.0106 µg/L). In addition, one sample collected from FR_TBM8 on 9 May 2018 had an elevated detection limit (<0.025 µg/L) that was above the long-term BC WQG. Mercury was not retained as a potential chronic stressor because the two samples were approximately equal to the long-term BC WQG, indicating negligible potential for chronic effects to WCT.
- **Copper**. Dissolved copper was above the long-term BC WQG in 1 of 1,243 samples collected in the decline window. This sample was collected from GH_FRUSGC on 27 March 2018 (dissolved Cu = 0.89 µg/L; sample-specific long-term BC WQG = 0.4 µg/L). The long-term BC ENV guideline for dissolved copper in this sample is calculated by taking the lowest normalized effect concentration (growth EC_{20} of 0.87 µg/L for the invertebrate *Lymnaea stagnalis*, rounded down to 0.8 µg/L) and applying a safety factor of 2. Copper was

[28] The interim guideline for fluoride was derived from the lowest acceptable adverse effect level reported: a 144-h LC_{50} value of 11.5 mg/L for the caddisfly *Hydropsyche bronta* (CCME 2002). Because this toxicity value was an acute lethality endpoint, CCME (2002) applied a safety factor of 0.01.

not retained as a potential chronic stressor because the measured concentration (0.89 µg/L) was approximately equal to the lowest effect concentration (0.87 µg/L) and was lower than all other effect concentrations (1.1 to 550 µg/L), including those for fish species (2.2 to 227 µg/L).

- **Cadmium**. Dissolved cadmium was approximately equal to the hardness-dependent level 1 EVWQP benchmark for fish (range: 0.26 to 1.04 µg/L) in 1 of 1,243 samples (FR_KC1 on 2 April 2019: maximum concentration = 1.1 µg/L; level 1 benchmark = 1.04 µg/L). Therefore, cadmium was considered to have a negligible potential for chronic effects.
- **Bromide, chromium, nickel, and uranium**. Maximum measured concentrations of these constituents in the decline window were lower than their level 1 screening value, indicating no effects on fish from these constituents, and were not carried forward for further assessment.

For the remaining seven constituents in Table 17 (lithium, nitrate, nitrite, selenium, sulphate, TDS, and dissolved oxygen), maximum measured concentrations were greater than the level 1 screening value (or below, in the case of dissolved oxygen). These seven constituents were carried forward for evaluation against requisite conditions (Section 3.2.5), including characterization of the spatial extent of exceedances.

Table 17: Screening of Maximum Water Quality Measured in the Decline Window at Fish Accessible Stations

Constituent	Units	Long-Term WQG	Level 1 Benchmark or Screening Value for Fish[a]	Maximum Concentration (Minimum for Dissolved Oxygen)	Maximum HQ for L1 Benchmark or Screening Value[b]	Number of Samples	% of Samples Greater Than (Below for Dissolved Oxygen)	
							Long-Term WQG	Level 1 Benchmark or Screening Value
Bromide	mg/L	No guideline	7.8	<0.5	0.06	1,229	-	0
Cadmium	µg/L	0.018 - 0. 46[c]	0.026 – 1[c]	1.1	1.06	1,243	3	0.08
Chromium	µg/L	1.0[d]	10	2.9	0.29	1,251	2	0
Lithium	µg/L	122	253	415	1.6	1,251	3	1
Nickel	µg/L	NA[h]	51 – 271[e]	102	0.37	1,251	0	0
Nitrate	mg-N/L	3.0	3.0 – 22[c]	150	6.8	1,254	75	12
Nitrite	mg-N/L	0.020 - 0.20[f]	0.039 – 1.1[f]	0.11	1.6	1,253	5	1.4
Selenium	µg/L	2	70	720	10	1,253	88	30
Sulphate	mg/L	128 – 429[c]	499	2,070	4.4	1,253	17	15
TDS	mg/L	No guideline	1,000	3,670	3.7	1,251	-	16
Uranium	µg/L	8.5	352	25	0.07	1,251	10	0
Dissolved oxygen[g]	mg/L	8 – 11	6 - 9	1.7	3.5	1,562	29	6

Notes: '-' = not applicable because constituent does not have a guideline;% = percent; HQ = hazard quotient; WQG = water quality guideline; TDS = total dissolved solids
Constituents carried forward from Step 1 are provided in this table. Measured concentrations are compared to WQGs and level 1 benchmarks and screening values for all constituents in Appendix E.
Shaded cells indicate concentrations above the level 1 benchmark or screening value or below in the case of dissolved oxygen.
Concentrations are in milligrams per litre (mg/L) or milligrams per litre as nitrogen (mg-N/L).

a) Level 1 benchmarks and screening values reflective of potential effects to fish are derived in Section 3.2.5.1.1.
b) Maximum hazard quotient calculated using the maximum concentration from September 2017 to September 2019, divided by the sample-specific level 1 screening value. For dissolved oxygen, the sample-specific screening value was divided by the minimum concentration.
c) Hardness-dependent guideline or benchmark. The range shown is based on the hardness range observed in the dataset. The guideline or benchmark is calculated based on the individual hardness value for each sample.
d) Guideline is for chromium VI.
e) Hardness, pH, and dissolved organic carbon (DOC)-dependent screening value. The range shown is based on the hardness, pH, and DOC ranges observed in the dataset. The screening value is calculated based on the individual hardness, pH, and DOC values for each sample. Although nickel concentrations were below the long-term BC WQG, nickel was identified as a COPC (see Section 3.2.4.1).
f) Chloride-dependent guideline or screening value. The range shown is based on the chloride range observed in the dataset. The guideline or screening value is calculated based on the individual hardness value for each sample.
g) Minimum guideline and screening value compared to minimum measured concentration. Guideline and screening value range is for different life stages of fish. The lower end applies for buried embryo/alevin stages (15 May to 31 August) and the upper end applies for other life stages (all months).
h) Guideline for total nickel is not shown because previous work in the Elk Valley has indicated that the working BC WQG may not be protective of chronic effects to sensitive aquatic life.

3.3.1.2 Temporal Patterns

Appendix F contains the following information for each station and constituent measured between 2012 and 2019:

- plots showing measured concentrations in individual samples collected between 2012 and 2019
- plots showing average annual concentrations between 2012 and 2019
- raw results for the statistical analyses described in Section 3.2.4.2 (maximum, average, increasing trend)
- tables showing magnitude results for each line of evidence (maximum, average, increasing trend) with gradient shading as described in Section 3.2.4.2

Results for temporal patterns are discussed below in the following order:

- summarized by station by showing the percentage of constituents with evidence of a change
- summarized by constituent by showing the percentage of stations at which there was evidence of a change
- summarized by constituent in the context of the screening results described in the preceding section

Temporal Results by Station

Table 18 summarizes the results by station by showing the percentage of constituents for which there was evidence of a change in water quality concentration between the decline window and pre-September 2017. Results are separated out for each of the three main lines of evidence outlined in Section 3.2.4.2. Gradient shading was used to show the relative proportion of constituents for which a trend was observed from 0% (no color) to 100% (dark blue). The following observations were made for the summary by station (Table 18):

- At all stations, one or more lines of evidence indicated that water quality conditions were different in the decline window relative to pre-September 2017 conditions. The proportion of constituents that differed during the decline window was similar between mainstem and tributary stations, and for both upstream reference stations and downstream mine-affected stations.
- The most frequently observed change was the occurrence of a higher maximum concentration in the decline window relative to pre-September 2017. At the three reference stations, up to half of monitored constituents (39% to 49%) exhibited a higher maximum concentration in the decline window relative to pre-September 2017. Most mine-affected stations exhibited similar or lower frequencies of temporal trends. The reason for the increase in maximum concentrations at reference stations is unknown, but such changes can be related to year-to-year variation in flow at a regional scale. According to Minnow (2020a), who conducted a temporal assessment for five constituents (cadmium, nitrate, sulphate, selenium, and nickel) at reference stations FR_UFR1 and FR_HC3, concentrations of nitrate, selenium, and sulphate (FR_HC3 only) increased in 2019 compared to 2013 and/or 2014; however, annual mean concentrations have not statistically changed since 2014 (nitrate) or 2016 (selenium) at FR_UFR1 and since 2015 at FR_HC3 (nitrate, selenium, sulphate).
- The greatest frequency of temporal changes in water quality conditions was observed for FR_FRCP1 and FR_FRRD in the mainstem Fording River and LC_DC1 on Dry Creek. Temporal patterns in this reach of the Fording River may be related to seasonal dewatering and the occurrence of Cataract Creek water in the Fording River channel during low flow periods. Temporal patterns in Dry Creek are related to recent placement of waste rock in the upper Dry Creek watershed.

In aggregate, the results by station indicate that water quality concentrations were higher in the decline window relative to previous years. This provides evidence of changing conditions, which would support a potential effect of water quality for constituents that were greater than a screening value at locations and times that overlapped with the distribution of WCT.

Table 18: \ Comparison of Temporal Trends by Station Showing Percentage of Constituents at Each Station that Exhibited a Temporal Trend for each Line of Evidence

Segment	Station	No. of Constituents	Higher Maxima?	Higher Average?	Increasing Trend?
Mainstem					
10	*FR_UFR1 (reference)*	57	49%	28%	9%
9	FR_FR1	57	26%	5%	4%
8	FR_MULTIPLATE	56	39%	21%	20%
	FR_FR2	57	42%	23%	11%
7	FR_FR3	56	50%	7%	7%
	FR_FR4	56	21%	16%	7%
	FR_FRCP1	57	63%	44%	5%
6	FR_FRRD	57	74%	23%	11%
	GH_PC2	56	32%	30%	14%
	FR_FRABCH	57	45%	25%	19%
5	FR_FR5	57	21%	21%	12%
3	LC_FRUS	57	9%	11%	5%
2	LC_FRB	58	54%	25%	24%
1	GH_FR1	57	37%	32%	30%
Tributary					
9	*FR_HC3 (reference)*	57	41%	38%	14%
6	*RG_CH1 (reference)*	58	39%	30%	16%
9	FR_HC1	56	38%	29%	9%
	FR_FC1	56	20%	20%	0%
	FR_CC1	56	23%	25%	27%
7	FR_KC1	57	32%	41%	26%
	GH_SC1-2	57	21%	16%	12%
6	GH_PC1	56	27%	25%	29%
3	LC_DC1	58	52%	41%	41%
2	GH_GH1	57	30%	32%	19%

Notes:
Stations are ordered from upstream to downstream.
Values are presented as the percentage of constituents at each station that exhibited a temporal trend for each line of evidence. Constituents carried forward as described in Section 3.2.3.1 are included in this table.
Gradient shading was used to show the proportion of constituents for which a trend was observed from 0% (no color) to 100% (dark blue).

Temporal Results by Constituent

Table 19 summarizes the results by constituent by showing the percentage of stations at which there was evidence of a change in water quality during the decline window relative to per-September 2017. Results are separated out for each of the three lines of evidence outlined in Section 3.2.4.2 and tabulated separately for mainstem stations and tributary stations. Gradient shading was used to show the relative proportion of stations at which a trend was observed from 0% (no color) to 100% (dark blue). The following observations were made for the summary by constituent (Table 19):

- For most constituents, one or more lines of evidence indicated that water quality concentrations in mainstem and tributary stations were higher in the decline window relative to pre-September 2017 conditions.
- Consistent with the summary provided by station, the most frequently observed change was the occurrence of a maximum concentration in the decline window relative to pre-September 2017.

Table 19: Summary of Initial Screening and Temporal Patterns Showing Percentage of Stations for Each Constituent that Exhibited a Temporal Trend for each Line of Evidence

Constituent	Unit	% Detect (Sep 2017 – Sep 2019)	Comparison to WQGs or Level 1 Benchmarks and Screening Values	Mainstem Stations				Tributary Stations			
				No. of Stations	Higher Maxima?	Higher Average?	Increasing Trend?	No. of Stations	Higher Maxima?	Higher Average?	Increasing Trend?
Field Measured											
Dissolved Oxygen[a]	mg/L	100%	Below Level 1	14	21%	14%	14%	10	10%	30%	30%
pH[b]	-	100%	Meets WQG – except 3 samples	14	57%	50%	50%	10	20%	20%	40%
Conventional Parameters											
pH[b]	-	100%	Meets WQG – except 1 sample	14	86%	29%	21%	10	70%	20%	40%
Total dissolved solids	mg/L	100%	Above Level 1	14	79%	69%	21%	10	70%	80%	40%
Major Ions											
Bromide	mg/L	2%	Meets Level 1	14	14%	7%	0%	10	10%	10%	10%
Chloride	mg/L	47%	Meets WQG	14	43%	0%	0%	10	20%	50%	10%
Fluoride	mg/L	96%	Meets WQG	14	21%	0%	0%	10	0%	0%	0%
Sulphate	mg/L	100%	Above Level 1	14	86%	69%	29%	10	80%	70%	30%
Sulphide	mg/L	5%	Meets WQG	3	50%	0%	0%	2	0%	0%	0%
Nutrients and Biological Indicators											
Nitrate	mg-N/L	99%	Above Level 1	14	29%	15%	14%	10	40%	40%	50%
Nitrite	mg-N/L	70%	Above Level 1	14	29%	0%	0%	10	30%	20%	10%
Total ammonia	mg-N/L	83%	Meets WQG	14	86%	71%	71%	10	70%	90%	80%
Total and Dissolved Metals											
Total Aluminum	mg/L	78%	NA – see dissolved	14	29%	0%	0%	10	0%	0%	0%
Dissolved Aluminum	mg/L	13%	Meets WQG – except 6 samples	14	36%	0%	0%	10	30%	0%	0%
Total Antimony	mg/L	69%	Meets WQG	14	14%	7%	7%	10	40%	30%	30%
Dissolved Antimony	mg/L	62%	NA – see total	14	36%	21%	7%	10	50%	60%	30%
Total Arsenic	mg/L	78%	Meets WQG	14	21%	0%	0%	10	20%	0%	0%
Dissolved Arsenic	mg/L	40%	NA – see total	14	36%	29%	7%	10	10%	10%	0%
Total Barium	mg/L	100%	Meets WQG	14	21%	0%	0%	10	40%	30%	10%
Dissolved Barium	mg/L	100%	NA – see total	14	43%	15%	7%	10	60%	60%	20%
Total Beryllium	mg/L	3%	Meets WQG	14	0%	0%	0%	10	0%	0%	0%
Total Boron	mg/L	29%	Meets WQG	14	43%	7%	0%	10	20%	20%	10%
Dissolved Boron	mg/L	24%	NA – see total	14	29%	8%	0%	10	50%	30%	10%
Total Cadmium	mg/L	98%	NA – see dissolved	14	14%	0%	0%	10	10%	20%	10%
Dissolved Cadmium	mg/L	90%	Meets WQG – except 1 sample	14	57%	14%	7%	10	60%	30%	30%
Total Chromium	mg/L	79%	Meets Level 1	14	29%	0%	0%	10	10%	0%	0%
Dissolved Chromium	mg/L	33%	NA – see total	14	36%	7%	7%	10	50%	10%	0%
Total Cobalt	mg/L	32%	Meets WQG	14	14%	21%	7%	10	10%	0%	0%
Dissolved Cobalt	mg/L	21%	NA – see total	14	50%	57%	36%	10	30%	20%	0%
Total Copper	mg/L	11%	NA – see dissolved	14	36%	7%	0%	10	10%	0%	0%
Dissolved Copper	mg/L	5%	Meets WQG	14	21%	7%	0%	10	10%	10%	0%
Total Iron	mg/L	65%	Meets WQG – except 1 sample	14	14%	0%	0%	10	10%	0%	0%
Dissolved Iron	mg/L	4%	NA – see total	14	36%	0%	0%	10	20%	0%	0%
Total Lead	mg/L	15%	Meets WQG	14	21%	7%	0%	10	0%	0%	0%
Dissolved Lead	mg/L	1%	NA – see total	14	43%	21%	0%	10	50%	50%	10%
Total Lithium	mg/L	97%	Above Level 1	14	79%	62%	64%	10	50%	50%	50%
Dissolved Lithium	mg/L	97%	NA – see total	14	93%	69%	71%	10	60%	70%	80%
Total Manganese	mg/L	98%	Meets WQG	14	21%	0%	0%	10	10%	10%	10%
Dissolved Manganese	mg/L	90%	NA – see total	14	43%	0%	0%	10	30%	20%	20%
Total Mercury	mg/L	34%	Meets WQG	14	0%	0%	0%	10	0%	0%	0%
Total Methyl mercury	µg/L	16%	NA – see total mercury	8	17%	0%	0%	6	50%	0%	0%
Total Molybdenum	mg/L	100%	Meets WQG	14	36%	14%	7%	10	30%	30%	40%
Dissolved Molybdenum	mg/L	100%	NA – see total	14	43%	15%	7%	10	40%	50%	40%
Total Nickel	mg/L	78%	Meets WQG and Level 1	14	36%	14%	7%	10	30%	40%	40%
Dissolved Nickel	mg/L	73%	NA – see total	14	71%	31%	7%	10	40%	60%	40%
Total Selenium	mg/L	100%	Above Level 1	14	57%	79%	36%	10	70%	70%	40%
Dissolved Selenium	mg/L	100%	NA – see total	14	71%	93%	57%	10	60%	90%	50%
Total Silver	mg/L	4%	Meets WQG	14	7%	7%	0%	10	10%	10%	0%
Total Strontium	mg/L	100%	Meets WQG	14	64%	69%	0%	10	50%	50%	40%
Dissolved Strontium	mg/L	100%	NA – see total	14	93%	85%	29%	10	80%	80%	50%

Table 19: Summary of Initial Screening and Temporal Patterns Showing Percentage of Stations for Each Constituent that Exhibited a Temporal Trend for each Line of Evidence

Constituent	Unit	% Detect (Sep 2017 – Sep 2019)	Comparison to WQGs or Level 1 Benchmarks and Screening Values	Mainstem Stations				Tributary Stations			
				No. of Stations	Higher Maxima?	Higher Average?	Increasing Trend?	No. of Stations	Higher Maxima?	Higher Average?	Increasing Trend?
Total Thallium	mg/L	23%	Meets WQG	14	0%	7%	0%	10	20%	0%	0%
Dissolved Thallium	mg/L	17%	NA – see total	14	29%	14%	0%	10	40%	40%	0%
Total Uranium	mg/L	100%	Meets Level 1	14	93%	92%	57%	10	60%	90%	40%
Dissolved Uranium	mg/L	100%	NA – see total	14	100%	92%	71%	10	60%	90%	50%
Total Vanadium	mg/L	22%	Meets WQG	14	21%	0%	0%	10	0%	0%	0%
Dissolved Vanadium	mg/L	6%	NA – see total	14	21%	0%	0%	10	10%	0%	0%
Total Zinc	mg/L	26%	Meets WQG	14	14%	0%	0%	10	20%	10%	10%
Dissolved Zinc	mg/L	31%	NA – see total	14	43%	0%	0%	10	30%	0%	10%

Notes: WQG = water quality guideline; NA = not applicable because the constituent does not have an applicable long term WQG or level 1 benchmark for the corresponding fraction; '-' = not applicable because constituent does enough data available
Values are presented as the percentage of stations where a given constituent exhibited a temporal trend for each line of evidence.

Constituents carried forward as described in Section 3.2.3.1 are included in this table.

Gradient shading was used to show the relative proportion of constituents for which a trend was observed from 0% (no color) to 100% (dark blue).

[(a)] For dissolved oxygen, stations were flagged if the observed minimum concentration was lower, the average concentration was lower, and/or there was a decreasing trend.

[(b)] For pH, stations were flagged if the observed minimum concentration/average concentration was lower or the observed maximum concentration/average concentration was higher, and/or there was evidence of an increasing or decreasing trend.

Temporal Results and Screening Results

To evaluate how evidence of temporal trends might affect the interpretation of chronic water quality as contributing to the WCT decline, temporal pattern results were integrated with results of screening against WQGs and screening values. The 57 constituents[29] with both screening results and temporal trend results are discussed below in one of the following categories:

- Trends in constituents with maximum concentrations less than WQGs and/or screening values.
- Trends in constituents with maximum concentrations greater than WQGs and/or screening values.

Trends in Constituents Less than Guidelines or Screening Values (50/57 constituents)

Most of the constituents included in the temporal analysis had maximum concentrations less than WQGs and/or less than level 1 screening values. The interpretation of these screening outcomes is that these constituents have a negligible potential for effects to aquatic life (below water quality guideline) or no chronic effects to fish (below level 1 screening value). Thus, these constituents would not be expected to result in direct effects to fish such as impaired survival, growth, or reproduction, or to individually contribute to the decline in a meaningful way. However, higher concentrations of several constituents, even if below guidelines or screening values for fish, could represent an underlying stress of water quality that was different in the decline window than it had been previously. This concept is evaluated further in Bollinger (2021) and EoC Team (2021).

Some constituents in this category, such as bromide, fluoride, aluminum, beryllium, mercury, and vanadium, exhibited weak or no temporal trends. Larger and more consistent trends for most constituents were localized to Dry Creek and the mainstem Fording River near FR_FRCP1 (Appendix F).

The main exception to the general pattern described above was total ammonia, which showed consistent indications across all three lines of evidence that concentrations were higher in the decline window relative to per-September 2017, with relatively large differences (maximum concentrations up to 15× higher, average concentrations up to 2.9× higher, and estimated annual increases up to 34%) between the decline window and pre-September 2017. These increases in ammonia concentrations, which were observed in both upstream reference stations and downstream stations, coincide with the frequent detection of ammonia in blank samples collected for Teck Coal's regional surface water and groundwater monitoring programs. The analytical laboratory conducted an investigation into potential sources of ammonia contamination in field and trip blank samples, but a clear mechanism has not been identified to date (Humphries 2020). The same issue (i.e., detection of ammonia in field and trip blank samples) was identified in Teck Coal's biological monitoring program for lentic areas in 2018 and 2019 (Minnow 2020c); additional analyses are planned for 2020 to investigate potential sources of ammonia contamination observed in the lentic area monitoring program (Arnold 2020).

Consistent evidence of temporal trends was also observed for pH, strontium, and uranium. These trends were weaker than those observed for ammonia and more prevalent at downstream stations than at upstream reference stations, supporting an interpretation of mine-related influence. The observation that concentrations of these constituents remained below WQGs and screening values indicates that effects would not be expected from exposure to each constituent individually. The potential for combined effects of multiple constituents is discussed further in Section 3.3.2.9.

[29] Rationale for the list of constituents is provided in Section 3.2.3.1.

Trends in Constituents Greater than Guidelines or Screening Values (7/57 constituents)

Maximum measured concentrations during the period of interest were greater than WQGs and/or level 1 screening values for the following constituents:

- Dissolved oxygen
- Sulphate
- Nitrite
- Total selenium
- Total dissolved solids
- Nitrate
- Total lithium

Most of these constituents (exceptions were dissolved oxygen and nitrite) exhibited temporal trends at stations in both the mainstem and tributaries. Changes in these constituents were more pronounced in downstream stations than upstream reference stations, supporting an interpretation of mine-related influence. These constituents are evaluated further below.

3.3.2 Were requisite conditions met?

The following sections discuss the potential for chronic effects to WCT from lithium (Section 3.3.2.1), nitrite (Section 3.3.2.2), nitrate (Section 3.3.2.3), selenium (Section 3.3.2.4; aqueous and tissue), sulphate (Section 3.3.2.4.2), TDS (Section 3.3.2.6), and dissolved oxygen (Section 3.3.2.7). Following these sections, chronic toxicity monitoring data (Section 3.3.2.8) are reviewed to evaluate whether there is an indication of potential chronic effects. In each of these sections, a discussion is provided regarding whether the requisite conditions were met to either contribute to or cause the WCT population decline.

3.3.2.1 Lithium

Lithium concentrations measured in the decline window were below the ECCC PNEC of 122 µg/L in 97% of samples and below the level 1 screening value of 253 µg/L in 99% of samples (see Table 17). The screening values used to evaluate potential effects for lithium are based on larval growth effects and were assumed to apply to all life stages. As discussed in Section 3.2.5.1.1, in the test that the lithium screening values are based on, no survival effects were observed at lithium concentrations up to 500 µg/L (i.e., between the level 2 and level 3 screening values).

Lithium concentrations measured throughout the upper Fording River watershed between 2012 and 2019 are compared to screening values in Table 20. Time-series plots with screened lithium concentrations are provided for locations with highest adult fish use in winter (Figure 12), spring (Figure 13), and summer-fall (Figure 14), and highest numbers of redds observed in spring (Figure 15). The following bullets summarize the results for mainstem stations and tributary stations included in the refined assessment, provide a spatial summary, and discuss spatiotemporal overlap with WCT:

- **Fording River**. Lithium concentrations in the decline window were below the ECCC PNEC and level 1 screening value. These results indicate a negligible potential for effects. The magnitude of potential effects associated with maximum monthly concentrations for the decline window was similar to pre-September 2017 conditions.

- **Tributaries**. Lithium concentrations in the decline window were below the ECCC PNEC and the level 1 screening value at all stations except Clode Creek, which had concentrations between the level 1 and level 2 screening values in winter (2017 and 2019) and spring (2018 and 2019). These results indicate a negligible effect from lithium to WCT at all but one tributary station. At Clode Creek, the results indicate a potential for low-level effects of lithium on WCT that may have been present during these conditions. The magnitude of potential effects associated with maximum monthly concentrations in the decline window was similar to or improved relative to pre-September 2017, which weakens the interpretation that lithium may have contributed to the WCT decline.
- **Spatial summary**. Almost all assessed habitat in the decline window (≥99%) indicated a negligible potential for effects of lithium in all seasons across all assessed years.
- **Spatiotemporal overlap with WCT**. Segments with the highest fish use indicated a negligible potential for effects of lithium in all seasons. Potential effects of lithium overlapped with WCT only in Clode Creek in spring, which had 6.2% of adult fish use (interpreted to be a likely over-estimate[30]) and 1.3% of redds in that season.

Based on the above results, lithium met the requisite conditions to contribute to the WCT decline, although the evidence for contribution was weak and highly localized. The majority of assessed habitat and areas with high fish use indicated negligible potential for effects. Therefore, lithium did not meet the requisite conditions to cause the WCT decline.

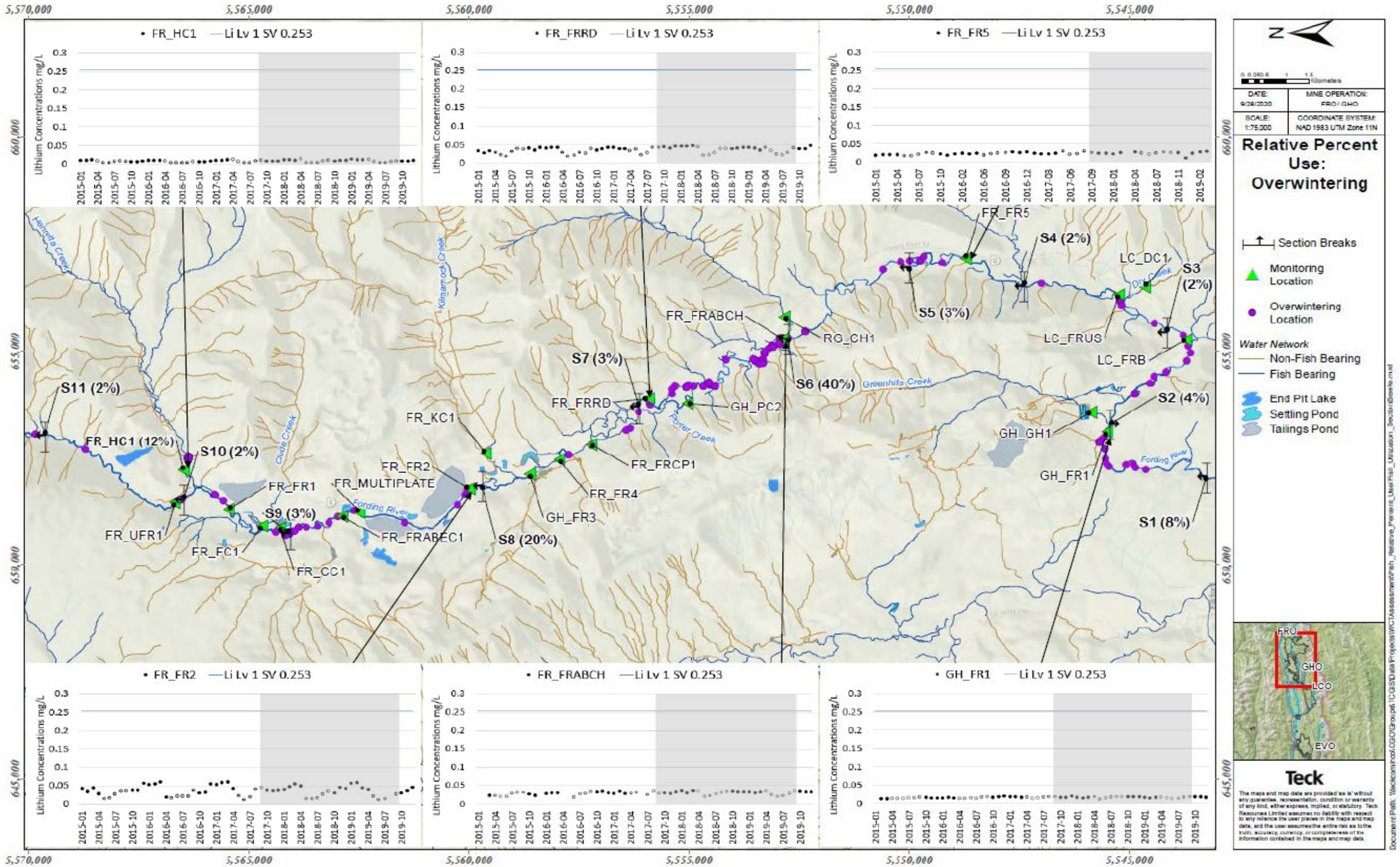
[30] The higher reported adult use in spring primarily reflected fish observed in Clode Sediment Pond. In July 2014, fish exclusion structures were added to preclude fish access. Thus, the fish use in Clode Creek in spring (6.2%) is biased high because fish could not access the sediment pond in the decline window.

Table 20: Peak Monthly Average Lithium Concentrations Compared to Fish Screening Values in Winter, Spring, and Summer-Fall Seasons (2012 to 2019)

Segment	WQ Station Code	Biological Area Code	Screening Values (µg/L)	Fish Habitat (ha)	Relative Fish Use (%)				Lithium (µg/L)																			
					Winter	Spring		Summer-Fall	Winter								Spring								Summer-Fall						
						Tagged	Redds		2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019
Mainstem Fording River																												
10	*FR_UFR1*	*FO26*	L1 = 253 L2 = 342 L3 = 570	7.4	3.8%	7.7%	0.0%	7.0%	2.0	2.1	1.8	1.8	1.9	1.7	2.3	2.0	1.5	1.5	2.0	2.4	1.7	1.4	1.3	1.4	1.7	2.5	2.1	2.2	1.7	2.1	1.8	1.8
9	FR_FR1	FODHE		2.9	3.4%	10%	12%	7.0%	5.0	8.2	6.5	7.6	6.9	8.6	7.6	8.3	5.6	6.4	10	6.1	5.0	9.9	11	7.1	4.8	6.7	5.1	5.6	4.8	7.4	7.9	5.5
		FOUCL		0.23					21	8.2	6.5	7.6	6.9	8.6	7.6	8.3	5.6	6.4	10	6.1	5.0	9.9	11	7.1	16	6.7	5.1	32	4.8	7.4	7.9	5.5
8		FOUNGD		1.4	20%	20%	12%	12%	21	8.2	6.5	7.6	6.9	8.6	7.6	8.3	5.6	6.4	10	6.1	5.0	9.9	11	7.1	16	6.7	5.1	32	4.8	7.4	7.9	5.5
	FR_FRABEC1	FODNGD		0.56					21																16			32				
	FR_MULTIPLATE	MP1		0.89					23	26			44		44	67		8.6					60		20			35			29	
		FOUSH		1.5					35	44	43	57	60	60	55	67	20	34	50	30	27	42	60	40	29	33	24	37	38	44	34	31
	FR_FR2	FOUKI		0.92					35	44	43	57	60	60	55	58	20	34	50	30	27	42	49	40	29	33	24	37	38	44	34	31
7	FR_FR3	FOBKS		2.5	2.7%	3.1%	1.3%	10%							50	57		13					32		34						33	28
		SCOUTDS		0.066					38	49	47	48	62	47	50	65	21	33	49	32	29	49	32	44	34	37	26	38	43	46	33	32
	FR_FR4	FOBSC		0.68					38	49	47	48	62	47	50	65	21	33	49	32	29	49	31	44	30	37	26	38	43	46	33	32
	FR_FRCP1	FOBCP		1.4								57	60	61	87	79				31	29	39	46	40				39	38	46	78	34
		FRCP1SW		1.4							32	57	60	61	87	79				31	31	39	46	42				43	39	46	78	40
6	FR_FRRD	FRUPO		2.2	40%	22%	47%	16%			32	42	43	47	49	43				29	31	38	44	42				43	39	43	40	40
		FO10-SP1		0.081					26	28	32	42	43	47	49	43	21	26	25	29	31	38	44	42	23	30	31	43	39	43	40	40
	GH_PC2	FODPO		1.9					26	28	28	28			40	36	21	26	25	29			30	35	23	30	31	31			34	
		RG_FOXL		0.064					26	28	28	28	35	36	40	36	21	26	25	29	27	32	36	35	23	30	31	32	34	36	34	35
	FR_FRABCH	FO22		1.9								28	35	36	38	34		17		23	27	32	36	35				32	34	36	33	35
5	FR_FR5	FOUEW		11	4.9%	9.2%	5.8%	17%	20	21	20	22	28	24	27	27	20	18	21	20	23	29	29	29	17	20		25	27	29	29	
3	LC_FRUS	FO28		4.9	2.3%	3.8%	0.6%	7.7%		15	16	16							17	18							16	18		19	18	21
2	LC_FRB	FO29		8.9	4.2%	9.2%	9.1%	7.3%	14	15	16	18	21	19	20	21	11	14	17	18	20	23	20	22	14	15	16	18	20	19	18	21
1	GH_FR1	FODGH		2.5	7.6%	4.6%	1.3%	6.2%	15	15	19	17	21	21	19	19	12	14	12	16	16	17	20	18	14	14	15	18	19	20	20	23
Tributaries																																
9	*FR_HC3*	*HENUP*	L1 = 253 L2 = 342 L3 = 570	1.7	0.0%	0.0%	0.0%	0.0%	0.82	0.9	1.6	1.2	1.8	1.1	2.0	1.1	0.85	0.92	1.0	1.0	1.0	1.0	1.0	1.1	0.77	0.8		1.1	1.0	1.1	1.0	1.0
6	*RG_CH1*	*CHCK*		0.4	0.0%	0.0%	0.0%	0.3%	4.9	5.3	4.3	5.3	5.4	4.6	5.0	4.7	4.6	5.0	4.4	3.1	3.2	4.0	4.6	4.3	3.8	3.7	3.3	3.8	3.3	3.7	3.7	3.4
9	FR_HC1	HENFO		3.0	12%	3.1%	1.3%	9.7%	7.3	8.5	11	10.0	10	11	11	12	8.6	8.8	11	8.1	6.7	12	12	11	6.2	8.3	6.3	6.7	5.8	8.9	10	7.5
	FR_FC1	FR_FC1		0.29	0.0%	0.8%	1.3%	0.0%	5.3	5.8		5.6	4.6	6.2	6.0		5.0	5.5	7.3		5.2	5.6			6.5	6.8	5.8		5.8	5.5		
	FR_CC1	CLODE		0.3	0.0%	6.2%	1.3%	0.0%	150	159	231	386	283	307	196	301	91	156	188	225	223	298	269	302	161	195	176	222	251	177	190	195
7	FR_KC1	KICK		0.086	0.0%	0.8%	0.0%	0.0%	54	89	65	72	90	96	101	99	41	63	68	75	95	104	98	102	53	56	51	57	55	70	73	67
	GH_SC1-2	SWCK		0.06	0.0%	0.0%	0.0%	0.0%	57	64	63	64	61	72	73	79	41	36	52	42	46	50	66	53	61	55	66	56	63	66	62	71
6	GH_PC1	POCK		0.15	0.0%	0.0%	0.0%	0.0%	8.0	7.8	7.9	7.5	7.7	7.1	7.5	8.3	9.4	7.8	8.9	8.8	9.9	9.5	9.7	10	8.2	9.5	7.8	8.3	7.7	8.2	8.6	9.7
3	LC_DC1	LC_DC1		0.2	0.0%	0.0%	5.8%	0.0%	10	9.8	9.7	11	11	12	12	13	10	9.0	8.6	10.0	10	10.0	12	12	11	10	10	11	11	11	12	13
2	GH_GH1	GHCKD		0.23	0.0%	0.0%	0.6%	0.0%	14	15	13	14	14	16	24	16	9.6	9.8	12	12	13	16	32	10	16	13	13	13	14	17	22	15
Proportion of Habitat Area in Each Magnitude Category		% <L1 (No Effects Rating)		62	n/a				100	100	100	99	99	99	100	99	100	100	100	100	100	99	99	99	100	100	100	100	100	100	100	100
		% Between L1 and L2 (Low Rating)							0	0	0	0	1	1	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0
		% Between L2 and L3 (Moderate Rating)							0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		% >L3 (High Rating)							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

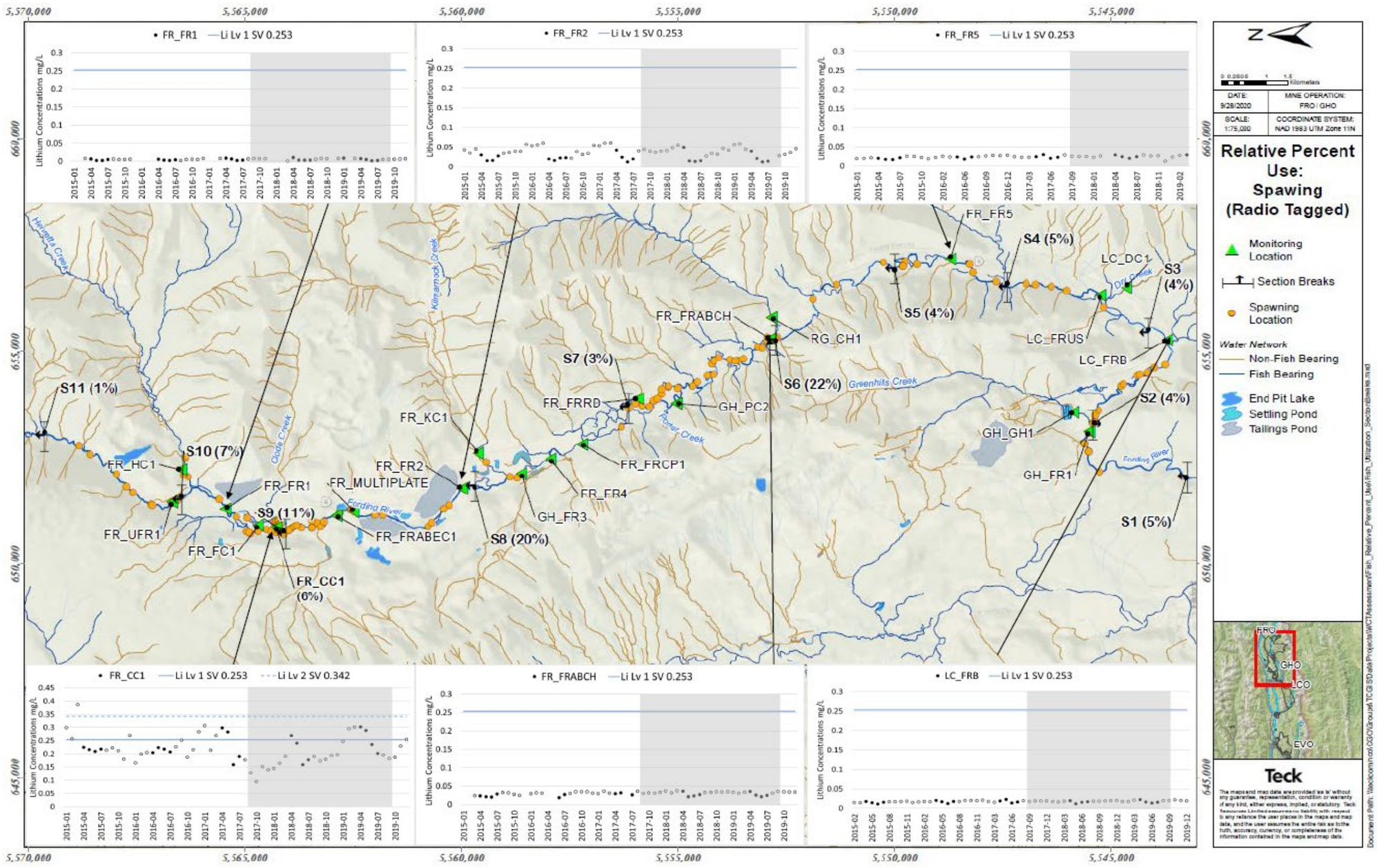
Notes: u/s = upstream; d/s = downstream; L1 = level 1; L2 = level 2; L3 = level 3.
Concentrations are in micrograms per litre total lithium (µg/L). Concentrations are compared to screening values for total lithium (see Section 3.2.5.1.1 for details). For rows (subunits) without a water quality station, concentrations are shown in grey; these are assumed to be equal to the highest concentration measured at adjacent stations.
FR_FR5 is located in S5; relative fish use is shown for S4 and S5 combined.
Years shaded grey indicate one or more samples collected in this year and season could be between September 2017 and September 2019.
Blank cells indicate no samples were collected for corresponding station and year/season.
Screening: shading indicates below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Area-weighted summary: transient shading used to shade from 0% (no color) to 100% (blue).

Figure 12: Lithium concentrations for locations with high adult fish use in winter



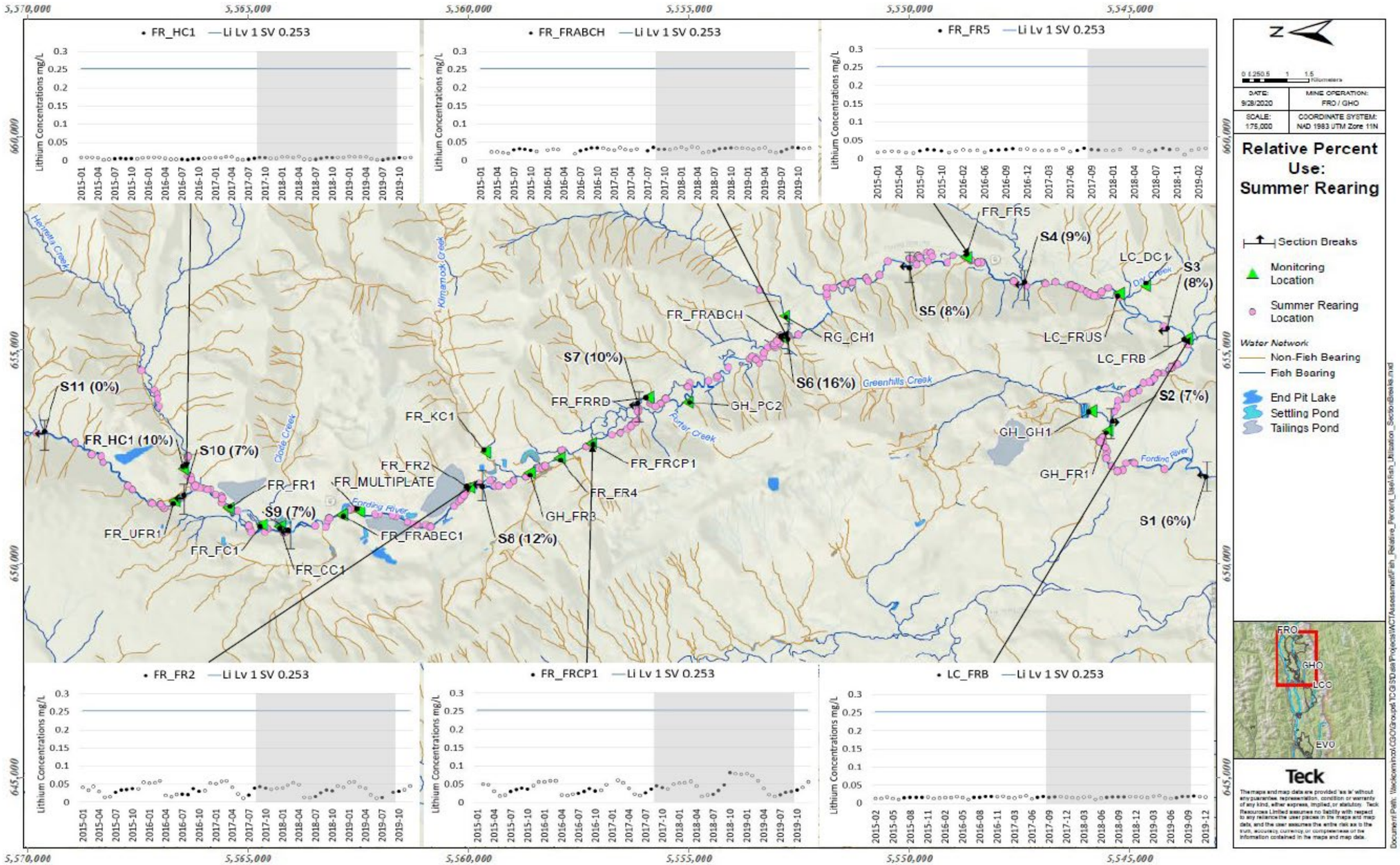
Note: Concentrations are in micrograms per litre total lithium (µg/L). Concentrations are compared to screening values for total lithium (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 13: Lithium concentrations for locations with high adult fish use in spring



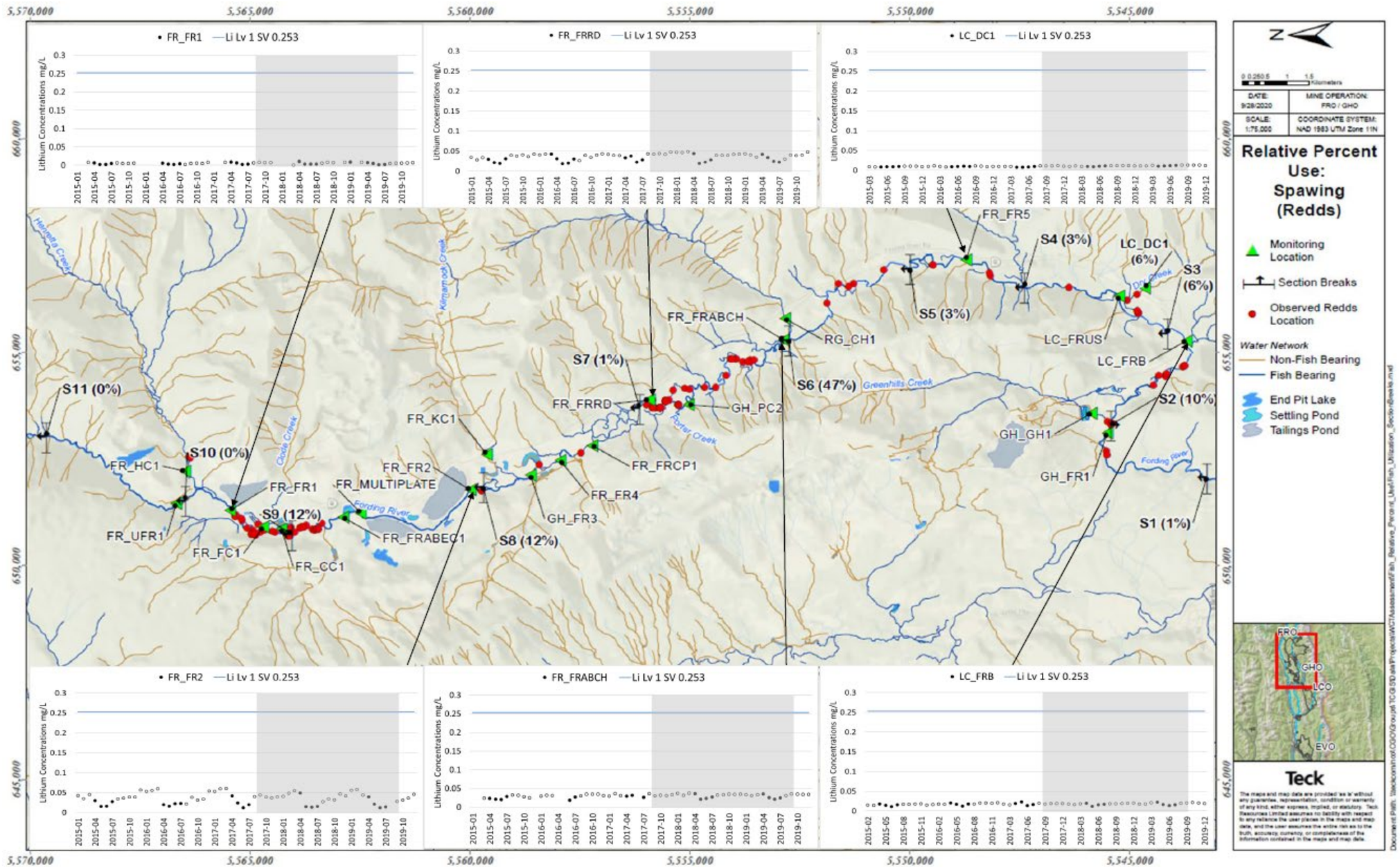
Note: Concentrations are in micrograms per litre total lithium (µg/L). Concentrations are compared to screening values for total lithium (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 14: Lithium concentrations for locations with high adult fish use in summer-fall



Note: Concentrations are in micrograms per litre total lithium (µg/L). Concentrations are compared to screening values for total lithium (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 15: Lithium concentrations for locations with high redds in spring



Note: Concentrations are in micrograms per litre total lithium (µg/L). Concentrations are compared to screening values for total lithium (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

3.3.2.2 Nitrite

As tabulated in Section 3.3.1.1, nitrite concentrations measured in the decline window were below the long-term BC WQG of 0.02 to 0.2 mg/L as N (chloride-dependent) in 95% of samples and below the level 1 screening value of 0.039 to 0.35 mg/L as N (chloride-dependent) in 98.6% of samples. The screening values used to evaluate potential effects for nitrite are based on juvenile growth effects and were assumed to apply to all life stages. As discussed in Section 3.2.5.1.1, in the test that the nitrite screening values are based on, no survival effects were observed at nitrite concentrations approximately equal to the level 3 screening value.

Nitrite concentrations measured throughout the upper Fording River watershed between 2012 and 2019 are compared to screening values in Table 21. Time-series plots with screened nitrite concentrations are provided for locations with highest adult fish use in winter (Figure 16), spring (Figure 17), and summer-fall (Figure 18), and highest number of redds observed in spring (Figure 19). The following bullets summarize the results for mainstem stations and tributary stations included in the refined assessment, provide a spatial summary, and discuss spatiotemporal overlap with WCT:

- **Fording River**. Nitrite concentrations in the decline window were below the long-term BC WQG[31] and level 1 screening value at all stations except for in winter 2018 at FR_FR1. These results indicate negligible potential for effects at all but one mainstem station. At FR_FR1, maximum nitrite concentrations were between the level 1 and level 2 screening values for a single measurement in March 2018, indicating a potential for low-level effects. Samples collected from FR_FR1 in adjacent sampling events were an order of magnitude lower (0.0024 mg/L as N in November 2017 and 0.0046 mg/L as N in March 2018) and below the long-term BC WQG. The magnitude of potential effects associated with maximum monthly concentrations in the decline window was the same as pre-September 2017 conditions, except in winter 2018 at FR_FR1 where there was a shift from negligible to low.
- **Tributaries**. Nitrite concentrations in the decline window were below the long-term BC WQG and level 1 screening value at all tributary stations except Clode Creek (winter 2018, spring 2019, and summer-fall 2017 and 2019), Swift Creek (spring 2019 summer-fall 2017 and 2018), and Greenhills Creek (summer-fall 2017 and 2018). In Swift and Greenhills creeks, nitrite concentrations were between the level 1 and level 2 screening values, indicating a potential for low-level effects. In Clode Creek, nitrite concentrations were either between the level 1 and level 2 screening values (low magnitude; winter 2018 and summer-fall 2017) or were between the level 2 and level 3 screening values (spring and summer-fall 2019). In Clode Creek, the magnitude of potential effects associated with maximum monthly concentrations in the decline window was either lower than or within the range observed pre-September 2017. In Swift and Greenhills creeks, there was a shift from negligible to low in summer-fall 2017 and 2018.

  There is elevated uncertainty and potential conservatism in a subset of the screening results for Clode (winter 2018 and spring and summer-fall 2019), Swift (spring 2019), and Greenhills (summer-fall 2017 and 2018) creeks because paired chloride concentrations had elevated detection limits. Per methods described in Section 3.2.4.1, chloride concentrations for these creeks and time periods were assigned a value of

[31] At FR_FRCP1 in September 2019, nitrite concentrations were measured weekly. Concentrations were 0.017, 0.0207, 0.016, and 0.011 mg/L as N. One of the four measurements (0.0207 mg/L as N) was approximately equal to the long-term BC WQG (0.02 mg/L). The average of these measurements was used to evaluate conditions in September 2019, which is consistent with application of BC ENV (2019b) long-term BC WQGs. BC ENV (2019b) states that this approach "allows concentrations of a substance to fluctuate above and below the guideline provided that the short-term acute is never exceeded and the long-term chronic is met over the specified averaging period (e.g., 5 samples in 30 days)". At FR_FR3, the nitrite concentration in 2019 was equal to the long-term BC WQG (0.02 mg/L as N).

0.5 mg/L (the lowest detection limit in the dataset) to calculate chloride-dependent nitrite screening values. If the actual chloride concentration was higher than 0.5 mg/L, then this chloride adjustment could overestimate the potential magnitude of effects. Conversely, if the actual chloride concentration was lower than 0.5 mg/L, then this chloride adjustment could underestimate the potential magnitude of effects.

- **Spatial summary**. Most of the assessed habitat in the decline window (92% to 100%) indicated a negligible potential for effects of nitrite in all seasons across all assessed years.
- **Spatiotemporal overlap with WCT**. Segments with the highest fish use had negligible potential for effects of nitrite on all life stages in all seasons. Potential effects of nitrite overlapped with WCT only in S8 and S9 in winter (low-level) and Clode Creek in spring (moderate-level). These areas represent approximately 23% of adult fish use in winter, 6.2% of adult fish use in spring (potentially an over-estimate; Section 3.3.2.1), and 1.3% of redds in spring. For winter in S8 (20% of adult fish use), there is elevated uncertainty and potential conservatism in this interpretation because estimated nitrite concentrations were used to represent conditions in S8.

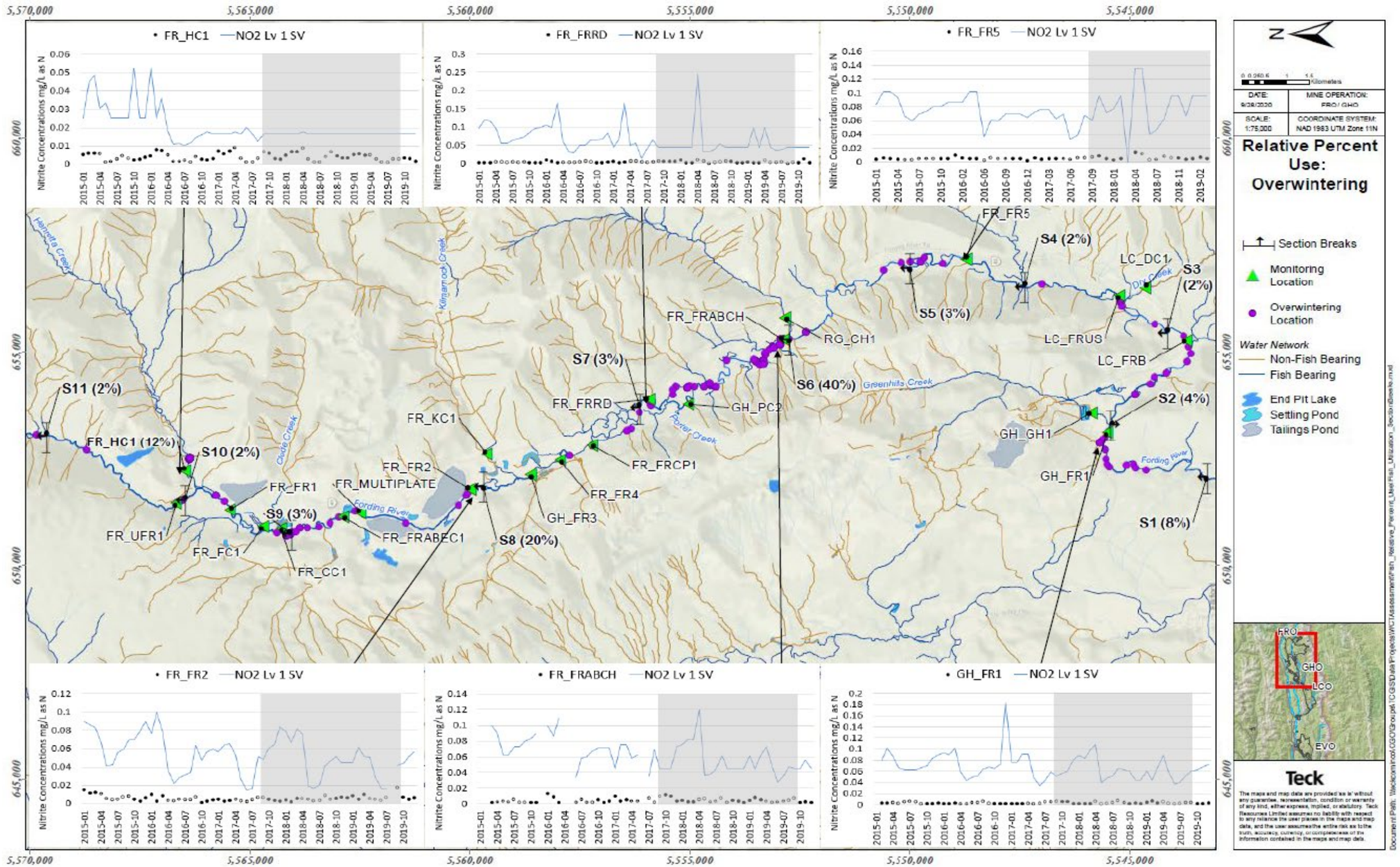
Based on the above results, nitrite met the requisite conditions for potentially contributing to the WCT decline at one mainstem station in March 2018 (FR_FR1) and at three tributary station (Clode, Swift, and Greenhills creeks). The majority of assessed habitat indicated a negligible potential for effects, including segments with the highest fish use. Therefore, nitrite did not meet the requisite conditions for being the cause of the WCT decline.

Table 21: Peak Monthly Average Nitrite Concentrations Compared to Fish Screening Values in Winter, Spring, and Summer-Fall Seasons (2012 to 2019)

Segment	WQ Station Code	Biological Area Code	Screening Values (µg/L)	Fish Habitat (ha)	Relative Fish Use (%)				Nitrite (mg/L as N)																					
					Winter	Spring		Summer-Fall	Winter								Spring								Summer-Fall						
						Tagged	Redds		2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019
Mainstem Fording River																														
10	*FR_UFR1*	*FO26*		7.4	3.8%	7.7%	0.0%	7.0%	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.0016*	*0.001*	*0.0016*	*0.0015*	*0.001*	*0.001*	*0.001*	*0.001*	*0.0019*	*0.001*	*0.001*	*0.001*	*0.001*	*0.0012*	*0.001*	*0.001*	*0.0011*	*0.005*	*0.001*
9	FR_FR1	FODHE		2.9	3.4%	10%	12%	7.0%	0.0031	0.014	0.0034	0.0033	0.0031	0.0055	0.04	0.0042	0.0042	0.011	0.0077	0.0034	0.0036	0.0075	0.0046	0.0011	0.0059	0.0077	0.0039	0.0051	0.0028	0.0073	0.0051	0.0024
		FOUCL		0.23					0.024	0.014	0.0034	0.0033	0.0031	0.0055	0.04	0.0042	0.0042	0.011	0.0077	0.0034	0.0036	0.0075	0.0046	0.0011	0.03	0.0077	0.0039	0.012	0.0028	0.0073	0.0051	0.0024
8		FOUNGD		1.4	20%	20%	12%	12%	0.024	0.014	0.0034	0.0033	0.0031	0.0055	0.04	0.0042	0.0042	0.011	0.0077	0.0034	0.0036	0.0075	0.0046	0.0011	0.03	0.0077	0.0039	0.012	0.0028	0.0073	0.0051	0.0024
	FR_FRABEC1	FODNGD		0.56					0.024																0.03			0.012				
	FR_MULTIPLATE	MP1		0.89					0.024	0.01			0.003		0.0053	0.0086		0.0057					0.013		0.029			0.013			0.012	
		FOUSH		1.5					0.03	0.029	0.015	0.015	0.01	0.0054	0.0073	0.01	0.014	0.039	0.026	0.012	0.0052	0.0051	0.013	0.0076	0.029	0.015	0.0061	0.013	0.007	0.0075	0.012	0.017
	FR_FR2	FOUKI		0.92					0.03	0.029	0.015	0.015	0.01	0.0054	0.0073	0.01	0.014	0.039	0.026	0.012	0.0052	0.0051	0.0057	0.0076	0.026	0.015	0.0061	0.0082	0.007	0.0075	0.0084	0.017
7	FR_FR3	FOBKS	L1: 0.007 to 0.24 L2: 0.011 to 0.39 L3: 0.024 to 0.87	2.5	2.7%	3.1%	1.3%	10%							0.0055	0.02		0.0094					0.011		0.023						0.011	0.016
		SCOUTDS		0.066					0.03	0.023	0.024	0.016	0.011	0.0051	0.0055	0.02	0.019	0.043	0.026	0.012	0.005	0.0056	0.013	0.0063	0.025	0.017	0.0079	0.012	0.0088	0.0083	0.013	0.016
	FR_FR4	FOBSC		0.68					0.03	0.023	0.024	0.016	0.011	0.0051	0.0051	0.017	0.019	0.043	0.026	0.012	0.005	0.0056	0.013	0.0063	0.025	0.017	0.0079	0.012	0.0088	0.0083	0.013	0.013
	FR_FRCP1	FOBCP		1.4								0.016	0.044	0.015	0.0059	0.013					0.011	0.0053	0.0054	0.0076	0.0051				0.0085	0.0071	0.0068	0.0093	0.016
		FRCP1SW		1.4							0.0053	0.016	0.044	0.015	0.0097	0.015					0.011	0.0053	0.0072	0.0097	0.0074				0.0085	0.0071	0.0068	0.0093	0.016
	FR_FRRD	FRUPO		2.2							0.0053	0.005	0.0093	0.0071	0.0097	0.015				0.0052	0.005	0.0072	0.0097	0.0074				0.0051	0.0061	0.0067	0.0065	0.005
		FO10-SP1		0.081					0.01	0.013	0.017	0.005	0.009	0.0071	0.0097	0.015	0.015	0.011	0.011	0.005	0.005	0.0072	0.01	0.0074	0.021	0.013	0.010	0.005	0.0061	0.0067	0.007	0.005
6	GH_PC2	FODPO		1.9	40%	22%	47%	16%	0.01	0.013	0.017	0.005			0.005	0.005	0.015	0.011	0.011	0.0048			0.0047	0.005	0.021	0.013	0.01	0.005			0.0071	
		RG_FOXL		0.064					0.01	0.013	0.017	0.005	0.013	0.0136	0.0054	0.008	0.015	0.012	0.011	0.005	0.0054	0.007	0.007	0.0056	0.021	0.013	0.010	0.006	0.0059	0.0096	0.007	0.007
	FR_FRABCH	FO22		1.9								0.005	0.013	0.014	0.0054	0.008		0.012		0.0042	0.0054	0.007	0.0067	0.0056				0.0056	0.0059	0.0096	0.0071	0.007
5	FR_FR5	FOUEW		11	4.9%	9.2%	5.8%	17%	0.011	0.017	0.013	0.0065	0.011	0.009	0.0063	0.0076	0.011	0.012	0.012	0.0041	0.0064	0.006	0.014	0.0053	0.011	0.01		0.0055	0.0057	0.0071	0.0085	
3	LC_FRUS	FO28		4.9	2.3%	3.8%	0.6%	7.7%		0.01	0.011	0.0035							0.01	0.0052							0.0077	0.0081		0.0076	0.0059	0.0073
2	LC_FRB	FO29		8.9	4.2%	9.2%	9.1%	7.3%	0.01	0.005	0.01	0.005	0.005	0.0056	0.0044	0.0056	0.0038	0.012	0.01	0.0054	0.005	0.0053	0.0056	0.005	0.0073	0.0088	0.0078	0.0063	0.005	0.0083	0.0077	0.0083
1	GH_FR1	FODGH		2.5	7.6%	4.6%	1.3%	6.2%	0.022	0.014	0.018	0.0051	0.0054	0.0059	0.005	0.0076	0.01	0.011	0.011	0.0078	0.0056	0.0054	0.0077	0.0056	0.0072	0.01	0.01	0.0062	0.0073	0.0072	0.0079	0.0054
Tributaries																														
9	*FR_HC3*	*HENUP*		1.7	0.0%	0.0%	0.0%	0.0%	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.0022*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.0024*	*0.001*	*0.001*	*0.001*		*0.001*	*0.001*	*0.001*	*0.001*	*0.001*
6	*RG_CH1*	*CHCK*		0.4	0.0%	0.0%	0.0%	0.3%	*0.001*	*0.0027*	*0.001*	*0.001*	*0.0014*	*0.0014*	*0.001*	*0.0012*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.0015*	*0.0022*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.0012*
9	FR_HC1	HENFO		3.0	12%	3.1%	1.3%	9.7%	0.0099	0.02	0.014	0.0063	0.0079	0.0073	0.0069	0.0059	0.0083	0.027	0.014	0.0057	0.0051	0.009	0.0089	0.005	0.0065	0.0091	0.004	0.0047	0.0044	0.0071	0.0069	0.0036
	FR_FC1	FR_FC1	L1: 0.007 to 0.44 L2: 0.011 to 0.71 L3: 0.024 to 1.6	0.29	0.0%	0.8%	1.3%	0.0%	0.001	0.0024		0.001	0.001	0.0014	0.0012		0.001	0.0025	0.0019		0.001	0.0021			0.0031	0.0021	0.001		0.001	0.0011		
	FR_CC1	CLODE		0.3	0.0%	6.2%	1.3%	0.0%	0.26	0.46	0.2	0.23	0.032	0.016	0.04	0.01	0.26	0.29	0.25	0.17	0.095	0.087	0.07	0.078	0.45	0.31	0.25	0.16	0.082	0.083	0.11	0.069
7	FR_KC1	KICK		0.086	0.0%	0.8%	0.0%	0.0%	0.034	0.057	0.02	0.02	0.028	0.019	0.011	0.008	0.018	0.023	0.02	0.017	0.02	0.044	0.011	0.0062	0.015	0.017	0.01	0.005	0.005	0.0056	0.008	0.005
	GH_SC1-2	SWCK		0.06	0.0%	0.0%	0.0%	0.0%	0.021	0.02	0.02	0.02	0.02	0.022	0.019	0.024	0.022	0.03	0.022	0.032	0.027	0.031	0.014	0.037	0.05	0.02	0.03	0.03	0.023	0.035	0.026	0.055
6	GH_PC1	POCK		0.15	0.0%	0.0%	0.0%	0.0%	0.01	0.01	0.021	0.005	0.005	0.005	0.01	0.011	0.01	0.01	0.01	0.005	0.005	0.005	0.005	0.005	0.02	0.01	0.011	0.005	0.005	0.005	0.0064	0.005
3	LC_DC1	LC_DC1		0.2	0.0%	0.0%	5.8%	0.0%	0.001	0.001	0.001	0.001	0.0037	0.0065	0.0037	0.0044	0.001	0.001	0.001	0.019	0.0011	0.014	0.034	0.0042	0.001	0.001	0.001	0.001	0.001	0.0041	0.0085	0.011
2	GH_GH1	GHCKD		0.23	0.0%	0.0%	0.6%	0.0%	0.02	0.02	0.02	0.052	0.01	0.021	0.015	0.025	0.01	0.01	0.012	0.026	0.028	0.66	0.019	0.013	0.037	0.027	0.025	0.019	0.018	0.04	0.033	0.018
Proportion of Habitat Area in Each Magnitude Category		% <L1 (No Effects Rating)		62	n/a				99	99	99	99	100	100	92	100	99	99	99	99	99	99	100	99	99	99	99	99	99	99	100	99
		% Between L1 and L2 (Low Rating)							0	0	0	0	0	0	8	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0
		% Between L2 and L3 (Moderate Rating)							1	0	1	1	0	0	0	0	1	1	1	1	0	1	0	1	0	1	1	1	0	0	0	1
		% >L3 (High Rating)							0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

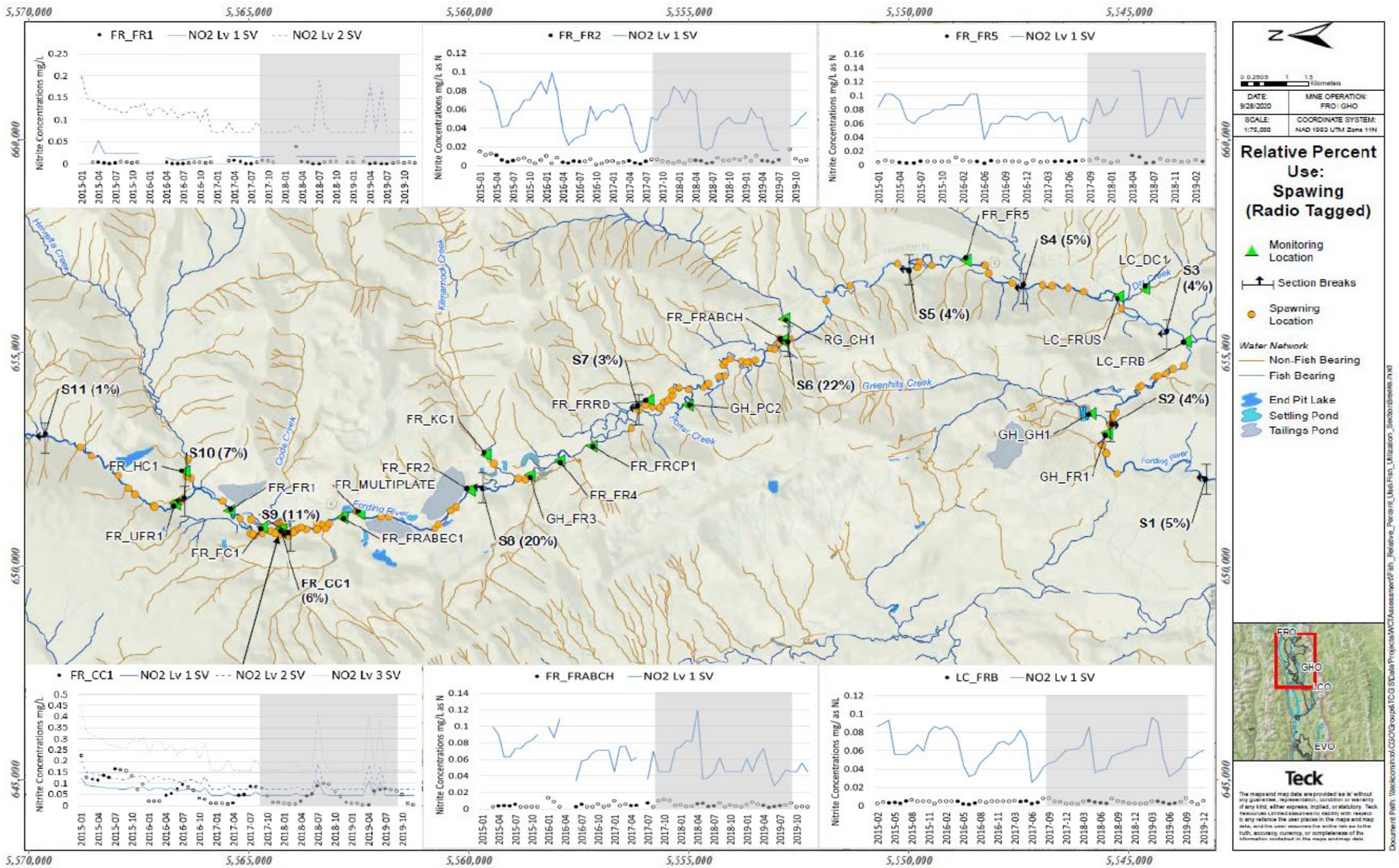
Notes: u/s = upstream; d/s = downstream; L1 = level 1; L2 = level 2; L3 = level 3.
Concentrations are in milligrams per litre nitrogen (mg/L as N). Concentrations are compared to the chloride-dependent level 1, level 2, and level 3 screening values for nitrite (see Section 3.2.5.1.1 for details). For rows (subunits) without a water quality station, concentrations are shown in grey; these are assumed to be equal to the highest concentration measured at adjacent stations.
FR_FR5 is located in S5; relative fish use is shown for S4 and S5 combined.
Years shaded grey indicate one or more samples collected in this year and season could be between September 2017 and September 2019.
Blank cells indicate no samples were collected for corresponding station and year/season.
Screening: shading indicates below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Area-weighted summary: transient shading used to shade from 0% (no color) to 100% (blue).

Figure 16: Nitrite concentrations for locations with high adult fish use in winter



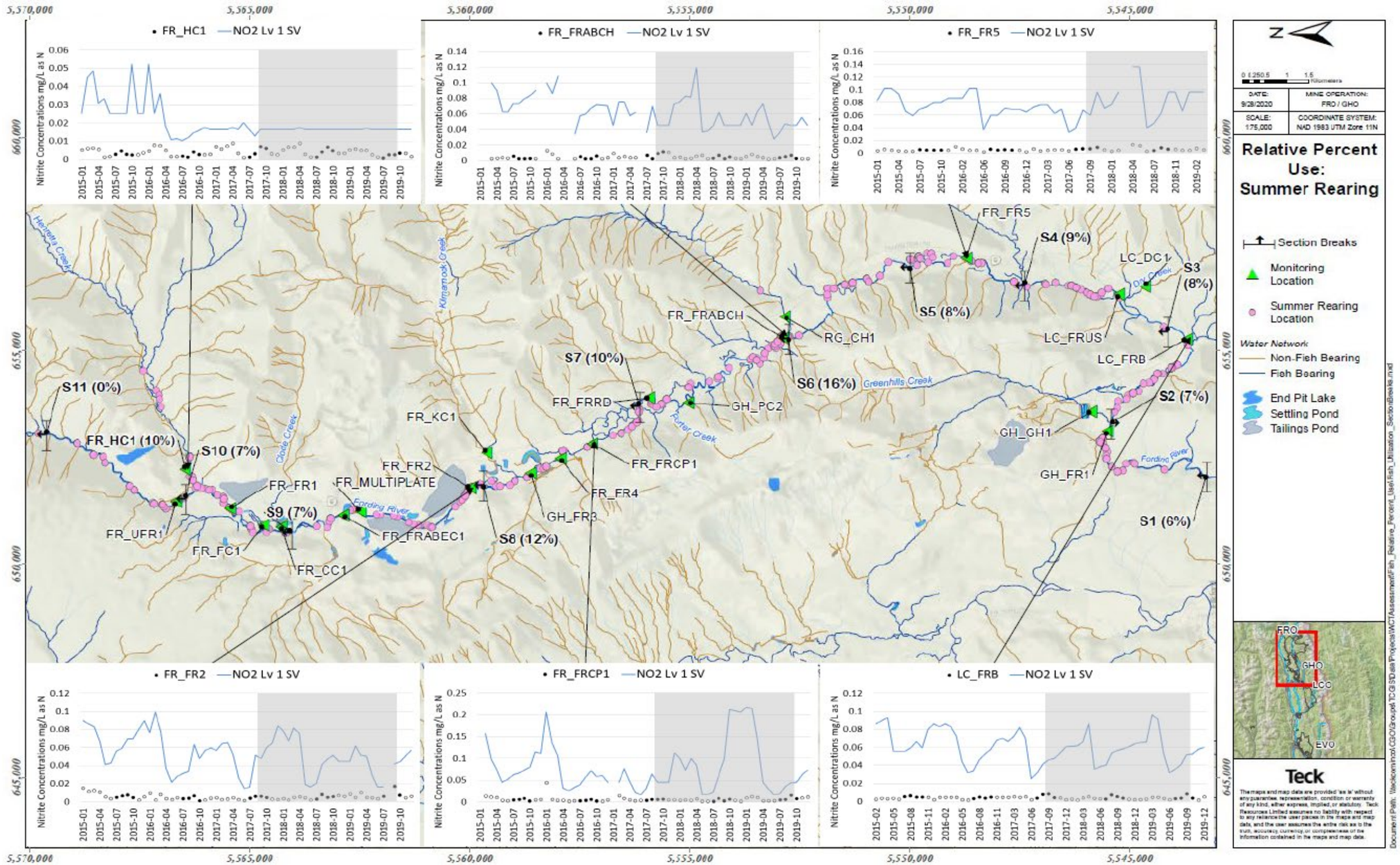
Note: Concentrations are in milligrams per litre as nitrogen (mg/L as N). Concentrations are compared to screening values for nitrite (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 17: Nitrite concentrations for locations with high adult fish use in spring



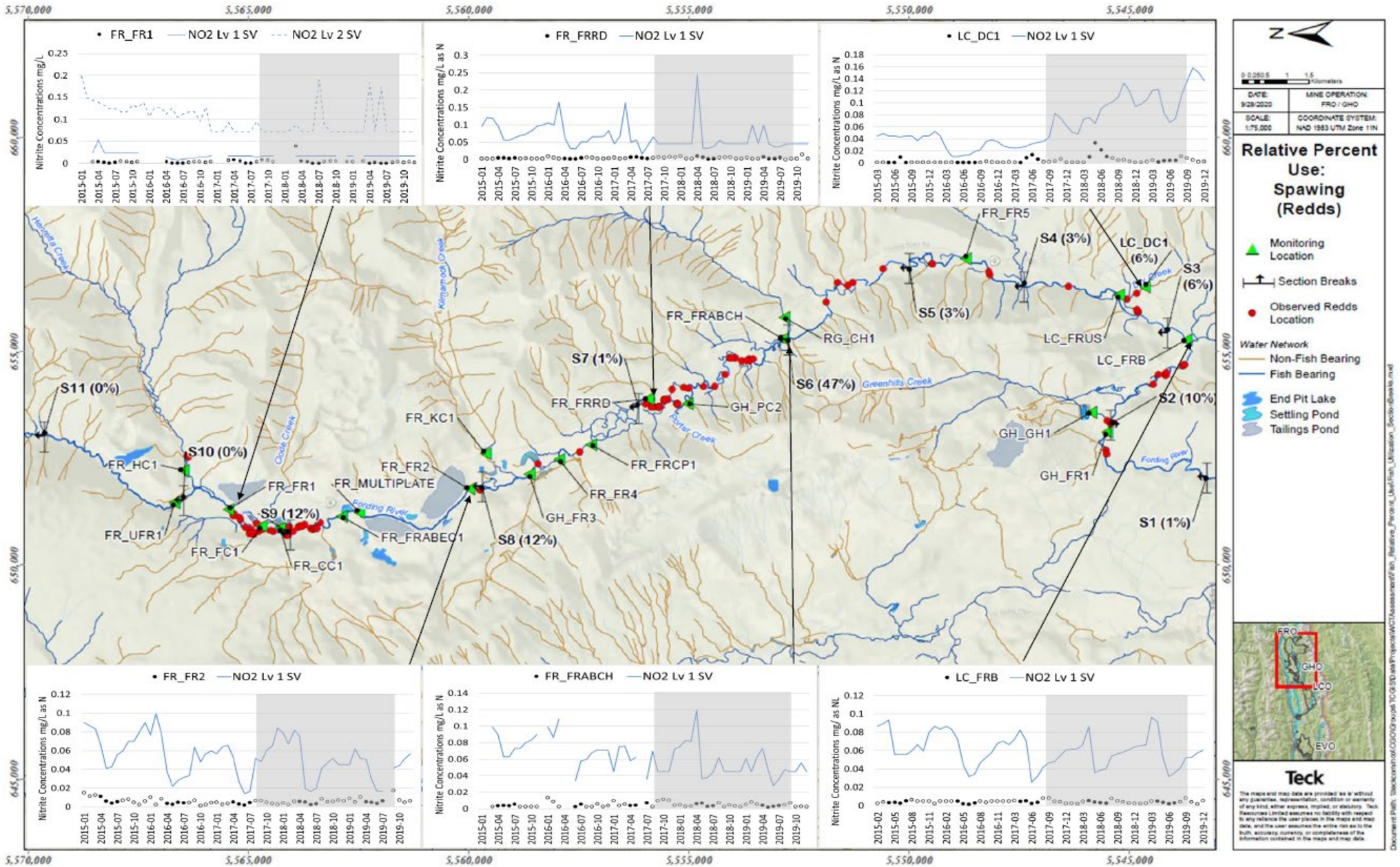
Note: Concentrations are in milligrams per litre as nitrogen (mg/L as N). Concentrations are compared to screening values for nitrite (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 18: Nitrite concentrations for locations with high adult fish use in summer-fall



Note: Concentrations are in milligrams per litre as nitrogen (mg/L as N). Concentrations are compared to screening values for nitrite (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 19: Nitrite concentrations for locations with high redds in spring



Note: Concentrations are in milligrams per litre as nitrogen (mg/L as N). Concentrations are compared to screening values for nitrite (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

3.3.2.3 Nitrate

As tabulated in Section 3.3.1.1, nitrate concentrations measured in the decline window were below the long-term BC WQG of 3 mg/L as N in 25% of samples but below the hardness-dependent level 1 benchmark of 3 to 22 mg/L as N in 88% of samples. As discussed in Section 3.2.5.1.1, the nitrate benchmarks derived in the EVWQP are based on effects to early life stages of fish (embryo-alevin), which are expected to be present between May 15 and August 31 (this spans the spring and a portion of the summer-fall seasons in Table 22). Potential effects to early life stages of WCT are discussed below, followed by a discussion of potential effects on juveniles and adults.

Nitrate concentrations measured throughout the upper Fording River watershed between 2012 and 2019 are compared to hardness-dependent benchmarks for early life stages in Table 22. Time-series plots with screened nitrate concentrations are provided for locations with highest adult fish use in winter (Figure 20), spring (Figure 21), and summer-fall (Figure 22), and highest redds observed in spring (Figure 23). The following bullets summarize the results for mainstem stations and tributary stations included in the refined assessment, provide a spatial summary, and discuss spatiotemporal overlap with WCT:

- **Fording River**. Nitrate concentrations in the decline window were either below the level 1 benchmark or between the level 1 and level 2 benchmarks at all but one mainstem station (FR_FRRD in winter [2017, 2018, 2019] and spring [2018]). For all stations except FR_FRRD, these results indicate either no chronic effects to fish or a potential low-level effect from nitrate on early life stages of WCT that may be spawning in those reaches of the mainstem Fording River. Nitrate concentrations at FR_FRRD that were between the level 2 and level 3 benchmarks occurred in winter, when early life stages of WCT are not present. As discussed at the end of this section, the available information indicates that nitrate concentrations (including at FR_FRRD) would not result in chronic effects to adult or juvenile WCT which are present in winter.

  The magnitude of potential effects associated with maximum concentrations in the decline window was either lower than or within the range observed pre-September 2017, except for several mainstem stations where there was a shift from negligible to low ratings (FR_MULTIPLATE in winter [2018 and 2019], FR_FRABCH in spring [2018], and FR_FRCP1 [2018], FR_FRRD [2017], and FR_FRABCH [2017] in summer-fall) or a shift from negligible to moderate at FR_FRRD in spring 2018. At FR_FRRD in spring 2018, the moderate rating was due to a sample collected on 4 April 2018 (31 mg/L), which based on the periodicity table, is approximately five weeks before early life stages of WCT are expected to be present (mid-May to mid-August; Table 15). In the next FR_FRRD sample collected on 9 May 2018, the nitrate concentration (9 mg/L) was below the level 1 benchmark, as were the other samples collected in spring 2018. Thus, spring 2018 nitrate concentrations at FR_FRRD indicate no chronic effects to early life stages of WCT.

- **Tributaries**. Nitrate concentrations in the decline window were below the level 1 benchmark at approximately half of the tributary stations (including Henretta Creek), indicating no chronic effects from nitrate to WCT in these tributaries. Concentrations were between the level 1 and level 2 benchmarks in Porter Creek (winter 2018) and Swift Creek (winter 2017, 2018, 2019; spring 2018; summer-fall 2017 and 2019), indicating a potential low-level effect from nitrate on early life stages. Maximum concentrations greater than the level 2 benchmark occurred in Kilmarnock Creek (all years and seasons in decline window) and Clode Creek (all years and seasons in decline window); these two tributaries represent 1.1% of fish accessible tributary habitat in the upper Fording River watershed. As indicated above, early life stages of WCT are not present in winter.

The magnitude of potential effects associated with maximum concentrations in the decline window was either lower than or within the range observed pre-September 2017, except for Porter Creek where there was a shift from negligible to low in winter when early life stages of WCT are not present.

- **Spatial summary**. The majority of assessed habitat in the decline window indicated no chronic effects nitrate in winter (82% to 88%), spring (85% to 99%), and summer-fall (89% to 99%), with most or all of the remaining habitat indicating a potential low-level or moderate-level effect from nitrate on early life stages of WCT that may spawn in those areas. Relative to previous years, there was no apparent shift in the area-weighted summaries.
- **Spatiotemporal overlap with WCT**. Potential effects of nitrate overlapped with WCT in mainstem segments S6 (all seasons), S7 (winter and summer-fall) [32], and S8 (winter and spring), as well as Clode and Kilmarnock creeks (all seasons). For adults, these areas represent 62% of fish use in winter, 49% of fish use in spring, and 26% of fish use in summer-fall. For early life stages (redds), these areas represent 62% of fish use in spring. Low-level effects on early life stages were indicated for overlapping areas except for in winter when early life stages are not present (areas with 42% of adult fish indicated moderate-level potential effects) and spring (areas with 7% of adult fish use and 1% of redds indicated high-level).[33]

Because the 2019 WCT monitoring results showed a decline in all life stages, nitrate effect concentrations for juveniles and adults were summarized. Results of this summary are as follows:

- CCME (2012) summarized juvenile and adult chronic effects data for relevant endpoints for five fish species (channel catfish, largemouth bass, Topeka shiner, medaka, and fathead minnow). No-observed effect concentrations for juveniles and adults ranged from 25 mg/L as N for medaka (298 d exposure) to 268 mg/L as N for Topeka shiner (30 d exposure). Effects were observed for three of the five fish species, ranging from a maximum allowable toxicant concentration (MATC) of 50 mg/L as N for growth of medaka to an MATC of 360 mg/L as N for growth of Topeka shiner. For all species except fathead minnow, effect concentrations for juvenile and adult life stages were higher (indicating less sensitivity to nitrate) than those reported for early life stages. For fathead minnow, CCME (2012) noted one study (Adelman et al. 2009) that reported a lower effect concentration for juveniles (maximum allowable toxicant concentration of 84 mg/L as N) compared to embryo-larval life stage (maximum allowable toxicant concentration of 215 mg/L as N). CCME (2012) concluded that "*[i]n general, early life stages of freshwater fish were found to be the most sensitive to nitrate exposure*".
- Subsequent to CCME (2012), three additional studies were identified that reported effect concentrations to juvenile fish. Davidson et al. (2014) reported 87.9% survival for juvenile rainbow trout exposed to 91 mg/L as N for three months, Davidson et al. (2017) reported >99% survival for juvenile Atlantic salmon exposed to 99 mg/L as N for eight months, and Gomez Isaza et al. (2020) reported 100% survival for juvenile perch exposed to 23 mg/L as N for four weeks. These results further support the CCME (2012) conclusion that juveniles and adults are generally less sensitive than early life stages.

[32] Moderate magnitude rating at FRCP1SW in spring 2018 was based on the concentration measured at FR_FRRD. Because the nitrate concentration at FR_FRRD was measured prior to early life stages being present and other spring 2018 conditions indicated no chronic effects of nitrate, S7 (spring) was not specified in the spatiotemporal summary.

[33] Moderate magnitude ratings in spring 2018 at FR_FRRD were not considered in this summary because these concentrations were measured prior to early life stages being present.

- For rainbow trout, which is expected to be the most relevant species to interpret potential effects to the congeneric WCT and is the species for which the EVWQP nitrate benchmarks were based on, nitrate effect concentrations were approximately 6.6 times higher for juveniles (12.1% effect on survival at 91 mg/L as N [test hardness = 308 mg/L) compared to early life stages (10% effect [level 1] on proportion normal at 13.8 mg/L as N [adjusted to hardness of 308 mg/L]).
- The lowest effect concentration for juvenile and adult fish (50 mg/L as N MATC for medaka) is above nitrate concentrations measured in the decline window at all mainstem stations and all but two tributary stations (Clode and Kilmarnock creeks). Thus, at all but these two locations, the available information indicates that nitrate concentrations would not result in chronic effects to adult or juvenile WCT. This interpretation is further supported by the observation that rainbow trout exhibited high survival at concentrations almost two times higher than the medaka MATC. At Clode Creek and Kilmarnock Creek, chronic effects to juvenile and adult fish could not be ruled out.

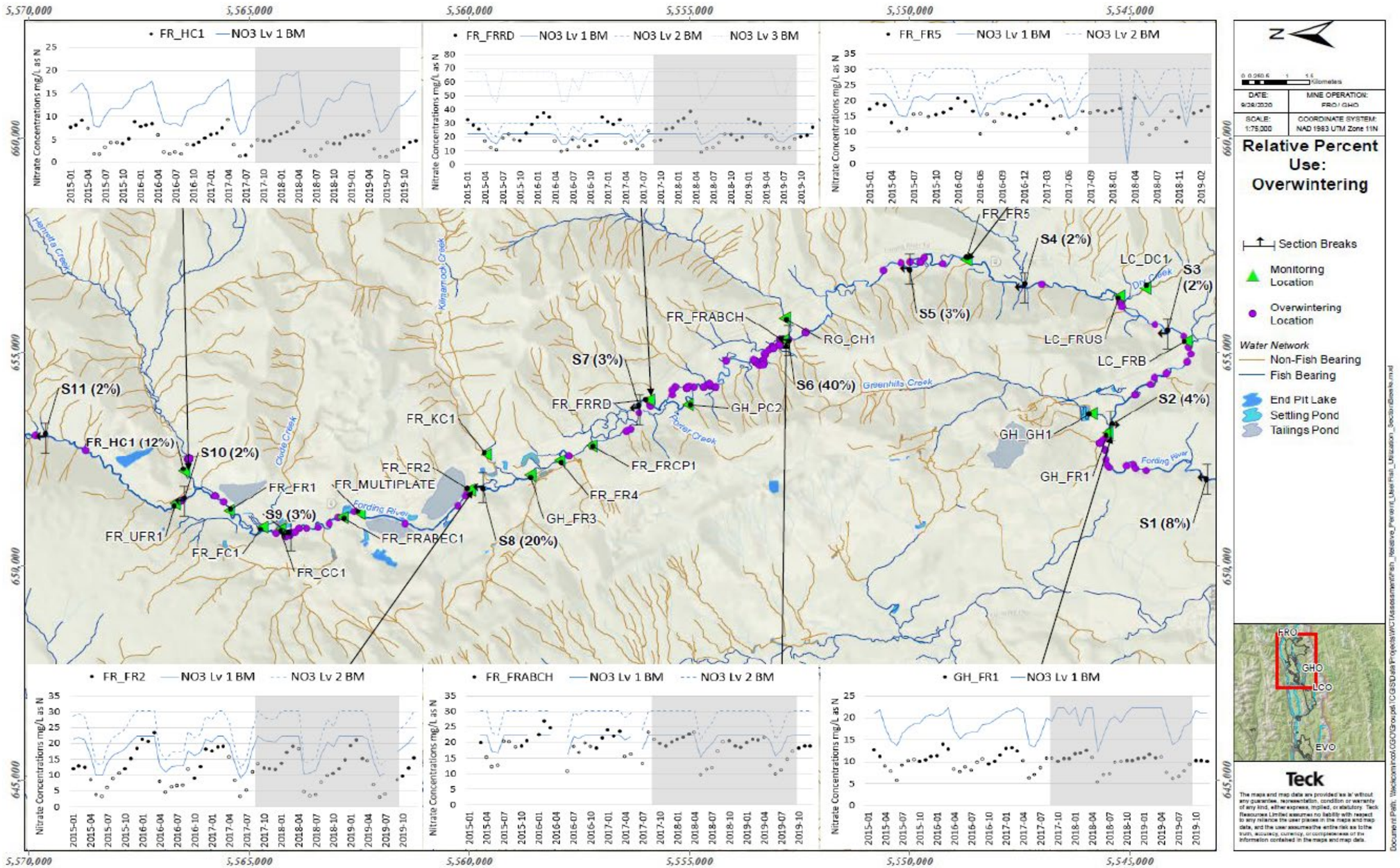
Based on the above results, nitrate met the requisite conditions to contribute to the WCT decline via potential viability effects (combined sublethal and lethal endpoint) to early life stages of WCT and potential effects to adults or juveniles at two tributary stations. For adults and juveniles, the majority of assessed habitat indicated no chronic effects. For early life stages, areas with potential effects represent 62% of fish use in spring, with 60% of that fish use in areas with a potential for low-level effects. Therefore, nitrate did not meet the requisite conditions for being the cause of the WCT decline.

Table 22: Peak Monthly Average Nitrate Concentrations Compared to Fish Benchmarks in Winter, Spring, and Summer-Fall Seasons (2012 to 2019)

Segment	WQ Station Code	Biological Area Code	Screening Values (µg/L)	Fish Habitat (ha)	Relative Fish Use (%)				Nitrate (mg/L as N)																			
					Winter	Spring		Summer-Fall	Winter								Spring								Summer-Fall							
						Tagged	Redds		2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019
Mainstem Fording River																												
10	*FR_UFR1*	*FO26*		7.4	3.8%	7.7%	0.0%	7.0%	*0.083*	*0.077*	*0.15*	*0.18*	*0.21*	*0.22*	*0.19*	*0.23*	*0.061*	*0.058*	*0.15*	*0.083*	*0.11*	*0.13*	*0.14*	*0.14*	*0.0092*	*0.0051*	*0.041*	*0.048*	*0.051*	*0.014*	*0.027*	*0.013*
9	FR_FR1	FODHE		2.9	3.4%	10%	12%	7.0%	5.6	11	5.5	6.7	4.9	5.6	3.9	4.2	4.7	6.4	9.5	5.5	3.9	7.1	7.4	4.5	4.5	6.5	3.4	3.2	2.8	4.1	3.3	1.8
		FOUCL		0.23					8.9	11	5.5	6.7	4.9	5.6	3.9	4.2	4.7	6.4	9.5	5.5	3.9	7.1	7.4	4.5	8.5	6.5	3.4	12	2.8	4.1	3.3	1.8
8		FOUNGD		1.4	20%	20%	12%	12%	8.9	11	5.5	6.7	4.9	5.6	3.9	4.2	4.7	6.4	9.5	5.5	3.9	7.1	7.4	4.5	8.5	6.5	3.4	12	2.8	4.1	3.3	1.8
	FR_FRABEC1	FODNGD		0.56					8.9																8.5			12				
	FR_MULTIPLATE	MP1		0.89					11	13			19		23	26		3.9					28		9.3			12			9.9	
		FOUSH		1.5					11	13	13	19	23	19	23	26	9.5	11	15	9.2	8.0	16	28	15	9.6	11	7.8	12	12	14	11	9.7
	FR_FR2	FOUKI		0.92					11	13	13	19	23	19	19	21	9.5	11	15	9.2	8.0	16	18	15	9.6	11	7.8	11	12	14	11	9.7
7	FR_FR3	FOBKS	L1: 5.5 to 22 L2: 7 to 30 L3: 16 to 67	2.5	2.7%	3.1%	1.3%	10%							18	22		4.9					14		10						12	8.9
		SCOUTDS		0.066					15	19	16	17	25	16	18	23	11	14	15	11	12	18	14	15	12	12	9.0	12	15	14	12	9.7
	FR_FR4	FOBSC		0.68					15	19	16	17	25	16	17	23	11	14	15	11	12	18	14	15	12	12	9.0	12	15	14	11	9.7
	FR_FRCP1	FOBCP		1.4								23	31	22	29	29				11	9.0	15	18	16				13	13	16	29	12
		FRCP1SW		1.4							29	33	37	33	39	33				17	18	17	31	20				22	18	24	29	20
6	FR_FRRD	FRUPO		2.2	40%	22%	47%	16%			29	33	37	33	39	33				17	18	17	31	20				22	18	24	22	20
		FO10-SP1		0.081					20	27	30	33	37	33	39	33	19.7	21	32	18.6	17.7	17	31	22	21.3	23	22.4	22	18	24	22	20.3
	GH_PC2	FODPO		1.9					20	27	30	22			21	20	20	21	32	19			15	22	21	23	22	21			21	
		RG_FOXL		0.064					20	27	30	22	27	24	23	21	19.7	21	32	18.6	18.7	16	23	22	21.3	23	22.4	21	20	23	21	17.2
	FR_FRABCH	FO22		1.9								21	27	24	23	21		8.3		15	19	16	23	21				21	20	23	21	17
5	FR_FR5	FOUEW		11	4.9%	9.2%	5.8%	17%	17	23	23	19	21	20	18	17	17	19	25	13	17	15	21	18	17	18		16	16	17	17	
3	LC_FRUS	FO28		4.9	2.3%	3.8%	0.6%	7.7%		16	17	15							19	13							12	12		12	11	9.8
2	LC_FRB	FO29		8.9	4.2%	9.2%	9.1%	7.3%	12	14	17	14	15	14	14	14	6.8	16	18	12	14	15	12	14	10	12	12	12	11	11	11	11
1	GH_FR1	FODGH		2.5	7.6%	4.6%	1.3%	6.2%	11	14	16	13	14	13	13	12	10	10	14	9.1	9.4	10	11	11	11	11	12	10	11	11	10	10
Tributaries																												
9	*FR_HC3*	*HENUP*		1.7	0.0%	0.0%	0.0%	0.0%	*0.25*	*0.23*	*0.28*	*0.29*	*0.33*	*0.31*	*0.31*	*0.33*	*0.23*	*0.23*	*0.25*	*0.26*	*0.34*	*0.3*	*0.3*	*0.29*	*0.17*	*0.22*		*0.29*	*0.29*	*0.29*	*0.28*	*0.2*
6	*RG_CH1*	*CHCK*		0.4	0.0%	0.0%	0.0%	0.3%	*0.16*	*0.15*	*0.19*	*0.18*	*0.2*	*0.22*	*0.19*	*0.19*	*0.096*	*0.16*	*0.16*	*0.12*	*0.11*	*0.14*	*0.14*	*0.15*	*0.029*	*0.046*	*0.16*	*0.12*	*0.094*	*0.038*	*0.068*	*0.04*
9	FR_HC1	HENFO	L1: 5.3 to 22 L2: 7 to 30 L3: 16 to 67	3.0	12%	3.1%	1.3%	9.7%	8.2	11	9.5	9.1	8.3	7.5	7.6	6.1	8.1	10	10	7.3	5.8	9.3	8.6	6.6	6.1	8.2	4.2	4.3	3.9	4.9	4.3	3.2
	FR_FC1	FR_FC1		0.29	0.0%	0.8%	1.3%	0.0%	5.4	6.0		5.9	3.0	4.5	6.0		1.9	6.1	7.3		1.5	5.0			4.2	5.6	3.2		2.8	2.2		
	FR_CC1	CLODE		0.3	0.0%	6.2%	1.3%	0.0%	28	34	38	59	87	81	84	99	38	36	40	36	76	89	112	98	44	33	28	48	73	57	61	58
7	FR_KC1	KICK		0.086	0.0%	0.8%	0.0%	0.0%	98	122	122	100	102	88	101	99	77	122	126	96	108	95	104	103	64	68	48	48	46	66	65	46
	GH_SC1-2	SWCK		0.06	0.0%	0.0%	0.0%	0.0%	67	63	60	44	38	26	28	26	64	40	56	22	24	19	28	22	52	42	37	33	24	24	20	25
6	GH_PC1	POCK		0.15	0.0%	0.0%	0.0%	0.0%	1.7	2.5	2.9	3.0	2.9	3.0	28	2.4	2.2	2.8	3.6	3.5	3.7	3.1	3.1	2.9	1.7	2.4	2.9	2.8	3.0	2.6	2.5	3.4
3	LC_DC1	LC_DC1		0.2	0.0%	0.0%	5.8%	0.0%	0.092	0.1	0.37	0.13	0.39	1.9	7.5	9.3	0.12	0.25	0.23	0.17	0.25	1.6	5.4	7.4	0.0069	0.017	0.034	0.035	0.05	1.2	7.0	9.5
2	GH_GH1	GHCKD		0.23	0.0%	0.0%	0.6%	0.0%	6.3	6.0	6.2	4.8	6.2	7.6	7.0	6.9	3.7	2.9	3.6	3.5	5.7	8.2	8.0	3.7	6.7	5.2	4.0	4.7	6.8	8.4	7.5	5.3
Proportion of Habitat Area in Each Magnitude Category		% <L1 (No Effects Rating)		62	n/a				99	74	68	90	79	88	82	85	99	99	73	99	99	99	85	95	99	95	94	99	99	89	95	99
		% Between L1 and L2 (Low Rating)							1	26	31	2	10	4	11	8	0	0	22	0	0	0	8	4	0	4	6	0	0	10	5	0
		% Between L2 and L3 (Moderate Rating)							0	1	1	7	10	7	7	7	1	1	5	1	0	0	7	0	1	1	0	1	0	1	1	1
		% >L3 (High Rating)							0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	0	0	0

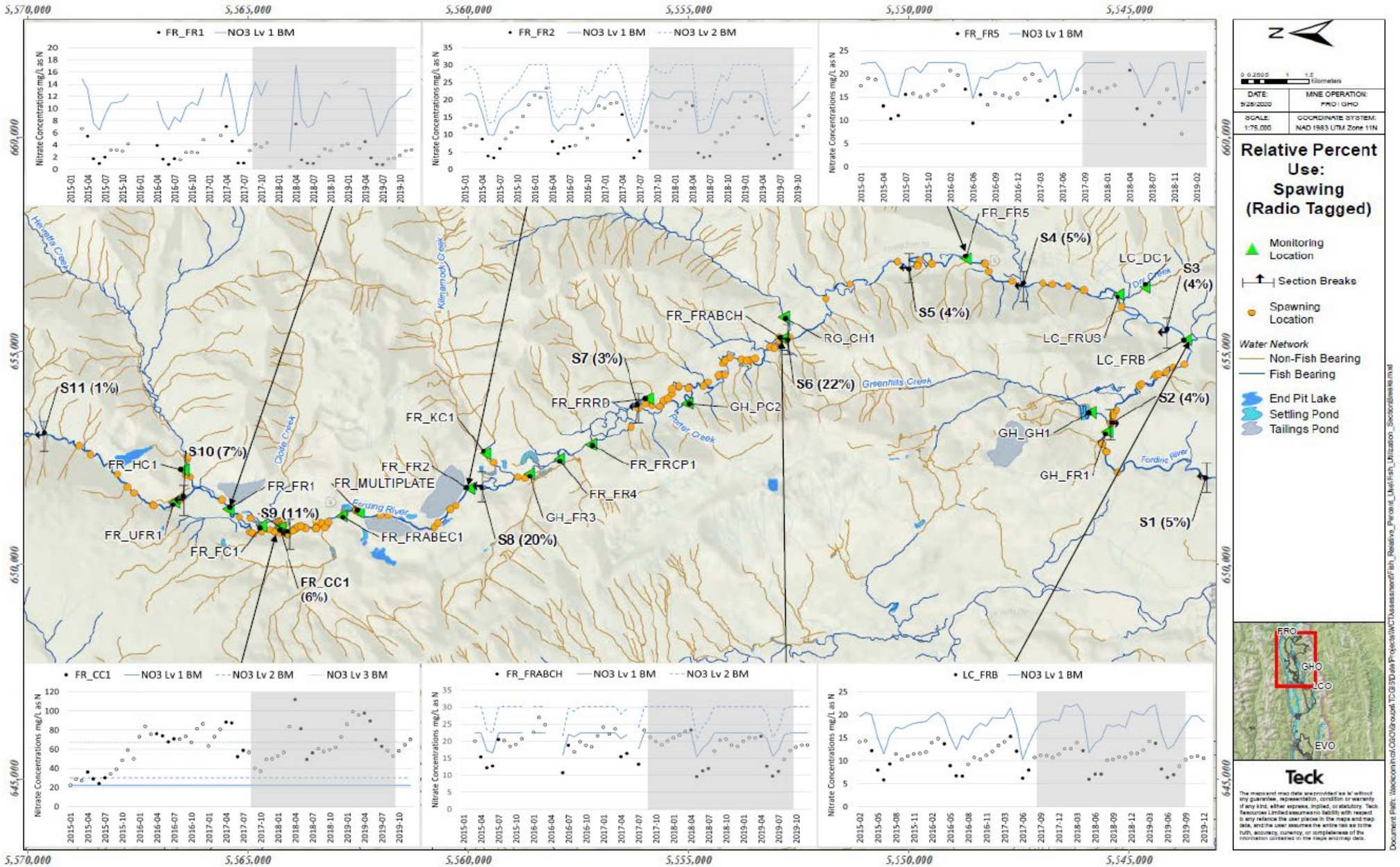
Notes: u/s = upstream; d/s = downstream; L1 = level 1; L2 = level 2; L3 = level 3.
Concentrations are in milligrams per litre nitrogen (mg/L as N). Concentrations are compared to the hardness-dependent level 1, level 2, and level 3 benchmarks for nitrate (see Section 3.2.5.1.1 for details). For rows (subunits) without a water quality station, concentrations are shown in grey; these are assumed to be equal to the highest concentration measured at adjacent stations.
FR_FR5 is located in S5; relative fish use is shown for S4 and S5 combined.
Years shaded grey indicate one or more samples collected in this year and season could be between September 2017 and September 2019.
Blank cells indicate no samples were collected for corresponding station and year/season.
Screening: shading indicates below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Area-weighted summary: transient shading used to shade from 0% (no color) to 100% (blue).

Figure 20: Nitrate concentrations for locations with high adult fish use in winter



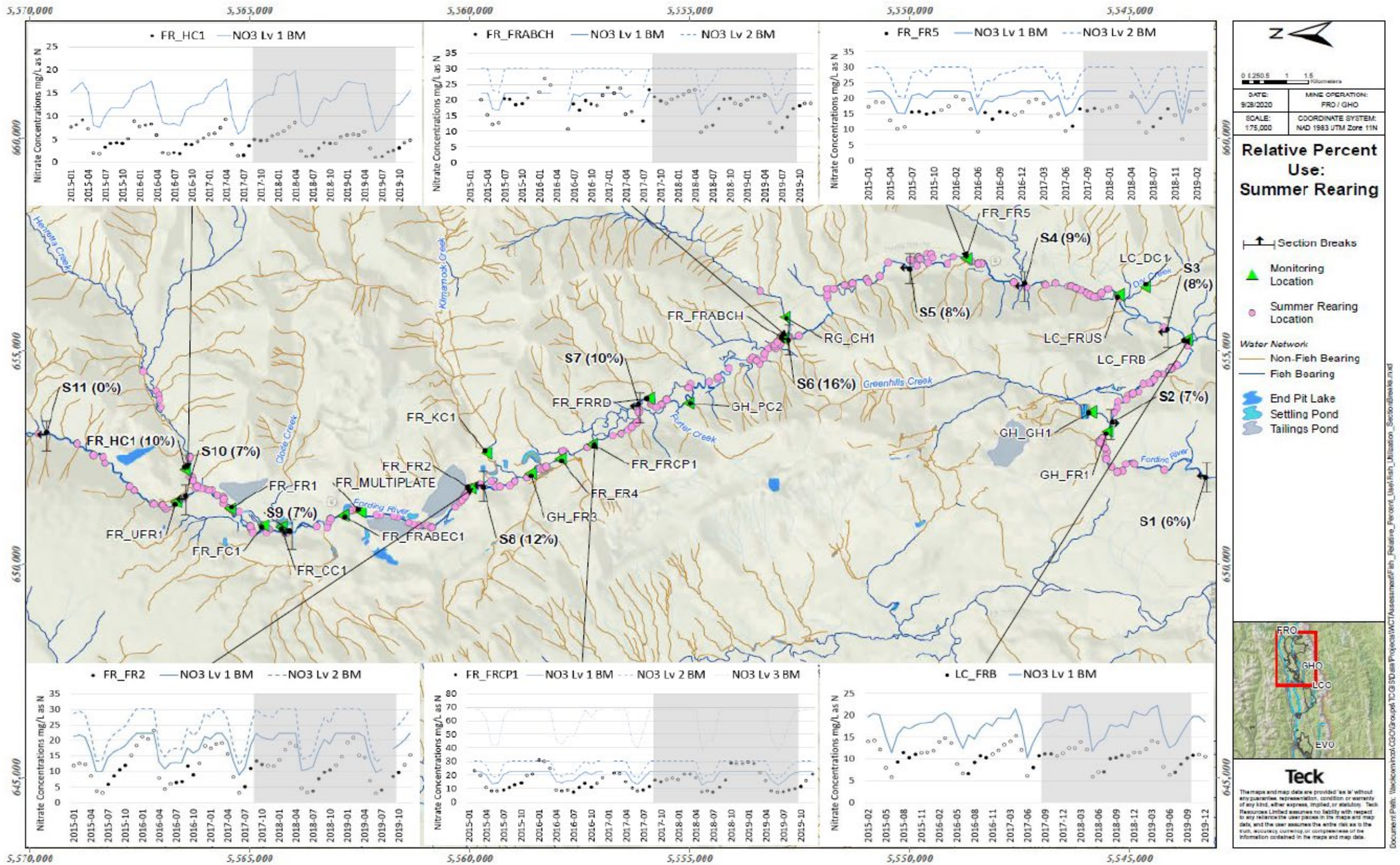
Note: Concentrations are in milligrams per litre as nitrogen (mg/L as N). Concentrations are compared to benchmarks for nitrate (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 21: Nitrate concentrations for locations with high adult fish use in spring



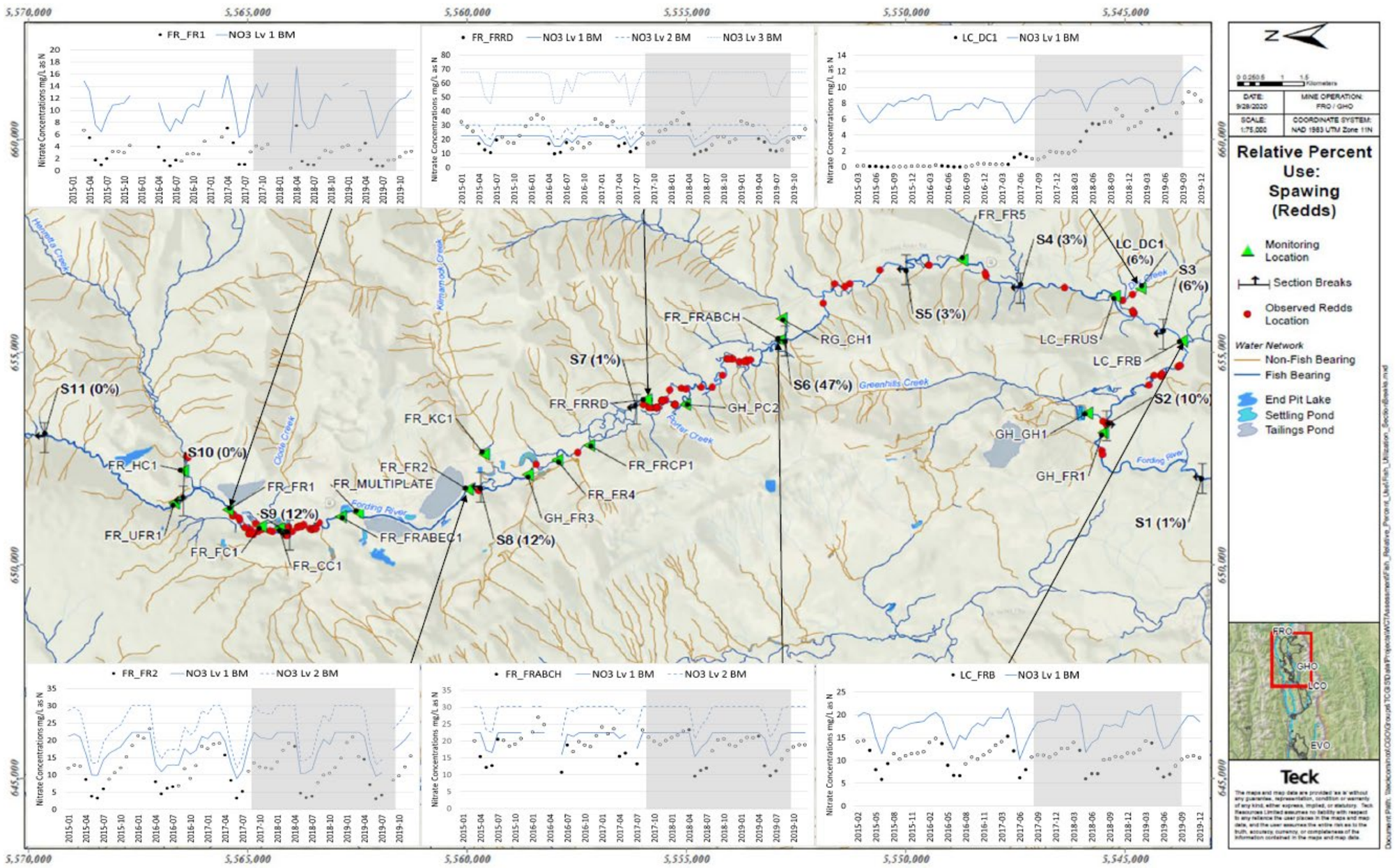
Note: Concentrations are in milligrams per litre as nitrogen (mg/L as N). Concentrations are compared to benchmarks for nitrate (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 22: Nitrate concentrations for locations with high adult fish use in summer-fall



Note: Concentrations are in milligrams per litre as nitrogen (mg/L as N). Concentrations are compared to benchmarks for nitrate (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 23: Nitrate concentrations for locations with high redds in spring



Note: Concentrations are in milligrams per litre as nitrogen (mg/L as N). Concentrations are compared to benchmarks for nitrate (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

3.3.2.4 Selenium

3.3.2.4.1 Water Quality

As tabulated in Section 3.3.1.1, selenium concentrations measured in the decline window were above the long-term BC WQG of 2 µg/L in 88% of samples but below the level 1 benchmark of 70 µg/L in 70% of samples. The level 1 benchmark reflects site-specific information on selenium bioaccumulation and the sensitivity of WCT and is expected to provide a site-relevant evaluation of potential survival effects on early life stages WCT (embryo-alevin). The evaluation of potential effects of aqueous selenium on early life stages is supported by the WCT tissue selenium monitoring data discussed in Section 3.3.2.4.2. For the evaluation of potential dietary effects to juveniles and adults, invertebrate tissue monitoring data were used (Section 3.3.2.4.2).

Aqueous selenium concentrations measured throughout the upper Fording River watershed between 2012 and 2019 are compared to EVWQP benchmarks for fish reproduction in Table 23. Time-series plots with screened selenium concentrations are provided for locations with highest adult fish use in winter (Figure 24), spring (Figure 25), and summer-fall (Figure 26), and highest redds observed in spring (Figure 27). Tissue selenium concentrations are evaluated in Section 3.3.2.4.2.

The following bullets summarize the results for mainstem stations and tributary stations included in the refined assessment, provide a spatial summary, and discuss spatiotemporal overlap with WCT:

- **Fording River**. Selenium concentrations in the decline window were either below the level 1 benchmark or between the level 1 and level 2 benchmarks at all but one mainstem station (FR_FRCP1 winter and summer-fall). For all stations except FR_FRCP1, these results indicate either no chronic effects or a potential low-level effect from selenium on reproduction of WCT feeding at those locations during the period of egg provisioning. At FR_FRCP1, winter and summer-fall concentrations were between the level 2 and level 3 benchmarks, indicating a potential moderate-level effect from selenium on reproduction of WCT feeding at FR_FRCP1 during the period of egg provisioning.

  The magnitude of potential effects associated with maximum concentrations in the decline window was lower than or within the range observed pre-September 2017 for most stations. At several mainstem stations there was a shift from negligible to low in the spring (FR_MULTIPLATE, FR_FRCP1, FR_FRRD, FR_FRABCH) and at one mainstem station (FR_FRCP1) there was a shift from low to moderate in the summer-fall.

  The change at FR_FRCP1 is due to seasonal drying of the Fording River, which results in the water quality reflecting undiluted Cataract Creek conditions. Nupqu (2018) reported limited habitat in this reach of the Fording River during overwintering conditions, with results of an underwater survey (conducted on 11 December 2018) suggesting an absence of fish in the identified habitat. Therefore, there is uncertainty as to whether fish were exposed to the overwintering conditions at FR_FRCP1.

- **Tributaries**. Selenium concentrations in the decline window were below the level 1 benchmark at half of the tributary stations (including Henretta Creek), indicating no chronic effects from selenium to WCT reproduction. Tributaries with selenium concentrations above the level 1 benchmark accounted for approximately 2.3% of the fish accessible tributary habitat.

  The magnitude of potential effects associated with maximum concentrations in the decline window was lower than or within the range observed pre-September 2017 at most stations. There was a shift from low to moderate in some tributaries in summer-fall (Clode Creek, Kilmarnock Creek, and reach 1 of Greenhills Creek). These three tributary stations combined represent 1.7% of tributary habitat in the upper Fording River watershed.

- **Spatial summary**. The majority of assessed habitat in the decline window indicated no chronic effects of selenium on WCT reproduction in winter (61% to 63%), spring (60% to 62%), and summer-fall (83% to 85%), with most or all of the remaining habitat indicating a potential low-level effect. Relative to previous years, there was a shift towards more habitat assigned a magnitude rating of low instead of no chronic effects in spring (9 to 13%), and a shift towards more habitat assigned a magnitude rating of moderate instead of low in summer-fall (1 to 5%). These results indicate a higher proportion of habitat in spring that had the potential for localized, low-level effects (up to approximately 20%) on WCT reproduction, and a higher proportion of habitat in summer-fall that had a potential for localized, moderate-magnitude effects (up to approximately 50%) on WCT reproduction.
- **Spatiotemporal overlap with WCT**. Potential effects of selenium overlapped with WCT in mainstem segments S4/5 (winter and spring), S6 (all seasons), and S7 (all seasons), as well as Clode, Kilmarnock, and Greenhills creeks (spring). For adults, these areas represent 47% of fish use in winter, 41% of fish use in spring, and 26% of fish use in summer-fall. For early life stages (redds), these areas represent 56% of fish use in spring.

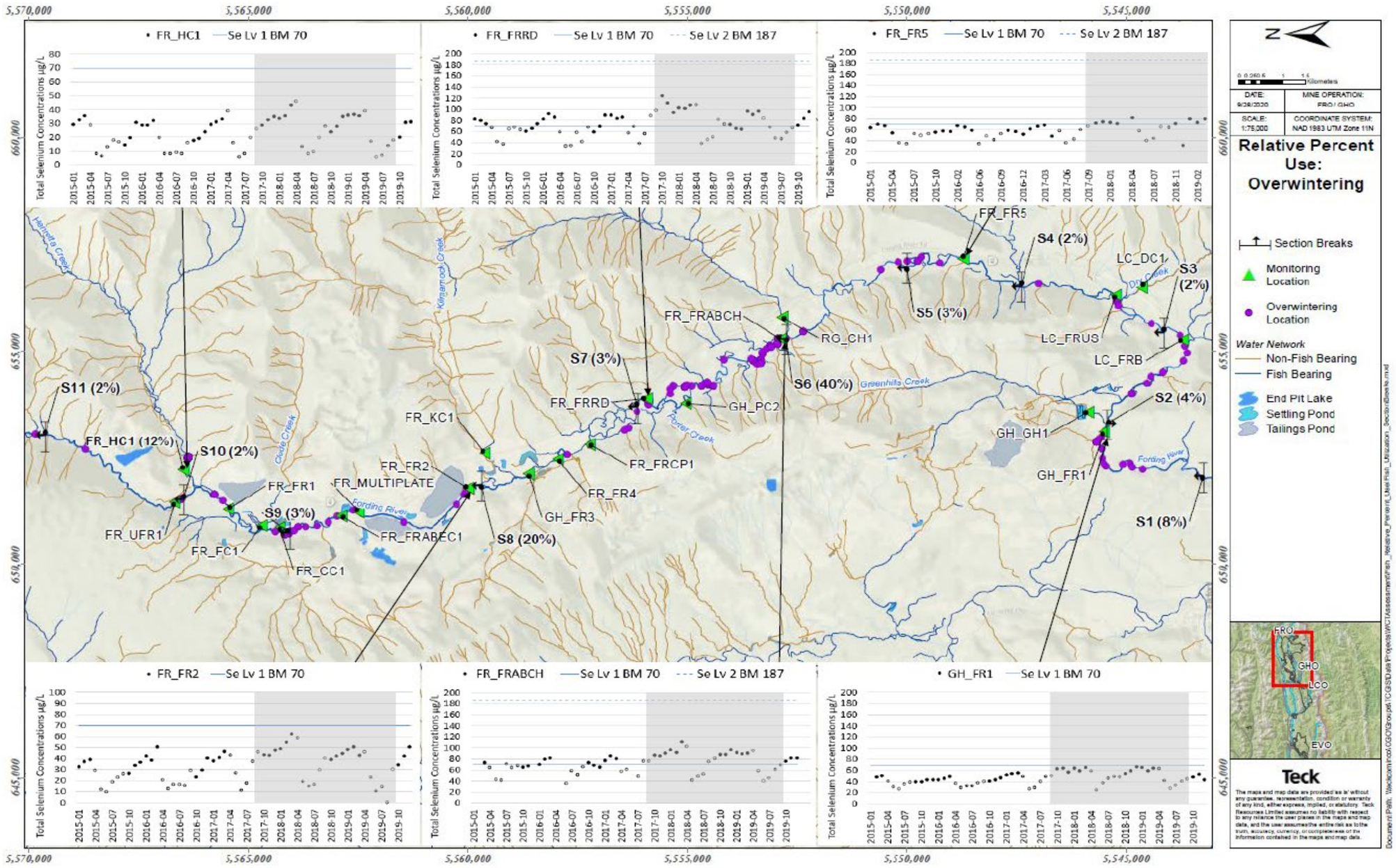
Based on the above results, selenium met the requisite conditions to contribute to the WCT decline via potential effects on reproduction of WCT. The majority of assessed habitat indicated no chronic effects or a potential for low-level effects on reproduction, including areas with the highest recorded fish use. Therefore, selenium did not meet the requisite conditions for being the cause of the WCT decline. This interpretation for aqueous selenium should be read in conjunction with that provided in Section 3.3.2.4.2 for tissue selenium. As discussed in Section 1.4.3, tissue selenium data provide a more direct and reliable basis of assessing potential effects of selenium compared to aqueous concentrations.

Table 23: Peak Monthly Average Selenium Concentrations Compared to Fish Reproduction Benchmarks in Winter, Spring, and Summer-Fall Seasons (2012 to 2019)

Segment	WQ Station Code	Biological Area Code	Screening Values (µg/L)	Fish Habitat (ha)	Relative Fish Use (%)				Selenium (µg/L)																			
					Winter	Spring		Summer-Fall	Winter								Spring								Summer-Fall						
						Tagged	Redds		2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019
Mainstem Fording River																												
10	*FR_UFR1*	*FO26*	L1 = 70 L2 = 187 L3 = Not derived	7.4	3.8%	7.7%	0.0%	7.0%	0.72	0.75	0.65	0.77	0.8	0.97	0.93	1.2	0.68	0.86	0.71	0.67	0.6	0.68	0.81	0.77	0.61	0.47	0.62	0.66	0.67	0.6	0.6	0.79
9	FR_FR1	FODHE		2.9	3.4%	10%	12%	7.0%	22	44	22	27	22	25	26	27	17	26	35	15	13	30	38	26	18	28	15	13	13	22	20	13
		FOUCL		0.23					33	49	45	37	55	25	26	27	17	26	35	17	19	30	38	26	33	38	25	30	30	22	20	13
		FOUNGD		1.4					33	49	45	37	55	25	26	27	17	26	35	17	19	30	38	26	33	38	25	30	30	22	20	13
	FR_FRABEC1	FODNGD		0.56					33	49	45	37	55					6.8		17	19				33	38	25	30	30			
8	FR_MULTIPLATE	MP1		0.89	20%	20%	12%	12%	44	58	47	38	48		66	59		12		17	21		72		40	40	26	27	33		38	
		FOUSH		1.5					44	58	47	40	51	48	66	59	35	42	58	29	21	43	72	46	40	40	26	27	33	48	41	34
	FR_FR2	FOUKI		0.92					41	48	38	40	51	48	62	51	35	42	58	29	20	43	58	46	33	37	25	26	29	48	41	34
	FR_FR3	FOBKS		2.5					29	46	38		42		59	58		13		18	20		48			37	24	26	31		42	32
		SCOUTDS		0.066					77	105	98	62	74	74	82	58	50	57	74	43	39	61	60	47	71	62	47	41	53	74	49	57
7	FR_FR4	FOBSC		0.68	2.7%	3.1%	1.3%	10%	77	105	98	62	74	74	82	56	50	57	74	43	39	61	60	47	71	62	47	41	53	74	49	57
	FR_FRCP1	FOBCP		1.4								311	447	212	638	623				61	45	67	92	88				74	70	134	586	71
		FRCP1SW		1.4							78	311	447	212	638	623				67	60	69	108	88				74	70	134	586	72
	FR_FRRD	FRUPO		2.2							78	83	92	125	108	98				67	60	69	108	84				73	68	99	82	72
		FO10-SP1		0.081					88	97	104	90	92	125	108	99	76	91	109	73	60	69	108	104	76	80	86	73	68	99	89	72
6	GH_PC2	FODPO		1.9	40%	22%	47%	16%	88	97	104	90			102	99	76	91	109	73			67	104	76	80	86	72			89	
		RG_FOXL		0.064					88	97	104	90	82	91	111	99	76	91	109	73	58	61	103	104	76	80	86	72	74	93	89	76
	FR_FRABCH	FO22		1.9								74	82	91	111	92		29		64	58	61	103	96				71	74	93	85	76
5	FR_FR5	FOUEW		11	4.9%	9.2%	5.8%	17%	62	75	71	70	68	74	74	79	59	73	85	54	59	58	82	80	58	62		53	59	66	64	
3	LC_FRUS	FO28		4.9	2.3%	3.8%	0.6%	7.7%		49	53	52							60	49							43	40		50	43	40
2	LC_FRB	FO29		8.9	4.2%	9.2%	9.1%	7.3%	43	47	53	51	49	50	57	59	33	61	56	50	44	52	54	60	39	43	42	39	38	48	46	43
1	GH_FR1	FODGH		2.5	7.6%	4.6%	1.3%	6.2%	53	62	70	51	50	64	67	65	44	63	60	42	37	50	60	62	45	49	44	40	42	66	50	45
Tributaries																																
9	*FR_HC3*	*HENUP*	L1 = 70 L2 = 187 L3 = Not derived	1.7	0.0%	0.0%	0.0%	0.0%	1.1	1.1	1.2	1.3	1.2	1.3	1.4	1.4	1.1	1.1	0.75	1.0	0.95	1.2	1.4	1.1	0.86	0.97		1.1	1.3	1.2	1.2	1.0
6	*RG_CH1*	*CHCK*		0.4	0.0%	0.0%	0.0%	0.3%	0.68	0.82	0.81	0.84	0.95	1.3	0.9	0.97	0.73	0.76	1.1	0.73	0.84	0.93	0.92	0.99	0.59	0.65	0.69	0.74	0.75	0.63	0.71	0.79
9	FR_HC1	HENFO		3.0	12%	3.1%	1.3%	9.7%	32	44	41	36	32	35	43	37	32	40	44	29	20	39	46	39	29	38	18	18	18	29	28	20
	FR_FC1	FR_FC1		0.29	0.0%	0.8%	1.3%	0.0%	22	26		23	14	25	30		7.0	24	27		6.6	22			16	25	14		12	12		
	FR_CC1	CLODE		0.3	0.0%	6.2%	1.3%	0.0%	78	99	120	107	172	153	184	175	152	162	145	126	166	202	230	182	116	111	95	97	132	167	191	191
7	FR_KC1	KICK		0.086	0.0%	0.8%	0.0%	0.0%	178	280	271	229	235	229	285	286	127	234	295	221	224	236	277	306	135	157	107	108	122	185	198	125
	GH_SC1-2	SWCK		0.06	0.0%	0.0%	0.0%	0.0%	798	813	858	777	691	720	700	711	700	481	777	421	476	427	646	523	715	707	693	572	592	696	613	536
6	GH_PC1	POCK		0.15	0.0%	0.0%	0.0%	0.0%	77	78	78	73	67	74	72	75	102	84	89	83	96	100	104	105	76	81	78	69	72	72	73	74
3	LC_DC1	LC_DC1		0.2	0.0%	0.0%	5.8%	0.0%	1.8	1.8	1.7	1.6	2.2	3.9	11.1	18	1.6	1.7	1.5	1.5	1.7	3.7	12	11	1.7	1.7	1.6	1.5	1.6	3.5	11	18
2	GH_GH1	GHCKD		0.23	0.0%	0.0%	0.6%	0.0%	154	178	177	103	111	178	166	178	95	73	114	89	88	142	124	79	185	161	152	100	118	190	170	125
Proportion of Habitat Area in Each Magnitude Category		% <L1 (No Effects Rating)		62	n/a				93	73	68	84	85	61	61	63	94	73	71	95	99	98	62	60	93	94	93	84	90	85	84	83
		% Between L1 and L2 (Low Rating)							7	27	31	11	10	33	33	32	6	27	29	4	1	1	38	40	7	6	7	15	10	15	11	16
		% Between L2 and L3 (Moderate Rating)							0	0	0	5	5	6	5	5	0	0	0	0	0	1	1	0	0	0	0	0	0	1	5	1
		% >L3 (High Rating)							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

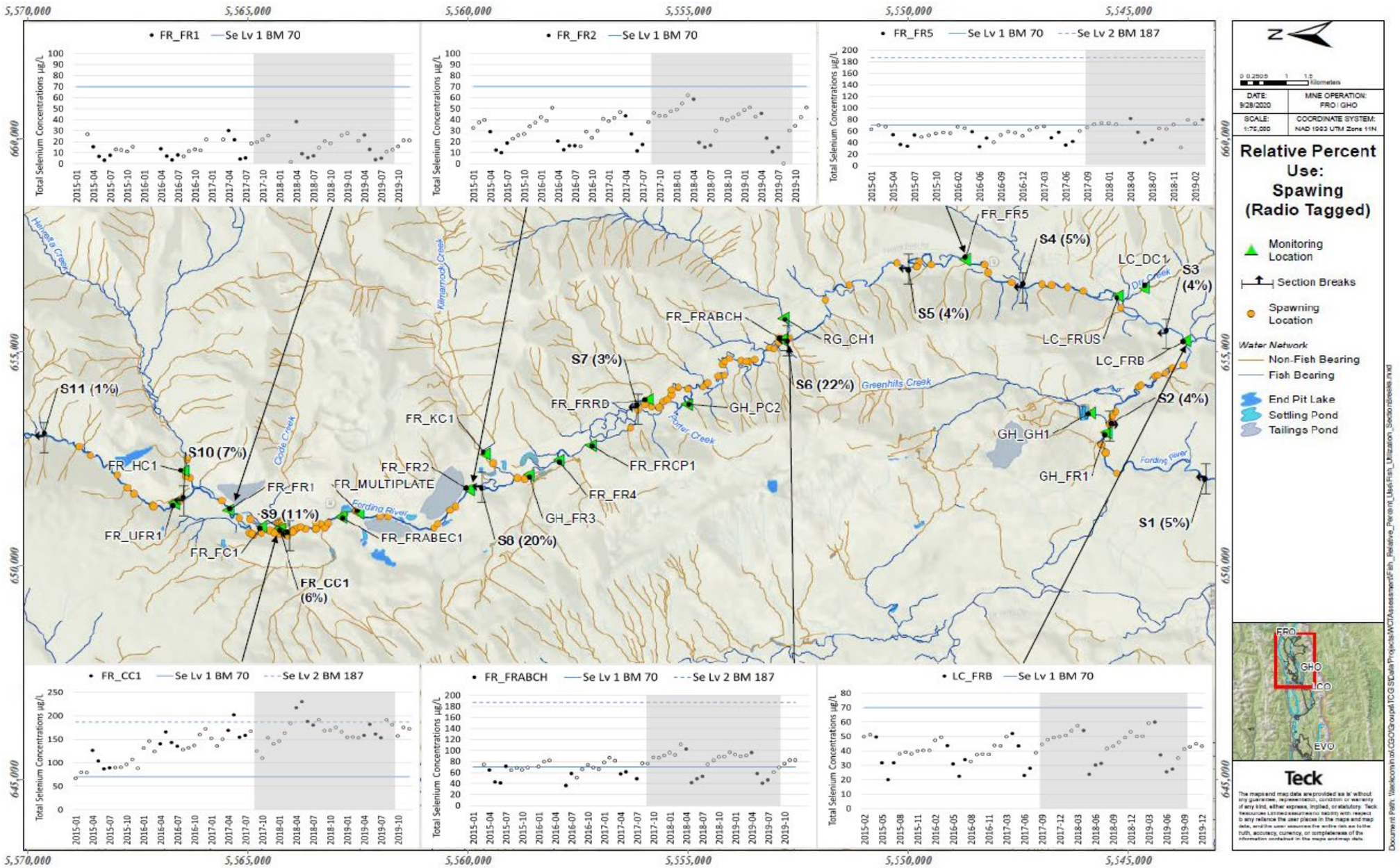
Notes: u/s = upstream; d/s = downstream; L1 = level 1; L2 = level 2; L3 = level 3.
Concentrations are in micrograms per litre total selenium (µg/L). Concentrations are compared to level 1 and level 2 benchmarks for selenium effects to WCT reproduction (see Section 3.2.5.1.1 for details). A level 3 benchmark was not calculated in the EVWQP. For rows (subunits) without a water quality station, concentrations are shown in grey; these are assumed to be equal to the highest concentration measured at adjacent stations.
FR_FR5 is located in S5; relative fish use is shown for S4 and S5 combined.
Years shaded grey indicate one or more samples collected in this year and season could be between September 2017 and September 2019.
Blank cells indicate no samples were collected for corresponding station and year/season.
Screening: shading indicates below level 1 (green), between level 1 and level 2 (blue), or between level 2 and level 3 (yellow).
Area-weighted summary: transient shading used to shade from 0% (no color) to 100% (blue).

Figure 24: Selenium concentrations for locations with high adult fish use in winter



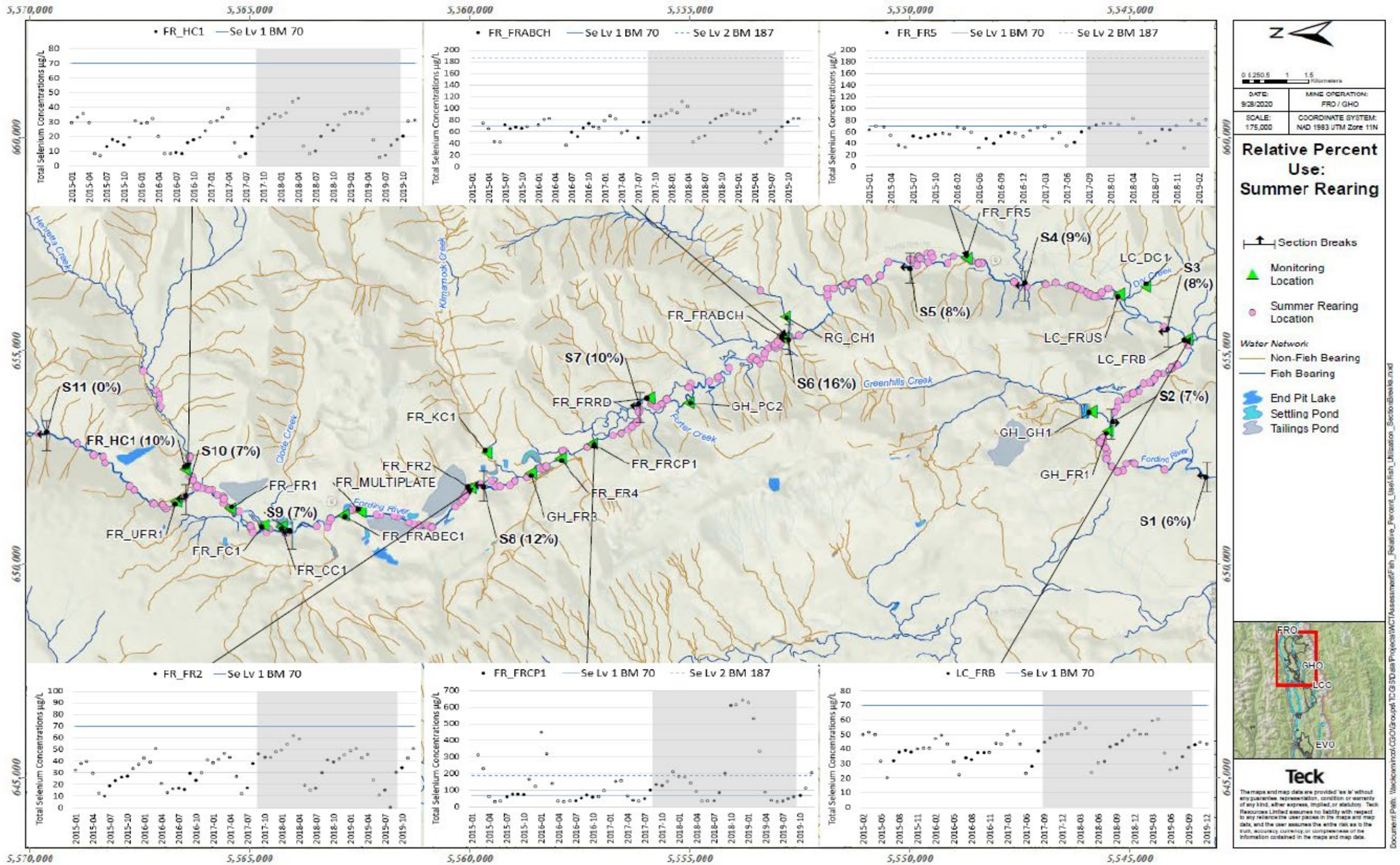
Note: Concentrations are in micrograms per litre total lithium (µg/L). Concentrations are compared to benchmarks for selenium (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 25: Selenium concentrations for locations with high adult fish use in spring



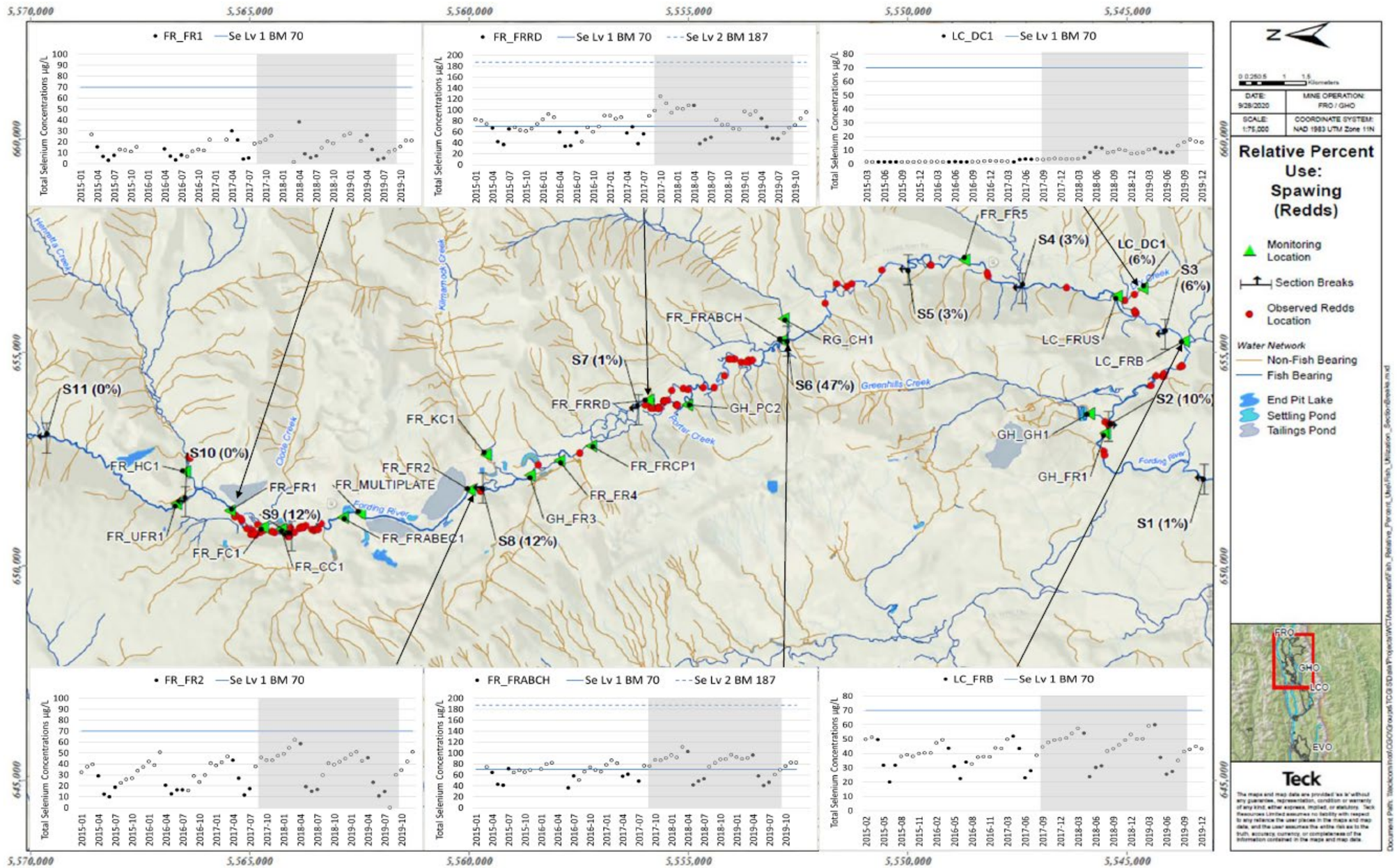
Note: Concentrations are in micrograms per litre total lithium (µg/L). Concentrations are compared to benchmarks for selenium (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 26: Selenium concentrations for locations with high adult fish use in summer-fall



Note: Concentrations are in micrograms per litre total lithium (µg/L). Concentrations are compared to benchmarks for selenium (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 27: Selenium concentrations for locations with high redds in spring



Note: Concentrations are in micrograms per litre total lithium (µg/L). Concentrations are compared to benchmarks for selenium (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

3.3.2.4.2 Tissue Selenium

Tissue chemistry results are summarized below relative to the BC tissue guideline and EVWQP benchmarks. Results are presented for invertebrate tissue followed by WCT tissue. As discussed in Section 3.2.3.2, invertebrate selenium concentrations are routinely monitored at locations throughout the upper Fording River watershed, and therefore provide the more spatially and temporally comprehensive characterization of exposure. Invertebrate selenium concentrations were used to evaluate potential dietary effects to juvenile and adult WCT. WCT tissue selenium concentrations were used to evaluate potential effects to early life stages of WCT.

Selenium concentrations in benthic invertebrates were between the BC tissue guideline (4 mg/kg dw) and the level 1 benchmark (11 mg/kg dw) for dietary effects to juvenile fish at most stations and in most samples collected between 2012 and 2019 (Appendix A, Table A6; Table 24). In the decline window, invertebrate selenium concentrations in individual replicates were below the level 1 benchmark in 90% of samples. Mean concentrations in the decline window were below the level 1 benchmark at 18 of 28 lotic stations and 5 of 9 lentic stations. These results indicate no chronic effects to juvenile fish in most assessed habitat. The remaining stations had one or more sampling events with an indication of potential chronic effects to growth of juvenile fish:

- Mean concentrations were between level 1 and level 2 benchmarks at the following locations: summer-fall at FODHE (2018), SCOUTDS (2019), FOBSC (2019), CLODE (2018), LC_DC1 (2018), GHCKD (2018 and 2019), spring at HE27 (2018) and FWDEC (2018), and winter at FOBKS (2019). Because the level 1 benchmark is a no-effect concentration for juvenile WCT, these concentrations do not necessarily indicate a potential for effects.
- Mean concentrations were between level 2 and level 3 benchmarks, indicating a potential for moderate-level growth effects on juvenile fish, at the following locations: summer-fall at GHPB (2018), spring at FRCP1SW (2019), RG_SAFR (2018), FRSCW (2019), and winter at FOBCP (2018).
- Mean concentrations were greater than the level 3 benchmark at Greenhills Creek below the pond (GHBP) in summer-fall and winter (2019).

There were 19 lotic stations in summer-fall (15 mainstem and 4 tributaries) at which samples were collected both in the decline window and pre-September 2017. At 16 of these 19 stations, the magnitude of potential effects associated with invertebrate selenium concentrations in the decline window was either lower than or within the range observed pre-September 2017. At the remaining three stations (FR_FR1, FR_FR4, LC_DC1), there was a shift from negligible to low. The lack of broad temporal trends noted herein is consistent with the interpretation provided in Minnow and Lotic (2020), which concluded that there are no consistent increases in selenium tissue concentrations at any areas in the upper Fording River.

As discussed in the EVWQP and summarized in Section 3.2.5.2, available effects information indicates that the dietary benchmarks for juvenile fish provide a conservative assessment of potential growth effects to WCT. Therefore, potential effects on the growth of WCT in the upper Fording River watershed are expected to be less than that indicated by the assessment summarized above. In the tests that the dietary benchmarks are based on, survival effects in juveniles of sensitive fish species did not occur until dietary selenium concentrations were at or above the level 3 benchmark. Therefore, with the possible exception of GHPB in summer-fall and winter 2019, reported benthic invertebrate selenium concentrations would not be expected to result in potential effects on juvenile survival.

Based on the above results, invertebrate selenium met the requisite conditions to contribute to the WCT decline via potential growth effects to juveniles and adults. For stations with concentrations between the level 1 and level 2 dietary benchmarks for juvenile fish, this is a conservative interpretation because the level 1 benchmark is based on an unbounded NOEC (i.e., no effects were observed at the highest test concentration; see Section 3.2.5.2). Most stations and sampling events indicated no chronic effects to juveniles and adults. Therefore, invertebrate selenium did not meet the requisite conditions for being the cause of the WCT decline.

Table 24: Mean Invertebrate Selenium Concentrations (2012 to 2019) at Lotic and Lentic Stations in the upper Fording River watershed

Segment	Biological Monitoring Area	Teck Coal Water Station Code	Winter		Spring					Summer-Fall						
			2018	2019	2013	2014	2015	2018	2019	2012	2014	2015	2016	2017	2018	2019
Lotic Mainstem Stations																
11	*FO26*	*FR_UFR1*	-	-	-	-	-	-	3.5	4.2	-	4.9	3.5	3.2	3.8	3.0
10	*UFR1*	*FR_UFR1*	3.9	4.6	-	-	-	-	-	-	-	-	-	-	-	-
9	FODHE	FR_FR1	6.4	-	-	-	-	-	5.6	8.9	-	6.6	-	8.1	13	5.8
	FOUCL	RG_FOUCL	-	-	-	-	-	-	-	-	-	-	-	-	-	6.2
	FOBC	-	-	-	8.6	-	11	-	-	-	-	-	-	-	-	-
8	FOUNGD	RG_FOUNGD	5.7	5.6	-	-	-	-	4.9	8.2	-	7.2	-	6.5	7.0	6.7
	FODNGD	FR_FRABEC1	5.3	6.8	-	-	-	-	4.7	-	-	-	-	5.6	8.3	6.5
	MP1	FR_MULTIPLATE	6.2	6.0	-	-	-	-	5.8	9.0	-	5.9	-	5.6	7.9	6.6
	FOUSH	FR_FRNTP, RG_FOUSH	5.2	7.7	-	-	-	-	6	7.6	-	6.0	-	6.5	8.4	5.8
	FOUKI	FR_FR2	5.9	4.7	-	-	-	-	4.8	8.5	-	5.1	5.2	6.7	10	8.1
7	FOBKS	GH_FR3	5.7	13	-	-	-	-	4.3	8.8	-	6.0	-	6.6	10	8
	SCOUTDS	RG_SCOUTDS	-	-	-	-	-	-	-	-	-	-	-	-	-	13
	FOBSC	FR_FR4, GH_FR	8.3	-	-	-	-	-	5.4	8.4	-	7.5	-	5.0	9	12
	FOBCP	FR_FRCP1	18.1	9	-	-	-	-	4.2	7.9	-	7.7	9.7	6.4	9	7.7
	FRCP1SW	FR_FRCP1SW	-	-	-	-	-	-	20	-	-	-	-	6.9	-	7.7
6	FRUPO	FR_FRRD	6.8	6.4	-	-	-	-	6.9	-	-	-	-	7.4	8.6	7.0
	FO10 (1)	-	-	-	-	12	-	-	-	-	-	7.0	-	-	-	-
	FODPO	GH_PC2	3.5	5.7	-	-	-	-	5.1	6.2	-	6.9	3.8	5.2	5.8	6.1
	FO22	FR_FRABCH	6.9	5.4	-	-	-	-	8.1	12	-	7.1	-	5.4	7.9	7.1
5	FOUEW	FR_FR5	6.3	4.9	-	-	-	-	6.2	8.3	-	6.1	5.8	6.6	7	6.7
3	FO28	LC_FRUS	-	-	-	-	-	-	-	9.2	7.4	7.0	9.1	6.5	9.0	8.7
	FRUSDC	-	-	-	-	-	-	-	-	-	5.6	-	-	-	-	-
	FRDSDC	-	-	-	-	-	-	-	-	-	6.1	-	-	-	-	-
2	FO29	LC_FRB	-	-	8.4	9.6	8.6	-	-	7.9	-	7.5	8.5	7.5	8.8	8.8
1	FODGH	GH_FR1	-	-	-	-	-	-	-	9.3	-	8.4	7.3	6.1	11	8.2
Lotic Tributary Stations																
9	*HENUP*	FR_HC3	-	-	-	-	-	-	6.1	6.4	-	-	3.8	4.9	4.0	4.6
6	*CHCK*	RG_CH1	-	-	3.4	5.0	-	-	-	3.9	-	-	-	-	-	-
3	*EWCK*	-	-	-	-	-	-	-	-	6.2	-	-	-	-	-	-
9	HENFO	FR_HC1	-	-	-	-	-	-	-	8.1	-	9.62	-	-	-	-
	FR_FC1	FR_FC1	-	-	-	-	-	-	-	-	-	-	-	-	4.8	6.5
	CLODE	FR_CC1	-	-	-	-	-	-	-	-	-	-	-	-	13	9.9
7	KICK	FR_KC1	-	-	-	-	-	-	-	4.6	-	0.4	-	-	6.6	5.2
	SWCK	GH_SC1-2	-	-	-	-	-	-	-	18	-	19	-	-	-	-
6	POCK	GH_PC1	-	-	-	-	-	-	-	5.2	-	5.6	-	-	-	-
3	LC_DC1	LC_DC1	10	-	-	-	-	-	9.4	5.9	4.9	5.2	7.7	7.0	11	8.9
2	GHBP	-	-	39	-	-	-	-	-	-	-	-	-	-	26	33
2	GHCKD	GH_GH1	-	-	-	-	-	-	-	12	-	22	-	-	16	17
Lentic Stations																
3	*UPBEC*	-	-	-	-	-	-	-	5.7	-	-	-	-	-	-	11
9	HE27	-	-	-	-	-	-	16	8.2	10	-	10	-	-	-	-
8	FOFR2W	-	-	-	-	-	-	3.9	4.2	4.4	-	-	-	-	-	-
6	FO10 (1)	-	-	-	-	-	-	-	-	40	-	-	-	-	-	-
	RG_SAFR (2)	-	-	-	-	-	-	21	-	-	-	-	-	-	-	-
	FOXL	-	-	-	-	-	-	-	-	0.9	-	1.5	-	-	-	-
	SFRR	-	-	-	-	-	-	3.2	-	-	-	-	-	-	-	-
	FOXCF	-	-	-	-	-	-	2.9	-	-	-	-	-	-	-	-
	FMUCK	-	-	-	-	-	-	-	-	-	-	13	-	-	-	-
	FRWUCH	-	-	-	-	-	-	6.9	-	-	-	-	-	-	-	-
4	FRSCW	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-
3	FWDEC	-	-	-	-	-	-	11	-	-	-	18	-	-	-	-
1	GHWFR	-	-	-	-	-	-	-	-	-	-	28	-	-	-	-

Notes: '-' = no data or corresponding station code.
Value represents maximum monthly average for the corresponding year and station.
Concentrations are in milligrams per kilogram dry weight (mg/kg dw). Concentrations are compared to the level 1, level 2, and level 3 screening values (see Section 3.2.5.2 for details). Shading indicates below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange). Underline values indicate concentration is above the BC tissue guideline.
Years shaded grey indicate one or more samples in the corresponding year and season could have been collected between September 2017 and September 2019.

Selenium concentrations in WCT tissue were above the BC tissue guideline of 4 mg/kg dw in muscle and 11 mg/kg dw in eggs in all samples collected in the decline window (Appendix A, Table A7). Muscle selenium concentrations were below the level 1 benchmark[34] in 82% of individual samples collected in the decline window. Only three ovary selenium concentrations were collected in the decline window, all were from Greenhills Creek below the sedimentation pond (GHBP), and all three were above the level 3 benchmark.

At mainstem Fording River stations, all muscle selenium concentrations were below the level 1 benchmark in all replicates, indicating no chronic reproductive effects to WCT (Table 25). No ovary samples were collected in mainstem areas in the decline window.

At tributary stations, mean muscle selenium concentrations were below the level 1 benchmark (Kilmarnock Creek and September 2019 in Swift Creek), between the level 1 and level 2 benchmarks (Smith Ponds Decant September 2019 and Swift Creek in October 2019), between the level 2 and level 3 benchmarks (Greenhills Creek in October 2019), or above the level 3 benchmark (Greenhills Creek in July 2019). Individual WCT selenium concentrations at each tributary station ranged from below the level 1 benchmark to above the level 3 benchmark. This variability reflects individual exposure scenarios, for example with some fish feeding in the mainstem Fording River with lower concentrations and others feeding in localized tributary areas with higher concentrations. In total, tributaries with selenium concentrations above the level 1 benchmark represent 0.34% of fish habitat in the upper Fording River watershed.

Four of the six locations sampled for WCT tissue selenium in the decline window (two mainstem locations, Greenhills Creek, and Kilmarnock Creek) also had invertebrate selenium concentrations measured. At these four locations, there was general alignment between screening outcomes. In the two mainstem locations and in Kilmarnock Creek, both WCT tissue and benthic invertebrates indicated no chronic effects to fish in most (Kilmarnock Creek) or all samples (mainstem). In Greenhills Creek, both tissue types indicated a potential for up to high-level effects.

Broadly, the available WCT tissue selenium data align with the results presented above for dietary exposure via benthic invertebrate selenium concentrations (Table 24). In most areas of the watershed, including the mainstem Fording River that accounted for approximately 90% of adult fish use in the telemetry study, selenium concentrations indicated no chronic effects to fish and that concentrations have been stable over time. However, both types of tissue selenium data indicate potential moderate- or high-level effects of selenium in localized areas.

This interpretation of stable dietary selenium exposure over time is supported by the observation that WCT muscle selenium concentrations in the mainstem Fording River have also been consistent over time. WCT muscle selenium concentrations in fall 2018 (n=16; range: 7.5 to 12 mg/kg dw) were within the range of concentrations measured in spring 2009 (n=2; range: 8.8 to 9.1 mg/kg dw), spring 2012 (n=5 ; range: 8.5 to 12.3 mg/kg dw), spring 2015 (n=10; range: 7.9 to 13.7 mg/kg dw), and fall 2015 (n=10; range: 6.9 to 11.5 mg/kg dw). These results indicate that there has been no apparent increase over time in potential selenium-related effects for the mainstem Fording River in the decline window relative to pre-September 2017.

As discussed in Section 3.2.3.2, a reliable comparison of WCT tissue selenium concentrations between 2018 and 2019 is not possible because the spatial coverage of these years differed with respect to their representativeness of the broader watershed. Specifically, WCT tissue samples collected in 2018 were more representative of the overall distribution of fish in the upper Fording River watershed because 2018 sampling included mainstem

[34] The muscle equivalent benchmarks are based on the Nautilus (2011) relationship between egg and muscle Se concentrations in WCT, and therefore the interpretation of these benchmarks has more uncertainty than egg-based benchmarks.

stations, whereas 2019 did not. This interpretation is based on the spatiotemporal fish use information from the telemetry study (EoC Team 2021 using data collected by Cope et al. 2016), which found that most adult fish reside in the mainstem Fording River (between 88% and 90% depending on the season) relative to tributaries (between 10 and 12% depending on the season). The mainstem stations sampled in 2018 were in S8 (FR_MULTIPLATE) and S6 (FR_FRABCH); combined, these segments accounted for 59% of adult fish use in winter, 28% of adult fish use in summer, and 42% of fish use in spring. The representativeness is further demonstrated by the invertebrate selenium concentrations in S6 and S8 (below level 1 dietary benchmark), which were broadly representative of most areas in the upper Fording River watershed.

In summary, WCT selenium data indicated no chronic effects in the Fording River mainstem but a potential for up to high-level reproductive effects in localized areas such as Greenhills Creek below the sedimentation pond. Invertebrate tissue selenium data indicate that most areas in the upper Fording River watershed had concentrations below effects benchmarks, and that invertebrate selenium concentrations have been generally stable over time, both of which align with patterns in WCT tissue data from the mainstem Fording River.

Based on the above results, WCT tissue selenium met the requisite conditions to contribute to the WCT decline via potential reproductive effects on early life stages. Most samples collected in the decline window, including all samples collected from the mainstem Fording River, indicated no chronic effects on reproduction. Therefore, WCT tissue selenium did not meet the requisite conditions for being the cause of the WCT decline.

Table 25: Selenium Concentrations in WCT Muscle and Ovary Samples Collected in the Decline Window

Segment	Water Station Code	Year	Month (*n*)	Muscle Selenium mg/kg dw Mean (Range)	Ovary Selenium mg/kg dw Mean (Range)
Fording River Mainstem					
8	FR_MULTIPLATE	2018	Sep (8)	9.4 (7.5-11)	-
6	FR_FRABCH	2018	Sep (8)	10 (8.7-12)	-
Tributaries					
8	FR_SP1 (Smith Ponds Decant)	2019	Sep (9)	16 (8.8-30)	-
7	FR_SKP1 (Kilmarnock)	2018	June (1)	10	-
			Sep (42)	10 (5.2-15)	-
	GH_SC1 (Swift)	2019	Sep (1)	9.8	-
			Oct (8)	16 (9.4-25)	-
2	GH_GH1 (Greenhills)	2019	Jul (3)	21 (20-24)	40 (34-44)
			Oct (7)	18 (13-22)	-

Notes: '-' = no data or corresponding station code.
Individual replicates are tabulated in Appendix A, Table A7.
Concentrations are in milligrams per kilogram dry weight (mg/kg dw). Mean concentrations are compared to the level 1, level 2, and level 3 screening values (see Section 3.2.5.2 for details). Shading indicates below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Muscle equivalent benchmarks are based on egg selenium effect concentrations; see Section 3.2.5.2

3.3.2.5 Sulphate

As tabulated in Section 3.3.1.1, sulphate concentrations measured in the decline window were below the long-term BC WQG of 128 to 429 mg/L (hardness-dependent) in 83% of samples and below the level 1 screening value of 499 mg/L in 85% of samples. The benchmarks used to evaluate potential effects for sulphate are based on viability effects (combined sublethal and lethal endpoint) to early life stages (embryo-alevin) and were applied to indicate potential effects to juveniles and adults.

Sulphate concentrations measured between 2012 and 2019 are compared to EVWQP benchmarks in Table 26. Time-series plots with screened sulphate concentrations are provided for locations with highest adult fish use in winter (Figure 28), spring (Figure 29), and summer-fall (Figure 30), and highest redds observed in spring (Figure 31). The following bullets summarize the results for mainstem stations and tributary stations included in the refined assessment, provide a spatial summary, and discuss spatiotemporal overlap with WCT:

- **Fording River**. Sulphate concentrations in the decline window were below the long-term BC WQG and level 1 screening value at all mainstem stations except for FR_FRRD (winter 2017), GH_PC2 (winter 2018), and FR_FRCP1 (winter [2017, 2018, 2019] and summer- fall [2017, 2018]). For all stations except FR_FRRD and FR_FRCP1, these results indicate negligible potential for effects. At FR_FRRD in winter 2017 and GH_PC2 in winter 2018, sulphate concentrations were below the level 1 benchmark, indicating no chronic effects to fish. At FR_FRCP1, sulphate concentrations in winter (2018 and 2019) and summer-fall (2018) were above the level 3 benchmark, indicating a potential high-level effect from sulphate on early life stages of WCT, if any are present in this reach. Early life stages are not present in winter months, nor would they be present in early October (see Table 1) which is the month associated with the 2018 summer-fall magnitude rating. No sulphate effects data are available for juveniles and adults. If juveniles and adults are similarly sensitive to sulphate, then effects could occur to WCT that overlapped with sulphate concentrations at FR_FRCP1 in winter and summer-fall. It is uncertain what proportion of fish overlapped with these conditions. However, the available telemetry data indicate that S7 overall represents a relatively small proportion of total fish use in the upper Fording River watershed (winter 2.7%; spring 3.9%; summer-fall 10%), and particularly in winter when potential effects were of the greatest magnitude. Factors that could have increased the number of fish exposed to sulphate concentrations in these time periods (e.g., drying reaches, impassible riffles) relative to the number of fish recorded in the telemetry study are considered in the integration chapter (EoC Team 2021).

  The change at FR_FRCP1 is due to the mainstem Fording River going dry for portion of the year, which results in water quality at this location reflecting Cataract Creek conditions. Nupqu (2018) reported limited habitat in this reach of the Fording River during overwintering conditions, with results of an underwater survey suggesting an absence of fish in the identified habitat. Therefore, there is uncertainty as to whether fish were exposed to the overwintering conditions at FR_FRCP1.

  The magnitude of potential effects associated with maximum monthly concentrations in the decline window was either lower than or within the range observed pre-September 2017, except for FR_FRCP1 in summer-fall where there was a shift from negligible to low (2017) or negligible to high (2018) ratings.

- **Tributaries**. Sulphate concentrations in the decline window were below the long-term BC WQG and level 1 benchmark at half of the tributary stations (including Henretta Creek), indicating a negligible effect from sulphate to WCT. At the other half of tributary stations, concentrations in the decline window were either between the level 1 and level 2 benchmarks (Clode Creek [winter and summer-fall 2018 and 2019], Kilmarnock Creek [summer-fall 2017], Porter Creek [spring 2019], and Greenhills Creek [spring 2018]),

between the level 2 and level 3 benchmarks (Clode Creek [spring 2018 and 2019], Kilmarnock Creek [winter and spring 2018 and 2019],and Greenhills Creek [winter and summer-fall 2017, 2018, 2019]), or above the level 3 benchmark (Swift Creek [all seasons and year] and Porter Creek [winter 2018]). Tributaries with sulphate concentrations above the level 1 benchmark accounted for approximately 2.3% of tributary habitat.

The magnitude of potential effects associated with maximum concentrations in the decline window was either lower than or within the range observed pre-September 2017 at most stations, At a subset of tributary stations, there was a shift from negligible to low in the winter (Clode Creek), spring (Porter Creek), and/or summer-fall (Clode and Kilmarnock creeks), a shift from low to moderate in the spring (Clode Creek), or a shift from negligible to high in winter (Porter Creek).These three tributaries combined represent 1.5% of fish-accessible tributary habitat in the upper Fording River watershed.

- **Spatial summary**. The majority of assessed habitat in the decline window indicated a negligible potential for effects of sulphate in winter (94%), spring (99%), and summer-fall (94% to 99%), with the remaining habitat indicating a potential low (up to 5%), moderate (up to 6%), or high (up to 5%) effect from sulphate on early life stages of WCT that spawn in the mainstem Fording River and its tributaries. Relative to previous years, there was a shift in the summer-fall towards more habitat assigned a rating of low or high (up to 5%). These results indicate that a portion of the assessed habitat (≤6%) has the potential for localized effects on early life stages of WCT that may spawn there.
- **Spatiotemporal overlap with WCT**. Segments with the highest fish use had negligible potential for effects of sulphate on all life stages in all seasons. Potential effects of sulphate overlapped with WCT only in S7 (winter and summer-fall), Clode Creek (spring), Kilmarnock Creek (spring), and Greenhills Creek (spring). These areas represent approximately 3% of adult fish use in winter, 7% of adult fish use in spring, and 10% of adult fish use in summer-fall.

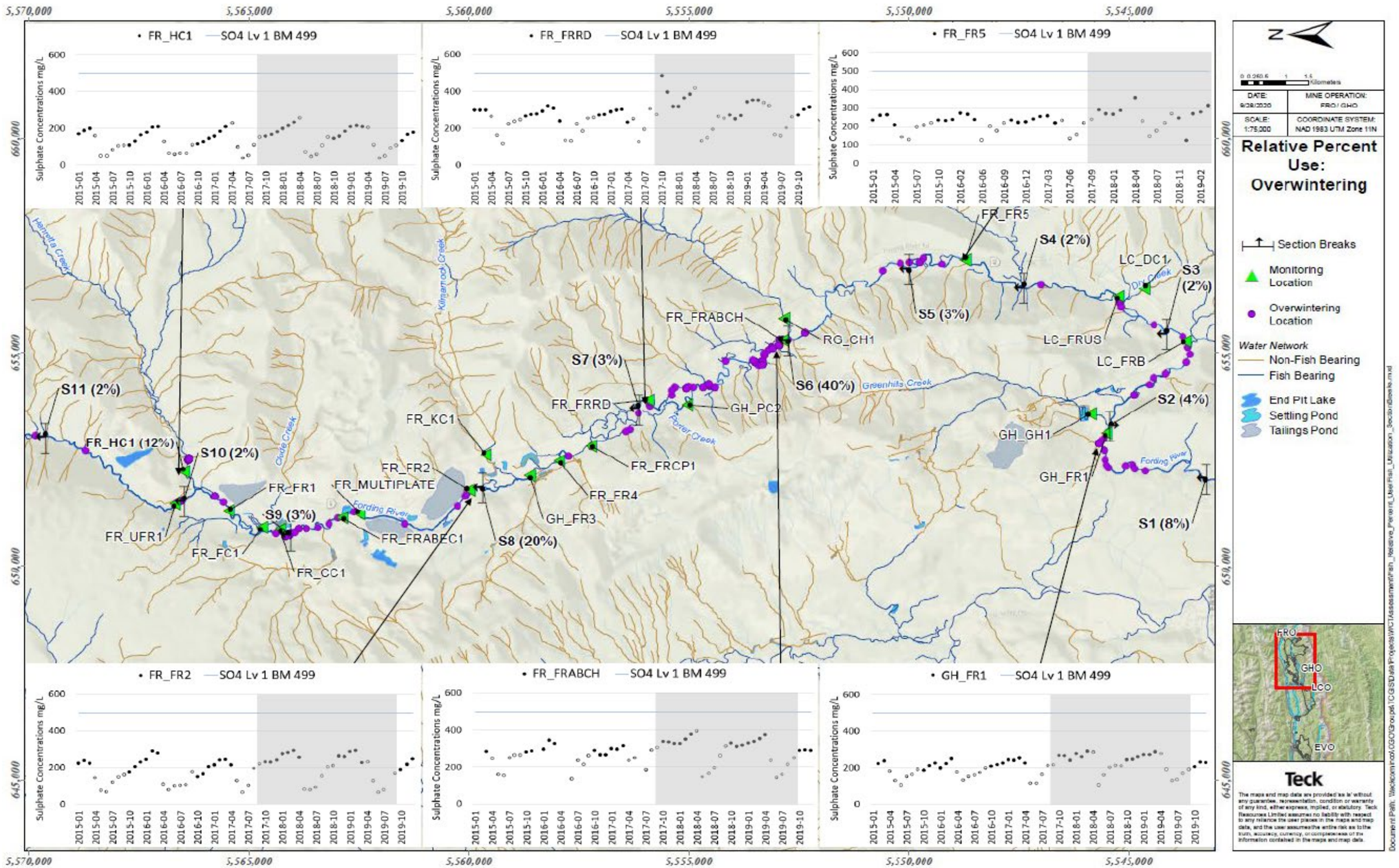
Based on the above results, sulphate met the requisite conditions to contribute to the WCT decline via potential effects on early life stages of WCT. The majority of assessed habitat and the areas with the highest fish use indicated a negligible potential for effects. Therefore, sulphate did not meet the requisite conditions for being the cause of the WCT decline.

Table 26: Peak Monthly Average Sulphate Concentrations Compared to Fish Benchmarks in Winter, Spring, and Summer-Fall Seasons (2012 to 2019)

Segment	WQ Station Code	Biological Area Code	Screening Values (µg/L)	Fish Habitat (ha)	Relative Fish Use (%)				Sulphate (mg/L)																			
					Winter	Spring		Summer-Fall	Winter								Spring								Summer-Fall						
						Tagged	Redds		2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019
Mainstem Fording River																												
10	*FR_UFR1*	*FO26*		7.4	3.8%	7.7%	0.0%	7.0%	*46*	*47*	*46*	*48*	*50*	*48*	*49*	*49*	*36*	*43*	*44*	*27*	*30*	*30*	*31*	*30*	*42*	*37*	*42*	*45*	*45*	*45*	*43*	*41*
9	FR_FR1	FODHE		2.9	3.4%	10%	12%	7.0%	116	185	122	156	137	161	143	159	112	141	196	125	102	189	222	140	100	125	93	90	96	131	124	84
		FOUCL		0.23					135	185	122	156	137	161	143	159	112	141	196	125	102	189	222	140	130	125	93	124	96	131	124	84
8		FOUNGD		1.4	20%	20%	12%	12%	135	185	122	156	137	161	143	159	112	141	196	125	102	189	222	140	130	125	93	124	96	131	124	84
	FR_FRABEC1	FODNGD		0.56					135																130			124				
	FR_MULTIPLATE	MP1		0.89					194	223			187		271	282		57					306		169			130			172	
		FOUSH		1.5					268	275	258	239	290	245	291	293	199	218	272	151	123	213	306	229	207	201	142	163	173	238	209	190
	FR_FR2	FOUKI		0.92					268	275	258	239	290	245	291	293	199	218	272	151	123	213	256	229	207	201	142	163	173	238	209	190
7	FR_FR3	FOBKS	L1 = 499 L2 = 674 L3 = 1,173	2.5	2.7%	3.1%	1.3%	10%	218						286	298		70					186								191	168
		SCOUTDS		0.066					352	423	356	293	375	293	354	329	232	241	292	197	169	280	211	225	280	258	205	201	238	287	208	247
	FR_FR4	FOBSC		0.68					352	423	356	293	375	293	354	329	232	241	292	197	169	280	211	225	280	258	205	201	238	287	208	247
	FR_FRCP1	FOBCP		1.4								983	1500	728	1940	1940				233	203	278	352	377				302	298	526	1960	315
		FRCP1SW		1.4							276	983	1500	728	1940	1940				262	238	278	415	377				302	298	526	1960	315
6	FR_FRRD	FRUPO		2.2	40%	22%	47%	16%			276	299	318	483	384	349				262	238	248	415	333				248	254	304	271	272
		FO10-SP1		0.081					330	366	367	332	318	483	432	360	346	328	382	270	238	248	415	412	271	288	279	283	254	304	348	272
	GH_PC2	FODPO		1.9					330	366	367	332			432	360	346	328	382	270			247	412	271	288	279	283			348	
		RG_FOXL		0.064					330	366	367	332	345	338	432	360	346	328	382	270	235	250	395	412	271	288	279	283	290	338	348	250
	FR_FRABCH	FO22		1.9								285	345	338	377	352		91		247	235	250	395	375				265	290	338	331	250
5	FR_FR5	FOUEW		11	4.9%	9.2%	5.8%	17%	245	284	264	262	273	290	286	278	266	289	287	209	235	232	353	311	211	226		218	233	238	268	
3	LC_FRUS	FO28		4.9	2.3%	3.8%	0.6%	7.7%		186	213	212							229	211							162	166		193	176	158
2	LC_FRB	FO29		8.9	4.2%	9.2%	9.1%	7.3%	179	179	205	207	213	208	240	248	123	240	220	199	196	222	211	244	156	165	158	172	163	189	175	173
1	GH_FR1	FODGH		2.5	7.6%	4.6%	1.3%	6.2%	224	260	287	236	250	265	288	286	225	278	279	181	176	225	284	276	182	210	188	192	201	273	213	195
Tributaries																												
9	*FR_HC3*	*HENUP*		1.7	0.0%	0.0%	0.0%	0.0%	*89*	*81*	*64*	*84*	*90*	*87*	*92*	*93*	*84*	*82*	*49*	*74*	*60*	*85*	*95*	*72*	*57*	*49*		*55*	*62*	*72*	*63*	*47*
6	*RG_CH1*	*CHCK*		0.4	0.0%	0.0%	0.0%	0.3%	*31*	*29*	*46*	*29*	*33*	*31*	*32*	*32*	*32*	*30*	*44*	*21*	*19*	*28*	*34*	*31*	*18*	*21*	*21*	*25*	*23*	*21*	*25*	*23*
9	FR_HC1	HENFO		3.0	12%	3.1%	1.3%	9.7%	169	183	206	199	208	209	231	215	176	197	221	158	127	226	253	202	124	151	105	107	115	155	150	133
	FR_FC1	FR_FC1		0.29	0.0%	0.8%	1.3%	0.0%	113	131		140	94	145	188		40	132	144		49	127			92	109	86		87	76		
	FR_CC1	CLODE		0.3	0.0%	6.2%	1.3%	0.0%	242	286	367	310	451	453	531	604	348	381	418	361	454	612	699	681	294	306	270	271	398	433	541	550
7	FR_KC1	KICK		0.086	0.0%	0.8%	0.0%	0.0%	553	664	735	625	637	623	795	788	437	664	749	582	667	637	826	863	355	395	302	314	314	507	494	361
	GH_SC1-2	SWCK		0.06	0.0%	0.0%	0.0%	0.0%	1740	1800	1880	1790	1780	1750	1770	1830	1610	1080	1720	1125	1220	1150	1720	1250	1660	1640	1690	1650	1450	1710	1,440	1,605
6	GH_PC1	POCK		0.15	0.0%	0.0%	0.0%	0.0%	441	464	458	464	446	459	1770	473	420	381	443	398	438	471	487	540	429	451	444	440	453	473	472	476
3	LC_DC1	LC_DC1		0.2	0.0%	0.0%	5.8%	0.0%	9	9	13	10	16	21	42	55	8	8	7	9	9	14	35	41	8	9	9	9	11	17	40	58
2	GH_GH1	GHCKD		0.23	0.0%	0.0%	0.6%	0.0%	703	752	801	703	803	881	841	843	467	341	534	547	516	704	667	426	774	799	729	681	682	906	883	715
Proportion of Habitat Area in Each Magnitude Category		% <L1 (No Effects Rating)		62	n/a				99	99	99	95	94	94	94	94	100	100	99	99	99	99	99	99	99	99	99	100	99	94	94	99
		% Between L1 and L2 (Low Rating)							0	0	0	0	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	5	0	1
		% Between L2 and L3 (Moderate Rating)							0	0	1	5	0	6	1	1	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	0
		% >L3 (High Rating)							0	0	0	0	5	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0

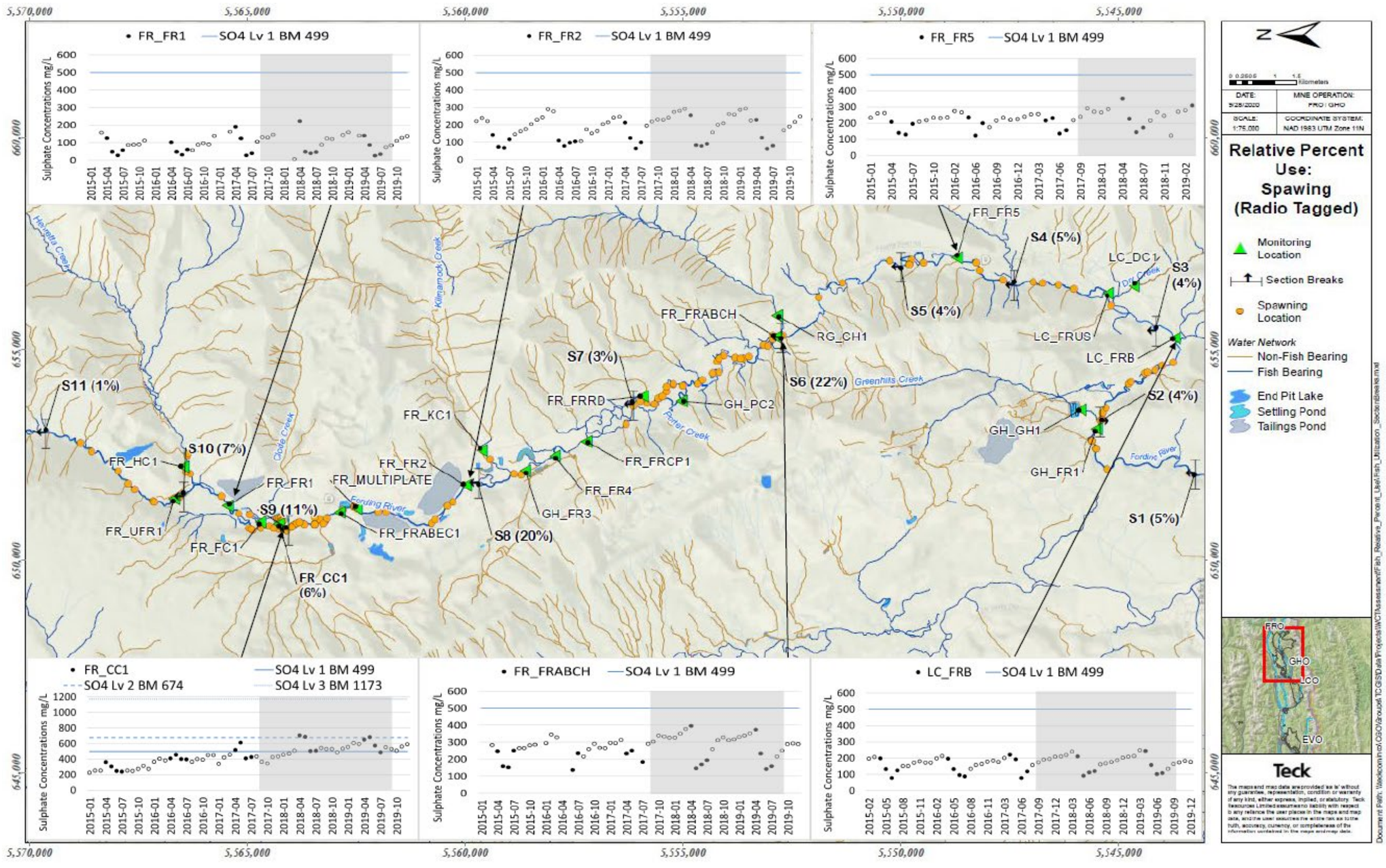
Notes: u/s = upstream; d/s = downstream; L1 = level 1; L2 = level 2; L3 = level 3.
Concentrations are in milligrams per litre (mg/L). Concentrations are compared to level 1, level 2, and level 3 benchmarks for sulphate (see Section 3.2.5.1.1 for details). For rows (subunits) without a water quality station, concentrations are shown in grey; these are assumed to be equal to the highest concentration measured at adjacent stations.
FR_FR5 is located in S5; relative fish use is shown for S4 and S5 combined.
Years shaded grey indicate one or more samples collected in this year and season could be between September 2017 and September 2019.
Blank cells indicate no samples were collected for corresponding station and year/season.
Screening: shading indicates below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Area-weighted summary: transient shading used to shade from 0% (no color) to 100% (blue).

Figure 28: Sulphate concentrations for locations with high adult fish use in winter



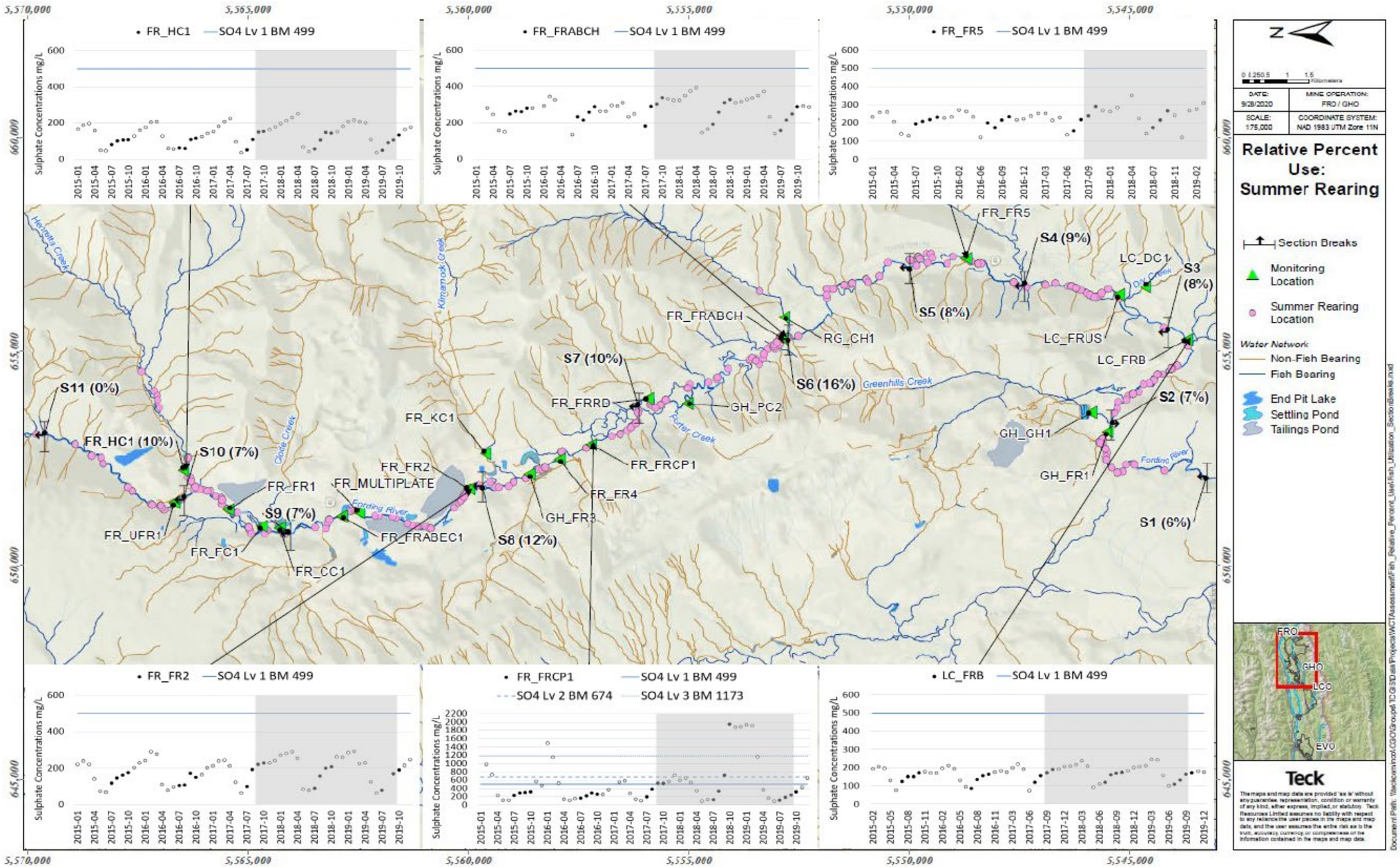
Note: Concentrations are in milligrams per litre (mg/L). Concentrations are compared to benchmarks for sulphate (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 29: Sulphate concentrations for locations with high adult fish use in spring



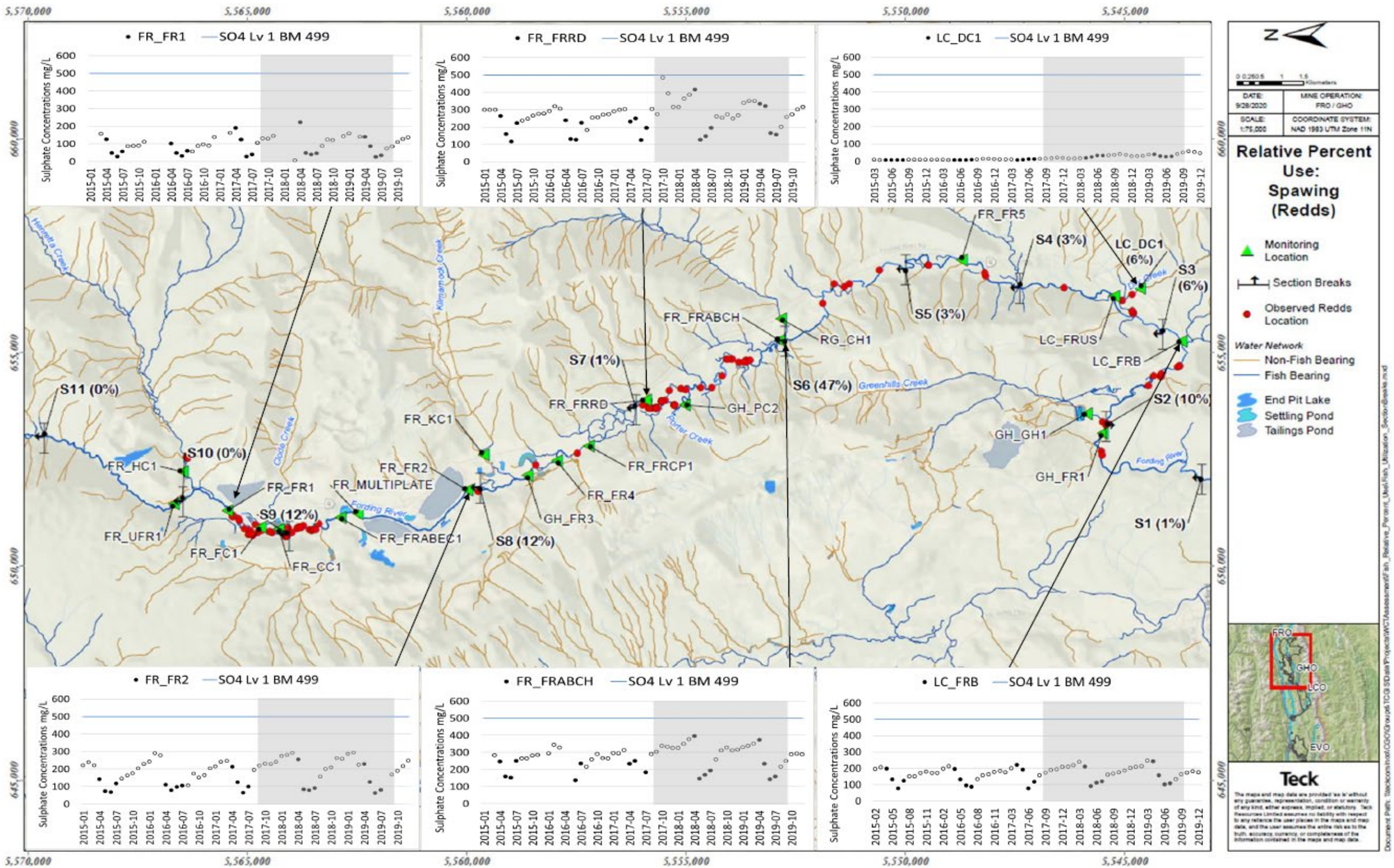
Note: Concentrations are in milligrams per litre (mg/L). Concentrations are compared to benchmarks for sulphate (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 30: Sulphate concentrations for locations with high adult fish use in summer-fall



Note: Concentrations are in milligrams per litre (mg/L). Concentrations are compared to benchmarks for sulphate (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 31: Sulphate concentrations for locations with high redds in spring



Note: Concentrations are in milligrams per litre (mg/L). Concentrations are compared to benchmarks for sulphate (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

3.3.2.6 Total dissolved solids

As discussed in Section 3.3.1.1, there is no long-term WQG for TDS. The level 1 screening value was derived from embryo-alevin testing of the blend of ions present in mine-affected waters in the Elk Valley. In terms of effects in chronic toxicity testing, this blend is understood to predominantly reflect effects of sulphate and its counter-ions (mainly calcium). Therefore, TDS and sulphate are essentially two ways of looking at the same stressor, and the evaluation of TDS presented herein is to a large extent redundant with that provided above for sulphate. This is important context for the evaluation of potential mixture effects in Section 3.3.2.9.

TDS concentrations measured in the decline window were below the level 1 screening value of 1,000 mg/L in 84% of samples. The percentage of samples with TDS concentrations below the level 1 screening value is similar to the percentages of samples with sulphate concentrations below the long-term BC WQG (83%) and below the level 1 benchmark (85%).

TDS concentrations measured between 2012 and 2019 are compared to screening values in Table 27. Time-series plots with screened TDS concentrations are provided for locations with highest adult fish use in winter (Figure 32), spring (Figure 33), and summer-fall (Figure 34), and highest redds observed in spring (Figure 35). The following bullets summarize the results for mainstem stations and tributary stations included in the refined assessment, provide a spatial summary, and discuss spatiotemporal overlap with WCT:

- **Fording River**. TDS concentrations in the decline window were below the level 1 screening value at all but two mainstem stations (FR_FRCP1, FR_FRRD). For all stations except FR_FRCP1 and FR_FRRD, these results indicate no chronic effects to fish. At FR_FRRD in winter 2017 only, TDS concentrations were approximately equal to the level 1 screening value, indicating a potential low-level effect from TDS on early life stages of WCT. At FR_FRCP1 in winter (2018, 2019) and summer-fall (2018 only), TDS concentrations were above the level 3 screening value, indicating a potential high-level effect from TDS. Early life stages are not present in winter months, nor would they be present in early October (see Table 1) which is the month associated with the 2018 summer-fall magnitude. However, the relative sensitivity of adults and juveniles to TDS is not known. Therefore, it cannot be ruled out that effects could have occurred to juvenile and/or adult WCT that overlapped with TDS concentrations at FR_FRCP1 in winter and summer-fall. It is uncertain what proportion of fish overlapped with these conditions. However, the available telemetry data indicate that S7 overall represents a relatively small proportion of total fish use in the upper Fording River watershed (winter 2.7%; spring 3.9%; summer-fall 10%), and particularly in winter when potential effects were of the greatest magnitude. Factors that could have increased the number of fish exposed to TDS concentrations in these time periods relative to the number of fish recorded in the telemetry study are considered in the integration chapter (EoC Team 2021).

  The change at FR_FRCP1 is due to mainstem Fording River going dry for portion of the year, which results in the water quality reflecting unmixed Cataract Creek conditions. Nupqu (2018) reported limited habitat in this reach of the Fording River during overwintering conditions, with results of an underwater survey (conducted 11 December 2018) suggesting an absence of fish in the identified habitat. Therefore, there is uncertainty as to whether fish were exposed to the overwintering conditions at FR_FRCP1.

  The magnitude of potential effects associated with maximum monthly concentrations in the decline window was either lower than or within the range observed pre-September 2017, except for FR_FRRD in winter (2017) and spring (2018) when there was a shift from negligible to low at and FR_FRCP1 in winter where there was a shift from moderate to high (2018 and 2019) and in summer-fall where there was a shift from negligible to low (2017) or negligible to moderate (2018).

- **Tributaries**. TDS concentrations in the decline window were below the level 1 screening value at half of the tributary stations (including Henretta Creek), indicating a negligible effect from TDS to WCT. At the other half of tributaries, sulphate concentrations in the decline window were between the level 1 and level 2 screening values (Clode Creek [all seasons and years], Kilmarnock Creek [winter 2017 and summer-fall 2017, 2018, 2019], Greenhills Creek [all seasons and years except spring 2019]), were between the level 2 and level 3 screening values (Kilmarnock Creek [winter and spring 2018 and 2019], Swift Creek [winter 2017, spring 2018 and 2019, summer-fall 2017, 2018, 2019]), or above the level 3 screening value (Swift Creek winter 2018 and 2019). Tributaries with TDS concentrations above the level 1 screening value accounted for approximately 1.9% of tributary habitat.

  The magnitude of potential effects associated with maximum monthly concentrations for September 2017 to September 2019 was either lower than or within the range observed pre-September 2017, except for Porter Creek where there was a shift from negligible to high in winter and a shift from negligible to low in spring.

- **Spatial summary**. The majority of assessed habitat in the decline window indicated no chronic effects of TDS in winter (89% to 94%), spring (92% to 99%), and summer-fall (94% to 99%), with the remaining habitat indicating a potential low (up to 11%) or high (up to 5%) level effect from TDS on individual WCT in those locations. Relative to previous years, there was a shift towards more habitat assigned low instead of no chronic effects (all seasons; 6 to 11%) or high (winter and summer-fall; 5%). These results indicate that water quality in a portion of the assessed habitat (≤11%) has the potential for localized effects on WCT.

- **Spatiotemporal overlap with WCT**. Potential effects of TDS overlapped with WCT in segments S6 (winter and spring) and S7 (all seasons), as well as Clode Creek (spring), Kilmarnock Creek (spring), and Greenhills Creek (spring). These areas represent approximately 42% of adult fish use in winter (40% of which indicated potential low-level effects), 32% of adult fish use in spring (31% of which indicated potential low-level effects), and 10% of adult fish use in summer-fall. For early life stages (redds), these areas represent approximately 51% of fish use in spring (all of which indicated potential low-level effects).[35] Thus, areas with potential moderate- or high-level effects represented 2% of adult fish use in winter, 1% of adult fish use in spring, and 10% of adult fish use in summer-fall 2018 only (due to FR_FRCP1).

Based on the above results, TDS met the requisite conditions to contribute to the WCT decline via potential effects on WCT. The majority of assessed habitat indicated no chronic effects to fish; most areas with adult fish use and approximately half of areas with recorded redds indicated no chronic effects to fish. Therefore, TDS did not meet the requisite conditions for being the cause of the WCT decline. The screening values used to evaluate potential effects for TDS are based on effects to early life stages (level 1; combined lethal and sublethal endpoint) or field observations of community changes to multiple life stages (level 2 and level 3). Therefore, the results described above were assumed to apply to all life stages.

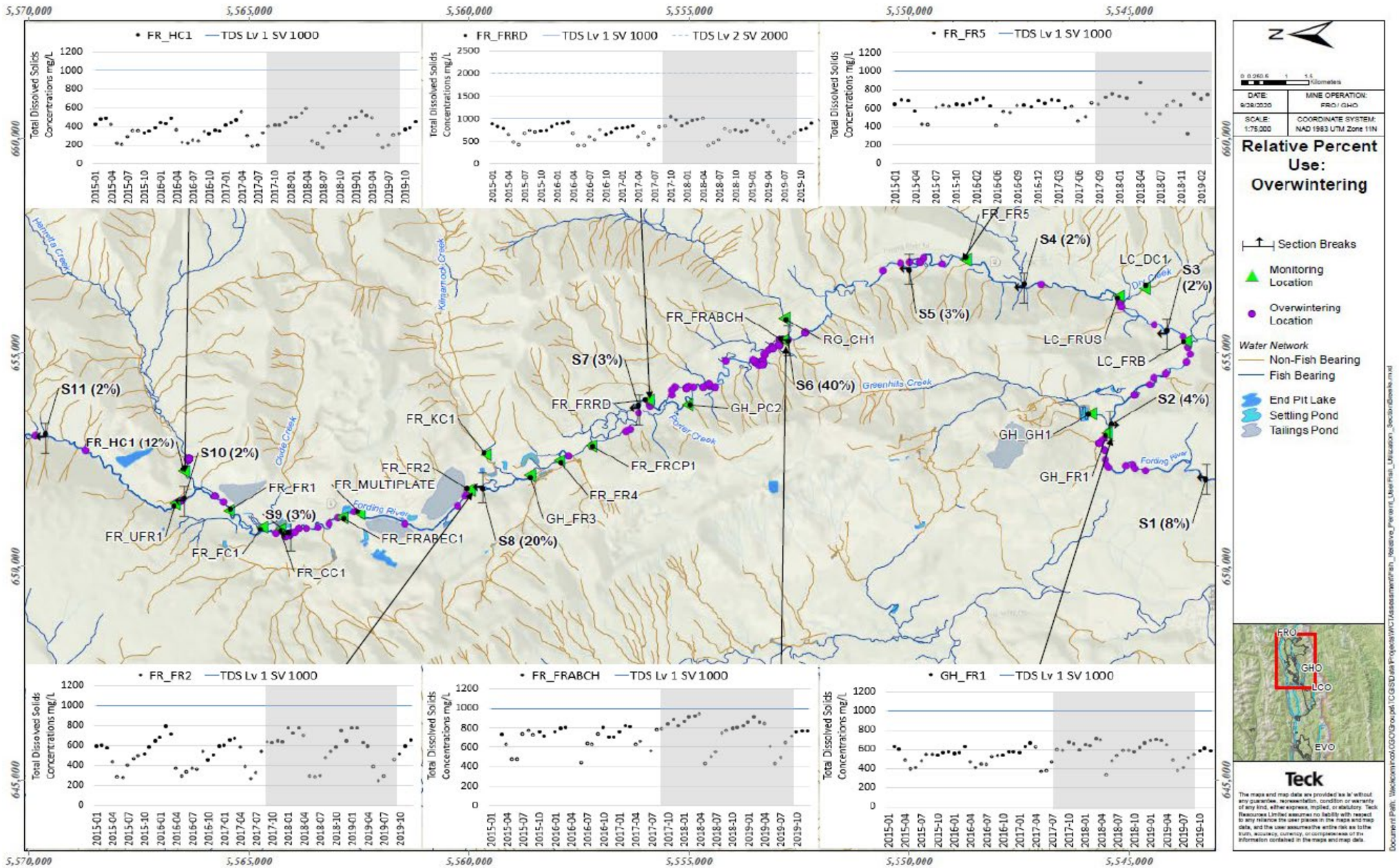
[35] The percentage results are higher for TDS relative to sulphate due to TDS concentrations at FR_FRRD. FR_FRRD is located in S6, which represents 40% of adult fish use in winter, 22% of adult fish use in spring, and 47% of redds in spring. More specifically, the discrepancy is due to the peak monthly TDS concentration at FR_FRRD in winter 2017 (1,050 mg/L) and spring 2018 (1,000 mg/L), which were approximately equal to the level 1 screening value (1,000 mg/L). Conversely, sulphate concentrations at FR_FRRD in winter 2017 (483 mg/L) and spring 2018 (415 mg/L) were slightly below the level 1 screening value (499 mg/L). As discussed in Section 3.2.5.1.4, contribution of TDS to sulphate effects is inherent in the sulphate benchmarks, and the contribution of sulphate to TDS effects is inherent in the TDS screening values. As such, TDS and sulphate are essentially two ways of looking at the same stressor, so the identification of either constituent is an indication of potential effects of major ions.

Table 27: Peak Monthly Average TDS Concentrations Compared to Fish Screening Values in Winter, Spring, and Summer-Fall Seasons (2012 to 2019)

Segment	WQ Station Code	Biological Area Code	Screening Values (µg/L)	Fish Habitat (ha)	Relative Fish Use (%)				Total Dissolved Solids (mg/L)																					
					Winter	Spring		Summer-Fall	Winter								Spring								Summer-Fall						
						Tagged	Redds		2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019
Mainstem Fording River																														
10	*FR_UFR1*	*FO26*	L1 = 1,000 L2 = 2,000 L3 = 3,000	7.4	3.8%	7.7%	0.0%	7.0%	*210*	*209*	*215*	*221*	*231*	*241*	*228*	*249*	*185*	*195*	*205*	*184*	*192*	*172*	*176*	*165*	*218*	*225*	*213*	*228*	*220*	*227*	*226*	*248*
9	FR_FR1	FODHE		2.9	3.4%	10%	12%	7.0%	322	421	352	379	353	411	410	433	336	371	492	352	309	446	519	377	316	394	291	323	305	361	373	291
		FOUCL		0.23					401	421	352	379	353	411	410	433	336	371	492	352	309	446	519	377	399	394	291	424	305	361	373	291
8		FOUNGD		1.4	20%	20%	12%	12%	401	421	352	379	353	411	410	433	336	371	492	352	309	446	519	377	399	394	291	424	305	361	373	291
	FR_FRABEC1	FODNGD		0.56					401																399			424				
	FR_MULTIPLATE	MP1		0.89					490	582			448		714	756		225					802		471			428			505	
		FOUSH		1.5					661	624	671	643	788	666	775	770	527	567	709	429	404	580	802	590	574	592	437	497	534	628	583	508
	FR_FR2	FOUKI		0.92					661	624	671	643	788	666	775	770	527	567	709	429	404	580	692	590	574	592	437	497	534	628	583	508
	FR_FR3	FOBKS		2.5					572						783	772		273					491								552	499
		SCOUTDS		0.066					782	957	826	728	815	755	835	851	572	592	737	502	474	699	533	593	696	668	528	526	612	694	590	650
7	FR_FR4	FOBSC		0.68	2.7%	3.1%	1.3%	10%	782	957	826	728	815	755	835	851	572	592	737	502	474	699	533	593	696	668	528	526	612	694	590	650
	FR_FRCP1	FOBCP		1.4								1815	2660	1418	3520	3508				566	527	655	812	771				719	718	1040	3010	702
		FRCP1SW		1.4							771	1815	2660	1418	3520	3508				653	658	675	1000	831				734	746	1040	3010	751
	FR_FRRD	FRUPO		2.2							771	884	923	1050	990	968				653	658	675	1000	831				734	746	820	762	751
		FO10-SP1		0.081					768	911	913	884	923	1050	990	968	808	827	987	684	658	675	1000	925	717	831	800	769	746	820	803	751
6	GH_PC2	FODPO		1.9	40%	22%	47%	16%	768	911	913	861			931	927	808	827	987	684			613	925	717	831	800	769			803	
		RG_FOXL		0.064					768	911	913	861	803	883	931	927	808	827	987	684	631	656	931	925	717	831	800	769	803	862	803	712
	FR_FRABCH	FO22		1.9								753	803	883	915	909		347		624	631	656	931	838				761	803	862	790	712
5	FR_FR5	FOUEW		11	4.9%	9.2%	5.8%	17%	642	743	721	681	703	748	718	749	682	741	769	559	615	606	870	739	660	684		626	630	650	663	
3	LC_FRUS	FO28		4.9	2.3%	3.8%	0.6%	7.7%		559	584	574							641	573							518	497		512	529	529
2	LC_FRB	FO29		8.9	4.2%	9.2%	9.1%	7.3%	521	548	573	559	573	592	675	607	398	640	625	546	548	583	559	621	505	505	504	495	495	530	522	500
1	GH_FR1	FODGH		2.5	7.6%	4.6%	1.3%	6.2%	571	661	689	623	625	680	706	698	590	670	698	483	460	611	686	643	523	587	551	546	521	661	575	576
Tributaries																														
9	*FR_HC3*	*HENUP*	L1 = 1,000 L2 = 2,000 L3 = 3,000	1.7	0.0%	0.0%	0.0%	0.0%	*243*	*209*	*202*	*236*	*240*	*237*	*267*	*257*	*233*	*224*	*194*	*217*	*187*	*237*	*266*	*228*	*202*	*196*		*208*	*202*	*220*	*198*	*189*
6	*RG_CH1*	*CHCK*		0.4	0.0%	0.0%	0.0%	0.3%	*170*	*176*	*167*	*193*	*238*	*196*	*186*	*200*	*175*	*181*	*202*	*170*	*162*	*207*	*188*	*173*	*162*	*187*	*161*	*194*	*184*	*174*	*175*	*173*
9	FR_HC1	HENFO		3.0	12%	3.1%	1.3%	9.7%	425	449	510	481	486	465	536	555	451	482	531	421	354	552	589	481	366	455	325	342	336	412	390	361
	FR_FC1	FR_FC1		0.29	0.0%	0.8%	1.3%	0.0%	324	360		386	253	406	449		197	359	400		216	362			308	365	280		302	272		
	FR_CC1	CLODE		0.3	0.0%	6.2%	1.3%	0.0%	691	894	981	1060	1410	1275	1440	1730	966	1035	1060	934	1350	1710	1840	1700	947	949	832	996	1350	1300	1430	1410
7	FR_KC1	KICK		0.086	0.0%	0.8%	0.0%	0.0%	1670	2040	2050	1780	1730	1750	2150	2250	1447	1950	2140	1690	1920	1760	2070	2200	1310	1360	1020	1160	1140	1580	1350	1200
	GH_SC1-2	SWCK		0.06	0.0%	0.0%	0.0%	0.0%	3860	4490	3320	3150	3020	2880	3010	3005	2930	2030	3180	2120	2290	2030	2920	2060	2800	3050	2900	2690	2680	2710	2,330	2,865
6	GH_PC1	POCK		0.15	0.0%	0.0%	0.0%	0.0%	819	880	867	886	828	859	3070	913	883	774	853	850	876	998	1010	917	858	919	922	915	929	903	890	847
3	LC_DC1	LC_DC1		0.2	0.0%	0.0%	5.8%	0.0%	193	193	179	195	197	222	285	344	193	170	157	159	175	175	250	266	190	193	182	190	202	224	290	329
2	GH_GH1	GHCKD		0.23	0.0%	0.0%	0.6%	0.0%	1640	1390	1440	1290	1320	1520	1540	1550	930	740	1040	1140	1010	1220	1330	826	1400	1410	1350	1290	1400	1590	1460	1235
Proportion of Habitat Area in Each Magnitude Category		% <L1 (No Effects Rating)		62	n/a				99	99	99	94	93	89	94	94	100	99	99	99	99	99	92	99	99	99	99	99	99	94	94	99
		% Between L1 and L2 (Low Rating)							1	0	0	6	1	11	1	1	0	1	1	1	1	1	8	1	1	1	1	1	1	6	1	1
		% Between L2 and L3 (Moderate Rating)							0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		% >L3 (High Rating)							0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0

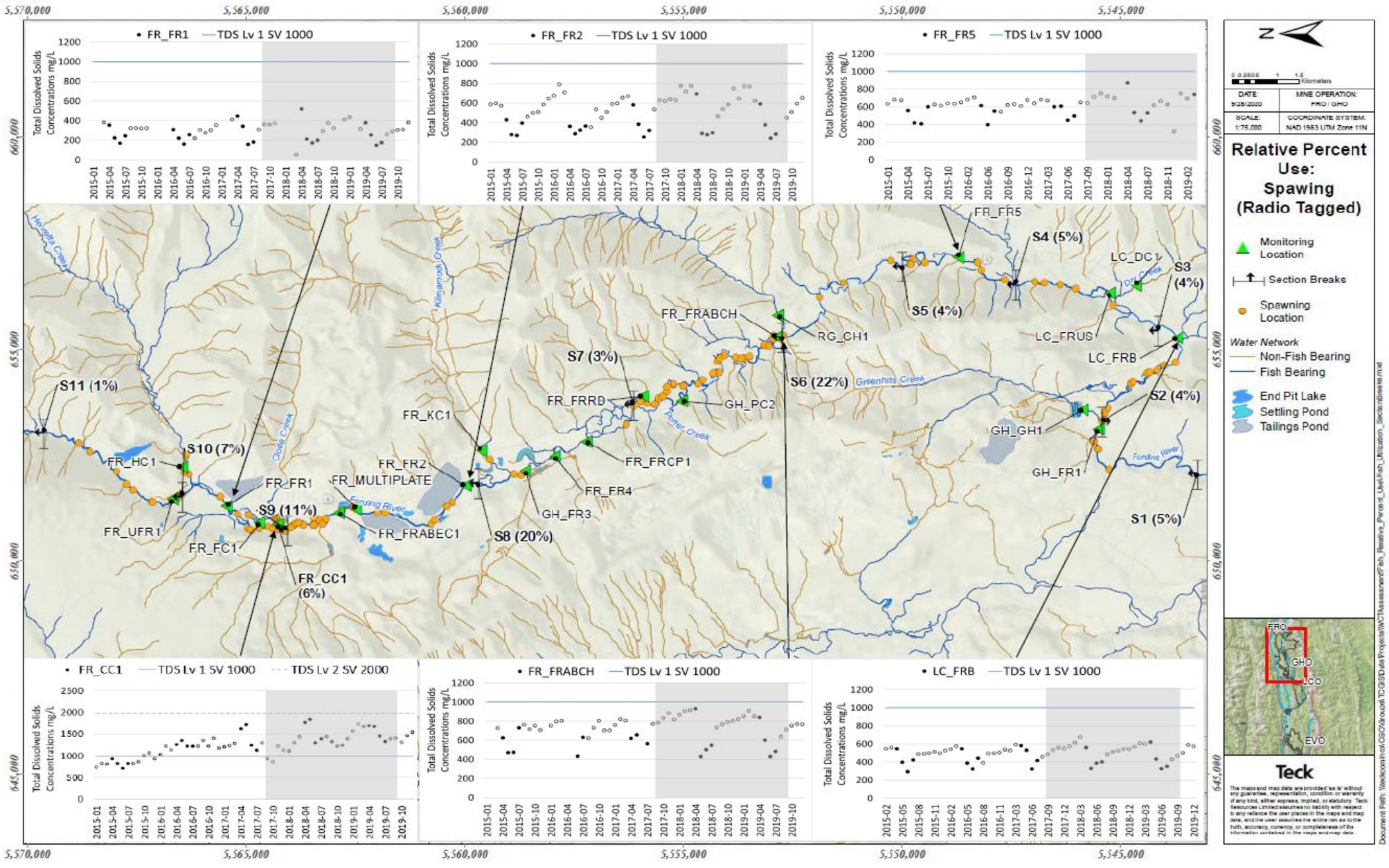
Notes: u/s = upstream; d/s = downstream; L1 = level 1; L2 = level 2; L3 = level 3.
Concentrations are in milligrams per litre (mg/L). Concentrations are compared to level 1, level 2, and level 3 screening values for total dissolved solids (TDS; see Section 3.2.5.1.1 for details). For rows (subunits) without a water quality station, concentrations are shown in grey; these are assumed to be equal to the highest concentration measured at adjacent stations.
FR_FR5 is located in S5; relative fish use is shown for S4 and S5 combined.
Years shaded grey indicate one or more samples collected in this year and season could be between September 2017 and September 2019.
Blank cells indicate no samples were collected for corresponding station and year/season.
Screening: shading indicates below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Area-weighted summary: transient shading used to shade from 0% (no color) to 100% (blue).

Figure 32: TDS concentrations for locations with high adult fish use in winter



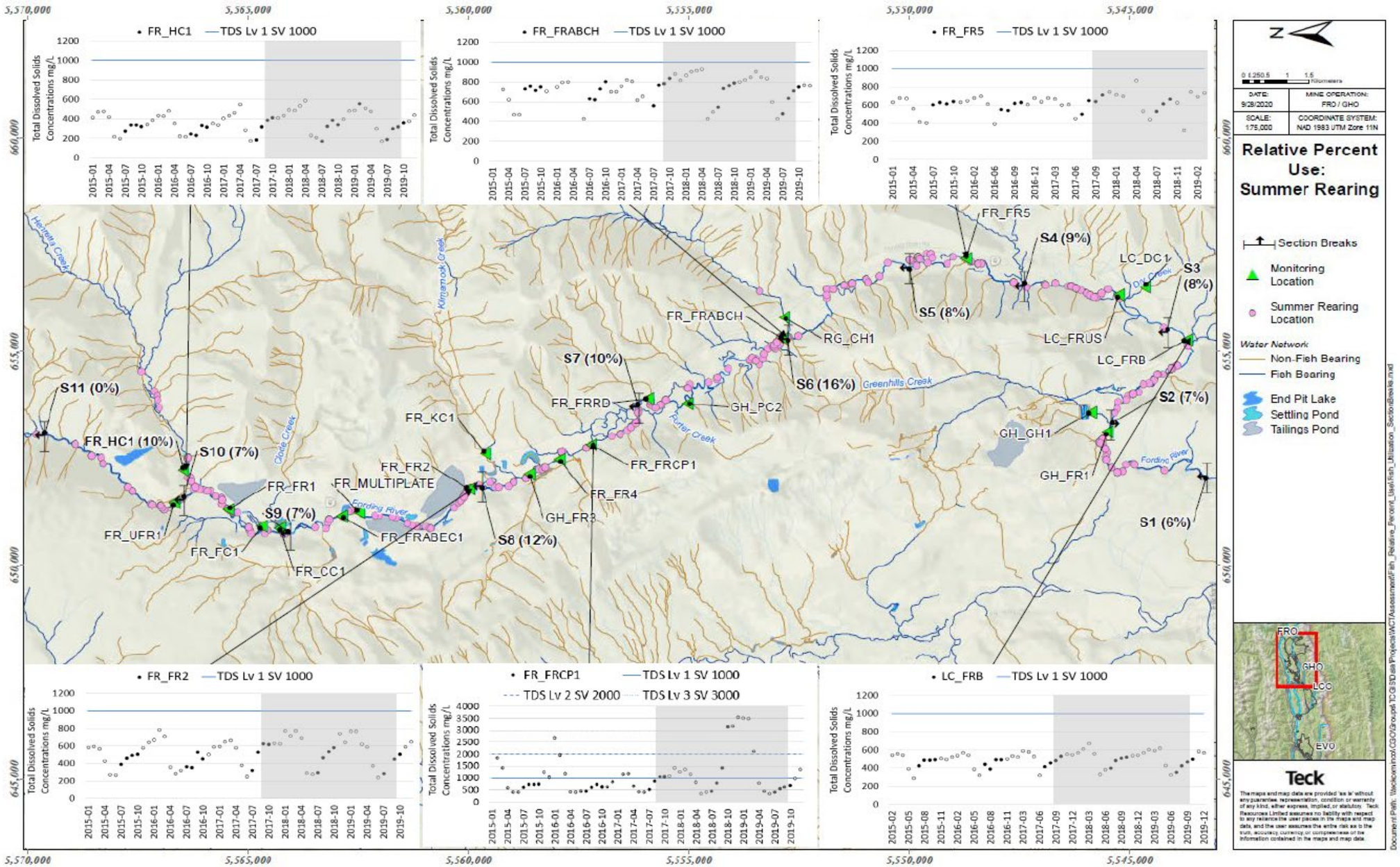
Note: Concentrations are in milligrams per litre (mg/L). Concentrations are compared to screening values for total dissolved solids (TDS; see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 33: TDS concentrations for locations with high adult fish use in spring



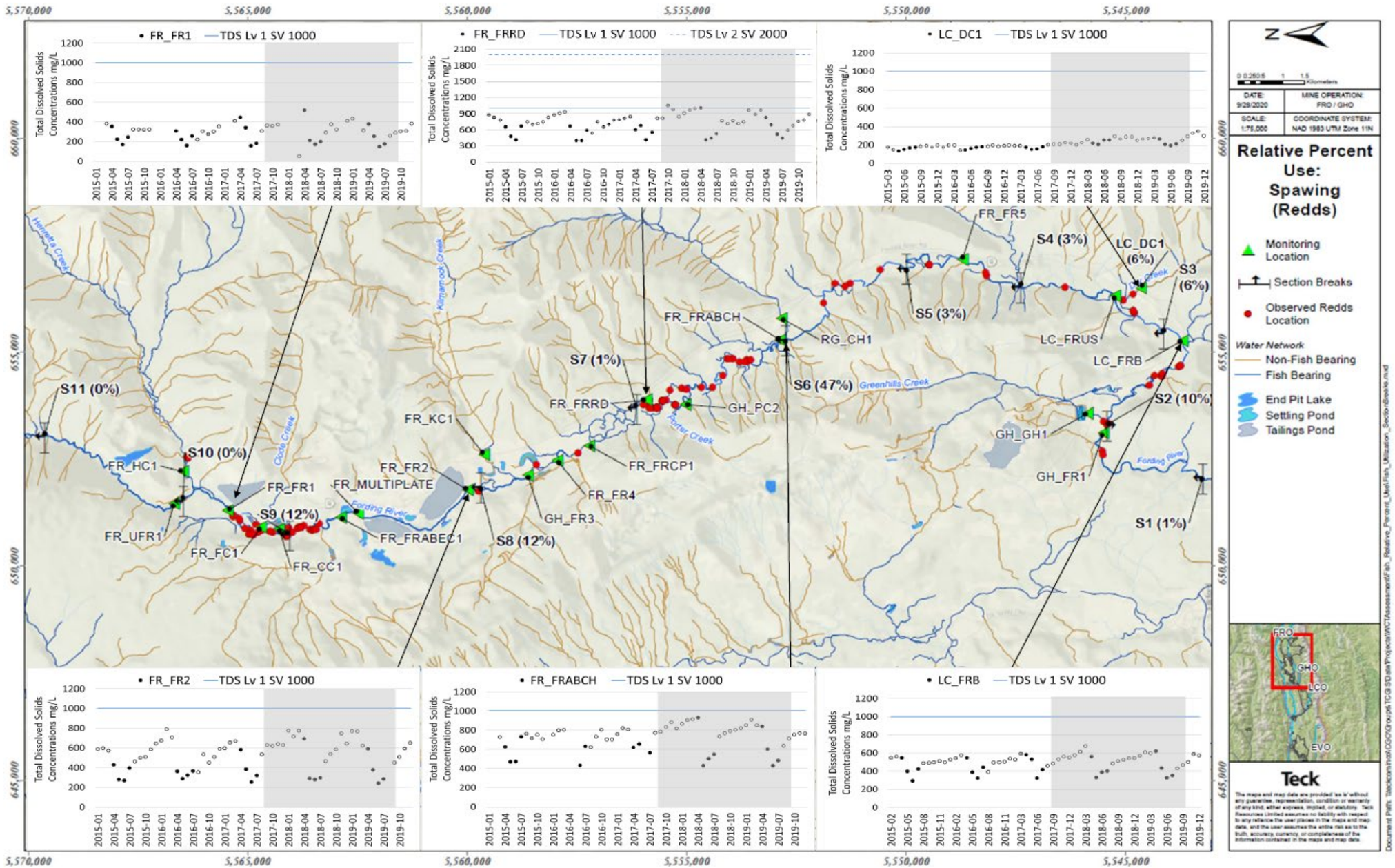
Note: Concentrations are in milligrams per litre (mg/L). Concentrations are compared to screening values for total dissolved solids (TDS; see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 34: TDS concentrations for locations with high adult fish use in summer-fall



Note: Concentrations are in milligrams per litre (mg/L). Concentrations are compared to screening values for total dissolved solids (TDS; see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 35: TDS concentrations for locations with high redds in spring



Note: Concentrations are in milligrams per litre (mg/L). Concentrations are compared to screening values for total dissolved solids (TDS; see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

3.3.2.7 Dissolved oxygen

As tabulated in Section 3.3.1.1, the majority of dissolved oxygen concentrations measured in the decline window were above the long-term BC WQG of 11 mg/L when buried embryo/alevins are present and 8 mg/L when they are not (life-stage dependent; 71% of samples) and the level 1 screening value of 9 mg/L when buried embryo/alevins are present and 6 mg/L when they are not (life-stage dependent; 94% of samples).

Dissolved oxygen concentrations measured between 2012 and 2019 are compared to screening values in Table 28 (screening for buried embryo/alevin stages) and Table 29 (screening for other life stages). Winter dissolved oxygen concentrations are provided in Table 29 but not in Table 28 because buried embryo/alevin stages are not present in winter. To support the interpretation of results for buried embryo/alevin stages, time-series plots with screened dissolved oxygen concentrations are provided for locations with highest adult fish use in spring (Figure 36) and highest redds observed in spring (Figure 37). To support the interpretation of results for buried other life stages, time-series plots with screened dissolved oxygen concentrations are provided for locations with highest adult fish use in winter (Figure 38), spring (Figure 39), and summer-fall (Figure 40). Because screening values for dissolved oxygen represent a minimum concentration, measured concentrations below the screening values indicate potential effects.

As discussed in Section 3.2.5.1.1, the screening values for dissolved oxygen (and thus their interpretation below) assumes a 3 mg/L differential between interstitial concentrations and overlying water.[36] This differential was adopted from that used for the BC WQG (BC MoE 1997). Interstitial dissolved oxygen measurements are not routinely measured because of the effort associated with such programs; therefore, this assumption cannot be tested for all stations and months assessed herein. However, the 3 mg/L differential is within the range measured by Ecofish (2018) in September 2016 and August 2017 at Henretta (2017 only), LCO Dry (2017 only), and Greenhills (2016 and 2017) creeks. Specifically, Ecofish (2018) evaluated the relationship between dissolved oxygen and calcite index (CI) in surface water (0 cm depth) and two interstitial depths (30cm and 50 cm). At 30cm depth, on average, the differential ranged from approximately 0.5 mg/L at CI of 0 to 2 mg/L at CI of 3 (Figure 18 of Ecofish 2018). At 50 cm depth, on average, the differential ranged from approximately 0.8 mg/L at CI of 0 to 3.8 mg/L at CI of 3 (Figure 18 of Ecofish 2018). The site-specific differentials for these three tributaries broadly overlap with those summarized by BC MoE (1997), supporting the use of 3 mg/L for the assessment conducted herein. As noted by Ecofish (2018), average redd depth for WCT is between 10 and 30 cm; thus, the average differentials for the 30 cm depth (0.5 to 2 mg/L) are expected to be more representative of typical exposure conditions. If the 30 cm differentials in these tributaries are representative of other stations and months in the upper Fording River watershed, then the 3 mg/L differential used herein would be conservative.

The following bullets summarize the results for mainstem stations and tributary stations included in the refined assessment, provide a spatial summary, and discuss spatiotemporal overlap with WCT for buried embryos and alevins:

- **Fording River**. Dissolved oxygen concentrations in the decline window were either above the level 1 screening value or between the level 1 and level 2 screening values at all but three mainstem stations (summer-fall FR_FR1, FR_FRABCH, and GH_FR1). For all stations except these three, the results indicate either no chronic effects or a potential low-level effect from dissolved oxygen on buried embryo/alevin life stages of WCT that may be present in those reaches of the mainstem Fording River. In the summer-fall at

[36] The BC MOE (1997) assumption is based on dissolved oxygen reductions observed in field studies conducted by Koski (1965) and Hollender (1981). Koski (1965) reported reductions ranging from 1.4 to 3.5 mg/L dissolved oxygen, whereas Hollender (1981) reported reductions ranging from 2.1 to 2.8 mg/L dissolved oxygen.

FR_FR1, FR_FRABCH, and GH_FR1, minimum dissolved oxygen concentrations were between the level 2 and level 3 screening values, indicating a potential moderate-level effect from dissolved oxygen on buried embryo/alevin life stages of WCT that spawn at these locations.

The magnitude of potential effects associated with minimum concentrations in the decline window was either lower than or within the range observed pre-September 2017 for two thirds of the mainstem stations. At other stations, there was a shift in the summer-fall from negligible to low or moderate (FR_FR1 [2017, 2018, 2019], FR_MULTIPLATE [2018], FR_FR3 [2018], FR_FRABCH [2019], GH_FR1 [2017]).

- **Tributaries**. Dissolved oxygen concentrations in the decline window were either below the level 1 screening value or between the level 1 and level 2 screening values except for summer-fall at Swift Creek (2017) and Dry Creek (2019). These results indicate either no chronic effects to fish or a potential low-level effect of dissolved oxygen. At Swift and Dry creeks in the summer-fall season, minimum dissolved oxygen concentrations in either 2017 or 2019 were between the level 2 and level 3 screening values, indicating a potential moderate-level effect from dissolved oxygen on buried embryo/alevin life stages of WCT that spawn at these locations. These two tributary stations combined represent 0.7% of the assessed tributary habitat in the upper Fording River watershed.

  The magnitude of potential effects associated with minimum monthly concentrations in the decline window was either lower than or within the range observed pre-September 2017, except in summer-fall for Henretta Creek where there was a shift from negligible to low at both the reference and mine-exposed stations and for Swift and Dry creeks where there was a shift from negligible to moderate. These three stations combined represent 5.6% of tributary habitat in the upper Fording River watershed.

- **Spatial summary**. The majority of assessed habitat in the decline window indicated no likely chronic effects of dissolved oxygen in spring (95% to 99%) and summer-fall (62% to 84%), with most or all of the remaining habitat indicating a potential for low-level effect from dissolved oxygen on early life stages of WCT that spawn in the mainstem Fording River and its tributaries. One notable exception was summer-fall in 2017 when approximately 13% of the assessed habitat was in the moderate rating. The 13% was driven by two mainstem stations (FR_FR1, GH_FR1) and one tributary station (LC_DC1 on Dry Creek). At these stations, the minimum value was based on a single measurement in July (LC_DC1) or average measurements in the month of August (FR_FR1) or September (GH_FR1). If dissolved oxygen concentrations at these stations are averaged over a 30-day period[37] (i.e., not contained to a single month but over a rolling 30-day period), then the dissolved oxygen measurements would be lower than the level 1 screening value at LC_DC1 (average of 9.9 mg/L) and between the level 1 and level 2 screening values at FR_FR1 (average of 8.03 mg/L) and GH_FR1 (average of 8.2 mg/L). If the rolling averages were used in the area-weighted summary, then summer-fall 2017 would have 68% of habitat assigned as no chronic effects with the remaining habitat indicating a potential low-level effect from dissolved oxygen. Similarly, for summer-fall 2019, the 4% was driven by one mainstem station (FR_FRABCH). At this station, the minimum monthly average was based on a single measurement in October (7.6 mg/L). If dissolved oxygen at FR_FRABCH is averaged over a rolling 30-day period, then the dissolved oxygen measurement would be above the level 1 screening value (average of 9.3 mg/L). If the rolling average was used, then summer-fall

[37] An average period approach is consistent with that used by BC ENV (2019b) for long-term BC WQGs. BC ENV (2019b) states that this approach “allows concentrations of a substance to fluctuate above and below the guideline provided that the short-term acute is never exceeded and the long-term chronic is met over the specified averaging period (e.g., 5 samples in 30 days)”.

2019 would have 88% of habitat assigned as no chronic effects with the remaining habitat indicating a potential low-level effect from dissolved oxygen.

Relative to previous years, if using the rolling averages, there was a shift in summer-fall towards more habitat (8% to 15%) assigned a magnitude rating of low instead of negligible. These results indicate a higher proportion of habitat in summer-fall had the potential for localized, low- level effects on WCT.

- **Spatiotemporal overlap with WCT**. Potential low-level effects of dissolved oxygen overlapped with WCT redds in mainstem segments S9 (summer-fall), S8 (summer-fall), S7 (summer-fall), S6 (spring and summer-fall), as well as Henretta Creek downstream (summer-fall), Fish Pond Creek (summer-fall), Clode Creek (spring and summer-fall), and Greenhills Creek (spring and summer-fall). For early life stages (redds), these areas represent approximately 77% of fish use in spring.

Based on the above results, dissolved oxygen met the requisite conditions to contribute to the WCT decline via potential effects on early life stages of WCT. The majority of assessed habitat indicated a negligible potential for effects or a potential for low-level effects on early life stages. Therefore, dissolved oxygen dd not meet the requisite conditions for being the cause of the WCT decline.

As discussed earlier in this section, the interpretation for DO assumes a 3 mg/L differential between interstitial concentrations and overlying water. If a differential of 2 mg/L was used instead (i.e., the average differential for 30 cm depth and CI = 3 in the Ecofish 2018 study), then the screening values for buried embryo and alevin life stages would decrease by 1 mg/L (level 1 = 8 mg/L; level 2 = 7 mg/L; level 3 = 6 mg/L). If a differential of 2 mg/L was assumed, then dissolved oxygen concentrations in the decline window would be interpreted to have no chronic effects at all mainstem and tributary stations, except for summer-fall at Swift Creek in 2017 which would have a magnitude rating of low. Swift Creek represents 0.07% of habitat in the upper Fording River watershed, with no adult or redds recorded in any season. Therefore, to summarize, if a 2 mg/L differential was used in this assessment, then the spatial summary would indicate no chronic effects in >99% of assessed habitat and 100% of habitat with recorded fish use.

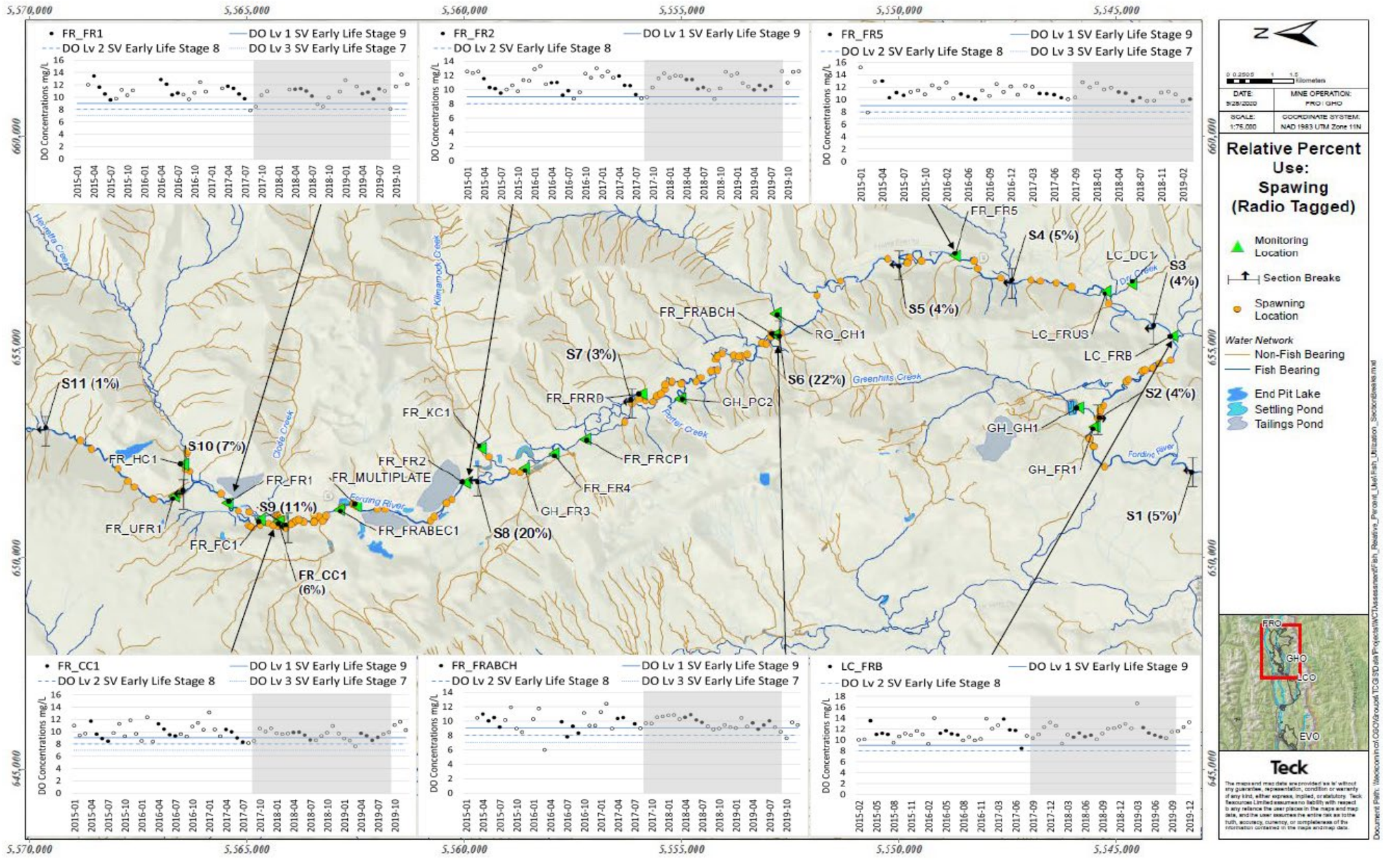
Potential effects to juveniles and adults are discussed below.

Table 28: Minimum Monthly Average Dissolved Oxygen Concentrations Compared to Embryo/Alevin Fish Screening Values in Spring and Summer-Fall Seasons (2012 to 2019)

Segment	WQ Station Code	Biological Area Code	Screening Values (µg/L)	Fish Habitat (ha)	Relative Fish Use (%)				Dissolved Oxygen (mg/L)													
					Winter	Spring		Summer-Fall	Spring								Summer-Fall							
						Tagged	Redds		2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019
10	*FR_UFR1*	*FO26*	L1: 9 L2: 8 L3: 7	7.4	3.8%	7.7%	0.0%	7.0%	*11*	*11*	*11*	*10*	*9.5*	*9.7*	*10*	*9.6*		*11*	*8.8*	*9.6*	*10*	*9.3*	*9.5*	*9.5*
9	FR_FR1	FODHE		2.9	3.4%	10%	12%	7.0%	11	11	10	9.5	10	9.8	10	9.7		11	10	9.8	9.6	7.8	8.5	8.1
		FOUCL		0.23					11	11	10	8.6	9.8	9.8	10	9.7		10	10	9.8	9.6	7.8	8.5	8.1
8		FOUNGD		1.4	20%	20%	12%	12%	11	11	10	8.6	9.8	9.8	10	9.7		10	10	9.8	9.6	7.8	8.5	8.1
	FR_FRABEC1	FODNGD		0.56						13		8.6	9.8					10	11	10	9.8			
	FR_MULTIPLATE	MP1		0.89						12		8.3	8.5		9.6			10	11	9.1	10		8.9	
		FOUSH		1.5					9.3	11	11	8.3	8.5	9.3	9.6	9.9		10.0	10	9.1	8.7	8.7	8.7	11
	FR_FR2	FOUKI		0.92					9.3	11	11	9.7	9.2	9.3	10	9.9		10.0	10	9.2	8.7	8.7	8.7	11
7	FR_FR3	FOBKS		2.5	2.7%	3.1%	1.3%	10%		11		8.8	8.5		9.4			11	13	10	10		8.9	9.1
		SCOUTDS		0.066					9.3	10	12	8.8	8.5	9.9	9.4			11	10	8.2	9.6	8.9	8.9	8.6
	FR_FR4	FOBSC		0.68					9.3	10	12	9.1	10	9.9	9.4			11	10	8.2	9.6	8.9	9.1	8.6
	FR_FRCP1	FOBCP		1.4								9.3	9.9	9.1	11	9.9				9.2	9.5	9.8	9.7	9.5
		FRCP1SW		1.4								9.3	9.6	9.1	9.9	9.9				8.9	9.3	9.6	8.6	9.2
6	FR_FRRD	FRUPO		2.2	40%	22%	47%	16%				9.9	9.6	9.3	9.9	9.9				8.9	9.3	9.6	8.6	9.2
		FO10-SP1		0.081					10	8	9	9.0	9.6	9.3	9.8	9.9	9	9.1	9	8.6	9.3	9.6	8.6	9.2
	GH_PC2	FODPO		1.9					10	8.3	9.1	9.0			9.8	10	9.2	9.1	9.2	8.6			8.8	
		RG_FOXL		0.064					10	8	9	9.0	7.8	9.6	9.8	8.9	9	9.1	9	8.6	8.3	9.0	8.8	8
	FR_FRABCH	FO22		1.9						10		10	7.8	9.6	9.8	8.9				9.1	8.3	9.0	8.8	7.6
5	FR_FR5	FOUEW		11	4.9%	9.2%	5.8%	17%	11	11	12	10	10	10	9.8	10		10		11	11	10	9.8	
3	LC_FRUS	FO28		4.9	2.3%	3.8%	0.6%	7.7%			9.1	10				11			9.8	9.6		12		10
2	LC_FRB	FO29		8.9	4.2%	9.2%	9.1%	7.3%	10	10	9.9	11	11	8.5	10	11	10.0	9.6	9.6	9.5	9.9	10	10	10
1	GH_FR1	FODGH		2.5	7.6%	4.6%	1.3%	6.2%	10	9.1	9.3	9.8	9.5	9.0	10.0	10	9.6	10.0	8.5	8.8	9.5	7.7	10	10
9	*FR_HC3*	*HENUP*	L1: 9 L2: 8 L3: 7	1.7	0.0%	0.0%	0.0%	0.0%	*11*	*10*	*11*	*10*	*9.6*	*10*	*10*	*9.8*		*11*		*9.9*	*9.9*	*9.0*	*9.5*	*10*
6	*RG_CH1*	*CHCK*		0.4	0.0%	0.0%	0.0%	0.3%	*11*	*11*	*13*	*11*	*11*	*10*	*11*	*11*		*11*	*11*	*11*	*10*	*10*	*10*	*9.8*
9	FR_HC1	HENFO		3.0	12%	3.1%	1.3%	9.7%	9.9	11	11	9.9	9.9	10.0	10	9.5		9.8	11	9.3	9.6	8.5	8.9	9.5
	FR_FC1	FR_FC1		0.29	0.0%	0.8%	1.3%	0.0%	10	8.7	11		9.8	10.0				8.5	9.2			9.0		
	FR_CC1	CLODE		0.3	0.0%	6.2%	1.3%	0.0%	8.0	7.6	8.7	8.4	9.3	8.3	8.9	8.6		8.6	7.9	9.3	9.2	8.2	8.1	9.6
7	FR_KC1	KICK		0.086	0.0%	0.8%	0.0%	0.0%	9.0	11	11	10	9.8	9.9	10	10		9.8	10	9.1	9.8	10	9.5	9.9
	GH_SC1-2	SWCK		0.06	0.0%	0.0%	0.0%	0.0%	11	9.7	11	10	10	9.8	11	8.4	11	11	11	10	10	11	9.8	7.4
6	GH_PC1	POCK		0.15	0.0%	0.0%	0.0%	0.0%	11	9.2	10	10	9.3	10.0	11	9.7	6.3	11	0.04	10	10	10	9.5	11
3	LC_DC1	LC_DC1		0.2	0.0%	0.0%	5.8%	0.0%	10	10	10	10	10	10	10	10	9.5	9.9	10	9.7	10	7.9	11	10
2	GH_GH1	GHCKD		0.23	0.0%	0.0%	0.6%	0.0%	8.7	8.7	7.7	6.8	8.5	8.3	8.4	8.5	8.1	8.5	7.6	7.0	8.1	8.1	8.1	8.3
Proportion of Habitat Area in Each Magnitude Category		% <L1 (No Effects Rating)		62	n/a				99	95	99	84	87	77	99	95	97	98	75	85	92	68	62	84
		% Between L1 and L2 (Low Rating)							0	5	1	15	9	23	1	5	2	2	24	14	8	19	38	12
		% Between L2 and L3 (Moderate Rating)							1	1	0	0	4	0	0	0	0	0	1	0	0	13	0	4
		% >L3 (High Rating)							0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

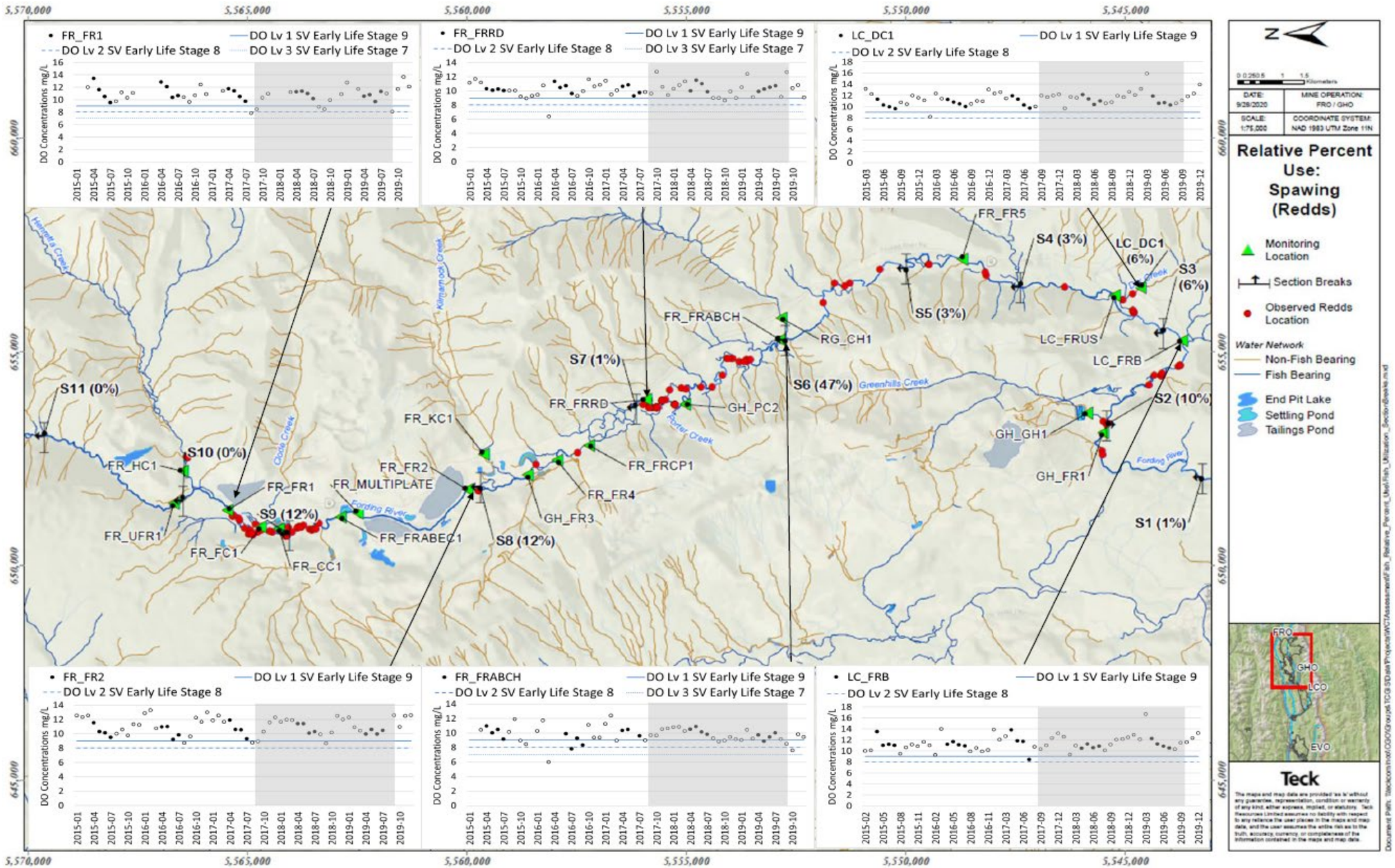
Notes: u/s = upstream; d/s = downstream; L1 = level 1; L2 = level 2; L3 = level 3.
Concentrations are in milligrams per litre (mg/L). Concentrations are compared to the level 1, level 2, and level 3 screening values (see Section 3.2.5.1.1 for details). For rows (subunits) without a water quality station, concentrations are shown in grey; these are assumed to be equal to the highest concentration measured at adjacent stations.
FR_FR5 is located in S5; relative fish use is shown for S4 and S5 combined.
Years shaded grey indicate one or more samples collected in this year and season could be between September 2017 and September 2019.
Blank cells indicate no samples were collected for corresponding station and year/season.
Screening: shading indicates below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Area-weighted summary: transient shading used to shade from 0% (no color) to 100% (blue).

Figure 36: Dissolved oxygen concentrations for locations with high adult fish use in spring (buried embyros/alevins)



Note: Concentrations are in milligrams per litre (mg/L). Concentrations are compared to screening values for dissolved oxygen (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 37: Dissolved oxygen concentrations for locations with high redds in spring (buried embyros/alevins)



Note: Concentrations are in milligrams per litre (mg/L). Concentrations are compared to screening values for dissolved oxygen (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

The following bullets summarize the results for mainstem stations and tributary stations, provide a spatial summary, and discuss spatiotemporal overlap with WCT for other life stages (e.g., juveniles, adults):

- **Mainstem Fording River**. Dissolved oxygen concentrations in the decline window were above the level 1 screening value at all stations and in all seasons except for winter 2018 at FR_FRCP1. With the exception of this value, these results indicate no chronic effects from dissolved oxygen on other life stages of WCT. At FR_FRCP1 in winter 2018, the minimum dissolved oxygen concentration (2.7 mg/L) was below acute screening values (see Section 2.0; Appendix C). The concentration of 2.7 mg/L was measured on 4 December 2018, with no other measurements taken in that month. In adjacent months, average concentrations were above the level 1 screening value: November 2018 had an average concentration of 11.1 mg/L and January 2019 had an average concentration of 9.7 mg/L. Thus, the low DO concentration was specific to December 2018.

  Overwintering conditions at FR_FRCP1 in 2018 primarily reflect Cataract Creek conditions. However, during this sampling event on 4 December 2018, FR_FRCP1 was partially frozen and an isolated pool may have been already present at this location (Moore 2020). The interpretation of an isolated pool aligns with the fact that Cataract Creek water (the source of FR_FRCP1 water when this reach of the Fording River is dry) sampled on the same day had a dissolved oxygen concentration of 10.61 mg/L. Other Fording River mainstem stations sampled on the same day also had oxygenated conditions, including those upstream (FR_UFR1 [11.5 mg/L], FR_FR1 [12.2 mg/L]) and downstream (FR_FRABCH [9.62 mg/L]) of FR_FRCP1. Nupqu (2018) reported limited habitat in this reach of the Fording River during overwintering conditions, with results of an underwater survey (conducted on 11 December 2018) suggesting an absence of fish in the identified habitat. Therefore, there is uncertainty as to whether fish were exposed to the low dissolved oxygen concentration at FR_FRCP1. Even with this uncertainty, acute effects could not be ruled out for fish exposed to December 2018 conditions at FR_FRCP1. It is uncertain what proportion of fish overlapped with these conditions. However, the available telemetry data indicate that S7 overall represents a relatively small proportion of total fish use in the upper Fording River watershed (winter 2.7%; spring 3.9%; summer-fall 10%), and particularly in winter when potential effects were identified. Factors that could have increased the number of fish exposed to dissolved oxygen concentrations in winter 2018 relative to the number of fish recorded in the telemetry study are considered in the integration chapter (EoC Team 2021).

  The magnitude of potential effects associated with minimum monthly concentrations in the decline window was either lower than or within the range observed pre-September 2017, except for FR_FRCP1 that shifted from negligible to high in winter 2018.

- **Tributaries**. Dissolved oxygen concentrations in the decline window were above the level 1 screening value at all stations. These results indicate no chronic effects from dissolved oxygen on other life stages of WCT. The magnitude of potential effects associated with minimum monthly concentrations in the decline window was within the range observed pre-September 2017.

- **Spatial summary**. The majority or all of the assessed habitat in the decline window indicated no chronic effects of dissolved oxygen in winter (96% to 100%), spring (100%), and summer-fall (100%). Relative to previous years, there was no shift in the magnitude ratings.

- **Spatiotemporal overlap with WCT**. Segments with the highest fish use had negligible potential for effects of dissolved oxygen on adults and juveniles in all seasons. Potential effects of dissolved oxygen overlapped with WCT only in S7 in winter, which had 3% of adult fish use.

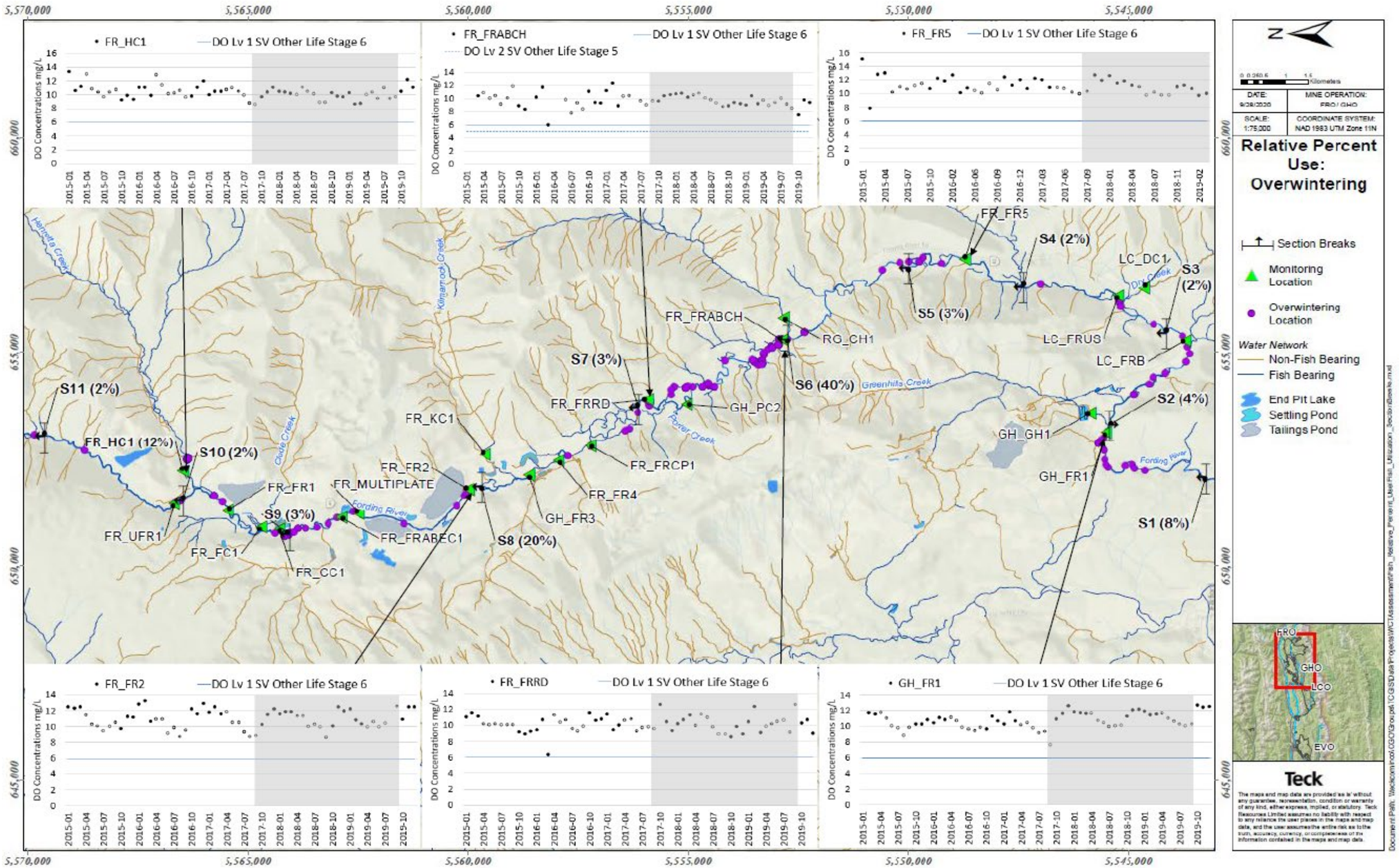
The above results indicate that dissolved oxygen could have contributed to effects at one mainstem station. However, this location (FR_FRCP1) has elevated uncertainty regarding the available of overwintering habitat and accounted for a small portion of the assessed habitat (≤4%). At other locations, dissolved oxygen would not be expected to affect adults or juveniles because assessed habitat indicated no chronic effects. Therefore, dissolved oxygen does not meet the requisite conditions for being the cause of the WCT decline.

Table 29: Minimum Monthly Average Dissolved Oxygen Concentrations Compared to Fish Screening Values for Other Life Stages in Winter, Spring, and Summer-Fall Seasons (2012 to 2019)

Segment	WQ Station Code	Biological Area Code	Screening Values (µg/L)	Fish Habitat (ha)	Relative Fish Use (%)				Dissolved Oxygen (mg/L)																					
					Winter	Spring		Summer-Fall	Winter								Spring								Summer-Fall						
						Tagged	Redds		2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019
Mainstem Fording River																														
10	*FR_UFR1*	*FO26*		7.4	3.8%	7.7%	0.0%	7.0%		*1.1*	*10*	*9.5*	*10*	*11*	*11*	*10*	*11*	*11*	*11*	*10*	*9.5*	*9.7*	*10*	*9.6*		*11*	*8.8*	*9.6*	*10*	*9.3*	*9.5*	*9.5*
9	FR_FR1	FODHE		2.9	3.4%	10%	12%	7.0%		13	13	11	11	11	11	11	11	11	10	9.5	10	9.8	10	9.7		11	10	9.8	9.6	7.8	8.5	8.1
		FOUCL		0.23						11	13	11	11	11	11	11	11	11	10	8.6	9.8	9.8	10	9.7		10	10	9.8	9.6	7.8	8.5	8.1
8		FOUNGD		1.4	20%	20%	12%	12%		11	13	11	11	11	11	11	11	11	10	8.6	9.8	9.8	10	9.7		10	10	9.8	9.6	7.8	8.5	8.1
	FR_FRABEC1	FODNGD		0.56						11	13	14	12						13		8.6	9.8					10	11	10	9.8			
	FR_MULTIPLATE	MP1		0.89						11	13	15	12		9.7	9.9			12		8.3	8.5		9.6			10	11	9.1	10		8.9	
		FOUSH		1.5						11	8.9	9.9	11	10	9.7	9.9	9.3	11	11	8.3	8.5	9.3	9.6	9.9		10.0	10	9.1	8.7	8.7	8.7	11
	FR_FR2	FOUKI		0.92						11	8.9	9.9	11	10	12	10	9.3	11	11	9.7	9.2	9.3	10	9.9		10.0	10	9.2	8.7	8.7	8.7	11
	FR_FR3	FOBKS		2.5						11	12		12		9.8	11		11		8.8	8.5		9.4			11	13	10	10		8.9	9.1
		SCOUTDS		0.066						11	10	10	11	12	9.8	11	9.3	10	12	8.8	8.5	9.9	9.4			11	10	8.2	9.6	8.9	8.9	8.6
7	FR_FR4	FOBSC	L1: 6 L2: 5 L3: 4	0.68	2.7%	3.1%	1.3%	10%		11	10	10	11	12	10	11	9.3	10	12	9.1	10	9.9	9.4			11	10	8.2	9.6	8.9	9.1	8.6
	FR_FRCP1	FOBCP		1.4								10	11	12	2.7	9.7				9.3	9.9	9.1	11	9.9				9.2	9.5	9.8	9.7	9.5
		FRCP1SW		1.4							12	8.9	6.4	9.4	2.7	9.1				9.3	9.6	9.1	9.9	9.9				8.9	9.3	9.6	8.6	9.2
	FR_FRRD	FRUPO		2.2							12	8.9	6.4	9.4	9.0	9.1				9.9	9.6	9.3	9.9	9.9				8.9	9.3	9.6	8.6	9.2
		FO10-SP1		0.081					9.1	6	9	9	6	9	8.5	9	10.0	8	9	9.0	9.6	9.3	9.8	9.9	9.2	9	9	8.6	9.3	9.6	8.6	9.2
6	GH_PC2	FODPO		1.9	40%	22%	47%	16%	9.1	5.9	8.7	9.1			8.5	9.8	10	8.3	9.1	9.0			9.8	10	9.2	9.1	9.2	8.6			8.8	
		RG_FOXL		0.064					9.1	6	9	8	6	9	8.5	9	10.0	8	9	9.0	7.8	9.6	9.8	8.9	9.2	9	9	8.6	8.3	9.0	8.8	7.6
	FR_FRABCH	FO22		1.9								8.4	6.0	8.9	8.8	9.0		10		10	7.8	9.6	9.8	8.9				9.1	8.3	9.0	8.8	7.6
5	FR_FR5	FOUEW		11	4.9%	9.2%	5.8%	17%		8.9	12	7.9	10	11	11	9.8	11	11	12	10	10	10	9.8	10		10		11	11	10	9.8	
3	LC_FRUS	FO28		4.9	2.3%	3.8%	0.6%	7.7%		1.0	11	10							9.1	10				11			9.8	9.6		12		10
2	LC_FRB	FO29		8.9	4.2%	9.2%	9.1%	7.3%	11	11	11	10	9.3	12	9.3	12	10	10	9.9	11	11	8.5	10	11	10.0	9.6	9.6	9.5	9.9	10	10	10
1	GH_FR1	FODGH		2.5	7.6%	4.6%	1.3%	6.2%	11	11	10	10	10	10	11	11	10	9.1	9.3	9.8	9.5	9.0	10.0	10	9.6	10.0	8.5	8.8	9.5	7.7	10	10
Tributaries																														
9	*FR_HC3*	*HENUP*		1.7	0.0%	0.0%	0.0%	0.0%		*11*	*1.6*	*9.9*	*11*	*11*	*10*	*6.2*	*11*	*10*	*11*	*10.0*	*9.6*	*10*	*10*	*9.8*		*11*		*9.9*	*9.9*	*9.0*	*9.5*	*10*
6	*RG_CH1*	*CHCK*		0.4	0.0%	0.0%	0.0%	0.3%		*5.1*	*12*	*11*	*7.8*	*11*	*12*	*9.6*	*11*	*11*	*13*	*11*	*11*	*10*	*11*	*11*		*11*	*11*	*11*	*10*	*10*	*10*	*9.8*
9	FR_HC1	HENFO		3.0	12%	3.1%	1.3%	9.7%		11	8.8	9.3	9.9	10	9.7	8.7	9.9	11	11	9.9	9.9	10.0	10	9.5		9.8	11	9.3	9.6	8.5	8.9	9.5
	FR_FC1	FR_FC1		0.29	0.0%	0.8%	1.3%	0.0%		11		11	11	10			10	8.7	11		9.8	10.0				8.5	9.2			9.0		
	FR_CC1	CLODE	L1: 6 L2: 5 L3: 4	0.3	0.0%	6.2%	1.3%	0.0%		7.2	8.3	9.4	8.4	9.2	9.6	7.6	8.0	7.6	8.7	8.4	9.3	8.3	8.9	8.6		8.6	7.9	9.3	9.2	8.2	8.1	9.6
7	FR_KC1	KICK		0.086	0.0%	0.8%	0.0%	0.0%		11	11	9.8	10	9.8	10	9.9	9.0	11	11	10	9.8	9.9	10	10		9.8	10	9.1	9.8	10	9.5	9.9
	GH_SC1-2	SWCK		0.06	0.0%	0.0%	0.0%	0.0%	11	7.8	10	11	9.3	9.9	10	11	9.6	11	9.7	11	10	10	9.8	11	8.4	11	11	10	10	11	9.8	7.4
6	GH_PC1	POCK		0.15	0.0%	0.0%	0.0%	0.0%	10	7.3	10	11	9.9	10	11	9.8	11	9.2	10	10	10	9.3	10.0	11	9.7	6.3	11	0.04	10	10	10	9.5	11
3	LC_DC1	LC_DC1		0.2	0.0%	0.0%	5.8%	0.0%	11	11	12	10	8.2	11	9.7	12	10	10	10	10	10	10	10	10	9.5	9.9	10	9.7	10	7.9	11	10
2	GH_GH1	GHCKD		0.23	0.0%	0.0%	0.6%	0.0%	10	7.2	10	11	11	11	11	12	8.7	8.7	7.7	6.8	8.5	8.3	8.4	8.5	8.1	8.5	7.6	7.0	8.1	8.1	8.1	8.3
Proportion of Habitat Area in Each Magnitude Category		% <L1 (No Effects Rating)		62	n/a				100	73	97	100	96	100	95	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
		% Between L1 and L2 (Low Rating)							0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		% Between L2 and L3 (Moderate Rating)							0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		% >L3 (High Rating)							0	22	3	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

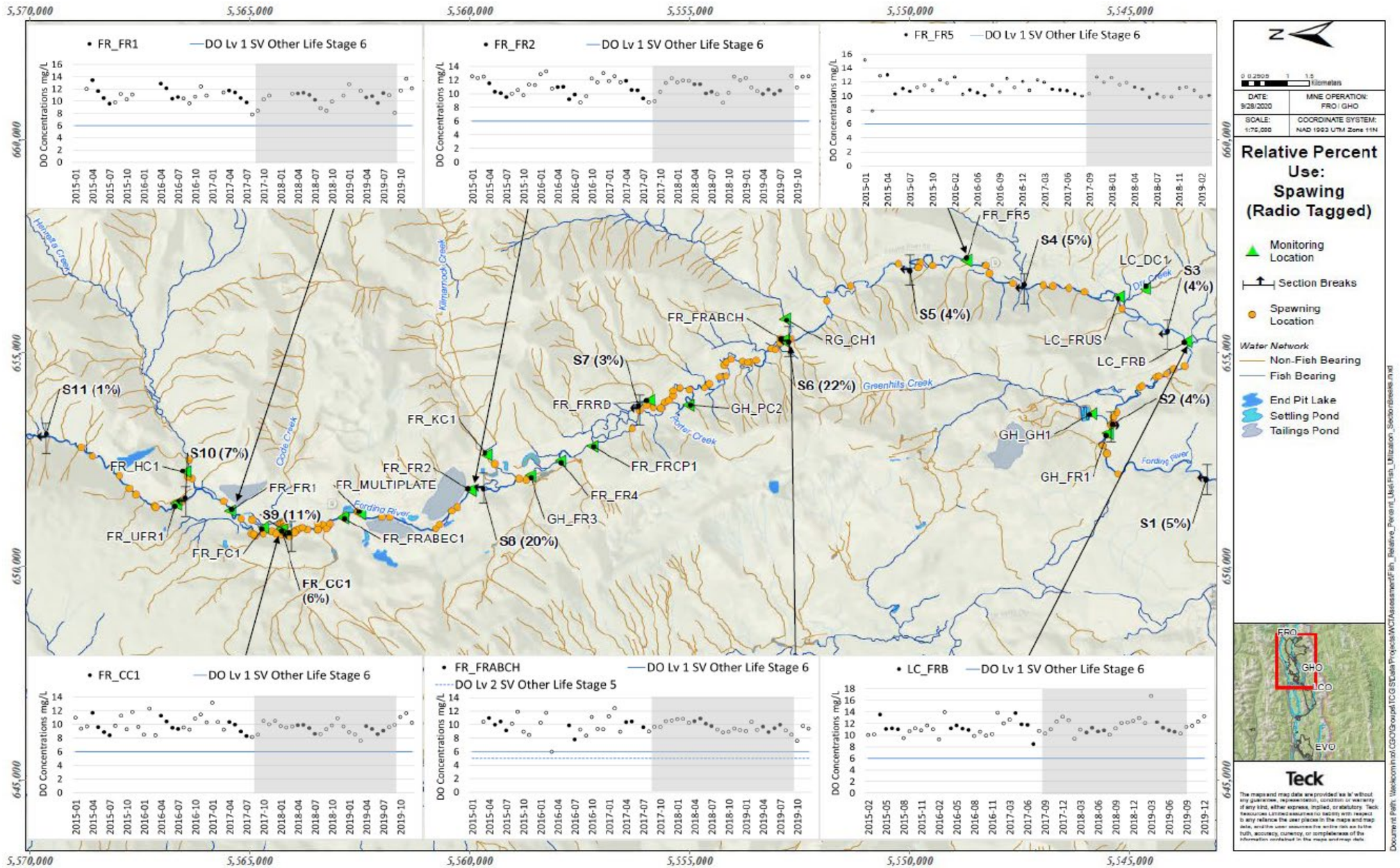
Notes: u/s = upstream; d/s = downstream; L1 = level 1; L2 = level 2; L3 = level 3.
Concentrations are in milligrams per litre nitrogen (mg/L as N). Concentrations are compared to the level 1, level 2, and level 3 screening values (see Section 3.2.5.1.1 for details). For rows (subunits) without a water quality station, concentrations are shown in grey; these are assumed to be equal to the highest concentration measured at adjacent stations.
FR_FR5 is located in S5; relative fish use is shown for S4 and S5 combined.
Years shaded grey indicate one or more samples collected in this year and season could be between September 2017 and September 2019.
Blank cells indicate no samples were collected for corresponding station and year/season.
Screening: shading indicates below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Area-weighted summary: transient shading used to shade from 0% (no color) to 100% (blue).

Figure 38: Dissolved oxygen concentrations for locations with high adult fish use in winter (other life stages)



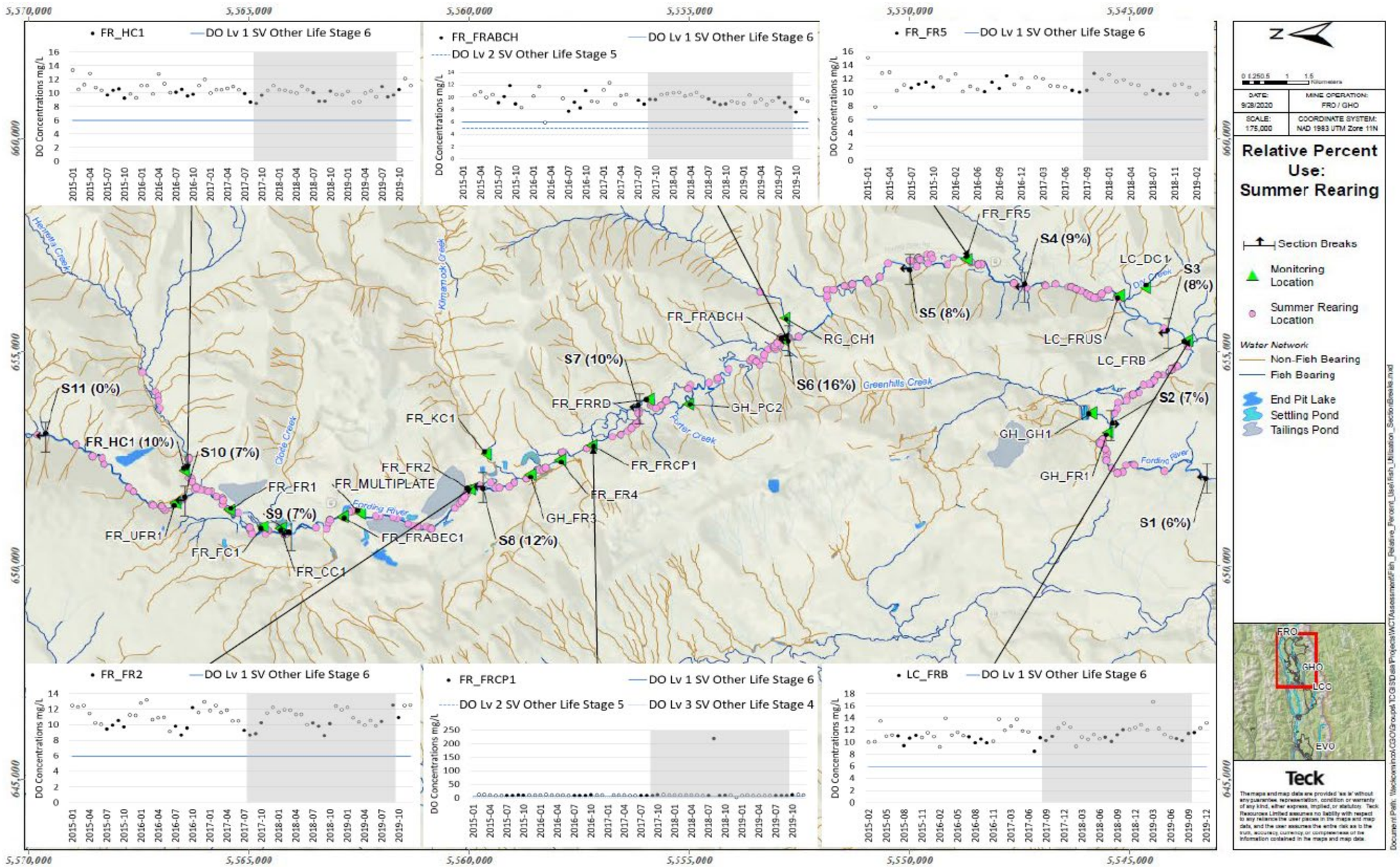
Note: Concentrations are in milligrams per litre (mg/L). Concentrations are compared to screening values for dissolved oxygen (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 39: Dissolved oxygen concentrations for locations with high adult fish use in spring (other life stages)



Note: Concentrations are in milligrams per litre (mg/L). Concentrations are compared to screening values for dissolved oxygen (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

Figure 40: Dissolved oxygen concentrations for locations with high adult fish use in summer-fall (other life stages)



Note: Concentrations are in milligrams per litre (mg/L). Concentrations are compared to screening values for dissolved oxygen (see Section 3.2.5.1.1 for details). Grey shading shows the decline window (September 2017 and September 2019). On time-series plots, filled symbols indicate samples collected in the same season as shown on the fish distribution map. Time-series plots show monthly average concentrations, with seasons defined as October to March for winter, April to July for spring, and July to October for summer-fall (i.e., slightly different than the tabular summaries).

3.3.2.8 Chronic Toxicity Testing

Mean results for chronic toxicity tests conducted between 2015 and 2019, which were obtained from Golder (2020b), are plotted in Figure 41 (rainbow trout) and Figure 42 (fathead minnow). These toxicity tests were conducted using water collected from reference and mine-exposed stations in the Fording River and other reference stations in the Elk Valley. Thus, responses in these tests directly measure the potential combined effects of all constituents present in surface water. As described in Golder (2020b), figures are interpreted as follows:

- Response are control normalized.[38] The objective of control normalization is to use control responses to reduce or eliminate variation in test organism performance among test batches, such that the ability to detect a true toxicological response between test site waters and reference waters is improved.
- Symbol color corresponds to an individual test site or reference location. Reference waters upstream of mine influence were tested alongside mine-affected stations to provide an indication of typical performance in site waters under non mine-influenced conditions.
- Symbol type corresponds to the response category (circle = no; diamond = possible; triangle = likely). Categories were designated in each reporting year. The approach to designate responses as no, possible, or likely has evolved over the program, but more recent years have relied on the following interpretation:
  - A test was considered to reflect **no adverse response** if the mean result was:
    - not significantly lower than any reference in the quarter (per statistical comparisons in laboratory reports) or
    - significantly lower than one or more references in the quarter but within the local normal range of reference responses (local NR) and effect size was less than 20%
  - A test was considered to reflect a **possible adverse response** if the mean result was significantly lower than one or more references in the quarter, but was:
    - within the local NR and the effect size was between 20% and 50% or
    - below the local NR but within the regional range of reference responses (regional NR)

    Tests in this category were considered to have uncertainty regarding whether the result represents an adverse response to toxicants in the test water or rather reflects variance in test organism performance related to background water quality.
  - A test was considered to reflect a **likely adverse response** if the mean endpoint result was significantly lower than one or more references in the quarter and:
    - within the local NR but the effect size was greater than 50% or
    - below the regional NR

[38] $control\ normalized\ response = \left(\frac{site\ water\ response}{laboratory\ control\ response}\right) \times 100$

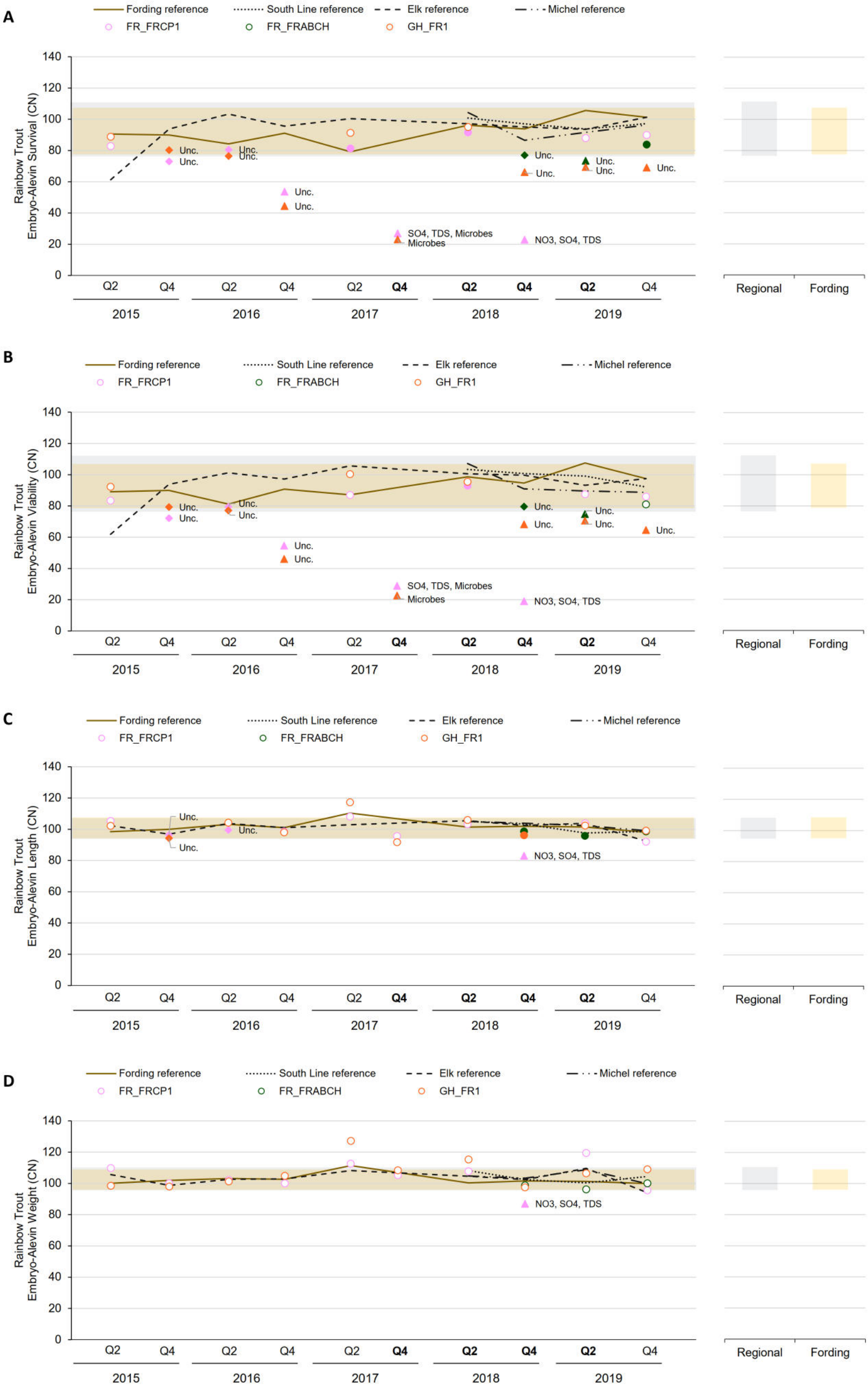
- Open symbols indicate test sites with a mean response statistically equivalent to all references tested in that batch. Filled symbols indicate test sites with a mean response significantly lower than one or more references tested in that batch. A test response significantly lower than one or more reference waters supports the interpretation of a potential effect of mine-related water quality.
- Local and regional NRs are provided on the plot to illustrate the range of responses in reference waters. Test responses within the NRs are interpreted to be within the range of typical performance in site waters under non mine-influenced conditions. The objective of these ranges is to capture potential effects of background water quality on test organism performance, such that the ability to detect a true toxicological response between test site waters and reference waters is improved.

As discussed in Section 3.2.3.3, each annual interpretive report for the chronic toxicity monitoring program includes a causation assessment that uses multiple lines of evidence to identify potential causes of adverse responses, including screening against generic WQGs and graphical analysis of responses versus water quality constituents. Concentration-response plots are provided for lithium, nitrate, sulphate, and TDS in Figure 43 (rainbow trout survival) and Figure 44 (fathead minnow survival).

Aside from water quality constituents contributing to adverse responses, microbial or fungal growth has also been identified as a common cause of adverse responses in fish tests (Section 3.2.3.3). In the results discussed below, potential microbial interferences are noted if they were documented in the laboratory report. Understanding of how to interpret evidence of microbial effects continues to evolve through the ongoing testing programs and integrated evaluations conducted by Teck Coal for annual reporting. Sporadic microbial observations noted in some historical laboratory reports are now being re-evaluated to further understand the role of microbes in more tests than had previously been linked to potential microbial artefacts. Thus, although the fish tests are a useful line of evidence for evaluating effects of a mixture of water quality constituents, chronic toxicity testing results should be reviewed in consideration of this potential confounding factor.

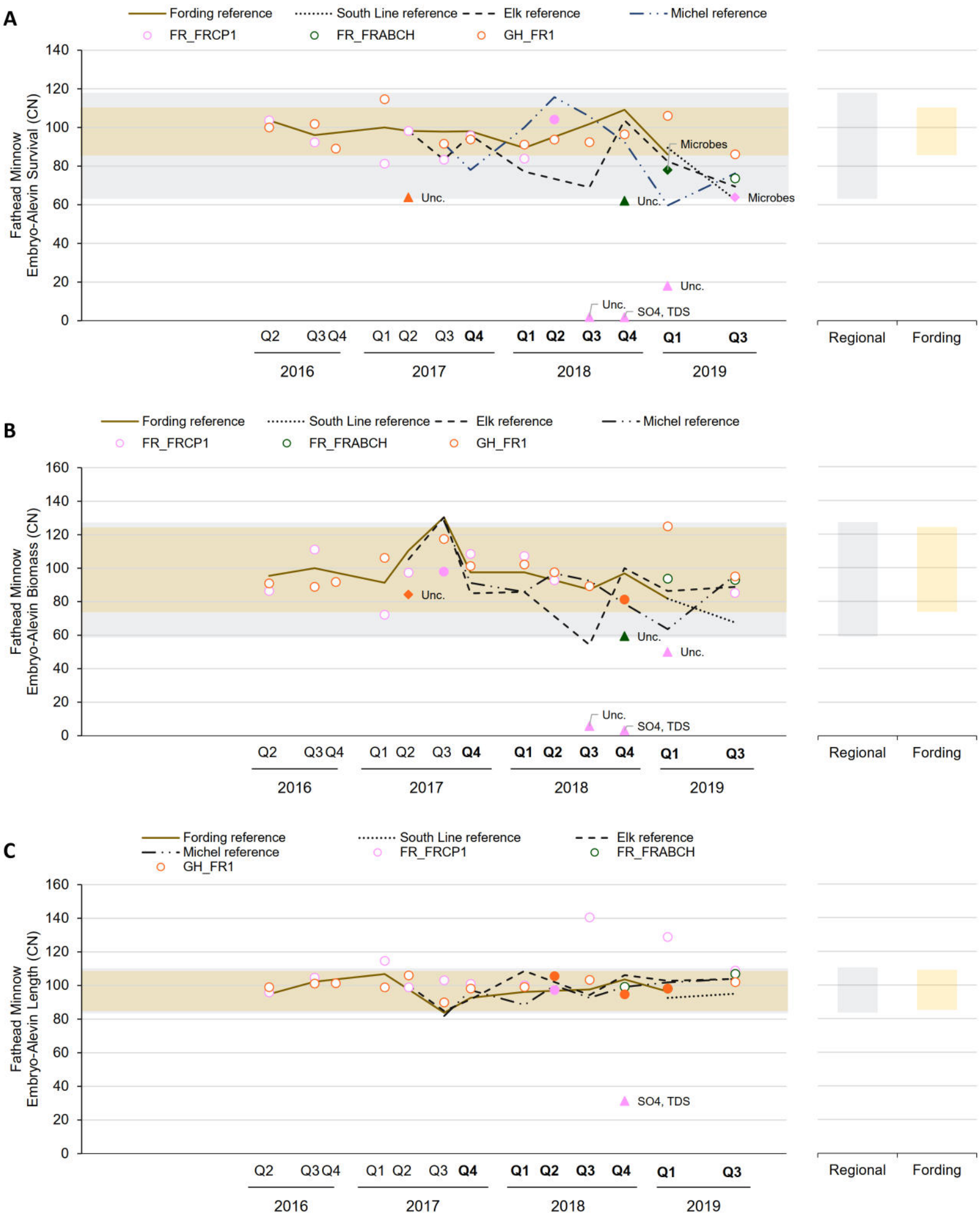
The sections below summarize fish testing results for three mainstem Fording River stations (FR_FRCP1, FR_FRABCH, GH_FR1) that are included in the chronic toxicity monitoring program. These stations, as well as the reference station FR_UFR1, generally reflect the range of water quality conditions in the mainstem Fording River and are located in river segments that contain a considerable proportion of adult WCT in winter (54%), spring (37%), and summer-fall (39%), as well as observed redds in spring (50%). Eight testing events occurred in the decline window (Q4 2017, Q1 to Q4 2018, and Q1 to Q3 2019). Following the station-by-station results, a summary is provided that evaluates whether the requisite conditions were met to contribute to or cause the WCT decline.

Figure 41: Control-normalized (CN) mean results for embryo-alevin rainbow trout survival (A), viability (B), length (C), and weight (D) in Elk Valley reference waters and Fording River test site waters. Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



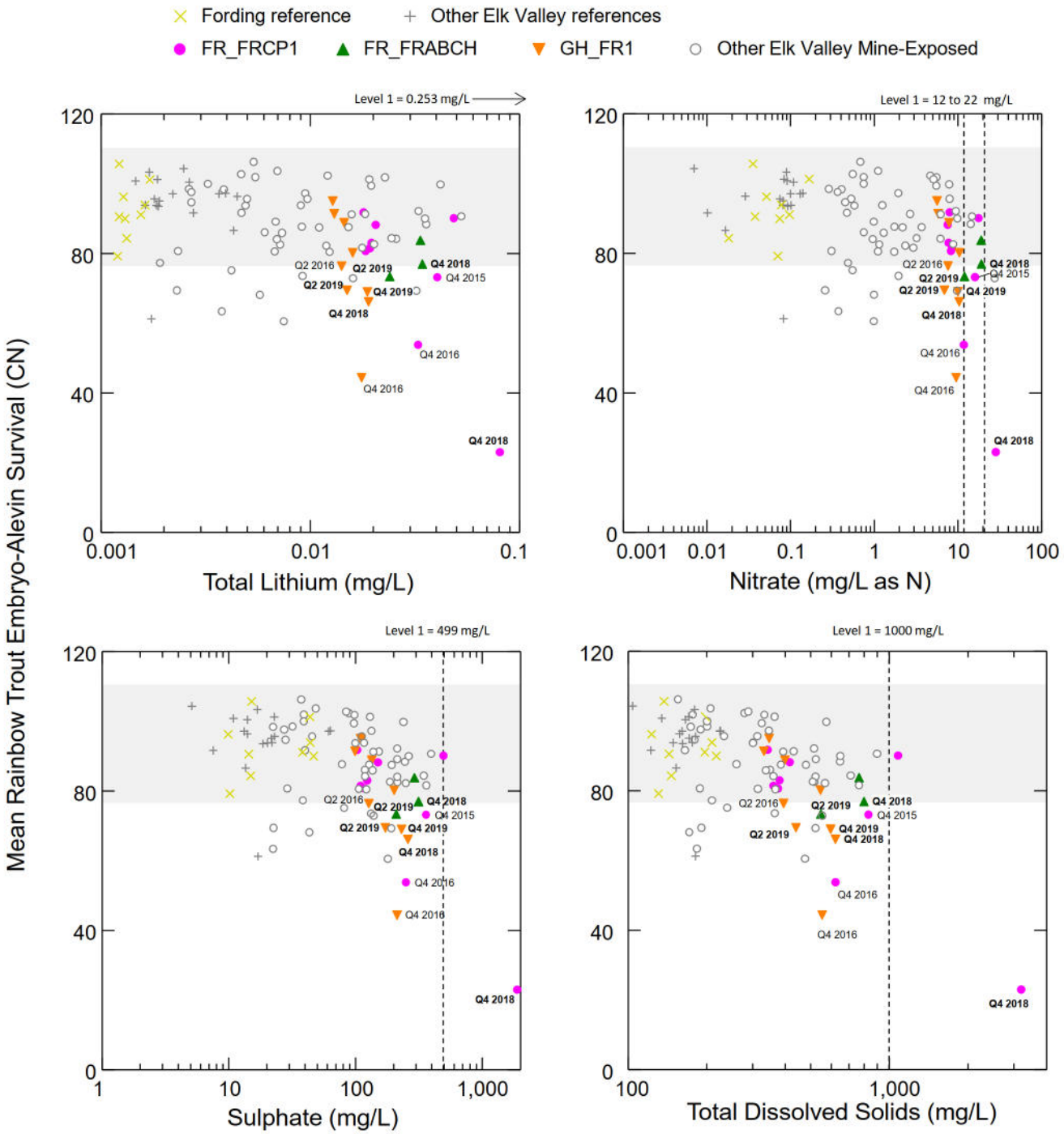
Note: See Appendix A for description of lines and symbols. Survival is calculated as (# alive at the end of the test/ # exposed). Viability is calculated as (# normally developed/ # exposed), which is the same as ((# Mortalities) + (# Abnormal))/(# exposed). Tests categorized as possible (diamond) or likely (triangle) adverse responses are annotated with potential causes of toxicity, if identified. Unc. = cause of toxicity is uncertain; no water quality constituent was identified in the annual chronic toxicity monitoring report. Quarterly tests that occurred in the decline window are bolded.

Figure 42: Mean results for fathead minnow survival (A), biomass (B), and length (C) in the Fording River reference and test site waters. Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



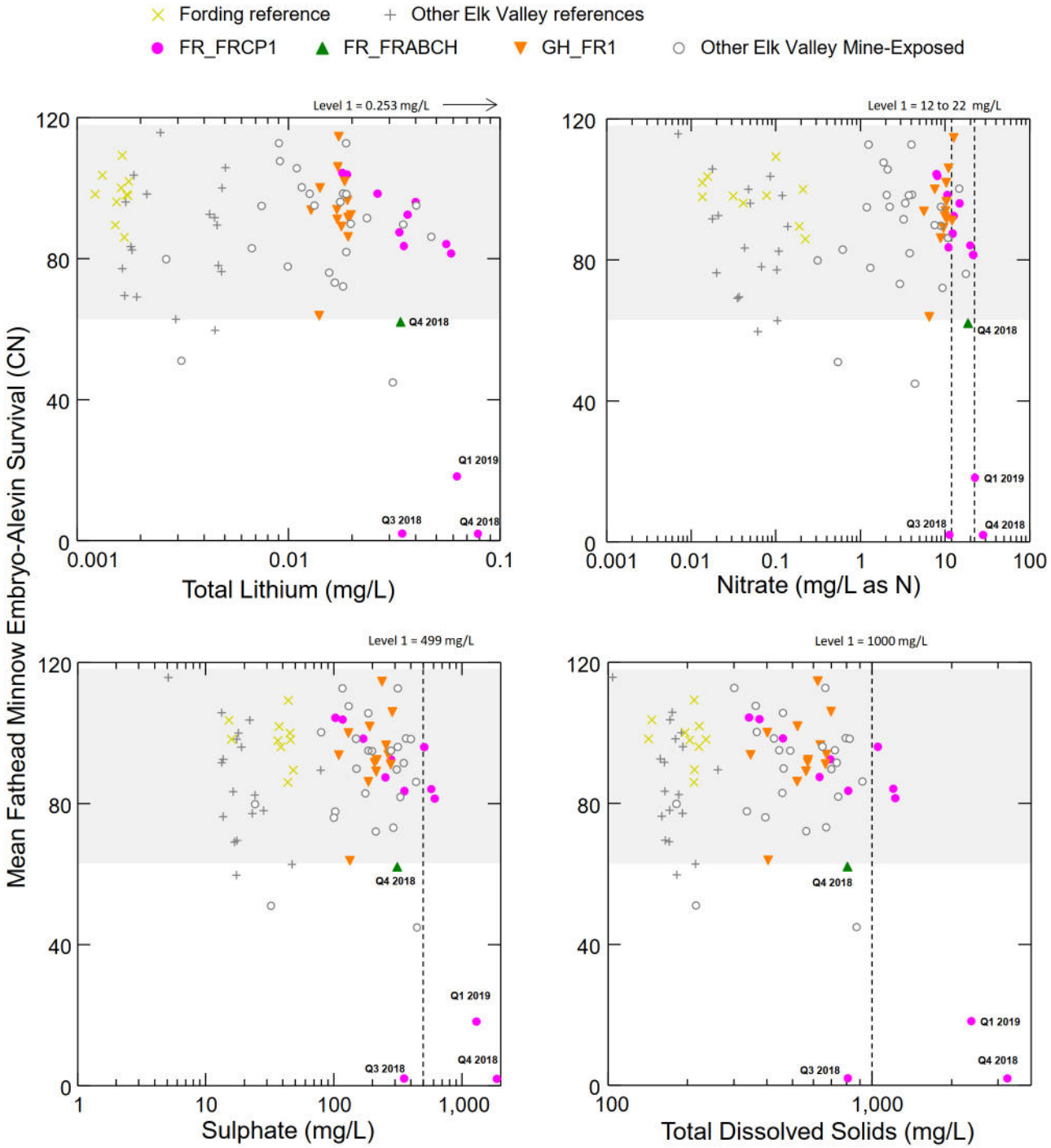
Note: See Appendix A for a description of lines and symbols. Tests were conducted in 2015 but not plotted because the laboratory noted effects in reference and mine-exposed waters were attributed to microbes or fungi. Such effects have been termed sporadic mortality phenomenon. Tests categorized as possible (diamond) or likely (triangle) adverse responses are annotated with potential causes of toxicity, if identified. Unc. = cause of toxicity is uncertain; no water quality constituent was identified in the annual chronic toxicity monitoring report. Quarterly tests that occurred in the decline window are bolded.

Figure 43: Control-normalized (CN) mean results for embryo-alevin rainbow trout survival versus lithium (top left), nitrate (top right), sulphate (bottom left), and total dissolved solids (bottom right).



Note: Data were obtained from Golder (2020b). Grey shading shows the regional normal range of responses in reference waters. Vertical dashed lines show the level 1 screening value from Appendix C; two lines are shown for nitrate to reflect the range of hardness-dependent level 1 values for the range of hardness observed in Fording River tests. Tests with mine-exposed Fording River water (filled symbols) are labelled with sampling event for tests with mean survival below the regional normal range of reference responses; those tests that occurred in the decline window are bolded. Tests with microbial interferences identified by the laboratory are not shown on these plots to avoid obscuring potential relationships with the plotted constituent.

Figure 44: Control-normalized (CN) mean results for embryo-alevin fathead minnow survival versus lithium (top left), nitrate (top right), sulphate (bottom left), and total dissolved solids (bottom right).



Note: Data were obtained from Golder (2020b). Grey shading shows the regional normal range of responses in reference waters. Vertical dashed lines show the level 1 screening value from Appendix C; two lines are shown for nitrate to reflect the range of hardness-dependent level 1 values for the range of hardness observed in Fording River tests. Tests with mine-exposed Fording River water (filled symbols) are labelled with sampling event for tests with mean survival below the regional normal range of reference responses; those tests that occurred in the decline window are bolded. Tests with microbial interferences identified by the laboratory are not shown on these plots to avoid obscuring potential relationships with the plotted constituent.

FR_FRCP1

Results for FR_FRCP1 are discussed by species in the following bullets.

- **Rainbow trout**—Mean responses in the decline window were within the local and/or regional NRs, except for Q4 2017 (embryo-larval survival and viability) and Q4 2018 (survival, viability, length, weight). These results indicate that most rainbow trout responses in the decline window were within the typical range observed in reference waters collected from the Elk Valley. For the noted exceptions, the magnitude of effect in the decline window was higher than observed previously. The most notable difference was observed for embryo-larval survival; specifically, percent effect for embryo-larval survival was 50% in Q4 2017 and 75% in Q4 2018, which are higher than measured prior to the decline window (-9% to 43%).

  As discussed in Section 3.2.3.3, each annual interpretive report for the chronic toxicity monitoring program includes a causation assessment that uses multiple lines of evidence (including screening against generic WQGs and EVWQP benchmarks) to identify potential causes of adverse responses. Sulphate, TDS, and microbes were identified as potentially contributing to the observed response in Q4 2017. In Q4 2018, the strongest evidence for causation was identified for sulphate and TDS, although nitrate may also have contributed to the responses.

- **Fathead minnow**—Mean responses in the decline window were within the local and/or regional NRs, except for Q3 2018 (survival, biomass), Q4 2018 (survival, biomass, length), and Q1 2019 (survival, biomass). These results indicate that most fathead minnow responses in the decline window were within the typical range observed in reference waters collected from the Elk Valley. For the noted exceptions, the magnitude of effect in the decline window was higher than observed previously. The most notable difference was observed for embryo-larval survival; specifically, percent effect for embryo-larval survival was 98% in Q3 and Q4 2018 and 77% in Q1 2019, which are higher than measured prior to the decline window (0% to 19%).

  Sulphate and TDS were identified as contributing to the observed response in Q4 2018. In Q1 2019, sulphate and TDS could not be ruled out as contributors because relevant toxicity testing data were not available for the same fathead minnow test duration (Golder 2020b); thus, although the cause of toxicity is uncertain for this test, the strongest potential for causation was identified for sulphate and TDS. In Q3 2018, no water quality constituent was identified as a potential cause of the observed responses; concentrations of all constituents were equal to or lower than concentrations in reference waters and/or test site waters with no adverse response and/or were lower than long-term BC WQGs (Golder 2019).

FR_FRABCH

This station, which is approximately 5 km downstream of FR_FRCP1, is not a Permit 107517 location but was added to the chronic toxicity monitoring program in Q4 2018 to better represent mixed Fording River water quality, capture more completely constituent loadings from upstream mining, and reduce the confounding influence of Cataract Creek during winter subsurface flow conditions at FR_FRCP1. Results for FR_FRABCH are discussed by species in the following bullets.

- **Rainbow trout**—Mean responses in the decline window were within the local and/or regional NRs, except for Q4 2018 (survival) and Q2 2019 (survival and viability). These results indicate that most rainbow trout responses in the decline window were within the typical range observed in reference waters collected from the Elk Valley. FR_FRABCH was added to the program in the decline window (Q4 2018), so a comparison to pre-September 2017 conditions could not be conducted using the same station. However, when compared to responses observed prior to the decline window at FR_FRCP1 (upstream of FR_FRABCH) and GH_FR1

(downstream of FR_FRABCH), the magnitude of effect at FR_FRABCH in the decline window was within the range observed prior to the decline window. For embryo-larval survival, the percent effect in Q4 2018 (17%) and Q2 2019 (24%) was within the range observed prior to the decline window at FR_FRCP1 (-9.1 to 43%) and GH_FR1 (-17% to 52%). Results were similar for viability: percent effect in Q2 2019 (23%) was within the ranged observed prior to the decline window at FR_FRCP1 (-11 to 42%) and GH_FR1 (-22% to 51%).

In Q2 2019, no water quality constituent was identified as a potential cause of the observed responses. Concentrations of all constituents were equal to or lower than concentrations in reference waters and/or test site waters with no adverse response, and/or were lower than long-term BC WQGs (Golder 2020b). In Q4 2018, no water quality constituent was identified as a potential cause of the observed response in this test. Concentrations of nitrate, selenium, TDS, and several components related to TDS (e.g., calcium) were higher in this test than reference waters and test site waters with no adverse response, but comparisons to site-specific toxicity benchmarks did not support a conclusion of causation.

- **Fathead minnow**—Mean responses in the decline window were within the local and/or regional NRs, except for survival and biomass in Q4 2018. These results indicate that most fathead minnow responses in the decline window were within the typical range observed in reference waters collected from the Elk Valley. FR_FRABCH was added to the program in the decline window (Q4 2018), so a comparison to pre-September 2017 conditions could not be conducted using the same station. However, when compared to responses observed prior to the decline window at FR_FRCP1 (upstream of FR_FRABCH) and GH_FR1 (downstream of FR_FRABCH), the magnitude of effect at FR_FRABCH in the decline window was higher than the range observed prior to the decline window. For embryo-larval survival, the percent effect in Q4 2018 (39%) was higher than observed prior to the decline window at FR_FRCP1 (0 to 19%) and slightly above the range observed at GH_FR1 (-15% to 35%). For biomass, percent effect in the Q4 2018 FR_FRABCH test (35%) was higher than observed prior to the decline window at FR_FRCP1 (-11 to 25%) and GH_FR1 (-16% to 22%).

  In Q4 2018, no water quality constituent was identified as a potential cause of the observed responses; concentrations of all constituents were equal to or lower than concentrations in reference waters and/or test site waters with no adverse response, and/or were lower than long-term BC WQGs (Golder 2019).

  The embryo-larval survival endpoint in Q4 2018 had inconsistency in response among replicates exposed to the same site water, with survival ranging from 33% to 80% (34% to 83% control-normalized). This inconsistency in response among replicates exposed to the same site water may suggest that the result is reflective of unusual conditions across test vessels, rather than an adverse response to the water. However, there were no unusual observations noted by the laboratory technicians that explain this inconsistency (Golder 2019). It is uncertain if this inter-replicate inconsistency reflects a test artifact or an actual adverse response to the test water.

GH_FR1

Results for GH_FR1 are discussed by species in the following bullets.

- **Rainbow trout**—Mean responses in the decline window were within the local and/or regional NRs for growth endpoints, but below in three of four tests for survival and viability. For growth endpoints, these results indicate that most rainbow trout responses in the decline window were within the typical range observed in reference waters collected from the Elk Valley. For embryo-larval survival and viability, with the exception of Q4 2017 when microbial interferences were identified, the magnitude of effect in the decline window was lower than those observed prior to the decline window. For embryo-larval survival, percent effect ranged

from 5 to 29%, which are within the range of effect sizes measured prior to the decline window (-17% to 53%). Viability results were similar: percent effect in the decline window (7 to 29%) was within the range observed previously (-22 to 51%).

As indicated above, responses observed in Q4 2017 were consistent with effects caused by microbial growth. In Q4 2018 and Q2 2019, no water quality constituent was identified as a potential cause of the observed responses; concentrations of all constituents were equal to or lower than concentrations in reference waters and/or test site waters with no adverse response, and/or were lower than long-term BC WQGs (Golder 2019, 2020b).

- **Fathead minnow**—Mean responses in the decline window were within the local and/or regional NRs for all endpoints. These results indicate that fathead minnow responses in the decline window were within the typical range observed in reference waters collected from the Elk Valley. These results are consistent with those observed prior to the decline window.

Summary

Rainbow trout early life stage tests had high magnitude responses in Q4 2016 (FR_FRCP1 and GH_FR1), Q4 2017 (FR_FRCP1 and GH_FR1), and Q4 2018 (FR_FRCP1 only). These effects were mainly attributed to sulphate and TDS, although nitrate was also identified as a potential contributor in Q4 2018. For Q4 2017, there is elevated uncertainty as to whether the response was related to water quality and/or microbial interferences, as the laboratory noted evidence of microbial effects in these tests. For the tests with no water quality constituent identified, it is uncertain whether microbes may have contributed to the response. The large magnitude responses occurred in winter when there is no pathway to early life stages of WCT (present from mid-May to August in the upper Fording River watershed), but it cannot be ruled out that these responses could have been indicative of potential effects to juveniles and adults. In spring testing when early life stages of WCT could be present, responses were comparable to reference, of lower magnitude, and/or within the range of magnitude observed prior to the decline window.

Fathead minnow early life stage tests had high magnitude responses to multiple endpoints between Q3 2018 and Q1 2019 for FR_FRCP1. The strongest evidence for causation was identified for sulphate and TDS in the Q4 2018 and Q1 2019 tests, with no water quality constituent identified for Q3 2018. It is uncertain whether microbial interferences contributed to one or more of these responses. With the exception of Q3 2018 (which was not attributed to water quality), the large magnitude responses occurred in winter; responses in spring and summer-fall testing were comparable to reference, of lower magnitude, and/or within the range of magnitude observed prior to the decline window.

For both test species, the highest magnitude responses were observed in winter testing with samples collected at FR_FRCP1. At the time of these winter tests, FR_FRCP1 is in a reach of the mainstem Fording River that is seasonally disconnected from the mainstem (i.e., there is no flow from the mainstem Fording River). Water quality in the FR_FRCP1 winter testing was dominated by unmixed mine-influenced water from Cataract Creek, which discharges into the Fording River approximately 500 m upstream of FR_FRCP1. At other mainstem stations (FR_FRABCH and GH_FR1), there were fewer and lower magnitude responses relative to FR_FRCP1, and the magnitude of those responses were within the range observed prior to the decline window.

In aggregate, chronic tests with early life stages of fathead minnow and rainbow trout indicated a potential for effects of water quality at the three mainstem Fording River stations in one or more sampling events in the decline window. Test response sizes were relatively high at FR_FRCP1 in winter when water quality primarily reflected inflows of Cataract Creek into the Fording River channel and were lower or similar to reference in spring and

summer when early life stages of WCT could be present. Because winter conditions at FR_FRCP1 are not representative of mixed Fording River conditions, these test responses in winter are expected to reflect a localized condition that is not reflective of the broader watershed. Further downstream at FR_FRABCH and GH_FR1, where water reflects fully mixed Fording River conditions, test responses were less frequent, of lower magnitude, and/or within the range of magnitudes observed prior to the decline window.

The chronic testing results support the constituent-by-constituent assessments that indicate that water quality may have contributed to but did not cause the WCT decline. Chronic testing is conducted at fewer locations and less frequently than water quality monitoring (two times per year for rainbow trout and four times per year for fathead minnow, with each test being conducted using weekly refresh samples for approximately one month) but has the advantage of considering combined effects of all constituents present in Fording River water. As discussed in Section 3.2.5.3, the interpretation of both chronic testing and the constituent-by-constituent assessments is most applicable to evaluate effects to early life stages of fish. It was necessary to assume that these data also characterize potential effects to juveniles and adults. Because juveniles and adults are often less sensitive than embryos and larvae, there is uncertainty and potentially conservatism in the assessment presented herein for potential effects to juveniles and adults.

3.3.2.9 Combined Effects of Multiple Constituents

Constituent-specific screening results presented in Section 3.3.2.1 to Section 3.3.2.7 indicate a potential for effects from multiple constituents at some locations. To support a consideration of how combined effects of multiple constituents might affect the interpretation presented herein, screening results were tabulated to show the number of constituents above guidelines and/or screening values in each season and year.

Aqueous screening results between 2012 and 2019 are summarized in Table 30 (using screening for juveniles and adults) and Table 31 (screening for early life stages). Winter results are summarized in Table 30 but not in Table 31 because early life stages are not present in winter. In both tables, aqueous selenium results for potential effects to early life stages are shown. The use of these results may overstate the potential for combined effects, given that aqueous screening indicated a more widespread potential for low-level effects and tissue selenium indicated no chronic effects in most stations and samples (invertebrates) or in all mainstem samples (WCT) collected in the decline window (see Section 3.3.2.4.2). Thus, for seasons and years with two constituents identified and one of those constituents was selenium, a discussion is provided regarding whether the tissue selenium results support the potential for combined effects of multiple constituents.

The following bullets summarize the interpretation of potential combined effects for juveniles and adults in mainstem stations, tributary stations, the area-weighted evaluation, and the relative fish use evaluation:

- **Fording River**. Concentrations in the decline window were often below WQGs and/or level 1 screening values for all constituents (e.g., LC_FRUS, LC_FRB, GH_FR1 in all seasons). When concentrations were above level 1 screening values, there was typically one constituent identified for the corresponding year and season; this occurred most frequently for selenium (e.g., FR_FR4, GH_PC2, and FR_FR5 in winter). Under these conditions, mixture interactions are interpreted to be less likely to occur. There were two stations with two or more constituents above screening values in the decline window: FR_FRCP1 in winter (2017, 2018, 2019) and summer-fall (2017, 2018) and FR_FRRD in winter 2017 and spring 2018. The constituents were selenium and sulphate/TDS (all years and stations) and dissolved oxygen (2018 at FR_FRCP1 only). These stations are located in the norther part of S6 and southern part of S7.

For FR_FRCP1 in winter 2017, the combination of constituents in the decline window, as well as the magnitude of potential effects of those constituents, were either lower than or within the range observed pre-September 2017. For the remaining 6 of 7 cases, unique combinations and/or higher magnitude potential effects were observed in the decline window relative to pre-September 2017.

Of the 7 cases, six had two constituents identified with one of those constituents being aqueous selenium (all except FR_FRCP1 in winter 2018, which had three constituents). For four of the six cases, invertebrate selenium concentrations at the corresponding station, season, and year were below the level 1 benchmark for dietary effects to juvenile fish. For FR_FRRD in winter 2017, a corresponding invertebrate selenium measurement was not available; however, all other measurements from FR_FRRD in winter (2018, 2019), spring (2019), and summer-fall (2017, 2018, 2019) were below the level 1 benchmark. Therefore, combined effects are not expected for these five cases. For the other two cases (FR_FRCP1 in winter 2017 and 2018), a potential for combined effects of multiple constituents was identified.

- **Tributaries**. At half of the tributary stations, concentrations in the decline window were below WQGs and/or below level 1 screening values for all constituents (Henretta, Chauncey, Fish Pond, and Dry creeks). At the remaining tributary stations (Clode, Kilmarnock, Swift, Porter, and lower Greenhills creeks), concentrations the decline window were often above level 1 screening values for two or more constituents. These five tributaries account for 2.3% of fish accessible tributary habitat in the upper Fording River watershed. Stations with two or more constituents above screening values in the decline window are:
  - In Clode Creek, three to five constituents were above level 1 screening values in all seasons and years in the decline window. Constituents were lithium, nitrite, nitrate, selenium, and sulphate/TDS.
  - In Kilmarnock Creek, two to three constituents were above level 1 screening values in all seasons and years in the decline window. Constituents were nitrate, selenium, and sulphate/TDS. In summer-fall 2019, combined effects are not expected because two aqueous constituents were identified (selenium and sulphate/TDS), but the invertebrate selenium concentration was below the level 1 benchmark for dietary effects.
  - In Swift Creek, two to three constituents were above level 1 screening values in all seasons and years in the decline window. Constituents were nitrite, selenium, and sulphate/TDS. Invertebrate selenium concentrations were not available in the decline window for this tributary.
  - In Porter Creek, two constituents (selenium and sulphate/TDS) were above level 1 screening values in winter 2018 and spring 2018 and 2019. Invertebrate selenium concentrations were not available in the decline window for this tributary.
  - In reach 1 of Greenhills Creek, two or three constituents (nitrite, selenium, and sulphate/TDS) were above level 1 screening values in all seasons and years in the decline window except spring 2019. Invertebrate selenium concentrations indicated a potential for dietary effects to juvenile fish.

  For 19 of 34 cases when two or more constituents were above screening values, the combination of constituents in the decline window, as well as the magnitude of potential effects of those constituents, were either lower than or within the range observed pre-September 2017. For the remaining 15 of 34 cases, unique combinations and/or higher magnitude potential effects were observed in the decline window relative to pre-September 2017 (Clode Creek [winter and spring 2018 and 2019, and summer-fall 2018, and 2019], Kilmarnock Creek [summer-fall 2017 and 2018], Swift Creek (summer-fall 2017 and 2018), Porter Creek [winter 2018 and spring 2018 and 2019], and Greenhills Creek [summer-fall 2017 and 2018]).

Table 30: Summary of Screening Results for Other Life Stages in Winter, Spring, and Summer-Fall Seasons (2012 to 2019)

Segment	WQ Station Code	Fish Habitat (ha)	Relative Fish Use (%)				Magnitude Rating																							
			Winter	Spring		Summer-Fall	Winter								Spring								Summer-Fall							
				Tagged	Redds		2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019
Mainstem Fording River																														
10	*FR_UFR1*	*7.4*	3.8%	7.7%	0.0%	7.0%	<L1	DO	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1
9	FR_FR1	2.9	3%	10%	12%	7%	<L1	<L1	<L1	<L1	<L1	<L1	NO2	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1
8	FR_FRABEC1	0.56	20%	20%	12%	12%	<L1	<L1	<L1	<L1	<L1	-	-	-	-	<L1	-	<L1	<L1	-	-	-	<L1	<L1	<L1	<L1	<L1	-	-	-
	FR_MULTIPLATE	0.89					<L1	<L1	<L1	<L1	<L1	-	<L1	<L1	-	<L1	-	<L1	<L1	-	Se	-	<L1	<L1	<L1	<L1	<L1	-	<L1	-
	FR_FR2	0.92					<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1
7	FR_FR3	2.5	2.7%	3.1%	1.3%	10%	<L1	<L1	<L1	-	<L1	-	<L1	<L1	-	<L1	-	<L1	<L1	-	<L1	-	<L1	<L1	<L1	<L1	<L1	-	<L1	<L1
	FR_FR4	0.68					Se	Se	Se	<L1	Se	Se	Se	<L1	<L1	<L1	Se	<L1	<L1	<L1	<L1	<L1	Se	<L1	<L1	<L1	<L1	Se	<L1	<L1
	FR_FRCP1	1.4					-	-	-	Se, S/T	Se, S/T	Se, S/T	Se, S/TDO	Se, S/T	-	-	-	<L1	<L1	<L1	Se	Se	-	-	-	Se	Se	Se, S/T	Se, S/T	<L1
6	FR_FRRD	2.2	40%	22%	47%	16%	-	-	Se	Se	Se	Se, S/T	Se	Se	-	-	-	<L1	<L1	<L1	Se, S/T	Se	-	-	-	Se	<L1	Se	Se	Se
	GH_PC2	1.9					Se	Se, DO	Se	Se	-	-	Se	Se	Se	Se	Se	Se	-	-	<L1	Se	Se	Se	Se	Se	-	-	Se	-
	FR_FRABCH	1.9					-	-	-	Se	Se, DO	Se	Se	Se	-	<L1	-	<L1	<L1	<L1	Se	Se	-	-	-	Se	Se	Se	Se	<L1
5	FR_FR5	11	4.9%	9.2%	5.8%	17%	<L1	Se	Se	<L1	<L1	Se	Se	Se	<L1	Se	Se	<L1	<L1	<L1	Se	Se	<L1	<L1	-	<L1	<L1	<L1	<L1	-
3	LC_FRUS	4.9	2.3%	3.8%	0.6%	7.7%	-	DO	<L1	<L1	-	-	-	-	-	-	<L1	<L1	-	-	-	<WQG	-	-	<L1	<L1	-	<L1	<L1	<L1
2	LC_FRB	8.9	4.2%	9.2%	9.1%	7.3%	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1
1	GH_FR1	2.5	7.6%	4.6%	1.3%	6.2%	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1
Tributaries																														
9	*FR_HC3*	*1.7*	0.0%	0.0%	0.0%	0.0%	<L1	<L1	DO	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	-	<L1	<L1	<L1	<L1	<L1
6	*RG_CH1*	*0.4*	0.0%	0.0%	0.0%	0.3%	<L1	DO	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1
9	FR_HC1	3.0	12%	3.1%	1.3%	9.7%	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1
	FR_FC1	0.29	0.0%	0.8%	1.3%	0.0%	<L1	<L1	-	<L1	<L1	<L1	<L1	-	<L1	<L1	<L1	-	<L1	<L1	-	-	<L1	<L1	<L1	-	<L1	<L1	-	-
	FR_CC1	0.3	0.0%	6.2%	1.3%	0.0%	NO2, Se	NO2, Se	NO2, Se	Li, NO2, NO3, Se, S/T	Li, NO3, Se, S/T	Li, NO3, Se, S/T	NO2, NO3, Se, S/T	Li, NO3, Se, S/T	NO2, Se	NO2, Se, S/T	NO2, Se, S/T	NO2, Se	NO2, NO3, Se, S/T	Li, NO2, NO3, Se, S/T	Li, NO3, Se, S/T	Li, NO2, NO3, Se, S/T	NO2, Se	NO2, Se	NO2, Se	NO2, Se	NO2, NO3, Se, S/T	NO2, NO3, Se, S/T	NO3, Se, S/T	NO2, NO3, Se, S/T
7	FR_KC1	0.086	0.0%	0.8%	0.0%	0.0%	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO2, NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	Se, S/T	Se, S/T	Se, S/T	NO3, Se, S/T	NO3, Se, S/T	Se, S/T
	GH_SC1-2	0.06	0.0%	0.0%	0.0%	0.0%	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	Se, S/T	Se, S/T	Se, S/T	Se, S/T	Se, S/T	NO3, Se, S/T	Se, S/T	NO3, Se, S/T	Se, S/T	NO2, Se, S/T	NO2, Se, S/T	Se, S/T	NO2, Se, S/T	NO3, Se, S/T	Se, S/T	Se, S/T	Se, S/T	Se, S/T	NO2, Se, S/T	NO2, Se, S/T	Se, S/T
6	GH_PC1	0.15	0.0%	0.0%	0.0%	0.0%	Se	Se	Se	Se	<L1	Se	Se, S/T	Se	Se	Se	Se	Se	Se	Se	Se, S/T	Se, S/T	Se	Se	Se, DO	<L1	Se	Se	Se	Se
3	LC_DC1	0.2	0.0%	0.0%	5.8%	0.0%	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1
2	GH_GH1	0.23	0.0%	0.0%	0.6%	0.0%	Se, S/T	Se, S/T	Se, S/T	Se, S/T	Se, S/T	Se, S/T	Se, S/T	Se, S/T	Se	Se,	Se, S/T	Se, S/T	Se, S/T	NO2, Se, S/T	Se, S/T	Se	Se, S/T	Se, S/T	Se, S/T	Se, S/T	Se, S/T	NO2, Se, S/T	NO2, Se, S/T	Se, S/T

Notes: u/s = upstream; d/s = downstream; Li = lithium; NO2 = nitrite; NO3 = nitrate; Se = selenium; S/T = sulphate and TDS; DO = dissolved oxygen. <= less than; >= greater than.
Constituent-specific screening results are provided in Section 3.3.1.1 to Section 3.3.2.7.
FR_FR5 is located in S5; relative fish use is shown for S4 and S5 combined.
Years shaded grey indicate more samples collected in this year and season could be between September 2017 and September 2019.
Blank cells indicate no samples were collected for corresponding station and year/season.
Stations in italics indicate reference locations.
Transient shading used to shade from 0 constituents above WQG (no color) to all constituents above level 1 screening value (blue).

The following bullets summarize the potential for combined effects when early life stages of WCT could be present f mainstem stations, tributary stations, the area-weighted evaluation, and the relative fish use evaluation.

- **Fording River**. Concentrations in the decline window were often below level 1 screening values for all constituents (e.g., FR_UFR1, LC_FRUS, LC_FRB in all seasons). When concentrations were above level 1 screening values, there was often one constituent identified for the corresponding year and season; this occurred most frequently for selenium in the spring (e.g., FR_FRCP1 and FR_FR5) and dissolved oxygen in the summer-fall (e.g., FR_FR1 and FR_FR2). Under these conditions, mixture interactions are interpreted to be less likely to occur. Stations with two or more constituents above screening values in the decline window are:
  - In spring, two or more constituents were above level 1 screening values at FR_MULTIPLATE (nitrate and selenium in 2018), FR_FRRD (nitrate, selenium, and sulphate/TDS in 2018), GH_PC2 (nitrate and selenium in 2019), and FR_FRABCH (nitrate and selenium in 2018 and selenium and dissolved oxygen in 2019). These stations are located in S6, S7, and S8.
  - In summer-fall, two or more constituents were above level 1 screening values at FR_FR4 (selenium and dissolved oxygen in 2017), FR_FRCP1 (selenium and sulphate/TDS in 2017 and nitrate, selenium, and sulphate/TDS in 2018), FR_FRRD (nitrate and selenium in 2017 and selenium and dissolved oxygen in 2018), GH_PC2 (selenium and dissolved oxygen in 2018), and FR_FRABCH (nitrate, selenium, and dissolved oxygen in 2017 and selenium and dissolved oxygen in 2018). These stations are located in S6 and S7.

  For 4 of 13 cases when two or more constituents were above screening values, the combination of constituents in the decline window, as well as the magnitude of potential effects of those constituents, were either lower than or within the range observed pre-September 2017. For the remaining 9 of 13 cases, unique combinations and/or higher magnitude of effects were observed in the decline window (FR_MULTIPLATE [spring 2018), FR_FR4 [summer-fall 2017], FR_FRCP1 [summer-fall 2017 and 2018], FR_FRRD [spring 2018 and summer-fall 2017], FR_FRABCH [spring 2018 and 2019 and summer-fall 2017]).

  Of the 13 cases, 10 cases had two constituents identified and 3 cases had three constituents identified. In all 13 cases, aqueous selenium was one of the constituents identified. WCT tissue selenium at mainstem stations indicated no chronic effects to fish in samples collected from S6 and S8 (Section 3.3.2.4.2). Thus, for the 11 cases with two constituents identified (one of which was aqueous selenium), the potential for combined effects was considered to be negligible. For FR_FRRD in spring 2018, nitrate concentrations were below the level 1 benchmark when early life stages could be present (see Section 3.3.2.3); therefore, the potential for combined effects was considered to be negligible at FR_FRRD in spring 2018 because only one constituent (TDS) was retained. For the remaining cases (FR_FRCP1 in summer-fall 2018, and FR_FRABCH in summer-fall 2017), potential combined effects could not be ruled out.

- **Tributaries**. Concentrations in the decline window were below level 1 screening values for most constituents and seasons at Henretta (reference reach), Chauncey (reference), Fish Pond, and Dry creeks. At the other tributary stations (Clode, Kilmarnock, Swift, Porter, and Greenhills creeks), concentrations in the decline window were often above level 1 screening values for of two or more constituents. These tributaries account of 2.3% of the fish accessible tributary habitat in the upper Fording River watershed. Stations with two or more constituents above screening values in the decline window are:
  - In Clode Creek, four to six constituents were above level 1 screening values in all seasons and years in the decline window. Constituents were lithium, nitrite, nitrate, selenium, sulphate/TDS, and dissolved oxygen.
  - In Kilmarnock Creek, two to three constituents were above level 1 screening values in all seasons and years in the decline window. Constituents were nitrate, selenium, and sulphate/TDS.
  - In Swift Creek, three to four constituents were above level 1 screening values in all seasons and years in the decline window. Constituents were nitrate, nitrite, selenium, sulphate/TDS, and dissolved oxygen.
  - In Porter Creek, two or more constituents were above level 1 screening values in spring 2018 and 2019 (selenium and sulphate/TDS).
  - In Greenhills Creek, three to four constituents were above level 1 screening values in all seasons and years in the decline window. Constituents were nitrite, selenium, sulphate/TDS, and dissolved oxygen.

  For 7 of 22 cases when two or more constituents were above screening values, the combination of constituents in the decline window, as well as the magnitude of potential effects of those constituents, were either lower than or within the range observed pre-September 2017. For the remaining 15 of 22 cases, unique combinations and/or higher magnitude potential effects were observed in the decline window relative to pre-September 2017 (Clode Creek [all five combinations of seasons and years], Kilmarnock Creek [summer-fall 2017 and 2018], Porter Creek [spring 2018 and 2019], Swift Creek [all five combinations of seasons and years except spring 2018], and Greenhills Creek [summer-fall 2017 and 2018]).

Table 31: Summary of Screening Result for Early Life Stages in Spring and Summer-Fall Seasons (2012 to 2019)

Segment	WQ Station Code	Fish Habitat (ha)	Relative Fish Use (%)				Spring								Summer-Fall							
			Winter	Spring		Summer-Fall	2012	2013	2014	2015	2016	2017	2018	2019	2012	2013	2014	2015	2016	2017	2018	2019
				Tagged	Redds																	
Mainstem Fording River																						
10	*FR_UFR1*	*5.9*	3.8%	7.7%	0.0%	7.0%	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	DO	<L1	<L1	<L1	<L1	<L1
9	FR_FR1	2.1	3%	10%	12%	7%	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	DO	DO	DO
8	FR_FRABEC1	2.1	20%	20%	12%	12%	-	<L1	-	DO	<L1	-	-	-	<L1	<L1	<L1	<L1	<L1	-	-	-
	FR_MULTIPLATE	2.1					-	<L1	-	DO	DO	-	NO3, Se	-	<L1	<L1	<L1	<L1	<L1	-	DO	-
	FR_FR2	2.1					<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	DO	DO	DO	<L1
7	FR-FR3	2.1	2.7%	3.1%	1.3%	10%	-	<L1	-	DO	DO	-	<L1	-	<L1	<L1	<L1	<L1	<L1	-	DO	<L1
	FR_FR4	3.2					<L1	<L1	Se	<L1	<L1	<L1	<L1	<L1	Se	<L1	<L1	DO	<L1	Se, DO	<L1	DO
	FR_FRCP1	3.2					-	-	-	<L1	<L1	<L1	Se	Se	-	-	-	Se	Se	Se, S/T	NO3, Se, S/T	<L1
6	FR_FRRD	0.5	40%	22%	47%	16%	-	-	-	<L1	<L1	<L1	NO3, Se, S/T	Se	-	-	-	Se, DO	<L1	NO3, Se	Se, DO	Se
	GH_PC2	9.2					Se	Se, DO	NO3, Se	Se, DO	-	-	<L1	NO3, Se	Se,	NO3, Se	NO3, Se	Se, DO	-	-	Se, DO	-
	FR_FRABCH	9.2					-	<L1	-	<L1	DO	<L1	NO3, Se	Se, DO	-	-	-	Se	Se, DO	NO3, Se, DO	Se, DO	<L1
5	FR_FR5	9.2	4.9%	9.2%	5.8%	17%	<L1	Se	NO3, Se	<L1	<L1	<L1	Se	Se	<L1	<L1	-	<L1	<L1	<L1	<L1	-
3	LC_FRUS	9.2	2.3%	3.8%	0.6%	7.7%	-	-	<L1	<L1	-	-	-	<L1	-	-	<L1	<L1	-	<L1	<L1	<L1
2	LC_FRB	9.2	4.2%	9.2%	9.1%	7.3%	<L1	<L1	<L1	<L1	<L1	DO	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1
1	GH_FR1	9.1	7.6%	4.6%	1.3%	6.2%	<L1	<L1	<L1	<L1	<L1	DO	<L1	<L1	<L1	<L1	DO	DO	<L1	DO	<L1	<L1
Tributaries																						
9	*FR_HC3*	*1.9*	0.0%	0.0%	0.0%	0.0%	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	-	<L1	<L1	DO	<L1	<L1
6	*RG_CH1*	*8.3*	0.0%	0.0%	0.0%	0.3%	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1
9	FR_HC1	2.7	12%	3.1%	1.3%	9.7%	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	DO	DO	<L1
	FR_FC1	0.2	0.0%	0.8%	1.3%	0.0%	<L1	DO	<L1	-	<L1	<L1	-	-	<L1	DO	<L1	-	<L1	DO	-	-
	FR_CC1	0.1	0.0%	6.2%	1.3%	0.0%	NO2, NO3, Se, DO	NO2, NO3, Se, S/T, DO	NO2, NO3, Se, S/T, DO	NO2, NO3, Se, DO	NO2, NO3, Se, S/T	Li, NO2, NO3, Se, S/T, DO	Li, NO3, Se, S/T, DO	Li, NO2, NO3, Se, S/T, DO	NO2, NO3, Se	NO2, NO3, Se, DO	NO2, NO3, Se, DO	NO2, NO3, Se	NO2, NO3, Se, S/T	NO2, NO3, Se, S/T, DO	NO3, Se, S/T, DO	NO2, NO3, Se, S/T
7	FR_KC1	0.01	0.0%	0.8%	0.0%	0.0%	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO2, NO3, Se, S/T	NO3, Se, S/T,	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T
	GH_SC1-2	0.0072	0.0%	0.0%	0.0%	0.0%	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	Se, S/T	NO2, NO3, Se, S/T	NO2, Se, S/T	NO3, Se, S/T	NO2, Se, S/T, DO	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO3, Se, S/T	NO2, NO3, Se, S/T	NO2, Se, S/T	NO3, Se, S/T, DO
6	GH_PC1	0.3	0.0%	0.0%	0.0%	0.0%	Se	Se	Se	Se	Se	Se	Se, S/T	Se, S/T	Se, DO	Se	Se, DO	<L1	Se	Se	Se	Se
3	LC_DC1	4.2	0.0%	0.0%	5.8%	0.0%	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1	<L1
2	GH_GH1	0.9	0.0%	0.0%	0.6%	0.0%	Se, DO	Se, DO	Se, S/T, DO	Se, S/T, DO	Se, S/T, DO	NO2, Se, S/T, DO	Se, S/T, DO	Se, DO	Se, S/T, DO	Se, S/T, DO	Se, S/T, DO	Se, S/T, DO	Se, S/T, DO	NO2, Se, S/T, DO	NO2, Se, S/T, DO	Se, S/T, DO

Notes: u/s = upstream; d/s = downstream; Li = lithium; NO2 = nitrite; NO3 = nitrate; Se = selenium; S/T = sulphate and TDS; DO = dissolved oxygen. <= less than; >= greater than.
Constituent-specific screening results are provided in Section 3.3.1.1 to Section 3.3.2.7.
FR_FR5 is located in S5; relative fish use is shown for S4 and S5 combined.
Years shaded grey indicate more samples collected in this year and season could be between September 2017 and September 2019.
Blank cells indicate no samples were collected for corresponding station and year/season.
Transient shading used to shade from 0 constituents above WQG (no color) to all constituents above level 1 screening value (blue).

The results described above indicate a potential for effects of multiple constituents, noting that this primarily occurred in mine-affected tributaries. In the mainstem Fording River, a potential for combined effects of multiple constituents was identified for adults and juveniles at FR_FRCP1 in winter 2017 and 2018 and for early life stages at FR_FRCP1 in summer-fall 2018 and FR_FRABCH in summer-fall 2017.

As discussed in Section 3.2.5.1.4, constituents with similar mechanisms of effect (i.e., those that affect an aquatic organism in the same way or by the same pathway) may exhibit additive or partially additive effects, such that overall toxicological effects may represent a sum or partial sum of effects associated with individual constituents. Constituents with dissimilar mechanisms of effect are more likely to exhibit independent effects. Synergistic effects (i.e., toxicological effects greater than the sum of effects associated with individual constituents) and antagonistic effects (i.e., toxicological effects less than the effects associated with individual constituents) tend to be rare (Kortenkamp et al. 2009), with the exception of the well-known antagonistic effect of hardness on the toxicity of constituents such as nitrate and sulphate.

A qualitative multiple-stressor analysis was presented in Chapter 8 of the EVWQP (Teck Coal 2014) to assess potential interactions among the four EVWQP constituents: cadmium, nitrate, selenium, and sulphate (Teck Coal 2014). Although mechanisms of action have not been definitively determined, the available information indicates that these constituents have different mechanisms of action:

- Selenium produces effects following dietary accumulation of seleno-amino acids into protein-rich tissues. Bioaccumulation models were used to calculate the water concentration at which invertebrate tissue concentrations would equal the level 1 benchmark for potential effects. As discussed by Bollinger (2021), at least three mechanisms have been proposed to explain selenium toxicity in fish: 1) selenium is substituted for sulfur in some amino acids, which alters the function of resulting enzymes and proteins; 2) increased production of reactive oxygen species (ROS) which overwhelms antioxidant capacities of the cell resulting in oxidative injury to tissues; and 3) alterations in the metabolism of glycogen and triglycerides.
- Although the specific mechanism of action is uncertain, nitrate may exhibit effects following uptake and conversion to nitrite, which can then impair oxygen transport. In the Elk Valley, nitrate is not likely to contribute meaningfully to the osmotic pressure that may be important for sulphate effects, because it is present at low concentrations relative to the total ionic content of mine-influenced water.
- Sulphate appears to act primarily on the iono-regulatory organs of freshwater organisms and may exert stress because of general osmoregulatory pressure or disruption of cellular membrane function in conjunction with other components of TDS.

Additional potential stressors in the assessment that were not included in the EVWQP are TDS, lithium, nitrite, and dissolved oxygen:

- As discussed earlier in this report, effects on fish associated with TDS are generally understood to be related to osmotic stress. The potential for elevated TDS to result in effects is dependent on the total concentration of all of the major ions contained in solution (i.e., TDS) and on their relative abundance (Weber-Scannell and Duffy 2007). The major constituents of TDS releases from coal mines are expected to be sulphate and its counter-ions (mainly calcium), which typically exhibit lower toxicity than other TDS mixtures (Mount et al. 1997; Mount et al. 2019). Therefore, potential effects from sulphate and other TDS components are not expected to be additive. Rather, the contribution of sulphate to TDS effects is inherent in the sulphate benchmarks, and the contribution of TDS to sulphate effects is inherent in the TDS screening values. Thus, these constituents were considered together in the evaluation of combined effects.

- Although the mechanism of action is uncertain, lithium may exert stress by disrupting sodium balance (Kszos et al. 2003). Kszos et al. (2003) demonstrated that increased sodium reduced lithium toxicity in fathead minnow and *C. dubia*. Similar to other metals, effects of lithium generally decrease with increasing sodium due to competition of cations for biotic ligands on fish gills.
- Elevated nitrite concentrations result in methaemoglobin, which is incapable of carrying oxygen, and so reduces the capacity of blood to transport oxygen (Kroupová et al. 2016).
- Low dissolved oxygen concentrations result in reduced oxygen loading in the blood, and so limits the amount of oxygen delivered to tissues. This has been linked to reduced growth and reduced metabolic performance (US EPA 1986). The potential role of dissolved oxygen in exacerbating other forms of physiological stress is evaluated in Bollinger (2021).

The information above indicates that some constituents assessed herein have distinct mechanisms of action. For dissolved oxygen, there is a potential for enhancement of effects of the above constituents during exposure to lowered oxygen concentrations. As summarized in BC MOE (1997) and discussed by Bollinger (2021), when exposed to low oxygen, fish increase respiration which is expected to increase uptake of ions across the gills. If low dissolved oxygen concentrations coincide with elevated concentrations of other water quality stressors, then enhanced effects may occur. For cases that were unique to the decline window, this consideration applies to when buried embryo/alevin life stages may be present at FR_FR4 (summer-fall 2017), FR_FRRD (summer-fall 2017), FR_FRABCH (spring 2019 and summer-fall 2017), Clode Creek (spring 2018 and 2019 and summer-fall 2017 and 2018), Swift Creek (spring and summer-fall 2019), and Greenhills Creek (summer-fall 2017). When buried embryo/alevin life stages are absent, there was one case when this occurred: FR_FRCP1 in December 2018.

In aggregate, the screening results indicate that most stations and seasons in the decline window had concentrations that were below long-term WQGs or level 1 screening values for all constituents, or had one constituent that was above a level 1 screening value. For the remaining combinations, two or more constituents were above level 1 screening values. It is important to acknowledge that the proportion of stations and seasons with two or more constituents identified are expected to be conservative estimates, given that each season combines the worst-case screening result across several months. For example, a station with sulphate above the level 1 screening value in November 2017 and nitrate above the level 1 screening value in December 2017 would be identified as having two constituents above the level 1 screening value in winter 2017, even though these concentrations may not have co-occurred. Nevertheless, although combined effects are not expected for most locations and seasons (i.e., those that do not identify two or more constituents or for which tissue selenium does not indicate potential effects), combined effects of multiple stressors cannot be ruled out. Thus, consistent with the interpretation provided in the constituent-specific assessments, the evaluation of potential combined effects also indicates that water quality may have contributed to the WCT decline. The potential for combined effects was identified most commonly in mine-affected tributaries (all life stages), with occasional occurrences at mainstem stations for juveniles and adults (FR_FRCP1 in winter 2017 and 2018) and early life stages (FR_FRCP1 in summer-fall 2018 and FR_FRACBH in summer-fall 2017).

The majority of assessed stations and seasons had concentrations below long-term WQGs and/or level 1 screening values, or only one constituent that was identified as being above the level 1 screening value. Therefore, even in consideration of combined effects, surface water quality does not meet the requisite conditions for being the cause of the WCT decline.

3.3.3 Data Gaps and Uncertainty

Key data gaps and uncertainty are discussed below.

Data Gaps and False Negatives

It cannot be confirmed that the available dataset captured peak concentrations of all constituents. As discussed in Section 1.2, one factor that may contribute to incomplete spatiotemporal coverage is periods of ice formation in winter, when it has been speculated that a phenomenon known as *cryoconcentration* could occur under some localized conditions (Golder 2020a). Cryoconcentration is the incremental increase in water quality concentrations that can occur when pure ice forms, leaving behind dissolved constituents in a smaller volume of water. The magnitude of potential cryoconcentration is directly related to the proportion of total water volume that freezes. If cryoconcentration was a common occurrence in the Elk Valley, the resulting increased constituent concentrations would be reflected in water quality monitoring data. Healey and Hatfield (2021), which is provided in Appendix G, assessed potential effects of cryoconcentration on surface water quality and interpreted the potential effects to be negligible.

Another factor that may contribute to incomplete spatiotemporal coverage is periods of low flows, which for some locations and times were lower in the decline window than they had been previously. During low flows, there is less water available to dilute in-stream concentrations, potentially resulting in higher in-stream concentrations.

This uncertainty is partially offset by the following:

- The robustness of Teck Coal's surface water quality monitoring program, with many stations being sampled monthly and some of those months being sampled weekly. In the refined assessment, the dataset from September 2017 to September 2019 assessed herein was extensive, including 1564 discrete samples in the full dataset and 1,086 discrete samples in the refined station list (not all constituents were sampled in all sampling events). Toxicity testing was conducted as specified in Permit 107517, with chronic testing occurring quarterly or semi-annually at specified monitoring locations. Routine tissue selenium monitoring occurred in September of each year and data have also been collected in other months under special programs. The robustness of these programs is depicted on Figure 2 (surface water), Figure 3 (toxicity testing), and Figure 4 (tissue selenium), which show that the spatial and temporal distribution of available monitoring data is both extensive (occurring in many places) and intensive (occurring frequently).
- Van Geest et al. (2021) evaluated reported spills in the decline window, with no spills meeting the requisite conditions for causation or contribution[39].
- Benthic invertebrate communities, which integrate water quality over roughly an annual period, were sampled in the fall of both 2018 and 2019 in the upper Fording River and generally did not show any significant changes compared to previous years of survey (Minnow and Lotic 2020).

Nevertheless, even with this uncertainty partially offset, it cannot be ruled out that water quality conditions could have occurred between sampling locations or between sampling events that were not captured in the available dataset.

[39] As discussed in Van Geest et al. (2021), two spills to ground could not be ruled out as potential contributors because no relevant water chemistry samples were collected for these events. Evidence for contribution was interpreted to be weak given that the spills occurred in the lower end of the watershed (Greenhills Operations) and at the end of the decline window (August 2019). In addition, for one of these spills, the spill material is expected to dilute in intermediate watercourses. Thus, the role of these spills in the decline was interpreted to be negligible to minor with uncertainty dependent on the spilled material.

Benchmarks and Screening Values

The confidence in benchmarks and screening values used herein varies between EVWQP constituents (cadmium, nitrate, sulphate, selenium) and other constituents (bromide, lithium, nickel, nitrite, TDS, uranium, and dissolved oxygen). For EVWQP constituents, there is higher confidence in the benchmarks because they have been validated using additional site-specific testing since their development. For selenium, there is additional confidence gained because the benchmarks are based on effects to WCT (reproduction) or an unbounded NOEC for cutthroat trout (juvenile growth). Teck Coal has done additional work subsequent to the EVWQP to further evaluate site-specific information on selenium bioaccumulation and sensitivity of WCT. In comparison, screening values are based on a desktop review of published fish effects data. For most benchmarks and screening values used herein, values were derived from laboratory testing with naïve organisms (without prior exposure) and conditions that are typically aligned with those specified in the protocol (e.g., dissolved oxygen or temperature within a specified range). The application from a controlled laboratory setting to field conditions remains an uncertainty. However, this uncertainty is partially offset because benchmarks and screening values were based on the most sensitive life stage and species from relevant and reliable studies.

For selenium, aqueous benchmarks were back-calculated from tissue benchmarks using a site-specific bioaccumulation model. The bioaccumulation model primarily reflects selenate-dominated conditions that predominate in the Elk Valley, and may not accurately reflect bioaccumulation in some localized areas (such as immediately downstream of some sedimentation ponds) where organoselenium species have been found at detectable concentrations. This uncertainty was addressed by relying primarily on benthic invertebrate tissue selenium data. Benthic invertebrate tissue selenium data reflect local bioaccumulation conditions, including effects related to the aqueous selenium species that are present.

For dissolved oxygen, a 3 mg/L difference was assumed between interstitial dissolved oxygen and the overlying water. If the actual difference is lower, then the magnitude of effects would be lower. Conversely, if the actual difference is higher, then the magnitude of effects would be higher. Available information from three tributaries in the upper Fording River watershed suggests that a 3 mg/L differential may be conservative. Therefore, to address this uncertainty, it is recommended that interstitial dissolved oxygen measurements be collected in the mainstem Fording River.

For TDS, most major ions were not assessed individually (the exception being sulphate). The combined effect of all ions was considered through the assessment of TDS. The level 1 screening value was derived from embryo-alevin testing of the blend of ions present in mine-affected waters in the Elk Valley. Thus, the interpretation of potential effects of TDS assumes that the screening values accurately reflect the major ion composition that occurred in fish accessible waters.

Spatial Summaries of Water Quality Screening

Screening results were summarized spatially using two approaches, each of which has different underlying assumptions.

Spatial summaries characterize the spatial distribution of surface water quality conditions across the upper Fording River watershed by calculating the proportion of the watershed that is assigned each magnitude category. This summary approach was included in the assessment to provide an evaluation of overall conditions in the upper Fording River watershed but are not indicative of the site-specific information for WCT distribution in time and in space that was observed between 2012 and 2015 (Cope et al. 2016).

Summaries of spatiotemporal overlap with WCT better characterize how surface water quality conditions overlapped with expected WCT distributions in time and in space and better addresses potential aggregates of fish being affected in a small area, such as overwintering aggregates recorded in Fording River upstream of Chauncey Creek (represented by water quality at FR_FRABCH) and Henretta Lake (represented by water quality FR_HC1). This summary approach assumes that fish use recorded between 2012 and 2015 is representative of fish use in the decline window. Although this remains an uncertainty, this uncertainty is partially offset by the high site fidelity that has been recorded for WCT in the upper Fording River watershed (Cope et al. 2016), meaning that spatial and temporal patterns of fish use are repeated.

Microbial Interferences in Chronic Toxicity Tests with Fish

The main uncertainty for chronic toxicity testing is that both rainbow trout and fathead minnow tests using site waters (reference and mine-exposed) have been affected by microbial or fungal interferences (see discussion in Section 3.2.3.3). Understanding of how to interpret evidence of microbial effects continues to evolve through the ongoing testing programs and integrated evaluations conducted by Teck Coal for annual reporting. Sporadic microbial observations noted in some historical laboratory reports are now being re-evaluated to further understand the role of microbes in more tests than had previously been linked to potential microbial artefacts. Microbial effects can obscure attribution of test responses to water quality constituents and may cause “false positive” test responses that are unrelated to water quality.

Combined Effects of Multiple Constituents

The evaluation of combined effects of multiple constituents was a qualitative assessment that considered the locations and seasons in the decline window that had two or more constituents above level 1 screening values. Because each season includes several months, it is possible that constituents were identified as co-occurring when they, in fact, did not. For example, a station with selenium above the level 1 screening value in November 2017 and nitrate above the level 1 screening value in December 2017 would be identified as having two constituents above the level 1 screening value in winter 2017, even though these concentrations did not co-occur. This may overstate the potential for combined effects of multiple constituents. Conversely, the evaluation did not consider constituents that were below long-term WQGs, even though the evaluation of temporal patterns (Section 3.3.1.2) indicated that water quality conditions were different (higher) in the decline window relative to pre-September 2017 conditions. The observation that concentrations of these constituents remained below WQGs and screening values indicates that effects would not be expected from exposure to each constituent individually. However, it cannot be ruled out that trends in concentrations of these constituents may be indicative of some other change that affected WCT or may have contributed in some unknown way to an effect.

3.3.4 Concluding Summary and Strength of Evidence

For most constituents assessed, maximum measured water quality indicated negligible potential for effects to WCT. The strength of evidence is high because these constituents were below long-term WQGs and/or did not indicate increasing trends. This interpretation follows BC ENV (2019a), which states long-term WQGs are intended to “protect the most sensitive species and life stage against sublethal and lethal effects for indefinite exposures”. For five constituents classified as no chronic effects (bromide, cadmium, chromium, nickel, uranium), the classification was based on maximum concentrations being lower than a level 1 screening value for fish.[40] Although the screening values are less conservative than WQGs (where they exist), the strength of evidence is

[40] For cadmium, one of 1,243 samples collected in the decline window had a concentration that was approximately equal to the level 1 screening value for fish.

still considered high because the screening values are based on the most sensitive fish species and life stage. The evidence is further strengthened by the maximum hazard quotients for these constituents, which were low (0.06 to 0.37, except a single cadmium concentration).

Seven of the assessed constituents met the requisite conditions to contribute to the WCT decline for one or more life stages (lithium, nitrite, nitrate, selenium, sulphate, TDS, dissolved oxygen). These constituents indicated a potential for chronic effects to the most sensitive life stage and species at one or more locations in the decline window. These results indicate a potential for localized chronic effects to WCT that overlapped with those concentrations in time and in space. Potential overlap of these conditions with WCT by season and segment is discussed further in Section 5.0. The strength of evidence is high that water quality may have contributed to the WCT decline via chronic effects, although the available information indicates that a low proportion of the WCT population is likely to have overlapped with these conditions.

None of the assessed constituents individually or in combination met the requisite conditions to cause the WCT decline because water quality in most of the upper Fording River watershed indicated negligible potential for effects to aquatic life (i.e., below long-term WQGs) or no chronic effects to fish (i.e., below level 1 screening values), with most or all of the remaining habitat indicating at most a potential for low-level chronic effects on the most sensitive life stages and endpoint. As discussed in Section 3.2.5.1, an effect size of 20% for the 'low' magnitude rating was selected based on rationale provided by US EPA (1999, 2013), Mebane (2010), and Suter et al. (1995). This effect size is commonly accepted in the toxicological literature to describe a level of effect, derive from laboratory studies to individuals, that is not likely to result in changes to populations of sensitive aquatic species in the environment. Effect sizes greater than 20% have a greater potential to cause changes to populations of sensitive species (US EPA 1999, 2013; Mebane 2010; Suter et al. 1995). However, such changes would normally relate to reduced recruitment or productivity of the population, not widespread mortality of adult fish. Effect sizes greater than 20% were indicated in some localized areas but were not widespread or continuous.

3.4 Preliminary Evaluation of Cause

As discussed in Section 3.3.4, the evidence supports water quality being a potential contributor to the WCT decline. Specifically, there were seven constituents (lithium, nitrite, nitrate, selenium, sulphate, TDS, dissolved oxygen) that were identified as having a potential chronic effect to individual WCT in one or more life stages at one or more stations. There were some locations in some seasons for which water quality indicated potential moderate- to high-level effects of multiple constituents, and this interpretation was also reflected in chronic toxicity monitoring data. Such conditions tended to be localized and/or associated with a small proportion of fish use (see additional discussion in Section 5.0). Most fish accessible habitat had water quality below long-term WQGs and/or screening values or indicated at most a potential low-level effect on WCT.

Uncertainty in this interpretation relates to the number of fish exposed to sulphate/TDS concentrations at FR_FRCP1 in winter (2018, 2019) and summer-fall (2018) and DO concentrations at FR_FRCP1 in December 2018. The available telemetry data indicate that S7 (where FR_FRCP1 is located) overall represents a relatively small proportion of total fish use in the upper Fording River watershed (winter 2.7%; spring 3.9%; summer-fall 10%), and particularly in winter when potential effects were of the greatest magnitude. Although Cope et al. (2016) reported high site fidelity and repeated patterns of habitat use by WCT in the upper Fording River, it is possible that conditions occurred during the decline window that may have affected movement patterns. If conditions in the upper Fording River watershed resulted in more or fewer fish exposed to FR_FRCP1 conditions than was observed during the years of the telemetry studies, particularly from late 2018 to early 2019, then the degree of contribution could be different than suggested by the analysis presented herein. That is, if more fish were exposed, then the degree of contribution could be higher; conversely, if fewer fish were exposed, then the

degree of contribution could be lower. This uncertainty is discussed further in the integration chapter (EoC Team 2021) by evaluating factors that could have affected the number of fish exposed to FR_FRCP1 conditions in winter (2018, 2019) and summer-fall (2018).

In consideration of the above, water quality met the requisite conditions to contribute to the WCT decline. The role of water quality alone in the WCT decline was classified as minor overall (this applies in most areas and seasons), and moderate under localized conditions, especially in winter. Uncertainty for the moderate rating is associated with the proportion of fish that were exposed to FR_FRCP1 conditions (i.e., contribution could be higher or lower as discussed in EoC Team 2021). Water quality did not meet the requisite conditions to be the sole cause of the WCT decline.

Section 4.0: Evaluation of Potential Nutrient Enrichment

4.0 EVALUATION OF POTENTIAL NUTRIENT ENRICHMENT

4.1 Description of and Rationale for Impact Hypothesis

The impact hypothesis is: *Did nutrient enrichment contribute to or cause the WCT decline?*

One of the initial consequences of nutrient enrichment, also referred to as *eutrophication*, is increased growth of algae and other plants (Environment Canada 2004). This increased growth can have a range of ecological effects, including increased sedimentation of organic materials, with the decomposition of this material potentially resulting in reduced dissolved oxygen (Environment Canada 2004).

In Elk Valley waters, including the upper Fording River, nitrogen is relatively abundant in the form of nitrate and phosphorus is usually identified as the limiting nutrient (Minnow 2020b). This means that phosphorus is the water quality constituent that could control the rate at which algae and aquatic plants grow. Productivity can be controlled by many factors in addition to nutrients, including flow cycles, light, substrate characteristics, temperature, and growing season length (Minnow 2017, Minnow 2020b). Larratt and Self (2021) evaluates potential effects of other factors on productivity.

In consideration of the above, total phosphorus (TP) was the water quality constituent used to evaluate potential nutrient enrichment herein.

4.2 Methods

4.2.1 Overview

TP was evaluated two ways:

First, TP concentrations in the growing season were compared to provincial and federal guidance documents to evaluate potential trophic status changes within the decline window relative to previous conditions (Section 4.2.4.1). To characterize trophic status, mean concentrations were used to provide an indication of the typical condition over time. Individual sample measurements were not used in this step (but were in the next step, see below) because this step is intended to provide a broad characterization of nutrient status over time in the upper Fording River watershed.

Second, TP concentrations in the growing season were compared to a site-specific screening value of 0.03 mg/L (Section 4.2.4.2). This screening value is based on previous evaluations of the relationship between productivity (e.g., as chlorophyll-*a*) and TP in Elk Valley waters, which indicate that changes to productivity have not been observed at TP concentrations less than 0.03 mg/L. To compare against the site-specific screening value, mean concentrations were used to provide an indication of the typical condition and individual sample measurements were used to provide an indication of the range of conditions.

The growing season used herein is 15 June to 30 September (as defined in Permit 107517), and thus constitutes a subset of the decline window. The growing season is the most relevant window to assess potential nutrient-related changes to productivity because these months are the most biologically relevant. Larratt and Self (2021) evaluates the potential for algal growth in other seasons (e.g., over winter).

4.2.2 Spatial Boundaries

Water quality stations were consistent with those used for the evaluation of potential effects of surface water quality (see Section 3.2.2). In brief, 15 stations on the Fording River mainstem and 10 fish-accessible tributary stations were included to represent conditions in the upper Fording River watershed (Figure 10).

4.2.3 Data Summary

Water quality data were consistent with those used for the evaluation of water quality at fish accessible stations (see Section 3.2.3.1). Data provided by Teck Coal were relied upon for the analyses conducted herein. Teck Coal houses these data in their Environmental Quality Information System (EQuIS). Issues identified when processing the water quality data were resolved according to the methods outlined in Section 3.2.3.1.

4.2.4 Evaluation of Requisite Conditions

The requisite condition for nutrient enrichment to contribute to the WCT decline was a potential for a trophic status change at any spatial scale, at TP concentrations associated with productivity changes. The sections below outline the approach for trophic status classification (Section 4.2.4.1) and comparison to screening values (Section 4.2.4.2).

The requisite condition for nutrient enrichment to cause the WCT decline was a potential for widespread trophic status changes at TP concentrations associated with productivity changes.

The more habitat that met these conditions and the more habitat that demonstrated these conditions in the decline window than previously, the stronger was the evidence that nutrient enrichment may have contributed to or caused the WCT decline.

4.2.4.1 Trophic Status Characterization

The potential for nutrient enrichment was first evaluated by comparing measured concentrations of TP in the growing season to corresponding trophic status in federal guidance documents. This approach assumes that phosphorus is the nutrient limiting potential growth of algae in mine-affected waters, which is supported by the finding that nitrogen is relatively abundant in the form of nitrate (Minnow 2020b). Mean concentrations were used to provide an indication of the typical condition over time, consistent with the interpretation of federal guidance documents that potential effects due to trophic status changes would be realized over long time periods (CCME 2004).

BC WQGs for nutrients and algae do not include a TP WQG for the protection of aquatic life in streams. Consequently, measured mean concentrations of TP were evaluated according to considerations outlined in the CCME phosphorus management framework (CCME 2004) and the *Canadian Guidance Framework for the Management of Phosphorus in Freshwater Systems* (Environment Canada 2004). The trophic status of freshwater systems corresponding to TP concentrations as described in these two guidance documents is summarized in Table 32. Trophic categories estimate the productivity of a waterbody based on nutrient concentrations alone; biological monitoring is used to verify actual productivity, which reflects the influence of nutrient concentrations and other environmental factors as summarized in Section 4.1.

The timeframe for the analysis was 2013 to 2019, inclusive. Data from 2012 were compiled but excluded from the analysis because concentrations in the growing season were below the detection limit of 0.3 mg/L in all samples(i.e., the detection limit was too high to be meaningful in terms of interpretation).

Table 32: Total Phosphorus Concentration Corresponding to Trophic Status of Freshwater Systems

Trophic Status	Concentration Range for Total Phosphorus in Lakes and Rivers (CCME 2004)	Concentration Range for Total Phosphorus in Rivers and Streams (Environment Canada 2004)	Description of Trophic Status
Ultra-oligotrophic	<0.004 mg/L	Not provided	System is nutrient poor and algal growth is limited.
Oligotrophic	0.004 to 0.01 mg/L	<0.025 mg/L	
Mesotrophic	0.01 to 0.02 mg/L	0.025 to 0.075 mg/L	BC ENV (BC MOE 2013) noted that total phosphorus concentrations in excess of 0.02 mg/L may result in some enrichment and increased plant and algae growth. Increased aquatic plant growth at concentrations of TP above 0.025 mg/L may result in possible issues with dissolved oxygen levels (Sosiak 2004). The degree to which these changes occur depend on the form in which the phosphorus exists (i.e., how much of the phosphorus is in bio-available form).
Meso-eutrophic	0.02 to 0.035 mg/L	Not provided	
Eutrophic	0.035 to 0.1 mg/L	>0.075 mg/L	Possible development of nuisance levels of periphyton (Sosiak 2004)

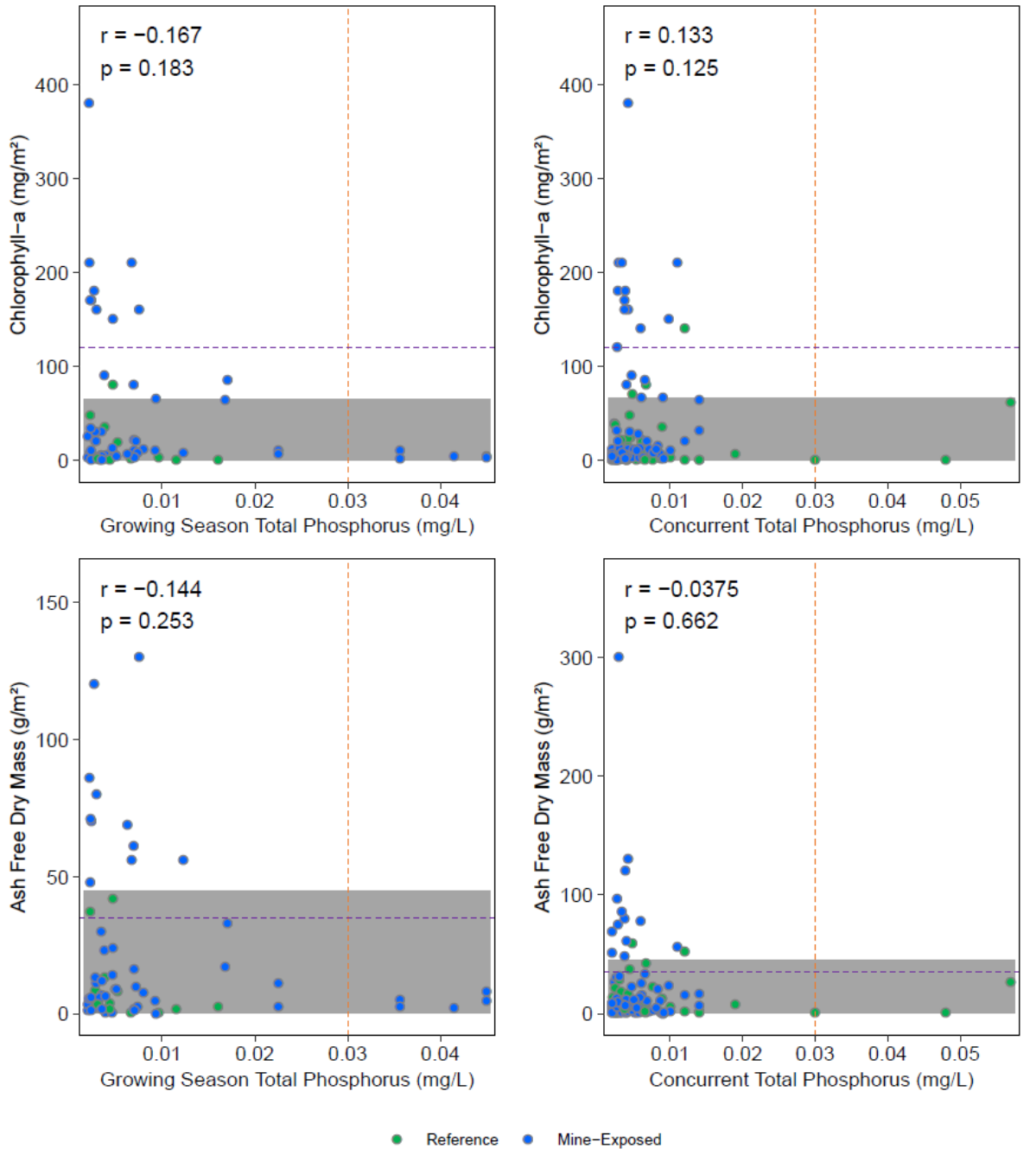
Notes: BC ENV = British Columbia Ministry of Environment and Climate Change; CCME = Canadian Council of Ministers of the Environment; TP = total phosphorus.

4.2.4.2 *Site-Specific Screening Value for Productivity*

A study of the relationship between nutrients and productivity in Elk Valley waters, including waters in the upper Fording River watershed, was recently conducted by Minnow (2020b). These relationships are useful to inform the interpretation of trophic status classification results in terms of the strength of evidence they provide that nutrient enrichment is likely. Productivity can be controlled by many factors in addition to nutrients, including flow cycles, light, substrate characteristics, temperature, and growing season length (Minnow 2017, Minnow 2020b). The analysis presented in Minnow (2020b) evaluates the degree to which nutrients are a controlling factor in watercourses in the Elk Valley.

Analyses of site-specific data and information in the scientific literature indicate that most of the streams in the Elk Valley are phosphorus-limited and also suggest that nutrient-related effects on productivity may not be distinguishable from the effects of other environmental factors (e.g., flow cycles, light) until concentrations of TP are greater than 0.03 mg/L (Minnow 2017, 2020b). In consideration of these and other findings reported in Minnow (2020b), Minnow (2020b) proposed an interim screening value of 0.03 mg/L for TP. For the purpose of the evaluation conducted herein, the proposed value of 0.03 mg/L was used as the site-specific level 1 screening value. This screening value was based in part on relationships like those shown in Figure 45, which show that chlorophyll-*a* and ash-free dry mass concentrations in the Elk Valley are relatively consistent over the range of TP concentrations and do not indicate that increases in TP within the observed range cause increases in productivity. Level 2 and level 3 screening values could not be derived because too few values were above 0.03 mg/L to interpret responses at higher concentrations.

Figure 45: Periphyton Chlorophyll-*a* (top) or Ash-Free Dry Mass (bottom) as a Function of Total Phosphorus Concentration for Stations Sampled from 2012 to 2015 (Figure 4-1 of Minnow 2020b)



Source: Draft figure from Minnow 2020b.

Notes: Concentrations are in milligrams per litre (mg/L) and grams or milligrams per square meter (g/m^2 or mg/m^2). Gray shading represents the reference area normal range defined as the 2.5th and 97.5th percentiles of the distribution of reference area data (pooled 2012 to 2015 data).

Individual measurements and mean TP concentrations in the growing season were compared to the level 1 screening value of 0.03 mg/L. To aid in the visual assessment of spatial and temporal trends, individual measurements were plotted relative to the screening value. In addition, mean concentrations measured between 2013 and 2019 were tabulated with stations in rows (ordered from upstream to downstream) and screened concentrations in columns according to the methods outlined in Section 3.2.5.1.2. Concentrations were shaded according to the screening value of 0.03 mg/L: lower than level 1 = green, and greater than level 1 = pink. Spatial and temporal trends were visually assessed using colour patterns in the table. For example, if the colour shifts from green on the left to pink on the right, this would indicate a potential change in productivity over time. Conversely, if colours remain relatively consistent from left to right, this would indicate a lack of temporal trend (consistent productivity). This format also permitted a visual evaluation of the spatial extent of potential changes in productivity levels by comparing across adjacent rows.

At the bottom of the table, screening results were summarized spatially by the proportion of habitat area assigned each magnitude category. These summaries are provided to support a spatially integrated evaluation of conditions across the upper Fording River watershed. These rows calculate the total proportion of assessed habitat that was assigned each colour (no effects, low, moderate, or high). Habitat areas for each station were provided by Teck Coal. This approach characterizes the spatial distribution of TP conditions across the watershed. To aid in visual assessment of the summary, gradient shading was used to indicate the percentage of habitat with each magnitude rating from 0% (no colour) to 100% (dark blue).

In addition, TP results were summarized in consideration of the spatiotemporal overlap with WCT distribution using percent fish use from EoC Team (2021) using data collected by Cope et al. (2016) (see Section 1.4.2). These summaries are provided to incorporate differential fish use of segments of the upper Fording River and its tributaries across seasons. This qualitative summary characterizes how surface water quality conditions overlapped with expected WCT distributions in time and in space and addresses potential aggregates of fish being affected in a small area, such as overwintering aggregations recorded in Fording River upstream of Chauncey Creek (represented by water quality at FR_FRABCH) and Henretta Lake (represented by water quality at FR_HC1). An integrated summary of results by river segment is provided in Section 5.0.

4.3 Findings

4.3.1 Were the Requisite Conditions Met?

Mean TP concentrations in the growing season throughout the Fording River watershed between 2013 and 2019 are compared to trophic status categories in Figure 46 (CCME 2004 categories) and Figure 47 (Environment Canada 2004 categories). TP concentrations are compared to the level 1 screening value of 0.03 mg/L in Figure 48 (individual samples) and Table 33 (mean concentrations). The following bullets summarize the results for mainstem stations, tributary stations, and the area-weighted evaluation:

- **Fording River**. TP concentrations in the decline window indicated ultra-oligotrophic to oligotrophic conditions at mainstem stations, except for FR_FR2 (mesotrophic) and LC_FRUS (eutrophic). Trophic status in the decline window was lower than or within the range observed pre-2018 throughout the upper Fording River watershed, except for LC_FRUS which indicated a shift in 2019 from ultraoligotrophic or mesotrophic to eutrophic using the CCME (2004) categories and a shift from oligotrophic to eutrophic using the Environment Canada (2004) categories.

TP concentrations in the decline window were below the level 1 screening value of 0.03 mg/L in all but two mainstem samples (Fording River downstream of Chauncey Creek [FR_FRABCH] in June 2019 and Fording River upstream of Dry Creek [LC_FRUS] in September 2019). Based on these results, changes to productivity would not be expected at most mainstem stations. The potential for productivity changes at FR_FRABCH and LC_FRUS is discussed at the end of this section.

- **Tributaries**. TP concentrations in the decline window indicated ultra-oligotrophic to oligotrophic conditions at tributary stations, except for Environment Canada (2004) categories that indicated mesotrophic for Swift Creek in 2018 (GH_SC1-2) and for Dry Creek in 2018 and 2019 (LC_DC1). As discussed in Minnow (2020b), Dry Creek has naturally elevated TP concentrations. Trophic status in the decline window was lower than or within the range observed pre-2018.

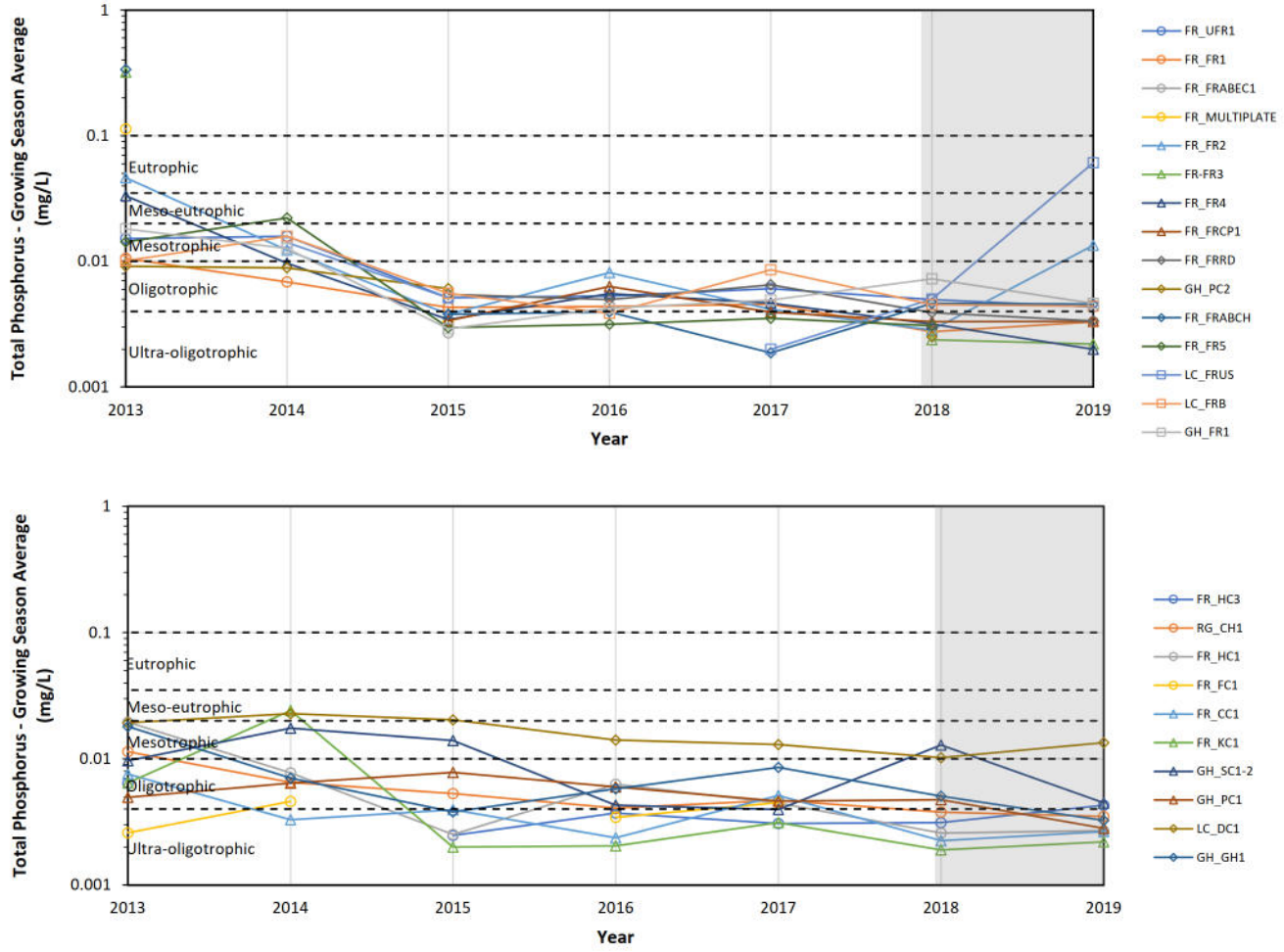
  TP concentrations in the decline window were below the level 1 screening value of 0.03 mg/L, indicating that changes to productivity would not be expected.

- **Spatial summary**. Most or all assessed habitat (90% in 2019; 100% in 2018) had TP concentrations in the decline window below the level 1 screening value, indicating that changes to productivity would not be expected. In 2019, the 10% of habitat with mean TP above the screening value was due to measured concentrations at LC_FRUS.

- **Spatiotemporal overlap with WCT**. Segments with the highest fish are not expected to result in changes to productivity. TP concentrations above the level 1 screening value overlapped with WCT at FR_FRABCH in June 2019 (which is in S6, with 22% of adult fish use and 47% of redds in that season) and LC_FRUS in September 2019 (which is in S3, with 8% of adult fish use and assumed 0.6% of redds in that season). [41]

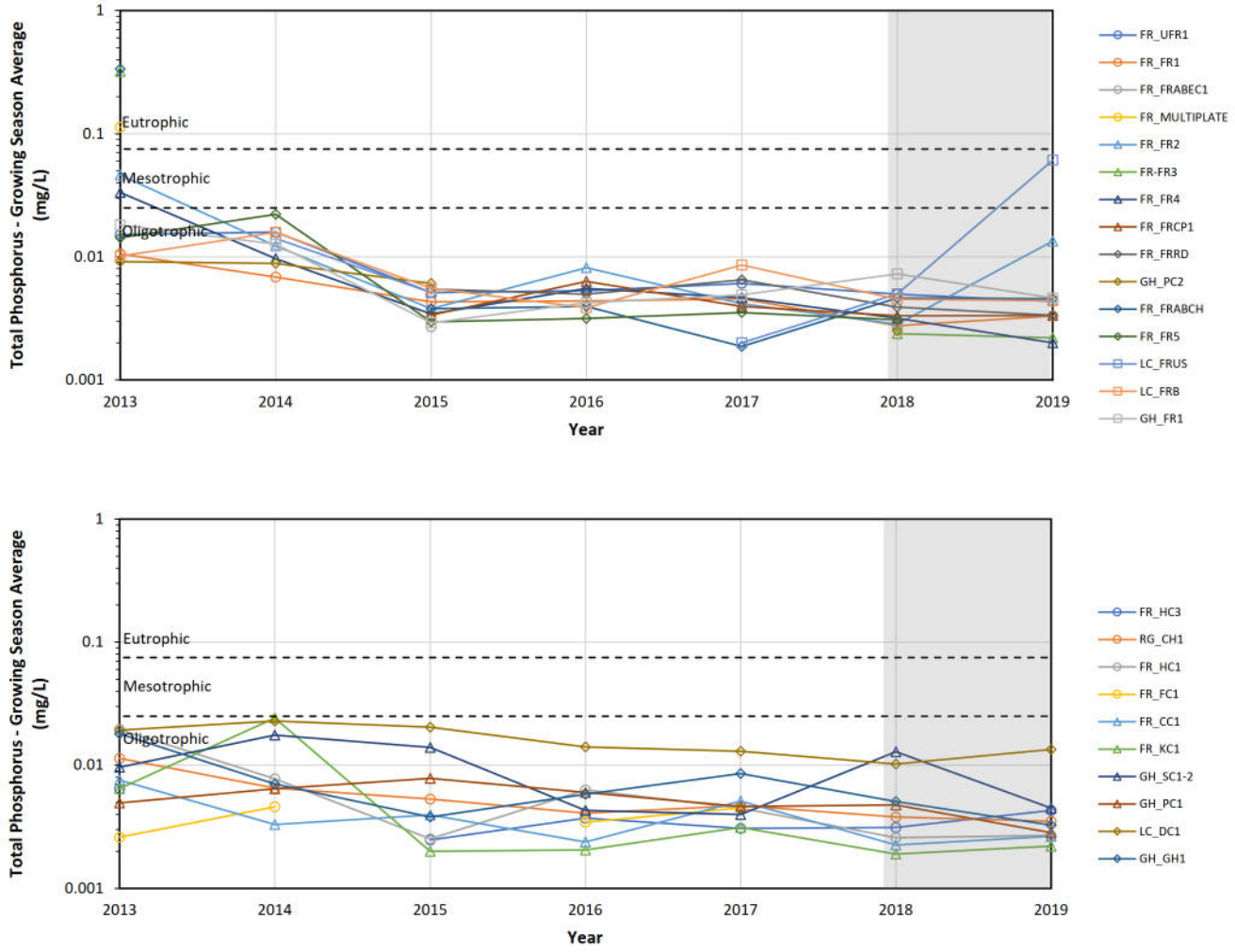
[41] Redd counts in spring are assumed to also apply to summer-fall.

Figure 46: Total Phosphorus Growing Season Average in Fording River Mainstem (top) and Tributary (bottom) Stations Compared to CCME (2004) Trophic Status Classification



Notes: Concentrations, which are in milligrams per litre (mg/L), are also shown in Table 33. Growing season average is the average monthly concentration between 15 June and 30 September. Horizontal dashed lines indicate concentrations associated with shift in trophic status (labelled on left of plot). Concentrations in 2012 are not plotted because they were below the detection limit (0.3 mg/L). Grey shading indicates samples collected during the decline window (September 2017 to September 2019).

Figure 47: Total Phosphorus Growing Season Average in Fording River Mainstem (top) and Tributary (bottom) Stations Compared to Environment Canada (2004) Trophic Status Classification



Notes: Concentrations, which are in milligrams per litre (mg/L), are also shown in Table 33. Growing season average is the average monthly concentration between 15 June and 30 September. Horizontal dashed lines indicate concentrations associated with shift in trophic status (labelled on left of plot). Concentrations in 2012 were equal to the detection limit (0.3 mg/L). Grey shading indicates samples collected during the decline window (September 2017 to September 2019).

Figure 48: Total Phosphorus in the Growing Season in Fording River Mainstem (top) and Tributary (bottom) Stations Compared to Level 1 Screening Value

Notes: Concentrations are in milligrams per litre (mg/L). Mean concentrations are compared to level 1 screening value in Table 33. Horizontal dashed line shows level 1 screening value of 0.03 mg/L (labelled on right of plot). Concentrations in 2012 were equal to the detection limit (0.3 mg/L). Grey shading indicates samples collected during the decline window (September 2017 to September 2019).

Table 33: Total Phosphorus Concentrations in the Growing Season Compared to the Level 1 Screening Value for Productivity (2013 to 2019)

Segment	Area Description	WQ Station Code	Biological Area Code	Screening Value (mg/L)	Fish Habitat Area (ha)	Relative Fish Use (%)				Total Phosphorus - Growing Season Average (mg/L)						
						Winter	Spring		Summer-Fall	2013	2014	2015	2016	2017	2018	2019
							Tagged	Redds								
Mainstem Fording River																
10	*u/s Henretta Cr. and FRO (reference)*	*FR_UFR1*	*FO26*		7.4	4%	8%	0%	7%	*0.015*	*0.016*	*0.0051*	*0.0053*	*0.0061*	*0.005*	*0.0043*
9	d/s Henretta Cr.	FR_FR1	FODHE		2.9	3%	10%	12%	7%	0.011	0.0069	0.0043	0.0044	0.0046	0.0028	0.0033
	u/s Clode Cr.		FOUCL		0.23					0.011	0.0069	0.0043	0.0044	0.0046	0.0028	0.0033
8	u/s North Greenhills Diversion		FOUNGD		1.4	20%	20%	12%	12%	0.011	0.0069	0.0043	0.0044	0.0046	0.0028	0.0033
	d/s North Greenhills Diversion	FR_FRABEC1	FODNGD		0.56							0.0027				
	Multiplate Culvert	FR_MULTIPLATE	MP1		0.89					0.11		0.0033			0.0027	
	u/s Shandley Cr.		FOUSH		1.5					0.11	0.012	0.0038	0.0081	0.0042	0.0028	0.013
	u/s Kilmarnock Cr.	FR_FR2	FOUKI		0.92					0.046	0.012	0.0038	0.0081	0.0042	0.0028	0.013
7	d/s Kilmarnock & u/s Swift Cr.	FR_FR3	FOBKS		2.5	3%	3%	1%	10%	0.32					0.0024	0.0022
	d/s future AWTF-S		SCOUTDS		0.066					0.32	0.01	0.0034	0.0055	0.0047	0.0032	0.002
	d/s Swift Cr., u/s Cataract Cr.	FR_FR4	FOBSC		0.68					0.033	0.0097	0.0034	0.0055	0.0047	0.0032	0.002
	d/s Cataract, u/s Porter	FR_FRCP1	FOBCP	L1: 0.03	1.4							0.0034	0.0063	0.0039	0.0033	0.0033
	1 km SW of Fording R Compliance		FRCP1SW		1.4							0.0055	0.0063	0.0065	0.0039	0.003
6	u/s Porter	FR_FRRD	FRUPO		2.2	40%	22%	47%	16%			0.0055	0.005	0.0065	0.0039	0.0034
	Fording River side channel		FO10-SP1		0.081					0.01	0.009	0.0061	0.005	0.0065	0.0039	0.003
	d/s Porter Cr., u/s Chauncey Cr.	GH_PC2	FODPO		1.9					0.0091	0.0089	0.0061			0.0025	
	Lower Fording River Oxbow		RG_FOXL		0.064					0.34	0.009	0.0061	0.004	0.0019	0.0046	0.005
	u/s Chauncey Creek	FR_FRABCH	FO22		1.9					0.34		0.0038	0.004	0.0019	0.0046	0.0046
5	d/s Chauncey Cr., u/s Ewin Cr.	FR_FR5	FOUEW		11	5%	9%	6%	17%	0.014	0.022	0.003	0.0032	0.0035	0.0031	
3	Fording River u/s Dry Creek	LC_FRUS	FO28		4.9	2%	4%	1%	8%		0.014	0.0051		0.002	0.005	0.061
2	d/s Dry Cr., u/s GHO	LC_FRB	FO29		8.9	4%	9%	9%	7%	0.01	0.016	0.0056	0.0039	0.0086	0.0045	0.0044
1	d/s GHO and Greenhills Cr.	GH_FR1	FODGH		2.5	8%	5%	1%	6%	0.018	0.013	0.0029	0.0042	0.0049	0.0073	0.0046
Tributaries																
9	*Henretta Creek (reference)*	*FR_HC3*	*HENUP*		1.7	0.0%	0.0%	0.0%	0.0%	0.006		0.002	0.004	0.003	0.003	0.004
6	*Chauncey Creek (reference)*	*RG_CH1*	*CHCK*		0.40	0.0%	0.0%	0.0%	0.3%	0.011	0.007	0.005	0.004	0.005	0.004	0.004
9	Henretta Creek	FR_HC1	HENFO		3.0	11.7%	3.1%	1.3%	9.7%	0.02	0.008	0.003	0.006	0.004	0.003	0.003
	Fish Pond Creek	FR_FC1	FR_FC1		0.29	0.0%	0.8%	1.3%	0.0%	0.003	0.005		0.003	0.005		
	Clode Creek	FR_CC1	CLODE		0.3	0.0%	6.2%	1.3%	0.0%	0.008	0.003	0.004	0.002	0.005	0.002	0.003
7	Kilmarnock Creek	FR_KC1	KICK	L1: 0.03	0.1	0.0%	0.8%	0.0%	0.0%	0.006	0.024	0.002	0.002	0.003	0.002	0.002
	Swift Creek	GH_SC1-2	SWCK		0.06	0.0%	0.0%	0.0%	0.0%	0.01	0.018	0.014	0.004	0.004	0.013	0.004
6	Porter Creek	GH_PC1	POCK		0.154	0.0%	0.0%	0.0%	0.0%	0.005	0.006	0.008	0.006	0.005	0.005	0.003
3	LCO Dry Creek	LC_DC1	LC_DC1		0.2	0.0%	0.0%	5.8%	0.0%	0.019	0.023	0.02	0.014	0.013	0.01	0.013
2	Greenhills Creek	GH_GH1	GHCKD		0.23	0.0%	0.0%	0.6%	0.0%	0.018	0.007	0.004	0.006	0.009	0.005	0.003
Proportion of Habitat Area in Each Magnitude Category									Below Screening Value	83	100	100	100	100	100	90
									Above Screening Value	17	0	0	0	0	0	10

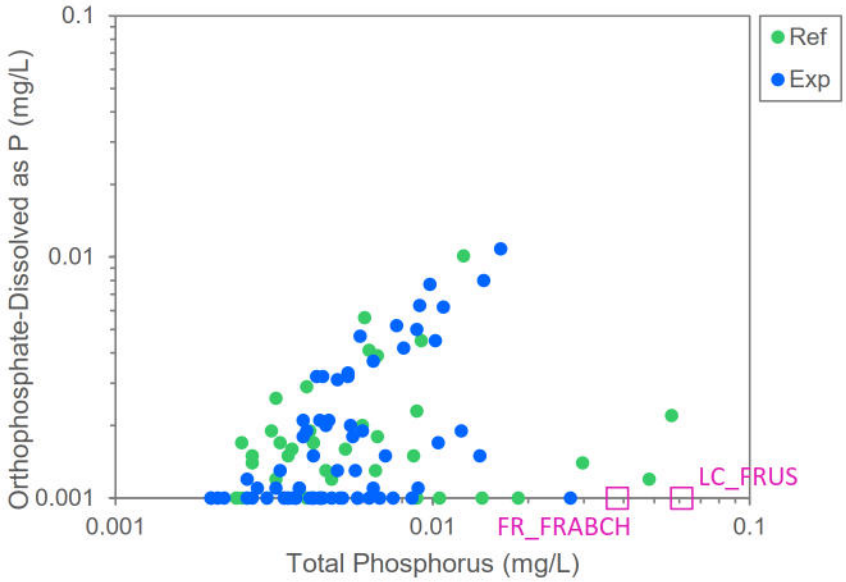
Notes: u/s = upstream; d/s = downstream.
Concentrations are in milligrams per litre total phosphorus (mg/L). Concentrations are compared to the level 1 screening value of 0.03 mg/L (Minnow 2020b). For rows (subunits) without a water quality station, concentrations are shown in grey; these are assumed to be equal to the highest concentration measured at adjacent stations.
FR_FR5 is located in S5; relative fish use is shown for S4 and S5 combined.
Concentrations in 2012 are not shown because they were below the detection limit of 0.3 mg/L (i.e., the detection limit, which is an order of magnitude higher than the level 1 screening value, was too high to be meaningful in terms of interpretation).
Years shaded grey indicate samples were collected between the decline window (September 2017 and September 2019).
Blank cells indicate no samples were collected for corresponding station and year.
Italics indicate reference locations.
Screening: shading indicates below level 1 (green) or above level 1 (pink).
Area-weighted summary: transient shading used to shade from 0% (no color) to 100% (blue).

As discussed in Section 4.2.4.2, the level 1 screening value for TP is associated with no changes to productivity. Level 2 and level 3 screening values could not be derived because too few site-specific values were above 0.03 mg/L to interpret responses at higher concentrations. Therefore, to further evaluate the potential for nutrient enrichment at FR_FRABCH (June 2019; 0.038 mg/L) and LC_FRUS (September 2019; 0.061 mg/L), the following supporting information was considered:

- TP concentrations relative to previous concentrations. The TP concentration at FR_FRABCH in June 2019 (0.038 mg/L) is approximately an order of magnitude lower than the concentration measured in June 2013 (0.34 mg/L) that did not result in a WCT decline. For LC_FRUS, the TP concentration in September 2019 (0.061 mg/L) was higher than previous measurements at LC_FRUS (maximum = 0.045 mg/L) but lower than previous measurements at other mainstem stations that did not result in a WCT decline (maximum = 0.34 mg/L).
- TP concentrations relative to the site-specific relationship with productivity. The TP concentration at FR_FRABCH in June 2019 (0.038 mg/L) is within the range of TP concentrations measured in Elk Valley waters that was not associated with changes in productivity (0.057 mg/L; maximum concentration in Figure 49, which was collected from a Fording River tributary [Ewin Creek]). For LC_FRUS, the TP concentration in September 2019 (0.061 mg/L) is only slightly above the highest TP concentration that was not associated with changes in productivity. This comparison suggests that changes to productivity would be unlikely.
- TP concentrations relative to dissolved phosphorus concentrations. Dissolved phosphorus concentrations were below the detection limit in both samples (Figure 49), indicating that TP concentrations at FR_FRABCH in June 2019 and LC_FRUS in September 2019 were primarily in a particulate form (i.e., less bioavailable for algae and aquatic plants). This suggests that changes to productivity would be unlikely.
- Dissolved oxygen concentrations relative to previous concentrations. At FR_FRABCH, the minimum dissolved oxygen concentration in the 2019 growing season (8.2 mg/L) was within the range of minimum dissolved oxygen concentrations measured in the growing season prior to the decline window (7.8 to 10.3 mg/L). At LC_FRUS, the minimum dissolved oxygen concentration in the 2019 growing season (10.1 mg/L) was within the range of minimum dissolved oxygen concentrations measured in the growing season prior to the decline window (8.3 to 11.6 mg/L).
- Periphyton and macrophyte coverage scores. At FR_FRABCH, macrophyte coverage scores did not change between 2015 and 2019 (Table 34); periphyton coverage scores were not recorded in 2019, so a comparison could not be made for this station. At LC_FRUS, macrophyte cover scores did not change whereas periphyton coverage scores decreased. These results suggest no changes to productivity (macrophyte scores at both stations) or a decrease in productivity (periphyton scores at LC_FRUS). Primary productivity results in Table 34 are supported by secondary productivity data (benthic invertebrates) at RG_FO22 and RG_FOUEW (which bracket FR_FRABCH) and at LC_FRUS, at which benthic invertebrate abundance and richness during the decline window were similar to previous years (Orr and Ings 2021; Minnow and Lotic 2020).

In aggregate, the supporting information for FR_FRABCH and LC_FRUS indicates that changes to productivity would be unlikely. This aligns with the TP results presented above for other mainstem and tributary stations, which also indicated a lack of productivity changes. Based on the results presented above, potential nutrient enrichment did not meet the requisite conditions to contribute to or cause the WCT decline.

Figure 49: Dissolved Phosphorus as a Function of Total Phosphorus at FR_FRABCH (June 2019) and LC_FRUS (September 2019) Relative to 114 Stations Sampled for the RAEMP and Calcite Monitoring Programs, September 2015)



Source: Dataset from Minnow 2020b.
Notes: Concentrations are in milligrams per litre (mg/L). Ref = reference stations; Exp = exposed stations.

Table 34: Periphyton and Macrophyte Coverage Scores at FR_FRABCH and LC_FRUS (2015, 2016, and 2019)

Score (1 to 5)	2015	2016	2019
FR_FRABCH			
Periphyton Coverage	3	-	-
Macrophyte Coverage	0	-	0
LC_FRUS			
Periphyton Coverage	3	3	2
Macrophyte Coverage	0	0	0

Source: Larratt and Self (2021). Coverage scores are described in the Environment Canada (2012) field manual for wadeable streams, with successive numbers indicating higher coverage. Macrophyte coverage refers to the quantity of rooted aquatic plants or vegetation that are present within the sampling reach (erosional and depositional zones). Periphyton coverage refers to descriptive categories, including the estimated thickness of periphyton coverage on substrate.

Notes: '-' = not measured; FR_FRABCH results are for biological monitoring station FO22.

4.3.2 Data Gaps and Uncertainty

Key data gaps and uncertainty are discussed below.

Data Gaps and False Negatives

There are limitations on the frequency of the data collection, which leaves some uncertainty that the available dataset may not have captured peak concentrations of TP. This uncertainty is partially offset by 1) the robustness of Teck Coal's surface water quality monitoring program, with many stations being sampled monthly and some of those months being sampled weekly; and 2) potential effects due to trophic status changes would be realized over long periods of time (CCME 2004), so the average concentration over the growing season (not maximums) is more relevant for this analysis. The growing season dataset from the decline window assessed herein was extensive, including 298 measurements of TP across 25 stations.

Screening Values

The level 1 screening value of 0.03 mg/L TP represents a concentration below which nutrient-related effects on productivity may not be distinguishable from the effects of other environmental factors (e.g., flow regime, water velocity, light) (Minnow 2020b). There is high confidence for the interpretation for TP concentrations below 0.03 mg/L because it was derived using site-specific relationships between TP and productivity. At TP concentrations above 0.03 mg/L, there is uncertainty in the interpretation because of the limited site-specific data at TP concentrations above 0.03 mg/L. This uncertainty is partially offset because peak TP concentrations in the decline window were lower than concentrations measured previously and other lines of evidence that were reviewed indicated that productivity changes were unlikely.

Spatial Summaries of Water Quality Screening

Screening results were summarizes spatially using two approaches, each of which has different underlying assumptions.

Spatial summaries characterize the spatial distribution of surface water quality conditions across the upper Fording River watershed by calculating the proportion of the watershed that is assigned each magnitude category. This summary approach was included in the assessment to provide an evaluation of overall conditions in the upper Fording River watershed but are not indicative of the site-specific information for WCT distribution in time and in space that was observed between 2012 and 2015 (Cope et al. 2016).

Summaries of spatiotemporal overlap with WCT better characterize how surface water quality conditions overlapped with expected WCT distributions in time and in space and better addresses potential aggregates of fish being affected in a small area, such as overwintering aggregates recorded in Fording River upstream of Chauncey Creek (represented by water quality at FR_FRABCH) and Henretta Lake (represented by water quality FR_HC1). This summary approach assumes that fish use recorded between 2012 and 2015 is representative of fish use in the decline window. Although this remains an uncertainty, this uncertainty is partially offset by the high site fidelity that has been recorded for WCT in the upper Fording River watershed (Cope et al. 2016), meaning that spatial and temporal patterns of fish use are repeated.

4.3.3 Concluding Summary and Strength of Evidence

TP concentrations in the growing season at mainstem and tributary stations indicated ultra-oligotrophic to oligotrophic conditions in the decline window, except for two mainstem stations (mesotrophic at FR_FR2; eutrophic at LC_FRUS) and three tributary stations (mesotrophic in Swift Creek and Dry Creek). With the exception of LC_FRUS, trophic status in the decline window throughout the upper Fording River watershed was lower than or within the range observed previously. Comparison of TP concentrations to screening values also indicated a negligible potential for changes to productivity in the decline window. At FR_FRABCH (June 2019; 0.038 mg/L) and LC_FRUS (September 2019; 0.061 mg/L), review of supporting information (historical concentrations, site-specific relationship with productivity endpoints such as chlorophyll-a, and periphyton and macrophyte scores) indicated that changes to productivity at FR_FRABCH and LC_FRUS would be unlikely. These results indicate that nutrient enrichment did not meet the requisite conditions to contribute to or cause the WCT decline. The strength of evidence for this conclusion is high because the TP screening value is based on site-specific data.

4.4 Preliminary Evaluation of Cause

As discussed in Section 3.4.3, the evidence indicates a lack of nutrient enrichment associated with TP concentrations. Therefore, the role of nutrient enrichment in the WCT decline is interpreted to be negligible.

Section 5.0: Integrated Summary by River Segment

5.0 INTEGRATED SUMMARY BY RIVER SEGMENT

The sections below integrate assessment results by river segment, describing how results overlap spatially and temporally with fish use information from EoC Team (2021) using data collected by collected by Cope et al. (2016). Mainstem and tributary habitat is quantified below in terms of the amount of fish accessible habitat in hectares (ha). Fish use information is quantified in terms of the proportion of fish records (telemetry counts or redds) found in each area in each season (see figures in Section 1.4.2). In the last subsection, an overall summary is provided for each season.

5.1 Segments 10 and 11

S10 and S11 are discussed together in this section because both segments are located upstream of mining. S10 begins ~400 m upstream of Henretta Creek and extends north for 4.35 km. S11 extends another 10.25 km into the Fording River headwaters.

S10 and S11 together contain 7.4 ha of fish accessible habitat in the mainstem. There are no named tributaries in these segments. Telemetry data (EoC Team 2021 using data collected by Cope et al. 2016) indicate that a proportion of adult WCT reside in S10 in all seasons (winter 2.3%; spring 6.9%; summer-fall 6.7%) with smaller proportions in S11 (winter 1.5%; spring 0.8%; summer-fall 0.3%). No redds were observed in either segment (EoC Team 2021 using data collected by Cope et al. 2016).

S10 had one water quality station in the refined assessment (FR_UFR1), which is a reference station on the mainstem Fording River. Benthic invertebrate tissue selenium data were available from one station in S10 (FR_UFR1) and one in S11 (FO26). Chronic toxicity testing was conducted at FR_UFR1 with fathead minnow and rainbow trout.

At biological monitoring station RG_UFR1 in S11, there were three dissolved oxygen measurements in February 2019 that indicated a potential for acute effects (Section 3.3.1.1). Invertebrate selenium concentrations were below the interim BC tissue guideline, indicating a negligible potential for effects to fish.

At water quality station FR_UFR1 in S10, concentrations of all constituents monitored in the decline window met long-term WQGs and/or were below level 1 screening values. Invertebrate selenium concentrations were below the interim BC tissue guideline and/or below the lowest level 1 benchmark for potential effects to fish. Responses in chronic toxicity tests with fathead minnow and rainbow trout were within the typical range of responses observed in Elk Valley reference waters. TP data indicated oligotrophic conditions. The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017.

Based on the information summarized above, water quality in S11 in February 2019 met the requisite conditions to contribute to the WCT decline. Other than that, water quality in S10 and S11 did not meet the requisite conditions to contribute to or cause the WCT decline. This interpretation applies to all life stages.

Table 35: S10 and S11: Fish Use and Water Quality Findings for the Decline Window

Watercourse	Line of Evidence	Winter		Spring		Summer-Fall	
		Adults and Juveniles	Early Life Stages[1]	Adults and Juveniles	Early Life Stages	Adults and Juveniles	Early Life Stages[1]
S11							
Fording River	Fish Use (%)	1.5	n/a	0.80	0	0.30	0
	Tissue Selenium[2]	—	—	<WQG	—	<WQG	—
S10							
Fording River	Fish Use (%)	2.3	n/a	6.9	0	6.7	0
	Water Quality (FR_UFR1)	<WQG or L1	—	<WQG or L1	<WQG or L1	<WQG or L1	<WQG or L1
	Tissue Selenium[2]	<WQG or <L1	—	—	—	—	—
	Chronic toxicity testing – survival (FR_UFR1)	—	Within regional NR	—	Within regional NR	—	Within regional NR

Notes: '—' = no applicable data for the corresponding season and life stage; n/a = not applicable because early life stages of fish are not present in winter; NR = normal range of responses observed in Elk Valley reference waters. Shading indicates the worst-case magnitude from screening across constituents: below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange). For lines of evidence and stations with data collected in the decline window and prior to September 2017, the magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017.
(1) Early life stages of WCT are not present in winter; this column is shown because chronic toxicity tests in winter were conducted with early life stages of fish. Fish use for early life stages in summer-fall was assumed to be equal to that recorded in spring.
(2) Invertebrate selenium concentrations were used to evaluate potential dietary effects to adult and juvenile WCT. Thus, screening outcomes are only shown under columns for adults and juveniles.

5.2 Segment 9

S9 is 3.65 km long, extending from ~300 m downstream of Clode Creek to ~400 m upstream of Henretta Creek. All mainstem habitat in S9 is located downstream of mining. S9 contains 13 ha of fish accessible habitat, 3.1 ha of which is in the mainstem Fording River. Fish accessible tributaries in S9 are Henretta Creek (4.7 ha, including Henretta Lake), Fish Pond Creek (0.29 ha), Clode Creek (0.30 ha), Turn Creek (0.53 ha), and McQuarrie Creek (3.7 ha). The upstream reach of Henretta Creek is unaffected by mining and McQuarrie Creek is a tributary of Henretta Creek that is unaffected by mining. There are three release locations in S9: Turn Creek, Post Sediment Pond Decant, and Clode Settling Pond Decant.

S9 is one of the reaches of the mainstem Fording River that experiences seasonal drying (Zathey and Robinson 2020). This reach is referred to as the northern drying section. No surveys were conducted in the decline window for the northern drying section. However, in surveys conducted in 2019 and 2020, drying occurred between November 2019 and April 2020, extending up to ~0.9 km between river km 62 and 63 (Zathey and Robinson 2020). This drying reach is located just downstream of mainstem station FR_FR1 (river km 63.1).

In addition, S9 contained two impassible riffles in the overwintering migration period of the decline window: FRD-CRA04 in 2017 (river km 61) and FRD-CRA05 in 2017 and 2018 (river km 63) (Hardwood et al. 2021); these riffles are approximately located at the confluence with Clode Creek (river km 61.1) or near mainstem station FR_FR1 (river km 63.1). For both riffles and years, impassible riffles were estimated to begin in mid September and continue to the end of the migration period (October 15).

Telemetry data (EoC Team 2021 using data collected by Cope et al. 2016) indicate that adult WCT reside in the mainstem portion of S9 in winter (3.4%), spring (10%), and summer-fall (7.0%), and a higher proportion of redds (12%) were found in the mainstem portion of S9 in spring relative to tributaries (1.3% in Henretta Creek downstream, Fish Pond Creek, and Clode Creek). The downstream segment of Henretta Creek, which includes Henretta Lake, was the only tributary with adult fish use in all three seasons (winter 12%; spring 3.1%; summer-fall 9.7%). Henretta Lake was identified by Cope et al. (2016) as high-use overwintering habitat for WCT. No fish were recorded by EoC Team (2021) in the upstream reference segment of Henretta Creek. No adult fish were recorded in Fish Pond Creek or Clode Creek in winter or summer-fall, but a proportion were observed in spring (0.8% in Fish Pond Creek; 6.2% in Clode Creek[42]). No fish use has ever been documented in Turn Creek (Section 2.3.2.3).

S9 had three water quality stations in the evaluation of mine-influenced releases (Section 2.0): Turn Creek (FR_TBM8), Post Sed. Pond Decant (FR_PP1), and Clode Settling Pond Decant (FR_CC1). With the exception of dissolved oxygen in one Turn Creek sample, concentrations of all constituents were below short-term water quality guidelines and/or acute screening values for rainbow trout, indicating that acute effects to fish would not be expected. The requisite condition to contribute via acute effects was potentially met for dissolved oxygen in Turn Creek in November 2018. However, the evidence that conditions reflected by this sample contributed to the WCT decline was interpreted to be weak because of uncertainty regarding fish access in winter, a lack of documented fish use in Turn Creek, and, based on telemetry data, a low proportion of adult WCT that were in the adjacent mainstem Fording River of S9 in winter (3.4%). Acute testing with rainbow trout at FR_PP1 and FR_CC1 indicated no acute effects within the decline window.

[42] The higher reported adult use in spring primarily reflected fish observed in Clode Sediment Pond. In July 2014, fish exclusion structures were added to preclude fish access. Thus, the fish use in Clode Creek in spring (6.2%) is biased high because fish could not access the sediment pond in the decline window.

S9 had five fish-accessible water quality stations in the refined assessment (Section 3.0), including one on the mainstem Fording River (FR_FR1), two on Henretta Creek (reference station FR_HC3 and mine-exposed station FR_HC1) and one on each of Fish Pond Creek (FR_FC1) and Clode Creek (FR_CC1). Invertebrate selenium concentrations were monitored at six stations sampled in the decline window (FR_FR1, FOUCL, FR_HC3, FR_FC1, FR_CC1, HE27).

Results for the mainstem Fording River of S9 (FR_FR1) are as follows:

- Concentrations of most water quality constituents were below long-term WQGs and/or level 1 screening values. Exceptions were observed in winter 2018 when nitrite concentrations were between the level 1 and level 2 screening values and in summer-fall 2017, 2018, and 2019 when dissolved oxygen concentrations were between the level 1 and level 2 screening values for buried embryo/alevin life stages (but not for juveniles and adults). These results indicate a potential low-magnitude effect of nitrite in winter 2018 and a potential low-magnitude effect of dissolved oxygen on buried embryo/alevin life stages in summer-fall. TP data indicated ultra-oligotrophic to oligotrophic conditions.
- Mean invertebrate selenium concentrations were below the dietary level 1 benchmark, except for summer-fall 2018 when concentrations were between the level 1 and level 2 benchmarks. These results indicate a potential low-magnitude effect of selenium on juvenile growth, although this is a conservative interpretation because the level 1 benchmark is an unbounded no-effects concentration for Yellowstone Cutthroat Trout (Section 3.2.5.2).
- The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017, except for nitrite in winter 2018, tissue selenium in summer-fall 2018, and dissolved oxygen in summer-fall.[43]

Results for tributaries in S9 are as follows:

- In Henretta Creek (FR_HC3 and FR_HC1) and Fish Pond Creek (FR_FC1):
  - Concentrations of most water quality constituents were below long-term WQGs and/or level 1 screening values. Exceptions were dissolved oxygen in summer-fall 2017 (all three locations) and 2018 (FR_HC1 only) when concentrations were between the level 1 and level 2 screening values for buried embryo/alevin life stages (but not for juveniles and adults). These results indicate a potential low-magnitude effect of dissolved oxygen on buried embryo/alevin life stages. TP data indicated ultra-oligotrophic to oligotrophic conditions.
  - Mean invertebrate selenium concentrations were below the level 1 benchmark except for spring 2018 at Henretta Lake, which had a concentration between the level 1 and level 2 benchmarks. These results indicate a potential for low-magnitude effect of selenium on juvenile growth, although this is a conservative interpretation because the level 1 benchmark is an unbounded no-effects concentration for Yellowstone Cutthroat Trout (Section 3.2.5.2).
  - The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017, except for dissolved oxygen in Henretta Creek in summer-fall.

[43] For this comparison and subsequent comparisons provided in Section 5.0, comparisons are provided for stations and lines of evidence with data collected prior to and during the decline window for the corresponding season. If data were not available prior to the decline window, then a comparison could not be made.

- In Clode Creek (FR_CC1):
  - Most or all of lithium, nitrite, nitrate, selenium, sulphate/TDS, and dissolved oxygen (early life stages only) were above screening values in all seasons and years in the decline window. Peak concentrations were between the level 1 and level 2 screening values (lithium, dissolved oxygen), between the level 2 and level 3 screening values (nitrite, selenium, sulphate/TDS), or above the level 3 screen value (nitrate), indicating a range of potential effects from multiple constituents. TP data indicated ultra-oligotrophic to oligotrophic conditions.
  - Mean invertebrate selenium concentrations were below the level 1 benchmark in spring 2018 and between the level 1 and level 2 benchmarks in spring 2019. These results indicate a potential low-magnitude effect of selenium on juvenile growth, although this is a conservative interpretation because the level 1 benchmark is an unbounded no-effects concentration for Yellowstone Cutthroat Trout (Section 3.2.5.2).
  - The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017, except for sulphate (all seasons) and selenium (summer-fall).

Table 36 summarizes results presented herein for water quality and tissue selenium in S9 relative to fish use. The following bullets discuss conditions in S9 in winter, spring, and summer-fall of the decline window relative to the requisite conditions.

- Winter water quality in S9 met the requisite conditions to contribute to the WCT decline via effects on juvenile and/or adult WCT in the Fording River (nitrite) and Clode Creek (multiple constituents), together representing potential effects on 3.4% of adult fish in winter. Winter water quality did not meet the requisite conditions in Henretta Creek or Fish Pond Creek, representing 11.7% of adult fish use in winter.
- Spring water quality in S9 met the requisite conditions to contribute to the WCT decline via potential effects on juvenile and/or adult WCT in lower Henretta Creek (dietary selenium) and Clode Creek (multiple constituents) and via effects on early life stages of WCT in Clode Creek (multiple constituents), representing potential effects on 9.3% of adult fish in spring and 1.3% of recorded redds. Spring water quality did not meet the requisite conditions in the Fording River (all life stages), upper Henretta Creek (all life stages), or lower Henretta Creek (early life stages), representing 10% of adult fish use in spring and 13.6% of recorded redds. No water quality data were available for Fish Pond Creek in the spring, which had 0.8% of adult use and 1.3% of recorded redds. Water quality in Clode Creek indicated low- to moderate-level effects from multiple constituents, but the overlap of juvenile and adult fish with these conditions is uncertain due to fish exclusion implemented subsequent to the telemetry study.
- Summer-fall water quality in S9 met the requisite conditions to contribute to the WCT decline via effects on juvenile and/or adult WCT in the Fording River (tissue selenium) and Clode Creek (multiple constituents) and on early life stages of WCT in the Fording River (dissolved oxygen), Henretta Creek (dissolved oxygen), Fish Pond Creek (dissolved oxygen), and Clode Creek (multiple constituents). For juveniles and adults, areas with potential effects represent 7% of adult fish use in summer. For early life stages, areas with potential effects represent 14.9% of recorded redds.

Based on the information summarized above, water quality in S9 met the requisite conditions to contribute to the WCT decline, but not to be the sole cause. Monitoring data indicated a potential for up to low-level effects to adults and/or juveniles, with approximately one-third of adult fish use in S9 overlapping with potential low-level effects in winter (nitrite) and summer-fall (tissue selenium), and approximately half of adult fish use in S9 overlapping with potential low-or moderate-level effects in spring. For early life stages in summer-fall, potential low-level effects of dissolved oxygen[44] were indicated in most areas with redds in S9, and low- to high-level effects of multiple constituents were indicated in Clode Creek (representing 1.3% of recorded redds).

[44] As discussed in Section 3.3.2.7, the interpretation for dissolved oxygen depends on the differential used between overlying water and interstitial dissolved oxygen. The available information indicates that potential effects may be overstated herein.

Table 36: S9: Fish Use and Water Quality Findings for the Decline Window

Watercourse	Line of Evidence	Winter	Spring		Summer-Fall	
		Adults and Juveniles	Adults and Juveniles	Early Life Stages	Adults and Juveniles	Early Life Stages[1]
Fording River	Fish Use (%)	3.4	10	12	7.0	12
	Water Quality (FR_FR1)	NO2: L1 - L2 (2018)	<WQG or <L1	<WQG or <L1	<WQG or <L1	DO: L1-L2
	Tissue Selenium[2]	<L1	<L1	—	L1-L2 (2018)	—
Henretta Creek (upstream)	Fish Use (%)	0	0	0	0	0
	Water Quality (FR_HC3)	<WQG or <L1	<WQG	<L1	<WQG	DO: L1-L2 (2017)
	Tissue Selenium[2]	—	<L1	—	<WQG or <L1	—
Henretta Creek (downstream)—applies to Henretta Lake	Fish Use (%)	12	3.1	1.3	9.7	1.3
	Water Quality (FR_HC1)	<WQG or <L1	<WQG or <L1	<WQG or <L1	<WQG or <L1	DO: L1-L2 (2017, 2018)
	Tissue Selenium[2]	—	L1-L2 (2018)	—	—	—
Fish Pond Creek	Fish Use	0	0.8	1.3	0	1.3
	Water Quality (FR_FC1)	<WQG or <L1	—	—	<WQG or <L1	DO: L1-L2 (2017)
	Tissue Selenium[2]	—	—	—	<L1	—
Clode Creek	Fish Use (%)	0	6.2	1.3	0	1.3
	Water Quality (FR_CC1)	Li: L1-L2, NO3[5]; NO2: L1-L2, Se[4], SO4: L1-L2, TDS: L1-L2	Li: L1-L2, NO2: L2-L3, NO3[5], Se[4], SO4: L2-L3, TDS: L1-L2	Li: L1-L2, NO2: L2-L3, NO3: >L3, Se: L2-L3, SO4: L2-L3, TDS: L1-L2, DO: L1-L2	NO2: L2-L3, NO3[5], Se[4], SO4: L1-L2, TDS: L1-L2	NO2: L2-L3, NO3: L2-L3, Se: L2-L3, SO4: L1-L2, TDS: L1-L2, DO: L1-L2
	Tissue Selenium[2]	—	—	—	L1-L2 (2018)	—

Notes: '—' = no applicable data for the corresponding station and season. Shading indicates the worst-case magnitude from screening across constituents: below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Underline indicates that the magnitude of potential effects was higher in the decline window than pre-September 2017 conditions. If data were not available prior to the decline window, then the magnitude could not be compared, and results were therefore not underlined.
(1) Fish use for early life stages in summer-fall was assumed to be equal to that recorded in spring.
(2) Invertebrate selenium concentrations were used to evaluate potential dietary effects to adult and juvenile WCT. Thus, screening outcomes are only shown under columns for adults and juveniles.
(3) Nitrate benchmarks are based on embryos and alevins and have uncertain relevance for interpreting potential effects to juveniles and adults. As discussed in Section 3.3.2.3, the available information suggests that juveniles and adults are less sensitive to nitrate and that peak nitrate concentrations would not result in adverse effects to these life stages. Therefore, the interpretation of toxicity data for juveniles and adults were used to identify the worst-case screening outcome.
(4) Aqueous selenium benchmarks are based on embryos and alevins and have no relevance for interpreting potential effects to adults and juveniles. Therefore, the worst-case outcome for selenium was based on invertebrate selenium concentrations (Section 3.3.2.4.2).
(5) Nitrate benchmarks are based on embryos and alevins and have uncertain relevance for interpreting potential effects to juveniles and adults. As discussed in Section 3.3.2.3, the available information suggests that juveniles and adults are less sensitive to nitrate but that peak nitrate concentrations could result in adverse effects to these life stages in Clode Creek.

5.3 Segment 8

S8 is 5.75 km long, extending from just upstream of Kilmarnock Creek to approximately 300 m downstream of Clode Creek. All mainstem habitat in S8 is located downstream of mining. S8 contains 5.3 ha of fish accessible habitat, a small portion of which is in three fish accessible channels: West Exfiltration Ditch (0.01 ha), Grassy Creek (0.024 ha), and Smith Ponds channel (0.14 ha).[45] The Smith Ponds channel had a fish fence installed from September 2018 to spring 2019 that prevented fish access for part of the decline window. There are seven release locations in S8: West Exfiltration Ditch, Grassy Creek, and five settling ponds (Lake Mountain, Eagle, Liverpool, North Loop, and Smith).

Telemetry data (EoC Team 2021 using data collected by Cope et al. 2016) indicate that adult WCT reside in the mainstem of S8 in winter (20%), spring (20%), and summer-fall (12%). Redds (12%) were observed in the mainstem portion of S8 in the spring.

S8 had seven water quality stations in the evaluation of mine-influenced releases (Section 2.0): West Exfiltration Ditch (FR_WED1), Grassy Creek (FR_GC1), Lake Mountain Sediment Pond Decant (FR_LMP1), Eagle Settling Pond Decant (FR_EC1), Liverpool Sediment Pond Decant (FR_LP1), North Loop Settling Pond Decant (FR_NL1), and Smith Ponds Decant (FR_SP1). Concentrations of all constituents were less than short-term water quality guidelines and/or acute screening values, indicating that acute effects to WCT would not be expected. Acute testing (at FR_LMP1, FR_EC1, FR_LP1, FR_NL1, and FR_SP1) also indicated no acute effects within the decline window.

S8 had three water quality stations in the refined assessment (Section 3.0), all of which were located on the mainstem Fording River (FR_FRABEC1, FR_MULTIPLATE, FR_FR2). Invertebrate selenium concentrations were monitored at six stations sampled in the decline window (FOUNGD, FODNGD, FR_MULTIPLATE, FR_FRNTP, FR_FR2, FOFR2W) and two stations were sampled for WCT tissue selenium (FR_MULTIPLATE and Smith Ponds Channel).

Results for the mainstem Fording River of S8 (FR_FRABEC1, FR_MULTIPLATE, FR_FR2) are as follows:

- Concentrations of most water quality constituents were below long-term WQGs and/or level 1 screening values. Exceptions were observed in winter 2018 and 2019 when nitrate concentrations were between the level 1 and level 2 screening values, in spring 2018 when nitrate and selenium concentrations were between level 1 and level 2 screening values, and in summer-fall 2017 and 2018 when dissolved oxygen concentrations were between the level 1 and level 2 screening values for buried embryo/alevin life stages (but not for juveniles and adults). These results indicate a potential for low magnitude effects of nitrate, selenium, and dissolved oxygen on early life stages of WCT, although the interpretation for selenium was not supported by tissue selenium concentrations (see bullets below). Nitrate concentrations would not be expected to result in effects to adults or juveniles (see Section 3.3.2.3). TP data indicated ultra-oligotrophic to oligotrophic conditions, except for FR_FR2 (2019) which was mesotrophic.

[45] As discussed in Section 2.3.2.3, West Exfiltration Ditch is fed by a combination of groundwater from the upper Fording River and exfiltration from Clode Sediment Pond and Grassy Creek is fed by exfiltration from Clode Sediment Pond; thus, water quality in the Fording River mainstem and Clode Creek are expected to reflect the range of conditions in West Exfiltration Ditch and Grassy Creek.

- Mean invertebrate selenium concentrations were below the dietary level 1 benchmark, indicating no chronic effects to juvenile fish feeding at these locations. Mean selenium concentrations in WCT were below the level 1 benchmark for effects to reproduction, indicating no chronic effects to early life stages of WCT.
- The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017, except for nitrate and selenium in spring and dissolved oxygen in summer-fall.

Results for tributaries in S8 are as follows:

- Mean selenium concentrations in WCT captured in the Smith Ponds channel were between the level 1 and level 2 benchmarks, indicating a potential 10 to 20% effect on reproduction of WCT.

Table 37 summarizes results presented herein for water quality and tissue selenium in S8 relative to fish use. The following bullets discuss conditions in S8 in winter, spring, and summer-fall of the decline window relative to the requisite conditions.

- In winter, water quality in S8 did not meet the requisite conditions for potentially contributing to the WCT decline. S8 represents 20% of adult fish use in winter.
- In spring, water quality in S8 met the requisite conditions for potentially contributing to the WCT decline via effects on early life stages in the Fording River (nitrate and aqueous selenium). This segment represents 12% of recorded redds in spring. For juveniles and adults, spring conditions in S8 did not meet the requisite conditions. S8 represents 20% of adult fish use in spring.
- In summer-fall, water quality in S8 met the requisite conditions for potentially contributing to the WCT decline via effects on early life stages in the Fording River (dissolved oxygen) and Smith Ponds channel (tissue selenium), representing 12% of recorded redds in spring. For juveniles and adults, summer-fall conditions in S8 did not meet the requisite conditions. S8 represents 12% of adult fish use in summer-fall.

Based on the information summarized above, water quality in S8 met the requisite conditions to contribute to the WCT decline, but not to be the sole cause. Monitoring data indicated a potential for up to low-level effects to early life stages in the mainstem Fording River. Water quality in S8 did not meet the requisite conditions for adults or juveniles.

Table 37: S8: Fish Use and Water Quality Findings for the Decline Window

Watercourse	Line of Evidence	Winter	Spring		Summer-Fall	
		Adults and Juveniles	Adults and Juveniles	Early Life Stages	Adults and Juveniles	Early Life Stages[1]
Fording River	Fish Use (%)	20	20	12	12	12
	Water Quality	NO3[3]	NO3[3], Se[4]	NO3: L1-L2, Se: L1-L2	<L1	DO: L1-L2
	Tissue Selenium[2]	<L1	<L1	—	<L1	<L1
Smith Ponds channel	Fish Use (%)	0	0	0	0	0
	Tissue Selenium[2]	—	—	—		L1-L2 (2019)

Notes: '—' = no applicable data for the corresponding station and season. Shading indicates the worst-case magnitude from screening across constituents: below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Underline indicates that the magnitude of potential effects was higher in the decline window than pre-September 2017 conditions; for the Fording River, underline indicates a shift in magnitude at one or more stations. If data were not available prior to the decline window, then the magnitude could not be compared, and results were therefore not underlined.
(1) Fish use for early life stages in summer-fall was assumed to be equal to that recorded in spring.
(2) Invertebrate selenium concentrations were used to evaluate potential dietary effects to adult and juvenile WCT. Thus, screening outcomes are only shown under columns for adults and juveniles. WCT selenium concentrations were used to evaluate potential reproduction effects on early life stages of WCT. Thus, screening outcomes are only shown under columns for early life stages.
(3) Nitrate benchmarks are based on embryos and alevins and have uncertain relevance for interpreting potential effects to juveniles and adults. As discussed in Section 3.3.2.3, the available information suggests that juveniles and adults are less sensitive to nitrate and that peak nitrate concentrations would not result in adverse effects to these life stages. Therefore, the interpretation of toxicity data for juveniles and adults were used to identify the worst-case screening outcome.
(4) Aqueous selenium benchmarks are based on embryos and alevins and have no relevance for interpreting potential effects to adults and juveniles. Therefore, the worst-case outcome for selenium was based on invertebrate selenium concentrations (Section 3.3.2.4.2)..

5.4 Segment 7

S7 is 5.04 km long, extending from ~1.5 km upstream of Porter Creek to just upstream of Kilmarnock Creek. All mainstem habitat in S7 is located downstream of mining. S7 contains 6.2 ha of fish-accessible habitat, 6.0 ha of which is in the mainstem Fording River. There are two release locations in S7 that are fish accessible in their lowest reaches: Kilmarnock Creek (0.09 ha) and Swift Creek (0.06 ha). As discussed in Section 3.2.2, fish access to these channels was intermittent in the decline window due to fish fences that restricted access from October 2018 to freshet 2019 (Swift Creek) or after September 2018 (Kilmarnock Creek). There are six release locations in S7: South Kilmarnock Settling Pond Decant (Phase 1 and 2), Kilmarnock Creek downstream of the rock drain, Swift Creek (pond decant and bypass), and Cataract Creek sediment pond.

S7 is one of the reaches of the mainstem Fording River that experiences seasonal drying. In the decline window, the drying occurred between December 2017 and March 2018 (up to ~1.7 km between FR_FRRD [top of S6] and FR_FRCP1 [mid S7]) and between September 2018 and March 2019 (up to ~2 km between FR_FRRD and FR_FR4 [mid S7, upstream of FR_FRCP1]) (Zathey and Robinson 2020; see Figure 2). This reach is referred to as the southern drying section. During seasonal dry periods in the decline window, a reach of the southern drying section immediately downstream of Cataract Creek had water quality resembling unmixed Cataract Creek water, with no apparent dilution from upstream Fording River water that was flowing subsurface at this time. These conditions of unmixed Cataract Creek water are reflected in water quality monitoring data from the Fording River Compliance Location (FR_FRCP1), which is located ~500 m downstream of the Cataract Creek confluence.

In September 2018, field crews sampling at FR_FRCPSW (~1 km downstream of FR_FRCP1) observed 15 WCT mortalities at the upstream end of the southern drying reach (Wilm 2020). While the cause of these mortalities is unknown, there is some evidence that suggests that the fish were stranded; for more information, please see Hocking et al. (2021).

In addition to drying reaches, S7 contained two impassible riffles in the 2018 overwintering migration period: FRD-CRA02 (river km 51) and FRD-CRA03 (river km 52) (Hardwood et al. 2021); these riffles are located upstream and downstream of FR_FRCP1 (river km 51.7). In both cases, impassible riffles were estimated to begin on September 10 and continue to the end of the migration period (October 15).

Telemetry data (EoC Team 2021 using data collected by Cope et al. 2016) indicate that a small portion of adult WCT reside in S7 in winter (2.7%), spring (3.1%), and summer-fall (10%), and a small proportion of redds (1.3%) were observed in the mainstem portion of S7 in the spring. Kilmarnock Creek was the only S7 tributary with fish use (0.8% of adults in spring). No redds were recorded in S7 tributaries, nor were adults recorded in winter or summer-fall. Although no adults were recorded in Kilmarnock and Swift creeks in summer-fall of the telemetry study, WCT tissue samples were collected in fall 2019 from these creeks. Based on the occurrence of fish during tissue sampling, adult fish use in these creeks is expected to be higher than indicated by the telemetry study. In addition, an analysis conducted by Akaoka and Hatfield (2021) indicated that up to 10% of fish may have been transiently exposed to conditions in S7 in winter and summer-fall (discussed further in EoC 2021).

S7 had six water quality stations in the evaluation of mine-influenced releases (Section 2.0): South Kilmarnock Settling Pond Decant (Phase 1 and 2 [FR_SKP1, 2]), Kilmarnock Creek downstream of the rock drain (FR_KC1), Swift Creek (GH_SC1-2), and Cataract Creek (GH_CC1). Concentrations of all constituents were below short-term water quality guidelines and/or acute screening values, indicating that acute effects to WCT would not be expected. Acute testing (at FR_SKP1, FR_SKP2, GH_SC1, and GH_CC1) also indicated no acute effects within the decline window.

S7 had five water quality stations in the refined assessment, including three on the mainstem Fording River (FR_FR3, FR_FR4, and FR_FRCP1), one on lower Kilmarnock Creek (FR_KC1), and one on lower Swift Creek (GH_SC1-2). Invertebrate selenium concentrations were monitored at six stations sampled in the decline window (FR_FR3, SCOUTDS, FR_FR4, FR_FRCP1, FRCP1SW, FR_KC1) and two stations were sampled for WCT tissue selenium (Swift and Kilmarnock creeks). Chronic toxicity testing was conducted at FR_FRCP1.

Results for the mainstem Fording River of S7 are as follows:

- At FR_FR3 and FR_FR4, reflecting conditions upstream of Cataract Creek:
  - Concentrations of most water quality constituents were below long-term WQGs and/or level 1 screening values. Exceptions were observed in winter at FR_FR4 when selenium (2017 and 2018) or nitrate (2019) were between level 1 and level 2 screening values, in summer-fall at FR_FR4 when selenium (2017) was between the level 1 and level 2 screening values, and in summer-fall at FR_FR4 (2017, 2019) and FR_FR3 (2018) when dissolved oxygen concentrations were between the level 1 and level 2 screening values for buried embryo/alevin life stages (but not for juveniles and adults). These results indicate a potential for low magnitude effects on early life stages in summer-fall. These screening outcomes are not expected to reflect potential chronic effects to juveniles and adults from nitrate (see Section 3.3.2.3) or selenium (see next bullet). TP data indicated ultra-oligotrophic to oligotrophic conditions.
  - Mean invertebrate selenium concentrations were below the level 1 benchmark, except for winter 2018 when concentrations were between the level 1 and level 2 benchmarks. These results indicate a potential for low magnitude effect of selenium on juvenile growth in winter 2018, although this is a conservative interpretation because the level 1 benchmark is an unbounded no-effects concentration for Yellowstone Cutthroat Trout (Section 3.2.5.2).
  - The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017, except for tissue selenium and dissolved oxygen in summer-fall.
- At FR_FRCP1, reflecting the seasonally dry reach downstream of Cataract Creek:
  - Several constituents had concentrations greater than screening values in winter and/or summer-fall in the decline window. Constituents were nitrate (between the level 1 and level 2 screening values in winter and summer-fall), sulphate/TDS (above the level 3 screen value in winter and summer-fall 2018), and dissolved oxygen (below the level 3 screening value in winter 2018). Selenium was greater than one or more screening values in all seasons, and the effect of these concentrations on bioaccumulation is reflected in tissue selenium data (next bullet). TP data indicated ultra-oligotrophic to oligotrophic conditions. Conditions at FR_FRCP1 in summer-fall 2018 coincided with the 15 WCT mortalities observed at FR_FRCP1SW discussed above.
  - Mean invertebrate selenium concentrations were below the level 1 benchmark, except for winter 2018 and spring 2019 when concentrations were between the level 2 and level 3 benchmarks. These results indicate a potential for moderate magnitude effects of selenium on juvenile growth.
  - Chronic toxicity testing with early life stages of rainbow trout and fathead minnow indicated several responses in the decline window that were outside the typical range observed in Elk Valley reference waters. For early life stage survival, responses were observed in winter 2017 (Q4 rainbow trout), summer-fall 2018 (Q3 fathead minnow), winter 2018 (Q4 rainbow trout and fathead minnow), and winter 2019 (Q1 fathead minnow). Percent effect on early life stage survival of rainbow trout was 50% in winter

2017 and 75% in winter 2018, which are higher than effect sizes measured prior to the decline window (up to 43%). Percent effect on early life stage survival of fathead minnow was 98% in summer-fall and winter 2018 and 77% in winter 2019, which are higher than effect sizes measured prior to the decline window (up to 19%). The strongest evidence for causation in winter was for sulphate/TDS, although microbes and nitrate were also identified as possible contributors. No water quality constituent was identified as a potential cause of observed responses in summer-fall 2018.[46] Aside from the results discussed above, responses in other seasons were within the range typically observed in Elk Valley reference waters. As discussed in Section 3.2.5.3, there is uncertainty and potentially conservatism in interpreting early life stage testing with respect to potential effects on juveniles and adults.

- The magnitude of potential effects in the decline window was higher than the range observed pre-September 2017 for one or more lines of evidence in each season. Lines of evidence indicating higher magnitude of effects included chronic toxicity testing with early life stages of fish (winter and summer-fall), dissolved oxygen (winter 2018), selenium (spring and summer-fall), nitrate (summer-fall), sulphate (summer-fall), and TDS (winter and summer-fall).

Results for tributaries in S7 are as follows:

- In the fish-accessible reach of Kilmarnock Creek:
  - Peak concentrations of selenium and sulphate/TDS were between the level 2 and level 3 screening values and peak concentrations of nitrate were above the level 3 screening value, indicating moderate- to high-magnitude effects (but noting that no redds were observed in this area). These screening outcomes are not expected to reflect potential chronic effects to juveniles and adults from selenium (see next bullet). TP data indicated ultra-oligotrophic to oligotrophic conditions.
  - Mean invertebrate selenium concentrations were below the dietary level 1 benchmark, indicating no chronic effects to juvenile fish feeding at these locations. Mean selenium concentrations in WCT were below the level 1 benchmark for effects to reproduction, indicating no chronic effects to early life stages of WCT.
  - The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017, except for selenium and sulphate in summer-fall.
- In the fish-accessible reach of Swift Creek:
  - Peak concentrations of nitrate and nitrite were between the level 1 and level 2 screening values, peak concentrations of selenium, TDS, and dissolved oxygen were between the level 2 and level 3 screening values, and peak concentrations of sulphate were above the level 3 screen value, indicating low- to high-level potential effects. TP data indicated oligotrophic to mesotrophic conditions.
  - Mean selenium concentrations in WCT were between the level 1 and level 2 benchmarks for effects to reproduction, indicating potential low-level effects to early life stages of WCT.
  - The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017, except for nitrite in summer-fall and dissolved oxygen in spring and summer-fall.

[46] Concentrations of all constituents were equal to or lower than concentrations in reference waters and/or test site waters with no adverse response, and/or were lower than long-term BC WQGs (Golder 2019). It is uncertain whether microbes may have contributed to the observed response in these tests.

Table 38 summarizes results presented herein for water quality, tissue selenium, and chronic toxicity testing in S7 relative to fish use. The following bullets discuss conditions in S7 in winter, spring, and summer-fall of the decline window relative to the requisite conditions.

- Winter water quality in S7 met the requisite conditions to contribute to the WCT decline via potential moderate- or high-level effects on juvenile and adult WCT at FR_FRCP1 in the Fording River (selenium, sulphate/TDS, and dissolved oxygen), Kilmarnock Creek (nitrate and sulphate/TDS), and Swift Creek (sulphate/TDS). These areas together represent 2.7% of adult fish use in winter. The interpretation of winter water quality data at FR_FRCP1 aligns with winter chronic testing results, which had high-magnitude responses in tests with early life stages of fathead minnow and/or rainbow trout.
- Spring water quality in S7 met the requisite conditions to contribute to the WCT decline via potential effects on juvenile and adult WCT in the mainstem Fording River at FR_FRCP1 (one invertebrate selenium measurement), Kilmarnock Creek (nitrate and moderate-level sulphate/TDS) and Swift Creek (low-level nitrite, high-level sulphate, moderate-level TDS) and via effects on early life stages of WCT in Fording River (selenium), Kilmarnock Creek (four constituents; up to high-level), and Swift Creek (five constituents; up to high-level). These areas together represent 7% of adult fish use and 1.3% of recorded redds in spring. The interpretation of spring water quality data at FR_FRCP1 aligns with spring chronic testing results, which had mean responses within the range of reference waters from the Elk Valley.
- Summer-fall water quality in S7 met the requisite conditions to contribute to the WCT decline via potential effects on juvenile and adult WCT in the mainstem Fording River (high-level sulphate/TDS in 2018 at FR_FRCP1), Kilmarnock Creek (low-level sulphate/TDS), and Swift Creek (low-level nitrite, high-level sulphate, moderate-level TDS) and via potential effects on early life stages of WCT in the Fording River (five constituents; up to high-level), Kilmarnock Creek (four constituents; up to moderate-level), and Swift Creek (six constituents; up to high-level). These areas together represent 10% of adult fish use and 1.3% of recorded redds. The interpretation of summer-fall water quality data at FR_FRCP1 aligns with summer-fall chronic testing results, which had high-magnitude responses in tests conducted with early life stages of fathead minnow.

Based on the information summarized above, water quality in S7 met the requisite conditions to contribute to the WCT decline. Monitoring data indicated potential effects in all seasons, and the magnitude of potential effects was distinct between the reach downstream of Cataract Creek (represented by FR_FRCP1) and the reach upstream of Cataract Creek (represented by FR_FR3 and FR_FR4). It is uncertain what proportion of fish use occurred in the lower reach vs. the upper reach during the decline window, and therefore it is uncertain what proportion of fish overlapped with each of these conditions. However, the available telemetry data indicate that S7 overall represents a relatively small proportion of total fish use in the upper Fording River watershed (winter 2.7%; spring 3.9%; summer-fall 10%), and particularly in winter when potential effects were of the greatest magnitude. Therefore, water quality in S7 did not meet the requisite conditions to be the sole cause of the WCT decline.

If other conditions in the upper Fording River watershed resulted in more fish exposed to FR_FRCP1 conditions than was observed during the years of the telemetry studies, particularly from late 2018 to early 2019, then the degree of contribution could be higher than suggested by the analysis above. That is, if more fish were exposed, then the degree of contribution could be higher. Conversely, if fewer fish were exposed, then the degree of contribution could be lower. This uncertainty is discussed further in the integration chapter (EoC Team 2021) by evaluating factors that could have affected the number of fish exposed to FR_FRCP1 conditions in winter (2018, 2019) and summer-fall (2018).

Table 38: S7: Fish Use and Water Quality Findings for the Decline Window

Watercourse	Line of Evidence	Winter		Spring		Summer-Fall	
		Adults and Juveniles	Early Life Stages(1)	Adults and Juveniles	Early Life Stages	Adults and Juveniles	Early Life Stages(1)
Fording River	Fish Use (%)	2.7	n/a	3.1	1.3	10	1.3
	Water Quality (FR_FR3, FR_FR4)	NO3(3), Se(4)	—	<L1	<L1	Se: L1-L2(4)	Se: L1-L2, DO: L1-L2
	Tissue Selenium (other than FR_FRCP1)(2)	L1-L2	—	<L1	—	L1-L2	—
	Water Quality (FR_FRCP1)	NO3(3), Se(4), SO4: >L3, TDS: >L3, DO: <L3	—	Se(4)	Se: L1-L2	NO3(3), Se(4), SO4: >L3, TDS: >L3	NO3: L1-L2, Se: L2-L3, SO4: >L3, TDS: >L3
	Tissue Selenium (FR_FRCP1)(2)	L2-L3	—	L2-L3	—	<L1	—
	Chronic toxicity testing (FR_FRCP1) - embryo-alevin survival	—	RBT: 75% effect FHM: 98% effect	—	Within regional NR	—	FHM: 98% effect
Kilmarnock Creek	Fish Use (%)	0	n/a	0.8	0	0	0
	Water Quality	NO3(5), Se(4), SO4: L2-L3, TDS: L2-L3	—	NO3(5), Se(4), SO4: L2-L3, TDS: L2-L3	NO3: >L3, Se: L2-L3, SO4: L2-L3, TDS: L2-L3	NO3(5), Se(4), SO4: L1-L2, TDS: L1-L2	NO3: L2-L3, Se: L2-L3, SO4: L1-L2, TDS: L1-L2
	Tissue Selenium(2)	—	—	—	<L1	<L1	<L1
Swift Creek	Fish Use (%)	0	n/a	0	0	0	0
	Water Quality	NO3(3), Se(4), SO4: >L3, TDS: >L3	—	NO2: L1-L2, NO3(3), Se(4), SO4: >L3, TDS: L2-L3	NO2: L1-L2, NO3: L1-L2, Se: L2-L3, SO4: >L3, TDS: L2-L3, DO: L1-L2	NO2: L1-L2, NO3(3), Se(4), SO4: >L3, TDS: L2-L3	NO2: L1-L2, NO3: L1-L2), Se: L2-L3, SO4: >L3, TDS: L2-L3, DO: L2-L3
	Tissue Selenium(2)	—	—	—	—	—	L1-L2 (2019)

Notes: '—' = no applicable data for the corresponding season and life stage; n/a = not applicable because early life stages of fish are not present in winter; NR = normal range of responses observed in Elk Valley reference waters.
Shading indicates the worst-case magnitude from screening across constituents: below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Underline indicates that the magnitude of potential effects was higher in the decline window than pre-September 2017 conditions; for the Fording River, underline indicates a shift in magnitude at one or more stations.
(1) Early life stages of WCT are not present in winter; this column is shown because chronic toxicity tests in winter were conducted with early life stages of fish. Fish use for early life stages in summer-fall was assumed to be equal to that recorded in spring.
(2) Invertebrate selenium concentrations were used to evaluate potential dietary effects to adult and juvenile WCT. Thus, screening outcomes are only shown under columns for adults and juveniles. WCT selenium concentrations were used to evaluate potential reproduction effects. Thus, screening outcomes are only shown under columns for early life stages.
(3) Nitrate benchmarks are based on embryos and alevins and have uncertain relevance for interpreting potential effects to juveniles and adults. As discussed in Section 3.3.2.3, the available information suggests that juveniles and adults are less sensitive to nitrate and that peak nitrate concentrations would not result in adverse effects to these life stages.
the interpretation of toxicity data for juveniles and adults were used to identify the worst-case screening outcome.
(4) Aqueous selenium benchmarks are based on embryos and alevins and have no relevance for interpreting potential effects to adults and juveniles.
Therefore, the worst-case outcome for selenium was based on invertebrate selenium concentrations (Section 3.3.2.4.2).
(5) Nitrate benchmarks are based on embryos and alevins and have uncertain relevance for interpreting potential effects to juveniles and adults. As discussed in Section 3.3.2.3, the available information suggests that juveniles and adults are less sensitive to nitrate but that peak nitrate concentrations could result in adverse effects to these life stages in Kilmarnock Creek.

5.5 Segment 6

S6 is 7 km long, extending from Chauncey Creek to ~1.5 km upstream of Porter Creek. All mainstem habitat in S6 is located downstream of mining. S6 contains 6.7 ha of fish-accessible habitat, 6.2 ha of which located in the mainstem Fording River. There only release location in S6 that has a reach accessible to fish is Porter Creek (0.15 ha). Chauncey Creek (0.40 ha) is a tributary in S6 that is unaffected by mining.

The mainstem Fording River in S6 contains high-use overwintering habitat in a series of deep pools upstream of Chauncey Creek near FR_FRABCH and high-use spawning habitat upstream of Porter Creek near FR_FRRD. Adult WCT reside in the mainstem portion of S6 in winter (40%), spring (22%), and summer-fall (16%). Redds (47%) were observed in the mainstem portion of S6 in the spring. No adults or redds were recorded in S6 tributaries, except for 0.3% of adults in summer-fall in Chauncey Creek.

S6 had one water quality station in the evaluation of mine-influenced releases (Section 2.0): Porter Creek sediment pond (GH_PC1). Concentrations of all constituents were below short-term water quality guidelines and/or acute screening values, indicating that acute effects to fish would not be expected. Acute testing also indicated no acute effects within the decline window.

S6 had five water quality stations in the refined assessment, including three on the mainstem Fording River (FR_FRRD, GH_PC2, FR_FRABCH), one on Porter Creek, and one on Chauncey Creek. Invertebrate selenium concentrations were monitored at seven stations sampled in the decline window (FR_FRRD, GH_PC2, FR_FRABCH, RG_SAFR, SFRR, FOXCF, FRWUCH) and one station was sampled for WCT tissue selenium (FR_FRABCH). Chronic toxicity testing was conducted at FR_FRABCH beginning in Q4 2018.

Results for the mainstem Fording River of S6 are as follows:

- At FR_FRRD and GH_PC2:
  - Constituents with concentrations greater than screening values in the decline window were nitrate (between the level 1 and level 2 screening values in summer-fall, between the level 2 and level 3 screening values in winter and spring), selenium (between the level 1 and level 2 screening values in all seasons), TDS (between the level 1 and level 2 screening values in winter and spring), and dissolved oxygen (between the level 1 and level 2 screening values for buried embryo/alevin life stages in summer-fall 2018 only). These results indicate a potential for low-level effects of multiple constituents on early life stages of WCT in summer-fall and spring[47] (early life stages are not present in winter and a potential for low-level effects of TDS on juveniles and adults in winter and spring). These screening outcomes are not expected to reflect potential chronic effects to juveniles and adults from nitrate (see Section 3.3.2.3) or selenium (see next bullet). TP data indicated ultra-oligotrophic to oligotrophic conditions.
  - Mean invertebrate selenium concentrations were below the level 1 dietary benchmark, except concentrations measured in a side channel along the Fording River (RG_SAFR) in spring 2018 that were between the level 2 and level 3 screening values. These results indicate no chronic effects at most stations and in most seasons, and a potential moderate-level effect on growth of juvenile WCT feeding in the side channel in spring 2018. RG_SAFR is located approximately 2.2 km downstream of FR_FRRD and approximately 4.8 km upstream of FR_FRABCH. Based on the telemetry data collected by Cope et al. (2016) in spring (Figure 6), adult WCT were found in the vicinity of RG_SAFR. However, based on the distribution shown in Figure 6, there is no indication of fish congregating near RG_SAFR.

[47] Peak nitrate concentrations at FR_FRRD occurred before the spawning period. Peak concentrations when early life stages would be present were between the level 1 and level 2 screening values.

- The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017, except for nitrate (spring and summer-fall), aqueous selenium (spring), and TDS (winter and spring).

- At FR_FRABCH:
  - Constituents with concentrations greater than screening values in the decline window were nitrate (between the level 1 and level 2 screening values in all seasons), selenium (between the level 1 and level 2 screening values in all seasons), and dissolved oxygen (between the level 1 and level 2 screening values in spring and summer-fall). These results indicate a potential for low-level effects to early life stages in spring and summer-fall (early life stages are not present in winter). These screening outcomes are not expected to reflect potential chronic effects to juveniles and adults from nitrate (see Section 3.3.2.3), selenium (see next bullet), or dissolved oxygen (Table 39). TP data indicated oligotrophic conditions.
  - Mean invertebrate selenium concentrations were below the level 1 dietary benchmark, indicating no chronic effects to juvenile or adult fish feeding at this location. Mean selenium concentrations in WCT were below the level 1 benchmark for effects to reproduction, indicating no chronic effects to early life stages of WCT.
  - Chronic testing with early life stages of rainbow trout and fathead minnow indicated that most responses in the decline window were within the typical range observed in Elk Valley reference waters. For early life stage survival, responses were observed in winter 2018 (Q4 rainbow trout and fathead minnow) and spring 2019 (Q2 rainbow trout). Percent effect on early life stage survival of rainbow trout was 17% in winter 2018 and 24% in spring 2019, which are within the range observed prior to the decline window at FR_FRCP1 (up to 43%) and GH_FR1 (up to 52%). Percent effect on early life stage survival of fathead minnow was 39% in winter 2018, which is higher than observed prior to the decline window at FR_FRCP1 (up to 19%) and GH_FR1 (up to 35%). No water quality constituent was identified as potentially contributing to the observed response.[48] Aside from the results discussed above, responses in other seasons were within the range typically observed in Elk Valley reference waters. As discussed in Section 3.2.5.3, there is uncertainty and potentially conservatism in interpreting early life stage testing with respect to potential effects to juveniles and adults.
  - The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017, except for chronic toxicity testing with early life stages of fathead minnow (winter), nitrate (spring and summer-fall), and selenium (spring).

Results for tributaries in S6 are as follows:

- In Porter Creek, constituents with concentrations greater than screening values were nitrate (between the level 1 and level 2 screening values in winter), selenium (between the level 1 and level 2 screening values in all seasons), and sulphate/TDS (between the level 1 and level 2 screening values in spring and above the level 3 screening values in winter). These results indicate potential low-level effects to early life stages in spring and summer-fall (early life stages are not present in winter). For juveniles and adults, these results indicate no chronic effects (summer-fall), potential low-level effects (spring), or potential high-level effects

[48] Concentrations of all constituents were equal to or lower than concentrations in reference waters and/or test site waters with no adverse response, and/or were lower than long-term BC WQGs (Golder 2019). It is uncertain whether microbes may have contributed to the observed response in these tests.

(winter). TP data indicated ultra-oligotrophic to oligotrophic conditions. The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017, except for sulphate and TDS in winter and spring.

- In Chauncey Creek, concentrations of water quality constituents were below long-term WQGs and/or level 1 screening values, indicating no chronic effects to fish. TP data indicated ultra-oligotrophic to oligotrophic conditions. The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017.

Table 39 summarizes results presented herein for water quality, tissue selenium, and chronic testing in S6 relative to fish use, with a focus on overlap of fish with conditions in the overwintering area near FR_FRABCH and the spawning area near FR_FRRD. The following bullets discuss conditions in S6 in winter, spring, and summer-fall of the decline window relative to the requisite conditions.

- Winter water quality in S6 met the requisite conditions to contribute to the WCT decline via potential effects on juvenile and adult WCT in the mainstem reach upstream of Porter Creek (low-level TDS) and in Porter Creek (high-level sulphate and TDS). At FR_FRABCH, which is the station closest to the congregation of overwintering adults, requisite conditions were not met for juveniles and adults. Winter chronic testing results from FR_FRABCH indicated low-magnitude (17%) effects to early life stages of rainbow trout and moderate-magnitude (39%) effects to early life stages of fathead minnow, although the relevance of these test results to adult and juvenile fish is uncertain.
- Spring water quality in S6 met the requisite conditions to contribute to the WCT decline via potential effects on juvenile and adult WCT in the mainstem reach upstream of Porter Creek (low-level TDS and moderate-level tissue selenium) and Porter Creek (low-level sulphate/TDS), and via potential low-level effects on early life stages of WCT in the mainstem (nitrate, selenium, TDS, dissolved oxygen) and Porter Creek (selenium and sulphate/TDS). The mainstem Fording River represents 22% of adult fish use in spring and 47% of recorded redds. Spring chronic testing results from FR_FRABCH indicated moderate-magnitude (24%) effects to early life stages of rainbow trout in Q2 2019 testing.
- Summer-fall water quality in S6 met the requisite conditions to contribute to the WCT decline via potential low-level effects on early life stages of WCT in the Fording River (nitrate, selenium, dissolved oxygen) and Porter Creek (selenium) but did not meet the requisite conditions for potential effects on juveniles and adults. The mainstem Fording River represents 47% of recorded redds and 16.3% of adult fish use in summer-fall. Summer-fall chronic testing results from FR_FRABCH indicated no effects to survival of early life stages of fish.

Based on the information summarized above, water quality in S6 met the requisite conditions to contribute to the WCT decline, but not to be the sole cause. Monitoring data indicated a potential for low-level effects[49] on adults and juveniles in spring and winter, although water quality indicating potential low-level effects did not overlap with reported high overwintering use of the S6 pools. Chronic toxicity monitoring data indicated a potential for up to moderate-level effects on early life stages in winter and spring, which did overlap with high overwintering use (40%) of the S6 pools near FR_FRABCH and with reported high spawning use (47%) of the upstream reach of S6 near FR_FRRD. No water quality constituent could be identified as the cause of the observed moderate-level effects in these chronic tests.

[49] One of 22 mean invertebrate selenium concentrations indicated potential moderate-level effects to growth of juvenile fish, which may be a conservative evaluation for growth of juvenile WCT.

Table 39: S6: Fish Use and Water Quality Findings for the Decline Window

Watercourse	Line of Evidence	Winter		Spring		Summer-Fall	
		Adults and Juveniles	Early Life Stages(1)	Adults and Juveniles	Early Life Stages	Adults and Juveniles	Early Life Stages(1)
Fording River	Fish Use (%)	40	n/a	22	47	16	47
	Water Quality (FR_FRRD, GH_PC2)	NO3(3), Se(4), TDS: L1-L2	—	NO3(3), Se(4), TDS: L1-L2	NO3: L2-L3(5), Se: L1-L2, TDS: L1-L2	NO3(3), Se(4)	NO3: L1-L2, Se: L1-L2, DO: L1-L2
	Tissue Selenium (other locations)(2)	<L1	—	L2-L3 (2018)	—	<L1	—
	Water Quality (FR_FRABCH)	NO3(3), Se(4)	—	NO3(3), Se(4)	NO3: L1-L2, Se: L1-L2, DO: L1-L2	NO3(3), Se(4)	NO3: L1-L2, Se: L1-L2, DO: L1-L2
	Tissue Selenium (FR_FRABCH)(2)	<L1	—	<L1	—	<L1	<L1
	Chronic toxicity testing (FR_FRABCH) – embryo-alevin survival	—	RBT: 17% effect FHM: 39% effect	—	RBT: 24% effect FHM: regional NR	—	Within regional NR
Porter Creek	Fish Use (%)	0	n/a	0	0	0	0
	Water Quality	NO3(3), Se(4), SO4: >L3, TDS: >L3	—	Se(3), SO4: L1-L2, TDS: L1-L2	Se: L1-L2, SO4: L1-L2, TDS: L1-L2	Se(3)	Se: L1-L2
	Tissue Selenium(2)	—	—	—	—	—	—
Chauncey Creek	Fish Use (%)	0	n/a	0	0	0.3	0
	Water Quality	<WQG	—	<WQG	<L1	<WQG	<L1
	Tissue Selenium(2)	—	—	—	—	—	—

Notes: '—' = no applicable data for the corresponding season and life stage; n/a = not applicable because early life stages of fish are not present in winter; NR = normal range of responses observed in Elk Valley reference waters. Shading indicates the worst-case magnitude from screening across constituents: below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).

Underline indicates that the magnitude of potential effects was higher in the decline window than pre-September 2017 conditions; for the Fording River, underline indicates a shift in magnitude at one or more stations.

(1) Early life stages of WCT are not present in winter; this column is shown because chronic toxicity tests in winter were conducted with early life stages of fish. Fish use for early life stages in summer-fall was assumed to be equal to that recorded in spring.

(2) Invertebrate selenium concentrations were used to evaluate potential dietary effects to adult and juvenile WCT. Thus, screening outcomes are only shown under columns for adults and juveniles. WCT selenium concentrations were used to evaluate potential reproduction effects on early life stages of WCT. Thus, screening outcomes are only shown under columns for early life stages.

(3) Nitrate benchmarks are based on embryos and alevins and have uncertain relevance for interpreting potential effects to juveniles and adults. As discussed in Section 3.3.2.3, the available information suggests that juveniles and adults are less sensitive to nitrate and that peak nitrate concentrations would not result in adverse effects to these life stages. Therefore, the interpretation of toxicity data for juveniles and adults were used to identify the worst-case screening outcome.

(4) Aqueous selenium benchmarks are based on embryos and alevins and have no relevance for interpreting potential effects to adults and juveniles. Therefore, the worst-case outcome for selenium was based on invertebrate selenium concentrations (Section 3.3.2.4.2).

(5) Peak nitrate concentration was measured in April 2018 sample collected from FR_FRRD, which is before early life stages are present (see Section 3.3.2.3).

5.6 Segments 4 and 5

S4 and S5 are discussed together in this section because both segments are located in a portion of the mainstem Fording River that is downstream of mining but does not directly receive releases of mine-influenced water. S4 begins ~20 m upstream of Ewin Creek and extends upstream for 4.4 km; S5 extends from that segment break another 4.4 km to Chauncey Creek. S4 and S5 together contain 11 ha of fish accessible habitat. There are no named tributaries in these segments.

Telemetry data (EoC Team 2021 using data collected by Cope et al. 2016) indicate that adult WCT reside in the mainstem of in S4 in winter (2.3%), spring (5.4%), and summer-fall (9.0%). A similar proportion of adult WCT reside in S5 in winter (2.7%), spring (3.8%), and summer-fall (7.8). Low proportions of redds were recorded in S4 (2.6%) and S5 (3.2%).

S5 had one water quality station in the refined assessment, which was located on the mainstem Fording River (FR_FR5). Water quality in S5 is expected to provide a reasonable approximation of water quality in S4 because there are no direct inputs of mine-affected water or large tributaries. Invertebrate selenium concentrations were monitored at one station sampled in the decline window in S4 (FRSCW, a side channel area) and one in S5 (FR_FR5).

Results for S4 and S5 are as follows:

- Concentrations of most water quality constituents were below long-term WQGs and/or level 1 screening values. Exceptions were observed in winter and spring when selenium concentrations were between the level 1 and level 2 benchmarks, although this screening outcome was not supported by the evaluation of tissue selenium data from the mainstem Fording River (see next bullet). TP data indicated ultra-oligotrophic to oligotrophic conditions.
- Mean invertebrate selenium concentrations were less than the level 1 benchmark in S5 and adjacent portions of the mainstem Fording River (see Table 19), indicating no chronic effects to growth of juvenile WCT. The single sampling event in the Fording River side channel in S4 (FRSCW) found higher invertebrate selenium concentrations, indicating that lentic conditions may have been present that resulted in higher bioaccumulation of selenium than is observed in lotic areas. Mean invertebrate selenium concentrations at FRSCW were between the level 2 and level 3 benchmarks, indicating a potential for moderate-level effects to growth of juvenile WCT feeding there.
- The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017.

Table 40 summarizes results presented herein for water quality and tissue selenium in S4 and S5 relative to fish use. The following bullets discuss conditions in winter, spring, and summer-fall of the decline window relative to the requisite conditions.

- Winter water quality in S4 and S5 did not meet the requisite conditions to contribute to the WCT decline. These segments represent 4.9% of adult fish use in winter.
- Spring water quality in S4 and S5 met the requisite conditions to contribute to the WCT decline via effects on growth of juvenile fish feeding in the side-channel lentic area. S4 and S5 represent 9.2% of adult fish use in spring, but it is unknown what proportion of juveniles may feed in side-channel lentic areas.

- Summer-fall water quality in S4 and S5 did not meet the requisite conditions to contributing to the WCT decline. These segments represent 16.8% of adult fish use in summer-fall and 5.8% of redds.

Based on the information summarized above, water quality in S4 and S5 met the requisite conditions to contribute to the WCT decline, but not to be the sole cause. Monitoring data indicated no effects in mainstem areas. Potential effects to juvenile growth associated with invertebrate selenium concentrations in the side channel lentic areas would not be expected to affect a large proportion of fish.

Table 40: S4 and S5: Fish Use and Water Quality Findings for the Decline Window

Watercourse	Line of Evidence	Winter	Spring		Summer-Fall	
		Adults and Juveniles	Adults and Juveniles	Early Life Stages	Adults and Juveniles	Early Life Stages[1]
S5						
Fording River	Fish Use (%)	2.7	3.8	3.2	7.8	3.2
	Water Quality (FR_FR5)	Se[3]	Se[3]	Se: L1-L2	<L1	<L1
	Tissue Selenium[2]	<L1	<L1	—	<L1	—
S4						
Fording River	Fish Use (%)	2.3	5.4	2.6	9.0	2.6
	Tissue Selenium[2]	—	L2-L3	—	—	—

Notes: '—' = no applicable data for the corresponding station and season. Shading indicates the worst-case magnitude from screening across constituents: below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
(1) Fish use for early life stages in summer-fall was assumed to be equal to that recorded in spring.
(2) Invertebrate selenium concentrations were used to evaluate potential dietary effects to adult and juvenile WCT. Thus, screening outcomes are only shown under columns for adults and juveniles.
(3) Aqueous selenium benchmarks are based on embryos and alevins and have no relevance for interpreting potential effects to adults and juveniles. Therefore, the worst-case outcome for selenium was based on invertebrate selenium concentrations (Section 3.3.2.4.2)..

5.7 Segment 3

S3 is 4.2 km long, extending from ~800 m downstream of Dry Creek to ~20 m upstream of Ewin Creek. All mainstem habitat in S3 is downstream of mining. S3 contains 21 ha of fish accessible habitat, 4.9 ha of which is in the mainstem Fording River and the remainder of which is in three fish-accessible tributaries: Ewin Creek (15 ha), Dry Creek (0.20 ha accessible from the Fording River; upstream reaches are isolated by culverts), and Unnamed Creek (0.81 ha).

Telemetry data (EoC Team 2021 using data collected by Cope et al. 2016) indicate that adult WCT reside in the mainstem of S3 in winter (2.3%), spring (3.8%), and summer-fall (7.7%). A small proportion of redds (0.65%) was observed in the mainstem portion of S3 and a larger proportion (5.8%) in lower Dry Creek. No adult fish were recorded in S3 tributaries.

S3 had two water quality stations in the refined assessment: one on the mainstem Fording River (LC_FRUS)[50] and one on lower Dry Creek (LC_DC1). Invertebrate selenium concentrations were monitored at four stations sampled in the decline window in S3 (LC_FRUS, LC_DC1, UPBEC, FWDEC).

Results for S3 are as follows:

- Concentrations of all constituents monitored in the decline window were less than long-term WQGs and/or level 1 screening values.[51] These results indicate negligible potential for effects or no chronic effects to fish. TP data indicated oligotrophic (2017 and 2018) to eutrophic (2019) conditions in the mainstem Fording River, but a review of supporting information indicated that changes to productivity at LC_FRUS were unlikely (Section 4.3.1). TP data indicated mesotrophic conditions in Dry Creek, reflecting naturally elevated TP concentrations in that tributary (Minnow 2020b).
- Most mean invertebrate selenium concentrations were below the level 1 benchmark. Mean invertebrate selenium concentrations measured in spring 2018 in the Fording River and summer-fall 2018 in Dry Creek were between the level 1 and level 2 benchmarks. These results indicate up to low-magnitude potential effects on juvenile growth, although this is a conservative interpretation because the level 1 benchmark is an unbounded no-effects concentration for Yellowstone Cutthroat Trout (Section 3.2.5.2).
- The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017, except for tissue selenium in Dry Creek in summer-fall.

[50] Station LC_FRDSDC (Fording River downstream Dry Creek), which is located in the mainstem of S3, had more samples collected in the decline window compared to LC_FRUS. Station LC_FRUS was selected for the refined assessment because is it upstream of Dry Creek. Station LC_FRB (S2) was included in the refined assessment to characterize conditions downstream of Dry Creek. Given the higher sampling frequency for LC_FRDSDC, screening results for LC_FRDSDC were also reviewed to confirm that the interpretation for LC_FRUS was also applicable to LC_FRDSDC.

[51] Two samples collected from LC_FRDSDC in April 2018 had aqueous selenium concentrations that were slightly above the level 1 benchmark of 70 µg/L (71.3 µg/L on 11 April 2018 and 70.9 µg/L on 23 April 2018). Selenium concentrations in the other three samples collected in April 2018 from LC_FRDSDC (66.5 µg/L on April 6, 63.6 µg/L on April 16, and 37.1 µg/L on April 30) were below the level 1 benchmark, as was the monthly average concentration for April 2018 (61.9 µg/L). Therefore, selenium was not retained as a chronic COPC for S3.

Table 41 summarizes results presented herein for water quality and tissue selenium in S3 relative to fish use. The following bullets discuss conditions in S3 in winter, spring, and summer-fall of the decline window relative to the requisite conditions:

- Winter water quality in S3 did not meet the requisite conditions to contribute to the WCT decline, representing 2.3% of adult fish use.
- Spring water quality in S3 met the requisite conditions to contribute to the WCT decline via effects on growth of juvenile fish feeding in the mainstem Fording River, representing 3.8% of adult fish use. Spring water quality in S3 did not meet the requisite conditions to contribute to the WCT decline via effects to early life stages, representing 6.5% of redds.
- Summer-fall water quality in S3 did not meet the requisite conditions to contribute to the WCT decline in the mainstem Fording River, representing 7.7% of adult fish use and 0.65% of redds. In addition, in Dry Creek, requisite conditions were not met for early life stages, representing 5.8% of redds. Summer-fall water quality did meet the requisite conditions in Dry Creek via potential effects on growth of juvenile fish feeding in this creek, although this creek had no recorded adult fish use.

Based on the information summarized above, water quality in S3 met the requisite conditions to contribute to the WCT decline via effects to juvenile growth in spring and summer-fall (albeit with weak evidence) but did not meet the requisite conditions to be the sole cause. Water quality in S3 did not meet the requisite conditions for early life stages.

Table 41: S3: Fish Use and Water Quality Findings for the Decline Window

Watercourse	Line of Evidence	Winter	Spring		Summer-Fall	
		Adults and Juveniles	Adults and Juveniles	Early Life Stages	Adults and Juveniles	Early Life Stages[1]
Fording River	Fish Use (%)	2.3	3.8	0.65	7.7	0.65
	Water Quality (LC_FRUS)	<L1	<L1	<L1	<L1	<L1
	Tissue Selenium[2]	—	L1-L2 (2018)	—	<L1	—
Dry Creek	Fish Use (%)	0	0	5.8	0	5.8
	Water Quality	<L1	<L1	<L1	<L1	<L1
	Tissue Selenium[2]	<L1	<L1	—	L1-L2 (2018)	—

Notes: '—' = no applicable data for the corresponding station and season. Shading indicates the worst-case magnitude from screening across constituents: below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange). Underline indicates that the magnitude of potential effects was higher in the decline window than pre-September 2017 conditions.
(1) Fish use for early life stages in summer-fall was assumed to be equal to that recorded in spring.
(2) Invertebrate selenium concentrations were used to evaluate potential dietary effects to adult and juvenile WCT. Thus, screening outcomes are only shown under columns for adults and juveniles.

5.8 Segment 2

S2 is 4 km long, extending from Greenhills Creek to ~800 m downstream of Dry Creek. All habitat in S2 is located downstream of mining. S2 contains 9.1 ha of fish-accessible habitat in the upper Fording River watershed, 8.9 ha of which is in the mainstem Fording River and the remainder of which is in lower Greenhills Creek (0.23 ha). S2 has two release locations: Rail Loop Pond and Greenhills Creek sediment pond.

Telemetry data (EoC Team 2021 using data collected by Cope et al. 2016) indicate that adult WCT reside in the mainstem portion of S2 in winter (4.2%), spring (9.2%), and summer-fall (7.3%). Redds (9.1%) were observed in the mainstem portion of S2 in the spring. No adult fish were recorded in lower Greenhills Creek, but a small proportion of redds (0.65%) was recorded in the spring. Although no adults were recorded as residing in Greenhills Creek in the telemetry study, Greenhills Creek was identified by Cope et al. (2016) as key spawning habitat, which is supported by the observation of redds. In addition, WCT tissue samples were collected in July and October 2019. Based on these considerations, adult fish use in Greenhills Creek is interpreted to be higher than indicated by the telemetry study.

S2 had two water quality stations in the evaluation of mine-influenced releases (Section 2.0): Rail Loop Pond (GH_RL1) and Greenhills Creek sediment pond (GH_GH1). Concentrations of all constituents were below short-term water quality guidelines and/or acute screening values, indicating that acute effects to fish would not be expected. Acute testing also indicated no acute effects within the decline window.

S2 had two water quality stations in the refined assessment (Section 3.0): one on the mainstem Fording River (LC_FRB) and one on Greenhills Creek (GH_GH1). Invertebrate selenium concentrations were monitored at three stations sampled in the decline window in S2 (LC_FRB, GH_GH1, GHBP). Incidental captures of WCT in the stilling basin at the outlet of the Greenhills Creek sediment pond (GH_GH1) were also sampled for tissue selenium.[52]

Results for the mainstem Fording River of S2 (LC_FRB) are as follows:

- Concentrations of water quality constituents were below long-term WQGs and/or level 1 screening values. These results indicate negligible potential for effects or no chronic effects to fish. TP data indicated oligotrophic conditions.
- Mean invertebrate selenium concentrations were below the level 1 dietary benchmark, indicating no chronic effects to fish.
- The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017.

Results for Greenhills Creek are as follows:

- Constituents with concentrations greater than screening values in the decline window were nitrite (between the level 1 and level 2 screening values), selenium (between the level 2 and level 3 screening values), sulphate (between the level 2 and level 3 screening values), TDS (between the level 1 and level 2 screening values), and dissolved oxygen (between the level 1 and level 2 screening values). These results indicate a potential for up to moderate-level effects of multiple constituents on all life stages. TP data indicated ultra-oligotrophic to oligotrophic conditions.

[52] It is uncertain whether some fish captured in the stilling basin may have originated from the sediment pond. Also, there is a hanging culvert below the stilling basin that may limit fish access from lower reaches under some flow conditions. Therefore, the relevance of these WCT tissue selenium data to the EoC is uncertain.

- Mean invertebrate selenium concentrations at GH_GH1 were above the level 3 benchmark in 2019, indicating a potential for high-level effects on growth of juvenile WCT. Muscle and egg selenium concentrations from WCT collected in the stilling basin below Greenhills Creek sediment pond in 2019 were between the level 2 and level 3 benchmarks or above the level 3 benchmark for reproduction, indicating a potential for moderate or high-level effects on reproduction of WCT.
- The magnitude of potential effects in the decline window was lower than or within the range observed pre-September 2017, except for nitrate and selenium in summer-fall.

Table 42 summarizes results presented herein for water quality and tissue selenium in S2 relative to fish use. The following bullets discuss conditions in S2 in winter, spring, and summer-fall of the decline window relative to the requisite conditions.

- Winter water quality in S2 did not meet the requisite conditions to contribute to the WCT decline in the mainstem Fording River, representing 4.2% of adult fish use. Winter water quality did meet the requisite conditions in Greenhills Creek via potential effects on juveniles and adults, although this creek had no recorded adult fish use in winter.
- Spring water quality in S2 did not meet the requisite conditions to contribute to the WCT decline in the mainstem Fording River, representing 9.2% of adult fish use and 9.1% of redds. Spring water quality did meet the requisite conditions in Greenhills Creek via potential effects on all life stages, although this creek had no recorded adult fish use and only 0.6% of redds.
- Summer-fall water quality in S2 met the requisite conditions to contribute to the WCT decline via potential effects on all life stages in Greenhills Creek (with no recorded adult fish use and 0.6% of redds). For WCT in the Fording River (representing 7.3% of adult fish use and 9.1% of redds), summer-fall water quality did not meet the requisite conditions.

Based on the information summarized above, water quality in S2 met the requisite conditions to contribute to the WCT decline but not to be the sole cause. Monitoring data indicated potential low- to moderate-level effects of multiple constituents that would overlap with the low proportion of fish use in Greenhills Creek (no recorded adult use, 0.6% of recorded redds). Monitoring data indicated no effects in mainstem areas.

Table 42: S2: Fish Use and Water Quality Findings for the Decline Window

Watercourse	Line of Evidence	Winter	Spring		Summer-Fall	
		Adults and Juveniles	Adults and Juveniles	Early Life Stages	Adults and Juveniles	Early Life Stages[1]
Fording River	Fish Use (%)	4.2	9.2	9.1	7.3	9.1
	Water Quality (LC_FRB)	<L1	<L1	<L1	<L1	<L1
	Tissue Selenium[2]	—	—	—	<L1	—
Greenhills Creek	Fish Use (%)	0	0	0.65	0	0.65
	Water Quality	Se[3], SO4: L2-L3, TDS: L1-L2	Se[3], SO4: L1-L2, TDS: L1-L2	Se: L1-L2, SO4: L1-L2, TDS: L1-L2, DO: L1-L2	NO2: L1-L2, Se[3], SO4: L2-L3, TDS: L1-L2	NO2: L1-L2, Se: L2-L3, SO4: L2-L3, TDS: L1-L2, DO: L1-L2
	Tissue Selenium[2]	>L3 (2019)	—	>L3 (2019)	>L3 (2019)	L2-L3 (2019)

Notes: '—' = no applicable data for the corresponding station and season. Shading indicates the worst-case magnitude from screening across constituents and stations: below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Underline indicates that the magnitude of potential effects was higher in the decline window than pre-September 2017 conditions.
(1) Fish use for early life stages in summer-fall was assumed to be equal to that recorded in spring.
(2) Invertebrate selenium concentrations were used to evaluate potential dietary effects to adult and juvenile WCT. Thus, screening outcomes are only shown under columns for adults and juveniles.
(3) Aqueous selenium benchmarks are based on embryos and alevins and have no relevance for interpreting potential effects to adults and juveniles. Therefore, the worst-case outcome for selenium was based on invertebrate selenium concentrations (Section 3.3.2.4.2).

5.9 Segment 1

S1 is 4.49 km long, extending from Josephine Falls to downstream of Greenhills Creek. S1 contains 2.5 ha of fish accessible habitat in the mainstem Fording River, all of which is downstream of mining. There are no named tributaries in S1.

Telemetry data (EoC Team 2021 using data collected by Cope et al. 2016) indicate that adult WCT reside in S1 in winter (7.6%), spring (4.6%), and summer-fall (6.2%), and a small proportion of redds (1.3%) was found in S1 in the spring.

S1 had one water quality station in the refined assessment (GH_FR1), which is located downstream of Greenhills Creek. Invertebrate selenium concentrations were monitored at GH_FR1 in the decline window. Chronic testing was also conducted at GH_FR1.

Results for S1 are as follows:

- Concentrations of most water quality constituents were below long-term WQGs and/or level 1 screening values. Exceptions were observed in summer-fall 2017 when dissolved oxygen concentrations were between the level 1 and level 2 screening values for buried embryo/alevin life stages (but not for juveniles and adults). These results indicate a potential low-magnitude effect of dissolved oxygen on buried embryo/alevin life stages in summer-fall. TP data indicated oligotrophic conditions.
- Mean invertebrate selenium concentrations were below the level 1 dietary benchmark, indicating no chronic effects to juvenile and adult fish.
- Chronic toxicity testing with early life stages of fish indicated that all (fathead minnow) or most (rainbow trout) responses in the decline window were within the typical range observed in Elk Valley reference waters. Exceptions were observed for early life stage survival of rainbow trout in winter 2017 (Q4), winter 2018 (Q4), and spring 2019 (Q2). In winter 2017 testing, microbial interferences were identified. In the other two quarters of testing, the magnitude of effect in the decline window (28 to 29%) was lower than observed prior to the decline window (up to 53%). No water quality constituent was identified as a potential cause of the observed responses.[53] Aside from the results discussed above, responses in other seasons were within the range typically observed in Elk Valley reference waters. As discussed in Section 3.2.5.3, there is uncertainty and potentially conservatism in interpreting early life stage testing with respect to potential effects to juveniles and adults.
- The magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017.

[53] Concentrations of all constituents were equal to or lower than concentrations in reference waters and/or test site waters with no adverse response, and/or were lower than long-term BC WQGs (Golder 2019). It is uncertain whether microbes may have contributed to the observed response in these tests.

Table 43 summarizes results presented herein for water quality, tissue selenium, and chronic toxicity testing in S1 relative to fish use. The following bullets discuss conditions in S1 in winter, spring, and summer-fall of the decline window relative to the requisite conditions.

- Winter and spring water quality in S1 did not meet the requisite conditions to contribute to the WCT decline. Although responses were observed in chronic testing in winter and spring, these responses were lower in magnitude than prior to the decline window and could not be attributed to water quality.
- Summer-fall water quality in S1 met the requisite conditions to contribute to the WCT decline via potential low-level effects on early life stages from dissolved oxygen in 2017, which would have overlapped with an estimated 1.3% of redds.

Based on the information summarized above, water quality in S1 met the requisite conditions to contribute to the WCT decline but not to be the sole cause. Monitoring data indicated potential low-level effects to early life stages in summer-fall 2017 that would have overlapped with a small proportion of recorded redds. Chronic toxicity results from winter and spring also indicated potential effects to early life stages but provide uncertain evidence for potential effects to juveniles and adults.

Table 43: S1: Fish Use and Water Quality Findings for the Decline Window

Watercourse	Line of Evidence	Winter		Spring		Summer-Fall	
		Adults and Juveniles	Early Life Stages[1]	Adults and Juveniles	Early Life Stages	Adults and Juveniles	Early Life Stages[1]
Fording River	Fish Use (%)	7.6	n/a	4.6	4.6	6.2	4.6
	Water Quality (GH_FR1)	<L1	—	<L1	<L1	<L1	DO: L1-L2 (2017)
	Tissue Selenium[2]	—	—	—	—	<L1	—
	Chronic toxicity testing (GH_FR1) – embryo-alevin survival	—	RBT: 29% [3] FHM: regional NR	—	RBT: 28% FHM: regional NR	—	Within regional NR

Notes: '—' = no applicable data for the corresponding station and season. Shading indicates the worst-case magnitude from screening across constituents and stations: below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange). For lines of evidence and stations with data collected in the decline window and prior to September 2017, the magnitude of potential effects in the decline window was either lower than or within the range observed pre-September 2017.
(1)) Early life stages of WCT are not present in winter; this column is shown because chronic toxicity tests in winter were conducted with early life stages of fish. Fish use for early life stages in summer-fall was assumed to be equal to that recorded in spring.
(2) Invertebrate selenium concentrations were used to evaluate potential dietary effects to adult and juvenile WCT. Thus, screening outcomes are only shown under columns for adults and juveniles.
(3) Magnitude of effect for Q4 2017 is not shown because the response in Q4 2017 was consistent with effects caused by microbes.

5.10 Seasonal Summary

The sections below integrate assessment results across the upper Fording River watershed by season, describing how results overlap spatially and temporally with fish use information from EoC Team (2021) using data collected by collected by Cope et al. (2016). For each season, a table is provided that shades segments and tributaries according to the highest magnitude of potential effects, either for potential effects of water quality and tissue selenium on juveniles and adults or for the magnitude of response in chronic toxicity tests with early life stages of fish. Percentages in these tables show the proportion of adult fish or redds that were recorded in the corresponding mainstem segment or tributary.

5.10.1 Winter

Telemetry data (EoC Team 2021 using data collected by Cope et al. 2016) indicate that adult WCT reside in three main areas in winter: Henretta Lake (12%; represented by station FR_HC1), S8 (20%), and S6 (40%). Most of the fish in S6 were located at the southern portion of S6 near water quality station FR_FRABCH. The remaining 28% of adult fish resided in the mainstem Fording River, ranging from 1.5% in S11 to 7.6% in S1. Early life stages of WCT are not present in winter.

Table 44 integrates assessment results and fish use information for winter. Results for winter are discussed in the bullets below, focusing on areas with recorded fish use:

- In areas representing approximately 53% of adult fish use, concentrations of water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values. These results indicate negligible potential for effects or no chronic effects to fish.
- In two areas representing approximately 43% of adult fish use (S9 and S6), concentrations of most water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values but potential low-level effects were identified for a single constituent (nitrite in S9 and TDS in S6). In both S9 and S6, these conditions represent a change relative to pre-September 2017 conditions. In S6, potential low-level effects were identified for TDS at FR_FRRD (located in the northern part of S6). At other stations in S6 (GH_PC2 and FR_FRABCH), one of which (FR_FRABCH) is near the largest congregation of overwintering fish, no chronic effects were identified.
- In two areas representing approximately 4% of adult fish use (S11 and S7), concentrations of one or more water quality constituents indicated a potential for up to high-level effects. In S11, this was due to dissolved oxygen measurements in February 2019 that indicated a potential for acute effects. In S7, this is due to dissolved oxygen, sulphate, and TDS concentrations indicating potential high-level effects at FR_FRCP1 in 2018 (sulphate/TDS and dissolved oxygen [December 2018 only]) and 2019 (sulphate/TDS). In both S11 and S7, these conditions represent a change relative to pre-September 2017 conditions. At other stations in S7 (FR_FR3 and FR_FR4), which are located in the northern part of S7, concentrations of water quality and tissue selenium indicated no chronic effects except for tissue selenium at FR_FR3 in winter 2019 which indicated a potential for low-level effects; at FR_FR3, this a conservative interpretation because the level 1 benchmark is an unbounded no-effects concentration for Yellowstone Cutthroat Trout (Section 3.2.5.2).
- Chronic toxicity testing indicated up to high-level effects at FR_FRCP1 in S7 (rainbow trout and fathead minnow), low-level (rainbow trout) to moderate-level (fathead minnow) effects at FR_FRABCH in S6, and moderate-level effects (fathead minnow only) at GH_FR1 in S1. Responses in one or more tests with FR_FRCP1 water (rainbow trout and fathead minnow) and FR_FRABCH water (fathead minnow only) were higher than observed prior to the decline window. In FR_FRCP1 tests, the strongest evidence for causation

in winter was for sulphate/TDS, although microbes and nitrate were also identified as possible contributors. In FR_FRABCH and GH_FR1 tests, no water quality constituent was identified as a potential cause of observed responses in winter.[54] This testing is conducted with early life stages of fish (embryos-alevins), which are not present in winter in the upper Fording River.

Based on the information summarized above, water quality in winter met the requisite conditions to contribute to the WCT decline via effects to juveniles and adults, but not to be the sole cause.

Table 44: Winter Results for the Decline Window Compared to Relative Fish Use

Segment	Area Description	Relative Fish Use (Percentages) Compared to Results for Water Quality and Tissue Selenium (Colours) (1)	Chronic Toxicity Testing (2)
		Adults/ Juveniles	Early Life Stages
Mainstem Fording River			
S11	*Headwaters*	**1.5%**	—
S10	*upstream Henretta Creek*	2.3%	within regional NR
S9	~300 m ds Clode to ~400 m us Henretta	**3.4%**	—
S8	us Kilmarnock to ~300m ds Clode	20%	—
S7	~1.5 km us Porter to us Kilmarnock	**2.7%**	**RBT: high; FHM: high**
S6	Chauncey Creek to ~1.5 km us Porter	**40%**	RBT: low; **FHM: mod**.
S5	S4 to Chauncey	2.7%	—
S4	~20 m us Ewin to S5	2.3%	—
S3	~800 m ds Dry to ~20 m us Ewin	2.3%	—
S2	us Greenhills to ~800 m ds Dry	4.2%	—
S1	Josephine Falls to ds Greenhills	7.6%	RBT: mod.; FHM: in NR
Tributaries			
S9	*Henretta Creek*	0%	—
S6	*Chauncey Creek*	0%	—
S9	Henretta Creek	12%	—
S9	Fish Pond Creek	0%	—
S9	Clode Creek	**0%**	—
S7	Kilmarnock Creek	0%	—
S7	Swift Creek	0%	—
S6	Porter Creek	**0%**	—
S3	LCO Dry Creek	0%	—
S2	Greenhills Creek	0%	—

Notes: '—' = no applicable data for the corresponding station and season; mod = moderate; FHM = fathead minnow; RBT = rainbow trout; NR = response was within the normal range of responses observed in Elk Valley reference waters.
Shading indicates the worst-case magnitude from screening across constituents and stations: below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Underline and bold indicates that the magnitude of potential effects was higher in the decline window than pre-September 2017 conditions for at least one station and constituent.
Italics indicates reference segment or tributary.
(1) Fish use percentages, which were calculated by EoC Team (2021), are based on the multi-year telemetry study in the upper Fording River (Cope et al. 2016).
(2) Chronic toxicity tests were conducted with early life stages (embryo-alevin) of fathead minnow (FHM) or rainbow trout (RBT). In the upper Fording River, early life stages of WCT are not present in the winter.

[54] Concentrations of all constituents were equal to or lower than concentrations in reference waters and/or test site waters with no adverse response, and/or were lower than long-term BC WQGs.

5.10.2 Spring

Telemetry data (EoC Team 2021 using data collected by Cope et al. 2016) indicate that adult WCT reside in four main areas of the mainstem Fording River in spring: S9 (10%), S8 (20%), S6 (22%), and S2 (9.2%). In addition to these areas, adult fish were recorded in the other seven mainstem segments (ranging from 0.8% in S11 to 6.9% in S10) and in four tributaries (0.8% in Fish Pond and Kilmarnock creeks, 3.1% in lower Henretta Creek [including Henretta Lake], and 6.2% in Clode Creek[55]). Redds were observed in the same four areas in the mainstem Fording River: S9 (12%), S8 (12%), S6 (47%), and S2 (9.1%). In addition to these areas, redds were recorded in five of the other seven mainstem segments (all except S10 and S11; ranging from 0.65% in S3 to 3.2% in S5) and in five tributaries (0.65% in Greenhills Creek, 1.3% in lower Henretta, Fish Pond, and Clode creeks, and 5.8% in Dry Creek).

Table 45 integrates assessment results and fish use information for spring.

Results for adults and juveniles in spring are discussed in the bullets below, focusing on areas with recorded fish use:

- In areas representing approximately 58% of adult fish use, concentrations of water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values. These results indicate negligible potential for effects or no chronic effects to fish.
- In two areas representing approximately 7% of adult fish use (S3 and lower Henretta Creek [including Henretta Lake]), concentrations of water quality constituents were below long-term WQGs and/or level 1 screening values. In each of these areas, potential low-level effects were identified for tissue selenium, although this a conservative interpretation because the level 1 benchmark is an unbounded no-effects concentration for Yellowstone Cutthroat Trout (Section 3.2.5.2). As discussed in Section 3.2.5.2, these tissue selenium concentrations would not be expected to result in effects on juvenile survival.
- In four areas representing approximately 34% of adult fish use (S6, S4, Clode Creek, Kilmarnock Creek), concentrations of one or more constituents indicated a potential for up to moderate-level effects. In S6 and S4, this was due to potential moderate-level effects of invertebrate selenium at one lentic station (RG_SAFR 2018 in S6 and FRSCW 2019 in S4); as discussed in Section 3.2.5.2, these tissue selenium concentrations would not be expected to result in effects on juvenile survival. All other water quality constituents and tissue selenium measurements in S6 and S4 indicated no chronic effects except for TDS at FR_FRRD (S6) which indicated a potential for low-level effects.[56] In Clode and Kilmarnock creeks, up to moderate-level effects were identified for multiple constituents; the magnitude of potential effects was within the range observed pre-September 2017, except for sulphate in Clode Creek.

Results for early life stages in spring are discussed in the bullets below, focusing on areas with recorded fish use:

- In areas representing approximately 31% of recorded redds (S1 to S3, S9, Henretta Creek, and Dry Creek), concentrations of water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values. These results indicate negligible potential for effects or no chronic effects to fish.

[55] The higher reported adult use in spring primarily reflected fish observed in Clode Sediment Pond. In July 2014, fish exclusion structures were added to preclude fish access. Thus, the fish use in Clode Creek in spring (6.2%) is biased high because fish could not access the sediment pond in the decline window.

[56] As discussed in Section 5.6, water quality in S5 was used as a reasonable approximation of water quality in S4 because there are no direct inputs of mine-affected water or large tributaries.

- In areas representing approximately 66% of recorded redds (S4 to S8), concentrations of most water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values. Potential low-level effects were identified in one or more years in S4 and S5 (selenium), S6 (nitrate, selenium, TDS, and dissolved oxygen depending on the station), S7 (selenium), and S8 (nitrate and selenium). In S6 to S8, the magnitude of potential effects was higher than observed pre-September 2017. Based on the discussion provided in Section 3.3.2.9, combined effects of multiple constituents are not expected in these segments in spring.
- In areas representing approximately 2% of recorded redds (Clode and Greenhills creeks), up to high-level effects were identified for multiple constituents; the magnitude of potential effects was within the range observed pre-September 2017, except for sulphate in Clode Creek.
- Chronic toxicity testing indicated up to moderate-level effects in rainbow trout testing at FR_FRABCH in S6 and GH_FR1 in S1, but not in fathead minnow testing. Responses at FR_FRCP1 in S7 were within the range typically observed in Elk Valley reference waters. In all tests, responses in the decline window were within the range observed pre-September 2017. In FR_FRABCH and GH_FR1 tests with rainbow trout, no water quality constituent was identified as a potential cause of observed responses in spring.[57] This testing is conducted with early life stages of fish (embryos-alevins).

Based on the information summarized above, water quality in spring met the requisite conditions to contribute to the WCT decline via effects to all life stages, but not to be the sole cause.

[57] Concentrations of all constituents were equal to or lower than concentrations in reference waters and/or test site waters with no adverse response, and/or were lower than long-term BC WQGs.

Table 45: Spring Results for the Decline Window Compared to Relative Fish Use

Segment	Area Description	Relative Fish Use (Percentages) Compared to Results for Water Quality and Tissue Selenium (Colours) [1]		Chronic Toxicity Testing [2]
		Adults/ Juveniles	Early Life Stages	Early Life Stages
Mainstem Fording River				
S11	*Headwaters*	0.8%	0%	—
S10	*upstream Henretta Creek*	6.9%	0%	within regional NR
S9	~300 m ds Clode to ~400 m us Henretta	10%	12%	—
S8	us Kilmarnock to ~300m ds Clode	20%	**12%**	—
S7	~1.5 km us Porter to us Kilmarnock	3.1%	**1.3%**	within regional NR
S6	Chauncey Creek to ~1.5 km us Porter	**22%**	**47%**	RBT: mod.; FHM: in NR
S5	S4 to Chauncey	3.8%	3.2%	—
S4	~20 m us Ewin to S5	5.4%	2.6%	—
S3	~800 m ds Dry to ~20 m us Ewin	3.8%	0.6%	—
S2	us Greenhills to ~800 m ds Dry	9.2%	9.1%	—
S1	Josephine Falls to ds Greenhills	4.6%	1.3%	RBT: mod.; FHM: in NR
Tributaries				
S9	*Henretta Creek*	0%	0%	—
S6	*Chauncey Creek*	0%	0%	—
S9	Henretta Creek	3.1%	1.3%	—
S9	Fish Pond Creek [3]	0.8%	1.3%	—
S9	Clode Creek	**6.2%**	**1.3%**	—
S7	Kilmarnock Creek	0.8%	0%	—
S7	Swift Creek	0%	**0%**	—
S6	Porter Creek	**0%**	**0%**	—
S3	LCO Dry Creek	0%	5.8%	—
S2	Greenhills Creek	0%	0.6%	—

Notes: '—' = no applicable data for the corresponding station and season; mod = moderate; FHM = fathead minnow; RBT = rainbow trout; NR = response was within the normal range of responses observed in Elk Valley reference waters.
Shading indicates the worst-case magnitude from screening across constituents and stations: below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Underline and bold indicates that the magnitude of potential effects was higher in the decline window than pre-September 2017 conditions for at least one constituent and station.
Italics indicates reference segment or tributary.
(1) Fish use percentages, which were calculated by EoC Team 2021, are based on the multi-year telemetry study in the upper Fording River (Cope et al. 2016).
(2) Chronic toxicity tests were conducted with early life stages (embryo-alevin) of fathead minnow (FHM) or rainbow trout (RBT). In the upper Fording River, early life stages of WCT are present from mid-May to late August.
(3) Percentages are not shaded because no water quality data were available for Fish Pond Creek in the spring.

5.10.3 Summer-Fall

Telemetry data (EoC Team 2021 using data collected by Cope et al. 2016) indicate that adult WCT primarily reside throughout the mainstem Fording River in summer-fall (ranging from 6.2% in S1 to 16% in S6, except for S11 which had 0.3%). In addition to these areas, adult fish were also recorded in lower Henretta Creek (9.7%) and to a lesser degree Chauncey Creek (0.3%). Redds observations in spring were assumed to also apply to summer-fall. Specifically, redds were observed in four main areas in the mainstem Fording River: S9 (12%), S8 (12%), S6 (47%), and S2 (9.1%). In addition to these areas, redds were recorded in five of the other seven mainstem segments (all except S10 and S11; ranging from 0.65% in S3 to 3.2% in S5) and in five tributaries (0.65% in Greenhills Creek, 1.3% in lower Henretta, Fish Pond, and Clode creeks, and 5.8% in Dry Creek).

Table 46 integrates assessment results and fish use information for summer-fall.

Results for adults and juveniles in summer-fall are discussed in the bullets below, focusing on areas with recorded fish use:

- In areas representing approximately 83% of adult fish use, concentrations of water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values. These results indicate negligible potential for effects or no chronic effects to fish.
- In areas representing approximately 7% of adult fish use (S9), concentrations of water quality constituents were below long-term WQGs and/or level 1 screening values. Potential low-level effects were identified for invertebrate selenium at FR_FR1 in 2018, although this a conservative interpretation because the level 1 benchmark is an unbounded no-effects concentration for Yellowstone Cutthroat Trout (Section 3.2.5.2). The magnitude of potential effects for invertebrate selenium at FR_FR1 was higher in the decline window than it had been previously. Other invertebrate selenium concentrations measured in mainstem S9 in summer-fall were below the level 1 benchmark.
- In areas representing approximately 10% of adult fish use (S7), concentrations of one or more water quality constituents indicated a potential for up to high-level effects. This is based on sulphate and TDS concentrations measured at FR_FRCP1 in 2018, which represented a change relative to pre-September 2017. At other stations in S7 (FR_FR3 and FR_FR4), which are located in the northern part of S7, concentrations of water quality and tissue selenium indicated no chronic effects except for tissue selenium at FR_FR4 and RG_SCOUTDS in 2019 which indicated a potential for low-level effects; this a conservative interpretation because the level 1 benchmark is an unbounded no-effects concentration for Yellowstone Cutthroat Trout (Section 3.2.5.2). As discussed in Section 3.2.5.2, these tissue selenium concentrations would not be expected to result in effects on juvenile survival.

Results for early life stages in summer-fall are discussed in the bullets below, focusing on areas with recorded fish use:

- In areas representing approximately 21% of recorded redds (S2 to S5, Dry Creek), concentrations of water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values. These results indicate negligible potential for effects or no chronic effects to fish.
- In areas representing approximately 75% of recorded redds (S6, S8, S9, lower Henretta Creek, Fish Pond Creek), concentrations of most water quality constituents and tissue selenium were below long-term WQGs and/or level 1 screening values. At all of these locations, potential low-level effects were identified for a single constituent (dissolved oxygen). The only exception was at S6 station FR_FRABCH in 2017, at which a potential for combined effects of nitrate and dissolved oxygen was identified.
- In areas representing approximately 3% of recorded redds (S7, Clode Creek, Kilmarnock Creek), up to moderate-level effects (Clode and Kilmarnock creeks) or up to high-level effects (S7) were identified for multiple constituents. At each of these locations, the magnitude of potential effects in the decline window was higher than pre-September 2017 for one or more constituents.
- Chronic toxicity testing indicated up to high-level effects in fathead minnow testing at FR_FRCP1 in S7, and this represented a change relative to pre-September 2017 testing. Responses at FR_FRABCH in S6 and GH_FR1 in S1 were within the range typically observed in Elk Valley reference waters. This testing is conducted with early life stages of fish (embryos-alevins).

Based on the information summarized above, water quality in summer-fall met the requisite conditions to contribute to the WCT decline via effects to all life stages, but not to be the sole cause.

Table 46: Summer-Fall Results for the Decline Window Compared to Relative Fish Use

Segment	Area Description	Relative Fish Use (Percentages) Compared to Results for Water Quality and Tissue Selenium (Colours) [1]		Chronic Toxicity Testing [2]
		Adults/ Juveniles	Early Life Stages	Early Life Stages
Mainstem Fording River				
S11	*Headwaters*	0.3%	0%	—
S10	*upstream Henretta Creek*	6.7%	0%	within regional NR
S9	~300 m ds Clode to ~400 m us Henretta	**7.0%**	**12%**	—
S8	us Kilmarnock to ~300m ds Clode	12%	**12%**	—
S7	~1.5 km us Porter to us Kilmarnock	**10%**	**1.3%**	**FHM: high**
S6	Chauncey Creek to ~1.5 km us Porter	16%	**47%**	within regional NR
S5	S4 to Chauncey	7.8%	3.2%	—
S4	~20 m us Ewin to S5	9.0%	2.6%	—
S3	~800 m ds Dry to ~20 m us Ewin	7.7%	0.6%	—
S2	us Greenhills to ~800 m ds Dry	7.3%	9.1%	—
S1	Josephine Falls to ds Greenhills	6.2%	1.3%	within regional NR
Tributaries				
S9	*Henretta Creek*	0%	**0%**	—
S6	*Chauncey Creek*	0.3%	0%	—
S9	Henretta Creek	9.7%	**1.3%**	—
S9	Fish Pond Creek	0%	1.3%	—
S9	Clode Creek	**0%**	**1.3%**	—
S7	Kilmarnock Creek	**0%**	**0%**	—
S7	Swift Creek	**0%**	**0%**	—
S6	Porter Creek	0%	0%	—
S3	LCO Dry Creek	**0%**	5.8%	—
S2	Greenhills Creek	**0%**	**0.6%**	—

Notes: '—' = no applicable data for the corresponding station and season; FHM = fathead minnow; NR = response was within the normal range of responses observed in Elk Valley reference waters.
Shading indicates the worst-case magnitude from screening across constituents and stations: below level 1 (green), between level 1 and level 2 (blue), between level 2 and level 3 (yellow), or greater than level 3 (orange).
Underline and bold indicates that the magnitude of potential effects was higher in the decline window than pre-September 2017 conditions for at least one constituent and station.
Italics indicates reference segment or tributary.
(1) Fish use percentages, which were calculated by EoC Team 2021, are based on the multi-year telemetry study in the upper Fording River (Cope et al. 2016).
(2) Chronic toxicity tests were conducted with early life stages (embryo-alevin) of fathead minnow (FHM). In the upper Fording River, early life stages of WCT are present from mid-May to late August.

Section 6.0: Summary of Findings

6.0 SUMMARY OF FINDINGS

The potential stressor investigated in this report is water quality. The requisite condition to contribute to the WCT decline was any indication of a potential effect that overlapped with WCT in time and space. The requisite condition to cause the WCT decline was an indication of a potential high-level effect that overlapped with a large proportion of the WCT population, either by being widespread or by occurring at a time and place associated with high fish use. Table 47 summarizes the analysis approach and findings presented herein into the framework to evaluate cause.

Potential direct effects of mine-influenced water quality at the point of release were assessed in Section 2.0. Overall, water quality data and acute testing with rainbow trout during the decline window provided little to no indication of acute effects associated with releases of mine-influenced water. Potential acute effects of low dissolved oxygen in November 2018 were identified for one sample from Turn Creek. Thus, the requisite condition to contribute via acute effects was met for one constituent and location. However, the evidence that this one sample contributed to the decline was interpreted to be weak because of uncertainty regarding fish access in winter, a lack of documented fish use in Turn Creek, and, based on telemetry data, a low proportion of adult WCT that were in the adjacent mainstem Fording River of S9 in winter (3.4%). Therefore, the role of acute exposure to mine-influenced water in the WCT decline was concluded to be negligible.

Potential acute and chronic effects of surface water quality in fish accessible waters were assessed in Section 3.0. Water quality data, tissue selenium data, and chronic toxicity monitoring data for early life stages of rainbow trout and fathead minnow indicated a range of potential effects to WCT. There were three broad types of conditions in the upper Fording River watershed during the decline window:

- Water quality in some areas indicated no potential for effects to fish. In these areas, concentrations were below long-term water quality guidelines and/or were below site-specific screening values for fish.
- Water quality in some areas indicated a potential for up to low-level chronic effects associated with concentrations of one constituent exceeding a screening value. For most constituents and locations, assessment results in the decline window were similar to those prior to the decline window. Exceptions to this general pattern are discussed in Section 5.0.
- Water quality in some mine-affected tributaries and in the Fording River downstream of Cataract Creek under seasonal dry conditions (represented by station FR_FRCP1) was characterized by potential higher-level effects of multiple constituents. These localized conditions had the greatest potential to contribute to the WCT decline.

Most segments of the upper Fording River were characterized by no chronic effects or potential low-level effects of one or more constituents that could have contributed to the WCT decline individually or in combination. Segments that accounted for the majority of recorded fish use in winter (Henretta Lake, lower S6 pools, S8), spring (upper S6, S8, S9), and summer-fall (S4, S6, S7, S8, lower Henretta Creek) did not have sufficient indication of water quality stress to conclude that water quality could be the sole cause of the WCT decline.

Some areas in mine-affected tributaries and in the Fording River downstream of Cataract Creek under seasonal dry conditions were characterized by potential moderate- to high-level effects of multiple constituents. In these areas, evidence for potential effects was strong and the interpretation of contribution and causation depended on what proportion of the WCT population may have overlapped with such conditions. The available telemetry information, and a consideration of the spatial extent of the conditions, generally indicated that a low proportion of

the WCT population may have been affected by water quality in these areas. However, it cannot be ruled out that conditions during the decline window may have affected fish movement and distribution. Potential scenarios of altered fish movement and resulting exposure to differing levels of potential stress are discussed further in the integration chapter (EoC Team 2021).

In consideration of the results summarized above, water quality at fish accessible stations met the requisite conditions to contribute to the WCT decline, but not to be the sole cause. The role of water quality alone in the WCT decline was classified as minor overall (this applies in most areas and seasons), and moderate under localized conditions, especially in winter. Uncertainty for the moderate rating is associated with the proportion of fish that were exposed to FR_FRCP1 conditions.

Potential nutrient enrichment effects of surface water quality were assessed in Section 4.0. Water quality data and site-specific relationships between TP and productivity indicated little to no evidence of nutrient enrichment effects. Nutrient enrichment did not meet the requisite conditions for contribution or causation. Therefore, the role of nutrient enrichment in the WCT decline is interpreted to be negligible.

Table 47: Framework to Evaluate Cause: Summary of Findings

Inputs to Plan the Analysis						Findings: Evaluate Overarching Hypothesis #1				Preliminary Assessment: Strength of Current Evidence to Evaluate Overarching Hypothesis #2		
Stressor	Potential Causal Pathway(s)	Impact Hypothesis	Relevant WCT life-stage, habitat, location, temporal info	Endpoints	What are the requisite conditions?	Are the requisite conditions met?	Uncertainties or Data Gaps	Summary of Findings	What is the strength of the evidence to support this impact hypothesis as the potential sole cause?	Strength of evidence for contribution to the WCT population decline?	Judgement on relative contribution to the WCT population decline?	If judged to be a potential contributor, what other impact hypothesis(es) is this hypothesis likely to be combined with?
Water quality (Release of Mine-Influenced Water)	Direct lethal or sublethal effects	Did exposure to releases of mine-influenced water quality contribute to or cause the WCT decline?	Not restricted; depends on where water was discharged into fish-accessible waters in the upper Fording River watershed in the decline window.	1) Surface water quality at the point of discharge 2) Acute testing data for rainbow trout at discharge locations	To contribute: an indication of a potential acute or chronic effect at a point of release, per the definition provided in the report. To cause: an indication of a potential acute or high-level chronic effect that could have affected a large fraction of the WCT population, either by being widespread or by occurring at a time and location that overlapped with a large number of fish in time and in space.	To contribute: Yes To cause: No	1) Rainbow trout was used as a surrogate to evaluate potential effects to WCT. 2) Combined effects of multiple constituents. 3) Data gaps and false negatives.	Authorized discharge water was not acutely lethal to rainbow trout. Most constituents were below acute screening values for rainbow trout. Acute effects could not be ruled out for DO in Turn Creek (one sample collected in November 2018). 8 of 190 release locations had the potential for a chronic exposure.	Weak/none	None for most constituents Weak for dissolved oxygen because of a lack of documented fish use in Turn Creek.	Negligible.	Other stressors that overlapped with water quality stressors in time and in space.
Water Quality (Fish Accessible Waters)	Direct lethal or sublethal effects	Did exposure to surface water quality in fish accessible waters contribute to or cause the WCT decline?	Not restricted; depends on where water quality was elevated relative to benchmarks and screening values and where WCT were located in time and in space.	1) Surface water quality in the upper Fording River watershed compared to WQGs and toxicological benchmarks and screening values for fish. 2) Tissue selenium data in the upper Fording River watershed compared to benchmarks for fish. 3) Chronic testing data for early life stages of fathead minnow and rainbow trout.	To contribute: a constituent or result that indicated a potential for effects to fish in the decline window. To cause: a constituent or finding that indicated a potential for high-level effects that could have affected a large fraction of the WCT population, either by being widespread or by occurring at a time and location that overlapped with a large number of fish in time and in space.	To contribute: Yes To cause: No	1) Combined effects of multiple constituents. 2) Incomplete spatiotemporal coverage of data. 3) Confidence in benchmarks and screening values. 4) Spatial summaries assume fish use in the decline window was similar to that measured in 2012 to 2015 telemetry studies. 5) Microbial interferences in chronic tests.	Negligible potential for effects for most constituents assessed. Potential chronic effects of seven constituents. In most places, up to low-level effects of a single constituent. In some places, up to high-level effects of multiple constituents. No constituents or findings met requisite conditions to cause the WCT population decline.	Weak/none Measured conditions across most of the upper Fording River watershed indicated no chronic effects, and most or all of the remaining habitat indicated a potential for localized and low-level chronic stress to early life stages of WCT. The potential for chronic water quality effects on adult fish is expected to be lower than for early life stages.	Yes Minor/uncertain in most segments and seasons, moderate under localized conditions, especially in winter.	Minor overall (moderate in specific localized areas) and Uncertain Localized conditions could have contributed if conditions in the decline window resulted in greater exposure of WCT to those conditions than were indicated by the telemetry studies.	Multiple water quality constituents. Other stressors that overlapped with chronic water quality stressors in time and in space. Factors that would increase number of fish exposed to potential high-level effects.

Table 47: Framework to Evaluate Cause: Summary of Findings

Inputs to Plan the Analysis						Findings: Evaluate Overarching Hypothesis #1				Preliminary Assessment: Strength of Current Evidence to Evaluate Overarching Hypothesis #2		
Stressor	Potential Causal Pathway(s)	Impact Hypothesis	Relevant WCT life-stage, habitat, location, temporal info	Endpoints	What are the requisite conditions?	Are the requisite conditions met?	Uncertainties or Data Gaps	Summary of Findings	What is the strength of the evidence to support this impact hypothesis as the potential sole cause?	Strength of evidence for contribution to the WCT population decline?	Judgement on relative contribution to the WCT population decline?	If judged to be a potential contributor, what other impact hypothesis(es) is this hypothesis likely to be combined with?
Nutrient enrichment	Increased productivity, which can lead to several direct or indirect effects	Did nutrient enrichment contribute to or cause the WCT population decline?	Not restricted; depends on where TP was elevated relative to screening values and where WCT were located in time and in space.	1) TP in the upper Fording River watershed compared to trophic status categories. 2) TP in the upper Fording River watershed compared to level 1 screening value for productivity.	To contribute: localized trophic status change at TP concentrations associated with productivity changes. To cause: widespread trophic status changes at TP concentrations associated with productivity changes, or a finding that could have affected a large fraction of the WCT population, either by being widespread or by occurring at a time and location that overlapped with a large number of fish in time and in space.	To contribute: No To cause: No	1) Data gaps and false negatives. 2) Level 2 and 3 screening values could not be derived because limited site-specific productivity data associated with higher TP concentrations. 2) Spatial summaries assume fish use is proportional to habitat size (area-weighted) or fish distribution in the decline window was comparable to that measured in 2012 to 2015 telemetry studies (relative fish use).	Trophic status was similar or lower than previous conditions, except for one mainstem station (LC_FRUS). Comparison of TP concentrations to screening values and review of supporting information (historical concentrations, site-specific relationships with productivity, periphyton and macrophyte scores, secondary productivity) indicated a negligible potential for changes to primary productivity in the decline window.	Weak/none The evidence indicates a lack of nutrient enrichment.	Not applicable (not identified as a potential contributor)	Not applicable (not identified as a potential contributor)	Not applicable (not identified as a potential contributor)

Notes: Framework to evaluate cause is described in the overarching report. DO = dissolved oxygen; TDS = total dissolved solids; WCT = westslope cutthroat trout.

7.0 CLOSURE

We trust that this information meets your present needs. If you have any questions, please do not hesitate to contact the undersigned.

Yours Truly,

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APPENDIX A

Data Summary

Chronic toxicity results and interpretation for fish tests conducted between 2015 and 2019 in Fording River stations were obtained from Golder (2020). Results were compiled by endpoint and by station, as follows.

- To summarize result by fish species, plots showing mean results over time (2015 to 2019) were obtained from Golder (2020) for each endpoint with a statistically significant reduction relative to one or more references. Sampling events that occurred between September 2017 and September 2019 were Q4 2017, Q1 to Q4 2018, and Q1 to Q3 2019. An example data plot is provided in Figure 1. In brief, the following items should be considered when reviewing these plots:
  - Mean results are control-normalized.
  - Symbol color corresponds to an individual test site or reference location.
  - Symbol type corresponds to the response category (circle = no; diamond = possible; triangle = likely). Categories were designated in each reporting year.
  - Open symbols indicate test sites with a mean response statistically similar to references tested in that batch. Filled symbols indicate test sites with a mean response significantly lower than one or more references tested in that batch.
  - Local and regional normal ranges are provided on the plot to illustrate the range of responses in reference waters.
- To summarize by test site, plots showing test categories over time (2015 to 2019) were obtained from Golder (2020). The symbols on each plot indicate whether the test endpoint was categorized as no (circle), possible (diamond), or likely (triangle) adverse response. For tests categorized as possible or likely, symbols are annotated where a potential toxicant was identified.

Mean results for tests conducted between 2015 and 2019 are plotted in Figure 2 (rainbow trout) and Figure 3 (fathead minnow). Test categories are summarized by station in Figure 4 (FR_FRCP1), Figure 5 (FR_FRABCH), and Figure 6 (GH_FR1).

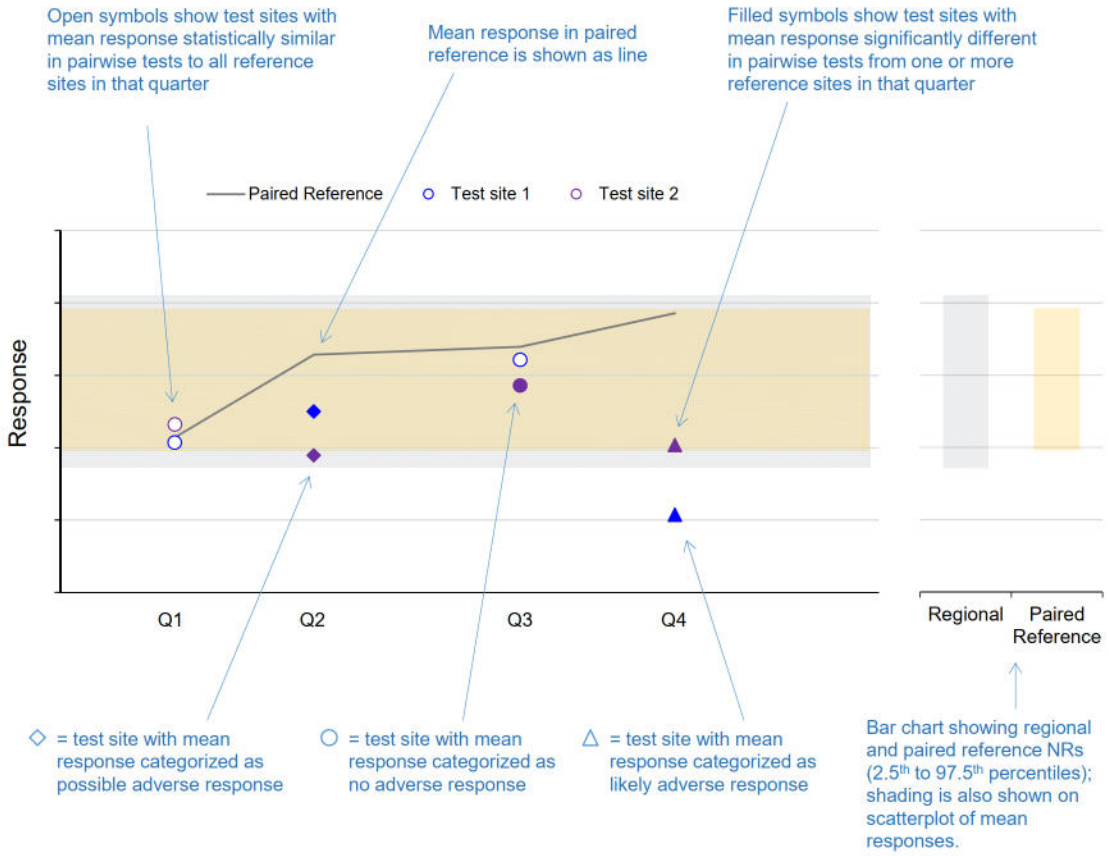

Figure 1: Example data plot for mean results.

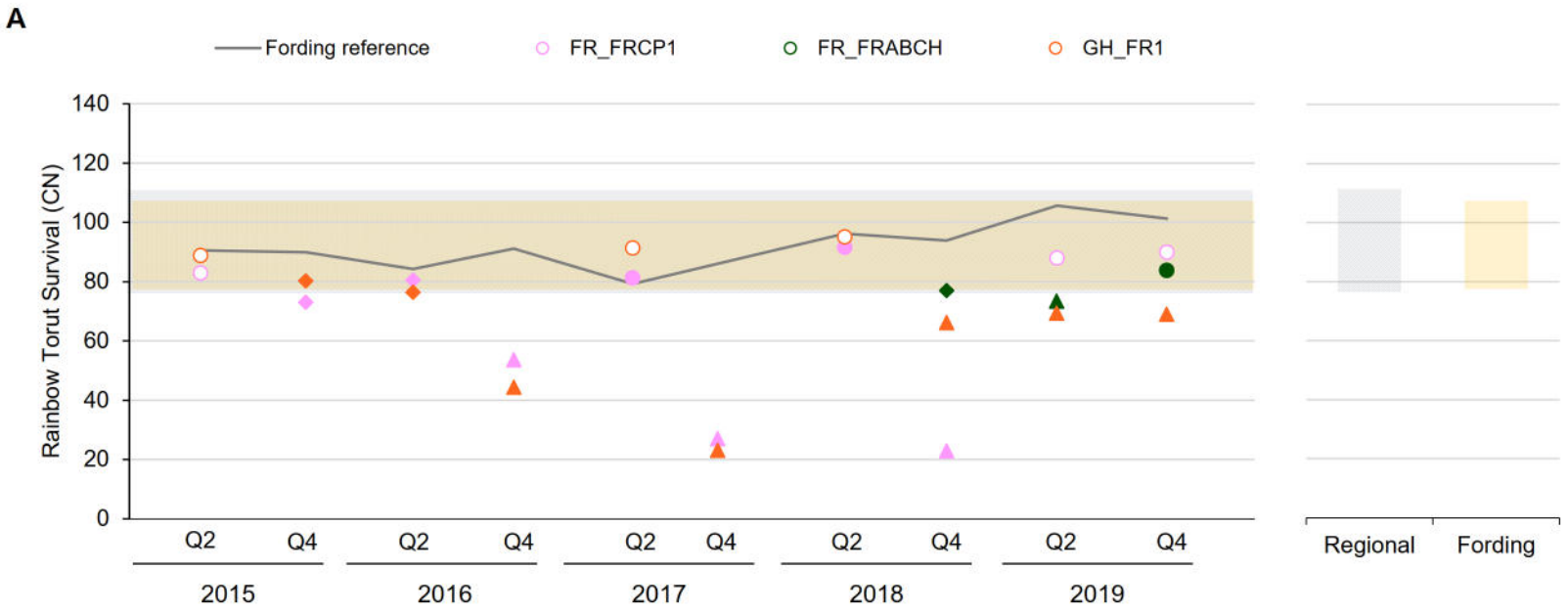

Figure 2: Mean results for rainbow trout survival (A), viability (B), length (C), and weight (D) in the Fording River reference and test site waters. Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).

Note: See Figure 1 for description of lines and symbols.

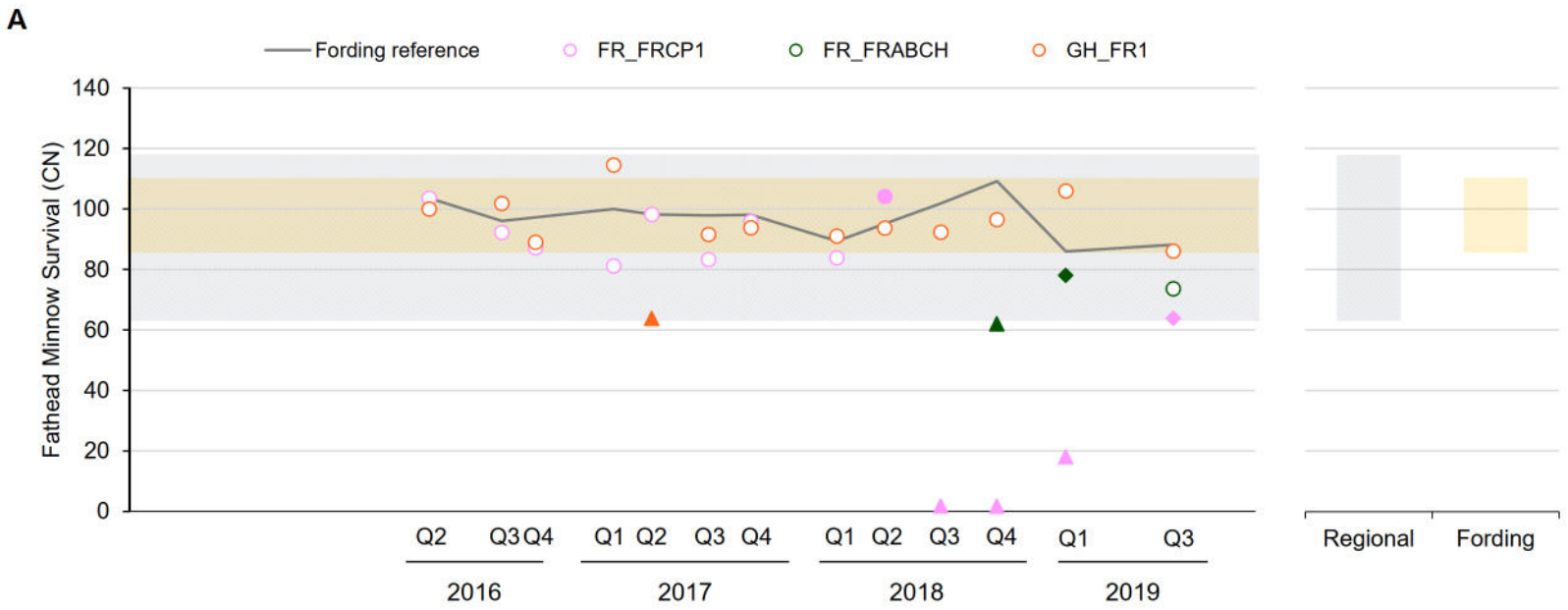

Figure 3: Mean results for fathead minnow survival (A), biomass (B), and length (C) in the Fording River reference and test site waters. Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).

Note: See Figure 1 for description of lines and symbols. Tests were conducted in 2015 but not plotted because Nautilus (2016) determined that effects in reference and mine-exposed waters were attributed to microbes or fungi. Such effects have been termed sporadic mortality phenomenon.

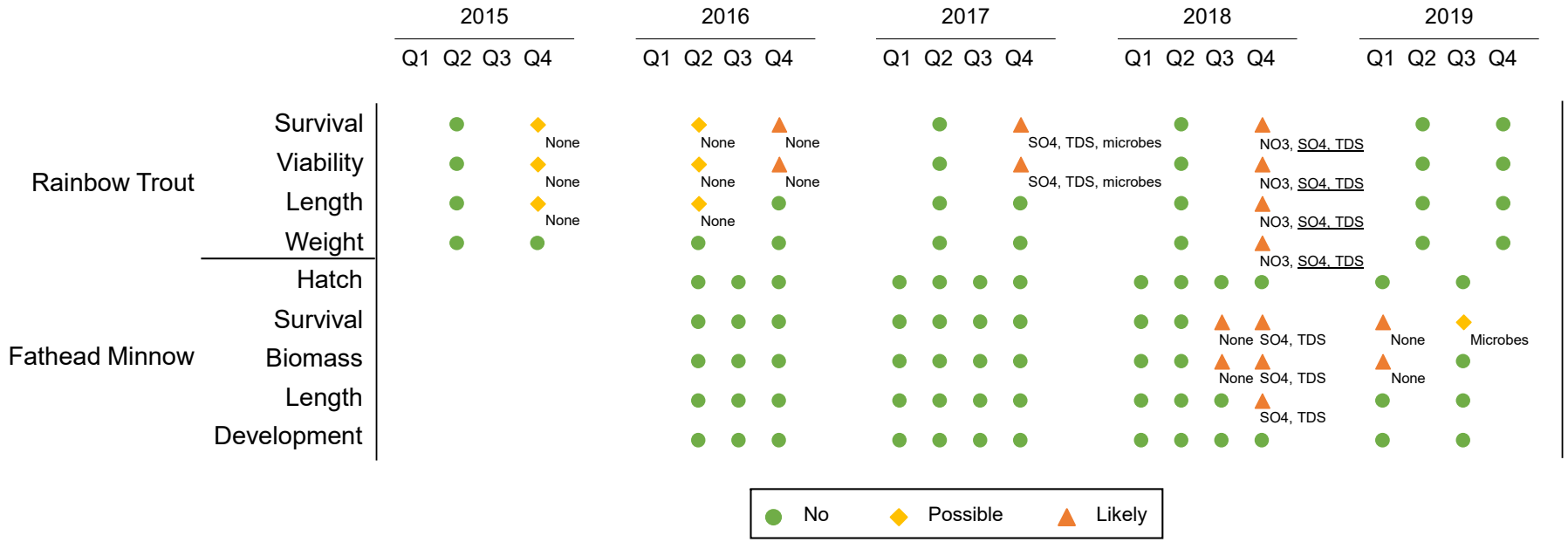

Figure 4: Summary of Fish Test Results by Category at FR_FRCP1

Note: Results obtained from Golder (2020). Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. Microbes = observed response was consistent with effects caused by microbes; NO3 = nitrate; SO4 = sulphate; TDS = total dissolved solids; None = no water quality constituent was identified.

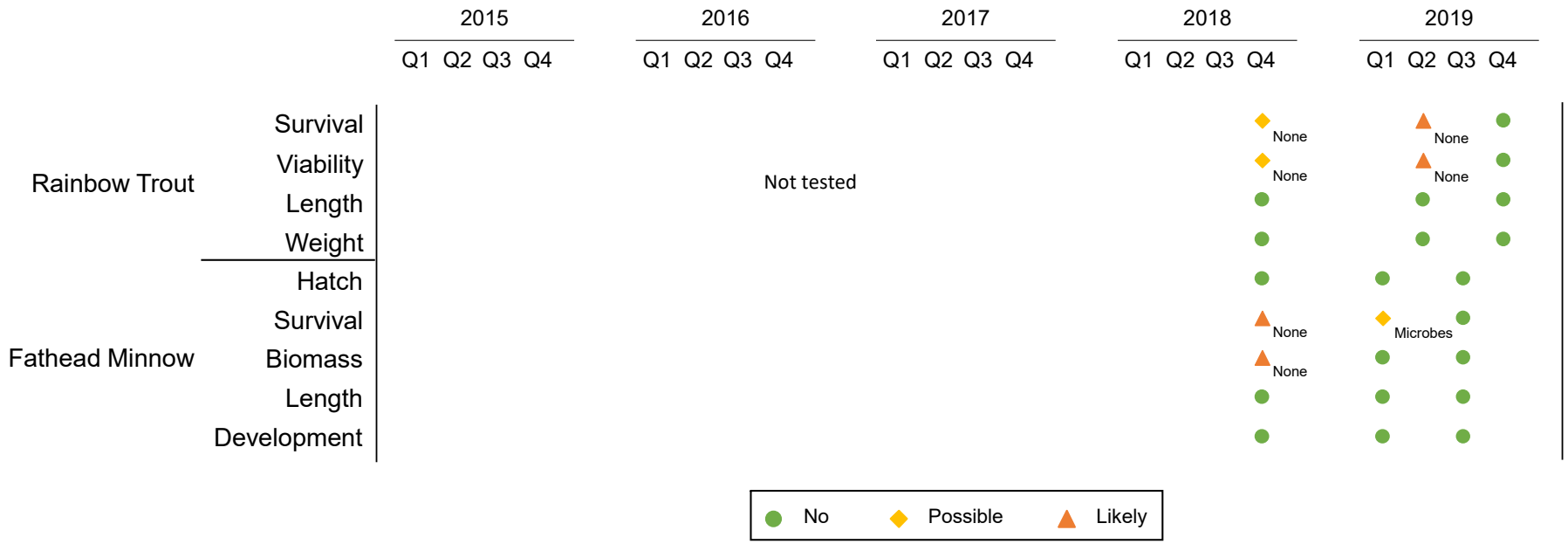

Figure 5: Summary of Fish Test Results by Category at FR_FRABCH

Note: Results obtained from Golder (2020). Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. Microbes = observed response was consistent with effects caused by microbes; None = no water quality constituent was identified.

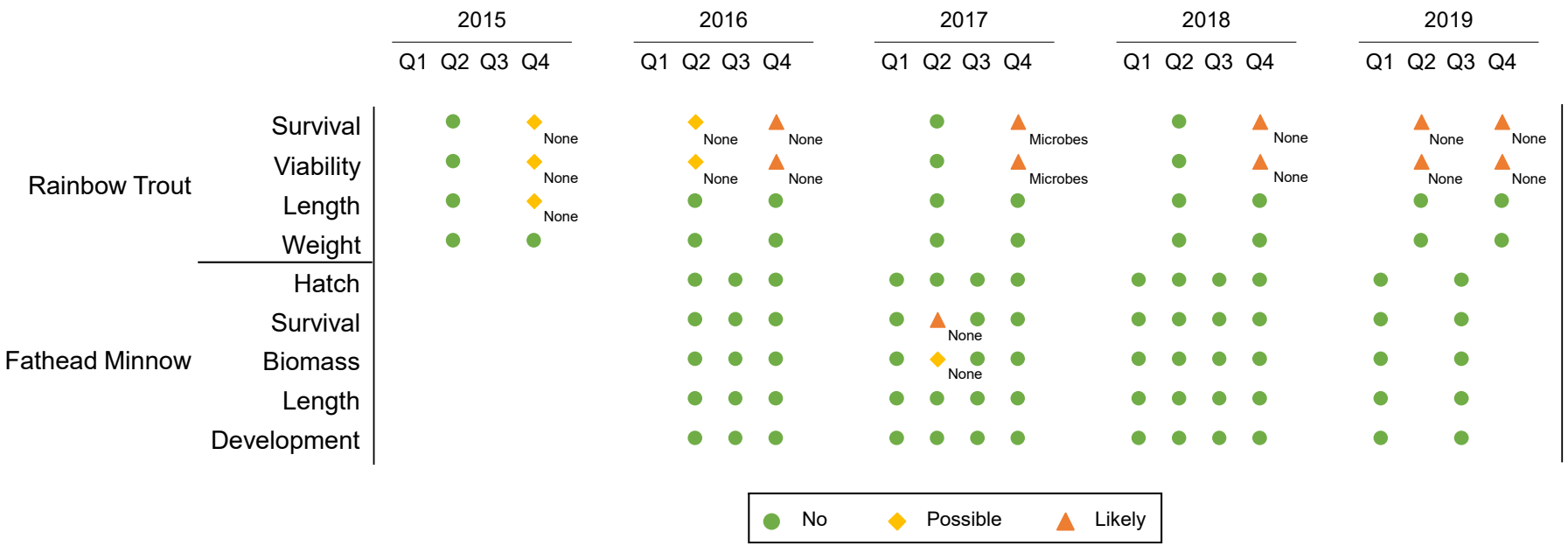

Figure 6: Summary of Fish Test Results by Category at GH_FR1

Note: Results obtained from Golder (2020). Possible, likely, and significant (no category) symbols are annotated with constituent(s) identified as potentially contributing to observed response. Microbes = observed response was consistent with effects caused by microbes; None = no water quality constituent was identified.

Table A1. Guidelines for the Protection of Aquatic Life

Parameter	Unit	Guidelines for the Protection of Aquatic Life						Guideline Used for Screening	
		BC ENV		CCME		ECCC (Long-Term)			
		Long-Term	Short-Term	Long-Term	Short-Term	PNEC	FEQG	Long-Term	Short-Term
Field Measured									
pH	-	6.5 - 9.0	6.5 - 9.0	6.5 - 9.0	-	-	-	6.5 - 9.0	6.5 - 9.0
Specific conductivity	µS/cm	-	-	-	-	-	-	-	-
Temperature	°C	-	-	-	-	-	-	-	-
Dissolved oxygen	mg/L	8 - 11 [(a)]	5 - 9 [(a)]	6.5	-	-	-	8 - 11 (a)	5 - 9 (a)
Turbidity	NTU	-	-	-	-	-	-	-	-
Conventional Parameters									
pH	-	6.5 - 9.0	6.5 - 9.0	6.5 - 9.0	-	-	-	6.5 - 9.0	6.5 - 9.0
Specific conductivity	µS/cm	-	-	-	-	-	-	-	-
Hardness, as $CaCO_3$	mg/L	-	-	-	-	-	-	-	-
Total alkalinity, as $CaCO_3$	mg/L	20[(a)]	-	-	-	-	-	20(a)	-
Total dissolved solids	mg/L	-	-	-	-	-	-	-	-
Total dissolved solids (calculated)	mg/L	-	-	-	-	-	-	-	-
Total suspended solids	mg/L	-	-	-	-	-	-	-	-
Total organic carbon	mg/L	-	-	-	-	-	-	-	-
Dissolved organic carbon	mg/L	-	-	-	-	-	-	-	-
Turbidity	NTU	-	-	-	-	-	-	-	-
Major Ions									
Bicarbonate, as $CaCO_3$	mg/L	-	-	-	-	-	-	-	-
Bromide	mg/L	-	-	-	-	-	-	-	-
Calcium	mg/L	-	-	-	-	-	-	-	-
Carbonate	mg/L	-	-	-	-	-	-	-	-
Carbonate, as $CaCO_3$	mg/L	-	-	-	-	-	-	-	-
Chloride	mg/L	150	600	120	640	-	-	150	600
Fluoride	mg/L	-	1.9[(b)]	0.12	-	-	-	0.12	1.9(b)
Hydroxide, as $CaCO_3$	mg/L	-	-	-	-	-	-	-	-
Magnesium	mg/L	-	-	-	-	-	-	-	-
Potassium	mg/L	-	-	-	-	-	-	-	-
Sodium	mg/L	-	-	-	-	-	-	-	-
Sulphate	mg/L	429[(b, c)]	-	-	-	-	-	429(b, c)	-
Nutrients									
Nitrate	mg-N/L	3.0	33	2.9	124	-	-	3.0	32.8
Nitrite	mg-N/L	0.020[(d)]	0.060[(d)]	0.060	-	-	-	0.020(d)	0.060(d)
Nitrate + nitrite	mg-N/L	-	-	-	-	-	-	-	-
Total ammonia	mg-N/L	0.76[(f)]	4.0[(g)]	0.87[(e)]	-	-	-	0.76(f)	4.0(g)
Total phosphorus	mg-P/L	-	-	-	-	-	-	-	-
Dissolved phosphorus	mg-P/L	-	-	-	-	-	-	-	-
Total Metals									
Aluminum	µg/L	-	-	100[(h, i)]	-	-	-	Dissolved fraction used	
Antimony	µg/L	9.0	-	-	-	-	-	9	-
Arsenic	µg/L	-	5.0	5.0	-	-	-	5.0	-
Barium	µg/L	1,000	-	-	-	1780	-	1000	-
Beryllium	µg/L	0.13	-	-	-	6.7	-	0.13	-
Bismuth	µg/L	-	-	-	-	0.5	-	0.5	-
Boron	µg/L	1,200	-	1,500	29,000	-	-	1,200	29,000
Cadmium	µg/L	-	-	0.37[(b)]	7.7[(b)]	-	-	Dissolved fraction used	
Calcium	µg/L	-	-	-	-	-	-	-	-
Cesium	µg/L	-	-	-	-	-	-	-	-
Chromium	µg/L	1.0[(j)]	-	1.0	-	-	5.0[(j)]	1.0(j)	-
Cobalt	µg/L	4.0	110	-	-	-	1.8[(b)]	4	110
Copper	µg/L	-	-	4.0[(b)]	-	-	-	Dissolved fraction used	
Iron	µg/L	-	1,000	300	-	-	1155[(b,h)]	1155(b,h)	1,000
Lead	µg/L	20[(b)]	417[(b)]	7.0[(b)]	-	-	1.4[(b,h)]	20(b)	417(b)
Lithium	µg/L	-	-	-	-	121.6	-	121.6	-
Magnesium	µg/L	-	-	-	-	-	-	-	-
Manganese	µg/L	2,312[(b)]	3,394[(b)]	-	-	-	-	2,312(b)	3,394(b)
Mercury	µg/L	0.010	-	0.026	-	-	-	0.010	-
Molybdenum	µg/L	1,000	2,000	73	-	26,340	-	1,000	2,000
Nickel	µg/L	150[(b)]	-	150[(b)]	-	-	-	150(b)	-
Potassium	µg/L	-	-	-	-	-	-	-	-
Rubidium	µg/L	-	-	-	-	-	-	-	-
Selenium	µg/L	2.0	-	1.0	-	-	-	2.0	-
Silicon	µg/L	-	-	-	-	-	-	-	-
Silver	µg/L	1.5[(b)]	3.0[(b)]	0.25	-	-	-	1.5(b)	3.0(b)
Sodium	µg/L	-	-	-	-	-	-	-	-
Strontium	µg/L	-	-	-	-	-	-	-	-
Sulphur	µg/L	-	-	-	-	-	-	-	-
Tellurium	µg/L	-	-	-	-	25	-	25	-
Thallium	µg/L	0.80	-	0.80	-	-	-	0.80	-
Thorium	µg/L	-	-	-	-	-	-	-	-
Tin	µg/L	-	-	-	-	300	-	300	-
Titanium	µg/L	-	-	-	-	850	-	850	-
Tungsten	µg/L	-	-	-	-	-	-	-	-
Uranium	µg/L	8.5	-	15	33	-	-	8.5	33
Vanadium	µg/L	-	-	-	-	-	120	120	-
Zinc	µg/L	188	257	-	-	-	-	188	257
Zirconium	µg/L	-	-	-	-	-	-	-	-
Dissolved Metals									
Aluminum	µg/L	50[(h)]	100[(h)]	-	-	-	-	50(h)	100(h)
Antimony	µg/L	-	-	-	-	-	-	-	-
Arsenic	µg/L	-	-	-	-	-	-	-	-

Table A1. Guidelines for the Protection of Aquatic Life

Parameter	Unit	Guidelines for the Protection of Aquatic Life						Guideline Used for Screening	
		BC ENV		CCME		ECCC (Long-Term)			
		Long-Term	Short-Term	Long-Term	Short-Term	PNEC	FEQG	Long-Term	Short-Term
Barium	µg/L	-	-	-	-	-	-	-	-
Beryllium	µg/L	-	-	-	-	-	-	-	-
Bismuth	µg/L	-	-	-	-	-	-	-	-
Boron	µg/L	-	-	-	-	-	-	-	-
Cadmium	µg/L	0.46[(b)]	2.4[(b)]	-	-	-	-	0.46(b)	2.4(b)
Cesium	µg/L	-	-	-	-	-	-	-	-
Chromium	µg/L	-	-	-	-	-	-	-	-
Cobalt	µg/L	-	-	-	-	-	-	-	-
Copper	µg/L	0.8[(k)]	4.9[(k)]	-	-	-	0.8[(p)]		
Iron	µg/L	-	350	-	-	-	-	-	350
Lead	µg/L	-	-	-	-	-	-	-	-
Lithium	µg/L	-	-	-	-	-	-	-	-
Manganese	µg/L	-	-	290 [(l)]	14881 [(b)]	-	-	Total fraction used	
Mercury	µg/L	-	-	-	-	-	-	-	-
Molybdenum	µg/L	-	-	-	-	-	-	-	-
Nickel	µg/L	-	-	-	-	-	-	-	-
Rubidium	µg/L	-	-	-	-	-	-	-	-
Selenium	µg/L	-	-	-	-	-	-	-	-
Silicon	µg/L	-	-	-	-	-	-	-	-
Silver	µg/L	-	-	-	-	-	-	-	-
Strontium	µg/L	-	-	-	-	-			-
Sulphur	µg/L	-	-	-	-	-	-	-	-
Tellurium	µg/L	-	-	-	-	-	-	-	-
Thallium	µg/L	-	-	-	-	-	-	-	-
Thorium	µg/L	-	-	-	-	-	-	-	-
Tin	µg/L	-	-	-	-	-	-	-	-
Titanium	µg/L	-	-	-	-	-	-	-	-
Tungsten	µg/L	-	-	-	-	-	-	-	-
Uranium	µg/L	-	-	-	-	-	-	-	-
Vanadium	µg/L	-	-	-	-	-	-	-	-
Zinc	µg/L	-	-	40[(n)]	172[(m)]	-	-	Total fraction used	
Zirconium	µg/L	-	-	-	-	-	-	-	-
Volatile Organics									
Benzene	µg/L								
Ethylbenzene	µg/L								
Toluene	µg/L								
Xylenes	µg/L								
Parent PAHs									
Naphthalene	µg/L	-	1.0	1.1	-	-	-	1.1	1.0
Acenaphthylene		-	-	-	-	-	-	-	-
Acenaphthene	µg/L	6.0	-	5.8	-	-	-	6.0	-
Acridine	µg/L	0.050	-	4.4	-	-	-	0.05	-
Fluorene	µg/L	12	-	3.0	-	-	-	12	-
Phenanthrene	µg/L	0.30	-	0.40	-	-	-	0.3	-
Anthracene	µg/L	0.10	-	0.012	-	-	-	0.1	-
Pyrene	µg/L	0.020	-	0.025	-	-	-	0.02	-
Fluoranthene	µg/L	0.20	-	0.040	-	-	-	0.2	-
Benzo(a)anthracene	µg/L	0.10	-	0.018	-	-	-	0.1	-
Chrysene	µg/L	-	-	-	-	-	-	-	-
Benzo(a)pyrene	µg/L	0.010	-	0.015	-	-	-	0.01	-
Benzo(g,h,i)perylene	µg/L	-	-	-	-	-	-	-	-
Benzo(b,j)fluoranthene	µg/L	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	µg/L	-	-	-	-	-	-	-	-
Indeno(c,d-123)pyrene	µg/L	-	-	-	-	-	-	-	-
Dibenzo(a,h)anthracene	µg/L	-	-	-	-	-	-	-	-
Quinoline	µg/L	3.4	-	3.4	-	-	-	3.4	-
Alkylated PAHs									
1-Methylnaphthalene	µg/L	-	-	-	-	-	-	-	-
2-Methylnaphthalene	µg/L	-	-	-	-	-	-	-	-

Notes:
For guidelines based on toxicity modifying factors (e.g., hardness), guidelines shown in this table were calculated using average conditions across fish accessible waters in the decline window.
[(a)] = guideline is a minimum value. For dissolved oxygen, the lower guideline is used when buried embryo/alevin life stages are present.
[(b)] = guideline is hardness dependent. The guideline shown is based on hardness of 388 mg/L.
[(c)] = At hardness greeater than 250 mg/L, no BC ENV water quality guideline has been established for sulphate; however, data were screened against the guideline for very hard water (i.e., 429 mg/L) for comparative purpo
[(d)] = guideline is chloride dependent. The guideline shown is based on chloride of 1.7 mg/L.
[(e)] = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (0.87 mg-N/L) is based on the combination of field pH (8.2) and water temperature (4.1°C).
[(f)] = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (0.76 mg-N/L) is based on the combination of field pH (8.2) and water temperature (4.1°C).
[(g)] = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (3.95 mg-N/L) is based on the combination of field pH (8.2) and water temperature (4.1°C).
[(h)] = guideline is pH dependent. The guideline shown is based on the pH of 8.2.
[(i)] = guideline is pH dependent: 5 µg/L at pH < 6.5 and 100 µg/L at pH ≥ 6.5.
[(j)] = guideline is for chromium VI.
[(k)] = guideline calculated using simplified Biotic Ligand Model based on the combination of field temperature (4.1 °C), field pH (8.2), DOC (1.1 mg/L), and hardness (388 mg/L).
[(l)] = guideline calculated using pH (8.2) and hardness (388 mg/L).
[(m)] = the acute dissolved zinc guideline is hardness and DOC dependent. The guideline shown is based on hardness of 388 mg/L and DOC of 1.1 mg/L.
[(n)] = the chronic dissolved zinc guideline is pH, hardness and DOC dependent. The guideline shown is based on the pH of 8.2, hardness of 388 mg/L, and DOC of 1.1 mg/L.
- = no guideline.

Table A2. Water Quality Field Blanks and Field Duplicates Excluded from Raw Files

Sample Code	Sample Type
FB_M_2017-01-03_033	FB
FB_M_2017-03-07_039	FB
FB_M_2017-10-03_060	FB
FD_M_20150302_013	FD
FD_M_20150601_017	FD
FD_M_2016-03-08_002	FD
FD_M_2016-06-07_011	FD
FD_M_2016-08-02_017	FD
FD_M_2016-10-04_023	FD
FR_FLD_MON_2018-11-05_FB-HG	N
FR_FR4_MON_2018-12-03_FB-HG	N
FR_FR5_MON_2018-12-03_FB-HG	N
FR_FRABCH_WS_2018-03-26_FB-HG_52	N
FR_FRCP1_WS_20180821_FB-HG	N
FR_GC1_MON_2018-10-01_FB-HG	FB-HG
FR_GC1_MON_2018-11-05_FB-HG	FB-HG
FR_GC1_MON_2019-01-07_FB-HG	FB-HG
FR_GC1_MON_2019-02-04_FB-HG	FB-HG
FR_GC1_MON_2019-03-04_FB-HG	FB-HG
FR_GC1_SEEP_2018-10-01_FB-HG	FB-HG
FR_GC1_WS_2018-09-19_FB-HG	FB-HG
FR_GC1_WS_2018-12-05_FB-HG	N
FR_MULTIPLATE_MON_LAEMP_2018-12-03_FB-HG	N
FR_SWFTCRBRDG_MON_LAEMP_2018-12-03_FB-HG	N
FR_SWFTCRBRDG-WS-201804251335_ FB-HG	N
FR_UFR1_WS_20180821_FB-HG	N
FR_WED1_MON_2018-10-01_FB-HG	FB-HG
FR_WED1_MON_2018-11-05_FB-HG	FB-HG
FR_WED1_MON_2019-01-07_FB-HG	FB-HG
FR_WED1_MON_2019-02-04_FB-HG	FB-HG
FR_WED1_MON_2019-03-04_FB-HG	FB-HG
FR_WED1_SEEP_2018-10-01_FB-HG	FB-HG
FR_WED1_WS_2018-09-19_FB-HG	FB-HG
FR_WED1_WS_2018-12-03_FB-HG	N
GH_PC2_MON_LAEMP_2018-11-05_FB-HG	N
GH_PC2_MON_LAEMP_2018-12-03_FB-HG	N
GH_RLP_WS_2017-12-04_FB	FB
GH_RLP_WS_2018-04-02_FB-HG	NST-FB
GH_RLP_WS_2018-04-09_FB-HG	FB-HG
GH_RLP_WS_2018-05-21_FB-HG	FB-HG
GH_RLP_WS_2018-05-21_FB-ME-HG	FB-HG
GH_RLP_WS_2018-05-28_FB_HG	FB-HG
GH_RLP_WS_2018-05-28_FB_ME_HG	FB-HG
GH_RLP_WS_2018-06-18_FB_ME_HG	FB-HG
GH_RLP_WS_2018-06-18_ME_HG	N
GH_RLP_WS_2018-07-02_FB-HG	FB-HG
GH_RLP_WS_2019-04-01_FB-HG	FB-HG
GH_RLP_WS_2019-04-08_FB-HG	FB-HG
LC_CC2_WS_2019-10-07_FB-HG	N
LC_CC3_MNT_2018-12-04_N	FD
LC_DC1_WS_20180910-1715_FB-HG	N
LC_DCDS_WS_20180910-1230_FB-HG	N
LC_FRB_221872_FD	FD
LC_FRB_221958_FD	FD
LC_FRB_MNT_2018-03-06_FB-HG	FB-HG
LC_FRB_MNT_2018-05-01_FB-HG	FB-HG
LC_FRB_MNT_2018-06-05_FB-HG	FB-HG

Table A2. Water Quality Field Blanks and Field Duplicates Excluded from Raw Files

Sample Code	Sample Type
LC_FRB_MNT_2018-08-07_FB-HG	FB-HG
LC_FRB_MNT_2018-09-04_FB-HG	FB-HG
LC_FRB_MNT_2018-10-02_FB-HG	FB-HG
LC_FRB_MNT_2018-11-07_FB-HG	FB-HG
LC_FRB_MNT_2018-12-04_FB-HG	FB-HG
LC_FRB_MNT_2019-01-07_FB-HG	FB-HG
LC_FRB_MNT_2019-02-05_FB-HG	FB-HG
LC_FRB_MNT_2019-03-05_FB-HG	FB-HG
LC_FRB_MNT_2019-05-07_FB-HG	FB-HG
LC_FRB_MON_2018-01-16_FB-HG	FB-HG
LC_FRB_Q1-2018_FB-HG	FB-HG
LC_FRB_WS_2016-02-02_NP BLK	FB
LC_FRB_WS_2016-03-08_FB	FB
LC_FRB_WS_2016-04-05_FB	FB
LC_FRB_WS_2016-05-03_FB	FB
LC_FRB_WS_2016-06-07_FB	FB
LC_FRB_WS_2016-07-05_FB	FB
LC_FRB_WS_2016-08-02_FB	FB
LC_FRB_WS_2016-09-06_FB	FB
LC_FRB_WS_2016-10-04_FB	FB
LC_FRB_WS_2016-11-01_FB	FB
LC_FRB_WS_2016-12-06_FB	FB
LC_FRB_WS_2017-01-03_FB	FB
LC_FRB_WS_2017-03-07_FB	FB
LC_FRB_WS_2017-04-04_FB	FB
LC_FRB_WS_2017-05-02_FB	FB
LC_FRB_WS_2017-06-06_FB	FB
LC_FRB_WS_2017-07-04_FB	FB
LC_FRB_WS_2017-08-01_FB	FB
LC_FRB_WS_2017-09-05_FB	FB
LC_FRB_WS_2017-10-03_FB	FB
LC_FRB_WS_2017-11-07_FB	FB
LC_FRB_WS_2017-12-05_FB	FB
LC_FRB_WS_2018-03-26_FB-HG	FB-HG
LC_FRB_WS_2018-04-09_FB-HG	FB-HG
LC_FRB_WS_2018-04-23_FB-HG	FB-HG
LC_FRB_WS_2018-04-30_FB-HG	FB-HG
LC_FRB_WS_2018-05-14_FB-HG	FB-HG
LC_FRB_WS_2018-05-21_FB-HG	FB-HG
LC_FRB_WS_2018-05-28_FB-HG	FB-HG
LC_FRB_WS_2018-06-11_FB-HG	FB-HG
LC_FRB_WS_2018-06-18_FB-HG	FB-HG
LC_FRB_WS_2018-06-25_FB-HG	FB-HG
LC_FRB_WS_2018-07-02_FB-HG	FB-HG
LC_FRB_WS_2018-07-03_FB-HG	FB-HG
LC_FRB_WS_2019-03-25_FB-HG	FB-HG
LC_FRB_WS_2019-04-02_FB-HG	FB-HG
LC_FRB_WS_2019-04-08_FB-HG	FB-HG
LC_FRB_WS_2019-04-15_FB-HG	FB-HG
LC_FRB_WS_2019-04-22_FB-HG	FB-HG
LC_FRB_WS_2019-04-29_FB-HG	FB-HG
LC_FRB_WS_2019-05-20_FB-HG	FB-HG
LC_MT2_WS_2018-04-23_N	FB
LC_MT2_WS_2019-04-22_N	FB
LC_MT2_WS_2019-10-28_N_FB-HG	N
RG_FO28_WS_20180909-1600_FB-HG	N
RG_FO29_WS_20180909-1015_FB-HG	N
WS_2017-10-04_FB6	NP

FB = field blank; FD = field duplicate; HG = mercury;

Table A3. Water Quality Duplicate Entries Identified in Raw Files

Station	Sample Code	Sample_ID	Duplicate Description
FR_CC1	Sample #1: FR_CC1_M_06072015_N	15098588	Duplicate Field Parameters. Daphnia and Rainbow Trout are reported under Duplicated Sample.
	Sample #2: FR_CC1_Q_06072015_N	15224405	
FR_FR2	Sample #1: FR_FR2_M_05012015_N	11396318	Duplicate Field Parameters. Additional selenium (Total and Dissolved) are reported under Duplicated Sample.
	Sample #2: FR_FR2_QEG_02012015_NP	11396319	
	Sample #1: FR_FR2_M_02012017_N	21441607	Duplicate Conventional Parameters, Major Ions, Nutrients, Metals. No field parameters reported for Duplicated Sample.
	Sample #2: FB_FR2_M_02012017_N	28574882	
	Sample #1: FR_FR2_M_06022017_N	21327251	Duplicate Field Parameters reported. Other constituents differing.
	Sample #2: FR_FR2-WS-201702011250	21332376	
FR_FR4	Sample #1: FR_FR4_MON_2018-02-05_NP	30665848	Duplicate Mercury reported.
	Sample #2: WS_2018-02-05_134	30665912	
FR_FR5	Sample #1: FR_FR5_MON_2018-02-05_N	30665849	Duplicate Mercury reported.
	Sample #2: WS_2018-02-05_116	30665909	
FR_FRABCH	Sample #1: FR_FRABCH_MON_2018-09-03_NP	39118994	
	Sample #2: FR_FRABCH_MON_2018-09-03_NP_SE	39338750	
FR_FRCP1	Sample #1: FR_FRCP1_WS_2019-11-12_N	50997674	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: FR_FRCP1_WS_2019-11-12_N_8	51187392	
FR_HC3	Sample #1: FR_HC3_M_02012017_N	21143865	Duplicate Field Parameters reported. Other constituents differing.
	Sample #2: FR_HC3-WS-201701171155	21128620	
	Sample #1: FR_HC3-WS-201702141110	21436669	Duplicate Field Parameters reported. Other constituents differing.
	Sample #2: FR_HC3_M_06022017_N	21436667	
FR_MULTIPLATE	Sample #1: FR_MULTIPLATE_WS_201801111256_N_26	29474309	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: FR_MULTIPLATE_WS_201801111256_N_44	32215926	
FR_UFR1	Sample #1: FR_UFR1_W_02062014_N	2853840	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: FR_UFR1-WS-0906141031	2867500	
	Sample #1: FR_UFR1_M_06022017_N	21714056	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: FR_UFR1_QR_09012017_N	21943930	
	Sample #1: FR_UFR1_QR_16012017_N	21860005	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: FR_UFR1_M_06032017_N	21944350	
GH_GH1	Sample #1: GH_GH1_WS_2013-06-19_NP	2768746	Only TSS and turbidity reported, Duplicated.
	Sample #2: GH_GH1_WS_2013-06-19_N	2776294	
	Sample #1: GH_GH1_WS_2013-06-21_NP	2768748	Only TSS and turbidity reported, Duplicated.
	Sample #2: GH_GH1 _WS_2013-06-21_N	2776297	
	Sample #1: GH_GH1_WS_2013-06-27_NP	2768747	Only TSS and turbidity reported, Duplicated.
	Sample #2: GH_GH1_WS_2013-06-27_N	2776296	
	Sample #1: GH_GH1_WS_2018-06-18_N	36243580	Duplicate Methyl Mercury reported.
	Sample #2: GH_GH1_WS_2018-06-18_ME_HG	35645104	
GH_PC1	Sample #1: GH_PC1_MON_2018-04-02_N	32755131	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_PC1_MON_2018-04-02_N	33925671	
	Sample #1: GH_PC1_WEK_2018-04-09_N	33119851	Field Parameters duplicated. Additional TSS and turbidity reported in Duplicated Sample
	Sample #2: GH_PC1_WEK_2018-04-09_N	33925672	
	Sample #1: GH_PC1_WEK_2018-04-16_N	33134788	Field Parameters duplicated. Additional TSS and turbidity reported in Duplicated Sample
	Sample #2: GH_PC1_WEK_2018-04-16_N	33925673	
	Sample #1: GH_PC1_WEK_2018-04-23_N	33925674	Field Parameters duplicated. Additional TSS and turbidity reported in Duplicated Sample
	Sample #2: GH_PC1_WEK_2018-04-23_N	33534966	
	Sample #1: GH_PC1_WEK_2018-04-30_N	33869008	Field Parameters duplicated. Additional TSS and turbidity reported in Duplicated Sample
	Sample #2: GH_PC1_WEK_2018-04-30_N	33925675	
	Sample #1: GH_PC1_MON_2018-06-04_N	35897604	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_PC1_MON_2018-06-04_N	36178200	
	Sample #1: GH_PC1_WEK_2018-06-11_N	36112833	Field Parameters duplicated. Additional TSS and turbidity reported in Duplicated Sample
	Sample #2: GH_PC1_WEK_2018-06-11_N	36178201	
	Sample #1: GH_PC1_WEK_2018-06-18_N	36112848	Field Parameters duplicated. Additional TSS and turbidity reported in Duplicated Sample
	Sample #2: GH_PC1_WEK_2018-06-18_N	36178202	
	Sample #1: GH_PC1_WEK_2018-06-25_N	36112849	Field Parameters duplicated. Additional TSS and turbidity reported in Duplicated Sample
	Sample #2: GH_PC1_WEK_2018-06-25_N	36178203	
	Sample #1: GH_PC1_MON_2018-08-06_N	37989719	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_PC1_MON_2018-08-06_N	39662110	
	Sample #1: GH_PC1_MON_2018-09-03_N	39119039	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_PC1_MON_2018-09-03_N	39662730	
GH_PC2	Sample #1: GH_PC2_8932	2680821	All parameters reported duplicated.
	Sample #2: GH_PC2_8835	2680817	

Table A3. Water Quality Duplicate Entries Identified in Raw Files

Station	Sample Code	Sample_ID	Duplicate Description
GH_SC1	Sample #1: GH_SC1_MON_2018-04-02_N	32755133	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_SC1_MON_2018-04-02_N	33925679	
	Sample #1: GH_SC1_WEK_2018-04-09_N	33119852	Field Parameters duplicated. Additional TSS and turbidity reported in Duplicated Sample
	Sample #2: GH_SC1_WEK_2018-04-09_N	33925680	
	Sample #1: GH_SC1_WEK_2018-04-16_N	33305276	Field Parameters duplicated. Additional TSS and turbidity reported in Duplicated Sample
	Sample #2: GH_SC1_WEK_2018-04-16_N	33925681	
	Sample #1: GH_SC1_WEK_2018-04-23_N	33925696	
	Sample #2: GH_SC1_WEK_2018-04-23_N	33913235	
	Sample #3: GH_SC1-WS-201804251110	33925699	
	Sample #4: GH_SC1-WS-201804251110	33913238	
	Sample #1: GH_SC1-WS-201804271100	33925701	Only TSS reported, Duplicated.
	Sample #2: GH_SC1-WS-201804271100	33913240	
	Sample #1: GH_SC1-WS-201804281157	33925702	Only TSS reported, Duplicated.
	Sample #2: GH_SC1-WS-201804281157	33913241	
	Sample #1: GH_SC1-WS-201804291145	33925703	Only TSS reported, Duplicated.
	Sample #2: GH_SC1-WS-201804291145	33913242	
	Sample #1: GH_SC1_WEK_2018-04-30_N	33925697	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_SC1_WEK_2018-04-30_N	33869009	
	Sample #1: GH_SC1_MON_2018-06-04_N	36178207	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_SC1_MON_2018-06-04_N	35897605	
	Sample #1: GH_SC1_WEK_2018-06-11_N	36178208	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_SC1_WEK_2018-06-11_N	36112854	
	Sample #1: GH_SC1_WEK_2018-06-18_N	36112855	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_SC1_WEK_2018-06-18_N	36178209	
	Sample #1: GH_SC1_WEK_2018-06-25_N	36112856	All parameters reported duplicated.
	Sample #2: GH_SC1_WEK_2018-06-25_N	36178210	
	Sample #1: GH_SC1_MON_2018-08-06_N	37989721	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_SC1_MON_2018-08-06_N	39662114	
	Sample #1: GH_SC1_MON_2018-09-03_N	39119041	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_SC1_MON_2018-09-03_N	39662734	
LC_DC1	Sample #1: LC_DC1_WS_2013-08-07_N	2772403	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: LC_DC1_WS_2013-08-06_N	2768687	
LC_FRB	Sample #1: LC_FRB_WS_2013-08-07_NP	2772408	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: LC_FRB_WS_2013-08-06_NP	2768690	
GH_CC1	Sample #1: GH_CC1-WS-201702091115	21436690	Duplicate Field Parameters reported. Other constituents differing.
	Sample #2: GH_CC1_M_06022017_N	21436688	
	Sample #1: GH_CC1-WS-201707051011	25517398	All parameters reported duplicated.
	Sample #2: GH_CC1-WS-201707051011	25484805	
	Sample #1: GH_CC1_MON_2018-04-02_N	32755129	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_CC1_MON_2018-04-02_N	33925665	
	Sample #1: GH_CC1_WEK_2018-04-09_N	33119850	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_CC1_WEK_2018-04-09_N	33925666	
	Sample #1: GH_CC1_WEK_2018-04-16_N	33134787	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_CC1_WEK_2018-04-16_N	33925667	
	Sample #1: GH_CC1_WEK_2018-04-23_N	33913221	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_CC1_WEK_2018-04-23_N	33925668	
	Sample #1: GH_CC1_WEK_2018-04-30_N	33925669	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_CC1_WEK_2018-04-30_N	33869007	
	Sample #1: GH_CC1_MON_2018-06-04_N	35897602	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_CC1_MON_2018-06-04_N	36178195	
	Sample #1: GH_CC1_WEK_2018-06-11_N	36178196	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_CC1_WEK_2018-06-11_N	36112828	
	Sample #1: GH_CC1_WEK_2018-06-18_N	36178197	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_CC1_WEK_2018-06-18_N	36112829	
	Sample #1: GH_CC1_WEK_2018-06-25_N	36178198	All parameters reported duplicated.
	Sample #2: GH_CC1_WEK_2018-06-25_N	36112830	
	Sample #1: GH_CC1_MON_2018-08-06_N	37989717	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_CC1_MON_2018-08-06_N	39662108	
	Sample #1: GH_CC1_MON_2018-09-03_N	39119037	Field parameters duplicated. No other parameters reported for Duplicated Sample.
	Sample #2: GH_CC1_MON_2018-09-03_N	39662728	

Table A4. Water Quality Assessment for Release of Mine-Influenced Water: Number of Samples and Detection Frequency by Constituent and Units

Constituent	Unit	Count	% Detect (Sept 2017 - Sept 2019)
Field Measured			
pH	-	622	100%
Temperature	°C	622	100%
Dissolved oxygen	mg/L	622	100%
Turbidity	NTU	105	100%
Conductivity	µS/cm	620	100%
Conductivity	µS/cmA	1	100%
Specific conductivity (temperature corrected at 25 °c)	µS/cm	1	100%
Specific conductivity (temperature corrected at 25 °c)	µS/cm at 25 C	2	100%
Oxidation-reduction potential	mV	620	98%
Dissolved oxygen	%	619	100%
Total suspended solids	mg/L	27	100%
Conventional Parameters			
pH	-	359	100%
Hardness, as $CaCO_3$	mg/L	358	100%
Total alkalinity, as $CaCO_3$	mg/L	359	99%
Total dissolved solids	mg/L	358	100%
Total suspended solids	mg/L	703	66%
Total organic carbon	mg/L	354	95%
Dissolved organic carbon	mg/L	354	95%
Colour	TCU	5	60%
Turbidity	NTU		
Conductivity	µS/cm	359	99%
Oxidation-reduction potential	mV	358	100%
Acidity, $CaCO_3$	mg/L	358	53%
Bicarbonate alkalinity, as $CaCO_3$	mg/L	354	99%
Carbonate alkalinity, as $CaCO_3$	mg/L	354	40%
Hydroxide alkalinity, as $CaCO_3$	mg/L	354	1%
Major Ions			
Bromide	mg/L	359	5%
Calcium	mg/L	358	100%
Chloride	mg/L	359	37%
Fluoride	mg/L	359	90%
Magnesium	mg/L	358	100%
Potassium	mg/L	358	100%
Sodium	mg/L	358	100%
Sulphate	mg/L	359	100%
Sulphide	mg/L	3	0%
Hydrogen sulphide	mg/L	3	0%
Nutrients and Biological Indicators			
Nitrate	mg-N/L	359	100%
Nitrite	mg-N/L	359	75%
Total ammonia	mg-N/L	359	91%
Total Kjeldahl nitrogen	mg-N/L	354	74%
Total phosphorus	mg-P/L	359	83%
Biochemical oxygen demand	mg/L	7	0%
Total ortho-phosphate	mg-P/l	359	53%
Total Metals			
Aluminum	µg/L	355	67%
Antimony	µg/L		
Arsenic	µg/L	355	74%
Barium	µg/L	355	100%
Beryllium	µg/L	355	6%
Bismuth	µg/L	355	1%
Boron	µg/L	355	64%
Cadmium	µg/L	355	97%
Calcium	µg/L	355	100%

Table A4. Water Quality Assessment for Release of Mine-Influenced Water: Number of Samples and Detection Frequency by Constituent and Units

Constituent	Unit	Count	% Detect (Sept 2017 - Sept 2019)
Chromium	µg/L	355	55%
Cobalt	µg/L	355	46%
Copper	µg/L	355	32%
Iron	µg/L	355	45%
Lead	µg/L	355	22%
Lithium	µg/L	355	100%
Magnesium	µg/L	355	100%
Manganese	µg/L	355	99%
Mercury	µg/L		
Methyl mercury	µg/L	50	32%
Molybdenum	µg/L		
Nickel	µg/L		
Potassium	µg/L	355	100%
Selenium	µg/L	355	100%
Silicon	µg/L	355	100%
Silver	µg/L	355	7%
Sodium	µg/L	355	100%
Strontium	µg/L	355	100%
Thallium	µg/L		
Tin	µg/L	355	1%
Titanium	µg/L	355	3%
Uranium	µg/L	355	100%
Vanadium	µg/L		
Zinc	µg/L		
Dissolved Metals			
Aluminum	µg/L	355	25%
Antimony	µg/L		
Arsenic	µg/L	355	59%
Barium	µg/L	355	100%
Beryllium	µg/L	355	0%
Bismuth	µg/L	355	0%
Boron	µg/L	355	57%
Cadmium	µg/L	355	88%
Chromium	µg/L	355	16%
Cobalt	µg/L	355	37%
Copper	µg/L	355	25%
Iron	µg/L	355	5%
Lead	µg/L	355	3%
Lithium	µg/L	355	100%
Manganese	µg/L	355	92%
Mercury	µg/L	353	1%
Molybdenum	µg/L	355	100%
Nickel	µg/L		
Selenium	µg/L	355	100%
Silicon	µg/L	355	100%
Silver	µg/L	355	1%
Strontium	µg/L	355	100%
Thallium	µg/L		
Tin	µg/L	355	0%
Titanium	µg/L	355	0%
Uranium	µg/L	355	100%
Vanadium	µg/L		
Zinc	µg/L		
Parent PAHs			
Naphthalene	µg/L	4	0%
Acenaphthylene	µg/L	4	0%
Acenaphthene	µg/L	4	0%
Acridine	µg/L	4	0%

Table A4. Water Quality Assessment for Release of Mine-Influenced Water: Number of Samples and Detection Frequency by Constituent and Units

Constituent	Unit	Count	% Detect (Sept 2017 - Sept 2019)
Fluorene	µg/L	4	0%
Phenanthrene	µg/L	4	25%
Anthracene	µg/L	4	0%
Pyrene	µg/L	4	0%
Fluoranthene	µg/L	4	0%
Benzo(a)anthracene	µg/L	4	0%
Chrysene	µg/L	4	0%
Benzo(a)pyrene	µg/L	4	0%
Benzo(g,h,i)perylene	µg/L	4	0%
Indeno(c,d-123)pyrene	µg/L	4	0%
Dibenzo(a,h)anthracene	µg/L	4	0%
Quinoline	µg/L	4	0%
Benzo(b,j)fluoranthene	µg/L	4	0%
Benzo(k)fluoranthene	µg/L	4	0%
Alkylated PAHs			
1-Methylnaphthalene	µg/L	4	0%
2-Methylnaphthalene	µg/L	4	25%
Speciation Of Selenium			
Dissolved dimethylseleneoxide	µg/L	4	25%
Dissolved methylseleninic acid	µg/L	4	75%
Dissolved selenite	µg/L	4	100%
Dissolved selenate	µg/L	4	100%
Dissolved selenocyanate	µg/L	4	0%
Dissolved selenomethionine	µg/L	4	0%
Dissolved selenosulphate	µg/L	4	0%
Unknown dissolved selenium species	µg/L	4	0%
Volatile Organics			
Extractable Petroleum Hydrocarbons (C10 - C19)	mg/L	42	0%
Extractable Petroleum Hydrocarbons (C19 - C32)	mg/L	42	2%
Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32)	mg/L	41	2%
Total Extractable Hydrocarbons (TEH 10 - 30)	mg/L	40	3%
Bacterial			
Microcystin	µg/L	3	0%

Notes: units are in milligrams per litre (mg/L), milligrams per litre as nitrogen (mg-N/L), or micrograms per litre (µg/L). PAH = polycyclic aromatic hydrocarbon; % = percent

Table A5. Water Quality Assessment for Fish Accessible Waters: Number of Samples and Detection Frequency by Constituent and Units (September 2017 to September 2019)

Constituent	Unit	Count	% Detect (Sept 2017 - Sept 2019)
Field Measured			
pH	-	1,078	100%
Temperature	°C	1,078	100%
Dissolved oxygen	mg/L	1,075	100%
Turbidity	NTU	294	100%
Conductivity	µS/cm	950	100%
Conductivity	µS/cm at 25 C	1	100%
Conductivity	µS/cmA	2	100%
Specific conductivity (temperature corrected at 25 °c)	µS/cm	1	100%
Specific conductivity (temperature corrected at 25 °c)	µS/cm at 25 C	131	100%
Oxidation-reduction potential	mV	1,047	98%
Dissolved oxygen	%	1,070	100%
Total suspended solids	mg/L	6	100%
Conventional Parameters			
pH	-	878	100%
Hardness, as $CaCO_3$	mg/L	878	100%
Total alkalinity, as $CaCO_3$	mg/L	878	100%
Total dissolved solids	mg/L	877	100%
Total suspended solids	mg/L	1,086	57%
Total organic carbon	mg/L	875	90%
Dissolved organic carbon	mg/L	875	88%
Colour	TCU	5	60%
Turbidity	NTU	1,085	99%
Conductivity	µmhos/cm	2	100%
Conductivity	µS/cm	876	100%
Oxidation-reduction potential	mV	877	100%
Acidity, $CaCO_3$	mg/L	877	32%
Bicarbonate alkalinity, as $CaCO_3$	mg/L	856	100%
Carbonate alkalinity, as $CaCO_3$	mg/L	856	49%
Hydroxide alkalinity, as $CaCO_3$	mg/L	856	0%
Hydroxide	mg/L	2	0%
Major Ions			
Bicarbonate	mg/L	2	100%
Bromide	mg/L	878	2%
Calcium	mg/L	878	100%
Carbonate	mg/L	2	0%
Chloride	mg/L	878	47%
Fluoride	mg/L	878	96%
Magnesium	mg/L	878	100%
Potassium	mg/L	878	100%
Sodium	mg/L	878	100%
Sulphate	mg/L	878	100%
Sulphide	mg/L	190	5%
Hydrogen sulphide	mg/L	190	5%
Nutrients and Biological Indicators			
Nitrate	mg-N/L	879	99%
Nitrite	mg-N/L	878	70%
Total ammonia	mg-N/L	878	83%
Total Kjeldahl nitrogen	mg-N/L	874	73%
Total phosphorus	mg-P/L	879	83%
Biochemical oxygen demand	mg/L	7	0%
Total ortho-phosphate	mg-P/l	877	54%
Total Metals			
Aluminum	µg/L	878	78%
Antimony	µg/L	878	69%
Arsenic	µg/L	878	78%

Table A5. Water Quality Assessment for Fish Accessible Waters: Number of Samples and Detection Frequency by Constituent and Units (September 2017 to September 2019)

Constituent	Unit	Count	% Detect (Sept 2017 - Sept 2019)
Barium	µg/L	878	100%
Beryllium	µg/L	877	3%
Bismuth	µg/L	878	0%
Boron	µg/L	878	29%
Cadmium	µg/L	878	98%
Calcium	µg/L	878	100%
Cesium	µg/L	1	100%
Chromium	µg/L	878	79%
Cobalt	µg/L	878	32%
Copper	µg/L	878	11%
Iron	µg/L	878	65%
Lead	µg/L	878	15%
Lithium	µg/L	878	97%
Magnesium	µg/L	878	100%
Manganese	µg/L	878	98%
Mercury	µg/L	874	34%
Methyl mercury	µg/L	134	16%
Molybdenum	µg/L	878	100%
Nickel	µg/L	878	78%
Potassium	µg/L	878	100%
Rubidium	µg/L	1	100%
Selenium	µg/L	879	100%
Silicon	µg/L	878	100%
Silver	µg/L	878	4%
Sodium	µg/L	878	100%
Strontium	µg/L	878	100%
Sulphur	µg/L	1	100%
Tellurium	µg/L	1	0%
Thallium	µg/L	878	23%
Thorium	µg/L	1	0%
Tin	µg/L	878	1%
Titanium	µg/L	878	1%
Tungsten	µg/L	1	0%
Uranium	µg/L	878	100%
Vanadium	µg/L	878	22%
Zinc	µg/L	878	26%
Zirconium	µg/L	1	100%
Dissolved Metals			
Aluminum	µg/L	877	13%
Antimony	µg/L	877	62%
Arsenic	µg/L	877	40%
Barium	µg/L	876	100%
Beryllium	µg/L	876	0%
Bismuth	µg/L	877	0%
Boron	µg/L	877	24%
Cadmium	µg/L	877	90%
Chromium	µg/L	877	33%
Cobalt	µg/L	877	21%
Copper	µg/L	877	5%
Iron	µg/L	877	4%
Lead	µg/L	877	1%
Lithium	µg/L	877	97%
Manganese	µg/L	876	90%
Mercury	µg/L	874	0%
Molybdenum	µg/L	877	100%
Nickel	µg/L	877	73%
Selenium	µg/L	878	100%
Silicon	µg/L	877	100%

Table A5. Water Quality Assessment for Fish Accessible Waters: Number of Samples and Detection Frequency by Constituent and Units (September 2017 to September 2019)

Constituent	Unit	Count	% Detect (Sept 2017 - Sept 2019)
Silver	µg/L	877	0%
Strontium	µg/L	877	100%
Thallium	µg/L	877	17%
Tin	µg/L	877	0%
Titanium	µg/L	877	0%
Uranium	µg/L	877	100%
Vanadium	µg/L	877	6%
Zinc	µg/L	877	31%
Parent PAHs			
Naphthalene	µg/L	9	0%
Acenaphthylene	µg/L	9	0%
Acenaphthene	µg/L	9	0%
Acridine	µg/L	9	0%
Fluorene	µg/L	9	0%
Phenanthrene	µg/L	9	11%
Anthracene	µg/L	9	0%
Pyrene	µg/L	9	0%
Fluoranthene	µg/L	9	0%
Benzo(a)anthracene	µg/L	9	0%
Chrysene	µg/L	9	0%
Benzo(a)pyrene	µg/L	9	0%
Benzo(g,h,i)perylene	µg/L	9	0%
Indeno(c,d-123)pyrene	µg/L	9	0%
Dibenzo(a,h)anthracene	µg/L	9	0%
Quinoline	µg/L	9	0%
Benzo(b,j)fluoranthene	µg/L	9	0%
Benzo(k)fluoranthene	µg/L	9	0%
Alkylated PAHs			
1-Methylnaphthalene	µg/L	9	0%
2-Methylnaphthalene	µg/L	9	11%
Speciation Of Selenium			
Dissolved dimethylseleneoxide	µg/L	59	7%
Dissolved methylseleninic acid	µg/L	59	51%
Dissolved selenite	µg/L	59	97%
Dissolved selenate	µg/L	59	100%
Dissolved selenocyanate	µg/L	59	0%
Dissolved selenomethionine	µg/L	59	0%
Dissolved selenosulphate	µg/L	59	0%
Unknown dissolved selenium species	µg/L	59	0%
Volatile Organics			
Extractable Petroleum Hydrocarbons (C10 - C19)	mg/L	45	0%
Extractable Petroleum Hydrocarbons (C19 - C32)	mg/L	45	0%
Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32)	mg/L	45	0%
Total Extractable Hydrocarbons (TEH 10 - 30)	mg/L	44	0%
Bacterial			
Microcystin	µg/L	3	0%

Notes: units are in milligrams per litre (mg/L), milligrams per litre as nitrogen (mg-N/L), or micrograms per litre (µg/L). PAH = polycyclic aromatic hydrocarbon; % = percent

Table A6. Invertebrate Tissue Selenium Concentrations (2012 to 2019)

Exposure	Habitat	Station	Replicate	Season	Date	Year	Selenium (mg/kg dw)
			1	Summer-Fall	18-Sep-12	2012	4.9
			2	Summer-Fall	18-Sep-12	2012	3.6
			3	Summer-Fall	18-Sep-12	2012	4.2
			1	Summer-Fall	14-Sep-15	2015	4.9
			1	Summer-Fall	12-Sep-16	2016	3.5
			1	Summer-Fall	12-Sep-17	2017	3.2
			1	Summer-Fall	07-Sep-18	2018	3.4
			2	Summer-Fall	07-Sep-18	2018	4.1
			3	Summer-Fall	07-Sep-18	2018	3.8
			1	Spring	20-Jun-19	2019	3.6
			2	Spring	20-Jun-19	2019	3.4
			3	Spring	20-Jun-19	2019	3.4
			1	Summer-Fall	10-Sep-19	2019	3.2
			2	Summer-Fall	10-Sep-19	2019	3.1
			3	Summer-Fall	10-Sep-19	2019	2.8
			1	Winter	05-Dec-18	2018	4.1
			2	Winter	05-Dec-18	2018	3.7
			3	Winter	05-Dec-18	2018	4.0
			1	Winter	14-Feb-19	2019	4.9
			2	Winter	14-Feb-19	2019	3.8
			3	Winter	14-Feb-19	2019	5.2
Mine-exposed	Lotic	FODHE	1	Summer-Fall	19-Sep-12	2012	8.9
Mine-exposed	Lotic	FODHE	1	Summer-Fall	14-Sep-15	2015	6.6
Mine-exposed	Lotic	FODHE	1	Summer-Fall	15-Sep-17	2017	8.1
Mine-exposed	Lotic	FODHE	1	Summer-Fall	05-Sep-18	2018	11
Mine-exposed	Lotic	FODHE	2	Summer-Fall	05-Sep-18	2018	12
Mine-exposed	Lotic	FODHE	3	Summer-Fall	05-Sep-18	2018	15
Mine-exposed	Lotic	FODHE	1	Winter	05-Dec-18	2018	7.8
Mine-exposed	Lotic	FODHE	2	Winter	05-Dec-18	2018	7.6
Mine-exposed	Lotic	FODHE	3	Winter	05-Dec-18	2018	3.8
Mine-exposed	Lotic	FODHE	1	Spring	20-Jun-19	2019	6.8
Mine-exposed	Lotic	FODHE	2	Spring	20-Jun-19	2019	6.0
Mine-exposed	Lotic	FODHE	3	Spring	20-Jun-19	2019	3.9
Mine-exposed	Lotic	FODHE	1	Summer-Fall	10-Sep-19	2019	5.1
Mine-exposed	Lotic	FODHE	2	Summer-Fall	10-Sep-19	2019	5.2
Mine-exposed	Lotic	FODHE	3	Summer-Fall	10-Sep-19	2019	7.0
Mine-exposed	Lotic	FOUCL	1	Summer-Fall	12-Sep-19	2019	7.2
Mine-exposed	Lotic	FOUCL	2	Summer-Fall	12-Sep-19	2019	5.5
Mine-exposed	Lotic	FOUCL	3	Summer-Fall	12-Sep-19	2019	5.8
Mine-exposed	Lotic	FOBC	1	Spring	12-Jul-13	2013	8.6
Mine-exposed	Lotic	FOBC	1	Spring	02-Jul-15	2015	11
Mine-exposed	Lotic	FOUNGD	1	Summer-Fall	12-Sep-12	2012	8.2
Mine-exposed	Lotic	FOUNGD	1	Summer-Fall	15-Sep-15	2015	7.2
Mine-exposed	Lotic	FOUNGD	1	Summer-Fall	17-Sep-15	2015	7.2
Mine-exposed	Lotic	FOUNGD	1	Summer-Fall	16-Sep-17	2017	6.5
Mine-exposed	Lotic	FOUNGD	1	Summer-Fall	13-Sep-18	2018	6.0
Mine-exposed	Lotic	FOUNGD	2	Summer-Fall	13-Sep-18	2018	7.0
Mine-exposed	Lotic	FOUNGD	3	Summer-Fall	13-Sep-18	2018	8.0
Mine-exposed	Lotic	FOUNGD	1	Winter	05-Dec-18	2018	6.0
Mine-exposed	Lotic	FOUNGD	2	Winter	05-Dec-18	2018	6.1
Mine-exposed	Lotic	FOUNGD	3	Winter	05-Dec-18	2018	5.0
Mine-exposed	Lotic	FOUNGD	1	Winter	12-Feb-19	2019	5.6
Mine-exposed	Lotic	FOUNGD	2	Winter	12-Feb-19	2019	5.5
Mine-exposed	Lotic	FOUNGD	3	Winter	12-Feb-19	2019	5.7
Mine-exposed	Lotic	FOUNGD	1	Spring	19-Jun-19	2019	5.1
Mine-exposed	Lotic	FOUNGD	2	Spring	19-Jun-19	2019	4.5
Mine-exposed	Lotic	FOUNGD	3	Spring	19-Jun-19	2019	5.1
Mine-exposed	Lotic	FOUNGD	1	Summer-Fall	12-Sep-19	2019	7.5
Mine-exposed	Lotic	FOUNGD	2	Summer-Fall	12-Sep-19	2019	6.4
Mine-exposed	Lotic	FOUNGD	3	Summer-Fall	12-Sep-19	2019	6.1
Mine-exposed	Lotic	FODNGD	1	Summer-Fall	16-Sep-17	2017	5.6
Mine-exposed	Lotic	FODNGD	1	Summer-Fall	12-Sep-18	2018	9.0

Table A6. Invertebrate Tissue Selenium Concentrations (2012 to 2019)

Exposure	Habitat	Station	Replicate	Season	Date	Year	Selenium (mg/kg dw)
Mine-exposed	Lotic	FODNGD	2	Summer-Fall	12-Sep-18	2018	8.0
Mine-exposed	Lotic	FODNGD	3	Summer-Fall	12-Sep-18	2018	8.0
Mine-exposed	Lotic	FODNGD	1	Winter	05-Dec-18	2018	4.7
Mine-exposed	Lotic	FODNGD	2	Winter	05-Dec-18	2018	4.2
Mine-exposed	Lotic	FODNGD	3	Winter	05-Dec-18	2018	7.0
Mine-exposed	Lotic	FODNGD	1	Winter	12-Feb-19	2019	7.2
Mine-exposed	Lotic	FODNGD	2	Winter	12-Feb-19	2019	5.0
Mine-exposed	Lotic	FODNGD	3	Winter	12-Feb-19	2019	8.1
Mine-exposed	Lotic	FODNGD	1	Spring	19-Jun-19	2019	4.1
Mine-exposed	Lotic	FODNGD	2	Spring	19-Jun-19	2019	5.6
Mine-exposed	Lotic	FODNGD	3	Spring	19-Jun-19	2019	4.4
Mine-exposed	Lotic	FODNGD	1	Summer-Fall	12-Sep-19	2019	8.0
Mine-exposed	Lotic	FODNGD	2	Summer-Fall	12-Sep-19	2019	4.5
Mine-exposed	Lotic	FODNGD	3	Summer-Fall	12-Sep-19	2019	7.0
Mine-exposed	Lotic	MP1	1	Summer-Fall	12-Sep-12	2012	9.0
Mine-exposed	Lotic	MP1	1	Summer-Fall	15-Sep-15	2015	5.9
Mine-exposed	Lotic	MP1	1	Summer-Fall	12-Sep-17	2017	5.6
Mine-exposed	Lotic	MP1	1	Summer-Fall	11-Sep-18	2018	7.0
Mine-exposed	Lotic	MP1	2	Summer-Fall	11-Sep-18	2018	8.6
Mine-exposed	Lotic	MP1	3	Summer-Fall	11-Sep-18	2018	8.0
Mine-exposed	Lotic	MP1	1	Winter	06-Dec-18	2018	6.6
Mine-exposed	Lotic	MP1	2	Winter	06-Dec-18	2018	6.8
Mine-exposed	Lotic	MP1	3	Winter	06-Dec-18	2018	5.3
Mine-exposed	Lotic	MP1	1	Winter	13-Feb-19	2019	5.0
Mine-exposed	Lotic	MP1	2	Winter	13-Feb-19	2019	4.7
Mine-exposed	Lotic	MP1	3	Winter	13-Feb-19	2019	8.4
Mine-exposed	Lotic	MP1	1	Spring	18-Jun-19	2019	5.2
Mine-exposed	Lotic	MP1	2	Spring	18-Jun-19	2019	6.0
Mine-exposed	Lotic	MP1	3	Spring	18-Jun-19	2019	6.1
Mine-exposed	Lotic	MP1	1	Summer-Fall	05-Sep-19	2019	5.6
Mine-exposed	Lotic	MP1	2	Summer-Fall	05-Sep-19	2019	7.0
Mine-exposed	Lotic	MP1	3	Summer-Fall	05-Sep-19	2019	7.3
Mine-exposed	Lotic	FOUSH	1	Summer-Fall	13-Sep-12	2012	7.6
Mine-exposed	Lotic	FOUSH	1	Summer-Fall	15-Sep-15	2015	6.0
Mine-exposed	Lotic	FOUSH	1	Summer-Fall	14-Sep-17	2017	6.5
Mine-exposed	Lotic	FOUSH	1	Summer-Fall	11-Sep-18	2018	8.0
Mine-exposed	Lotic	FOUSH	2	Summer-Fall	11-Sep-18	2018	8.0
Mine-exposed	Lotic	FOUSH	3	Summer-Fall	11-Sep-18	2018	9.1
Mine-exposed	Lotic	FOUSH	1	Winter	06-Dec-18	2018	5.5
Mine-exposed	Lotic	FOUSH	2	Winter	06-Dec-18	2018	5.0
Mine-exposed	Lotic	FOUSH	3	Winter	06-Dec-18	2018	5.2
Mine-exposed	Lotic	FOUSH	1	Winter	13-Feb-19	2019	9.6
Mine-exposed	Lotic	FOUSH	2	Winter	13-Feb-19	2019	6.9
Mine-exposed	Lotic	FOUSH	3	Winter	13-Feb-19	2019	6.6
Mine-exposed	Lotic	FOUSH	1	Spring	17-Jun-19	2019	5.9
Mine-exposed	Lotic	FOUSH	2	Spring	17-Jun-19	2019	6.1
Mine-exposed	Lotic	FOUSH	3	Spring	17-Jun-19	2019	4.7
Mine-exposed	Lotic	FOUSH	1	Summer-Fall	09-Sep-19	2019	5.6
Mine-exposed	Lotic	FOUSH	2	Summer-Fall	09-Sep-19	2019	5.9
Mine-exposed	Lotic	FOUSH	3	Summer-Fall	09-Sep-19	2019	6.0
Mine-exposed	Lotic	FOUKI	1	Summer-Fall	14-Sep-12	2012	8.5
Mine-exposed	Lotic	FOUKI	1	Summer-Fall	16-Sep-15	2015	5.1
Mine-exposed	Lotic	FOUKI	1	Summer-Fall	12-Sep-16	2016	5.2
Mine-exposed	Lotic	FOUKI	1	Summer-Fall	12-Sep-17	2017	6.7
Mine-exposed	Lotic	FOUKI	2	Summer-Fall	12-Sep-17	2017	6.6
Mine-exposed	Lotic	FOUKI	3	Summer-Fall	12-Sep-17	2017	6.8
Mine-exposed	Lotic	FOUKI	1	Winter	06-Mar-18	2018	4.9
Mine-exposed	Lotic	FOUKI	2	Winter	06-Mar-18	2018	5.4
Mine-exposed	Lotic	FOUKI	3	Winter	06-Mar-18	2018	5.0
Mine-exposed	Lotic	FOUKI	1	Summer-Fall	07-Sep-18	2018	9.4
Mine-exposed	Lotic	FOUKI	2	Summer-Fall	07-Sep-18	2018	10
Mine-exposed	Lotic	FOUKI	3	Summer-Fall	07-Sep-18	2018	11

Table A6. Invertebrate Tissue Selenium Concentrations (2012 to 2019)

Exposure	Habitat	Station	Replicate	Season	Date	Year	Selenium (mg/kg dw)
Mine-exposed	Lotic	FOUKI	1	Winter	04-Dec-18	2018	4.9
Mine-exposed	Lotic	FOUKI	2	Winter	04-Dec-18	2018	5.5
Mine-exposed	Lotic	FOUKI	3	Winter	04-Dec-18	2018	7.2
Mine-exposed	Lotic	FOUKI	1	Winter	12-Feb-19	2019	4.5
Mine-exposed	Lotic	FOUKI	2	Winter	12-Feb-19	2019	4.8
Mine-exposed	Lotic	FOUKI	3	Winter	12-Feb-19	2019	4.7
Mine-exposed	Lotic	FOUKI	1	Spring	18-Jun-19	2019	4.7
Mine-exposed	Lotic	FOUKI	2	Spring	18-Jun-19	2019	4.7
Mine-exposed	Lotic	FOUKI	3	Spring	18-Jun-19	2019	5.0
Mine-exposed	Lotic	FOUKI	1	Summer-Fall	05-Sep-19	2019	6.2
Mine-exposed	Lotic	FOUKI	2	Summer-Fall	05-Sep-19	2019	8.8
Mine-exposed	Lotic	FOUKI	3	Summer-Fall	05-Sep-19	2019	9.2
Mine-exposed	Lotic	FOBKS	1	Summer-Fall	14-Sep-12	2012	8.8
Mine-exposed	Lotic	FOBKS	1	Summer-Fall	16-Sep-15	2015	6.0
Mine-exposed	Lotic	FOBKS	1	Summer-Fall	13-Sep-17	2017	5.8
Mine-exposed	Lotic	FOBKS	2	Summer-Fall	13-Sep-17	2017	8.2
Mine-exposed	Lotic	FOBKS	3	Summer-Fall	13-Sep-17	2017	5.9
Mine-exposed	Lotic	FOBKS	1	Winter	12-Mar-18	2018	5.8
Mine-exposed	Lotic	FOBKS	2	Winter	12-Mar-18	2018	5.1
Mine-exposed	Lotic	FOBKS	3	Winter	12-Mar-18	2018	6.2
Mine-exposed	Lotic	FOBKS	1	Summer-Fall	08-Sep-18	2018	11
Mine-exposed	Lotic	FOBKS	2	Summer-Fall	08-Sep-18	2018	10
Mine-exposed	Lotic	FOBKS	3	Summer-Fall	08-Sep-18	2018	9.9
Mine-exposed	Lotic	FOBKS	1	Winter	04-Dec-18	2018	3.8
Mine-exposed	Lotic	FOBKS	2	Winter	04-Dec-18	2018	3.8
Mine-exposed	Lotic	FOBKS	3	Winter	04-Dec-18	2018	6.6
Mine-exposed	Lotic	FOBKS	3	Winter	12-Feb-19	2019	13
Mine-exposed	Lotic	FOBKS	1	Spring	17-Jun-19	2019	5.0
Mine-exposed	Lotic	FOBKS	2	Spring	17-Jun-19	2019	3.8
Mine-exposed	Lotic	FOBKS	3	Spring	17-Jun-19	2019	4.0
Mine-exposed	Lotic	FOBKS	1	Summer-Fall	09-Sep-19	2019	7.5
Mine-exposed	Lotic	FOBKS	2	Summer-Fall	09-Sep-19	2019	7.9
Mine-exposed	Lotic	FOBKS	3	Summer-Fall	09-Sep-19	2019	9.5
Mine-exposed	Lotic	SCOUTDS	1	Summer-Fall	12-Sep-19	2019	14
Mine-exposed	Lotic	SCOUTDS	2	Summer-Fall	12-Sep-19	2019	14
Mine-exposed	Lotic	SCOUTDS	3	Summer-Fall	12-Sep-19	2019	10
Mine-exposed	Lotic	FOBSC	1	Summer-Fall	15-Sep-12	2012	8.4
Mine-exposed	Lotic	FOBSC	1	Summer-Fall	17-Sep-15	2015	7.5
Mine-exposed	Lotic	FOBSC	1	Summer-Fall	15-Sep-17	2017	5.0
Mine-exposed	Lotic	FOBSC	1	Summer-Fall	10-Sep-18	2018	9.0
Mine-exposed	Lotic	FOBSC	2	Summer-Fall	10-Sep-18	2018	9.0
Mine-exposed	Lotic	FOBSC	3	Summer-Fall	10-Sep-18	2018	8.2
Mine-exposed	Lotic	FOBSC	1	Winter	04-Dec-18	2018	8.0
Mine-exposed	Lotic	FOBSC	2	Winter	04-Dec-18	2018	9.2
Mine-exposed	Lotic	FOBSC	3	Winter	04-Dec-18	2018	7.6
Mine-exposed	Lotic	FOBSC	1	Spring	18-Jun-19	2019	5.3
Mine-exposed	Lotic	FOBSC	2	Spring	18-Jun-19	2019	5.1
Mine-exposed	Lotic	FOBSC	3	Spring	18-Jun-19	2019	5.7
Mine-exposed	Lotic	FOBSC	1	Summer-Fall	13-Sep-19	2019	13
Mine-exposed	Lotic	FOBSC	2	Summer-Fall	13-Sep-19	2019	12
Mine-exposed	Lotic	FOBSC	3	Summer-Fall	13-Sep-19	2019	13
Mine-exposed	Lotic	FOBCP	1	Summer-Fall	15-Sep-12	2012	7.9
Mine-exposed	Lotic	FOBCP	1	Summer-Fall	17-Sep-15	2015	7.7
Mine-exposed	Lotic	FOBCP	1	Summer-Fall	12-Sep-16	2016	9.7
Mine-exposed	Lotic	FOBCP	1	Summer-Fall	14-Sep-17	2017	6.4
Mine-exposed	Lotic	FOBCP	1	Summer-Fall	09-Sep-18	2018	9.4
Mine-exposed	Lotic	FOBCP	2	Summer-Fall	09-Sep-18	2018	8.0
Mine-exposed	Lotic	FOBCP	3	Summer-Fall	09-Sep-18	2018	10
Mine-exposed	Lotic	FOBCP	4	Summer-Fall	09-Sep-18	2018	8.0
Mine-exposed	Lotic	FOBCP	5	Summer-Fall	09-Sep-18	2018	7.9
Mine-exposed	Lotic	FOBCP	1	Winter	03-Dec-18	2018	39
Mine-exposed	Lotic	FOBCP	2	Winter	03-Dec-18	2018	8.4

Table A6. Invertebrate Tissue Selenium Concentrations (2012 to 2019)

Exposure	Habitat	Station	Replicate	Season	Date	Year	Selenium (mg/kg dw)
Mine-exposed	Lotic	FOBCP	3	Winter	03-Dec-18	2018	7.0
Mine-exposed	Lotic	FOBCP	1	Winter	11-Feb-19	2019	9.4
Mine-exposed	Lotic	FOBCP	2	Winter	11-Feb-19	2019	10
Mine-exposed	Lotic	FOBCP	3	Winter	11-Feb-19	2019	8.6
Mine-exposed	Lotic	FOBCP	1	Spring	18-Jun-19	2019	2.8
Mine-exposed	Lotic	FOBCP	2	Spring	18-Jun-19	2019	5.3
Mine-exposed	Lotic	FOBCP	3	Spring	18-Jun-19	2019	4.4
Mine-exposed	Lotic	FOBCP	1	Summer-Fall	06-Sep-19	2019	9.1
Mine-exposed	Lotic	FOBCP	2	Summer-Fall	06-Sep-19	2019	8.4
Mine-exposed	Lotic	FOBCP	3	Summer-Fall	06-Sep-19	2019	6.3
Mine-exposed	Lotic	FOBCP	4	Summer-Fall	06-Sep-19	2019	7.6
Mine-exposed	Lotic	FOBCP	5	Summer-Fall	06-Sep-19	2019	7.3
Mine-exposed	Lotic	FRCP1SW	1	Summer-Fall	14-Sep-17	2017	6.9
Mine-exposed	Lotic	FRCP1SW	1	Spring	19-Jun-19	2019	48
Mine-exposed	Lotic	FRCP1SW	2	Spring	19-Jun-19	2019	5.7
Mine-exposed	Lotic	FRCP1SW	3	Spring	19-Jun-19	2019	6.5
Mine-exposed	Lotic	FRCP1SW	1	Summer-Fall	13-Sep-19	2019	7.7
Mine-exposed	Lotic	FRCP1SW	2	Summer-Fall	13-Sep-19	2019	7.7
Mine-exposed	Lotic	FRCP1SW	3	Summer-Fall	13-Sep-19	2019	7.7
Mine-exposed	Lotic	FRUPO	1	Summer-Fall	15-Sep-17	2017	7.4
Mine-exposed	Lotic	FRUPO	1	Winter	07-Mar-18	2018	6.8
Mine-exposed	Lotic	FRUPO	1	Summer-Fall	09-Sep-18	2018	7.5
Mine-exposed	Lotic	FRUPO	2	Summer-Fall	09-Sep-18	2018	9.7
Mine-exposed	Lotic	FRUPO	3	Summer-Fall	09-Sep-18	2018	8.7
Mine-exposed	Lotic	FRUPO	1	Winter	04-Dec-18	2018	5.3
Mine-exposed	Lotic	FRUPO	2	Winter	04-Dec-18	2018	5.1
Mine-exposed	Lotic	FRUPO	3	Winter	04-Dec-18	2018	5.0
Mine-exposed	Lotic	FRUPO	1	Winter	11-Feb-19	2019	5.1
Mine-exposed	Lotic	FRUPO	2	Winter	11-Feb-19	2019	8.0
Mine-exposed	Lotic	FRUPO	3	Winter	11-Feb-19	2019	6.2
Mine-exposed	Lotic	FRUPO	1	Spring	19-Jun-19	2019	8.1
Mine-exposed	Lotic	FRUPO	2	Spring	19-Jun-19	2019	7.6
Mine-exposed	Lotic	FRUPO	3	Spring	19-Jun-19	2019	5.0
Mine-exposed	Lotic	FRUPO	1	Summer-Fall	07-Sep-19	2019	6.1
Mine-exposed	Lotic	FRUPO	2	Summer-Fall	07-Sep-19	2019	8.1
Mine-exposed	Lotic	FRUPO	3	Summer-Fall	07-Sep-19	2019	6.8
			1	Spring	02-Jul-14	2014	12
			1	Summer-Fall	08-Aug-15	2015	5.8
			2	Summer-Fall	08-Aug-15	2015	6.6
			3	Summer-Fall	08-Aug-15	2015	9.0
Mine-exposed	Lotic	FO10-SP1	1	Summer-Fall	17-Sep-15	2015	7.1
Mine-exposed	Lotic	FODPO	1	Summer-Fall	17-Sep-12	2012	6.2
Mine-exposed	Lotic	FODPO	1	Summer-Fall	15-Sep-15	2015	6.9
Mine-exposed	Lotic	FODPO	1	Summer-Fall	12-Sep-16	2016	3.8
Mine-exposed	Lotic	FODPO	1	Summer-Fall	13-Sep-17	2017	5.2
Mine-exposed	Lotic	FODPO	1	Winter	07-Mar-18	2018	3.5
Mine-exposed	Lotic	FODPO	1	Summer-Fall	13-Sep-18	2018	4.3
Mine-exposed	Lotic	FODPO	2	Summer-Fall	13-Sep-18	2018	8.0
Mine-exposed	Lotic	FODPO	3	Summer-Fall	13-Sep-18	2018	5.0
Mine-exposed	Lotic	FODPO	1	Winter	04-Dec-18	2018	0.33
Mine-exposed	Lotic	FODPO	2	Winter	04-Dec-18	2018	4.4
Mine-exposed	Lotic	FODPO	3	Winter	04-Dec-18	2018	5.4
Mine-exposed	Lotic	FODPO	1	Winter	14-Feb-19	2019	3.6
Mine-exposed	Lotic	FODPO	2	Winter	14-Feb-19	2019	5.0
Mine-exposed	Lotic	FODPO	3	Winter	14-Feb-19	2019	8.4
Mine-exposed	Lotic	FODPO	1	Spring	21-Jun-19	2019	4.7
Mine-exposed	Lotic	FODPO	2	Spring	21-Jun-19	2019	5.0
Mine-exposed	Lotic	FODPO	3	Spring	21-Jun-19	2019	5.7
Mine-exposed	Lotic	FODPO	1	Summer-Fall	07-Sep-19	2019	5.4
Mine-exposed	Lotic	FODPO	2	Summer-Fall	07-Sep-19	2019	7.3
Mine-exposed	Lotic	FODPO	3	Summer-Fall	07-Sep-19	2019	5.6
			1	Summer-Fall	16-Sep-12	2012	12

Table A6. Invertebrate Tissue Selenium Concentrations (2012 to 2019)

Exposure	Habitat	Station	Replicate	Season	Date	Year	Selenium (mg/kg dw)
			1	Summer-Fall	17-Sep-15	2015	7.1
			1	Summer-Fall	14-Sep-17	2017	5.4
			1	Winter	12-Mar-18	2018	6.9
			1	Summer-Fall	08-Sep-18	2018	7.0
			2	Summer-Fall	08-Sep-18	2018	9.2
			3	Summer-Fall	08-Sep-18	2018	7.0
			4	Summer-Fall	08-Sep-18	2018	8.9
			5	Summer-Fall	08-Sep-18	2018	7.6
			1	Winter	05-Dec-18	2018	3.4
			2	Winter	05-Dec-18	2018	3.9
			3	Winter	05-Dec-18	2018	5.6
			1	Winter	14-Feb-19	2019	4.9
			2	Winter	14-Feb-19	2019	5.8
			3	Winter	14-Feb-19	2019	5.4
			1	Spring	21-Jun-19	2019	7.5
			2	Spring	21-Jun-19	2019	6.8
			3	Spring	21-Jun-19	2019	10
			1	Summer-Fall	16-Sep-19	2019	7.1
			2	Summer-Fall	16-Sep-19	2019	7.8
			3	Summer-Fall	16-Sep-19	2019	7.3
			4	Summer-Fall	16-Sep-19	2019	6.7
			5	Summer-Fall	16-Sep-19	2019	6.6
Mine-exposed	Lotic	FOUEW	1	Summer-Fall	16-Sep-12	2012	8.3
Mine-exposed	Lotic	FOUEW	1	Summer-Fall	13-Sep-15	2015	6.1
Mine-exposed	Lotic	FOUEW	1	Summer-Fall	12-Sep-16	2016	5.8
Mine-exposed	Lotic	FOUEW	1	Summer-Fall	13-Sep-17	2017	6.6
Mine-exposed	Lotic	FOUEW	1	Winter	07-Mar-18	2018	6.3
Mine-exposed	Lotic	FOUEW	1	Summer-Fall	06-Sep-18	2018	7.6
Mine-exposed	Lotic	FOUEW	2	Summer-Fall	06-Sep-18	2018	7.0
Mine-exposed	Lotic	FOUEW	3	Summer-Fall	06-Sep-18	2018	5.0
Mine-exposed	Lotic	FOUEW	1	Winter	05-Dec-18	2018	4.8
Mine-exposed	Lotic	FOUEW	2	Winter	05-Dec-18	2018	5.5
Mine-exposed	Lotic	FOUEW	3	Winter	05-Dec-18	2018	4.7
Mine-exposed	Lotic	FOUEW	1	Winter	13-Feb-19	2019	4.4
Mine-exposed	Lotic	FOUEW	2	Winter	13-Feb-19	2019	6.0
Mine-exposed	Lotic	FOUEW	3	Winter	13-Feb-19	2019	4.4
Mine-exposed	Lotic	FOUEW	1	Spring	20-Jun-19	2019	5.6
Mine-exposed	Lotic	FOUEW	2	Spring	20-Jun-19	2019	6.4
Mine-exposed	Lotic	FOUEW	3	Spring	20-Jun-19	2019	6.6
Mine-exposed	Lotic	FOUEW	1	Summer-Fall	04-Sep-19	2019	7.3
Mine-exposed	Lotic	FOUEW	2	Summer-Fall	04-Sep-19	2019	6.9
Mine-exposed	Lotic	FOUEW	3	Summer-Fall	04-Sep-19	2019	6.0
			1	Summer-Fall	20-Sep-12	2012	9.2
			1	Summer-Fall	22-Sep-14	2014	7.4
			1	Summer-Fall	13-Sep-15	2015	7.0
			1	Summer-Fall	10-Sep-16	2016	9.1
			1	Summer-Fall	17-Sep-17	2017	6.5
			1	Summer-Fall	17-Sep-17	2017	6.5
			1	Summer-Fall	09-Sep-18	2018	9.4
			2	Summer-Fall	09-Sep-18	2018	9.0
			3	Summer-Fall	09-Sep-18	2018	8.7
			1	Summer-Fall	07-Sep-19	2019	8.9
			2	Summer-Fall	07-Sep-19	2019	8.7
			3	Summer-Fall	07-Sep-19	2019	8.0
			4	Summer-Fall	07-Sep-19	2019	8.6
			5	Summer-Fall	07-Sep-19	2019	9.2
Mine-exposed	Lotic	FRUSDC	1	Summer-Fall	22-Sep-14	2014	5.6
Mine-exposed	Lotic	FRDSDC	1	Summer-Fall	21-Sep-14	2014	6.1
			1	Summer-Fall	13-Sep-12	2012	7.9
			1	Spring	13-Jul-13	2013	8.4
			1	Spring	04-Jul-14	2014	9.6
			1	Spring	04-Jul-15	2015	8.6

Table A6. Invertebrate Tissue Selenium Concentrations (2012 to 2019)

Exposure	Habitat	Station	Replicate	Season	Date	Year	Selenium (mg/kg dw)
			1	Summer-Fall	12-Sep-15	2015	7.5
			1	Summer-Fall	10-Sep-16	2016	8.5
			1	Summer-Fall	16-Sep-17	2017	7.5
			1	Summer-Fall	09-Sep-18	2018	8.0
			2	Summer-Fall	09-Sep-18	2018	9.7
			3	Summer-Fall	09-Sep-18	2018	8.8
			1	Summer-Fall	11-Sep-19	2019	8.8
			2	Summer-Fall	11-Sep-19	2019	7.3
			3	Summer-Fall	11-Sep-19	2019	7.7
			4	Summer-Fall	11-Sep-19	2019	11
			5	Summer-Fall	11-Sep-19	2019	9.1
Mine-exposed	Lotic	FODGH	1	Summer-Fall	18-Sep-12	2012	9.3
Mine-exposed	Lotic	FODGH	1	Summer-Fall	16-Sep-15	2015	8.4
Mine-exposed	Lotic	FODGH	1	Summer-Fall	14-Sep-16	2016	7.3
Mine-exposed	Lotic	FODGH	1	Summer-Fall	12-Sep-17	2017	6.1
Mine-exposed	Lotic	FODGH	1	Summer-Fall	08-Sep-18	2018	9.2
Mine-exposed	Lotic	FODGH	2	Summer-Fall	08-Sep-18	2018	9.6
Mine-exposed	Lotic	FODGH	3	Summer-Fall	08-Sep-18	2018	17
Mine-exposed	Lotic	FODGH	4	Summer-Fall	08-Sep-18	2018	10
Mine-exposed	Lotic	FODGH	5	Summer-Fall	08-Sep-18	2018	7.2
Mine-exposed	Lotic	FODGH	1	Summer-Fall	15-Sep-19	2019	7.7
Mine-exposed	Lotic	FODGH	2	Summer-Fall	15-Sep-19	2019	8.1
Mine-exposed	Lotic	FODGH	3	Summer-Fall	15-Sep-19	2019	7.9
Mine-exposed	Lotic	FODGH	4	Summer-Fall	15-Sep-19	2019	9.0
Mine-exposed	Lotic	FODGH	5	Summer-Fall	15-Sep-19	2019	8.5
Reference	Lotic	HENUP	1	Summer-Fall	18-Sep-12	2012	6.4
Reference	Lotic	HENUP	1	Summer-Fall	12-Sep-16	2016	3.8
Reference	Lotic	HENUP	1	Summer-Fall	15-Sep-17	2017	4.9
Reference	Lotic	HENUP	1	Summer-Fall	06-Sep-18	2018	2.5
Reference	Lotic	HENUP	2	Summer-Fall	06-Sep-18	2018	4.6
Reference	Lotic	HENUP	3	Summer-Fall	06-Sep-18	2018	4.8
Reference	Lotic	HENUP	1	Spring	20-Jun-19	2019	4.9
Reference	Lotic	HENUP	2	Spring	20-Jun-19	2019	7.3
Reference	Lotic	HENUP	3	Spring	20-Jun-19	2019	6.2
Reference	Lotic	HENUP	1	Summer-Fall	11-Sep-19	2019	5.2
Reference	Lotic	HENUP	2	Summer-Fall	11-Sep-19	2019	4.6
Reference	Lotic	HENUP	3	Summer-Fall	11-Sep-19	2019	3.9
Reference	Lotic	CHCK	1	Summer-Fall	18-Sep-12	2012	3.9
Reference	Lotic	CHCK	1	Spring	11-Jul-13	2013	3.4
Reference	Lotic	CHCK	1	Spring	06-Jul-14	2014	5.0
Reference	Lotic	EWCK	1	Summer-Fall	20-Sep-12	2012	6.2
Mine-exposed	Lotic	HENFO	1	Summer-Fall	19-Sep-12	2012	8.1
Mine-exposed	Lotic	HENFO	1	Summer-Fall	16-Sep-15	2015	9.6
Mine-exposed	Lotic	FR_FC1	1	Summer-Fall	12-Sep-18	2018	4.8
Mine-exposed	Lotic	FR_FC1	1	Summer-Fall	05-Sep-19	2019	6.5
Mine-exposed	Lotic	CLODE	1	Summer-Fall	12-Sep-18	2018	13
Mine-exposed	Lotic	CLODE	1	Summer-Fall	05-Sep-19	2019	9.9
			1	Summer-Fall	14-Sep-12	2012	4.6
			1	Summer-Fall	17-Sep-15	2015	0.4
Mine-exposed	Lotic	KICK	1	Summer-Fall	12-Sep-18	2018	6.6
			1	Summer-Fall	05-Sep-19	2019	5.2
Mine-exposed	Lotic	SWCK	1	Summer-Fall	15-Sep-12	2012	18
Mine-exposed	Lotic	SWCK	1	Summer-Fall	10-Sep-15	2015	19
Mine-exposed	Lotic	POCK	1	Summer-Fall	17-Sep-12	2012	5.2
Mine-exposed	Lotic	POCK	1	Summer-Fall	14-Sep-15	2015	5.6
Mine-exposed	Lotic	LC_DC1	1	Summer-Fall	20-Sep-12	2012	5.9
Mine-exposed	Lotic	LC_DC1	1	Summer-Fall	21-Sep-14	2014	4.9
Mine-exposed	Lotic	LC_DC1	1	Summer-Fall	13-Sep-15	2015	5.2
Mine-exposed	Lotic	LC_DC1	1	Summer-Fall	10-Sep-16	2016	7.7
Mine-exposed	Lotic	LC_DC1	1	Summer-Fall	17-Sep-17	2017	7.0
Mine-exposed	Lotic	LC_DC1	1	Summer-Fall	17-Sep-17	2017	7.0
Mine-exposed	Lotic	LC_DC1	1	Summer-Fall	10-Sep-18	2018	11

Table A6. Invertebrate Tissue Selenium Concentrations (2012 to 2019)

Exposure	Habitat	Station	Replicate	Season	Date	Year	Selenium (mg/kg dw)
Mine-exposed	Lotic	LC_DC1	2	Summer-Fall	10-Sep-18	2018	12
Mine-exposed	Lotic	LC_DC1	3	Summer-Fall	10-Sep-18	2018	10
Mine-exposed	Lotic	LC_DC1	1	Winter	30-Nov-18	2018	10
Mine-exposed	Lotic	LC_DC1	2	Winter	30-Nov-18	2018	10
Mine-exposed	Lotic	LC_DC1	3	Winter	30-Nov-18	2018	10
Mine-exposed	Lotic	LC_DC1	4	Winter	30-Nov-18	2018	11
Mine-exposed	Lotic	LC_DC1	5	Winter	30-Nov-18	2018	9.8
Mine-exposed	Lotic	LC_DC1	1	Spring	30-May-19	2019	10
Mine-exposed	Lotic	LC_DC1	2	Spring	30-May-19	2019	10
Mine-exposed	Lotic	LC_DC1	3	Spring	30-May-19	2019	8.2
Mine-exposed	Lotic	LC_DC1	1	Spring	26-Jun-19	2019	9.0
Mine-exposed	Lotic	LC_DC1	2	Spring	26-Jun-19	2019	9.9
Mine-exposed	Lotic	LC_DC1	3	Spring	26-Jun-19	2019	8.6
Mine-exposed	Lotic	LC_DC1	4	Spring	26-Jun-19	2019	6.6
Mine-exposed	Lotic	LC_DC1	5	Spring	26-Jun-19	2019	10
Mine-exposed	Lotic	LC_DC1	1	Summer-Fall	11-Sep-19	2019	9.2
Mine-exposed	Lotic	LC_DC1	2	Summer-Fall	11-Sep-19	2019	8.4
Mine-exposed	Lotic	LC_DC1	3	Summer-Fall	11-Sep-19	2019	8.8
Mine-exposed	Lotic	LC_DC1	4	Summer-Fall	11-Sep-19	2019	8.7
Mine-exposed	Lotic	LC_DC1	5	Summer-Fall	11-Sep-19	2019	9.6
Mine-exposed	Lotic	GHBP	1	Summer-Fall	05-Sep-18	2018	25
Mine-exposed	Lotic	GHBP	3	Summer-Fall	06-Sep-18	2018	30
Mine-exposed	Lotic	GHBP	5	Summer-Fall	06-Sep-18	2018	22
Mine-exposed	Lotic	GHBP	1	Winter	12-Feb-19	2019	54
Mine-exposed	Lotic	GHBP	2	Winter	12-Feb-19	2019	32
Mine-exposed	Lotic	GHBP	3	Winter	12-Feb-19	2019	31
Mine-exposed	Lotic	GHBP	1	Summer-Fall	09-Sep-19	2019	36
Mine-exposed	Lotic	GHBP	3	Summer-Fall	09-Sep-19	2019	36
Mine-exposed	Lotic	GHBP	5	Summer-Fall	09-Sep-19	2019	28
Mine-exposed	Lotic	GHCKD	1	Summer-Fall	19-Sep-12	2012	15
Mine-exposed	Lotic	GHCKD	3	Summer-Fall	19-Sep-12	2012	10.0
Mine-exposed	Lotic	GHCKD	1	Summer-Fall	15-Sep-15	2015	22
Mine-exposed	Lotic	GHCKD	1	Summer-Fall	06-Sep-18	2018	21
Mine-exposed	Lotic	GHCKD	1	Summer-Fall	06-Sep-18	2018	21
Mine-exposed	Lotic	GHCKD	1	Summer-Fall	09-Sep-18	2018	6.9
Mine-exposed	Lotic	GHCKD	1	Summer-Fall	09-Sep-19	2019	17
Reference	Lentic	UPBEC	1	Spring	16-Jul-19	2019	5.8
Reference	Lentic	UPBEC	2	Spring	16-Jul-19	2019	6.2
Reference	Lentic	UPBEC	3	Spring	16-Jul-19	2019	5.0
Reference	Lentic	UPBEC	1	Summer-Fall	11-Sep-19	2019	9.9
Reference	Lentic	UPBEC	2	Summer-Fall	11-Sep-19	2019	12
Reference	Lentic	UPBEC	3	Summer-Fall	11-Sep-19	2019	10
			1	Summer-Fall	22-Sep-12	2012	10
			1	Summer-Fall	07-Aug-15	2015	12
			2	Summer-Fall	07-Aug-15	2015	12
			3	Summer-Fall	07-Aug-15	2015	7.2
			1	Spring	30-Jul-18	2018	18
			2	Spring	30-Jul-18	2018	14
			3	Spring	30-Jul-18	2018	15
			1	Spring	17-Jun-19	2019	7.6
			2	Spring	17-Jun-19	2019	8.9
			3	Spring	17-Jun-19	2019	8.1
Mine-exposed	Lentic	FOFR2W	1	Summer-Fall	22-Sep-12	2012	4.4
Mine-exposed	Lentic	FOFR2W	1	Spring	08-May-18	2018	2.6
Mine-exposed	Lentic	FOFR2W	2	Spring	08-May-18	2018	3.9
Mine-exposed	Lentic	FOFR2W	3	Spring	08-May-18	2018	5.2
Mine-exposed	Lentic	FOFR2W	1	Spring	27-Jul-18	2018	5.2
Mine-exposed	Lentic	FOFR2W	2	Spring	27-Jul-18	2018	1.4
Mine-exposed	Lentic	FOFR2W	3	Spring	27-Jul-18	2018	2.3
Mine-exposed	Lentic	FOFR2W	1	Spring	17-Jun-19	2019	2.3
Mine-exposed	Lentic	FOFR2W	2	Spring	17-Jun-19	2019	6.0
Mine-exposed	Lentic	FOFR2W	3	Spring	17-Jun-19	2019	4.3

Table A6. Invertebrate Tissue Selenium Concentrations (2012 to 2019)

Exposure	Habitat	Station	Replicate	Season	Date	Year	Selenium (mg/kg dw)
			1	Summer-Fall	22-Sep-12	2012	31
			2	Summer-Fall	22-Sep-12	2012	28
			3	Summer-Fall	22-Sep-12	2012	61
Mine-exposed	Lentic	RG_SAFR	1	Spring	29-Jul-18	2018	19
Mine-exposed	Lentic	RG_SAFR	2	Spring	29-Jul-18	2018	20
Mine-exposed	Lentic	RG_SAFR	3	Spring	29-Jul-18	2018	25
			1	Summer-Fall	21-Sep-12	2012	0.94
			2	Summer-Fall	21-Sep-12	2012	1.1
			3	Summer-Fall	21-Sep-12	2012	0.72
			1	Summer-Fall	09-Aug-15	2015	1.2
			2	Summer-Fall	09-Aug-15	2015	1.3
			3	Summer-Fall	09-Aug-15	2015	2.0
Mine-exposed	Lentic	SFRR	1	Spring	11-May-18	2018	2.0
Mine-exposed	Lentic	SFRR	2	Spring	11-May-18	2018	3.6
Mine-exposed	Lentic	SFRR	3	Spring	11-May-18	2018	4.0
Mine-exposed	Lentic	FOXCF	1	Spring	09-May-18	2018	1.5
Mine-exposed	Lentic	FOXCF	2	Spring	09-May-18	2018	6.0
Mine-exposed	Lentic	FOXCF	3	Spring	09-May-18	2018	1.1
Mine-exposed	Lentic	FOXCF	1	Spring	29-Jul-18	2018	1.4
Mine-exposed	Lentic	FOXCF	2	Spring	29-Jul-18	2018	2.1
Mine-exposed	Lentic	FOXCF	3	Spring	29-Jul-18	2018	1.6
Mine-exposed	semi-Lotic	FMUCK	1	Summer-Fall	08-Aug-15	2015	13
Mine-exposed	semi-Lotic	FMUCK	2	Summer-Fall	08-Aug-15	2015	14
Mine-exposed	semi-Lotic	FMUCK	3	Summer-Fall	08-Aug-15	2015	12
Mine-exposed	Lentic	FRWUCH	1	Spring	29-Jul-18	2018	2.0
Mine-exposed	Lentic	FRWUCH	2	Spring	29-Jul-18	2018	8.9
Mine-exposed	Lentic	FRWUCH	3	Spring	29-Jul-18	2018	9.8
Mine-exposed	Lentic	FRSCW	1	Spring	13-Jun-19	2019	18
Mine-exposed	Lentic	FRSCW	2	Spring	13-Jun-19	2019	13
Mine-exposed	Lentic	FRSCW	3	Spring	13-Jun-19	2019	24
Mine-exposed	Lentic	FWDEC	1	Summer-Fall	09-Aug-15	2015	12
Mine-exposed	Lentic	FWDEC	2	Summer-Fall	09-Aug-15	2015	22
Mine-exposed	Lentic	FWDEC	3	Summer-Fall	09-Aug-15	2015	20
Mine-exposed	Lentic	FWDEC	1	Spring	30-Jul-18	2018	12
Mine-exposed	Lentic	FWDEC	2	Spring	30-Jul-18	2018	11
Mine-exposed	Lentic	FWDEC	3	Spring	30-Jul-18	2018	10
Mine-exposed	Lentic	GHWFR	1	Summer-Fall	14-Aug-15	2015	32
Mine-exposed	Lentic	GHWFR	2	Summer-Fall	14-Aug-15	2015	24
Mine-exposed	Lentic	GHWFR	3	Summer-Fall	14-Aug-15	2015	29

Notes:
"-" no data; % = percent; dw = dry weight; g = gram; mg/kg = milogram per kilogram.

Shaded	= concentration is above the level 1 dietary benchmark (11 mg/kg dw)
Shaded	= concentration is above the level 2 dietary benchmark (18 mg/kg dw)
Shaded	= concentration is above the level 3 dietary benchmark (26 mg/kg dw)
Underlined	= concentration is above the British Columbia Environment and Climate Change Strategy interim water quality guideline for fish diet (4 mg/kg dw)

Table A7. Westslope Cutthroat Trout Selenium Concentrations (Decline Window)

Sampling Type	Segment	Minnow Biological Monitoring Area	Associated Teck Water Monitoring Station Code	Sample Date	Muscle Selenium	Ovary Selenium
					mg/kg dw	mg/kg dw
Biological Monitoring	8	RG_MP1	FR_MULTIPLATE	September 11, 2018	**9.9**	-
				September 11, 2018	**11**	-
				September 11, 2018	**7.5**	-
				September 11, 2018	**10**	-
				September 11, 2018	**8.3**	-
				September 11, 2018	**9.5**	-
				September 11, 2018	**9.4**	-
				September 11, 2018	**9.2**	-
	6	RG_FODCH	FR_FRABCH	September 9, 2018	**10**	-
				September 9, 2018	**8.8**	-
				September 9, 2018	**11**	-
				September 9, 2018	**12**	-
				September 9, 2018	**8.7**	-
				September 11, 2018	**11**	-
				September 11, 2018	**11**	-
				September 11, 2018	**11**	-
Opportunistic Sampling	7	-	FR_SKP1	June 9, 2018	**10**	-
				September 4, 2018	**7.8**	-
				September 4, 2018	**9.6**	-
				September 4, 2018	**10**	-
				September 4, 2018	5.2	-
				September 4, 2018	**9.8**	-
				September 4, 2018	**10**	-
				September 4, 2018	**8.5**	-
				September 4, 2018	**11**	-
				September 4, 2018	**10**	-
				September 4, 2018	**8.9**	-
				September 4, 2018	**12**	-
				September 4, 2018	**12**	-
				September 4, 2018	**8.7**	-
				September 4, 2018	**8.8**	-
				September 4, 2018	**8.1**	-
				September 4, 2018	**10**	-
				September 4, 2018	**8.6**	-
				September 4, 2018	**9.8**	-
				September 4, 2018	**10**	-
				September 4, 2018	**9.9**	-
				September 4, 2018	**12**	-
				September 4, 2018	**11**	-
				September 4, 2018	**9.8**	-
				September 4, 2018	**8.9**	-
				September 4, 2018	**9.6**	-
				September 4, 2018	**11**	-
				September 4, 2018	**12**	-
				September 4, 2018	**15**	-
				September 4, 2018	**9**	-
				September 4, 2018	**12**	-
				September 4, 2018	**7.9**	-
				September 4, 2018	**12**	-
				September 4, 2018	**9.2**	-
				September 4, 2018	**12**	-
				September 4, 2018	**8**	-
				September 4, 2018	**10**	-
				September 4, 2018	**13**	-
				September 4, 2018	**11**	-
				September 4, 2018	**10**	-
				September 4, 2018	**14**	-
				September 4, 2018	**7.5**	-
				September 4, 2018	**12**	-

Table A7. Westslope Cutthroat Trout Selenium Concentrations (Decline Window)

Sampling Type	Segment	Minnow Biological Monitoring Area	Associated Teck Water Monitoring Station Code	Sample Date	Muscle Selenium	Ovary Selenium
					mg/kg dw	mg/kg dw
Opportunistic Sampling	8	-	FR_SP1	September 17, 2019	13	-
				September 17, 2019	30	-
				September 17, 2019	23	-
				September 17, 2019	11	-
				September 18, 2019	11	-
				September 19, 2019	8.8	-
				September 19, 2019	11	-
				September 20, 2019	20	-
				September 20, 2019	14	-
	2	GHCKD	GH_GH1	July 4, 2019	20	34
				July 8, 2019	20	41
				July 14, 2019	24	44
				October 1, 2019	14	-
				October 1, 2019	20	-
				October 1, 2019	22	-
				October 1, 2019	13	-
				October 1, 2019	21	-
				October 1, 2019	22	-
				October 1, 2019	17	-
	7	SWCK	GH_SC1	October 3, 2019	25	-
				October 3, 2019	18	-
				October 3, 2019	23	-
				October 3, 2019	17	-
				October 3, 2019	12	-
				October 3, 2019	9.4	-
				October 3, 2019	11	-
				October 16, 2019	16	-
				September 25, 2019	9.8	-

Shaded = concentration is above the level 1 benchmark for reproduction (muscle = 15.5 mg/kg dw; egg = 25 mg/kg dw)
Shaded = concentration is above the level 2 benchmark for reproduction (muscle = 16.9 mg/kg dw; egg = 27 mg/kg dw)
Shaded = concentration is above the level 3 benchmark for reproduction (muscle = 20.8 mg/kg dw; egg = 33 mg/kg dw)
Bold = concentration is above the Environment Canada and Climate Change predicted no effect concentration for muscle/whole body (6.7 mg/kg dw) or for eggs/ovaries (14.7 mg/kg dw)
Underlined = concentration is above the British Columbia Evnironment and Climate Change Strategy interim water quality guideline for fish muscle (4 mg/kg dw) or approved water quality guideline for fish eggs (11 mg/kg dw)

APPENDIX B

Comparison of Acute Toxicity Values for Rainbow Trout and Westslope Cutthroat Trout

TECHNICAL MEMORANDUM

DATE April 22, 2021 **Reference No.** 19136042/AppB

TO Dayna Meredith
Teck Coal Limited

CC Emily-Jane Costa

FROM Adrian de Bruyn **EMAIL adebruyn@golder.com**

COMPARISON OF ACUTE TOXICITY VALUES FOR RAINBOW TROUT AND WESTSLOPE CUTTHROAT TROUT

Westslope cutthroat trout (WCT; *Oncorhynchus clarkii lewisi*) is the only fish species present in the Fording River upstream of Josephine Falls. Because few toxicity data exist regarding the sensitivity of WCT, acute toxicity screening values for the closely-related species rainbow trout (*Oncorhynchus mykiss*) were used as a surrogate to evaluate potential effects to WCT. The purpose of this technical memorandum is to compare acute toxicity data for the two species to validate this approach.

1.0 METHODS

The relative sensitivity of rainbow trout and WCT was evaluated using the following approach:

- **Step 1: Identify constituents with acute toxicity data for cutthroat trout**. A search was conducted using the United States Environmental Protection Agency's ECOTOX database[1] to identify acute toxicity data for cutthroat trout, including subspecies such as WCT. Constituents that are relevant to the Elk Valley (e.g., major ions, nutrients, metals) were carried forward for further assessment. Organic constituents such as pesticides and persistent organic pollutants were not considered relevant for the assessment and were therefore not compiled.
- **Step 2: Compile acute toxicity data**. For the constituents carried forward, acute toxicity data (96-hour LC_{50} values) were summarized for cutthroat trout and rainbow trout from water quality guideline documents or published toxicity reviews. These review documents were preferred to primary literature and the ECOTOX output because the guideline documents and reviews 1) generally evaluate data reliability, and 2) often report effect concentrations normalized for toxicity-modifying factors (e.g., hardness). For constituents summarized in guideline documents, toxicity values were only compiled for tests considered appropriate for guideline development (e.g., Canadian Council of Ministers of the Environment [CCME] study ranking of primary of secondary). In this step, data for WCT were used preferentially. If WCT data were not available, then data for cutthroat trout and its subspecies were used. Where readily available, information on life stage was also summarized.
- **Step 3: Compare acute toxicity data**. Normalized toxicity data were plotted for rainbow trout and cutthroat trout or its subspecies. Fish life stage was tabulated for each test, where such information was recorded in the review documents.

[1] Search conducted 5 February 2020 for all chemicals with acute toxicity data for "cutthroat trout".

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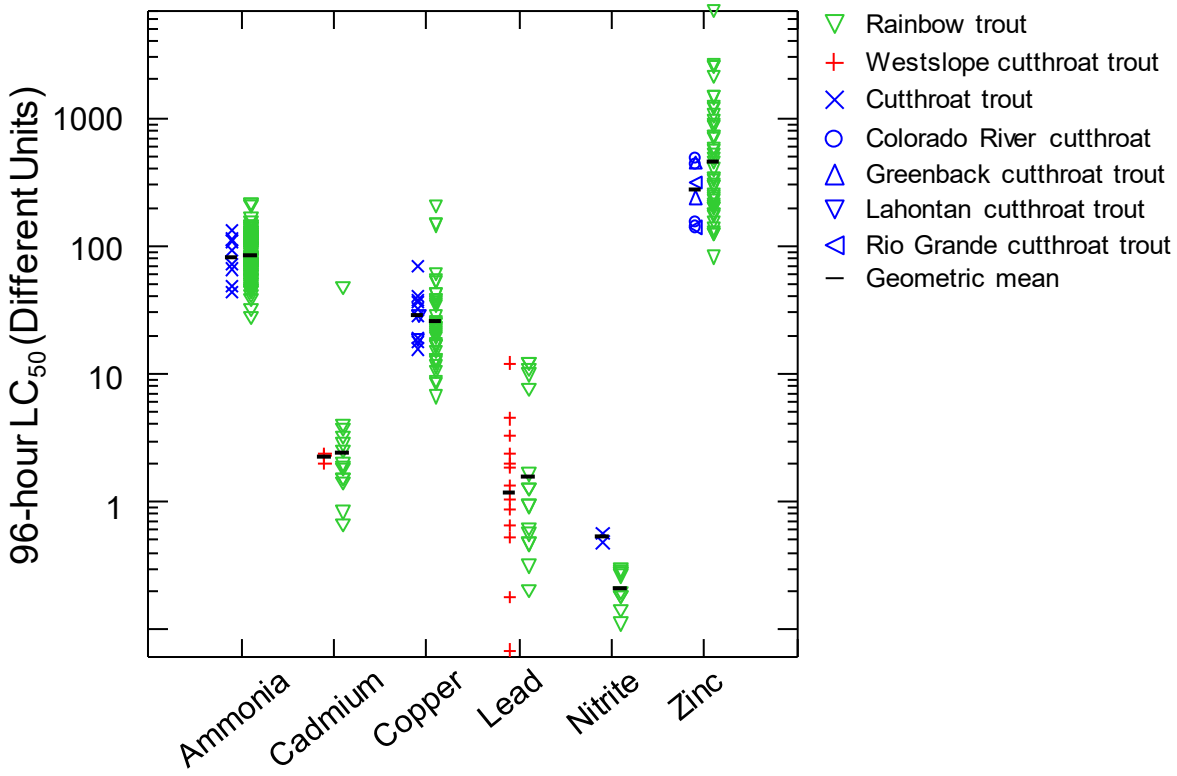
2.0 RESULTS

The ECOTOX search identified acute toxicity data for cutthroat trout or its subspecies for six constituents routinely measured in Elk Valley waters (ammonia, cadmium, copper, lead, nitrite, and zinc). Normalized toxicity data (96-hour LC_{50} values) are provided in Figure 1 and Attachment 1.

Figure 1: Acute Toxicity Values (96-hour LC_{50}) for Cutthroat Trout (Species and Subspecies) and Rainbow Trout



Units are milligrams per litre nitrogen (ammonia and nitrite), micrograms per litre (cadmium, copper, zinc), or nanomoles per gram wet weight (lead). Toxicity data are normalized for toxicity-modifying factors, as described in Section 2.0.

The following bullets summarize results by constituent:

- **Ammonia:** Acute toxicity data were obtained from US EPA (2013) for cutthroat trout (*n* = 8; fry) and rainbow trout (*n* = 118; fry, juvenile, and adult). US EPA (2013) normalized toxicity data to a pH of 7. There was broad overlap in the 96-hour LC_{50} values between species, with similar geometric means for cutthroat trout (79 mg/L as N) and rainbow trout (83 mg/L as N). These results indicate that rainbow trout and cutthroat trout are similarly sensitive to ammonia.
- **Cadmium:** Acute toxicity data were obtained from the British Columbia Ministry of Environment (BC MOE) (2015) for WCT (*n* = 3; fry) and rainbow trout (*n* = 14; alevin, fry, and juvenile). BC MOE (2015) normalized toxicity data to a hardness of 50 mg/L as $CaCO_3$. There was broad overlap in the 96-hour LC_{50} values between species, with similar geometric means for WCT (2.2 µg/L) and rainbow trout (2.3 µg/L). These results indicate that rainbow trout and WCT are similarly sensitive to cadmium.

- **Copper:** Acute toxicity data were obtained from Brix et al. (2017) for cutthroat trout (*n* = 9; juvenile), Lahontan cutthroat trout (*n* = 2; fry), and rainbow trout (*n* = 37; alevin, fry, and juvenile)[2]. Brix et al. (2017) normalized toxicity data to a hardness of 85 mg/L as $CaCO_3$, dissolved organic carbon [DOC] of 0.5 mg/L, and pH of 7.5. There was broad overlap in the 96-hour LC_{50} values between species, with similar geometric means for cutthroat trout and its subspecies (28 µg/L) relative to rainbow trout (25 µg/L). These results indicate that rainbow trout and cutthroat trout are similarly sensitive to copper.
- **Lead**: Acute toxicity data were obtained from DeForest et al. (2017) for WCT (*n* = 13; fry) and rainbow trout (*n* = 16; fry and juvenile). DeForest et al. (2017) normalized toxicity data using the Biotic Ligand Model and reported normalized critical accumulation concentrations. There was broad overlap in the 96-hour critical accumulation values between species, with geometric means slightly lower for cutthroat trout (1.2 nmolg/g ww) relative to rainbow trout (1.5 nmolg/g ww). These results indicate that rainbow trout and cutthroat trout are similarly sensitive to lead.
- **Nitrite:** Acute toxicity data were obtained from Thurston et al. (1978) for cutthroat trout (*n* = 2; fry) and from Russo et al. (1981) and Thurston et al. (1978) for rainbow trout (*n* = 10; fry and juvenile). Toxicity data normalized for the effect of chloride could not be obtained from the literature. Therefore, results were summarized for tests conducted at similar chloride concentrations (cutthroat trout tests = 0.44 mg/L chloride; rainbow trout tests = 0.1 to 0.63 mg/L chloride). Toxicity values were higher for cutthroat trout (geometric mean = 0.52 mg/L as N) relative to rainbow trout (geometric mean = 0.21 mg/L as N), despite the chloride concentrations extending higher in rainbow trout tests. This finding may be related to different fish sizes used in the cutthroat trout tests (approximately 3 grams) compared to the rainbow trout tests (12.8 to 188 grams). These data indicate that cutthroat trout may be less sensitive to nitrite than rainbow trout.
- **Zinc:** Acute toxicity data were obtained from CCME (2018) for three cutthroat trout subspecies (Colorado River [*n* = 4; fry]; Greenback [*n* = 2; fry]; Rio Grande [*n* = 3; fry]) and rainbow trout (*n* = 45; alevin, fry, juvenile, adult). CCME (2018) normalized toxicity data to hardness of 50 mg/L as $CaCO_3$ and DOC of 0.5 mg/L. Toxicity values for cutthroat trout subspecies (geometric mean = 238 µg/L) were on the lower end of toxicity values for rainbow trout (geometric mean = 448 µg/L), although this finding could be a result of a small sample size for cutthroat trout. When comparing the same life stage (fry), acute toxicity data for the two species are similar (see Attachment 1). These results indicate that rainbow trout and cutthroat trout are similarly sensitive to zinc.

3.0 SUMMARY

There was broad overlap in acute toxicity values (96-hour LC_{50}) for five of six constituents (all except nitrite), indicating similar sensitivity for rainbow trout and either WCT (cadmium and lead) or cutthroat trout and its other subspecies (ammonia, copper, lead). For nitrite, acute toxicity values were higher for cutthroat trout, indicating that this species may be less sensitive than rainbow trout to nitrite. Results presented herein indicate that rainbow trout is a reasonable surrogate to evaluate potential effects to WCT.

[2] Life stage information was obtained from BC ENV (2019).

Signature Page

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Attachment: Attachment 1 - Acute Toxicity Data for Cutthroat Trout (Species and Subspecies) and Rainbow Trout

4.0 REFERENCES

British Columbia Ministry of Environment (BC MOE). 2015. Ambient Water Quality Guidelines for Cadmium, Technical Report. Dated February 2015. Water Protection & Sustainability Branch, Environmental Sustainability and Strategic Policy Division, BC Ministry of Environment.

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ATTACHMENT 1

Acute Toxicity Data for Cutthroat Trout (Species and Subspecies) and Rainbow Trout

Attachment 1: Acute Toxicity Data for Cutthroat Trout (Species and Subspecies) and Rainbow Trout

Constituent	Units	Species	Life Stage or Weight Grouping	Weight (g)	Normalized 96-h LC50	Source
Ammonia	mg/L as N	Cutthroat trout	1-5g	1	112	US EPA 2013
Ammonia	mg/L as N	Cutthroat trout	1-5g	1	132	US EPA 2013
Ammonia	mg/L as N	Cutthroat trout	1-5g	3.3	109	US EPA 2013
Ammonia	mg/L as N	Cutthroat trout	1-5g	3.4	93	US EPA 2013
Ammonia	mg/L as N	Cutthroat trout	1-5g	3.6	43	US EPA 2013
Ammonia	mg/L as N	Cutthroat trout	1-5g	3.6	73	US EPA 2013
Ammonia	mg/L as N	Cutthroat trout	1-5g	4.1	48	US EPA 2013
Ammonia	mg/L as N	Cutthroat trout	1-5g	4.1	66	US EPA 2013
Ammonia	mg/L as N	Geomean			79	
			<1g	0.06	69	US EPA 2013
			<1g	0.06	71	US EPA 2013
			<1g	0.06	76	US EPA 2013
			<1g	0.08	46	US EPA 2013
			<1g	0.12	38	US EPA 2013
			<1g	0.14	55	US EPA 2013
			<1g	0.15	57	US EPA 2013
			<1g	0.15	77	US EPA 2013
			<1g	0.18	64	US EPA 2013
			<1g	0.18	71	US EPA 2013
			<1g	0.23	64	US EPA 2013
			<1g	0.23	67	US EPA 2013
			<1g	0.33	69	US EPA 2013
			<1g	0.33	79	US EPA 2013
			<1g	0.33	69	US EPA 2013
			<1g	0.33	79	US EPA 2013
			<1g	0.36	115	US EPA 2013
			<1g	0.47	97	US EPA 2013
			<1g	0.47	95	US EPA 2013
			<1g	0.61	117	US EPA 2013
			<1g	0.61	109	US EPA 2013
			<1g	0.76	208	US EPA 2013
			<1g	0.86	136	US EPA 2013
			1-5g	1.01	162	US EPA 2013
			1-5g	1.02	111	US EPA 2013
			1-5g	1.47	114	US EPA 2013
			1-5g	1.48	137	US EPA 2013
			1-5g	1.7	123	US EPA 2013
			1-5g	1.7	116	US EPA 2013
			1-5g	1.7	102	US EPA 2013
			1-5g	1.7	94	US EPA 2013
			1-5g	1.8	106	US EPA 2013
			1-5g	1.8	129	US EPA 2013
			1-5g	1.8	94	US EPA 2013
			1-5g	2.1	151	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	1-5g	2.1	112	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	1-5g	2.3	142	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	1-5g	2.5	103	US EPA 2013

Attachment 1: Acute Toxicity Data for Cutthroat Trout (Species and Subspecies) and Rainbow Trout

Constituent	Units	Species	Life Stage or Weight Grouping	Weight (g)	Normalized 96-h LC50	Source
Ammonia	mg/L as N	Rainbow trout	1-5g	2.6	107	US EPA 2013
			1-5g	3.3	98	US EPA 2013
			1-5g	4	81	US EPA 2013
			1-5g	4	115	US EPA 2013
			1-5g	4.3	77	US EPA 2013
			1-5g	4.3	124	US EPA 2013
			1-5g	4.6	105	US EPA 2013
			1-5g	4.6	87	US EPA 2013
			1-5g	5	108	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	5.7	125	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	5.7	101	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	5.7	119	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	6.3	54	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	6.7	78	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	7	68	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	7.1	92	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	7.9	81	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	8	44	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	8	104	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	8.1	92	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	8.6	92	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	9	103	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	9.3	133	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	9.3	133	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	9.4	71	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	9.4	111	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	9.5	117	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	9.5	81	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	9.5	102	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	9.5	104	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	9.5	80	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	9.5	70	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	5-10g	9.7	127	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	10.1	96	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	10.3	107	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	10.9	96	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	11.2	70	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	12.3	67	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	13.2	68	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	14	138	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	14.4	80	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	14.8	65	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	15.1	63	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	18	64	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	18.1	143	US EPA 2013

Attachment 1: Acute Toxicity Data for Cutthroat Trout (Species and Subspecies) and Rainbow Trout

Constituent	Units	Species	Life Stage or Weight Grouping	Weight (g)	Normalized 96-h LC50	Source
Ammonia	mg/L as N	Rainbow trout	10-60g	18.9	66	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	20.6	113	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	21	105	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	22.4	54	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	22.6	66	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	22.8	66	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	23.4	63	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	24.5	53	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	25.8	86	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	26	79	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	28	50	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	29.6	57	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	29.8	68	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	35.9	61	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	40	32	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	40	202	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	42	90	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	45.6	44	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	46.4	50	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	48.6	117	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	10-60g	52.1	98	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	>200g	230	27	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	>200g	230	60	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	>200g	230	27	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	>200g	244	51	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	>200g	247	75	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	>200g	248	69	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	>200g	293	53	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	>200g	380	62	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	>200g	558	72	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	>200g	1496	58	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	>200g	1698	45	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	>200g	2080	40	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	>200g	2596	45	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	>200g	2596	47	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	Juvenile	NR	213	US EPA 2013
Ammonia	mg/L as N	Rainbow trout	NR	NR	108	US EPA 2013
Ammonia	mg/L as N	Geomean			83	
Cadmium	µg/L	Westslope cutthroat trout	Young of year	0.95	2.0	BC ENV 2015
Cadmium	µg/L	Westslope cutthroat trout	Young of year	0.95	2.3	BC ENV 2015
Cadmium	µg/L	Westslope cutthroat trout	Young of year	0.95	2.4	BC ENV 2015
Cadmium	µg/L	Geomean			2.2	
Cadmium	µg/L	Rainbow trout	Alevin	NR	47	BC ENV 2015
Cadmium	µg/L	Rainbow trout	Swim-up	NR	1.8	BC ENV 2015

Attachment 1: Acute Toxicity Data for Cutthroat Trout (Species and Subspecies) and Rainbow Trout

Constituent	Units	Species	Life Stage or Weight Grouping	Weight (g)	Normalized 96-h LC50	Source
Cadmium	µg/L	Rainbow trout	Fry	NR	0.83	BC ENV 2015
Cadmium	µg/L	Rainbow trout	Fry	NR	1.5	BC ENV 2015
Cadmium	µg/L	Rainbow trout	Fry	NR	1.5	BC ENV 2015
Cadmium	µg/L	Rainbow trout	Fry	NR	2.0	BC ENV 2015
Cadmium	µg/L	Rainbow trout	Fry	NR	2.8	BC ENV 2015
Cadmium	µg/L	Rainbow trout	Fry	NR	3.6	BC ENV 2015
Cadmium	µg/L	Rainbow trout	Fry	NR	4.0	BC ENV 2015
Cadmium	µg/L	Rainbow trout	Fry	NR	0.66	BC ENV 2015
Cadmium	µg/L	Rainbow trout	Fry	NR	1.4	BC ENV 2015
Cadmium	µg/L	Rainbow trout	Fry	NR	3.1	BC ENV 2015
Cadmium	µg/L	Rainbow trout	Juvenile	NR	2.5	BC ENV 2015
Cadmium	µg/L	Rainbow trout	Juvenile	NR	1.8	BC ENV 2015
Cadmium	µg/L	Geomean			2.3	
			<1g	0.34	29	Brix et al. 2017
			<1g	0.57	19	Brix et al. 2017
Copper	µg/L	Cutthroat trout	Juvenile	NR	40	Brix et al. 2017
Copper	µg/L	Cutthroat trout	Juvenile	NR	32	Brix et al. 2017
Copper	µg/L	Cutthroat trout	Juvenile	NR	38	Brix et al. 2017
Copper	µg/L	Cutthroat trout	Juvenile	NR	28	Brix et al. 2017
Copper	µg/L	Cutthroat trout	Juvenile	NR	69	Brix et al. 2017
Copper	µg/L	Cutthroat trout	Juvenile	NR	36	Brix et al. 2017
Copper	µg/L	Cutthroat trout	Juvenile	NR	16	Brix et al. 2017
Copper	µg/L	Cutthroat trout	Juvenile	NR	36	Brix et al. 2017
Copper	µg/L	Cutthroat trout	Juvenile	NR	16	Brix et al. 2017
Copper	µg/L	Cutthroat trout	Juvenile	NR	19	Brix et al. 2017
Copper	µg/L	Cutthroat trout	Juvenile	NR	18	Brix et al. 2017
Copper	µg/L	Geomean			28	
Copper	µg/L	Rainbow trout	Alevin	NR	38	Brix et al. 2017
Copper	µg/L	Rainbow trout	Swim-up	NR	23	Brix et al. 2017
Copper	µg/L	Rainbow trout	<1g	0.2	6.6	Brix et al. 2017
Copper	µg/L	Rainbow trout	<1g	0.2	15	Brix et al. 2017
Copper	µg/L	Rainbow trout	<1g	0.2	11	Brix et al. 2017
Copper	µg/L	Rainbow trout	<1g	0.2	22	Brix et al. 2017
Copper	µg/L	Rainbow trout	<1g	0.29	53	Brix et al. 2017
Copper	µg/L	Rainbow trout	<1g	0.35	147	Brix et al. 2017
Copper	µg/L	Rainbow trout	<1g	0.43	144	Brix et al. 2017
Copper	µg/L	Rainbow trout	<1g	0.48	21	Brix et al. 2017
Copper	µg/L	Rainbow trout	<1g	0.5	25	Brix et al. 2017
Copper	µg/L	Rainbow trout	<1g	0.64	60	Brix et al. 2017
Copper	µg/L	Rainbow trout	<1g	0.67	36	Brix et al. 2017
Copper	µg/L	Rainbow trout	<1g	0.68	205	Brix et al. 2017
Copper	µg/L	Rainbow trout	1-5g	1	17	Brix et al. 2017
Copper	µg/L	Rainbow trout	1-5g	2.1	8.4	Brix et al. 2017
Copper	µg/L	Rainbow trout	1-5g	2.5	10	Brix et al. 2017
Copper	µg/L	Rainbow trout	1-5g	2.6	28	Brix et al. 2017
Copper	µg/L	Rainbow trout	1-5g	2.65	17	Brix et al. 2017

Attachment 1: Acute Toxicity Data for Cutthroat Trout (Species and Subspecies) and Rainbow Trout

Constituent	Units	Species	Life Stage or Weight Grouping	Weight (g)	Normalized 96-h LC50	Source
Copper	µg/L	Rainbow trout	1-5g	4.3	13	Brix et al. 2017
Copper	µg/L	Rainbow trout	Length = 4.9 cm	Length = 4.9 cm	8.6	Brix et al. 2017
Copper	µg/L	Rainbow trout	5-10g	6.9	19	Brix et al. 2017
Copper	µg/L	Rainbow trout	5-10g	9.4	22	Brix et al. 2017
Copper	µg/L	Rainbow trout	10-70g	11.5	17	Brix et al. 2017
Copper	µg/L	Rainbow trout	10-70g	18.7	20	Brix et al. 2017
Copper	µg/L	Rainbow trout	10-70g	24.9	52	Brix et al. 2017
Copper	µg/L	Rainbow trout	10-70g	25.6	25	Brix et al. 2017
Copper	µg/L	Rainbow trout	10-70g	68.1	41	Brix et al. 2017
Copper	µg/L	Rainbow trout	NR	NR	16	Brix et al. 2017
Copper	µg/L	Rainbow trout	NR	NR	12	Brix et al. 2017
Copper	µg/L	Rainbow trout	NR	NR	13	Brix et al. 2017
Copper	µg/L	Rainbow trout	NR	NR	35	Brix et al. 2017
Copper	µg/L	Rainbow trout	NR	NR	34	Brix et al. 2017
Copper	µg/L	Rainbow trout	NR	NR	21	Brix et al. 2017
Copper	µg/L	Rainbow trout	NR	NR	41	Brix et al. 2017
Copper	µg/L	Rainbow trout	NR	NR	24	Brix et al. 2017
Copper	µg/L	Rainbow trout	NR	NR	38	Brix et al. 2017
Copper	µg/L	Geomean			25	
Lead	nmolg/g ww	Westslope cutthroat trout	Fry	NR	0.64	DeForest et al. 2017
Lead	nmolg/g ww	Westslope cutthroat trout	Fry	NR	0.069	DeForest et al. 2017
Lead	nmolg/g ww	Westslope cutthroat trout	Fry	NR	1.3	DeForest et al. 2017
Lead	nmolg/g ww	Westslope cutthroat trout	Fry	NR	0.18	DeForest et al. 2017
Lead	nmolg/g ww	Westslope cutthroat trout	Fry	NR	4.5	DeForest et al. 2017
Lead	nmolg/g ww	Westslope cutthroat trout	Fry	NR	3.3	DeForest et al. 2017
Lead	nmolg/g ww	Westslope cutthroat trout	Fry	NR	2.0	DeForest et al. 2017
Lead	nmolg/g ww	Westslope cutthroat trout	Fry	NR	2.3	DeForest et al. 2017
Lead	nmolg/g ww	Westslope cutthroat trout	Fry	NR	0.53	DeForest et al. 2017
Lead	nmolg/g ww	Westslope cutthroat trout	Fry	NR	0.87	DeForest et al. 2017
Lead	nmolg/g ww	Westslope cutthroat trout	Fry	NR	1.0	DeForest et al. 2017
Lead	nmolg/g ww	Westslope cutthroat trout	Fry	NR	1.9	DeForest et al. 2017
Lead	nmolg/g ww	Westslope cutthroat trout	Fry	NR	12	DeForest et al. 2017
					1.2	
Lead	nmolg/g ww	Rainbow trout	Length = 86 mm	NR	0.56	DeForest et al. 2017
Lead	nmolg/g ww	Rainbow trout	Length = 130 mm	NR	0.2	DeForest et al. 2017
Lead	nmolg/g ww	Rainbow trout	Length = 145 mm	NR	7.5	DeForest et al. 2017
Lead	nmolg/g ww	Rainbow trout	Swim-up fry	NR	1.3	DeForest et al. 2017
Lead	nmolg/g ww	Rainbow trout	Swim-up fry	NR	0.46	DeForest et al. 2017
Lead	nmolg/g ww	Rainbow trout	Swim-up fry	NR	0.92	DeForest et al. 2017
Lead	nmolg/g ww	Rainbow trout	Fry	NR	1.3	DeForest et al. 2017
Lead	nmolg/g ww	Rainbow trout	Fry	NR	0.46	DeForest et al. 2017
Lead	nmolg/g ww	Rainbow trout	Fry	NR	0.92	DeForest et al. 2017
Lead	nmolg/g ww	Rainbow trout	Fry	NR	11	DeForest et al. 2017
Lead	nmolg/g ww	Rainbow trout	Fry	NR	9.9	DeForest et al. 2017

Attachment 1: Acute Toxicity Data for Cutthroat Trout (Species and Subspecies) and Rainbow Trout

Constituent	Units	Species	Life Stage or Weight Grouping	Weight (g)	Normalized 96-h LC50	Source
Lead	nmolg/g ww	Rainbow trout	Fry	NR	12	DeForest et al. 2017
Lead	nmolg/g ww	Rainbow trout	Fry	NR	12	DeForest et al. 2017
Lead	nmolg/g ww	Rainbow trout	Fry	NR	0.31	DeForest et al. 2017
Lead	nmolg/g ww	Rainbow trout	Fry	NR	1.6	DeForest et al. 2017
Lead	nmolg/g ww	Rainbow trout	Juvenile	1.5-3.5	0.61	DeForest et al. 2017
					1.5	
Nitrite	mg/L as N	Cutthroat trout	1-5 g	3	0.56	Thurston and Russo 1978
Nitrite	mg/L as N	Cutthroat trout	1-5 g	3.1	0.48	Thurston and Russo 1978
Nitrite	mg/L as N	Geomean			0.52	
Nitrite	mg/L as N	Rainbow trout	10-60g	12.8	0.14	Russo et al. 1981
Nitrite	mg/L as N	Rainbow trout	10-60g	13.2	0.18	Russo et al. 1981
Nitrite	mg/L as N	Rainbow trout	10-60g	13.7	0.18	Russo et al. 1981
Nitrite	mg/L as N	Rainbow trout	10-60g	13.7	0.29	Russo et al. 1981
Nitrite	mg/L as N	Rainbow trout	10-60g	15.3	0.11	Russo et al. 1981
Nitrite	mg/L as N	Rainbow trout	10-60g	18.2	0.26	Russo et al. 1981
Nitrite	mg/L as N	Rainbow trout	10-60g	24.3	0.28	Russo and Thurston 1978
Nitrite	mg/L as N	Rainbow trout	10-60g	53.1	0.27	Russo and Thurston 1978
Nitrite	mg/L as N	Rainbow trout	>60g	60.5	0.27	Russo and Thurston 1978
Nitrite	mg/L as N	Rainbow trout	>60g	188	0.19	Russo and Thurston 1978
Nitrite	mg/L as N	Geomean			0.21	
Zinc	µg/L	Colorado River cutthroat trout	swim-up fry	NR	151	CCME 2018
Zinc	µg/L	Colorado River cutthroat trout	swim-up fry	NR	480	CCME 2018
Zinc	µg/L	Colorado River cutthroat trout	fry	NR	427	CCME 2018
Zinc	µg/L	Colorado River cutthroat trout	fry	NR	140	CCME 2018
Zinc	µg/L	Greenback cutthroat trout	fry	NR	451	CCME 2018
Zinc	µg/L	Greenback cutthroat trout	fry	NR	238	CCME 2018
Zinc	µg/L	Rio Grande cutthroat trout	fry	NR	313	CCME 2018
Zinc	µg/L	Rio Grande cutthroat trout	fry	NR	120	CCME 2018
Zinc	µg/L	Rio Grande cutthroat trout	fry	NR	140	CCME 2018
Zinc	µg/L	Geomean			238	
Zinc	µg/L	Rainbow trout	1-5 g	2.8–3.2 g	2540	CCME 2018
Zinc	µg/L	Rainbow trout	alevin	NR	2544	CCME 2018
Zinc	µg/L	Rainbow trout	alevin	NR	1177	CCME 2018
Zinc	µg/L	Rainbow trout	swim-up fry	NR	128	CCME 2018
Zinc	µg/L	Rainbow trout	swim-up fry	NR	176	CCME 2018
Zinc	µg/L	Rainbow trout	swim-up fry	NR	232	CCME 2018
Zinc	µg/L	Rainbow trout	swim-up fry	NR	172	CCME 2018
Zinc	µg/L	Rainbow trout	swim-up fry	NR	122	CCME 2018
Zinc	µg/L	Rainbow trout	swim-up fry	NR	134	CCME 2018
Zinc	µg/L	Rainbow trout	Fingerling or Parr	NR	196	CCME 2018
Zinc	µg/L	Rainbow trout	Fingerling or Parr	NR	1223	CCME 2018
Zinc	µg/L	Rainbow trout	Fingerling or Parr	NR	1463	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	710	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	546	CCME 2018

Attachment 1: Acute Toxicity Data for Cutthroat Trout (Species and Subspecies) and Rainbow Trout

Constituent	Units	Species	Life Stage or Weight Grouping	Weight (g)	Normalized 96-h LC50	Source
Zinc	µg/L	Rainbow trout	juvenile	NR	514	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	393	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	123	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	477	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	223	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	154	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	2594	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	198	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	294	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	81	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	6874	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	212	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	572	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	333	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	336	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	248	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	288	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	723	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	1441	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	847	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	324	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	451	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	941	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	175	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	1048	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	241	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	204	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	2078	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	691	CCME 2018
Zinc	µg/L	Rainbow trout	juvenile	NR	300	CCME 2018
Zinc	µg/L	Rainbow trout	adult	NR	871	CCME 2018
Zinc	µg/L	Geomean			448	

Notes:

Toxicity data are normalized for toxicity-modifying factors, as described in Section 2.0.

APPENDIX C

Acute Screening Values for Fish

Acute toxicity screening values were obtained from a review of toxicity literature, regulatory values from BC and other jurisdictions, and toxicity databases such as United States Environmental Protection Agency's (US EPA) ECOTOX (http://cfpub.epa.gov/ecotox/). The definition of acute toxicity used in this evaluation follow BC Ministry of Environment and Climate Change Strategy (ENV) guidance for WQG development (ENV 2019). Short-term WQGs are derived by ENV using 50% effect concentrations (EC_{50}) from acute testing. Survival is the most common endpoint in these derivations. The preferred basis for an acute toxicity screening value was a 96-hour median lethal concentration (concentration resulting in 50% mortality, LC_{50}) for rainbow trout (*Oncorhynchus mykiss*). Where a relevant and reliable 96-hour LC_{50} for rainbow trout was not available, professional judgment was used to select a representative toxicity value.

Table C1: Acute Screening Values for Fish

Constituent[(a)]	Acute Screening Value	Source	Description
Beryllium	0.38 mg/L	US EPA 1980	ENV does not provide an approved acute WQG for beryllium (ENV 2018). The chronic working freshwater aquatic life BC WQG for beryllium is adopted from the 2000 Australian and New Zealand Environment and Conservation Council (ANZECC) guideline for freshwater quality. ANZECC (2000) reviewed the 1980 technical report from the US EPA and concluded that insufficient data were available to derive either a water quality guideline or trigger value. Instead, ANZECC (2000) derived an "environmental concern level" of 0.00013 mg/L by applying a safety factor of 0.0001 to the lowest acute toxicity value for fish or invertebrates (0.13 mg/L beryllium). The acute toxicity value of 0.13 mg/L beryllium (as beryllium sulphate) in US EPA (1980) represents a 48-hour LC_{50} for guppy, *Poecilia reticulata*, in very soft water (hardness of 20-25 mg/L $CaCO_3$). The only rainbow trout toxicity value listed in a search on 26 November 2018 of the US EPA ECOTOX database is a 28-day embryo-larval LC_{50} of 0.38 mg/L (as beryllium chloride), conducted in soft water (hardness of 92-110 mg/L as $CaCO_3$), which represents a subacute endpoint. US EPA (1980) concludes from available data that the acute toxicity of beryllium to freshwater fishes is related to hardness, with toxicity decreasing as hardness increases. The rainbow trout 28-day LC_{50} of 0.38 mg/L provides a conservative basis for assessing potential acute toxicity in two respects: first, because the screening value is derived from subacute data, and second, because the discharge water hardness is sufficiently high that hardness based amelioration of rainbow trout toxicity is expected to occur. Therefore, 0.38 mg/L was selected as the acute toxicity screening value for rainbow trout.
Bromide	1,000 mg/L	US EPA 2005	There is no aquatic life acute guideline for bromide. US EPA (2005) completed an ecological hazard and risk assessment for sodium bromide and bromine chloride. 96-hour LC_{50} values for sodium bromide were >1,000 mg/L for bluegill sunfish (*Lepomis macrochirus*) and rainbow trout. The unbounded value of 1,000 mg/L was used as the acute screening value.
Chromium (VI)	0.1 mg/L	CCME 1999	ENV does not provide an approved WQG for chromium (ENV 2018). The working freshwater aquatic life chronic BC WQG for hexavalent chromium, 0.001 mg/L, is based on the long-term (chronic) CCME freshwater guideline for hexavalent chromium, derived by multiplying the lowest single-species chronic toxicity value in the CCME dataset (14-day lowest observed effect level (LOEC) of 0.01 mg/L for *Ceriodaphnia dubia*, Hickey 1989 in CCME 1999) by a safety factor of 0.1. The working chronic BC WQG for trivalent chromium, 0.0089 mg/L, is based on the long-term CCME freshwater guideline for trivalent chromium, derived by multiplying the lowest single-species chronic toxicity value in the dataset (102-day LOEC of 0.089 mg/L for rainbow trout, Stevens and Chapman 1984 in CCME 1999) by a safety factor of 0.1. Data collected by CCME (1999) to derive chromium water quality guidelines for the protection of aquatic life include hexavalent chromium acute toxicity data for rainbow trout (72-hour LC_{50}) of 0.1 mg/L and trivalent chromium acute toxicity data for more than 10 freshwater fish species ranging from 3.3 mg/L to 77.5 mg/L (rainbow trout data were not specified). The 72-hour LC_{50} value for rainbow trout of 0.1 mg/L hexavalent chromium (CCME 1999) was selected as the acute screening value for rainbow trout, noting that chromium is entirely present in western Canada milled coal as trivalent chromium, and thus hexavalent chromium may not be the predominant form in discharge water.

Table C1: Acute Screening Values for Fish

Constituent[(a)]	Acute Screening Value	Source	Description
Dissolved Oxygen (DO)	3.1 mg/L for life stages except embryo/alevin; 5 mg/L if embryo/alevin life stage present	US EPA 1986 and BC MOE 1997	The embryo/alevin WQG is based on the US EPA (1986) 1-day minimum criterion of 5 mg/L. BC MOE (1997) summarized embryo effect concentrations from two studies. Gottwald (1965) reported 89% mortality after rainbow trout embryos were exposed for 72 hours to DO concentrations between 1.5 and 1.85 mg/L, and reported 29% mortality when rainbow trout embryos were exposed for 210 hours to DO concentrations between 2 and 3.25 mg/L. Sowden and Powell (1985) evaluated the effects of groundwater velocity and groundwater DO concentrations on 19 rainbow trout redds in a stream. No survival occurred in redds where mean groundwater DO was less than 4.3 mg/L, and survival was <1% where mean groundwater DO was between 4.3 and 5.2 mg/L. Due to the large discrepancy between the information available for rainbow trout, the US EPA 1-day minimum criterion of 5 mg/L was selected as the conservative screening value for embryo/alevin life stage. This is not based on an effect concentration but is expected to be protective of any lethal effects of dissolved oxygen to the embryo/alevin life stage. BC MOE (1997) did not report 96-hour LC_{50} values for adult rainbow trout. BC MOE (1997) reported 24-hour LC_{50} values ranging from 1.3 to 2.7 mg/L, 72-hour LC_{50} values ranging from 1.5 to 1.6 mg/L, and 7-day LC_{50} values ranging from 2.4 to 3.1 mg/L. The highest 7-day LC_{50} value of 3.1 mg/L was adopted as the acute screening value for life stages other than embryo/alevin life stage.
Iron	53.6 mg/L	ENV 2018	The approved maximum BC WQG for total iron (1.0 mg/L) was derived to be protective to early life stages of fish, with the acknowledgement that 1.0 mg/L may be overprotective (BC MOE 2008). BC MOE conducted toxicity testing, exposing six freshwater organisms (rainbow trout, *Hyalella azteca*, and *Chironomus tentans*, *D. magna*) to iron at a water hardness of 50 (soft), 100 (moderate), and 250 mg/L (high) as $CaCO_3$. BC MOE (2008) noted that the addition of ferric chloride to test water to increase the iron concentration also resulted in a decrease in pH. The decrease in pH varied with the buffering capacity of the dilution water (i.e., hard water was able to dissolve a greater concentration of ferric chloride before pH depressions occurred). In order to discern between the toxicity of iron and toxic effects of low pH, BC MOE set a minimum pH threshold of 5 to the tests. This factor resulted in a limitation of the amount of ferric chloride that could be added to each solution. For example, in hard water, the maximum iron concentration that could be achieved at pH 5 was 53.6 mg/L. Mortality was less than 50% in the highest concentrations tested. BC MOE reported 96-hour LC_{50} values for rainbow trout to be >53.6 mg/L in hard water, and this was used as the rainbow trout acute toxicity screening value. BC MOE (2008) did not report the percent mortality in the highest concentration tested. BC MOE (2008) noted that one potential problem introduced by the effect of iron on pH is that the controls utilized for the test were conducted at near-neutral pH, while the pH for other concentrations decreased as the concentration of iron increased.

Table C1: Acute Screening Values for Fish

Constituent[(a)]	Acute Screening Value	Source	Description
Lithium	158 mg/L	Merck 2010	There are no BC MOE, CCME, or US EPA WQGs for the protection of aquatic life for lithium. As of February 2019, the US EPA ECOTOX database does include any toxicity data for lithium chloride or lithium bromide. The Merck (2018) material safety data sheet for lithium bromide reports a 96-hour LC_{50} for rainbow trout of 428 mg/L. The Merck (2010) material safety data sheet for lithium chloride reports the 96-hour LC_{50} for rainbow trout as 158 mg/L. The lowest 96-hour LC_{50} value for toxicity of rainbow trout to lithium chloride was used as the acute screening value (158 mg/L).
Mercury	0.15 mg/L inorganic Hg	CCME 2003	ENV does not provide an acute WQG for mercury (ENV 2018). CCME (2003) compiled acute toxicity data for inorganic mercury. In freshwater acute tests, 96-hour LC_{50} values for fish ranged from 0.15 mg/L for fathead minnow to 0.9 mg/L for white sucker (*Catostomus commersoni*). CCME (2003) plotted a single 96-hour LC_{50} value for rainbow trout between 0.15 mg/L and 0.9 mg/L, but the concentration was not reported in the text. The lowest 96-hour LC_{50} value for fish from CCME (2003), 0.15 mg/L inorganic mercury, was selected as the acute toxicity screening value.
Nickel - Dissolved	20.8 mg/L	US EPA 2018	There is no aquatic life short-term maximum BC WQG for nickel. The reported 96-hour LC_{50} value for juvenile rainbow trout in soft water (91 mg/L hardness) is 20.8 mg/L nickel (Brix et al. 2004). Toxicity at higher hardness (320 mg/L as $CaCO_3$) has been reported in rainbow trout at 56 mg/L nickel (96-hour LC_{50} for juvenile rainbow trout) in the ECOTOX database, but the source of this datum could not be verified. The US EPA (2018) freshwater criterion maximum concentration of 1 mg/L (0.99 mg/L) nickel is based on a hardness level of 250 mg/L as $CaCO_3$. Therefore, although the existing conditions and mixed water quality is expected to be higher hardness, the former (20.8 mg/L nickel) is the adopted as the rainbow trout acute toxicity screening value for this assessment.
Nitrate	381 mg/L NO_3-N	CCME 2012	CCME (2012) derived a short-term nitrate benchmark concentration of 124 mg/L NO_3-N, which is intended to "protect most species against lethality during severe but transient events". Review of data in the CCME (2012) compilation indicated that fish and amphibians were less sensitive than most invertebrate taxa, with LC_{50} values consistently above 200 mg/L NO_3-N for the tests conducted in moderately hard or hard water. The lowest acute endpoint for fish in the CCME dataset was a 96-hour LC_{50} of 381 mg/L nitrate as nitrogen (NO_3-N) for juvenile rainbow trout tested in moderately hard water (110 to 125 mg/L as $CaCO_3$). The 96-hour LC_{50} of 381 mg/L NO_3-N for juvenile rainbow trout was adopted as the acute toxicity screening value. This value is expected to be conservative as subsequent toxicity testing using Fording River and Elk River water spiked with nitrate identified hardness-based amelioration of toxicity for multiple salmonid taxa and crustaceans. Further, Baker et al. (2010) and Rescan (2012) concluded that LC_{50} values for sensitive freshwater taxa increased significantly with increased hardness. BHP Billiton (2012) also verified the importance of hardness-dependence for nitrate toxicity to sensitive fish species (lake trout [*Salvelinus namaycush*]).
Nitrite	Chloride-based equation (mg/L N): $0.29\ x\ [chloride\ (mg/L)] + 0.52$	Kroupová et al. 2016	In the absence of rainbow trout acute toxicity data provided in BC MOE (1986) specific to chloride concentrations relevant to Project discharge, an acute toxicity screening value was obtained from a recent review by Kroupová et al. (2016). Kroupová et al. (2016) reviewed studies of nitrite toxicity and the effect of chloride in a wide range of aquatic species and developed a predictive equation for nitrite toxicity to rainbow trout using data from Russo and Thurston (1977). The equation was reported by Kroupová et al. (2016) in units of mg/L nitrogen dioxide (NO_2) and has been converted here to mg/L NO_2-N.

Table C1: Acute Screening Values for Fish

Constituent[(a)]	Acute Screening Value	Source	Description
Selenium	4.2 mg/L selenite 4.5 mg/L selenate	BC MOE 2014	ENV does not provide an approved acute WQG for selenium (ENV 2018). Guideline derivations and individual toxicity data from several compendia (BC MOE 2014; de Bruyn and Chapman 2007; US EPA 2004) were evaluated to determine the potential for acute selenium toxicity under high sulphate conditions. The lowest acute (96-hour LC_{50}) toxicity value for rainbow trout was 4.5 mg/L selenate (juvenile rainbow trout), while the lowest selenite value was 4.2 mg/L selenite (adult rainbow trout; BC MOE 2014; US EPA 2004). The lowest acute toxicity value for rainbow trout from BC MOE (2014), 4.5 mg/L selenium as selenate, was selected as the acute screening value for selenate, and 4.2 mg/L was used as the screening value for selenite.
Sulphate	9,900 mg/L	Rescan 2012a	There is no aquatic life acute BC WQG for sulphate (ENV 2018). The hardness-dependent approved chronic WQG for sulphate, derived to be protective of freshwater aquatic life under chronic exposures, is 429 mg/L sulphate at hardness levels between 181 mg/L and 250 mg/L as $CaCO_3$. Above 250 mg/L hardness as $CaCO_3$, BC MOE recommends toxicity testing, as organisms exposed to higher concentrations of water hardness in combination with sulphate may experience osmotic stress (BC MOE 2013). Rescan (2012a) characterized the effect of hardness on acute sulphate toxicity and compiled acute LC_{50} values for fish and invertebrates. Of the three fish species included in Rescan (2012a), rainbow trout were the least sensitive at hardness of 100 mg/L as $CaCO_3$ or higher. The 96-hour LC_{50} of 9,900 mg/L sulphate for rainbow trout (reported at 250 mg/L hardness as $CaCO_3$ in Singleton 2000 as summarized by Rescan 2012a) was selected acute toxicity screening value for rainbow trout.
Total Dissolved Solids (TDS)	5,000 mg/L	IDNR 2009	Published studies of total dissolved solids (TDS) toxicity to aquatic life have shown that the toxicity of TDS may vary depending on the specific constituent compositions. The studies indicate that most acute LC_{50} values fall in the range of 5,300 to 20,000 mg/L TDS (Weber-Scannell and Duffy 2007; Mount et al. 1997). The Iowa Department of Natural Resources (IDNR 2009) discussed many of the challenges in the interpretation of TDS data, and found that the TDS concentration that caused adverse effects varied substantially with ion composition. As part of permitting of effluent, IDNR received TDS acute toxicity test data from approximately 70 facilities since 2004, and the toxicity test data are described as "relatively scattered" (IDNR 2009). Among these IPSCO Steel Inc. provided wastewater toxicity testing data for fathead minnow to IDNR on 14 March 1996, reporting an LC_{50} for fathead minnow of 5,000 to 7,000 mg/L TDS. A published TDS LC_{50} for rainbow trout was not located. Therefore, the acute toxicity screening value of 5,000 mg/L TDS was selected based on the lower bound of the fathead minnow results from IDNR (2009).
Uranium	4 mg/L	CCME 2011	There is no aquatic life short-term maximum BC WQG for uranium. CCME (2011) derived a short-term benchmark of 33 µg/L (0.033 mg/L) uranium, indicating a potential for severe effects (e.g., ranging from immobilization to lethality) to sensitive freshwater life during transient events. The short-term benchmark represents the 5th percentile of a species sensitivity distribution (SSD) of compiled acute effects data from the literature, which included a 96-hour LC_{50} for rainbow trout of 4 mg/L (the geometric mean of values from comparable acute toxicity tests). The 96-hour LC_{50} for rainbow trout of 4 mg/L was selected as the acute screening value.

Table C1: Acute Screening Values for Fish

Constituent[a]	Acute Screening Value	Source	Description
Zinc	Hardness- and DOC-based equation (mg/L Zinc): $e^{[\ln(0.0849)-0.24(\ln(0.5)-\ln(DOC))-0.833(\ln(5($ Valid 13.8 to 250.5 mg/L as $CaCO_3$ and DOC 0.3 to 17.3 mg/L	CCME 2018	ENV provides an approved acute WQG for zinc, based on a water hardness between 90 to 400 mg/L $CaCO_3$ (ENV 2018). CCME (2018) recently compiled, reviewed, and ranked short-term toxicity data for invertebrates, fish, amphibians, and aquatic plants, and normalized the underlying toxicity data for the effect of DOC and hardness to generate an SSD for dissolved zinc. For rainbow trout, CCME (2018) calculated a geometric mean of six 5-day normalized LC_{50} values for use in the SSD (0.0849 mg/L). This value was selected to set a hardness- and DOC- based acute screening value for rainbow trout. As discussed in CCME (2018), this equation is valid for hardness between 13.8 to 250.5 mg/L $CaCO_3$ and DOC between 0.3 and 17.3 mg/L. At hardness and DOC concentrations greater than these values, the upper limit should be used to calculate the toxicity value (CCME 2018).

Notes: mg/L = milligrams per litre; ng/L = nanograms per litre; µg/L = micrograms per litre; % = percent; > = less than; ANZECC = Australian and New Zealand Environment and Conservation Council; BC MOE/ENV = British Columbia Ministry of Environment; BC WQG = British Columbia water quality guideline; $CaCO_3$ = calcium carbonate; CCME = Canadian Council of Ministers of Environment; DOC = dissolved organic carbon; EC_{50} = concentration resulting in 50% effect; ECCC = Environment and Climate Change Canada; IDNR = Iowa Department of Natural Resources; LC_{50} = concentration resulting in 50% mortality; LOEC = lowest observed effect level; MLR = multiple linear regression; N/A = not available; *n* = number of samples; N = nitrogen; NO_2 = nitrogen dioxide; NO_3-N = nitrate as nitrogen; SMAV = species mean acute values; SSD = species sensitivity distribution; TDS = total dissolved solids; US EPA = United States Environmental Protection Agency.

[a] All parameters are measured in the total fraction unless specified.

[b] ECOTOX is a database of toxicity data available from the US EPA (http://cfpub.epa.gov/ecotox/).

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APPENDIX D

Screening Results (Releases of Mine-Influenced Water)

This appendix shows temporal plots for constituents identified as potential acute stressors at release locations (see Section 2.0 of the main report). These time-series plots, which were provided by Teck, show concentrations for stations at which the constituent was identified as a potential acute stressor. For metals, concentrations are shown for the total fraction. Grey shading is used to depict the decline window (September 2017 to September 2019). Concentrations are shown in units of micrograms per litre (µg/L) or milligrams per litre (mg/L).

Figure D1: Total Beryllium

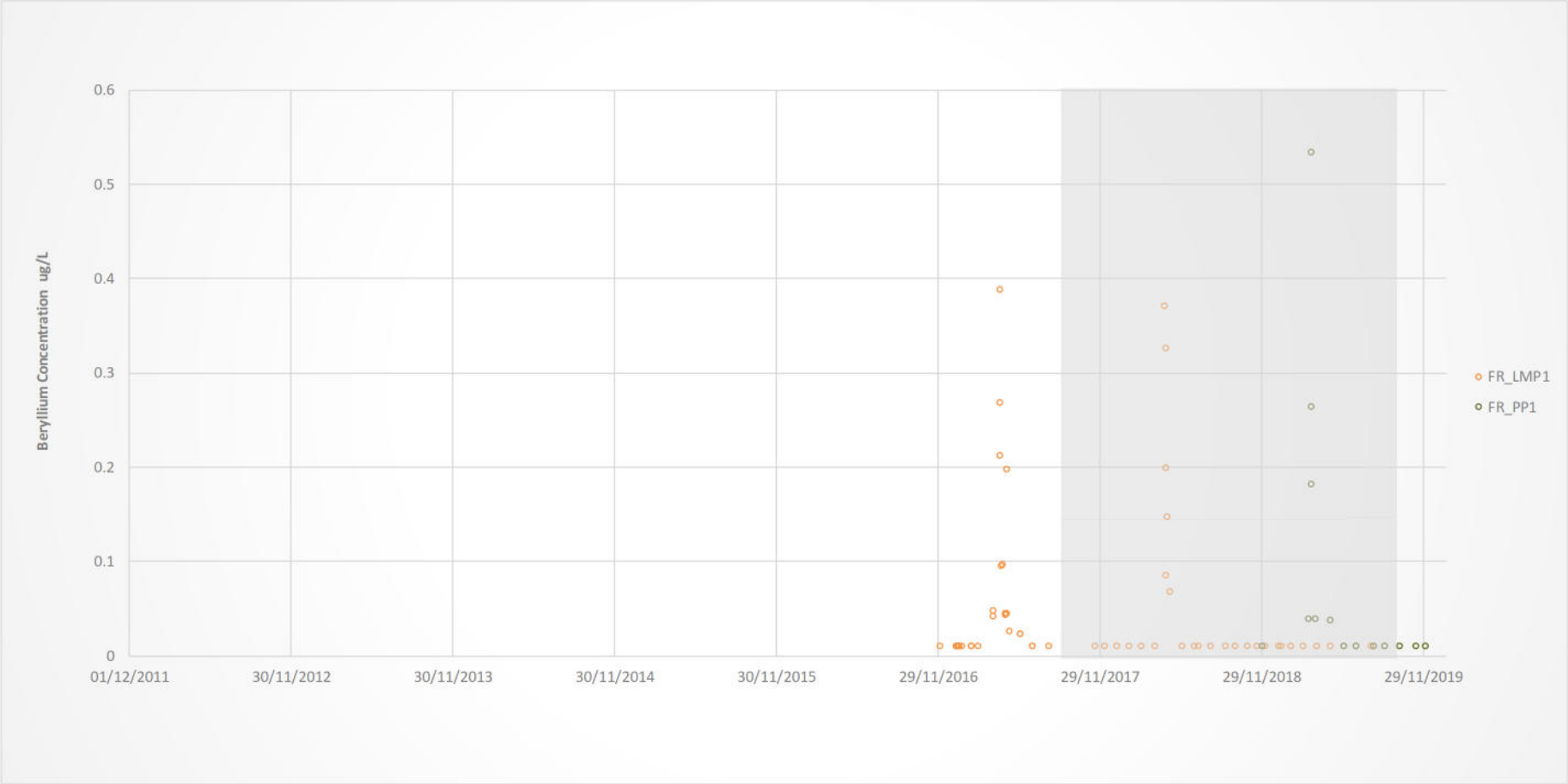


Figure D2: Bromide

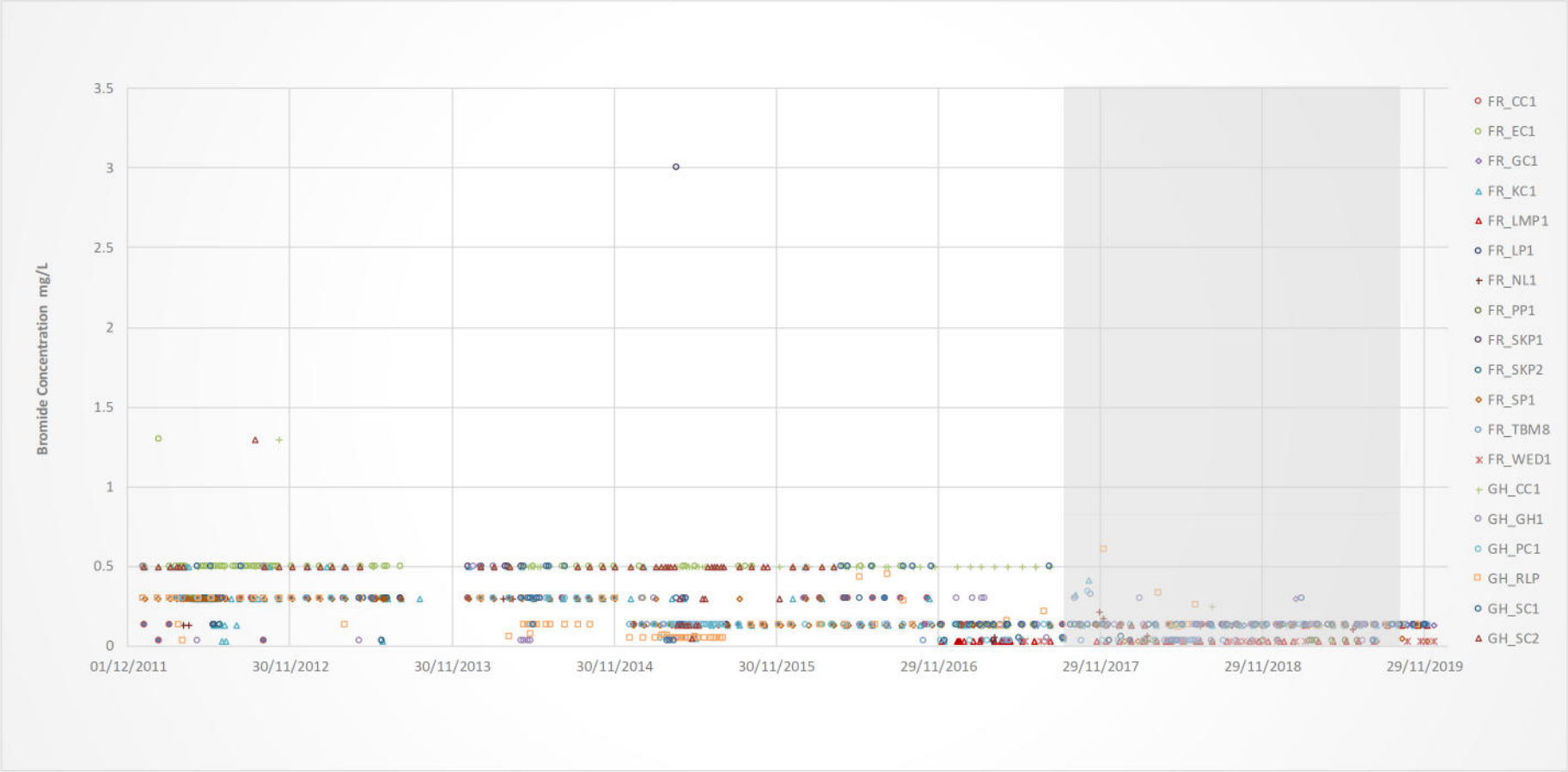


Figure D3: Total Chromium

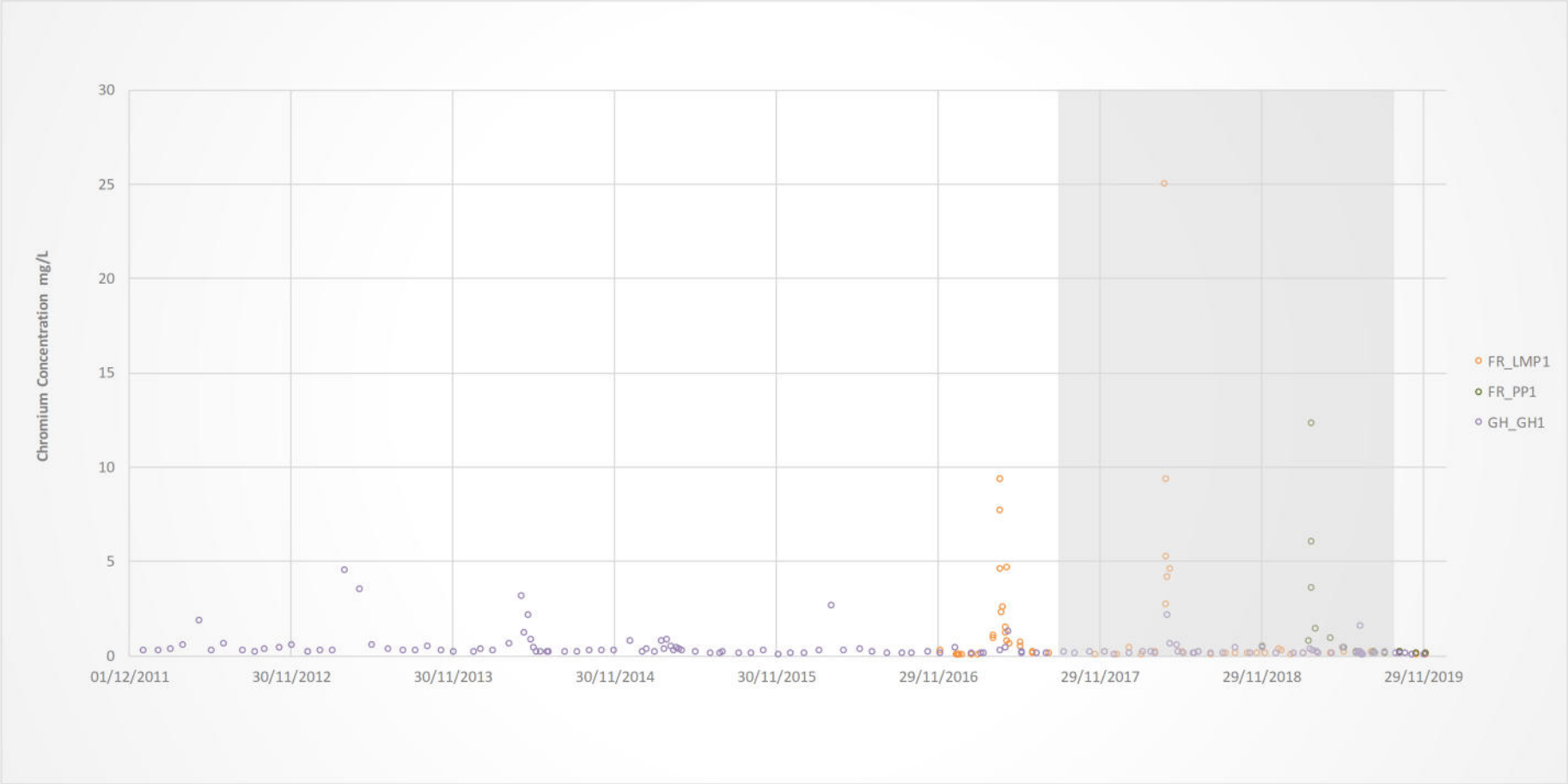


Figure D4: Dissolved Oxygen

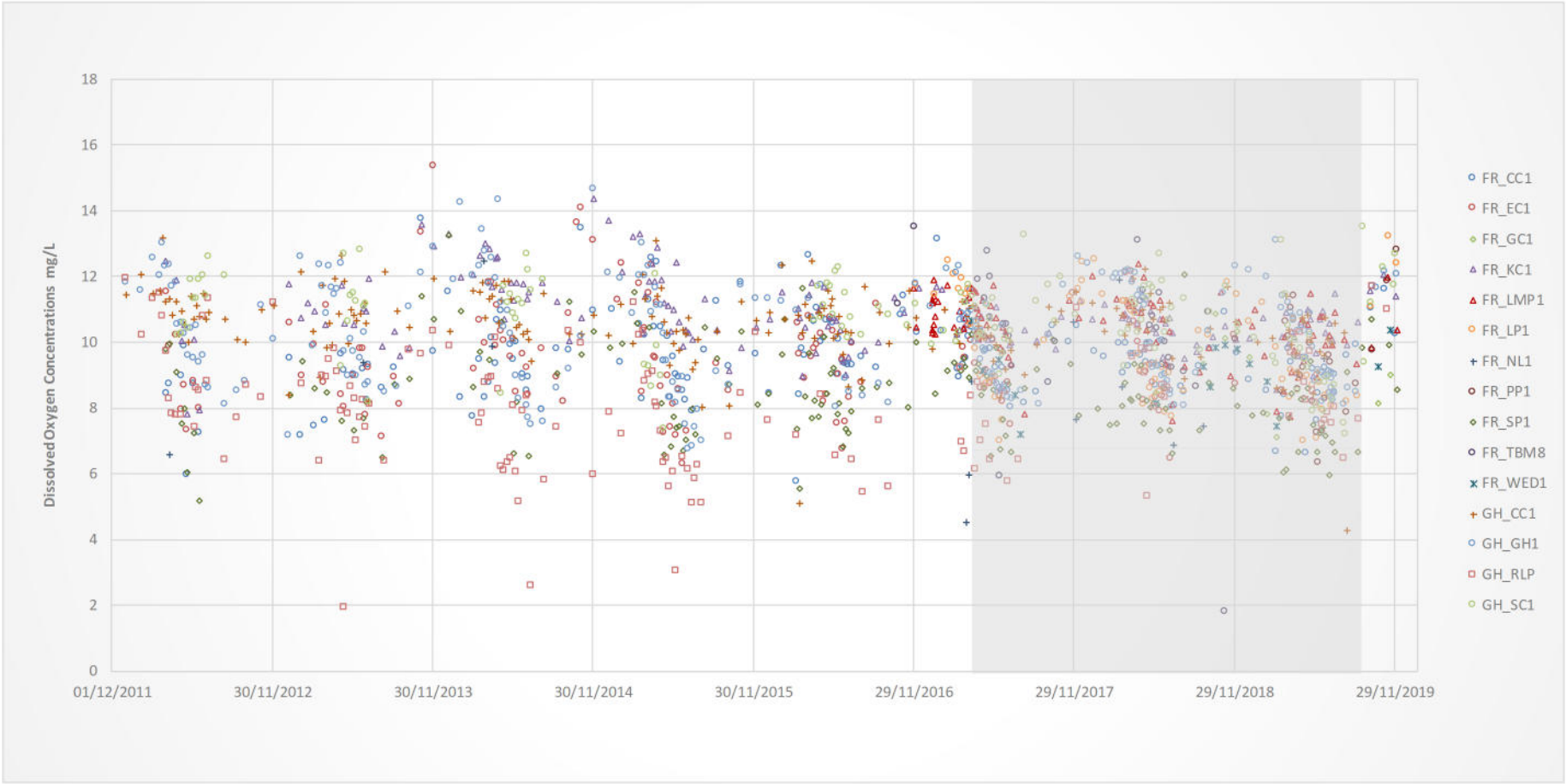


Figure D5: Total Iron

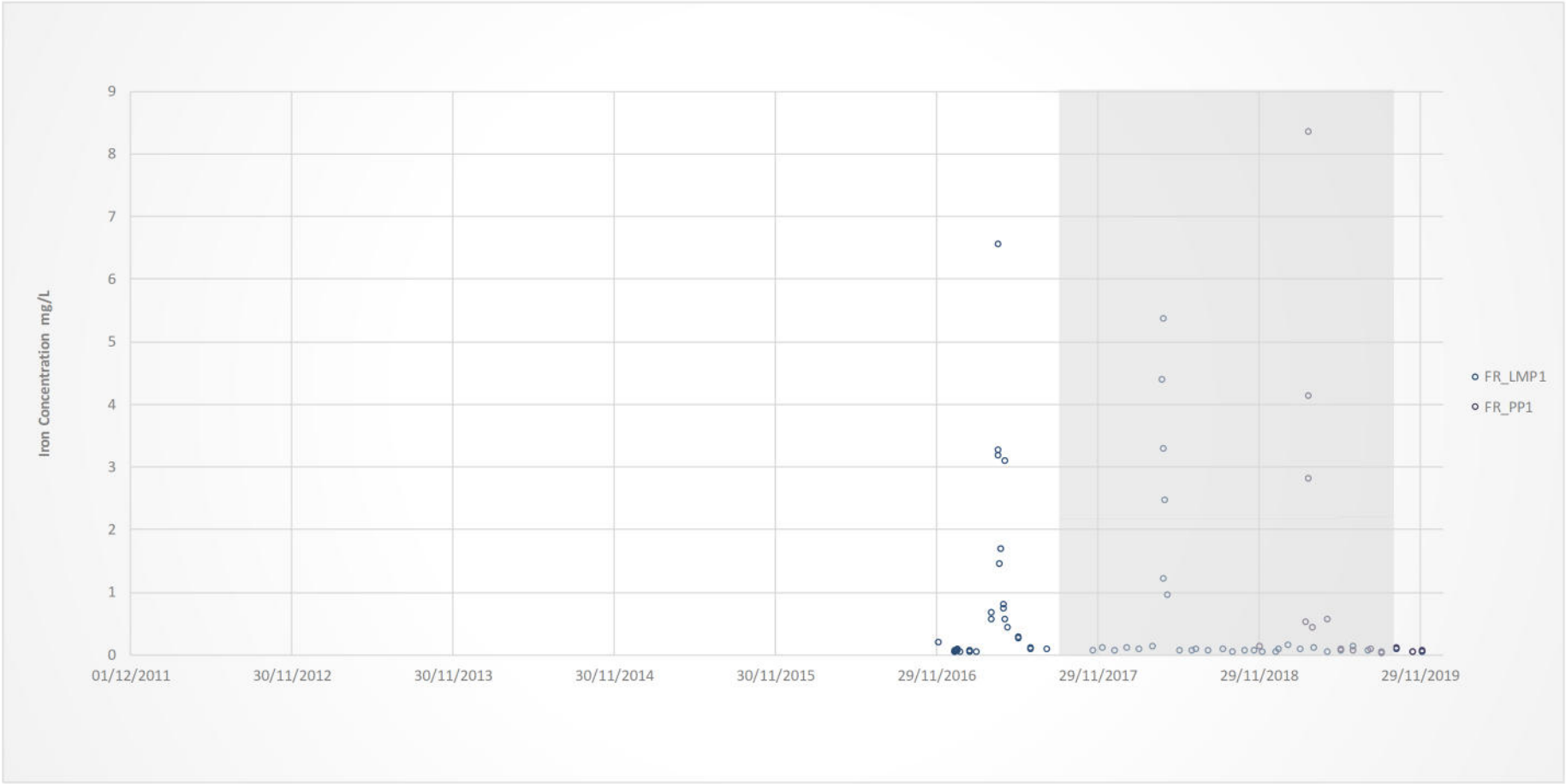


Figure D6: Total Lithium

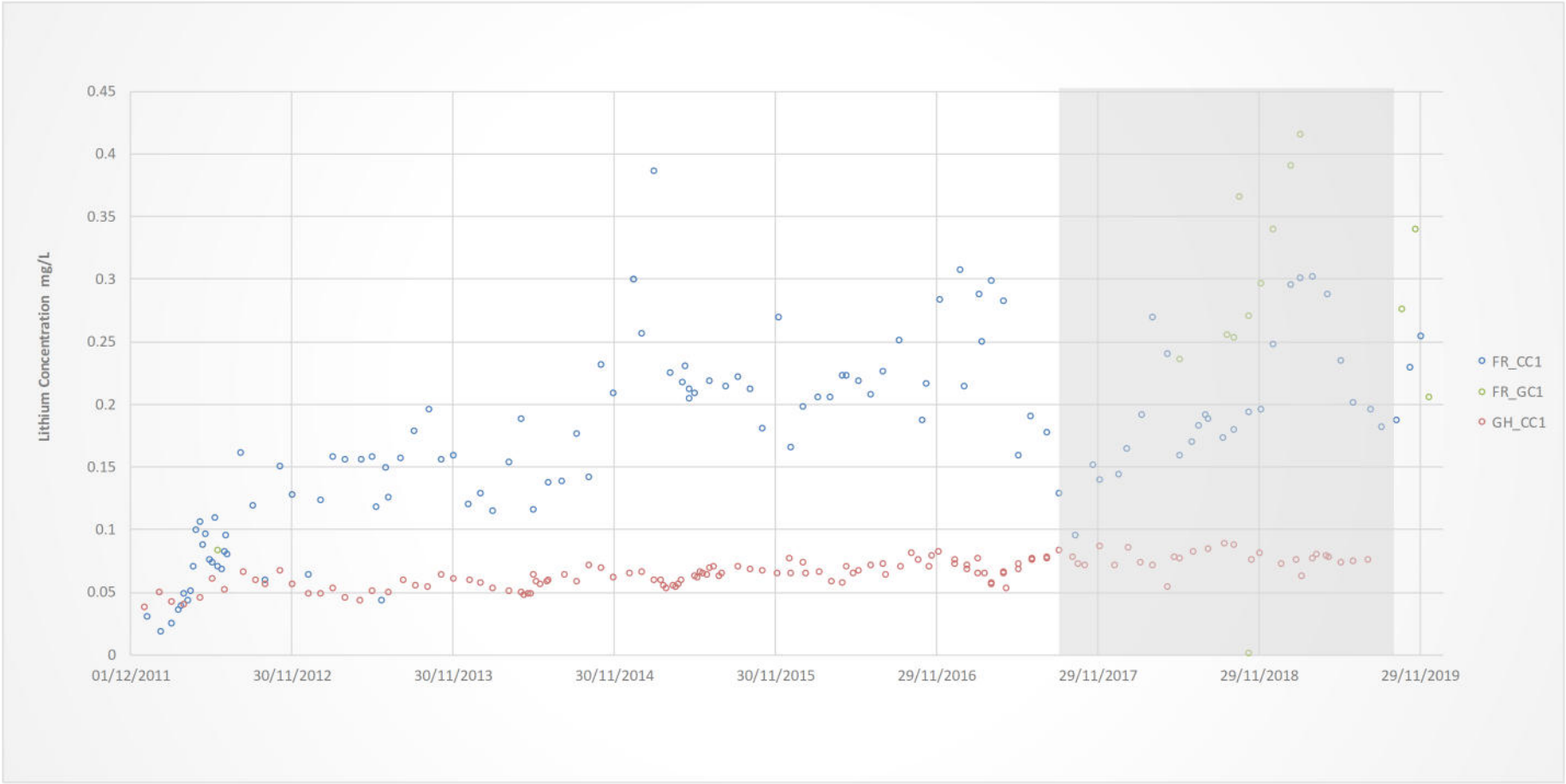


Figure D7: Total Mercury

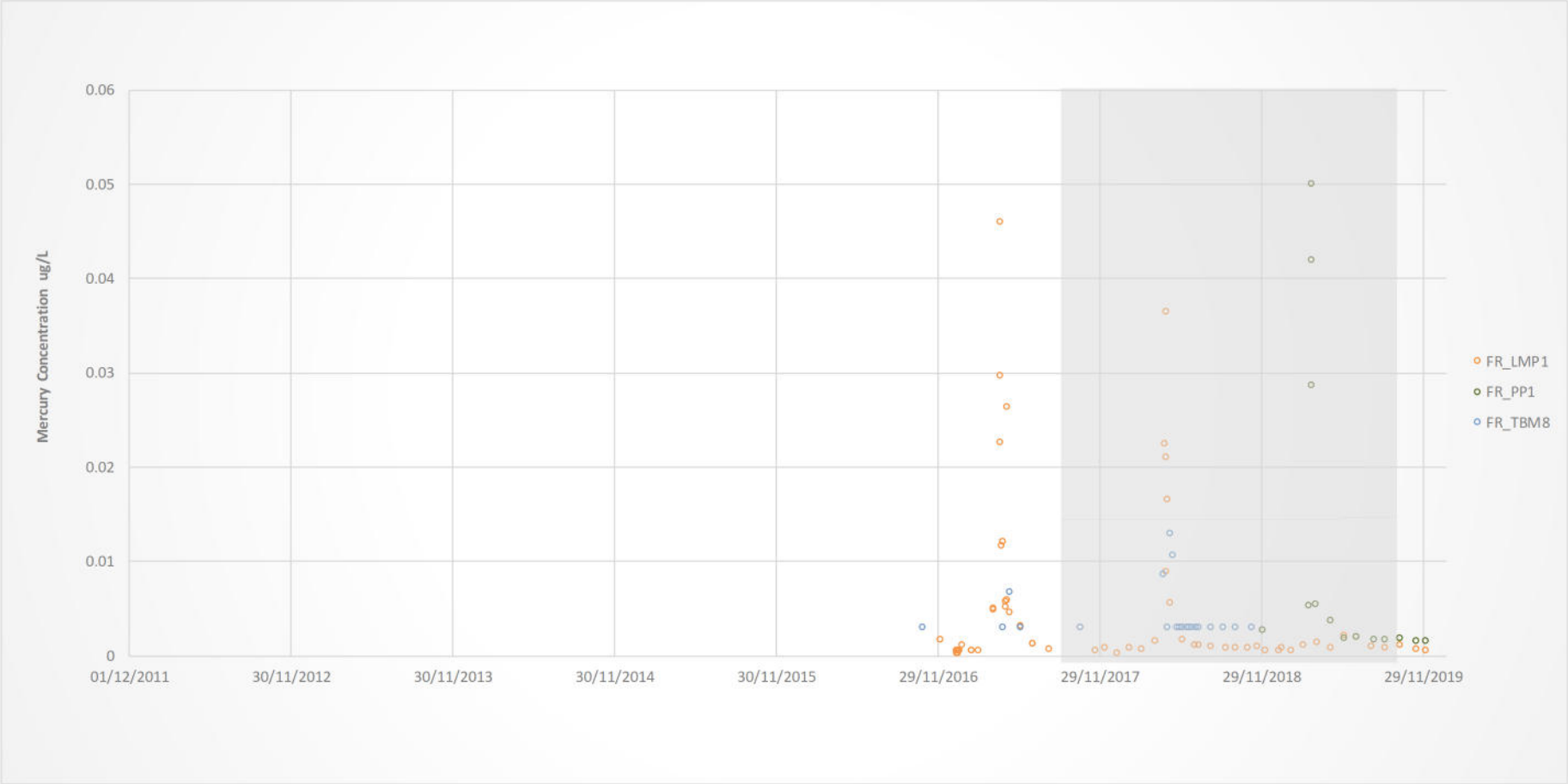


Figure D8: Total Nickel

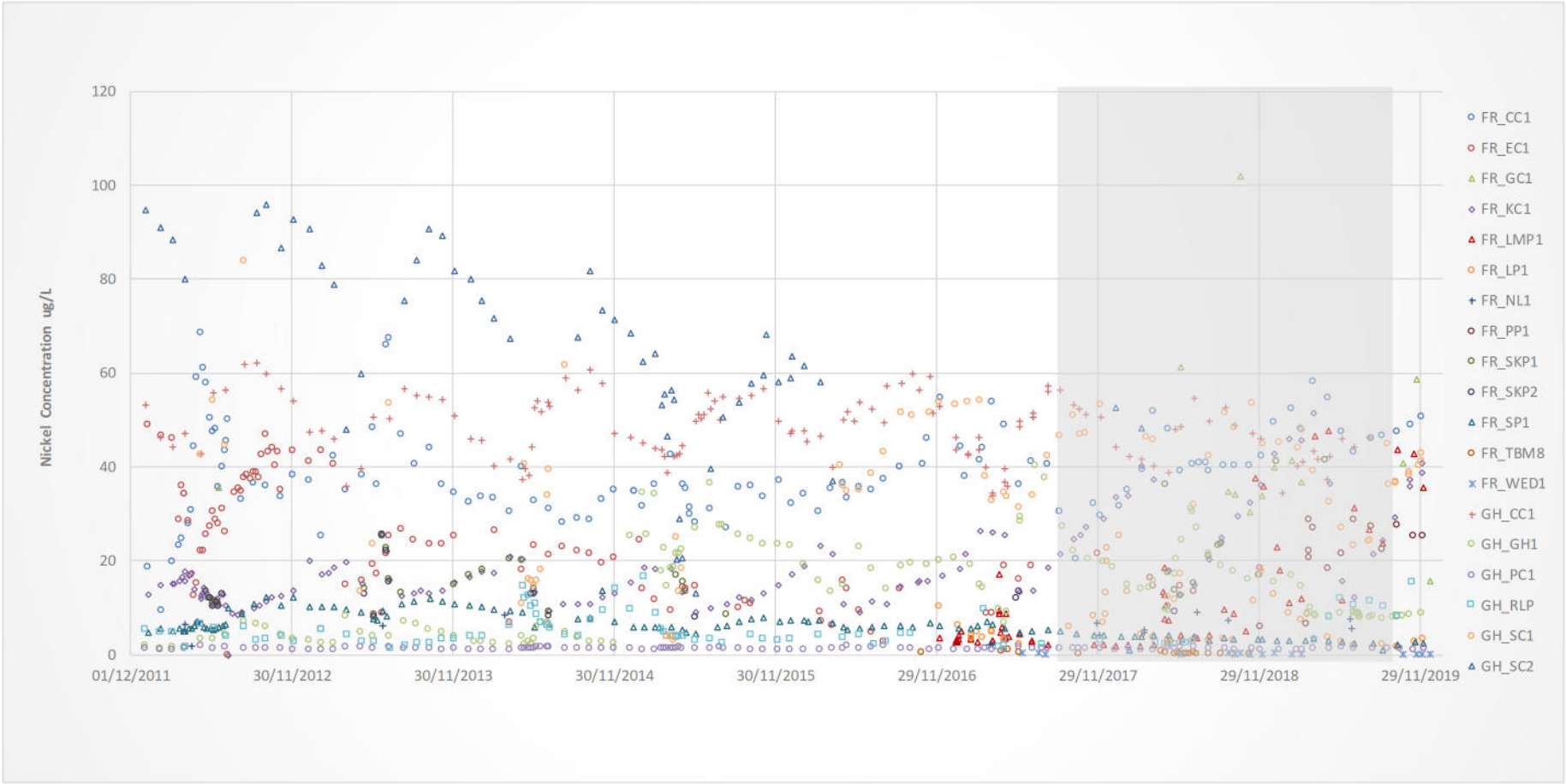


Figure D9: Nitrate (mg/L as nitrogen)

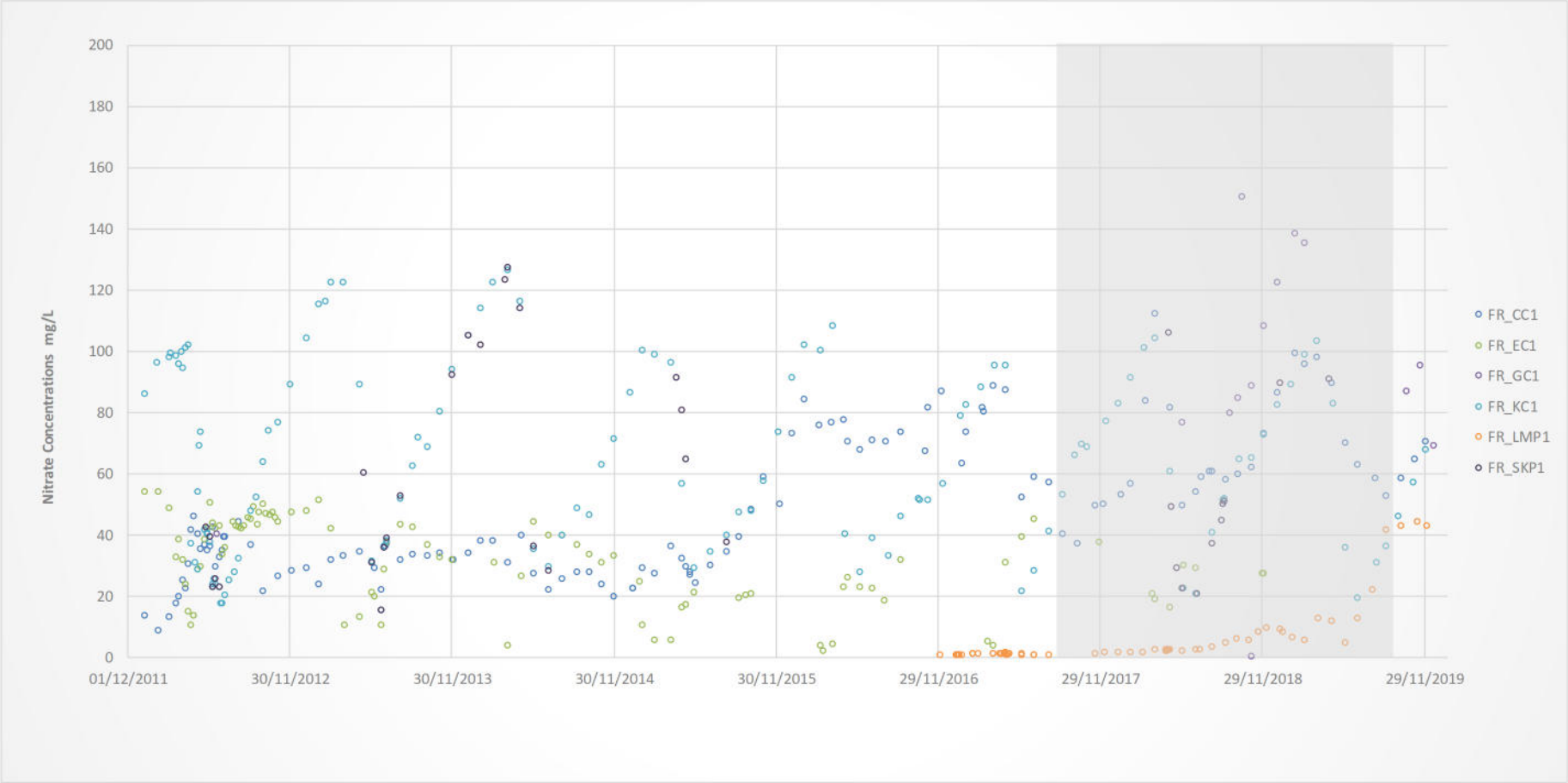


Figure D10: Nitrite (mg/L as nitrogen)

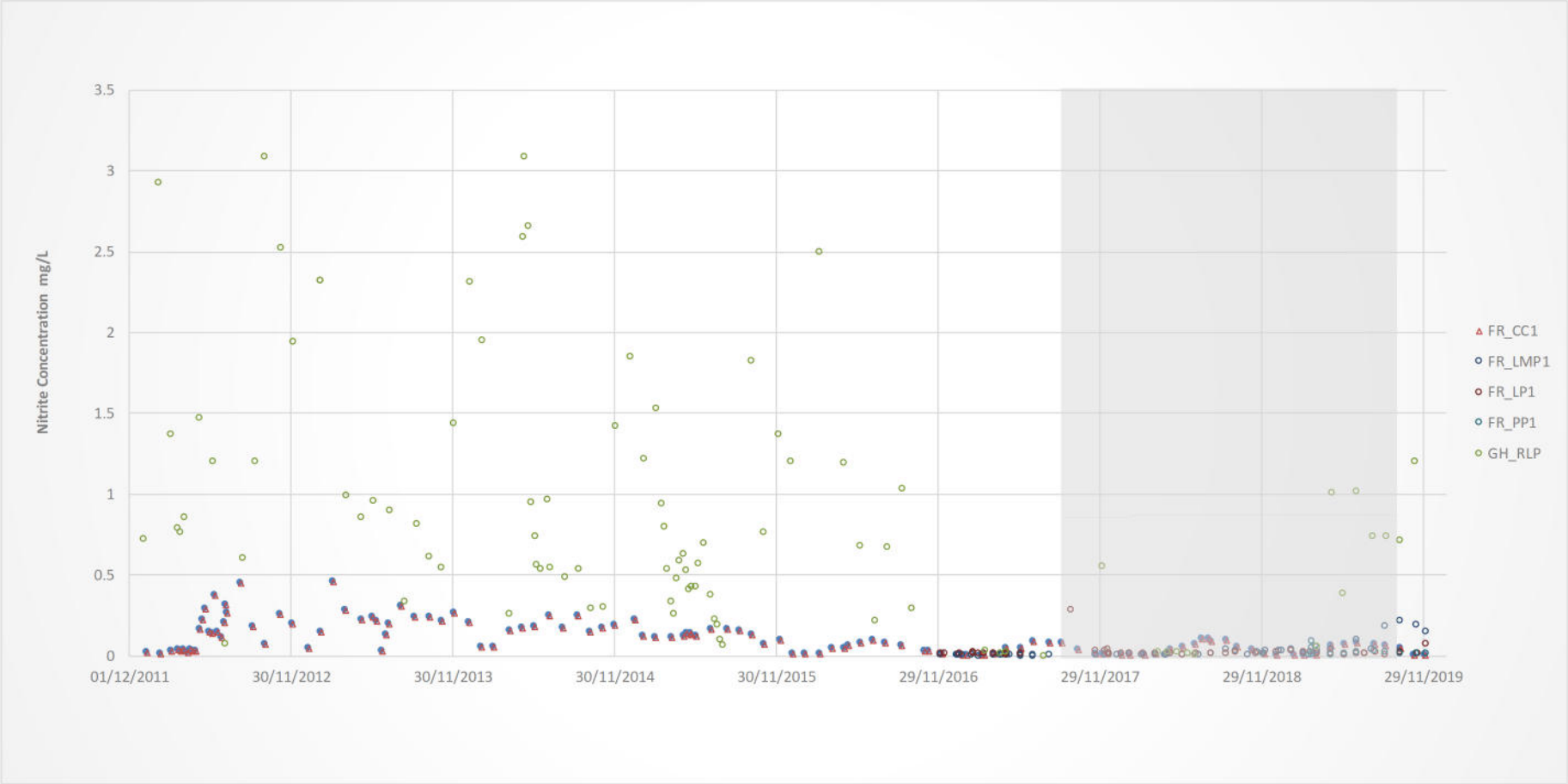


Figure D11: Total Selenium

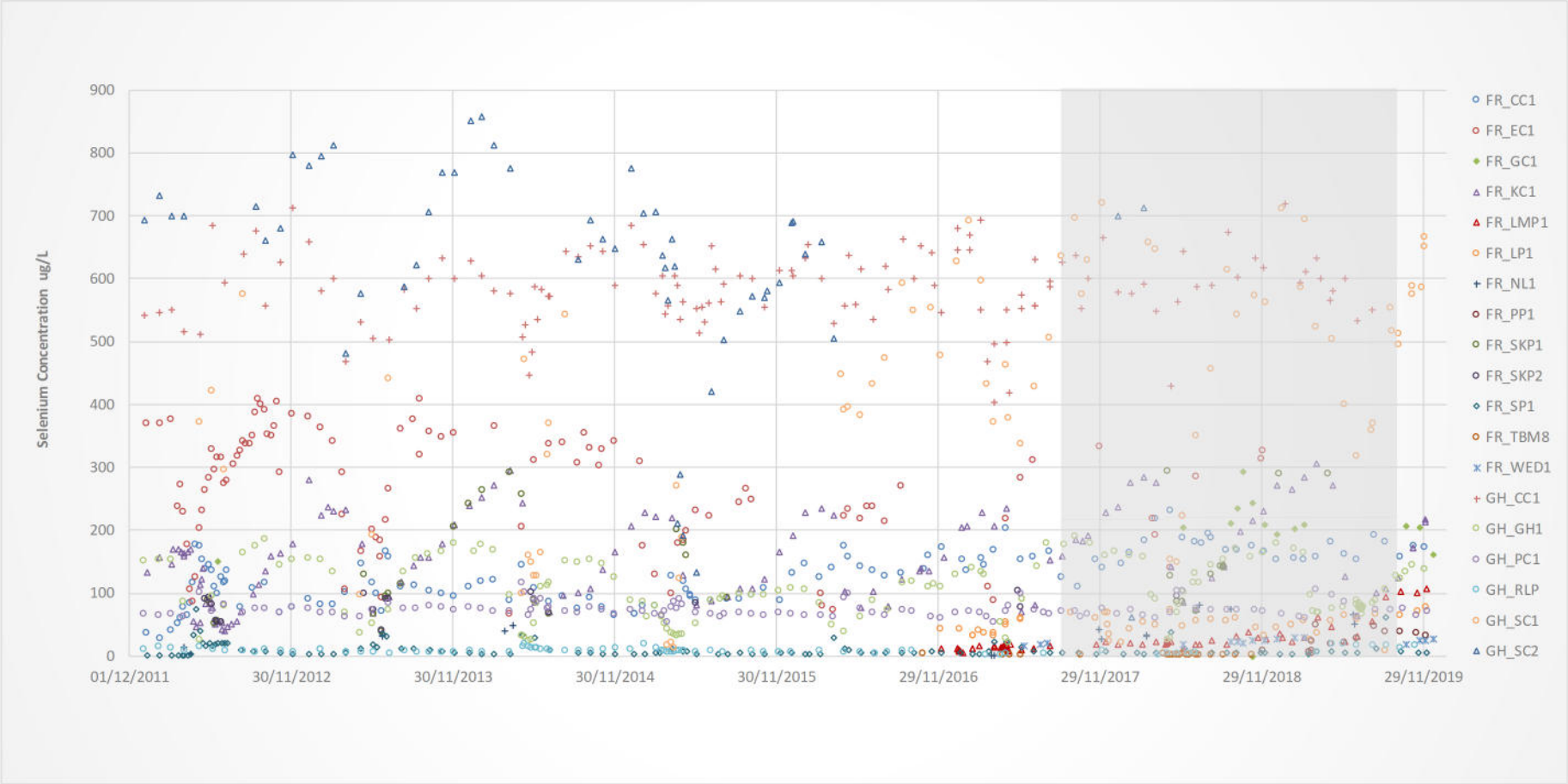


Figure D12: Sulphate

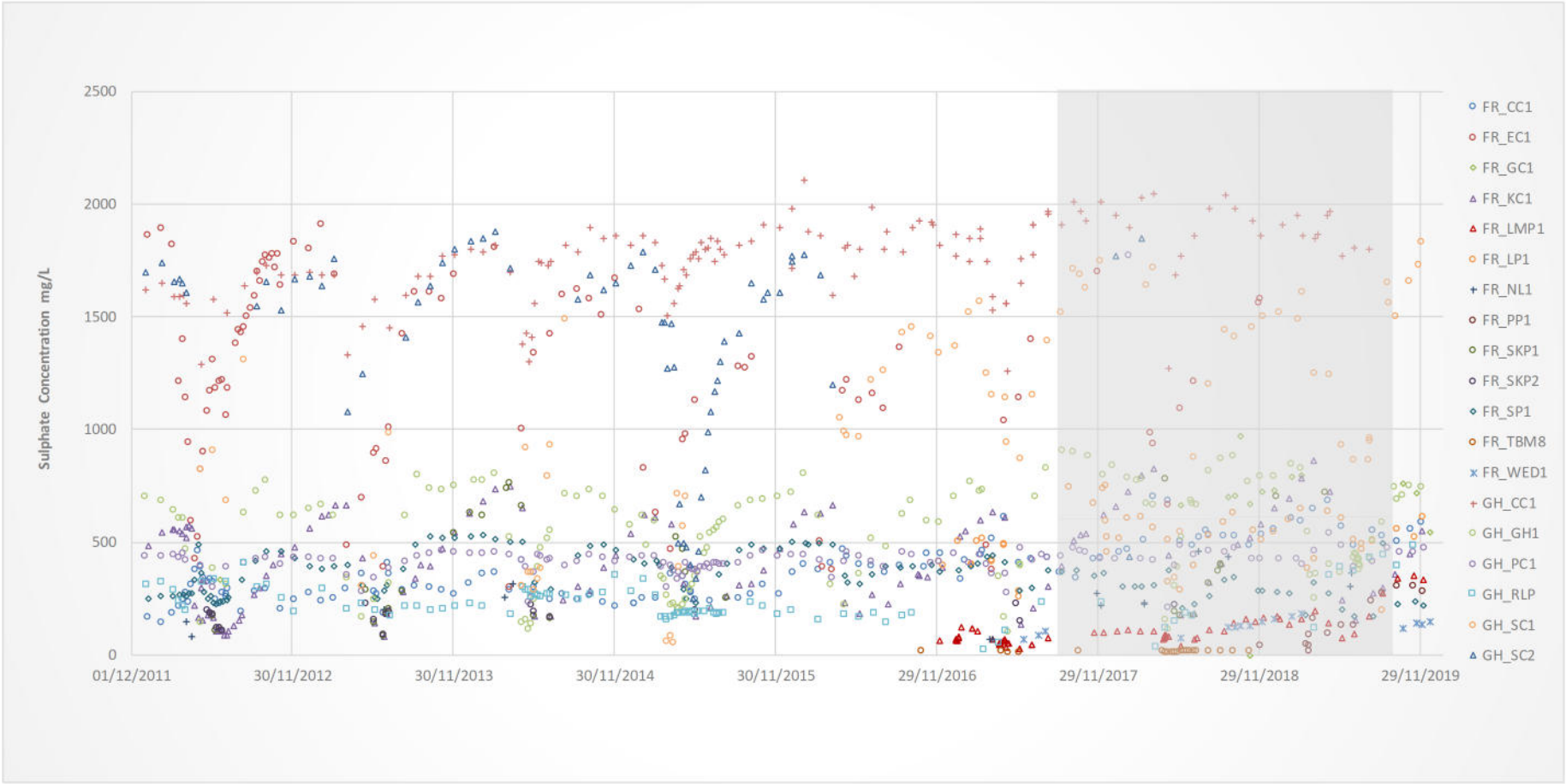


Figure D13: Total Dissolved Solids (TDS)

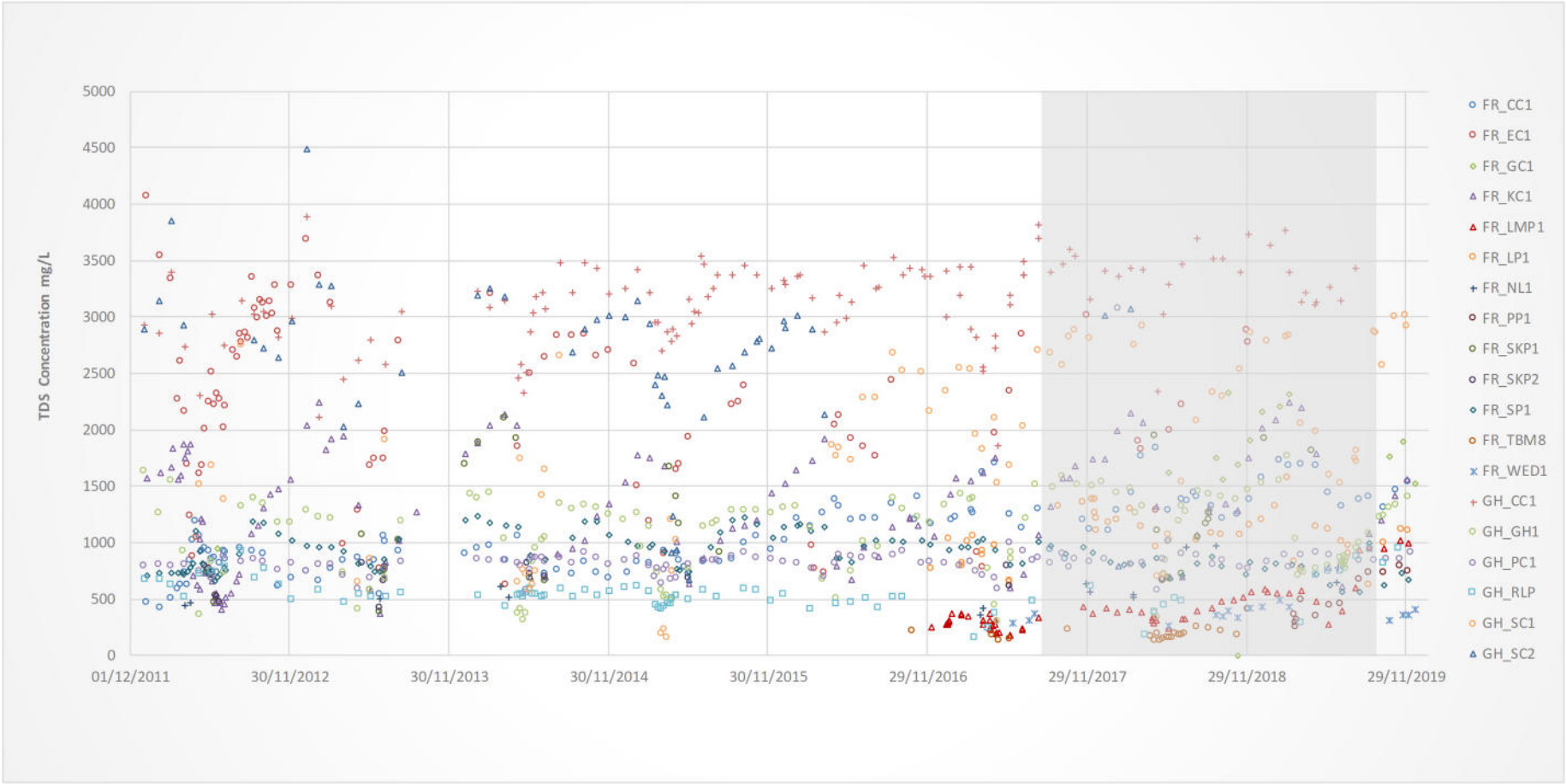


Figure D14: Total Uranium

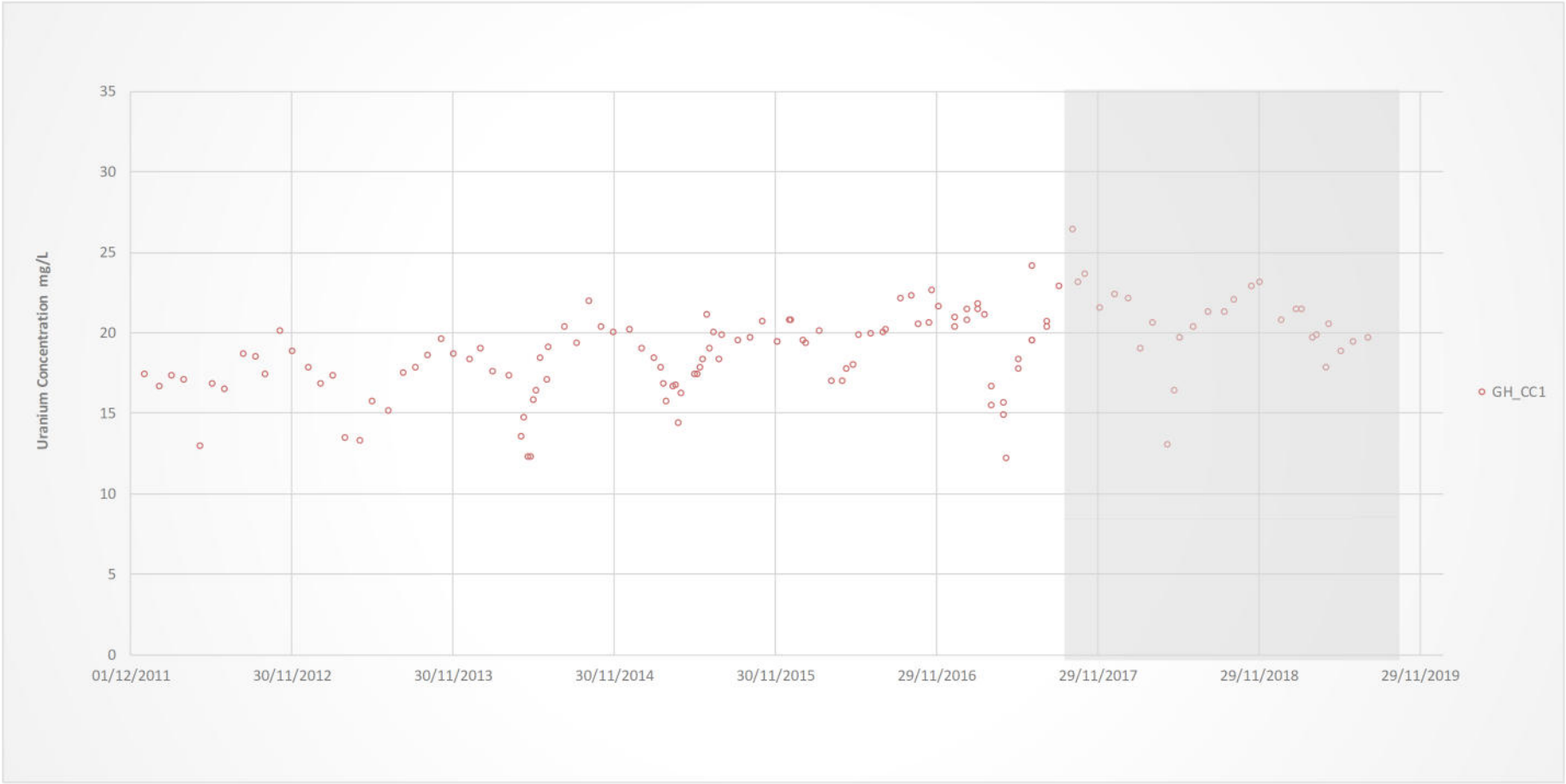


Figure D15: Total Zinc

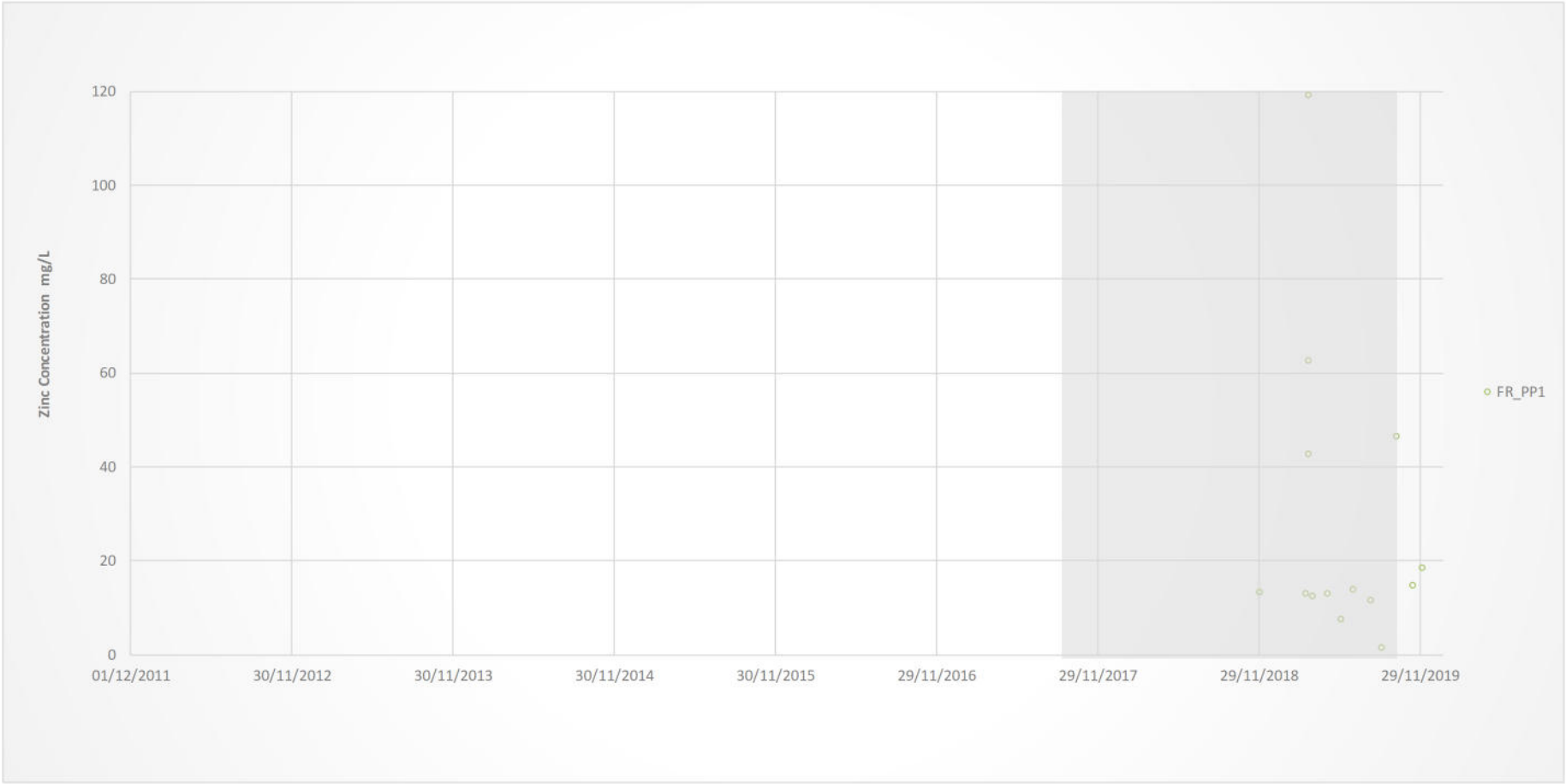


Table D1. Released of Mine-Influenced Water: Comparison to Water Quality Guidelines and Acute Screening Values (all locations combined)

		Guidelines for the protection of:			Summary											
		Aquatic Life			2017 - 2019											
		30-day mean	Maximum	Values	Median	Mean	5th Percentile	95th Percentile	Min	Max	Standard Deviation	nd	Count	% Above Guideline Mn	% Above Guideline Mx	% Above Guideline A
Field Measured																
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.1	8.0	7.4	8.4	7.0	**9.1**(Mn, Mx)	0.33	0	622	0.16	0.16	-
Temperature	°C	-	-	-	5.3	6.5	0.40	16	-0.1	23	4.8	0	622	-	-	-
Dissolved oxygen	mg/L	8 - 11(a)	5 - 9(a)	3.1 - 5(a)	10.0	12	**7.4**(Mn)	12	**1.8**(Mn, Mx)	1,190	47	0	622	40	18	0.3
Turbidity	NTU	-	-	-	3.5	7.8	0.39	25	0.23	112	14	0	105	-	-	-
Conductivity	µS/cm	-	-	-	1,104	1,350	383	2,980	7.9	3,295	757	0	620	-	-	-
Conductivity	µS/cmA	-	-	-	1,341	-	1,341	1,341	-	-	-	0	1	-	-	-
Specific conductivity (temperature corrected at 25 °c)	µS/cm	-	-	-	967	-	967	967	-	-	-	0	1	-	-	-
Specific conductivity (temperature corrected at 25 °c)	µS/cm at 25 C	-	-	-	571	571	87	1,055	33	1,109	761	0	2	-	-	-
Oxidation-reduction potential	mV	-	-	-	204	204	95	288	2.4	2,123	123	10	620	-	-	-
Dissolved oxygen	%	-	-	-	81	80	60	93	12	114	10	0	619	-	-	-
Total suspended solids	mg/L	-	-	-	37	49	21	94	14	166	31	0	27	-	-	-
Conventional Parameters																
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.2	7.9	8.5	**5.7**(Mn, Mx)	8.7	0.23	0	359	0.28	0.28	-
Hardness, as $CaCO_3$	mg/L	-	-	-	747	951	221	2,433	<0.5	2,870	642	1	358	-	-	-
Total alkalinity, as $CaCO_3$	mg/L	20(a)	-	-	251	263	148	418	<1.0(DL>Mn)	640	87	3	359	-	-	-
Total dissolved solids	mg/L	-	-	5,000	972	1,275	246	3,301	<10	3,770	896	1	358	-	-	-
Total suspended solids	mg/L	-	-	-	1.7	10	<1.0	49	<1.0	376	32	239	703	-	-	-
Total organic carbon	mg/L	-	-	-	2.0	2.8	0.50	7.3	<0.5	44	3.8	18	354	-	-	-
Dissolved organic carbon	mg/L	-	-	-	1.8	2.1	0.51	4.5	<0.5	9.5	1.4	17	354	-	-	-
Colour	TCU	-	-	-	7.2	6.0	<5.0	9.7	<5.0	10	3.4	2	5	-	-	-
Turbidity	NTU	-	-	-	1.1	21	0.13	133	<0.1	704	69	11	702	-	-	-
Conductivity	µS/cm	-	-	-	1,200	1,455	370	3,242	<2.0	3,500	824	2	359	-	-	-
Oxidation-reduction potential	mV	-	-	-	331	342	233	462	162	498	74	0	358	-	-	-
Acidity, $CaCO_3$	mg/L	-	-	-	1.5	4.0	<1.0	17	<1.0	31	5.5	170	358	-	-	-
Bicarbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	241	257	140	415	<1.0	640	91	5	354	-	-	-
Carbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	4.8	<1.0	17	<1.0	35	6.4	212	354	-	-	-
Hydroxide alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	2.1	<1.0	<1.0	<1.0	312	21	352	354	-	-	-
Major Ions																
Bromide	mg/L	-	-	1,000	<0.25	0.100	<0.05	<0.25	<0.05	0.61	0.065	342	359	-	-	-
Calcium	mg/L	-	-	-	147	183	49	418	<0.05	476	110	1	358	-	-	-
Chloride	mg/L	150	600	-	<2.5	2.8	<0.5	11	<0.5	52	4.8	227	359	-	-	-
Fluoride	mg/L	0.12	0.40 - 2.7(b)	-	**0.18**(Mn)	**0.19**(Mn)	<0.1	**0.39**(Mn)	<0.02	**0.54**(Mn)	0.10	36	359	75	-	-
Magnesium	mg/L	-	-	-	94	120	21	340	<0.1	416	92	1	358	-	-	-
Potassium	mg/L	-	-	-	3.5	3.4	1.0	5.7	<0.05	8.3	1.6	1	358	-	-	-
Sodium	mg/L	-	-	-	2.1	3.1	0.46	9.7	<0.05	26	3.2	1	358	-	-	-
Sulphate	mg/L	128 - 429(b, c)	-	9,900	**453**(Mn)	**605**(Mn)	18	**1,861**(Mn)	<0.3	**2,050**(Mn)	534	1	359	53	-	-
Sulphide	mg/L	0.0020 - 0.14(d)	-	-	<0.0015	0.00075	<0.0015	<0.0015	<0.0015	<0.0015	0	3	3	-	-	-
Hydrogen sulphide	mg/L	-	-	-	<0.0016	0.00080	<0.0016	<0.0016	<0.0016	<0.0016	0	3	3	-	-	-
Nutrients and Biological Indicators																
Nitrate	mg-N/L	3.0	32.8	381	**6.5**(Mn)	**21**(Mn)	0.16	**89**(Mn, Mx)	<0.005	**150**(Mn, Mx)	29	1	359	70	19	-
Nitrite	mg-N/L	0.020 - 0.20(e)	0.06 - 0.60(e)	0.81- 16(e)	0.0095	**0.032**(Mn)	<0.001	**0.11**(Mn)	<0.001	**1.0**(Mn, Mx)	0.10	89	359	24	6.0	-
Total ammonia	mg-N/L	0.13 - 2.1(f)	0.70 - 28(g)	-	0.016	0.052	<0.005	0.17	<0.005	**3.1**(Mn)	0.19	34	359	0.28	-	-
Total Kjeldahl nitrogen	mg-N/L	-	-	-	<0.25	0.33	<0.05	0.86	<0.05	2.6	0.35	93	354	-	-	-
Total phosphorus	mg-P/L	-	-	-	0.0040	0.016	0.0014	0.060	<0.001	0.77	0.057	62	359	-	-	-
Biochemical oxygen demand	mg/L	-	-	-	<2.0	1.0	<2.0	<2.0	<2.0	<2.0	0	7	7	-	-	-
Total ortho-phosphate	mg-P/l	-	-	-	0.0012	0.0047	<0.001	0.020	<0.001	0.17	0.013	167	359	-	-	-
Total Metals																
Aluminum	µg/L	-	-	-	7.0	140	<3.0	269	<3.0	15,300	948	116	355	-	-	-
Antimony	µg/L	9.0	-	-	0.56	0.74	<0.1	2.0	<0.1	8.2	1.0	31	355	-	-	-
Arsenic	µg/L	-	5.0	-	0.22	0.26	<0.1	0.61	<0.1	4.1	0.35	94	355	-	-	-
Barium	µg/L	1,000	-	-	42	63	19	171	<0.1	294	52	1	355	-	-	-
Beryllium	µg/L	0.13	-	380	<0.02	0.019	<0.02	<0.04	<0.02	**0.53**(Mn)	0.043	335	355	2.0	-	-
Bismuth	µg/L	0.50	-	-	<0.05	0.030	<0.05	<0.1	<0.05	<0.25	0.012	353	355	-	-	-
Boron	µg/L	1,200	29,000	-	<20	16	<10	34	<10	50	9.9	128	355	-	-	-
Cadmium	µg/L	-	-	-	0.13	0.24	0.011	0.85	<0.005	1.6	0.27	9	355	-	-	-
Calcium	µg/L	-	-	-	150,000	186,274	48,970	433,200	<50	882,000	118,976	1	355	-	-	-
Chromium	µg/L	1.0(h)	-	100	0.18	0.38	<0.1	0.74	<0.1	**25**(Mn)	1.6	158	355	3.0	-	-
Cobalt	µg/L	4.0	110	-	0.14	0.36	<0.1	1.8	<0.1	**4.8**(Mn)	0.70	193	355	0.56	-	-
Copper	µg/L	-	-	-	0.50	0.70	<0.5	1.9	<0.5	15	1.3	243	355	-	-	-
Iron	µg/L	167 - 4,754(i)	1,000	53,600	<20	131	<10	341	<10	**8,350**(Mn, Mx)	671	195	355	2.3	2.3	-
Lead	µg/L	20(b)	3.0 - 417(b)	-	<0.05	0.13	<0.05	0.44	<0.05	**7.2**(Mn)	0.54	278	355	0.28	-	-
Lithium	µg/L	122	-	158,000	45	59	5.2	**198**(Mn)	<1.0	**415**(Mn)	68	1	355	10	-	-
Magnesium	µg/L	-	-	-	92,900	121,806	19,870	347,600	<100	736,000	97,608	1	355	-	-	-
Manganese	µg/L	768 - 2,585(b)	816 - 3,394(b)	-	2.0	12	0.22	49	<0.1	212	28	5	355	-	-	-
Mercury	µg/L	0.010	-	150	<0.0005	0.0015	<0.0005	<0.005	<0.0005	<0.1(DL>Mn)	0.0047	203	353	2.0	-	-
Methyl mercury	µg/L	-	-	-	<0.00002	0.000017	<0.00002	0.000041	<0.00002	0.000051	0.000011	34	50	-	-	-
Molybdenum	µg/L	1,000	2,000	-	2.8	3.7	0.53	9.6	<0.05	41	4.8	2	355	-	-	-
Nickel	µg/L	25 - 150(b)	-	-	14	20	0.52	51	<0.5	102	18	18	355	-	-	-
Potassium	µg/L	-	-	-	3,480	3,410	1,005	5,753	<50	9,990	1,582	1	355	-	-	-
Selenium	µg/L	2.0	-	4,200	**76**(Mn)	**165**(Mn)	**3.0**(Mn)	**628**(Mn)	<0.05	**1,270**(Mn)	202	1	355	98	-	-
Silicon	µg/L	-	-	-	2,420	2,527	1,347	3,790	<100	30,700	1,736	1	355	-	-	-
Silver	µg/L	0.050 - 1.5(b)	0.10 - 3.0(b)	-	<0.01	0.011	<0.01	0.022	<0.01	0.41	0.031	331	355	-	-	-
Sodium	µg/L	-	-	-	2,130	3,096	435	10,064	<50	27,900	3,197	1	355	-	-	-
Strontium	µg/L	-	-	-	172	197	60	400	<0.2	684	98	1	355	-	-	-
Thallium	µg/L	0.80	-	-	0.025	0.032	<0.01	0.066	<0.01	0.42	0.043	73	355	-	-	-
Tin	µg/L	300	-	-	<0.1	0.062	<0.1	<0.2	<0.1	<0.5	0.029	350	355	-	-	-
Titanium	µg/L	850	-	-	<10	7.4	<10	<10	<10	511	28	344	355	-	-	-
Uranium	µg/L	8.5	33	4,000	5.6	7.8	0.80	**21**(Mn)	<0.01	**38**(Mn, Mx)	6.1	1	355	36	0.28	-
Vanadium	µg/L	120	-	-	<0.5	1.3	<0.5	2.6	<0.5	69	5.6	250	355	-	-	-
Zinc	µg/L	7.5 - 188(b)	33 - 341(b)	38 - 427(i)	7.1	13	<3.0	40	<3.0	132	16	105	355	0.56	0.28	-
Dissolved Metals																
Aluminum	µg/L	14 - 50(d)	36 - 100(d)	-	<3.0	4.8	<3.0	9.2	<1.0	**637**(Mn, Mx)	34	266	355	0.28	0.28	-
Antimony	µg/L	-	-	-	0.54	0.72	<0.1	2.0	<0.1	8.5	1.0	49	355	-	-	-
Arsenic	µg/L	-	-	-	<0.2	0.18	<0.1	0.43	<0.1	0.75	0.12	144	355	-	-	-
Barium	µg/L	-	-	-	42	61	18	165	<0.1	317	50	1	355	-	-	-
Beryllium	µg/L	-	-	-	<0.02	0.012	<0.02	<0.04	<0.02	0.17	0.0096	354	355	-	-	-
Bismuth	µg/L	-	-	-	<0.05	0.030	<0.05	<0.1	<0.05	<0.25	0.011	355	355	-	-	-
Boron	µg/L	-	-	-	19	15	<10	32	<10	50	9.5	151	355	-	-	-
Cadmium	µg/L	0.018 - 0.46(b)	0.038 - 2.8(b)	-	0.045	0.13	<0.005	**0.56**(Mn)	<0.005	**1.1**(Mn)	0.20	41	355	11	-	-
Chromium	µg/L	-	-	-	<0.1	0.085	<0.1	0.25	<0.1	0.52	0.071	298	355	-	-	-
Cobalt	µg/L	-	-	-	0.10	0.26	<0.1	1.5	<0.1	3.5	0.48	224	355	-	-	-
Copper	µg/L	0.8 - 6.1(j)	4 - 34.1(j)	-	<0.5	0.39	<0.5	0.95	<0.2	5.0	0.36	268	355	0.56	-	-
Iron	µg/L	-	350	-	<10	9.0	<10	<20	<10	**623**(Mx)	33	337	355	-	0.28	-
Lead	µg/L	-	-	-	<0.05	0.039	<0.05	<0.1	<0.05	2.0	0.11	344	355	-	-	-
Lithium	µg/L	-	-	-	44	57	4.7	197	<1.0	369	65	1	355	-	-	-
Manganese	µg/L	-	-	-	0.90	7.1	<0.1	37	<0.1	130	17	29	355	-	-	-
Mercury	µg/L	-	-	-	<0.005	0.0025	<0.005	<0.005	<0.005	0.0077	0.00034	350	353	-	-	-
Molybdenum	µg/L	-	-	-	2.8	3.6	0.52	9.4	<0.05	41	4.8	1	355	-	-	-
Nickel	µg/L	-	-	20,800	13	19	<0.5	49	<0.5	98	18	24	355	-	-	-
Selenium	µg/L	-	-	-	85	173	3.1	654	<0.05	765	203	1	355	-	-	-
Silicon	µg/L	-	-	-	2,280	2,229	1,257	3,092	<50	3,990	569	1	355	-	-	-
Silver	µg/L	-	-	-	<0.01	0.0061	<0.01	<0.02	<0.01	<0.05	0.0026	350	355	-	-	-
Strontium	µg/L	2,500	-	-	174	197	59	399	<0.2	653	98	1	355	-	-	-
Thallium	µg/L	-	-	-	0.024	0.024	<0.01	0.057	<0.01	0.073	0.016	88	355	-	-	-
Tin	µg/L	-	-	-	<0.1	0.059	<0.1	<0.2	<0.1	<0.5	0.022	355	355	-	-	-
Titanium	µg/L	-	-	-	<10	5.0	<10	<10	<10	<10	0	355	355	-	-	-
Uranium	µg/L	-	-	-	5.5	7.7	0.69	20	<0.01	25	5.7	1	355	-	-	-
Vanadium	µg/L	-	-	-	<0.5	0.42	<0.5	1.2	<0.5	5.3	0.45	313	355	-	-	-
Zinc	µg/L	-	-	-	<3.0	6.7	<1.0	27	<1.0	114	11	128	355	-	-	-
Parent PAHs																
Naphthalene	µg/L	1.1	1.0	-	<0.05	0.018	<0.02	<0.05	<0.02	<0.05	0.0087	4	4	-	-	-
Acenaphthylene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	4	4	-	-	-
Acenaphthene	µg/L	6.0	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	4	4	-	-	-
Acridine	µg/L	0.050	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	4	4	-	-	-
Fluorene	µg/L	12	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	4	4	-	-	-
Phenanthrene	µg/L	0.30	-	-	<0.02	0.013	<0.02	0.023	<0.02	0.023	0.0065	3	4	-	-	-
Anthracene	µg/L	0.10	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	4	4	-	-	-
Pyrene	µg/L	0.020	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	4	4	-	-	-
Fluoranthene	µg/L	0.20	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	4	4	-	-	-
Benzo(a)anthracene	µg/L	0.10	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	4	4	-	-	-
Chrysene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	4	4	-	-	-
Benzo(a)pyrene	µg/L	0.010	-	-	<0.005	0.0025	<0.005	<0.005	<0.005	<0.005	0	4	4	-	-	-
Benzo(g,h,i)perylene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	4	4	-	-	-
Indeno(c,d-123)pyrene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	4	4	-	-	-
Dibenzo(a,h)anthracene	µg/L	-	-	-	<0.005	0.0025	<0.005	<0.005	<0.005	<0.005	0	4	4	-	-	-
Quinoline	µg/L	3.4	-	-	<0.05	0.025	<0.05	<0.05	<0.05	<0.05	0	4	4	-	-	-
Benzo(b,j)fluoranthene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	4	4	-	-	-
Benzo(k)fluoranthene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	4	4	-	-	-
Alkylated PAHs																
1-Methylnaphthalene	µg/L	-	-	-	<0.05	0.025	<0.05	<0.05	<0.05	<0.05	0	4	4	-	-	-
2-Methylnaphthalene	µg/L	-	-	-	<0.02	0.016	<0.02	0.035	<0.02	0.035	0.013	3	4	-	-	-

Table D1. Released of Mine-Influenced Water: Comparison to Water Quality Guidelines and Acute Screening Values (all locations combined)

		Guidelines for the protection of:			Summary											
		Aquatic Life			2017 - 2019											
		30-day mean	Maximum	Values	Median	Mean	5th Percentile	95th Percentile	Min	Max	Standard Deviation	nd	Count	% Above Guideline		
														Mn	Mx	A
Speciation Of Selenium																
Dissolved dimethylseleneoxide	µg/L	-	-	-	<0.01	0.0078	<0.01	0.016	<0.01	0.016	0.0055	3	4	-	-	-
Dissolved methylseleninic acid	µg/L	-	-	-	0.027	0.036	0.024	0.077	<0.01	0.085	0.034	1	4	-	-	-
Dissolved selenite	µg/L	-	-	-	1.1	1.9	0.20	4.6	0.064	5.3	2.3	0	4	-	-	-
Dissolved selenate	µg/L	-	-	-	60	95	31	208	26	234	94	0	4	-	-	-
Dissolved selenocyanate	µg/L	-	-	-	<0.04	0.020	<0.04	<0.04	<0.04	<0.04	0	4	4	-	-	-
Dissolved selenomethionine	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	4	4	-	-	-
Dissolved selenosulphate	µg/L	-	-	-	<0.06	0.024	<0.06	<0.06	<0.01	<0.06	0.013	4	4	-	-	-
Unknown dissolved selenium species	µg/L	-	-	-	<0.06	0.030	<0.06	<0.06	<0.06	<0.06	0	4	4	-	-	-
Volatile Organics																
Extractable Petroleum Hydrocarbons (C10 - C19)	mg/L	-	-	-	<0.25	0.13	<0.25	<0.25	<0.25	<0.25	0	42	42	-	-	-
Extractable Petroleum Hydrocarbons (C19 - C32)	mg/L	-	-	-	<0.25	0.13	<0.25	<0.25	<0.25	0.51	0.059	41	42	-	-	-
Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C	mg/L	-	-	-	<0.5	0.26	<0.5	<0.5	<0.5	0.51	0.041	40	41	-	-	-
Total Extractable Hydrocarbons (TEH 10 - 30)	mg/L	-	-	-	<0.25	0.14	<0.25	<0.25	<0.25	0.65	0.083	39	40	-	-	-
Bacterial																
Microcystin	µg/L	-	-	-	<0.2	0.10	<0.2	<0.2	<0.2	<0.2	0	3	3	-	-	-

Notes:

[a] = guideline is a minimum value, unless the background concentration or value is lower. For dissolved oxygen, the lower end of the range applies when embryo/alevin life stages are present (May 15 to August. 31), whereas the upper end of the range applies for all other life stages. For alkalinity, this applies unless the background concentration or value is lower..

[b] = guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (113 to 2,870 mg/L [one value of <0.5 mg/L was also recorded]). The guideline is calculated based on the individual hardness value for each sample.

[c] = for some samples, water hardness was greater than 250 mg/L. At this hardness, no BC ENV water quality guideline has been established for sulphate; however, the observed data were screened against the guideline for very hard water (i.e., 429 mg/L) for comparative purposes.

[d] = guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7 to 9.1). The guideline is calculated based on the individual pH for each sample.

[e] = guideline is chloride dependent. The guideline range shown is based on the chloride concentration range observed in the dataset (0.5 to 52.4 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

[f] = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (0.13 mg-N/L) is based on the combination of field pH (9.1) and water temperature (0.5°C). Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.

[g] = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (0.70 mg-N/L) is based on the combination of field pH (9.1) and water temperature (0.5°C). Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.

[h] = guideline is for chromium VI.

[i] = long-term WQG or screening value is hardness and DOC dependent. The range shown is based on the hardness range observed in the dataset (113 to 2,870 mg/L [one value of <0.5 mg/L was also recorded])and DOC range observed in the dataset (<0.5 to 9.5 mg/L). The screening value is based on DOC and hardness measured in each sample.

[j] = guideline calculated using the simplified Biotic Ligand Model. The guideline range shown is based on the toxicity-modifying factors for samples with copper concentrations above the detection limit.

[Mn] = concentration is higher than the 30-day mean BC ENV guideline or outside the recommended pH, DO or total alkalinity range.

[Mx] = concentration is higher than the maximum BC ENV guideline or outside the recommended pH, DO or total alkalinity range.

[A] = concentration is higher than the acute screening values guideline

[DL>Mn] = analytical detection limit is higher than the 30-day mean BC ENV guideline.

Bolded concentrations are higher than water quality guidelines.

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

- = no guideline or no data.

Source for water quality guidelines is provided in Appendix A, Table A1.

Table D2: Acute Toxicity Test Results for Rainbow Trout (September 2017 to September 2019)

Station	Sample Date	Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality	Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed
		%	%
FR_PP1	December 3, 2018	0	0
	March 18, 2019	0	0
	March 20, 2019	0	0
	March 21, 2019	0	0
	March 22, 2019	0	0
	March 24, 2019	0	0
	April 2, 2019	0	0
	August 13, 2019	0	0
FR_CC1	November 20, 2017	0	0
	January 17, 2018	0	0
	June 4, 2018	0	0
	July 3, 2018	0	0
	October 5, 2018	0	0
	January 2, 2019	0	0
	February 12, 2019	0	0
	April 2, 2019	0	0
	August 13, 2019	0	0
FR_LMP1	November 20, 2017	0	0
	January 10, 2018	0	0
	April 26, 2018	0	0
	April 28, 2018	0	0
	April 29, 2018	0	0
	April 30, 2018	0	0
	May 3, 2018	0	0
	July 4, 2018	0	0
	October 3, 2018	0	0
	December 10, 2018	0	0
	January 8, 2019	0	0
	April 4, 2019	0	0
	September 5, 2019	0	10
FR_EC1	November 28, 2017	0	0
	March 28, 2018	0	0
	June 5, 2018	0	0
	July 4, 2018	0	0
	November 29, 2018	0	0
FR_LP1	September 25, 2017	0	0
	November 20, 2017	0	0
	January 17, 2018	0	0
	June 5, 2018	0	0
	July 4, 2018	0	0
	October 3, 2018	0	0
	March 20, 2019	0	0
	April 4, 2019	0	0
	August 13, 2019	0	0
FR_NL1	November 27, 2017	0	0
	March 13, 2018	0	0
	July 13, 2018	0	0
	June 22, 2019	0	0
FR_SP1	November 20, 2017	0	0
	January 22, 2018	0	0
	June 7, 2018	0	0
	July 4, 2018	0	0
	October 3, 2018	0	0
	February 4, 2019	0	0
	April 2, 2019	10	0
	August 13, 2019	0	0

Table D2: Acute Toxicity Test Results for Rainbow Trout (September 2017 to September 2019)

Station	Sample Date	Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality	Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed
		%	%
FR_SKP1	May 3, 2018	0	0
	July 5, 2018	0	0
	August 30, 2018	0	0
	September 4, 2018	0	0
	September 5, 2018	0	0
	January 9, 2019	0	0
	April 29, 2019	0	0
FR_SKP2	May 23, 2018	0	0
GH_SC1	November 1, 2017	0	0
	March 19, 2018	0	0
	June 4, 2018	0	0
	July 5, 2018	0	0
	October 4, 2018	0	0
	February 27, 2019	10	10
	April 3, 2019	20	0
	July 2, 2019	10	0
	September 21, 2019	0	0
GH_CC1	November 1, 2017	0	0
	January 9, 2018	0	0
	June 4, 2018	0	0
	July 5, 2018	0	0
	October 4, 2018	0	0
	January 21, 2019	0	0
	April 3, 2019	10	0
	July 2, 2019	0	0
GH_PC1	November 1, 2017	10	0
	January 9, 2018	0	0
	June 4, 2018	0	0
	July 5, 2018	0	0
	October 4, 2018	0	0
	February 25, 2019	10	10
	April 3, 2019	10	0
	July 2, 2019	0	0
GH_GH1	October 4, 2017	0	0
	January 2, 2018	0	0
	May 3, 2018	0	0
	July 3, 2018	0	0
	July 12, 2018	0	0
	October 1, 2018	0	0
	January 3, 2019	0	0
	March 19, 2019	0	0
	March 27, 2019	0	0
	April 3, 2019	0	0
	April 8, 2019	0	0
	July 3, 2019	0	0
	July 4, 2019	0	0
	July 8, 2019	0	0
	July 14, 2019	0	0

Notes: stations are generally ordered from upstream to downstream. % = percent

Response greater than 10% is highlighted.

APPENDIX E

Screening Results (Fish Accessible Waters)

Table E1. Fish Accessible Water: Comparison to Water Quality Guidelines and Chronic Screening Values (Full Dataset)

Parameter	Unit	Guidelines for the protection of:			Summary											
		Aquatic Life			September 2017 - September 2019									% Above		
		Long-Term	Short-Term	L1 Benchmark or Screening Value	Median	Mean	5th Percentile	95th Percentile	Min	Max	Standard Deviation	nd	Count	LT	ST	L1
Field Measured																
										9.2(Mn, Mx)	0.30	0	1,564	0.19	0.19	-
Temperature	°C	-	-	-	4.7	5.1	0	12	-0.3	19	3.9	0	1,564	-	-	-
Dissolved oxygen	mg/L	8.0 - 11 (a)	5.0 - 9.0 (a)	6.0 - 9.0 (a)	11	11	8.3	13	**1.7**(Mn, Mx)	1,060	27	0	1,562	29	6	6
Turbidity	NTU	-	-	-	1.4	8.0	0.010	16	0	1,958	93	0	440	-	-	-
Conductivity	µS/cm	-	-	-	823	890	216	2,087	0.42	3,307	596	0	1,255	-	-	-
Conductivity	µS/cm at 25 C	-	-	-	849	-	849	849	-	-	-	0	1	-	-	-
Conductivity	µS/cmA	-	-	-	1,258	1,049	619	1,333	548	1,341	436	0	3	-	-	-
Specific conductivity (temperature corrected at 25 °c)	µS/cm	-	-	-	970	970	967	972	967	972	3.5	0	2	-	-	-
Specific conductivity (temperature corrected at 25																
Oxidation-reduction potential	mV	-	-	-	201	201	86	307	0.40	2,123	84	25	1,476	-	-	-
Dissolved oxygen	%	-	-	-	84	84	65	105	2.9	865	23	0	1,556	-	-	-
Total suspended solids	mg/L	-	-	-	28	31	16	50	14	56	14	0	6	-	-	-
Conventional Parameters																
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.3	8.3	8.0	8.5	**5.4**(Mn, Mx)							
Hardness, as $CaCO_3$	mg/L	-	-	-	435	531	150	1,245	<0.5	2,800	413	2	1,252	-	-	-
Total alkalinity, as $CaCO_3$	mg/L	20(a)	-	-	193	198	114	323	<1.0(DL>MAC)							
								1,745(BM)	<10	**3,670**(BM)	574	2	1,251	-	-	16
Total suspended solids	mg/L	-	-	-	1.1	37	<1.0	16	<1.0	46,200	1,195	677	1,503	-	-	-
Total organic carbon	mg/L	-	-	-	1.1	1.4	<0.5	3.6	<0.5	16	1.2	110	1,248	-	-	-
Dissolved organic carbon	mg/L	-	-	-	1.0	1.3	<0.5	3.1	<0.5	15	0.99	127	1,248	-	-	-
Colour	TCU	-	-	-	7.2	7.1	<5.0	14	<5.0	16	5.4	2	5	-	-	-
Turbidity	NTU	-	-	-	0.53	3.1	0.15	11	<0.1	1,100	29	15	1,498	-	-	-
Conductivity	µmhos/cm	-	-	-	458	476	360	604	349	620	136	0	3	-	-	-
Conductivity	µS/cm	-	-	-	768	884	274	1,970	<2.0	3,480	578	3	1,250	-	-	-
Oxidation-reduction potential	mV	-	-	-	358	356	237	464	151	565	75	0	1,251	-	-	-
Acidity, $CaCO_3$	mg/L	-	-	-	<1.0	1.6	<1.0	6.8	<1.0	19	2.5	855	1,251	-	-	-
Phenolphthalein alkalinity	mg/L	-	-	-	<2.0	1.0	<2.0	<2.0	<2.0	<2.0	0	3	3	-	-	-
Bicarbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	187	193	112	321	<1.0	439	64	7	1,224	-	-	-
Carbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	4.5	<1.0	16	<1.0	35	5.5	615	1,224	-	-	-
Hydroxide alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	0.97	<1.0	<1.0	<1.0	248	9.7	1,221	1,224	-	-	-
Hydroxide	mg/L	-	-	-	<0.34	0.17	<0.34	<0.34	<0.34	<0.34	0	3	3	-	-	-
Major Ions																
Bicarbonate	mg/L	-	-	-	66	82	38	136	35	144	56	0	3	-	-	-
Bromide	mg/L	-	-	7.8	<0.05	0.062	<0.05	<0.25	<0.05	<0.5	0.055	1,229	1,253	-	-	-
Calcium	mg/L	-	-	-	101	114	40	256	<0.05	456	73	2	1,245	-	-	-
Carbonate	mg/L	-	-	-	<0.6	0.30	<0.6	<0.6	<0.6	<0.6	0	3	3	-	-	-
Chloride	mg/L	150	600	-	1.4	1.3	<0.5	3.3	0.12	50	1.8	669	1,253	-	-	-
Fluoride	mg/L	0.12	0.40 - 2.7(b)	-	**0.17**(Mn)	**0.18**(Mn)	<0.1	**0.31**(Mn)	<0.02	**0.44**(Mn)	0.066	48	1,253	82	-	-
Magnesium	mg/L	-	-	-	44	60	11	159	<0.1	418	58	2	1,245	-	-	-
Potassium	mg/L	-	-	-	1.4	1.7	0.32	4.4	<0.05	7.8	1.2	3	1,245	-	-	-
Sodium	mg/L	-	-	-	1.6	1.8	0.49	3.3	<0.05	31	1.3	2	1,245	-	-	-
Sulphate	mg/L	128 - 429(b, c)	-	499	204	289	16	**861**(Mn, BM)	<0.3	**2,070**(Mn, BM)	329	3	1,253	17	-	15
Sulphide	mg/L	0.0019 - 0.17(d)	-	-	<0.0015	0.0012	<0.0015	0.0028	<0.0015	0.020	0.0021	231	241	-	-	-
Hydrogen sulphide	mg/L	-	-	-	<0.0016	0.0013										
Nutrients and Biological Indicators																
				3.0 - 22(b)	**7.9**(Mn)	**13**(Mn)	0.070	**42**(Mn, Mx, BM)	<0.005	**150**(Mn, Mx, BM)	17	13	1,254	75	6.0	12
		0.020 - 0.20(e)	0.06 - 0.60(e)	0.039 - 1.1(e)	<0.005	0.0067	<0.001	**0.022**(Mn)	<0.001	**0.11**(Mn, Mx, BM)	0.010	330	1,253	5.0	0.6	1.4
		0.13 - 2.1(f)	0.69 - 29(g)	-	0.011	0.019	<0.005	0.055	<0.005	1.2	0.044	231	1,253	-	-	-
Total Kjeldahl nitrogen	mg-N/L	-	-	-	0.20	0.24	<0.05	0.59	<0.05	2.6	0.23	348	1,247	-	-	-
Total phosphorus	mg-P/L	-	-	-	0.0032	0.0068	0.0015	0.025	<0.001	0.15	0.012	232	1,254	-	-	-
Biochemical oxygen demand	mg/L	-	-	-	<2.0	1.0	<2.0	<2.0	<2.0	<2.0	0	8	8	-	-	-
Total ortho-phosphate	mg-P/l	-	-	-	0.0011	0.0022	<0.001	0.0075	<0.001	0.053	0.0036	594	1,252	-	-	-
Total Metals																
Aluminum	µg/L	-	-	-	6.4	35	<3.0	165	<3.0	1,560	112	289	1,251	-	-	-
Antimony	µg/L	9.0	-	-	0.16	0.24	<0.1	0.77	<0.1	1.8	0.25	362	1,251	-	-	-
Arsenic	µg/L	-	5.0	-	0.13	0.15	<0.1	0.30	<0.1	2.3	0.11	343	1,251	-	-	-
Barium	µg/L	1,000	-	-	72	79	20	196	<0.1	262	48	2	1,251	-	-	-
Beryllium	µg/L	0.13	-	-	<0.02	0.012	<0.02	<0.04	<0.02	0.11	0.0068	1,213	1,250	-	-	-
Bismuth	µg/L	0.50	-	-	<0.05	0.027	<0.05	<0.1	<0.05	<0.25	0.0082	1,251	1,251	-	-	-
Boron	µg/L	1,200	29,000	-	<10	8.3	<10	22	<10	<50	5.5	860	1,251	-	-	-
Cadmium	µg/L	-	-	-	0.034	0.080	0.0085	0.40	<0.005	1.3	0.15	25	1,251	-	-	-
Calcium	µg/L	-	-	-	100,000	113,784	38,850	259,000	<50	450,000	74,006	2	1,251	-	-	-
Cesium	µg/L	-	-	-	0.030	-	0.030	0.030	-	-	-	0	1	-	-	-

Table E1. Fish Accessible Water: Comparison to Water Quality Guidelines and Chronic Screening Values (Full Dataset)

Parameter	Unit	Guidelines for the protection of:			Summary											
		Aquatic Life			September 2017 - September 2019									% Above		
		Long-Term	Short-Term	L1 Benchmark or Screening Value	Median	Mean	5th Percentile	95th Percentile	Min	Max	Standard Deviation	nd	Count	LT	ST	L1
Chromium	µg/L	1.0[(h)]	-	10	0.17	0.21	<0.1	0.60	<0.1	**2.9**[(Mn)]	0.24	284	1,251	2.0	-	-
Cobalt	µg/L	4.0	110	-	<0.1	0.10	<0.1	0.33	<0.1	1.0	0.11	865	1,251	-	-	-
Copper	µg/L	-	-	-	<0.5	0.47	<0.5	<1.0	<0.5	134	3.8	1,121	1,251	-	-	-
Iron	µg/L	422 - 6,615[(d)]	1,000	-	16	50	<10	222	<10	**2,000**[(Mn, Mx)]	141	467	1,251	0.16	0.4	-
Lead	µg/L	20[(b)]	3.0 - 417[(b)]	-	<0.05	0.060	<0.05	0.22	<0.05	5.6	0.19	1,067	1,251	-	-	-
Lithium	µg/L	122	-	253	18	29	1.6	77	<1.0	**415**[(Mn, BM)]	41	27	1,251	3.0	-	1.0
Magnesium	µg/L	-	-	-	43,300	59,547	11,500	161,000	<100	386,000	57,865	2	1,251	-	-	-
Manganese	µg/L	768 - 2,585[(b)]	816 - 3,394[(b)]	-	2.5	5.9	0.24	23	<0.1	293	13	24	1,251	-	-	-
						0.00074	<0.0005	<0.005	<0.0005	<0.025[(DL>Mn)]	0.0011	854	1,250	0.24	-	-
Methyl mercury	µg/L	-	-	-	<0.00002	0.000021	<0.00002	<0.00005	<0.00002	<0.0008	0.000045	132	158	-	-	-
Molybdenum	µg/L	1,000	2,000	-	1.1	1.6	0.54	4.9	<0.05	31	1.9	3	1,251	-	-	-
Nickel	µg/L	25 - 150[(b)]	-	51 - 271[(d, b)]	1.7	6.3	<0.5	38	<0.5	102	11	254	1,251	-	-	-
Rubidium	µg/L	-	-	-	0.63	-	0.63	0.63	-	-	-	0	1	-	-	-
Selenium	µg/L	2.0	-	70	**45**[(Mn)]	**73**[(Mn, BM)]	0.66	**219**[(Mn, BM)]	<0.05	**720**[(Mn, BM)]	0.11	2	1,253	88	-	30
Silicon	µg/L	-	-	-	2,050	2,106	1,390	2,990	<100	5,720	526	2	1,251	-	-	-
Silver	µg/L	0.050 - 1.5[(b)]	0.10 - 3.0[(b)]						.01	<0.05	0.0037	1,207	1,251	-	-	-
								345	<50	29,200	1,316	2	1,251	-	-	-
Strontium	µg/L	-	-	-	144	145	62	247	<0.2	503	61	2	1,251	-	-	-
Sulphur	µg/L	-	-	-	33,300	-	33,300	33,300	-	-	-	0	1	-	-	-
Tellurium	µg/L	25	-	-	<0.2	-	<0.2	<0.2	-	-	-	1	1	-	-	-
Thallium	µg/L	0.80	-	-	<0.01	0.0098	<0.01	0.035	<0.01	0.26	0.012	967	1,251	-	-	-
Thorium	µg/L	-	-	-	<0.1	-	<0.1	<0.1	-	-	-	1	1	-	-	-
Tin	µg/L	300	-	-	<0.1	0.056	<0.1	<0.2	<0.1	1.1	0.041	1,239	1,251	-	-	-
Titanium	µg/L	850	-	-	<10	5.1	<10	<10	1.8	<51	1.4	1,245	1,251	-	-	-
Tungsten	µg/L	-	-	-	<0.1	-	<0.1	<0.1	-	-	-	1	1	-	-	-
Uranium	µg/L	8.5	33	352	2.4	3.5	0.47	**11**[(Mn)]	<0.01	**25**[(Mn)]	3.8	2	1,251	10	-	-
Vanadium	µg/L	120	-	-	<0.5	0.44	<0.5	1.2	<0.5	7.5	0.55	1,009	1,251	-	-	-
Zinc	µg/L	7.5 - 188	33 - 341	-	<3.0	3.9	<3.0	16	<3.0	91	6.4	934	1,251	-	-	-
Zirconium	µg/L	-	-	-	0.11	-	0.11	0.11	-	-	-	0	1	-	-	-
Dissolved Metals																
Aluminum	µg/L	9.6 - 50[(d)]	29 - 100[(d)]	-	<3.0	3.0	<3.0	5.2	<1.0	**329**[(Mn, Mx)]	14	1,094	1,243	0.48	0.48	-
Antimony	µg/L	-	-	-	0.15	0.23	<0.1	0.75	<0.1	1.8	0.25	445	1,243	-	-	-
Arsenic	µg/L	-	-	-	<0.1	0.096	<0.1	0.22	<0.1	1.7	0.079	777	1,243	-	-	-
Barium	µg/L	-	-	-	73	81	20	198	<0.1	261	49	2	1,242	-	-	-
Beryllium	µg/L	-	-	-	<0.02	0.011	<0.02	<0.04	<0.02	<0.1	0.0038	1,247	1,249	-	-	-
								0.1	<0.05	<0.25	0.0092	1,243	1,243	-	-	-
Boron	µg/L	-	-	-	<10	7.9	<10	22	<10	<50	5.3	910	1,243	-	-	-
Cadmium	µg/L	0.018 - 0.46[(b)]	0.038 - 2.8[(b)]	0.026 - 1.0[(b)]						**1.1**[(Mn, BM)]	0.11	109	1,243	3.0	-	0.08
Chromium	µg/L	-	-	-	<0.1	0.086	<0.1	0.20	<0.1	0.60	0.058	834	1,243	-	-	-
Cobalt	µg/L	-	-	-	<0.1	0.081	<0.1	0.22	<0.1	1.0	0.080	993	1,243	-	-	-
Copper	µg/L	0.0004 - 0.0059 [(i)]	0.0026 - 0.035 [(i)]	-	<0.5	0.27	<0.5	<0.5	<0.2	1.2	0.090	1,189	1,243	0.08	-	-
Iron	µg/L	-	350	-	<10	7.4	<10	<20	<10	**611**[(Mx)]	26	1,195	1,243	-	0.24	-
Lead	µg/L	-	-	-	<0.05	0.029	<0.05	<0.1	<0.05	0.60	0.029	1,233	1,243	-	-	-
Lithium	µg/L	-	-	-	18	28	1.6	76	<1.0	369	40	31	1,243	-	-	-
Manganese	µg/L	-	-	-	0.98	3.0	<0.1	13	<0.1	224	8.1	119	1,243	-	-	-
								.005	<0.005	<0.025	0.00054	1,241	1,247	-	-	-
Molybdenum	µg/L	-	-	-	1.1	1.7	0.54	4.9	<0.05	42	2.5	2	1,243	-	-	-
Nickel	µg/L	-	-	-	1.5	6.1	<0.5	38	<0.5	98	11	311	1,243	-	-	-
Selenium	µg/L	-	-	-	48	78	0.69	248	<0.05	798	0.12	2	1,245	-	-	-
Silicon	µg/L	-	-	-	1,950	2,003	1,331	2,848	<50	4,270	487	2	1,243	-	-	-
Silver	µg/L	-	-	-	<0.01	0.0054	<0.01	<0.02	<0.01	<0.05	0.0019	1,238	1,243	-	-	-
Strontium	µg/L	2,500	-	-	145	147	62	253	<0.2	497	62	2	1,243	-	-	-
Thallium	µg/L	-	-	-	<0.01	0.0087	<0.01	0.034	<0.01	0.057	0.0089	1,025	1,243	-	-	-
Tin	µg/L	-	-	-	<0.1	0.054	<0.1	<0.2	<0.1	<0.5	0.019	1,242	1,243	-	-	-
Titanium	µg/L	-	-	-	<10	5.0	<10	<10	<10	<10	0	1,243	1,243	-	-	-
Uranium	µg/L	-	-	-	2.3	3.5	0.48	11	<0.01	23	3.7	2	1,243	-	-	-
Vanadium	µg/L	-	-	-	<0.5	0.29	<0.5	<1.0	<0.5	<2.5	0.13	1,190	1,243	-	-	-
Zinc	µg/L	-	-	-	1.0	2.0	<1.0	7.2	<1.0	45	4.4	878	1,243	-	-	-
Parent PAHs																
Naphthalene	µg/L	-	1.0	-	<0.02	0.017	<0.02	<0.05	<0.02	<0.05	0.0078	13	13	-	-	-
Acenaphthylene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	13	13	-	-	-
Acenaphthene	µg/L	6.0	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	13	13	-	-	-
Acridine	µg/L	0.050	-	-	<0.01	0.0054	<0.01	<0.02	<0.01	<0.02	0.0014	13	13	-	-	-

Table E1. Fish Accessible Water: Comparison to Water Quality Guidelines and Chronic Screening Values (Full Dataset)

Parameter	Unit	Guidelines for the protection of:			Summary											
		Aquatic Life			September 2017 - September 2019											
		Long-Term	Short-Term	L1 Benchmark or Screening Value	Median	Mean	5th Percentile	95th Percentile	Min	Max	Standard Deviation	nd	Count	% Above		
														LT	ST	L1
Fluorene	µg/L	12	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	13	13	-	-	-
Phenanthrene	µg/L	0.30	-	-	<0.02	0.011	<0.02	0.023	<0.02	0.023	0.0036	12	13	-	-	-
Anthracene	µg/L	0.10	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	13	13	-	-	-
Pyrene	µg/L	0.020	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	13	13	-	-	-
Fluoranthene	µg/L	0.20	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	13	13	-	-	-
Benzo(a)anthracene	µg/L	0.10	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	13	13	-	-	-
Chrysene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	13	13	-	-	-
Benzo(a)pyrene	µg/L	0.010	-	-	<0.005	0.0025	<0.005	<0.005	<0.005	<0.005	0	13	13	-	-	-
Benzo(g,h,i)perylene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	13	13	-	-	-
Indeno(c,d-123)pyrene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	13	13	-	-	-
Dibenzo(a,h)anthracene	µg/L	-	-	-	<0.005	0.0025	<0.005	<0.005	<0.005	<0.005	0	13	13	-	-	-
Quinoline	µg/L	3.4	-	-	<0.05	0.025	<0.05	<0.05	<0.05	<0.05	0	13	13	-	-	-
Benzo(b,j)fluoranthene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	13	13	-	-	-
Benzo(k)fluoranthene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	13	13	-	-	-
Alkylated PAHs																
1-Methylnaphthalene	µg/L	-	-	-	<0.05	0.025	<0.05	<0.05	<0.05	<0.05	0	13	13	-	-	-
2-Methylnaphthalene	µg/L	-	-	-	<0.02	0.012	<0.02	0.035	<0.02	0.035	0.0069	12	13	-	-	-
Speciation Of Selenium																
Dissolved dimethylseleneoxide	µg/L	-	-	-	<0.01	0.0051	<0.005	<0.01	<0.005	0.016	0.0019	69	73	-	-	-
Dissolved methylseleninic acid	µg/L	-	-	-	<0.01	0.011	0.0080	0.022	<0.005	0.11	0.016	42	73	-	-	-
Dissolved selenite	µg/L	-	-	-	0.17	0.23	0.059	0.75	<0.05	1.2	0.21	4	73	-	-	-
Dissolved selenate	µg/L	-	-	-	27	59	6.7	236	0.25	578	103	0	73	-	-	-
Dissolved selenocyanate	µg/L	-	-	-	<0.04	0.018	<0.015	<0.04	<0.015	<0.04	0.0043	73	73	-	-	-
Dissolved selenomethionine	µg/L	-	-	-	<0.01	0.0047	<0.005	<0.01	<0.005	<0.01	0.00087	73	73	-	-	-
Dissolved selenosulphate	µg/L	-	-	-	<0.06	0.026	<0.015	<0.06	<0.01	<0.06	0.0086	73	73	-	-	-
Unknown dissolved selenium species	µg/L	-	-	-	<0.06	0.027	<0.015	<0.06	<0.015	<0.06	0.0078	73	73	-	-	-
Volatile Organics																
Extractable Petroleum Hydrocarbons (C19 - C32)	mg/L	-	-	-	<0.25	0.13	<0.25	<0.25	<0.25	<0.25	0	66	66	-	-	-
Sum of Extractable Petroleum Hydrocarbons (C10 - C19 a	mg/L	-	-	-	<0.5	0.25	<0.5	<0.5	<0.5	<0.5	0	66	66	-	-	-
Total Extractable Hydrocarbons (TEH 10 - 30)	mg/L	-	-	-	<0.25	0.13	<0.25	<0.25	<0.25	<0.25	0	65	65	-	-	-
Bacterial																
Microcystin	µg/L	-	-	-	<0.2	0.10	<0.2	<0.2	<0.2	<0.2	0	3	3	-	-	-

Notes:

(a) = guideline is a minimum value. For alkalinity, this applies unless the background concentration or value is lower. For dissolved oxygen, guideline and L1 exceedance was calculated assuming that the embryo/alevin guideline applies from May 15 to August 31.

(b)

(c) = for some samples, water hardness was greater than 250 mg/L. At this hardness, no BC ENV water quality guideline has been established for sulphate; however, the observed data were screened against the guideline for very hard water (i.e., 429 mg/L) for comparative purposes.

(d) = guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (5.4 to 9.2). The guideline is calculated based on the individual pH for each sample.

(e) = guideline is chloride dependent. The guideline range shown is based on the chloride concentration range observed in the dataset (2.5 to 49.5 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(f) = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (0.13 mg-N/L) is based on the combination of field pH (9.2) and water temperature (3.9°C). Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.

(g) = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (0.69 mg-N/L) is based on the combination of field pH (9.2) and water temperature (3.9°C). Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.

(h) = guideline is for chromium VI.

(j) = guideline calculated using the Biotic Ligand Model. The guideline range shown is based on the toxicity-modifying factors for each sample with copper concentrations above the detection limit.

(Mn) = concentration is higher than the 30-day mean BC ENV guideline or outside the recommended pH, DO or total alkalinity range.

(Mx)

(BM) = concentration is higher than the L1 benchmark or screening value.

(DL>Mn) = analytical detection limit is higher than the 30-day mean BC ENV guideline.

Bolded concentrations are higher than water quality guidelines.

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

- = no guideline or no data.

Guideline sources are provided in Appendix A, Table A1.

Table E2. Fish Accessible Water: Comparison to Water Quality Guidelines and Chronic Screening Values (25 Stations in Refined Assessment)

Parameter	Unit	Guidelines for the protection of:			Summary											
		Aquatic Life		L1 Benchmarks or Screening Values	September 2017 - September 2019									% Above		
		Long-Term	Short-Term		Median	Mean	5th Percentile	95th Percentile	Min	Max	Standard Deviation	nd	Count	LT	ST	L1
Field Measured																
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.2	7.7	8.5	6.7	**9.2**(Mn, Mx)	0.27	0	1,078	0.19	0.19	-
Dissolved oxygen	mg/L	8.0 - 11 (a)	5.0 - 9.0 (a)	6.0 - 9.0 (a)	11	11	8.5	13	**2.7**(Mn, Mx)	17	1.3	0	1,075	29	5	5
Specific conductivity (temperature																
Specific conductivity (temperature	µS/cm at 25 C	-	-	-	451	521	281	922	35	1,356	217	0	131	-	-	-
Conventional Parameters																
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.3	8.3	8.0	8.5	**5.4**(Mn, Mx)							
Hardness, as $CaCO_3$	mg/L	-	-	-	419	527	141	1,372	<0.5	2,800	450	1	878	-	-	-
Total alkalinity, as $CaCO_3$	mg/L	20(d)	-	-	191	193	112	303	<1.0(DL>MDL)							
Total dissolved solids	mg/L	-	-	1,000	540	685	161	**1,884**(BM)	<10	**3,670**(BM)	623	1	877	-	-	15
Acidity, $CaCO_3$	mg/L	-	-	-	<1.0	1.6	<1.0	7.7	<1.0	19	2.6	593	877	-	-	-
Bicarbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	184	189	110	302	<1.0	431	62	4	856	-	-	-
Carbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	4.3	<1.0	16	<1.0	35	5.1	435	856	-	-	-
Hydroxide alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	0.97	<1.0	<1.0	<1.0	248	10	854	856	-	-	-
Major Ions																
Fluoride	mg/L	0.12	0.40 - 2.7(b)	-	**0.17**(Mn)	**0.17**(Mn)	<0.1	**0.30**(Mn)	<0.02	**0.44**(Mn)	0.067	39	878	79	-	-
Sulphate	mg/L	128 - 429(b, c)	-	499	199	289	16	**881**(Mn, BM)	<0.3	**2,070**(Mn, BM)	360	1	878	17	-	14
Sulphide	mg/L	0.0019 - 0.17(d)	-	-	<0.0015	0.0013	<0.0015	0.0028	<0.0015	0.020	0.0022	181	190	-	-	-
Nutrients and Biological Indicators																
Nitrate	mg-N/L	3.0	32.8	3.0 - 22(b)	**8.0**(Mn)	**13**(Mn)	0.062	**49**(Mn, Mx, BM)	<0.005	**112**(Mn, Mx, BM)	17	10	879	74	6.0	13
Nitrite	mg-N/L	0.020 - 0.20(e)	0.060 - 0.60(e)	0.039 - 0.35(e)	<0.005	0.0067	<0.001	0.022	<0.001	**0.11**(Mn, BM)	0.011	261	878	5.2	0.91	1.9
Total ammonia	mg-N/L	0.13 - 2.1(f)	0.69 - 29(g)	-	0.011	0.019	<0.005	0.050	<0.005	1.2	0.049	151	878	-	-	-
Total Metals																
Barium	µg/L	1,000	-	-	72	81	19	205	<0.1	262	52	1	878	-	-	-
Beryllium	µg/L	0.13	-	-	<0.02	0.012	<0.02	<0.04	<0.02	0.11	0.0065	853	877	-	-	-
Bismuth	µg/L	0.50	-	-	<0.05	0.027	<0.05	<0.1	<0.05	<0.25	0.0073	878	878	-	-	-
Boron	µg/L	1,200	29,000	-	<10	7.9	<10	20	<10	<50	5.0	627	878	-	-	-
Cadmium	µg/L	-	-	-	0.036	0.086	0.0081	0.51	<0.005	1.3	0.17	19	878	-	-	-
Calcium	µg/L	-	-	-	96,700	112,831	37,900	285,300	<50	450,000	79,932	1	878	-	-	-
Cesium	µg/L	-	-	-	0.030	-	0.030	0.030	-	-	-	0	1	-	-	-

Table E2. Fish Accessible Water: Comparison to Water Quality Guidelines and Chronic Screening Values (25 Stations in Refined Assessment)

Parameter	Unit	Guidelines for the protection of:			Summary											
		Aquatic Life		L1 Benchmarks or Screening Values	September 2017 - September 2019									% Above		
		Long-Term	Short-Term		Median	Mean	5th Percentile	95th Percentile	Min	Max	Standard Deviation	nd	Count	LT	ST	L1
Chromium	µg/L	1.0[(h)]	-	10	0.17	0.22	<0.1	0.62	<0.1	**2.9**[(Mn)]	0.26	185	878	2.0	-	-
Cobalt	µg/L	4.0	110	-	<0.1	0.11	<0.1	0.33	<0.1	1.0	0.11	601	878	-	-	-
Copper	µg/L	-	-	-	<0.5	0.38	<0.5	<1.0	<0.5	16	0.66	780	878	-	-	-
Iron	µg/L	422 - 3,779[(d)]	1,000	-	18	51	<10	212	<10	**2,000**[(Mn, Mx)]	143	310	878	0.23	0.34	-
Lead	µg/L	20[(b)]	3.0 - 417[(b)]	-	<0.05	0.056	<0.05	0.20	<0.05	1.9	0.12	749	878	-	-	-
Lithium	µg/L	122	-	253	17	28	1.4	80	<1.0	**302**[(Mn, BM)]	38	25	878	3.0	-	0.57
Magnesium	µg/L	-	-	-	42,050	59,033	10,500	169,150	<100	386,000	62,810	1	878	-	-	-
Manganese	µg/L	768 - 2,585[(b)]	816 - 3,394[(b)]	-	2.7	5.9	0.24	24	<0.1	97	8.7	19	878	-	-	-
Mercury	µg/L	0.010	-	-	<0.0005	0.00064	<0.0005	0.0024	<0.0005	0.0093	0.00093	579	874	-	-	-
Methyl mercury	µg/L	-	-	-	<0.00002	0.000019	<0.00002	<0.00005	<0.00002	<0.0008	0.000036	112	134	-	-	-
Molybdenum	µg/L	1,000	2,000	-	1.2	1.5	0.55	3.6	<0.05	21	1.3	1	878	-	-	-
Nickel	µg/L	25 - 150[(b)]	-	49 - 263[(d, b)]	1.6	6.5	<0.5	41	<0.5	58	12	192	878	-	-	-
Potassium	µg/L	-	-	-	1,330	1,589	289	4,435	<50	5,750	1,150	2	878	-	-	-
Rubidium	µg/L	-	-	-	0.63	-	0.63	0.63	-	-	-	0	1	-	-	-
Selenium	µg/L	2.0	-	70	**45**[(Mn)]	**78**[(Mn, BM)]	0.63	**280**[(Mn, BM)]	<0.05	**720**[(Mn, BM)]	125	1	879	85	-	30
Silicon	µg/L	-	-	-	2,040	2,081	1,349	2,873	<100	5,720	516	1	878	-	-	-
Silver	µg/L	0.050 - 1.5[(b)]	0.10 - 3.0[(b)]	-	<0.01	0.0060	<0.01	<0.02	<0.01	<0.05	0.0038	846	878	-	-	-
Sodium	µg/L	-	-	-	1,565	1,717	489	3,202	<50	6,080	944	1	878	-	-	-
Strontium	µg/L	-	-	-	140	141	62	248	<0.2	396	59	1	878	-	-	-
Sulphur	µg/L	-	-	-	33,300	-	33,300	33,300	-	-	-	0	1	-	-	-
Tellurium	µg/L	25	-	-	<0.2	-	<0.2	<0.2	-	-	-	1	1	-	-	-
Thallium	µg/L	0.80	-	-	<0.01	0.010	<0.01	0.037	<0.01	0.26	0.013	678	878	-	-	-
Thorium	µg/L	-	-	-	<0.1	-	<0.1	<0.1	-	-	-	1	1	-	-	-
Tin	µg/L	300	-	-	<0.1	0.057	<0.1	<0.2	<0.1	1.1	0.046	869	878	-	-	-
Titanium	µg/L	850	-	-	<10	5.1	<10	<10	1.8	<51	1.7	873	878	-	-	-
Tungsten	µg/L	-	-	-	<0.1	-	<0.1	<0.1	-	-	-	1	1	-	-	-
Uranium	µg/L	8.5	33	352	2.3	3.5	0.47	**13**[(Mn)]	<0.01	**25**[(Mn)]	4.1	1	878	10	-	-
Vanadium	µg/L	120	-	-	<0.5	0.45	<0.5	1.1	<0.5	7.5	0.56	686	878	-	-	-
Zinc	µg/L	7.5 - 188	33 - 341	-	<3.0	4.2	<3.0	18	<3.0	43	6.5	647	878	-	-	-
Zirconium	µg/L	-	-	-	0.11	-	0.11	0.11	-	-	-	0	1	-	-	-
Dissolved Metals																
Aluminum	µg/L	9.6 - 50[(d)]	29 - 100[(d)]	-	<3.0	3.1	<3.0	5.7	<1.0	**265**[(Mn, Mx)]	12	765	877	0.57	0.57	-
Antimony	µg/L	-	-	-	0.15	0.22	<0.1	0.74	<0.1	1.8	0.23	329	877	-	-	-
Arsenic	µg/L	-	-	-	<0.1	0.096	<0.1	0.22	<0.1	<0.5	0.060	528	877	-	-	-
Barium	µg/L	-	-	-	74	83	19	208	<0.1	261	54	1	876	-	-	-
Beryllium	µg/L	-	-	-	<0.02	0.011	<0.02	<0.04	<0.02	<0.1	0.0039	875	876	-	-	-
Bismuth	µg/L	-	-	-	<0.05	0.027	<0.05	<0.1	<0.05	<0.25	0.0096	877	877	-	-	-
Boron	µg/L	-	-	-	<10	7.6	<10	21	<10	<50	4.9	666	877	-	-	-
Cadmium	µg/L	0.018 - 0.46[(b)]	0.038 - 2.8[(b)]	0.026 - 1.0[(b)]	0.025	0.054	<0.005	0.22	<0.005	**1.1**[(Mn, BM)]	0.12	92	877	3.0	-	0.11
Chromium	µg/L	-	-	-	<0.1	0.087	<0.1	0.22	<0.1	<0.6	0.060	591	877	-	-	-
Cobalt	µg/L	-	-	-	<0.1	0.082	<0.1	0.22	<0.1	0.90	0.076	690	877	-	-	-
Copper	µg/L	0.0007 - 0.0055 [(i)]	0.004 - 0.0306 [(i)]	-	<0.5	0.27	<0.5	0.50	<0.2	1.1	0.086	835	877	-	-	-
Iron	µg/L	-	350	-	<10	7.0	<10	<20	<10	**510**[(Mx)]	20	845	877	-	0.11	-
Lead	µg/L	-	-	-	<0.05	0.029	<0.05	<0.1	<0.05	0.50	0.027	869	877	-	-	-
Lithium	µg/L	-	-	-	17	27	1.5	78	<1.0	308	37	29	877	-	-	-
Manganese	µg/L	-	-	-	1.0	3.1	<0.1	14	<0.1	47	5.3	91	876	-	-	-
Mercury	µg/L	-	-	-	<0.005	0.0025	<0.005	<0.005	<0.005	<0.025	0.00052	872	874	-	-	-
Molybdenum	µg/L	-	-	-	1.2	1.5	0.54	3.6	<0.05	21	1.3	1	877	-	-	-
Nickel	µg/L	-	-	-	1.4	6.2	<0.5	40	<0.5	60	12	237	877	-	-	-
Selenium	µg/L	-	-	-	49	83	0.65	317	<0.05	798	132	1	878	-	-	-
Silicon	µg/L	-	-	-	1,930	1,973	1,280	2,770	<50	3,990	465	1	877	-	-	-
Silver	µg/L	-	-	-	<0.01	0.0055	<0.01	<0.02	<0.01	<0.05	0.0020	873	877	-	-	-
Strontium	µg/L	2,500	-	-	142	143	61	252	<0.2	410	60	1	877	-	-	-
Thallium	µg/L	-	-	-	<0.01	0.0089	<0.01	0.035	<0.01	0.057	0.0096	727	877	-	-	-
Titanium	µg/L	-	-	-	<10	5.0	<10	<10	<10	<10	0	877	877	-	-	-
Uranium	µg/L	-	-	-	2.3	3.5	0.47	13	<0.01	23	4.0	1	877	-	-	-
Vanadium	µg/L	-	-	-	<0.5	0.30	<0.5	<1.0	<0.5	<2.5	0.14	828	877	-	-	-
Zinc	µg/L	-	-	-	1.1	2.3	<1.0	9.2	<1.0	45	5.0	609	877	-	-	-
Parent PAHs																
Naphthalene	µg/L	-	1.0	-	<0.02	0.017	<0.02	<0.05	<0.02	<0.05	0.0079	9	9	-	-	-
Acenaphthylene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	9	9	-	-	-
Acenaphthene	µg/L	6.0	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	9	9	-	-	-
Acridine	µg/L	0.050	-	-	<0.01	0.0056	<0.01	<0.02	<0.01	<0.02	0.0017	9	9	-	-	-
Fluorene	µg/L	12	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	9	9	-	-	-

Table E2. Fish Accessible Water: Comparison to Water Quality Guidelines and Chronic Screening Values (25 Stations in Refined Assessment)

Parameter	Unit	Guidelines for the protection of:			Summary											
		Aquatic Life		L1 Benchmarks or Screening Values	September 2017 - September 2019											
		Long-Term	Short-Term		Median	Mean	5th Percentile	95th Percentile	Min	Max	Standard Deviation	nd	Count	% Above		
														LT	ST	L1
Phenanthrene	µg/L	0.30	-	-	<0.02	0.011	<0.02	0.023	<0.02	0.023	0.0043	8	9	-	-	-
Anthracene	µg/L	0.10	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	9	9	-	-	-
Pyrene	µg/L	0.020	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	9	9	-	-	-
Fluoranthene	µg/L	0.20	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	9	9	-	-	-
Benzo(a)anthracene	µg/L	0.10	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	9	9	-	-	-
Chrysene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	9	9	-	-	-
Benzo(a)pyrene	µg/L	0.010	-	-	<0.005	0.0025	<0.005	<0.005	<0.005	<0.005	0	9	9	-	-	-
Benzo(g,h,i)perylene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	9	9	-	-	-
Indeno(c,d-123)pyrene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	9	9	-	-	-
Dibenzo(a,h)anthracene	µg/L	-	-	-	<0.005	0.0025	<0.005	<0.005	<0.005	<0.005	0	9	9	-	-	-
Quinoline	µg/L	3.4	-	-	<0.05	0.025	<0.05	<0.05	<0.05	<0.05	0	9	9	-	-	-
Benzo(b,j)fluoranthene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	9	9	-	-	-
Benzo(k)fluoranthene	µg/L	-	-	-	<0.01	0.0050	<0.01	<0.01	<0.01	<0.01	0	9	9	-	-	-
Alkylated PAHs																
1-Methylnaphthalene	µg/L	-	-	-	<0.05	0.025	<0.05	<0.05	<0.05	<0.05	0	9	9	-	-	-
2-Methylnaphthalene	µg/L	-	-	-	<0.02	0.013	<0.02	0.035	<0.02	0.035	0.0083	8	9	-	-	-
Speciation Of Selenium																
Dissolved dimethylseleneoxide	µg/L	-	-	-	<0.01	0.0051	<0.005	0.010	<0.005	0.016	0.0021	55	59	-	-	-
Dissolved methylseleninic acid	µg/L	-	-	-	<0.01	0.011	0.0080	0.020	<0.005	0.085	0.012	29	59	-	-	-
Dissolved selenite	µg/L	-	-	-	0.19	0.25	0.059	0.74	<0.05	1.2	0.22	2	59	-	-	-
Dissolved selenate	µg/L	-	-	-	15	62	6.8	242	5.9	578	114	0	59	-	-	-
Dissolved selenocyanate	µg/L	-	-	-	<0.04	0.018	<0.015	<0.04	<0.015	<0.04	0.0047	59	59	-	-	-
Dissolved selenomethionine	µg/L	-	-	-	<0.01	0.0046	<0.005	<0.01	<0.005	<0.01	0.00095	59	59	-	-	-
Dissolved selenosulphate	µg/L	-	-	-	<0.06	0.025	<0.015	<0.06	<0.01	<0.06	0.0093	59	59	-	-	-
Unknown dissolved selenium spe	µg/L	-	-	-	<0.06	0.026	<0.015	<0.06	<0.015	<0.06	0.0085	59	59	-	-	-
Volatile Organics																
Extractable Petroleum Hydrocarb	mg/L	-	-	-	<0.25	0.13	<0.25	<0.25	<0.25	<0.25	0	45	45	-	-	-
Extractable Petroleum Hydrocarb	mg/L	-	-	-	<0.25	0.13	<0.25	<0.25	<0.25	<0.25	0	45	45	-	-	-
Sum of Extractable Petroleum Hy	mg/L	-	-	-	<0.5	0.25	<0.5	<0.5	<0.5	<0.5	0	45	45	-	-	-
Total Extractable Hydrocarbons (	mg/L	-	-	-	<0.25	0.13	<0.25	<0.25	<0.25	<0.25	0	44	44	-	-	-
Bacterial																
Microcystin	µg/L	-	-	-	<0.2	0.10	<0.2	<0.2	<0.2	<0.2	0	3	3	-	-	-

Notes:

(a) = guideline is a minimum value. For alkalinity, this applies unless the background concentration or value is lower. For dissolved oxygen, guideline and L1 exceedance was calculated assuming that the embryo/alevin guideline applies from May 15 to August 3

(b) = guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (0.3 to 2,800 mg/L). The guideline is calculated based on the individual hardness value for each sample.

(c) = for some samples, water hardness was greater than 250 mg/L. At this hardness, no BC ENV water quality guideline has been established for sulphate; however, the observed data were screened against the guideline for very hard water (i.e., 429 mg/L) for comparative purposes.

(d) = guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (5.4 to 9.2). The guideline is calculated based on the individual pH for each sample.

(e) = guideline is chloride dependent. The guideline range shown is based on the chloride concentration range observed in the dataset (2.5000 to 11.9000 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(f) = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (0.13 mg-N/L) is based on the combination of field pH (9.2) and water temperature (3.9°C). Guidelines calculated with temperature as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.

(g) = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (0.69 mg-N/L) is based on the combination of field pH (9.2) and water temperature (3.9°C). Guidelines calculated with temperature as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.

(h) = guideline is for chromium VI.

(i) = guideline calculated using the Biotic Ligand Model. The guideline range shown is based on the toxicity-modifying factors for each sample with copper concentrations above the detection limit.

(Mn) = concentration is higher than the 30-day mean BC ENV guideline or outside the recommended pH, DO or total alkalinity range.

(Mx) = concentration is higher than the maximum BC ENV guideline or outside the recommended pH, DO or total alkalinity range.

(BM) = concentration is higher than the l1 benchmarks guideline.

(DL>Mn) = analytical detection limit is higher than the 30-day mean BC ENV guideline.

Bolded concentrations are higher than water quality guidelines.

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision *after* comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances.

- = no guideline or no data.
Guideline sources are provided in Appendix A, Table A1.

APPENDIX F

Temporal Patterns

Appendix F contains the following:

Section F1 (Summary of Statistical Analyses)

- **Table F1-1 (Maximum Concentrations)**: This table shows the magnitude results for this line of evidence. Maximum concentrations of each constituent (minimum for dissolved oxygen; both minimum and maximum for pH) at each station were compared between the period September 2017 to September 2019, and the period prior to September 2017. The magnitude of difference was calculated as the maximum (or minimum) in September 2017 to September 2019 divided by the maximum (or minimum) pre-September 2017. The table is organized by station (columns) and constituent (rows). Gradient shading was used to indicate the intensity of the magnitude from 1 (no colour) to 2 (dark blue). This range was selected to show a gradient that captures most variation in the magnitude without extreme values influencing the shading. Magnitude values greater than 2 were assigned the darkest blue.
- **Table F1-2 (Average Concentrations)**: This table shows the magnitude results for this line of evidence. Average concentrations of each constituent at each station were compared between the period September 2017 to September 2019, and the period prior to September 2017. The magnitude of difference was calculated as the average in September 2017 to September 2019 divided by the average pre-September 2017. The table is organized by station (columns) and constituent (rows). Gradient shading was used to indicate the intensity of the magnitude from 1 (no colour) to 2 (dark blue). This range was selected to show a gradient that captures most variation in the magnitude without extreme values influencing the shading. Magnitude values greater than 2 were assigned the darkest blue. Values were only shaded in cases where a significant difference ($p < 0.05$) was observed in the Tukey's post-hoc pairwise comparison test.
- **Table F1-3 (Increasing Trends Over Time)**: This table shows the annual percent changes over the period from 2012 to 2019. The magnitude of trends was estimated as an annual percent change by multiplying the slope of the log transformed data by 365 (for the number of days per year) and then exponentiating. The table is organized by station (columns) and constituent (rows). Gradient shading was used to indicate the intensity of significant increasing trends from a 0% annual change (no colour) to a 50% annual change (dark blue). This range was selected to show a gradient that captures most variation in the magnitude without extreme values influencing the shading. Estimated annual increases greater than 50% were assigned the darkest blue. Values were only shaded in cases where the increasing trend was significant (slope estimate p value <0.05).

Sections F2 – G26 (Time-Series Plots)

For each station, in order from upstream to downstream on the mainstem of the Fording River followed by upstream to downstream for the tributaries, the following was provided:

- **Plots of raw data**: Data were plotted by constituent and unit of measurement. In some cases, the same constituent was reported in different units for different samples. The units for each plot are provided in the plot title. Non detected values are denoted by open circles, detected values are denoted by filled circles. Grey shading is used to depict the September 2017 to September 2019 time period.
- **Plots of annual averages**: Data were used to calculated monthly average concentrations which were then averaged to provided mean annual concentrations. The estimated mean annual concentrations were plotted by constituent. Once again, the units for each plot are provided in the plot title. For the purposes of visualizing trends in magnitude, non-detected values were included as the full detection limit.

The following units are shown on one or more plots: micrograms per litre (µg/L), milligrams per litre (mg/L), microSiemens per centimetre (µS/cm), millivolts (mV), nephelometric turbidity units (NTU), percent (%), degrees Celsius (°C), milligrams phosphorus per litre (mg-P/L), milligrams nitrogen per litre (mg-N/L), parts per million (ppm), micromhos per centimetre (µmhos/cm), colour units (CU), Siemens (si), percent volume per volume (%v/v), wedge units (Wedge Units), and formazin nephelometric units (FNU).

Section F26 (Raw Output for Statistical Analyses)

- **Table F27-1 (Maximum Concentrations)**: This table contains the raw output from the comparison of maximum values for the September 2017 to September 2019 time period relative to the pre-September 2017 time period.
- **Table F27-2 (Average Concentrations)**: For each constituent and station, monthly average concentrations were compared using a two-way ANOVA with factors for time period (September 2017 to September 2019 or pre-September 2017) and month. Concentrations of most constituents were log-transformed to normalize and stabilize residual variance (ORP, temperature, turbidity, and toxicity testing results contain zeroes and thus are not amenable to log-transformation). ANOVAs were performed using the aov() function in the stats package of R version 3.6.2. This table contains the raw output of the analysis.
- **Table F27-3 (Average Concentrations)**: Tukey's post-hoc pairwise comparisons were performed for the time period factor for each of the ANOVAs described above using the TukeyHSD function in the stats package of R version 3.6.2. This table contains the raw output of the analysis.
- **Table F27-4 (Increasing Trends Over Time)**: For each constituent and station, trends were evaluated to determine whether concentrations significantly increased from 2012 to 2019. The trend analysis was performed using monthly concentrations for each constituent and station. A linear regression for the monthly average concentration versus the date was performed for each constituent at each station using the lm() function in the stats package of R version 3.6.2. This table contains the raw output of the analysis.

ATTACHMENT F1

Magnitude Table

Table F1-1: Summary of Magnitude of Differences in Maximum Values

Constituent	Units	Group	Mainstem Fording River Stations														Tributary Stations									
			FR_UFR1	FR_FR1	FR_MULTIPLATE	FR_FR2	FR_FR3	FR_FR4	FR_FRCP1	FR_FRRD	GH_PC2	FR_FRABCH	FR_FR5	LC_FRUS	LC_FRB	GH_FR1	FR_HC3	RG_CH1	FR_HC1	FR_FC1	FR_CC1	FR_KC1	GH_SC1-2	GH_PC1	LC_DC1	GH_GH1
Dissolved Oxygen	mg/L	Field Measured	7.69	1.06	1.07	1.18	1.05	1.06	0.32	1.35	1.44	1.20	1.24	9.98	0.98	0.97	3.88	1.87	0.89	1.19	1.15	1.09	1.58	222.75	1.13	1.19
pH	-	Field Measured	0.86	0.99	0.93	1.03	1.00	0.92	0.93	0.79	0.89	0.93	0.90	0.98	0.97	0.90	0.94	0.93	0.85	0.95	0.95	0.93	0.79	0.89	0.96	0.99
pH	-	Conventional Parameters	1.00	1.00	1.01	1.01	1.02	1.00	1.01	1.01	1.01	1.01	1.00	1.00	1.02	1.01	1.01	1.00	1.01	0.99	0.99	1.00	1.01	1.01	1.00	1.01
Total dissolved solids	mg/L	Conventional Parameters	1.36	1.05	1.38	1.09	1.37	0.89	1.34	1.14	0.94	1.22	1.13	0.83	1.06	1.01	1.08	0.87	1.08	1.12	1.08	1.00	0.69	3.08	1.50	1.08
Bromide	mg/L	Major Ions	5.00	0.20	0.50	0.50	0.50	0.50	0.50	1.00	0.50	1.28	0.50	0.10	0.50	0.50	1.00	1.00	0.20	1.00	0.50	0.41	0.20	0.34	2.00	0.50
Chloride	mg/L	Major Ions	1.92	0.14	1.25	0.52	1.09	0.53	1.11	1.56	0.50	1.24	0.86	0.46	0.97	0.66	0.36	0.24	0.30	0.38	0.87	0.86	1.19	0.50	2.72	0.48
Fluoride	mg/L	Major Ions	0.98	0.96	0.76	0.69	1.08	0.71	0.52	0.94	1.05	1.13	0.63	0.49	0.80	0.61	0.98	0.90	0.91	0.74	0.54	0.50	0.23	0.72	0.93	0.29
Sulphate	mg/L	Major Ions	1.06	1.13	1.37	1.07	1.37	0.84	1.17	1.52	1.13	1.24	1.22	0.84	1.13	1.08	1.05	0.61	1.10	1.31	1.14	1.15	0.98	3.76	3.30	1.10
Sulphide	mg/L	Major Ions	-	-	-	-	-	-	-	-	-	-	9.52	-	1.00	-	-	0.29	-	-	-	-	-	-	1.00	-
Nitrate	mg-N/l	Nutrients and Biological Indicators	1.23	0.67	1.45	1.00	2.17	0.93	0.87	1.03	0.71	0.94	0.85	0.63	0.87	0.82	0.99	1.80	0.89	0.82	1.27	0.83	0.44	7.10	5.40	0.99
Nitrite	mg-N/l	Nutrients and Biological Indicators	0.88	2.80	0.33	0.44	0.69	0.39	0.70	1.16	0.34	1.13	0.67	0.69	1.03	0.70	1.33	1.37	0.46	0.39	0.24	0.32	0.46	0.49	1.26	0.03
Total ammonia	mg-N/l	Nutrients and Biological Indicators	6.07	12.97	1.29	0.47	4.87	0.66	4.21	3.99	1.93	11.34	15.19	11.31	3.90	3.46	2.58	10.19	1.91	1.96	0.02	0.39	2.71	1.75	1.90	0.87
Total Aluminum	mg/L	Total Metals	1.08	0.65	0.24	0.31	0.21	1.02	1.77	1.57	0.29	0.50	0.35	0.03	0.30	0.62	0.17	0.33	0.09	0.70	0.11	0.03	0.95	0.49	0.24	0.48
Dissolved Aluminum	mg/L	Dissolved Metals	1.20	2.02	0.51	4.96	0.56	0.58	0.46	0.03	0.38	9.36	0.32	0.46	21.37	0.07	0.14	1.04	0.10	0.91	0.10	0.10	1.04	0.20	2.84	0.39
Total Antimony	mg/L	Total Metals	0.77	0.15	0.88	1.00	0.91	0.61	0.94	1.71	0.60	0.46	0.30	0.59	1.13	0.52	1.67	0.91	1.33	0.59	0.23	1.25	0.85	0.68	0.76	1.21
Dissolved Antimony	mg/L	Dissolved Metals	2.00	0.83	0.74	1.09	1.25	0.65	1.10	1.85	0.63	1.00	1.00	0.63	0.80	0.74	2.00	4.55	1.67	0.83	0.23	1.18	0.81	0.20	0.68	1.22
Total Arsenic	mg/L	Total Metals	0.78	0.81	0.27	0.39	0.30	0.45	1.27	1.47	0.63	0.52	0.34	0.46	0.40	1.03	0.57	1.47	0.67	0.77	0.38	0.98	0.57	0.50	1.82	0.34
Dissolved Arsenic	mg/L	Dissolved Metals	1.05	1.00	0.20	2.78	0.68	0.87	1.00	4.55	2.00	1.00	1.00	0.91	2.06	0.40	0.71	3.33	1.00	0.91	0.38	0.95	0.40	0.52	0.60	0.74
Total Barium	mg/L	Total Metals	0.86	0.95	1.14	0.80	1.07	0.93	1.09	0.93	0.75	0.95	0.83	0.70	0.88	0.93	0.98	1.01	0.87	0.98	0.03	0.17	2.04	1.02	1.26	0.61
Dissolved Barium	mg/L	Dissolved Metals	0.98	1.00	1.22	1.11	1.32	1.26	1.20	0.99	0.75	1.02	0.84	0.75	0.99	0.97	0.97	1.12	0.97	1.17	0.29	0.32	2.07	1.03	1.20	1.07
Total Beryllium	mg/L	Total Metals	0.40	0.20	0.40	0.67	0.28	0.54	0.53	0.40	0.40	0.37	0.20	0.20	0.36	1.00	0.40	0.20	0.40	0.20	0.40	0.20	0.08	0.40	0.08	0.21
Total Boron	mg/L	Total Metals	2.00	0.83	1.25	2.63	1.43	0.74	1.00	1.05	0.95	0.40	0.26	0.67	1.33	0.40	2.00	1.00	1.67	0.83	0.47	1.00	0.40	0.40	0.40	1.00
Dissolved Boron	mg/L	Dissolved Metals	1.82	0.91	0.30	3.13	1.17	1.00	1.00	2.78	1.00	1.00	1.00	0.77	0.67	0.40	2.00	5.00	1.54	0.91	0.47	1.17	0.40	0.20	0.40	1.05
Total Cadmium	mg/L	Total Metals	0.77	0.84	0.72	0.35	0.50	0.38	1.13	1.41	0.10	0.56	0.60	0.40	0.30	0.83	0.31	0.14	0.49	0.01	0.46	1.40	0.53	0.32	0.99	0.45
Dissolved Cadmium	mg/L	Dissolved Metals	1.41	1.29	1.78	0.61	1.44	0.78	1.19	1.02	0.79	2.50	0.82	0.14	3.50	0.23	0.91	1.92	1.19	1.12	1.22	1.16	0.43	0.76	3.67	0.79
Total Chromium	mg/L	Total Metals	1.03	0.60	0.27	0.25	0.37	1.03	0.50	0.43	0.47	0.45	3.06	0.48	0.33	1.09	0.52	0.49	0.22	0.00	0.20	0.10	0.45	1.27	0.98	0.48
Dissolved Chromium	mg/L	Dissolved Metals	0.91	0.50	0.22	2.86	0.83	0.43	1.25	2.00	0.74	1.00	1.00	0.60	3.00	1.10	1.60	1.04	1.11	0.43	1.05	0.91	0.40	1.04	0.80	0.61
Total Cobalt	mg/L	Total Metals	0.74	0.89	0.25	0.33	0.23	0.25	2.06	3.35	0.67	0.42	0.52	0.50	0.25	0.86	1.82	0.50	0.37	1.00	0.13	0.06	0.98	0.39	0.84	0.30
Dissolved Cobalt	mg/L	Dissolved Metals	2.00	1.00	0.34	1.39	1.07	0.64	1.65	7.50	1.83	1.00	1.00	1.00	3.80	0.35	2.00	5.00	1.54	1.00	0.16	0.09	0.82	0.40	0.98	0.19
Total Copper	mg/L	Total Metals	1.39	0.26	0.49	2.10	0.37	0.17	1.18	1.46	4.72	0.51	0.39	0.72	0.36	0.87	1.28	0.39	0.85	0.17	0.30	0.79	0.55	0.28	0.33	0.28
Dissolved Copper	mg/L	Dissolved Metals	0.60	0.98	0.50	1.32	0.98	1.00	0.52	1.15	1.00	1.00	1.00	0.36	2.24	0.54	1.00	2.00	0.88	1.00	0.79	0.50	0.35	0.50	0.76	0.84
Total Iron	mg/L	Total Metals	0.74	0.32	0.21	0.19	0.18	0.34	1.90	2.41	0.34	0.51	0.38	0.05	0.23	0.90	0.12	0.31	0.08	0.07	0.14	0.02	1.81	0.42	0.33	0.25
Dissolved Iron	mg/L	Dissolved Metals	1.17	0.37	0.20	3.18	0.47	0.37	0.83	1.06	0.67	5.10	1.00	0.33	17.00	0.08	0.67	1.67	0.67	0.33	0.67	0.67	0.40	0.20	3.32	0.75
Total Lead	mg/L	Total Metals	0.70	0.49	0.22	0.20	0.22	0.30	1.80	2.09	1.28	0.72	0.40	0.20	0.23	0.74	0.55	0.46	0.14	0.43	0.25	0.00	0.48	0.27	0.59	0.21
Dissolved Lead	mg/L	Dissolved Metals	1.82	0.77	0.20	4.03	1.00	1.00	1.00	4.81	2.00	1.47	1.00	1.00	9.51	0.41	2.00	5.00	2.00	1.00	2.00	1.00	0.40	0.20	0.82	1.59
Total Lithium	mg/L	Total Metals	0.79	1.13	1.51	0.95	1.67	1.04	1.31	1.13	1.28	1.15	0.99	1.18	1.07	1.11	1.11	0.96	1.28	0.85	0.78	0.98	1.13	0.86	1.22	2.01
Dissolved Lithium	mg/L	Dissolved Metals	1.05	1.03	1.28	0.91	1.91	1.12	1.27	1.11	1.16	1.09	1.10	1.14	1.07	1.22	1.43	0.98	1.19	0.91	0.81	1.03	1.26	0.83	1.15	1.86
Total Manganese	mg/L	Total Metals	0.72	0.42	0.11	0.12	0.37	0.19	2.10	2.70	0.40	0.51	0.46	0.27	0.21	1.10	0.15	0.34	0.40	0.12	0.34	0.04	0.95	0.32	1.26	0.23
Dissolved Manganese	mg/L	Dissolved Metals	0.05	0.66	2.25	0.73	1.42	0.98	1.47	1.42	0.83	2.02	0.64	0.25	6.60	0.19	0.48	3.70	0.71	0.06	0.36	0.13	1.36	0.16	9.95	0.28
Total Mercury	mg/L	Total Metals	0.41	0.30	0.27	0.47	0.50	0.50	0.67	0.41	0.22	0.72	0.15	0.05	0.32	0.85	0.05	0.33	0.10	0.38	0.09	0.42	0.58	0.28	0.39	0.19
Total Methyl mercury	µg/L	Total Metals	1.00	0.40	-	0.64	-	-	1.70	0.86	-	-	-	-	-	0.70	-	-	-	-	-	-	-	-	16.00	0.94
Total Molybdenum	mg/L	Total Metals	1.02	0.92	0.91	0.86	1.08	0.61	0.97	0.92	1.65	0.80	0.70	0.83	1.01	2.09	0.93	0.81	0.95	0.80	0.32	1.00	0.77	1.07	1.67	2.50
Dissolved Molybdenum	mg/L	Dissolved Metals	1.01	0.90	0.94	0.98	1.31	0.78	1.08	0.78	1.72	0.89	0.72	0.73	1.17	2.19	0.83	0.82	0.94	0.76	0.31	1.14	0.76	1.02	1.90	2.51
Total Nickel	mg/L	Total Metals	0.89	1.51	1.21	0.80	0.59	0.54	1.40	1.37	0.82	0.56	0.25	0.30	0.43	1.37	1.14	0.11	0.66	0.54	0.85	1.95	0.56	0.55	1.55	0.78
Dissolved Nickel	mg/L	Dissolved Metals	1.04	1.37	1.37	1.67	1.43	0.62	1.37	1.58	0.73	1.13	0.71	0.40	1.49	1.18	2.00	5.00	0.98	1.00	0.91	1.59	0.55	0.59	1.21	0.80
Total Selenium	mg/L	Total Metals	0.91	0.86	1.24	1.25	1.29	0.78	1.39	1.35	0.95	1.34	0.96	0.84	1.08	1.08	1.08	0.78	1.14	1.14	1.14	1.04	0.84	0.91	3.94	1.03
Dissolved Selenium	mg/L	Dissolved Metals	0.93	0.96	1.46	1.26	1.21	0.79	1.57	1.34	1.30	1.39	1.15	0.90	1.05	1.21	0.88	0.85	1.10	1.21	1.03	1.28	0.90	0.93	3.74	1.13
Total Silver	mg/L	Total Metals	2.29	0.81	0.65	0.88	0.42	0.59	0.89	1.00	0.95	0.58	0.20	0.30	0.12	0.74	0.43	1.00	0.95	0.91	1.11	0.63	0.48	0.40	0.60	0.35
Total Strontium	mg/L	Total Metals	0.98	1.04	1.24	1.00	1.28	1.10	1.14	1.12	0.91	1.16	0.96	0.86	1.01	1.08	0.97	0.64	1.00	1.23	0.80	1.03	0.89	1.03	1.40	1.23
Dissolved Strontium	mg/L	Dissolved Metals	1.06	1.02	1.38	1.06	1.49	1.24	1.17	1.13	1.03	1.13	1.12	0.88	1.08	1.03	1.10	0.64	1.06	1.26	0.86	1.19	1.02	1.08	1.38	1.27
Total Thallium	mg/L	Total Metals	0.57	0.72	0.57	0.45	0.42	0.74	0.98	0.64	0.67	0.56	0.20	0.71	0.33	0.78	2.00	0.71	0.85	1.00	0.69	0.49	4.25	0.40	0.40	0.33
Dissolved Thallium	mg/L	Dissolved Metals	2.00	0.83	0.20	2.17	1.00	0.79	1.32	3.13	0.87	1.00	1.00	1.00	1.00	0.40	2.00	5.00	2.00	1.00	0.77	0.92	1.00	0.26	0.40	1.43
Total Uranium	mg/L	Total Metals	0.95	1.12	1.51	1.17	1.67	1.03	1.51	1.22	1.52	1.12	1.09	1.00	1.16	1.12	0.96	0.89	1.16	1.21	1.24	1.08	0.88	1.07	1.72	0.91
Dissolved Uranium	mg/L	Dissolved Metals	1.09	1.12	1.49	1.13	1.74	1.04	1.39	1.24	1.76	1.25	1.18	1.07	1.23	1.15	0.98	0.97	1.20	1.15	1.29	1.08	0.97	1.07	1.74	0.99
Total Vanadium	mg/L	Total Metals	1.17	0.64	0.50	0.40	0.43	1.14	0.77	1.02	0.57	0.55	0.35	0.38	0.33	0.72	1.00	0.67	0.38	0.50	0.43	0.18	0.61	0.51	0.36	0.39
Dissolved Vanadium	mg/L	Dissolved Metals	1.00	0.50	0.20	2.50	0.50	0.50	0.50	2.50	1.00	1.00	1.00	0.50	1.17	0.40	1.00	2.50	1.00	0.50	1.00	0.50	0.20	0.40	0.55	1.00
Total Zinc	mg/L	Total Metals	0.97	0.83	0.65	0.40	0.43	0.61	1.52	0.47	0.18	0.61	1.30	0.27	0.33	0.77	1.36	0.61	0.67	1.00	0.49	0.40	0.51	0.51	1.53	0.86
Dissolved Zinc	mg/L	Dissolved Metals	0.60	1.00	0.86	0.96	1.07	0.58	1.31	1.67	1.03	1.16	1.00	1.00	2.38	0.44	0.73	5.44	1.00	0.86	1.02	0.51	0.58	0.72	3.99	0.85

Notes

- = no data available; mg/L = milligrams per litre; mg-N/L = milligrams nitrogen per litre; mg-P/L = milligrams phosphorus per litre

Values are presented as the ratio between the highest observed maximum value between September 2017 and September 2019 and the highest observed maximum value prior to September 2017, with the exception of dissolved oxygen.

For dissolved oxygen, the values represent the ratio between the lowest observed minimum prior to September 2017 and the lowest observed minimum value between September 2017 and September 2019.

Value	indicates that the ratio between the observed maximums is less than one and therefore the highest observed maximum occurred prior to September 2017
Value	Indicates that the highest observed maximum between September 2017 and September 2019 was 2x the highest observed maximum prior to September 2017
Value	Indicates that the highest observed maximum between September 2017 and September 2019 was >2x the highest observed maximum prior to September 2017

Values in between 1 and 2 were shaded using a gradient to provide a visualization of relative magnitudes. For dissolved oxygen, gradient shading was used for values between 1 and 0 to show relative magnitudes in the difference between minimum values

Table F1-2. Summary of Magnitude of Differences in Estimated Average Concentrations

			Mainstem Fording River Stations														Tributary Stations									
Constituent	**Units**	**Group**	FR_UFR1	FR_FR1	FR_MULTIPLATE	FR_FR2	FR_FR3	FR_FR4	FR_FRCP1	FR_FRRD	GH_PC2	FR_FRABCH	FR_FR5	LC_FRUS	LC_FRB	GH_FR1	FR_HC3	RG_CH1	FR_HC1	FR_FC1	FR_CC1	FR_KC1	GH_SC1-2	GH_PC1	LC_DC1	GH_GH1
Dissolved Oxygen	mg/L	Field Measured	1.01	0.92	0.95	0.98	0.95	0.93	0.93	1.01	1.04	1.00	0.96	1.12	1.04	1.04	0.92	0.99	0.92	0.98	0.98	0.94	0.94	1.08	1.03	1.02
pH	-	Field Measured	0.99	1.00	0.97	1.00	0.98	0.97	0.99	0.98	0.96	0.99	0.98	1.04	0.98	0.99	0.99	0.99	0.98	0.99	0.99	0.99	0.98	0.99	0.99	0.99
pH	-	Conventional Parameters	1.00	1.00	1.01	1.00	1.01	1.00	0.99	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	0.99	1.00	1.00	1.00
Total dissolved solids	mg/L	Conventional Parameters	1.03	0.98	1.40	1.13	1.38	1.10	1.41	1.10	1.12	1.09	1.08	1.06	1.09	1.12	1.08	1.04	1.09	1.51	1.48	1.15	0.92	1.09	1.46	1.17
Bromide	mg/L	Major Ions	1.09	0.94	1.09	0.49	0.47	0.44	0.65	0.89	0.35	0.84	0.66	0.28	0.48	0.68	1.00	1.00	0.79	1.00	0.63	0.47	0.30	0.49	1.01	0.68
Chloride	mg/L	Major Ions	0.73	0.67	0.85	0.76	0.57	0.75	1.22	1.09	0.86	1.01	0.99	0.63	0.79	0.83	0.75	0.67	0.62	0.66	1.13	1.33	1.17	1.19	2.68	0.87
Fluoride	mg/L	Major Ions	0.93	0.87	0.90	0.91	1.03	0.91	0.80	0.95	0.82	0.96	0.79	0.81	0.88	0.89	1.03	0.96	0.97	0.74	0.80	0.65	0.46	0.89	0.91	0.78
Sulphate	mg/L	Major Ions	1.05	1.03	1.55	1.17	1.56	1.13	1.51	1.15	1.23	1.14	1.18	1.08	1.18	1.22	1.14	1.09	1.16	2.01	1.70	1.25	0.94	1.12	3.20	1.24
Sulphide	mg/L	Major Ions	-	-	-	-	-	-	-	-	-	-	1.22	-	0.69	-	-	0.67	-	-	-	-	-	-	0.70	-
Nitrate	mg-N/l	Nutrients and Biological Indicators	1.20	0.73	1.55	1.14	1.68	1.11	1.12	1.00	0.78	0.95	0.95	0.89	0.99	0.97	1.18	1.08	0.78	1.52	1.68	0.94	0.59	1.11	52.76	1.40
Nitrite	mg-N/l	Nutrients and Biological Indicators	1.05	1.04	0.40	0.61	0.43	0.69	0.83	1.02	0.45	0.98	0.89	1.26	0.79	0.83	1.06	1.03	0.89	0.84	0.30	0.51	0.87	0.55	3.06	1.09
Total ammonia	mg-N/l	Nutrients and Biological Indicators	2.15	2.66	0.95	1.13	0.65	1.17	2.11	1.78	2.64	2.26	2.49	2.87	1.88	2.02	1.46	2.07	1.81	1.63	0.08	1.61	2.65	1.61	2.70	1.96
Total Aluminum	mg/L	Total Metals	0.82	0.81	0.61	0.69	0.14	0.58	0.66	0.59	0.95	0.50	0.49	0.45	0.72	0.66	0.65	0.64	0.73	2.38	0.50	0.81	0.97	0.64	0.50	0.29
Dissolved Aluminum	mg/L	Dissolved Metals	1.07	1.16	0.83	1.06	0.51	1.09	1.03	1.01	1.02	1.20	1.03	0.97	1.11	0.94	0.97	1.13	0.96	1.12	1.02	1.03	0.88	1.00	0.90	0.82
Total Antimony	mg/L	Total Metals	1.02	0.95	0.79	0.97	0.75	0.92	1.13	1.06	0.85	0.91	0.87	0.86	0.98	1.13	1.03	1.00	1.01	0.90	0.49	1.18	0.83	1.00	1.20	1.64
Dissolved Antimony	mg/L	Dissolved Metals	1.06	1.00	0.75	0.94	0.99	0.92	1.19	1.06	0.93	1.03	1.01	0.94	0.97	1.18	1.06	1.08	1.03	0.98	0.49	1.16	0.83	0.97	1.27	1.77
Total Arsenic	mg/L	Total Metals	0.96	0.97	0.82	1.03	0.33	0.93	1.11	0.95	1.15	0.81	0.83	0.83	0.96	1.01	0.94	1.07	0.98	0.94	0.65	1.08	1.02	0.99	0.95	0.87
Dissolved Arsenic	mg/L	Dissolved Metals	1.05	1.03	0.77	1.09	0.75	1.05	1.13	1.07	1.14	1.02	1.08	1.00	1.03	1.01	1.03	1.11	1.02	1.00	0.65	0.97	0.96	1.04	0.98	1.00
Total Barium	mg/L	Total Metals	0.96	0.96	1.08	0.96	0.79	1.03	0.75	0.92	0.80	0.92	0.93	0.92	0.99	0.98	1.03	1.03	0.97	1.34	0.32	0.86	1.23	1.02	1.29	0.82
Dissolved Barium	mg/L	Dissolved Metals	1.00	1.00	1.23	1.04	1.19	1.09	0.74	0.96	0.84	0.95	0.97	0.99	1.03	0.99	1.07	1.05	1.02	1.44	0.39	0.88	1.23	1.05	1.32	0.87
Total Beryllium	mg/L	Total Metals	0.30	0.31	0.26	0.32	0.18	0.31	0.50	0.46	0.21	0.44	0.29	0.20	0.32	0.31	0.33	0.29	0.31	0.32	0.33	0.31	0.24	0.30	0.31	0.29
Total Boron	mg/L	Total Metals	1.03	0.99	0.93	1.01	0.85	0.92	1.07	1.06	0.88	0.95	0.90	0.92	0.97	0.93	1.03	1.00	1.04	0.98	0.80	1.17	0.82	1.02	0.94	0.86
Dissolved Boron	mg/L	Dissolved Metals	1.05	0.99	0.80	1.00	1.01	0.94	1.06	1.09	0.90	1.01	1.02	0.95	0.99	0.95	1.06	1.08	1.02	1.00	0.80	1.19	0.83	0.97	1.01	0.90
Total Cadmium	mg/L	Total Metals	0.92	1.07	1.19	0.85	0.35	0.79	0.83	1.07	0.97	0.96	0.89	0.87	0.90	0.90	0.77	0.87	1.13	0.81	1.53	1.27	0.64	1.03	1.06	0.62
Dissolved Cadmium	mg/L	Dissolved Metals	0.86	1.20	1.60	0.90	0.64	0.87	0.66	1.09	1.00	1.08	0.93	0.79	1.00	0.90	0.77	0.85	1.21	0.95	1.07	0.73	0.24	1.11	1.16	0.60
Total Chromium	mg/L	Total Metals	0.92	1.02	0.82	1.00	0.39	1.08	0.95	1.07	1.06	0.93	1.16	0.90	0.93	1.05	0.95	0.91	0.91	0.79	0.94	1.02	0.84	0.99	0.79	0.69
Dissolved Chromium	mg/L	Dissolved Metals	0.91	0.90	0.63	1.08	0.87	0.92	1.09	1.10	0.85	1.10	0.91	0.88	1.10	0.91	0.89	0.87	0.91	0.75	1.12	0.97	0.81	0.88	1.03	0.78
Total Cobalt	mg/L	Total Metals	1.02	1.03	0.91	1.11	0.26	0.93	1.21	1.58	1.24	1.04	1.01	0.97	1.07	1.00	1.03	0.99	0.95	1.00	0.28	0.90	1.07	1.01	1.04	0.76
Dissolved Cobalt	mg/L	Dissolved Metals	1.06	1.00	0.86	1.16	0.95	0.96	1.16	1.57	1.21	1.22	1.16	1.00	1.07	0.99	1.06	1.08	1.02	1.00	0.36	0.87	1.05	1.00	1.06	0.92
Total Copper	mg/L	Total Metals	0.98	1.04	0.80	1.09	0.41	0.92	1.07	1.06	1.34	0.91	0.97	0.98	0.96	0.97	1.02	0.97	1.03	0.93	0.93	0.99	0.82	0.93	0.92	0.74
Dissolved Copper	mg/L	Dissolved Metals	1.09	1.09	0.92	1.07	0.92	1.02	1.17	1.14	1.00	1.21	1.13	0.96	1.06	1.02	1.04	1.15	1.10	1.14	1.07	0.99	0.80	1.03	1.06	0.97
Total Iron	mg/L	Total Metals	0.72	0.67	0.41	0.97	0.16	0.77	0.82	0.74	0.70	0.57	0.50	0.47	0.70	0.69	0.65	0.56	0.62	0.69	0.62	0.74	0.83	0.59	0.57	0.44
Dissolved Iron	mg/L	Dissolved Metals	0.72	0.68	0.36	0.78	0.35	0.67	1.08	1.03	0.60	1.07	0.68	0.83	0.81	0.66	0.70	0.73	0.69	0.56	0.78	0.72	0.74	0.66	0.74	0.68
Total Lead	mg/L	Total Metals	0.99	0.98	0.81	0.94	0.22	0.89	1.13	1.00	1.42	0.86	0.85	0.87	0.99	0.99	0.98	0.94	0.91	0.92	1.00	0.93	0.78	0.99	0.86	0.63
Dissolved Lead	mg/L	Dissolved Metals	1.06	0.99	0.82	1.07	1.00	1.00	1.08	1.07	1.07	1.10	1.08	1.00	1.05	0.98	1.06	1.08	1.04	1.00	1.17	0.97	0.83	0.97	1.04	1.04
Total Lithium	mg/L	Total Metals	1.04	1.09	1.64	1.14	1.60	1.18	1.16	1.12	1.25	1.09	1.28	1.36	1.19	1.25	1.20	1.08	1.17	1.15	1.23	1.33	1.06	1.04	1.20	1.38
Dissolved Lithium	mg/L	Dissolved Metals	1.10	1.13	1.66	1.14	1.93	1.17	1.17	1.12	1.23	1.10	1.30	1.37	1.22	1.23	1.28	1.10	1.25	1.11	1.24	1.34	1.06	1.07	1.20	1.41
Total Manganese	mg/L	Total Metals	0.67	0.73	0.86	1.00	0.25	0.91	0.60	0.79	0.71	0.78	0.74	0.85	0.83	0.79	0.99	0.79	0.73	0.58	0.63	0.99	4.13	0.56	1.19	0.58
Dissolved Manganese	mg/L	Dissolved Metals	0.51	0.48	1.21	1.17	1.18	0.91	0.56	0.89	0.46	0.94	0.82	0.89	0.81	0.76	1.34	1.03	0.60	0.33	0.77	1.00	4.00	0.59	1.00	0.58
Total Mercury	mg/L	Total Metals	0.16	0.17	0.08	0.17	0.07	0.14	0.40	0.32	0.07	0.34	0.12	0.06	0.17	0.15	0.16	0.15	0.13	0.19	0.13	0.14	0.17	0.12	0.17	0.13
Total Methyl mercury	µg/L	Total Metals	0.56	0.40	-	0.42	-	-	0.64	0.62	-	-	-	-	-	0.51	-	-	-	-	-	-	-	-	0.63	0.43
Total Molybdenum	mg/L	Total Metals	0.99	0.97	0.88	0.98	0.89	0.94	1.15	0.98	1.03	0.98	0.92	1.04	0.97	1.43	1.04	1.02	1.01	0.97	0.62	0.90	0.92	1.07	1.30	1.46
Dissolved Molybdenum	mg/L	Dissolved Metals	1.03	1.00	0.92	0.99	1.00	0.95	1.16	0.99	1.06	0.99	0.94	1.04	1.01	1.43	1.08	1.05	1.06	0.94	0.63	0.94	0.93	1.07	1.33	1.45
Total Nickel	mg/L	Total Metals	1.02	1.03	1.03	1.16	0.51	0.95	1.60	1.02	0.83	0.86	0.90	0.85	0.92	1.45	1.02	0.95	0.94	0.98	1.15	1.86	0.62	0.96	1.42	1.85
Dissolved Nickel	mg/L	Dissolved Metals	1.05	1.03	1.16	1.20	1.04	0.98	1.61	1.00	0.86	0.90	0.92	0.85	0.92	1.36	1.06	1.08	0.93	1.00	1.19	1.90	0.61	0.95	1.46	1.97
Total Selenium	mg/L	Total Metals	1.12	1.06	1.39	1.27	1.45	1.10	1.63	1.19	1.13	1.21	1.19	1.07	1.17	1.24	1.19	1.10	1.14	1.92	1.56	1.25	0.89	1.02	4.27	1.26
Dissolved Selenium	mg/L	Dissolved Metals	1.18	1.10	1.46	1.33	1.53	1.18	1.70	1.26	1.24	1.26	1.29	1.22	1.24	1.28	1.20	1.16	1.20	1.93	1.68	1.40	0.92	1.05	4.46	1.32
Total Silver	mg/L	Total Metals	1.06	1.00	0.90	1.07	0.45	1.10	1.13	1.05	1.06	0.91	0.93	0.95	0.96	0.98	1.01	1.00	1.03	1.00	1.11	1.06	0.85	1.01	0.97	0.91
Total Strontium	mg/L	Total Metals	1.04	0.93	1.19	1.08	1.16	1.11	1.14	1.06	1.02	1.08	1.04	1.01	1.06	1.07	1.09	1.04	1.02	1.42	1.05	1.25	1.01	1.09	1.39	1.04
Dissolved Strontium	mg/L	Dissolved Metals	1.08	0.97	1.28	1.11	1.43	1.14	1.16	1.11	1.08	1.10	1.08	1.01	1.10	1.08	1.13	1.06	1.06	1.48	1.10	1.28	1.01	1.11	1.42	1.10
Total Thallium	mg/L	Total Metals	1.00	0.99	0.95	1.04	0.40	1.02	1.32	1.04	1.07	0.88	0.94	0.98	1.00	0.97	1.03	0.99	1.03	1.00	0.92	1.05	0.91	0.97	0.96	0.86
Dissolved Thallium	mg/L	Dissolved Metals	1.06	1.00	0.82	1.04	0.96	0.96	1.31	1.05	1.06	1.03	1.08	1.00	1.00	1.00	1.06	1.08	1.04	1.00	0.97	1.07	0.86	0.97	1.02	1.03
Total Uranium	mg/L	Total Metals	1.07	0.99	1.51	1.25	1.40	1.20	1.57	1.23	1.25	1.18	1.17	1.18	1.15	1.23	1.09	1.06	1.12	1.39	1.88	1.27	0.90	1.09	1.59	1.21
Dissolved Uranium	mg/L	Dissolved Metals	1.10	1.00	1.56	1.28	1.70	1.22	1.59	1.22	1.28	1.21	1.19	1.18	1.20	1.22	1.13	1.09	1.15	1.40	1.93	1.26	0.89	1.09	1.70	1.25
Total Vanadium	mg/L	Total Metals	0.71	0.75	0.59	0.76	0.24	0.81	1.02	0.91	0.67	0.84	0.65	0.59	0.74	0.70	0.74	0.69	0.70	0.59	0.74	0.70	0.57	0.69	0.70	0.59
Dissolved Vanadium	mg/L	Dissolved Metals	0.71	0.68	0.49	0.72	0.50	0.67	1.03	0.97	0.60	0.98	0.73	0.60	0.71	0.68	0.76	0.73	0.70	0.61	0.78	0.65	0.56	0.68	0.73	0.69
Total Zinc	mg/L	Total Metals	1.03	1.01	0.95	1.07	0.45	0.99	1.17	1.06	1.20	0.88	1.09	0.93	1.04	0.98	1.03	0.98	1.00	1.00	1.13	1.26	0.73	0.98	1.00	0.87
Dissolved Zinc	mg/L	Dissolved Metals	0.52	0.47	0.55	0.55	0.54	0.54	0.67	0.56	0.52	0.68	0.55	0.48	0.54	0.50	0.52	0.60	0.58	1.16	0.79	0.82	0.37	1.03	0.56	0.52

Notes:

- = no data available; mg/L = milligrams per litre; mg-N/L = milligrams nitrogen per litre; mg-P/L = milligrams phosphorus per litre

Values are presented as the ratio between the estimated average value between September 2017 and September 2019 and the estimated average value prior to September 2017.

The estimated average value was calculated as e^x, where x is equal to the Tukey's Honest Significant Difference Test estimate for the Year term of the model

Value	indicates that the ratio between the estimated average values is less than one and therefore the estimated average values were lower for the period of interest
Value	Indicates that the estimated average value between September 2017 and September 2019 was 2x the estimated average value prior to September 2017
Value	Indicates that the estimated average value between September 2017 and September 2019 was >2x the estimated average value prior to September 2017
	Values in between 1 and 2 were shaded using a gradient to provide a visualization of relative magnitudes. For dissolved oxygen, gradient shading was used for values between 1 and 0 to show relative magnitudes in the difference between minimum values
	Cells were only shaded where the calculated p-value for the test estimate was <0.05

Table F1-3. Summary of Annual Rates of Change for Each Constituent by Station

			Mainstem Fording River Stations													Tributary Stations									
Constituent	**Units**	**Group**	FR_UFR1	FR_FR1	FR_MULTIPLATE	FR_FR2	FR_FR3	FR_FR4	FR_FRCP1	FR_FRRD	GH_PC2	FR_FRABCH	FR_FR5	LC_FRUS	LC_FRB	GH_FR1	FR_HC3	RG_CH1	FR_HC1	FR_FC1	FR_CC1	FR_KC1	GH_SC1-2	GH_PC1	LC_DC1	GH_GH1
Dissolved Oxygen	mg/L	Field Measured	1.01	0.98	0.98	0.99	0.98	0.98	0.97	1.00	1.00	0.99	0.99	1.05	1.01	1.00	0.97	1.00	0.98	0.99	1.01	0.99	0.99	1.01	1.00	1.00
pH	-	Field Measured	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99	0.99	1.00	1.00	1.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
pH	-	Conventional Parameters	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total dissolved solids	mg/L	Conventional Parameters	1.01	1.01	1.07	1.02	1.06	1.01	1.07	1.01	1.02	1.04	1.02	1.00	1.03	1.02	1.02	1.01	1.01	1.01	1.11	1.01	0.98	1.02	1.08	1.02
Bromide	mg/L	Major Ions	1.01	0.98	1.01	0.84	0.88	0.81	0.86	0.93	0.81	0.99	0.83	0.69	0.88	0.92	1.00	1.00	0.95	1.00	0.91	0.82	0.78	0.83	1.00	0.89
Chloride	mg/L	Major Ions	0.87	0.85	0.96	0.89	0.92	0.89	1.01	0.98	0.95	0.98	0.94	0.89	0.93	0.93	0.86	0.86	0.85	0.78	1.01	1.03	1.01	1.01	1.13	0.91
Fluoride	mg/L	Major Ions	0.99	0.98	0.98	0.98	1.00	0.98	0.94	0.99	0.96	0.98	0.93	0.94	0.97	0.96	1.01	0.99	1.00	0.97	0.94	0.90	0.84	0.98	0.97	0.92
Sulphate	mg/L	Major Ions	1.02	1.03	1.10	1.02	1.08	1.01	1.09	1.03	1.04	1.06	1.03	0.99	1.05	1.04	1.04	1.03	1.02	1.02	1.13	1.03	0.99	1.02	1.27	1.03
Sulphide	mg/L	Major Ions	-	-	-	-	-	-	-	-	-	-	0.98	0.17	0.79	-	-	0.80	-	-	-	-	-	-	0.80	-
Nitrate	mg-N/l	Nutrients and Biological Indicators	1.11	0.94	1.11	1.05	1.10	1.03	1.02	0.98	0.96	1.00	1.00	0.94	1.01	1.00	1.06	1.03	0.93	0.94	1.18	0.97	0.88	1.05	2.32	1.07
Nitrite	mg-N/l	Nutrients and Biological Indicators	1.01	0.95	0.82	0.83	0.92	0.82	0.96	1.01	0.84	0.96	0.91	0.99	0.93	0.92	1.01	1.01	0.93	0.95	0.74	0.84	0.95	0.85	1.26	1.00
Total ammonia	mg-N/l	Nutrients and Biological Indicators	1.12	1.18	0.97	0.88	0.97	0.86	1.34	1.30	1.14	1.24	1.12	1.32	1.10	1.12	1.06	1.15	1.08	1.04	0.51	1.07	1.18	1.06	1.19	1.12
Total Aluminum	mg/L	Total Metals																								
Dissolved Aluminum	mg/L	Dissolved Metals	1.00	1.01	0.97	0.99	0.88	0.99	1.00	1.01	1.00	0.99	0.98	0.99	1.01	0.98	0.97	0.98	0.97	0.93	0.96	0.93	0.92	1.00	0.98	0.94
Total Antimony	mg/L	Total Metals	1.00	1.00	0.96	0.98	0.96	0.95	1.03	1.04	0.96	0.96	0.99	0.98	0.98	1.04	1.00	1.00	1.00	0.99	0.84	1.03	0.96	1.01	1.04	1.19
Dissolved Antimony	mg/L	Dissolved Metals	1.01	1.00	0.97	0.97	1.00	0.95	1.04	1.03	0.97	0.99	1.00	0.98	0.98	1.04	1.01	1.01	1.00	1.00	0.84	1.03	0.96	1.00	1.05	1.22
Total Arsenic	mg/L	Total Metals	1.00	0.98	0.95	1.00	0.83	0.98	1.02	0.98	1.02	0.89	0.99	0.98	0.97	0.99	0.99	1.01	1.00	1.00	0.89	0.97	0.98	1.00	1.00	0.97
Dissolved Arsenic	mg/L	Dissolved Metals	1.01	1.00	0.99	1.01	0.95	1.00	1.04	1.01	1.02	0.98	1.02	1.00	1.00	1.00	1.00	1.01	1.00	1.00	0.89	0.96	0.96	1.01	0.99	1.01
Total Barium	mg/L	Total Metals	1.00	0.99	1.02	0.99	0.97	1.00	0.91	0.95	0.95	0.96	0.98	0.96	1.00	0.99	1.00	1.01	0.91	0.98	1.01	0.75	0.95	1.01	1.01	0.95
Dissolved Barium	mg/L	Dissolved Metals	1.01	1.00	1.05	1.01	1.03	1.02	0.91	0.97	0.96	0.99	0.99	0.97	1.01	0.99	1.01	1.01	0.99	1.02	0.80	0.95	1.01	1.01	1.06	0.96
Total Beryllium	mg/L	Total Metals	0.74	0.74	0.76	0.75	0.74	0.73	0.70	0.68	0.78	0.69	0.74	0.71	0.73	0.75	0.75	0.74	0.74	0.69	0.75	0.72	0.69	0.75	0.74	0.74
Total Boron	mg/L	Total Metals	1.01	1.00	0.99	0.98	0.97	0.97	0.99	0.99	0.98	0.98	0.98	0.98	0.98	0.98	1.00	1.00	1.00	0.99	0.96	1.03	0.92	1.01	0.98	0.96
Dissolved Boron	mg/L	Dissolved Metals	1.00	1.00	1.00	0.98	1.00	0.97	1.00	1.00	0.98	0.99	0.99	0.99	1.00	0.99	1.01	1.01	1.00	1.00	0.96	1.03	0.93	1.00	1.00	0.97
Total Cadmium	mg/L	Total Metals	1.00	0.99	1.04	0.93	0.83	0.89	0.93	1.02	0.97	0.93	0.96	0.95	0.93	0.94	0.91	0.95	1.02	1.06	1.09	1.04	0.88	1.02	1.02	0.82
Dissolved Cadmium	mg/L	Dissolved Metals	0.97	1.02	1.12	0.97	0.94	0.92	0.95	1.04	0.98	1.01	0.97	0.92	0.97	0.94	0.90	0.94	1.04	0.98	1.01	1.00	0.74	1.06	1.03	0.82
Total Chromium	mg/L	Total Metals	0.98	0.96	0.95	1.00	0.82	0.95	1.00	1.01	1.00	0.91	0.99	0.97	0.95	0.97	0.96	0.95	0.97	1.03	0.93	0.94	0.94	0.97	0.94	0.87
Dissolved Chromium	mg/L	Dissolved Metals	0.96	0.96	0.96	0.99	0.98	0.97	1.02	1.01	0.95	1.03	0.95	0.97	1.02	0.95	0.96	0.96	0.96	0.93	1.00	0.96	0.93	0.96	1.00	0.92
Total Cobalt	mg/L	Total Metals	1.00	0.99	0.98	0.97	0.80	0.93	1.05	1.17	1.03	0.99	1.00	0.99	0.99	0.99	1.00	1.00	0.98	1.00	0.74	0.92	0.97	1.01	1.00	0.92
Dissolved Cobalt	mg/L	Dissolved Metals	1.01	1.00	1.01	0.99	0.99	0.96	1.04	1.16	1.03	1.08	1.03	1.00	1.01	1.00	1.01	1.01	1.00	1.00	0.79	0.93	0.97	1.01	1.01	0.97
Total Copper	mg/L	Total Metals	0.99	0.99	0.95	1.00	0.85	0.97	1.01	1.01	1.04	0.93	1.00	0.99	0.98	0.99	1.00	0.99	0.99	1.03	0.97	0.95	0.95	0.99	0.98	0.93
Dissolved Copper	mg/L	Dissolved Metals	0.97	0.98	1.00	0.97	0.95	0.96	0.96	0.97	1.00	0.98	0.97	1.00	0.97	0.97	0.99	0.96	0.97	0.92	0.98	0.94	0.92	0.98	0.97	0.98
Total Iron	mg/L	Total Metals	0.91	0.86	0.81	0.95	0.73	0.90	0.97	0.93	0.89	0.79	0.85	0.83	0.87	0.88	0.85	0.82	0.88	0.84	0.81	0.84	0.95	0.86	0.89	0.81
Dissolved Iron	mg/L	Dissolved Metals	0.87	0.86	0.83	0.88	0.85	0.83	1.03	1.01	0.83	1.01	0.84	0.91	0.88	0.85	0.85	0.86	0.86	0.78	0.87	0.86	0.89	0.86	0.87	0.86
Total Lead	mg/L	Total Metals	1.00	0.97	0.95	0.97	0.77	0.94	1.03	0.99	1.07	0.90	0.97	0.95	0.95	0.98	1.00	0.97	0.98	0.99	0.97	0.92	0.94	1.01	0.98	0.90
Dissolved Lead	mg/L	Dissolved Metals	1.01	1.00	1.00	1.01	1.00	1.00	1.02	1.01	1.01	1.02	1.02	1.00	1.01	0.99	1.01	1.01	1.00	1.00	1.02	0.97	0.93	1.00	1.01	1.00
Total Lithium	mg/L	Total Metals	1.01	1.03	1.13	1.06	1.09	1.06	1.03	1.03	1.07	1.05	1.09	1.08	1.07	1.07	1.07	1.01	1.03	1.00	1.14	1.08	1.03	1.01	1.04	1.06
Dissolved Lithium	mg/L	Dissolved Metals	1.02	1.03	1.14	1.06	1.12	1.06	1.04	1.04	1.06	1.06	1.09	1.08	1.07	1.07	1.08	1.02	1.04	1.01	1.14	1.08	1.04	1.02	1.04	1.06
Total Manganese	mg/L	Total Metals	0.95	0.89	0.97	0.97	0.81	0.93	0.83	0.96	0.95	0.88	0.94	0.96	0.91	0.91	1.01	0.94	0.92	1.06	0.82	0.97	1.23	0.92	1.06	0.81
Dissolved Manganese	mg/L	Dissolved Metals	0.89	0.88	1.08	1.00	1.06	0.97	0.82	1.02	0.89	1.03	0.98	0.94	0.91	0.91	1.09	1.00	0.91	1.07	0.88	0.98	1.21	0.92	1.02	0.81
Total Mercury	mg/L	Total Metals	0.61	0.60	0.61	0.61	0.62	0.59	0.65	0.58	0.62	0.62	0.57	0.52	0.58	0.61	0.59	0.59	0.58	0.79	0.58	0.58	0.62	0.59	0.61	0.62
Total Methyl mercury	µg/L	Total Metals	0.70	0.75	-	0.69	-	-	0.74	0.60	-	-	-	-	-	0.57	0.28	-	-	-	-	-	1.01	-	0.80	0.66
Total Molybdenum	mg/L	Total Metals	1.00	1.00	0.98	0.99	0.99	0.97	1.04	1.02	1.00	0.98	0.99	1.02	0.99	1.06	1.01	1.01	1.00	1.00	0.89	0.97	0.97	1.01	1.05	1.11
Dissolved Molybdenum	mg/L	Dissolved Metals	1.01	1.01	0.98	0.99	1.01	0.98	1.04	1.03	1.00	0.99	0.99	1.02	1.00	1.06	1.02	1.02	1.01	0.99	0.89	0.97	0.97	1.01	1.06	1.11
Total Nickel	mg/L	Total Metals	1.00	1.00	1.02	1.02	0.90	0.94	1.11	1.07	0.94	0.92	0.99	0.97	0.94	1.11	1.00	1.00	0.98	1.01	1.05	1.12	0.89	1.00	1.07	1.27
Dissolved Nickel	mg/L	Dissolved Metals	1.01	0.99	1.05	1.02	1.01	0.95	1.12	1.06	0.94	0.95	0.97	0.96	0.95	1.11	1.01	1.01	0.98	-	1.06	1.13	0.89	0.99	1.07	1.30
Total Selenium	mg/L	Total Metals	1.04	1.01	1.06	1.03	1.08	0.99	1.10	1.03	1.02	1.07	1.03	0.98	1.04	1.03	1.05	1.04	0.99	0.98	1.12	1.04	0.97	1.00	1.34	1.01
Dissolved Selenium	mg/L	Dissolved Metals	1.05	1.02	1.07	1.04	1.09	1.00	1.13	1.06	1.04	1.10	1.04	1.01	1.04	1.04	1.06	1.05	1.01	0.99	1.14	1.06	0.98	1.01	1.35	1.02
Total Silver	mg/L	Total Metals	1.01	1.00	0.98	1.00	0.87	1.01	1.02	1.01	1.01	0.94	1.00	1.00	0.98	0.99	1.00	1.00	1.00	1.00	1.01	0.97	0.93	1.01	0.99	0.98
Total Strontium	mg/L	Total Metals	1.01	1.00	1.04	1.01	1.03	1.02	1.03	1.00	1.00	1.03	1.00	0.99	1.02	1.01	1.02	1.01	1.00	0.99	1.03	1.04	1.00	1.03	1.07	1.00
Dissolved Strontium	mg/L	Dissolved Metals	1.02	1.01	1.06	1.02	1.07	1.02	1.03	1.02	1.01	1.04	1.01	0.99	1.02	1.01	1.03	1.01	1.01	1.00	1.04	1.04	1.00	1.03	1.08	1.01
Total Thallium	mg/L	Total Metals	1.00	0.99	0.98	1.00	0.85	0.98	1.07	1.01	1.01	0.92	1.00	1.00	0.98	0.99	1.00	1.00	1.00	1.00	1.01	0.99	0.98	1.01	0.99	0.97
Dissolved Thallium	mg/L	Dissolved Metals	1.01	1.00	1.00	1.00	0.99	0.98	1.06	1.01	1.01	1.00	1.02	1.00	1.00	1.00	1.01	1.01	1.00	1.00	1.01	1.00	0.98	1.00	1.00	1.00
Total Uranium	mg/L	Total Metals	1.01	1.02	1.09	1.04	1.07	1.02	1.11	1.06	1.04	1.06	1.03	1.03	1.04	1.04	1.02	1.01	1.01	1.00	1.20	1.03	0.98	1.02	1.10	1.03
Dissolved Uranium	mg/L	Dissolved Metals	1.02	1.02	1.10	1.04	1.10	1.02	1.11	1.06	1.04	1.07	1.03	1.03	1.05	1.04	1.03	1.02	1.02	1.01	1.21	1.03	0.98	1.02	1.11	1.03
Total Vanadium	mg/L	Total Metals	0.90	0.89	0.88	0.90	0.77	0.90	0.99	0.95	0.90	0.89	0.88	0.84	0.88	0.89	0.89	0.89	0.89	0.87	0.89	0.86	0.82	0.89	0.92	0.86
Dissolved Vanadium	mg/L	Dissolved Metals	0.89	0.88	0.89	0.89	0.89	0.87	0.99	0.96	0.89	0.96	0.88	0.85	0.88	0.89	0.90	0.89	0.89	0.85	0.90	0.85	0.82	0.89	0.91	0.88
Total Zinc	mg/L	Total Metals	1.01	0.99	0.99	0.99	0.86	0.95	1.05	1.02	1.02	0.93	1.01	0.97	1.00	0.99	1.00	0.99	1.00	1.00	1.03	1.02	0.89	1.03	1.00	0.97
Dissolved Zinc	mg/L	Dissolved Metals	0.86	0.85	0.91	0.89	0.89	0.90	0.83	0.77	0.89	0.81	0.88	0.84	0.86	0.87	0.88	0.87	0.89	0.90	0.97	0.98	0.80	1.05	0.87	0.88

Notes:

- = no data available; mg/L = milligrams per litre; mg-N/L = milligrams nitrogen per litre; mg-P/L = milligrams phosphorus per lit

Values are presented as the annual rate of change calculated based on all available data from 2012 to 201

The annual rate of change was calculated as e^(365 * x), where x is equal to the slope estimate for the linear model for log transformed da

Value — indicates that the annual rate of change is below zero and therefore concentrations are not increasin

Value — indicates that the annual rate of increase is 50%

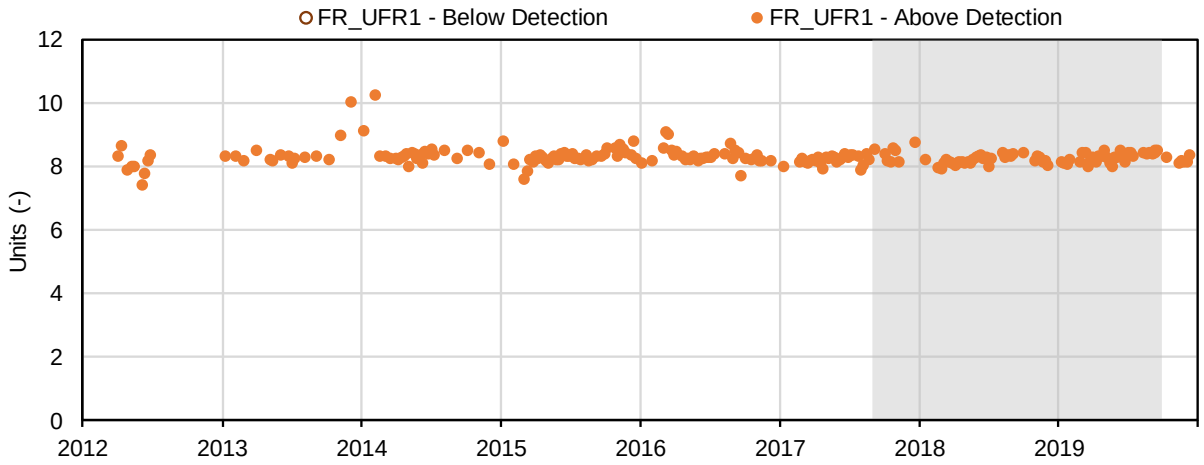
Rates of increase in between 0% and 50% were shaded using a gradient to provide a visualization of relative magnitudes. For dissolved oxygen, gradient shading was used for values between 1 and 0 to show relative magnitudes in decreasing trer

Cells were only shaded where the calculated p-value for the slope was <0.0

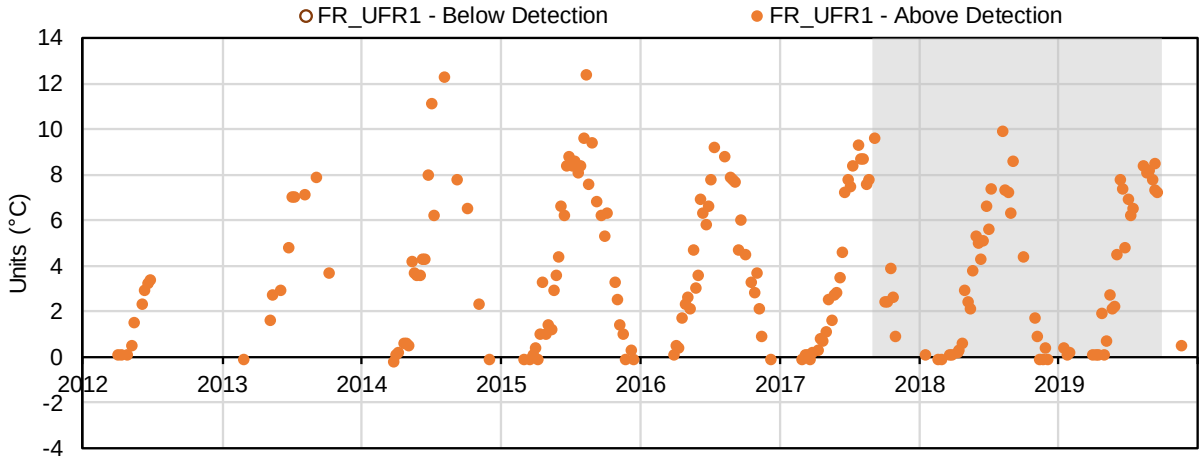
ATTACHMENT F2

FR_UFR1 Plots

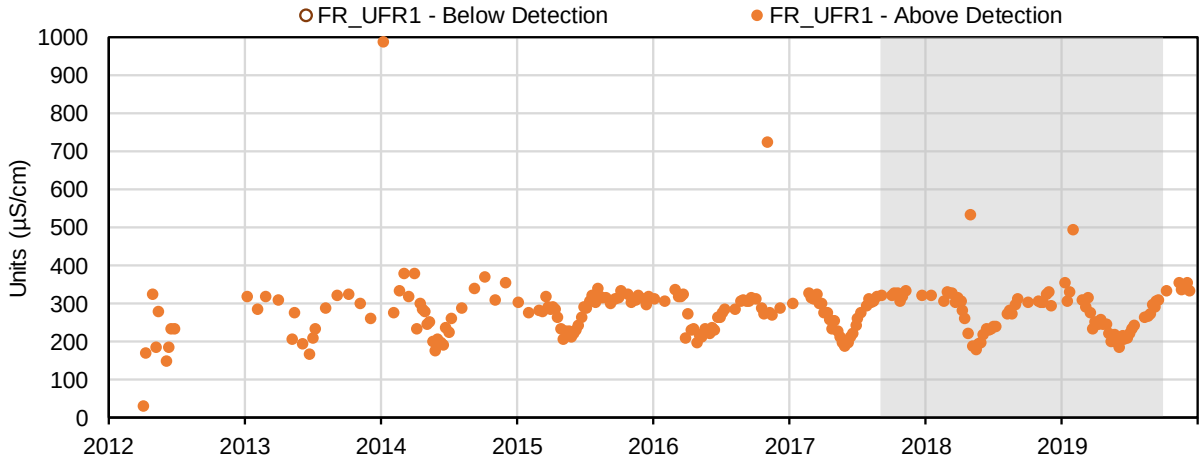
(1) pH (-); Field Measured



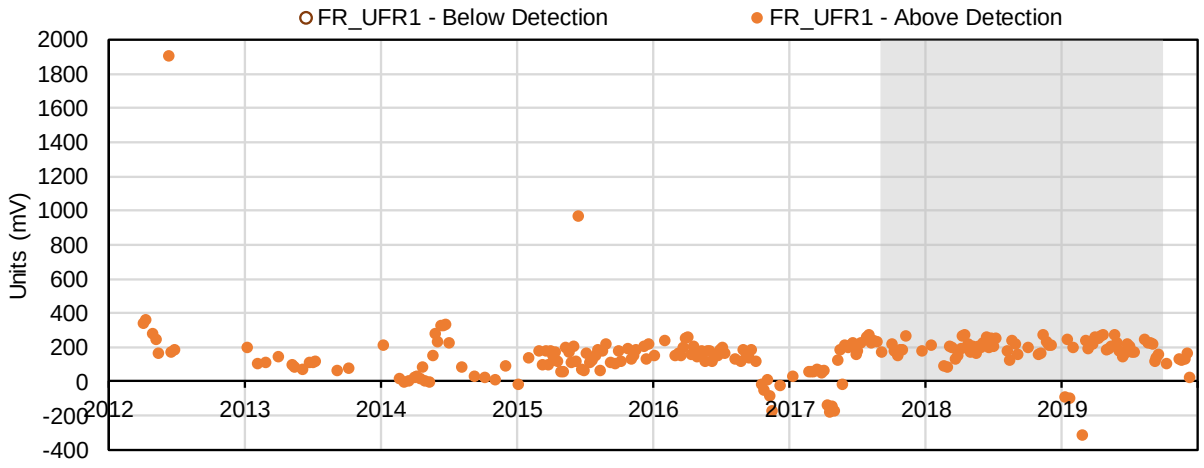
(2) Temperature (°C); Field Measured



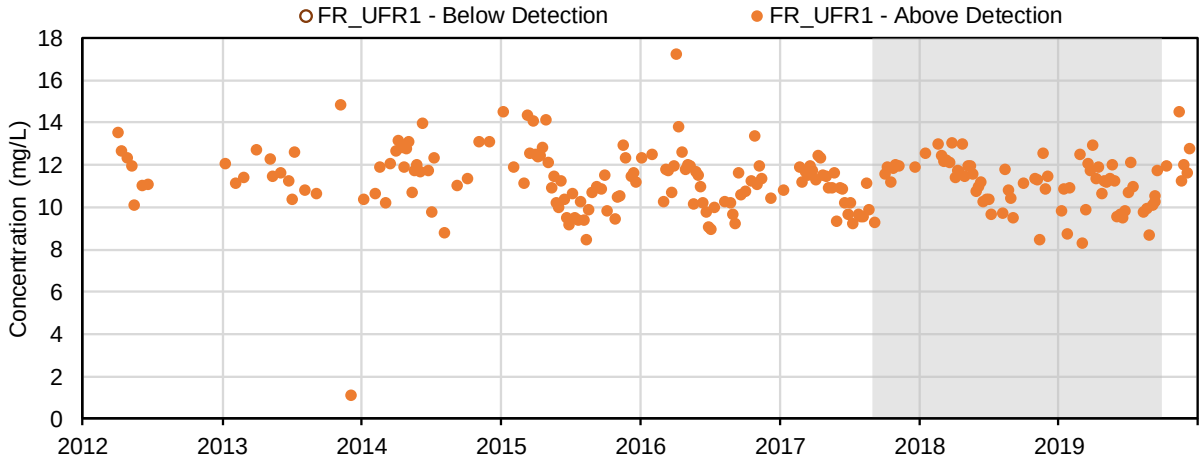
(3) Conductivity (µS/cm); Field Measured



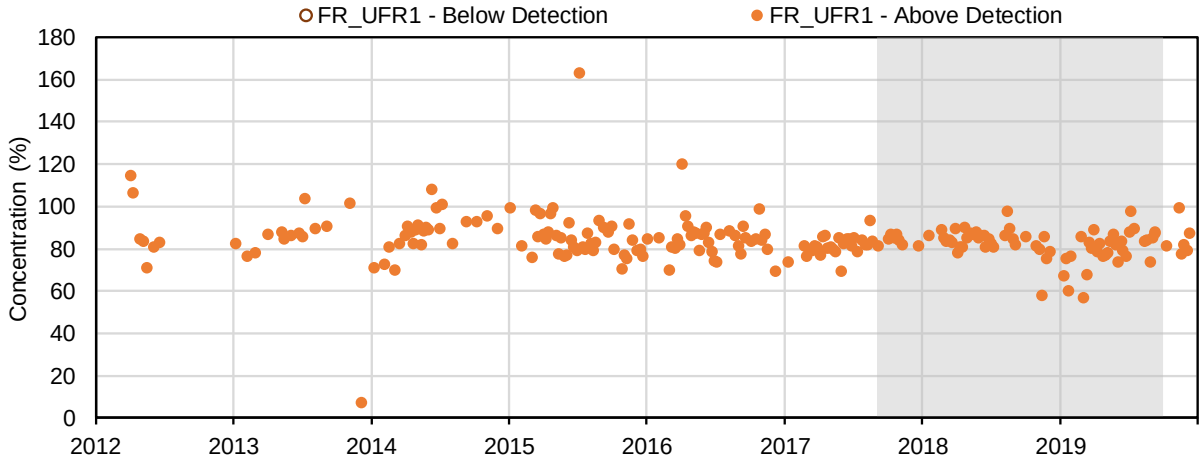
(4) Oxidation-Reduction Potential (mV); Field Measured



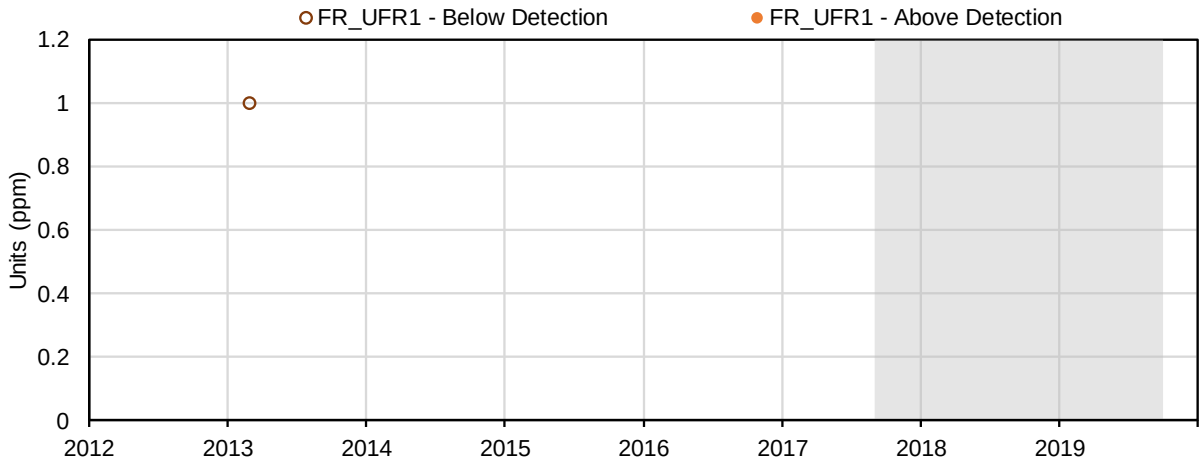
(5) Dissolved Oxygen (mg/L); Field Measured



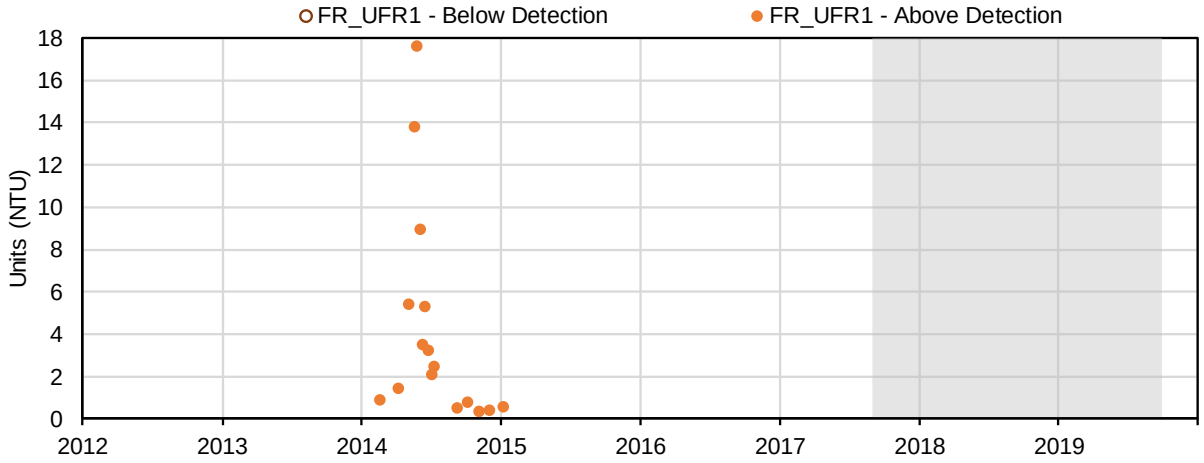
(6) Dissolved Oxygen (%); Field Measured



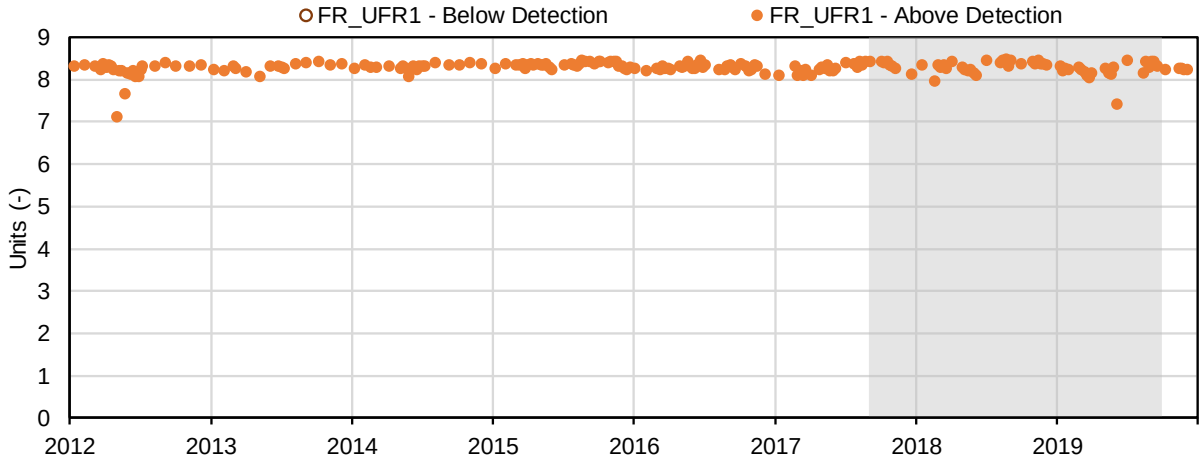
(7) Total Suspended Solids (ppm); Field Measured



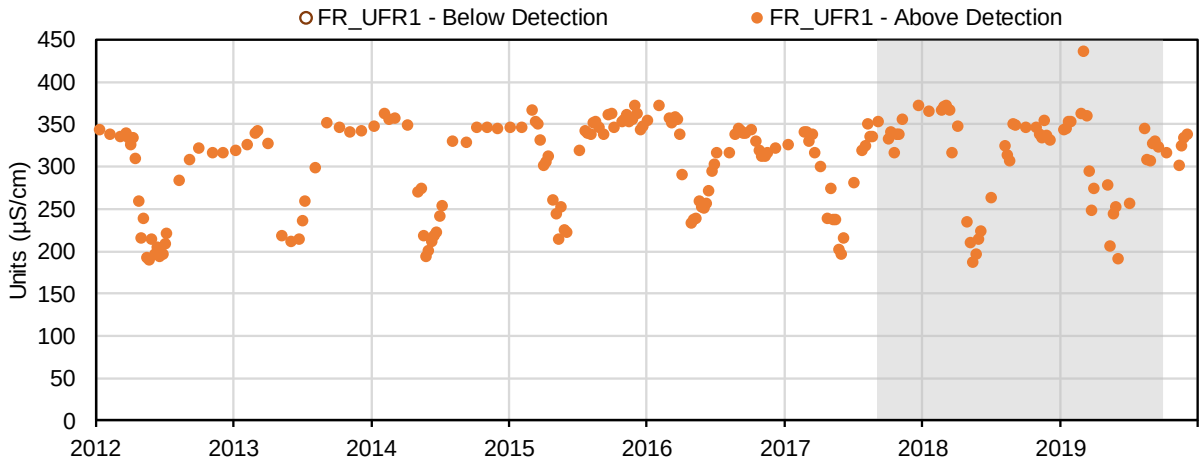
(8) Turbidity (NTU); Field Measured



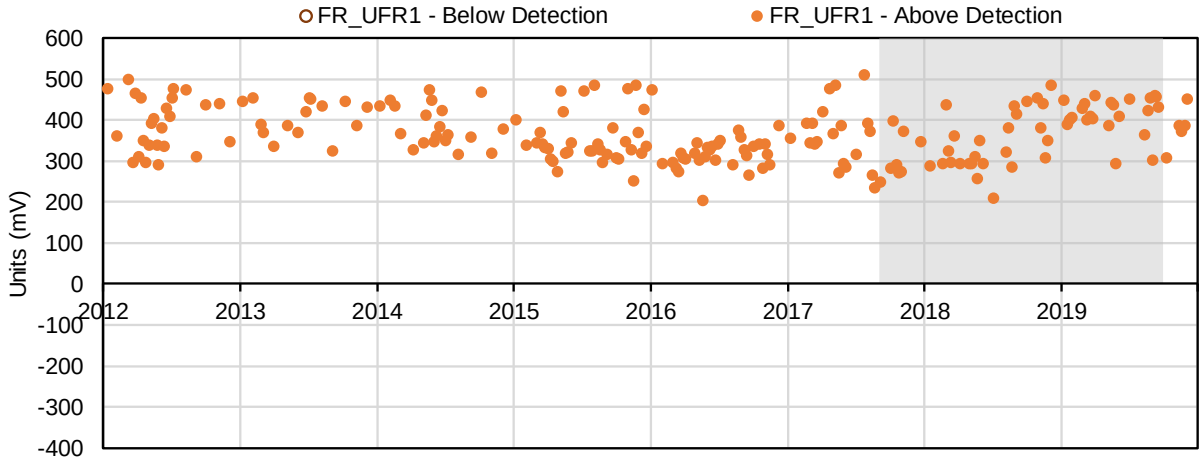
(9) pH (-); Conventional Parameters



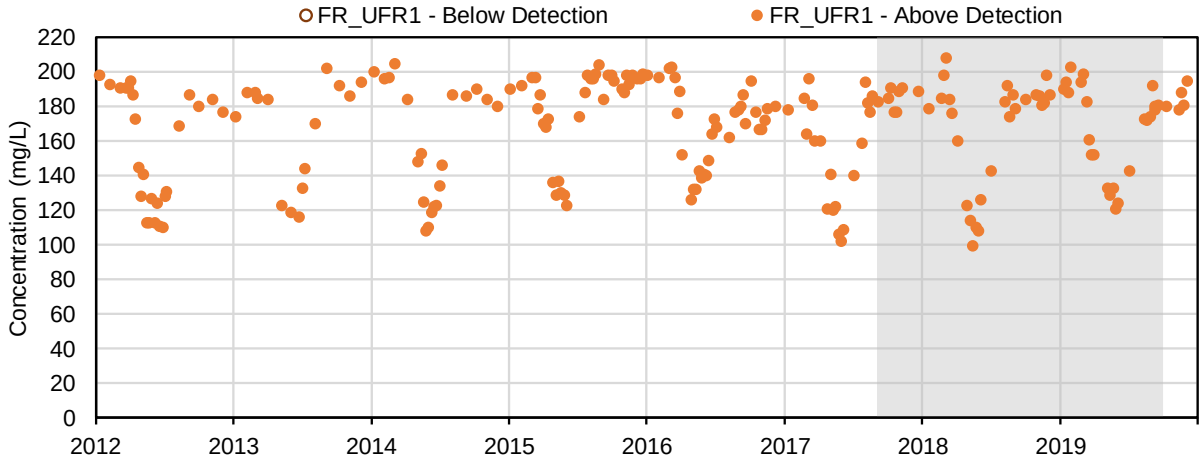
(10) Conductivity (µS/cm); Conventional Parameters



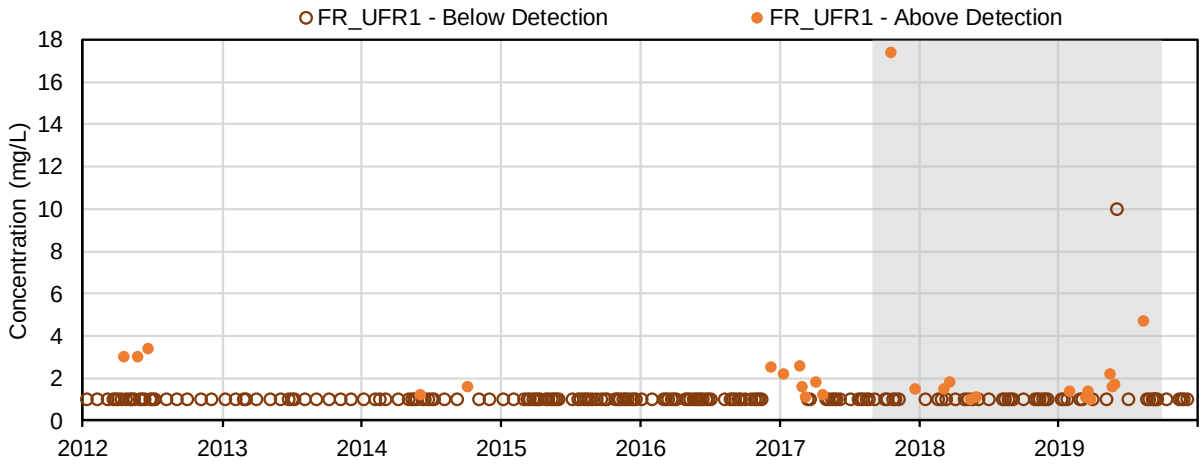
(11) Oxidation-Reduction Potential (mV); Conventional Parameters



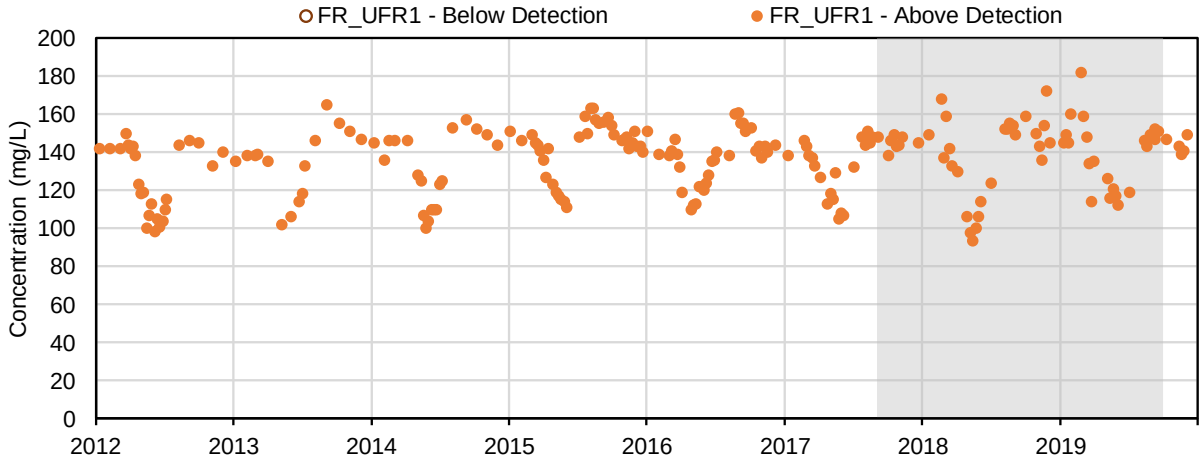
(12) Hardness, as CaCO3 (mg/L); Conventional Parameters



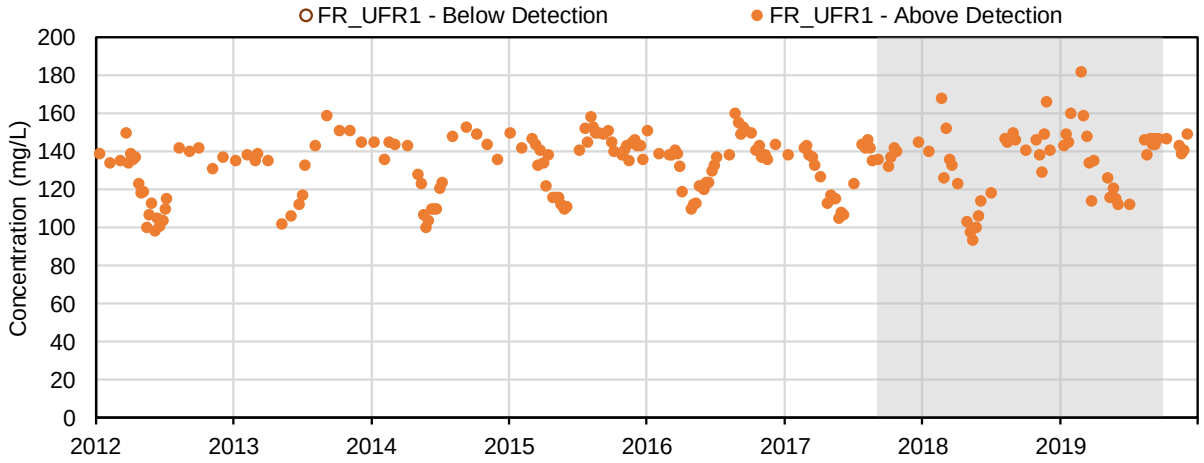
(13) Acidity, CaCO3 (mg/L); Conventional Parameters



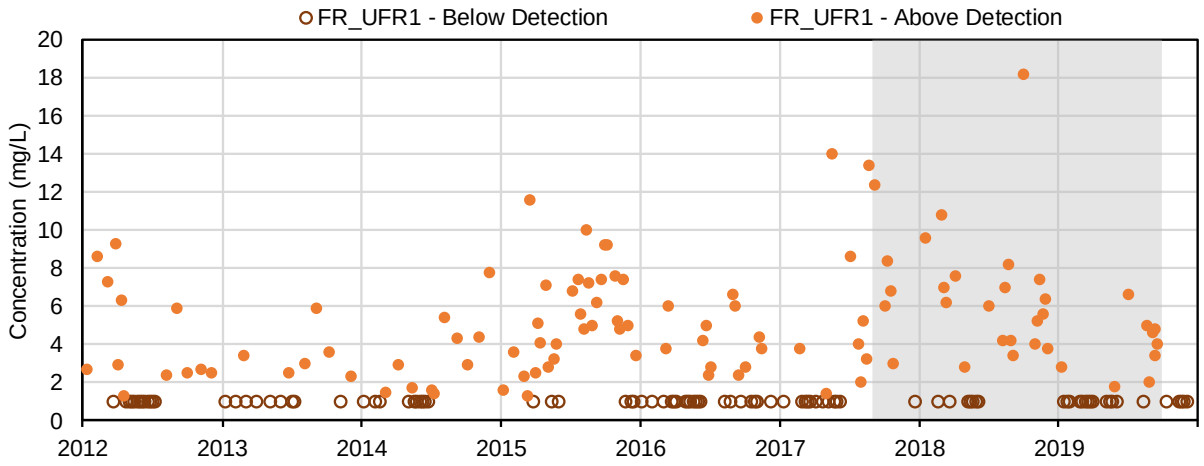
(14) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



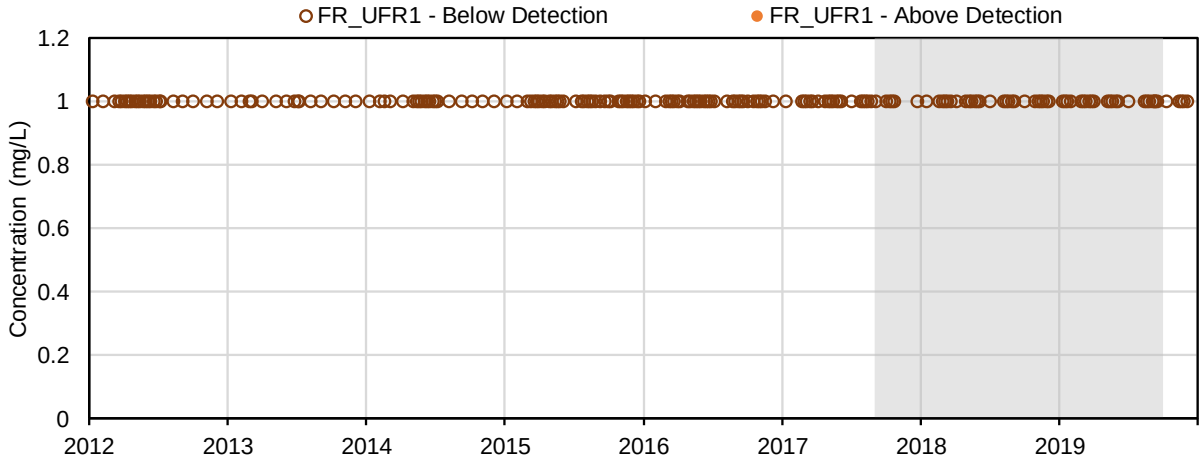
(15) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



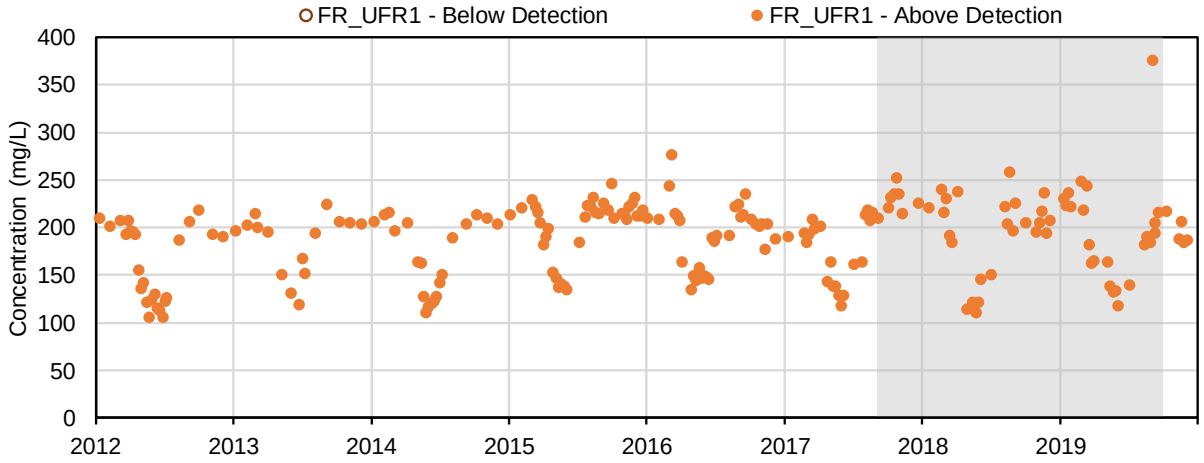
(16) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



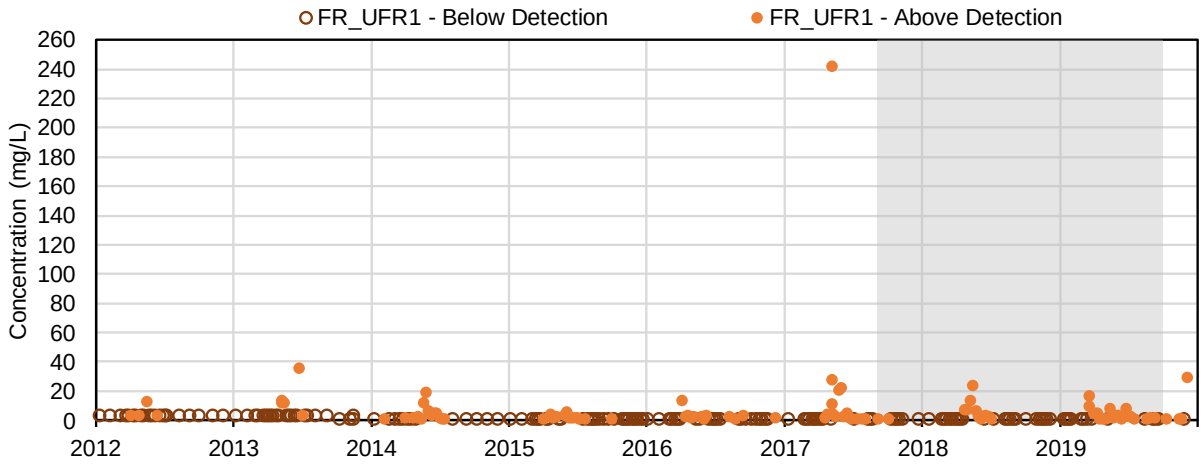
(17) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



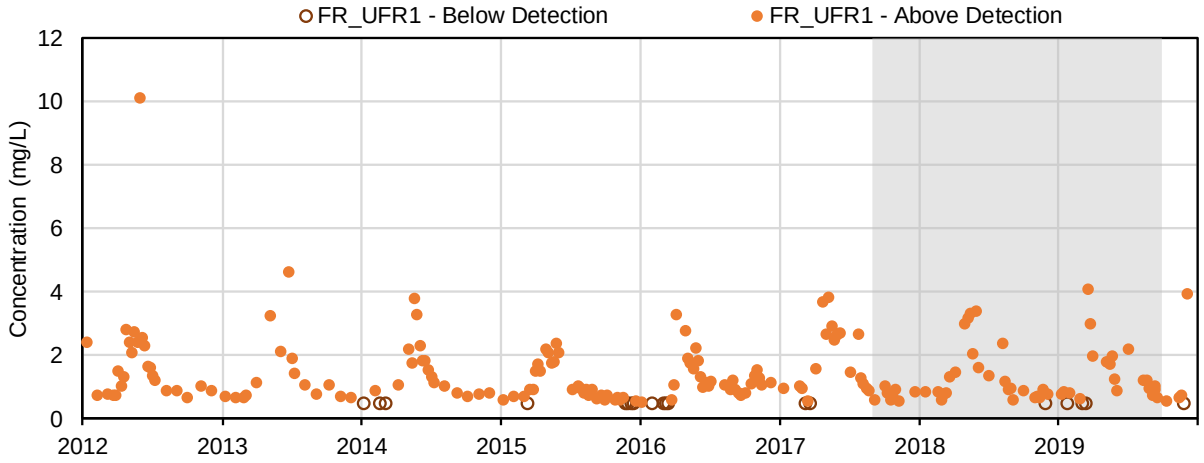
(18) Total dissolved solids (mg/L); Conventional Parameters



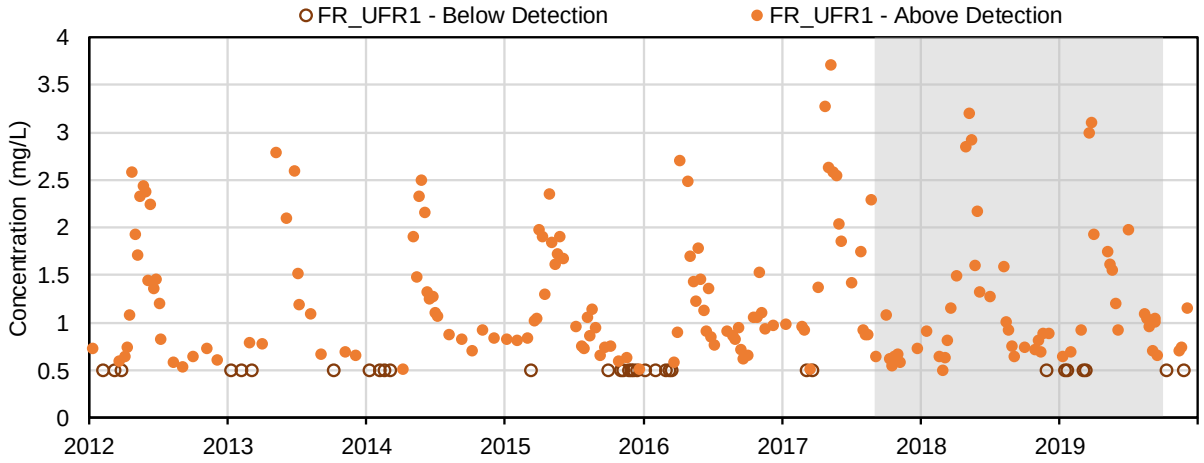
(19) Total suspended solids (mg/L); Conventional Parameters



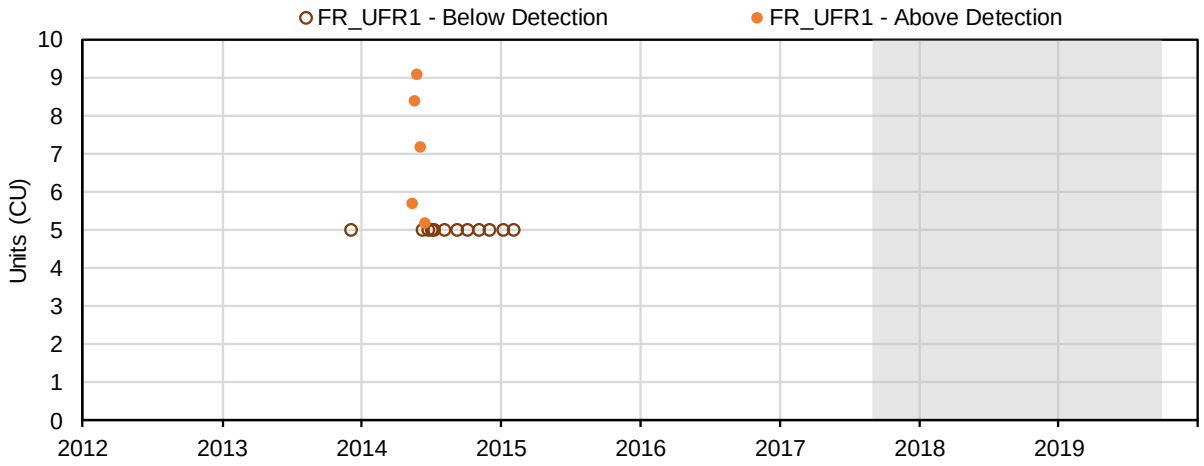
(20) Total organic carbon (mg/L); Conventional Parameters



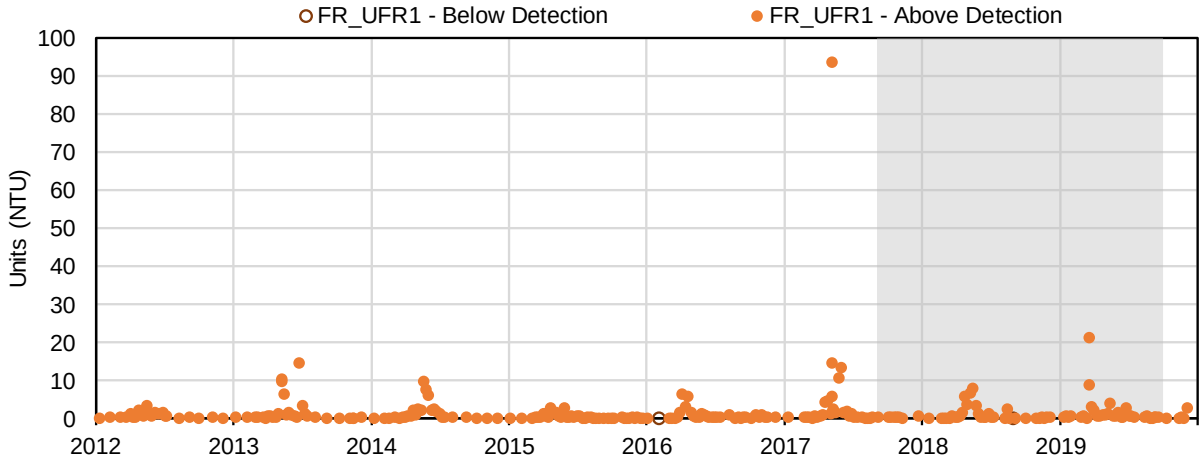
(21) Dissolved organic carbon (mg/L); Conventional Parameters



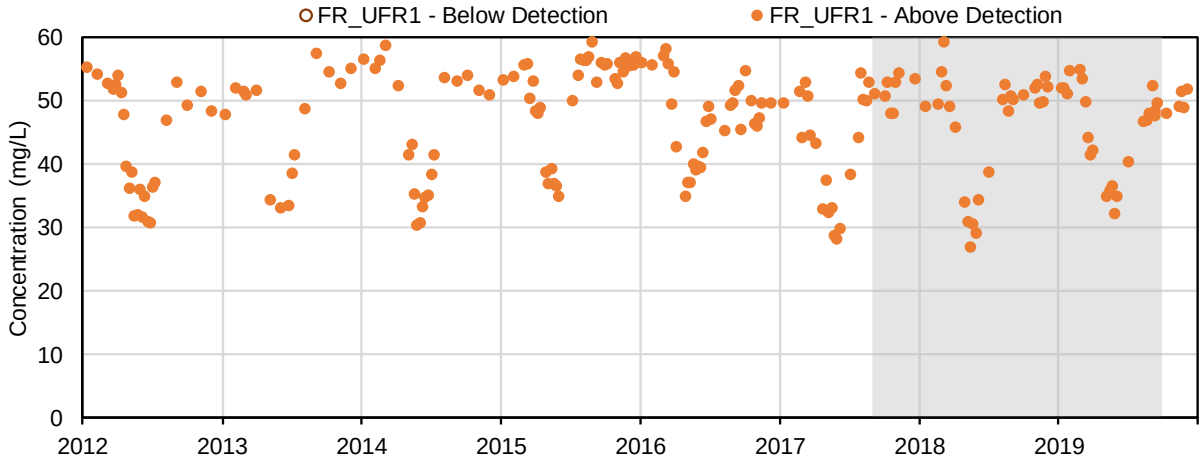
(22) Colour (CU); Conventional Parameters



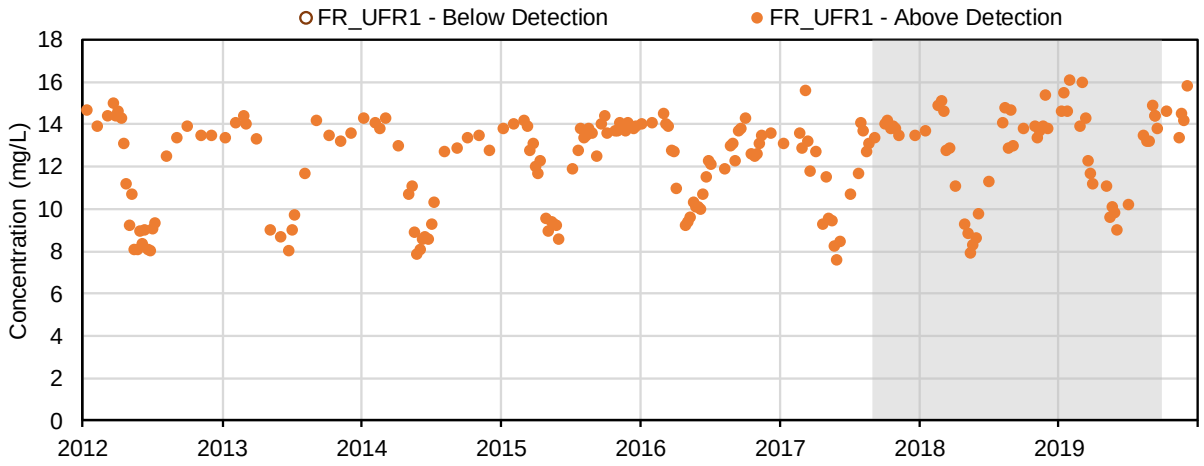
(23) Turbidity (NTU); Conventional Parameters



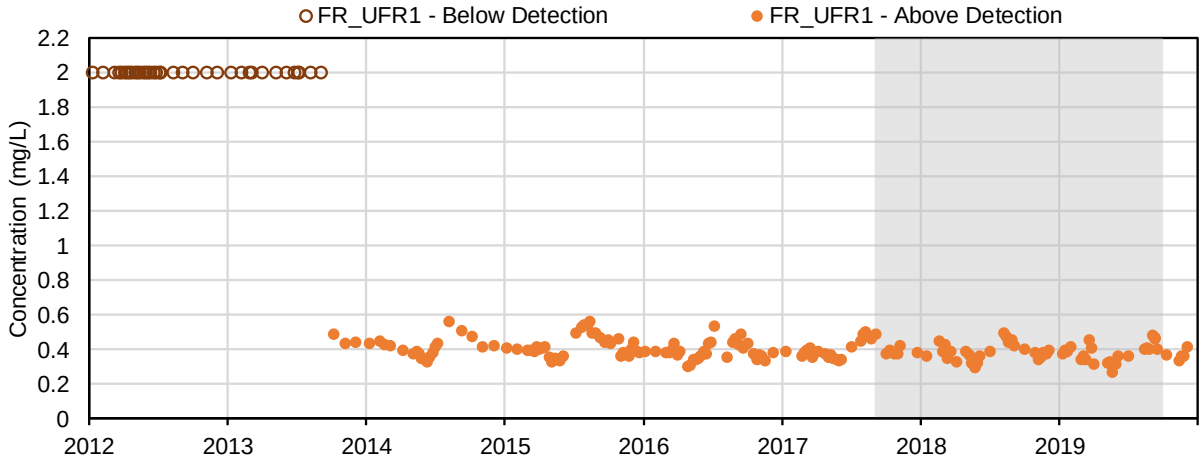
(24) Calcium (mg/L); Major Ions



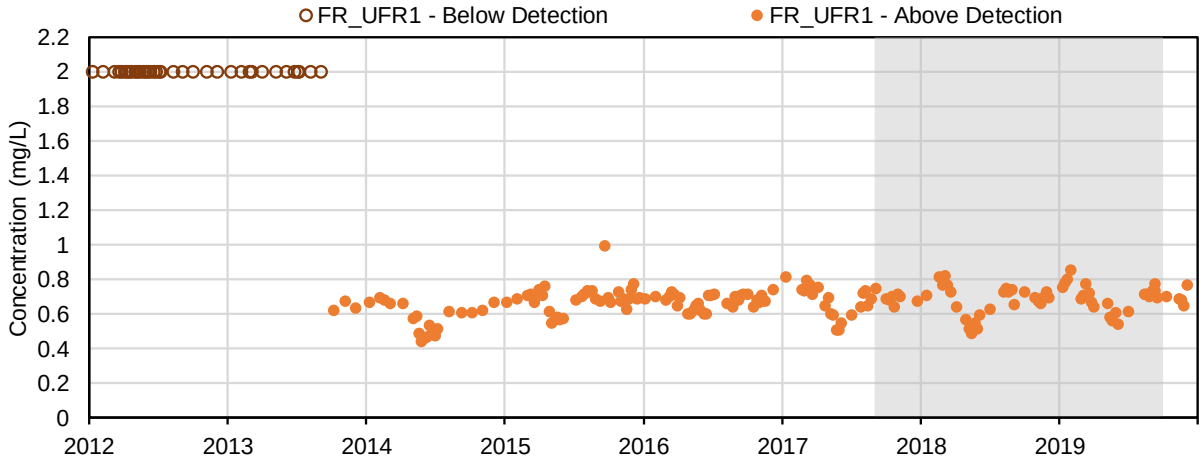
(25) Magnesium (mg/L); Major Ions



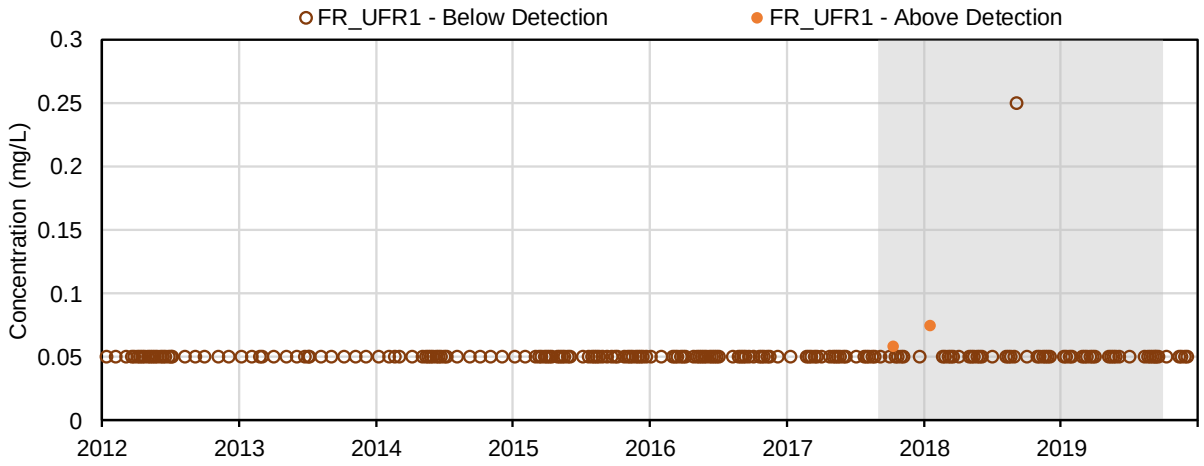
(26) Potassium (mg/L); Major Ions



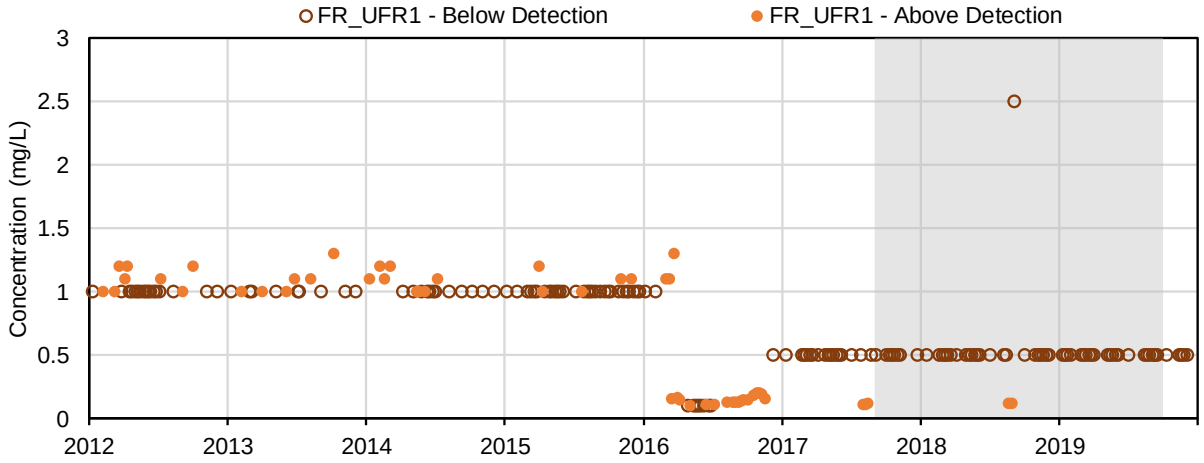
(27) Sodium (mg/L); Major Ions



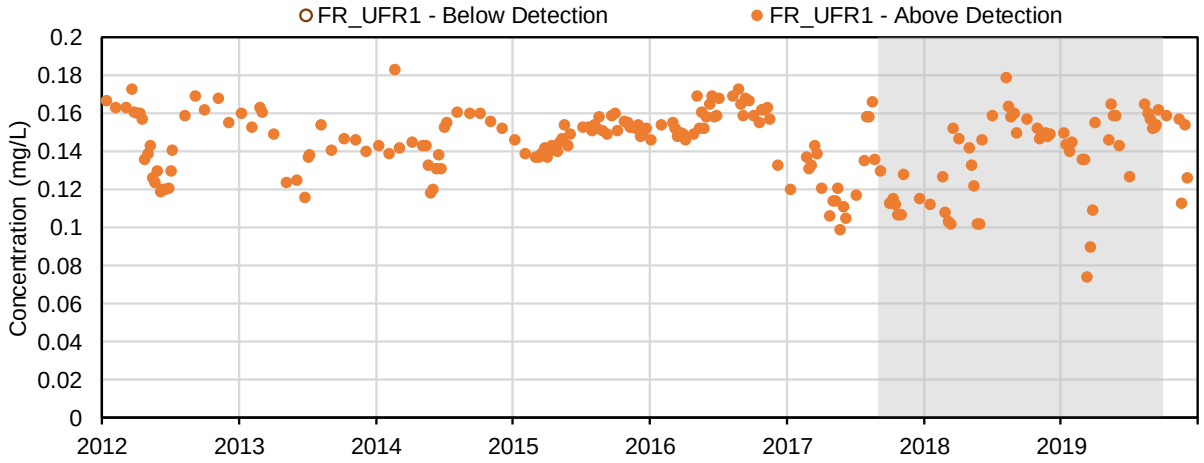
(28) Bromide (mg/L); Major Ions



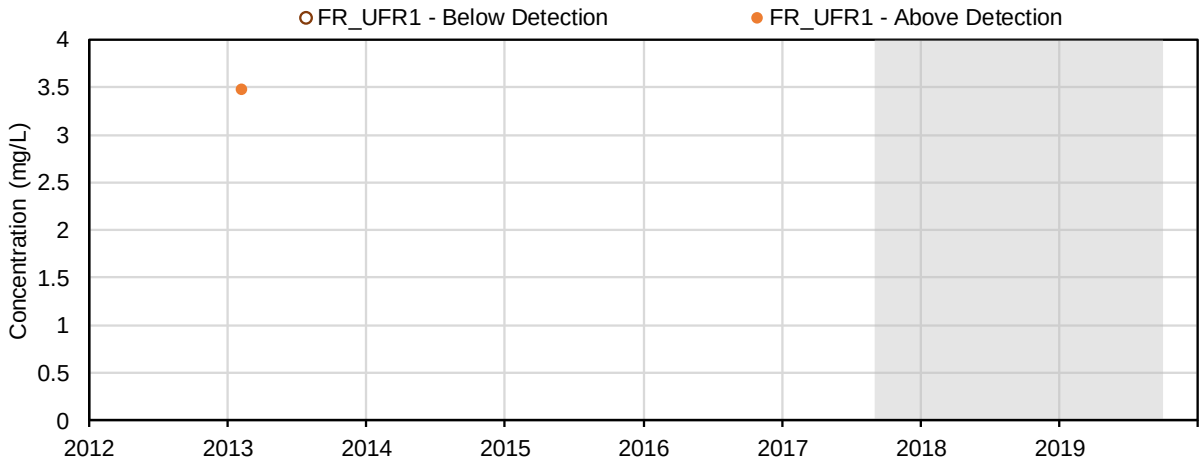
(29) Chloride (mg/L); Major Ions



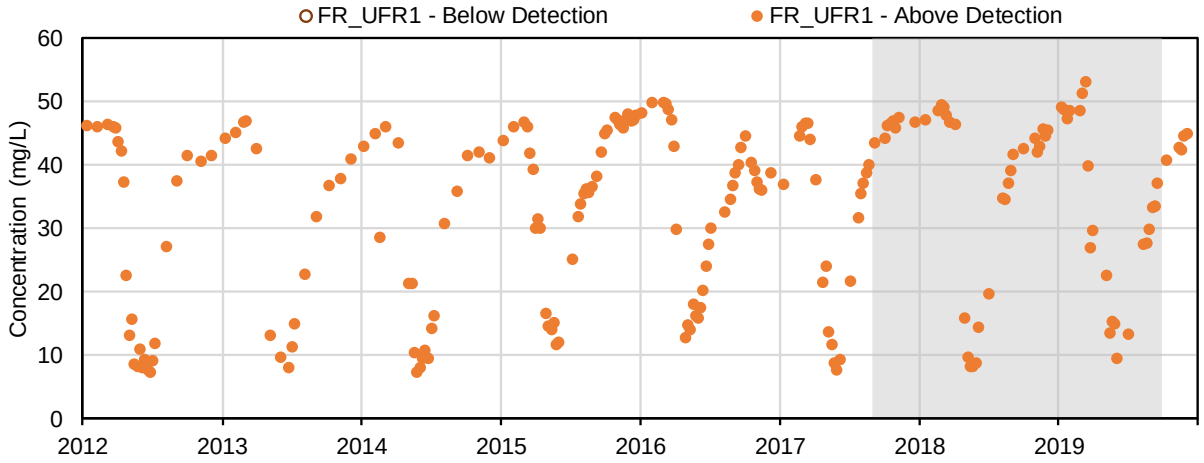
(30) Fluoride (mg/L); Major Ions



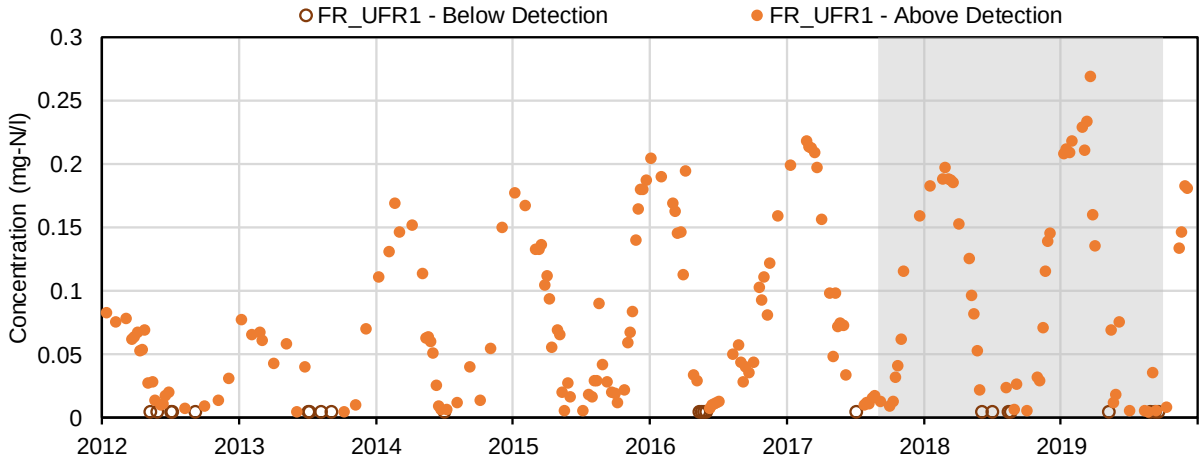
(31) Silica (mg/L); Major Ions



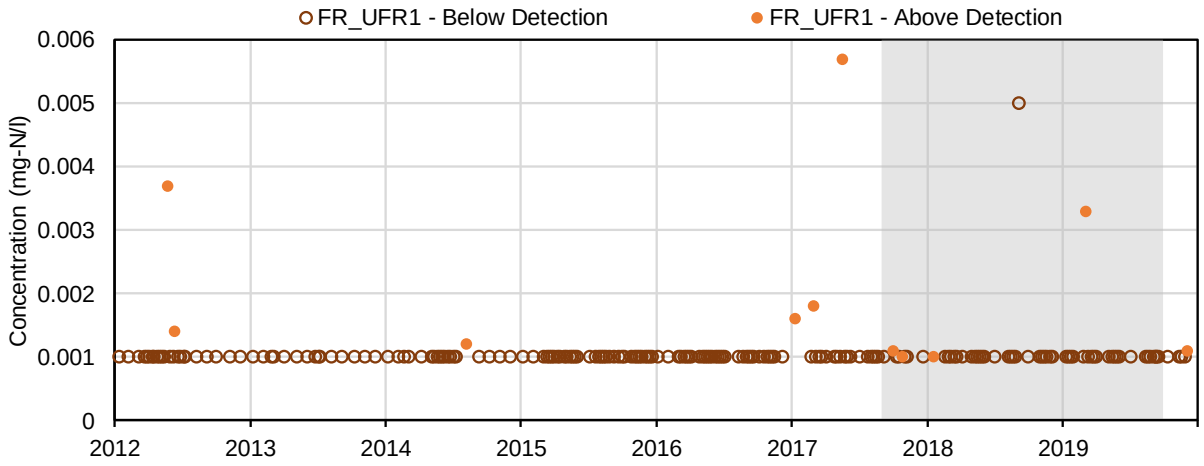
(32) Sulphate (mg/L); Major Ions



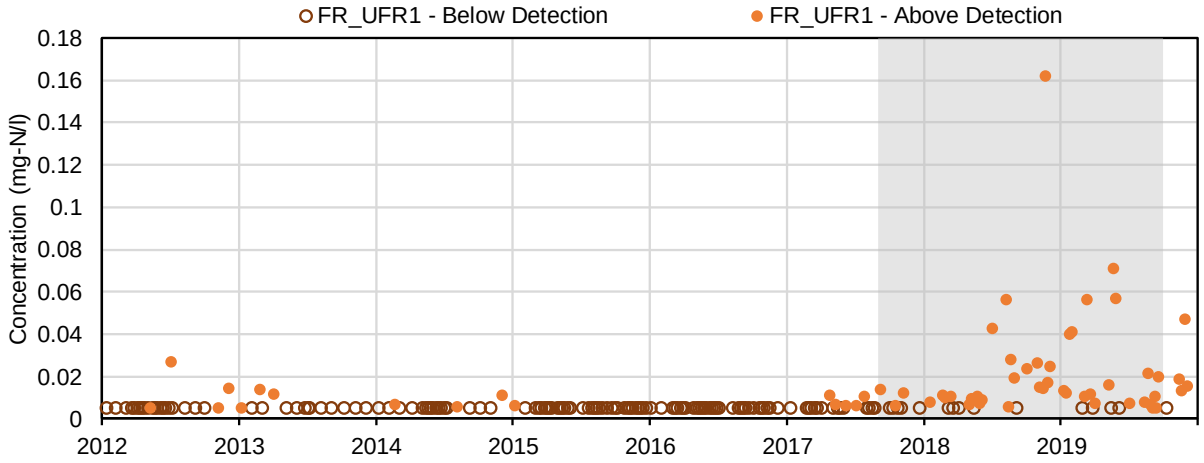
(33) Nitrate (mg-N/l); Nutrients and Biological Indicators



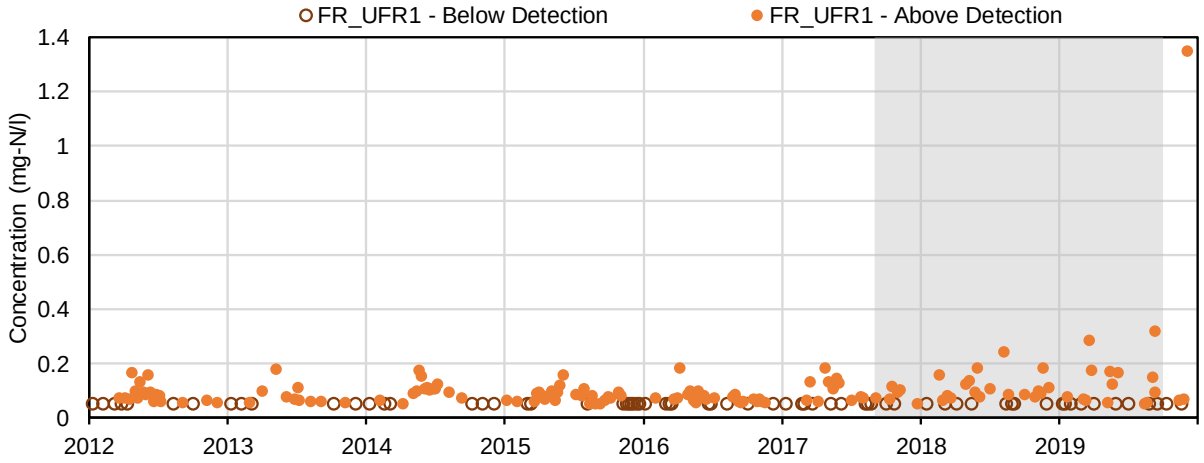
(34) Nitrite (mg-N/l); Nutrients and Biological Indicators



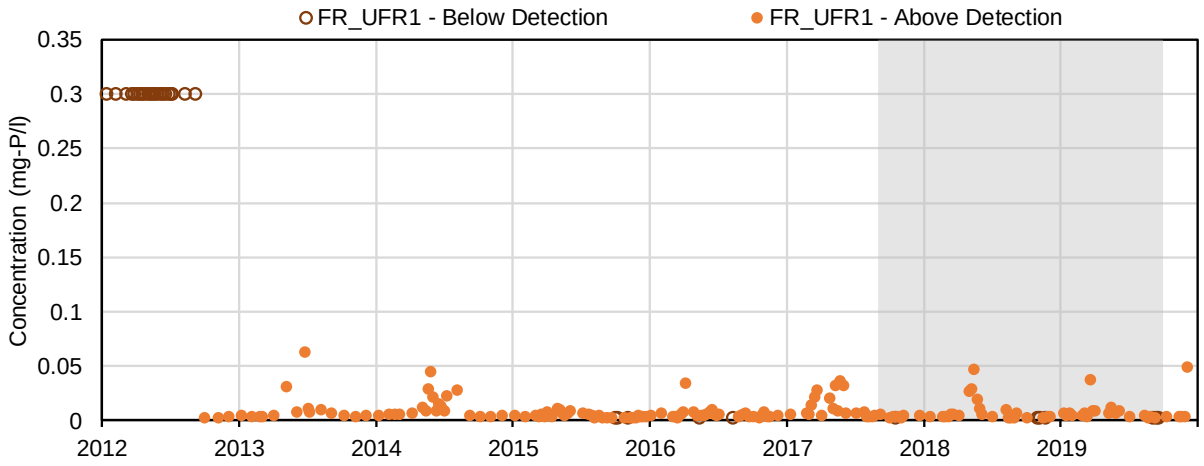
(35) Total ammonia (mg-N/l); Nutrients and Biological Indicators



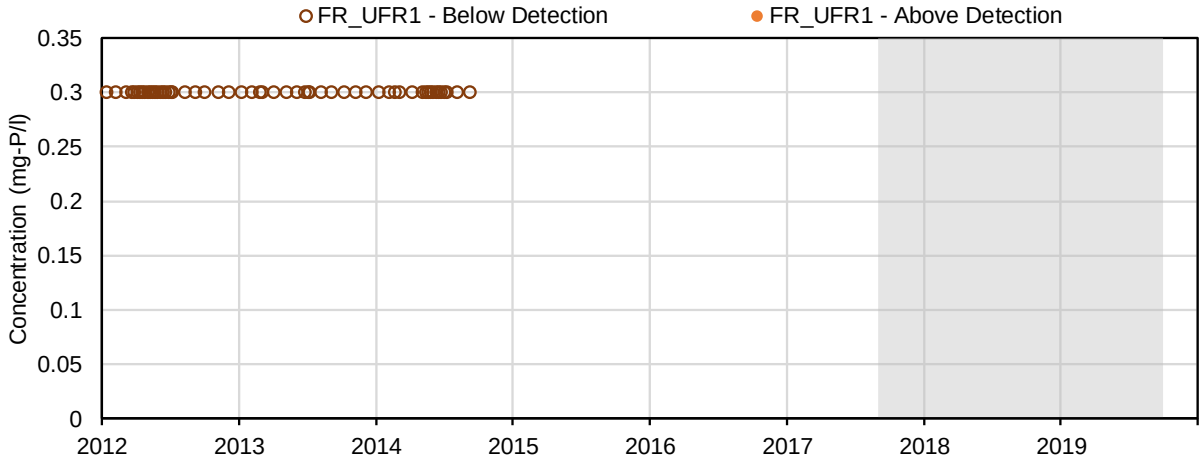
(36) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



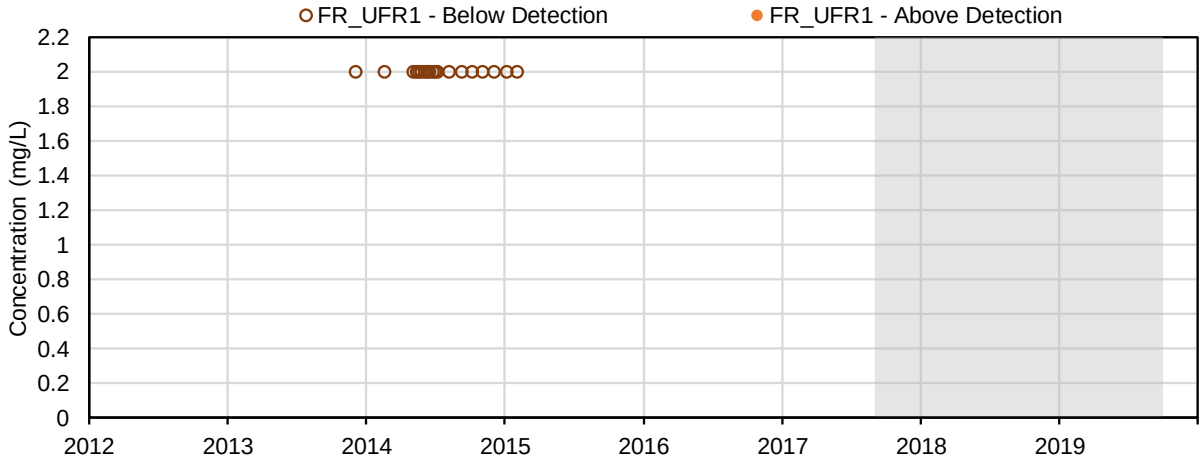
(37) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



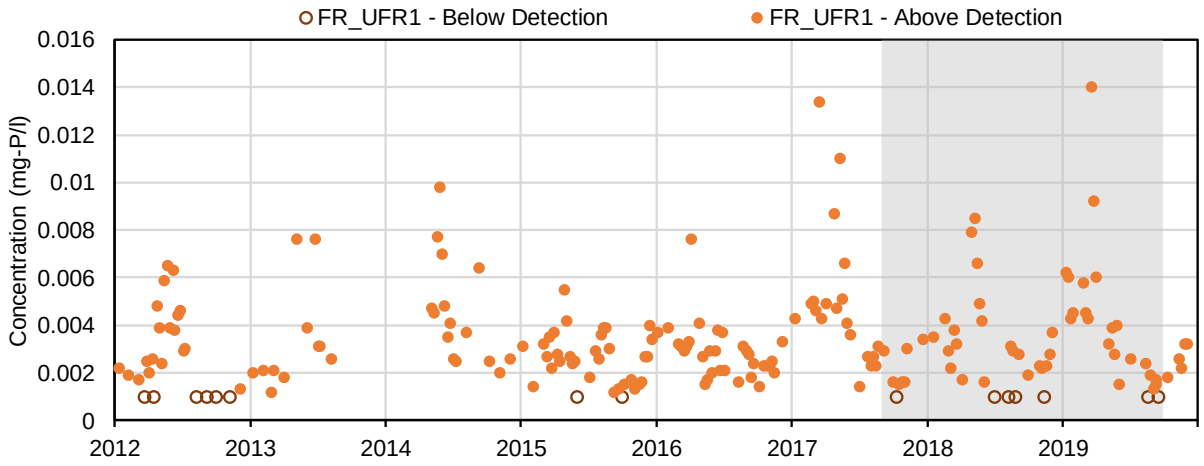
(38) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



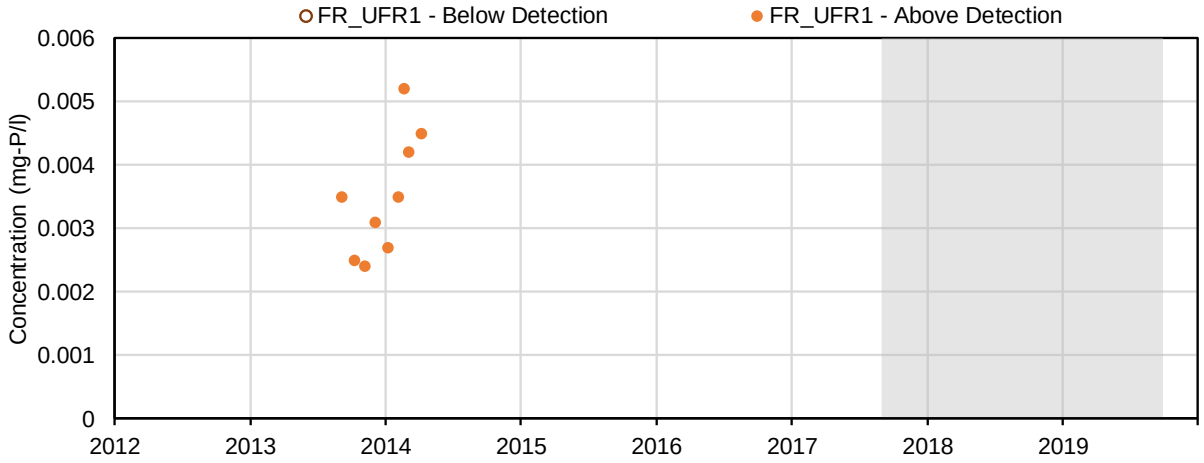
(39) Biochemical oxygen demand (mg/L); Nutrients and Biological Indicators



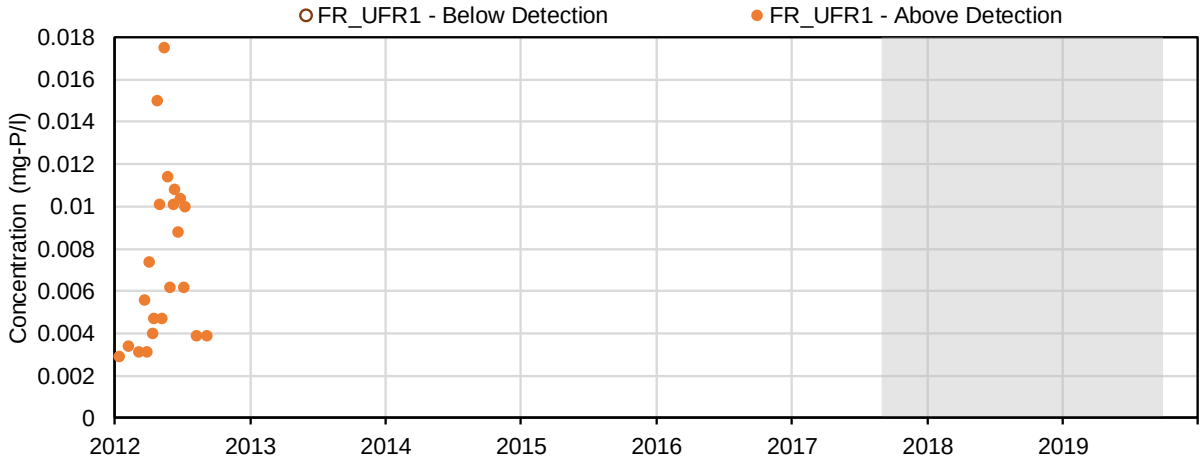
(40) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



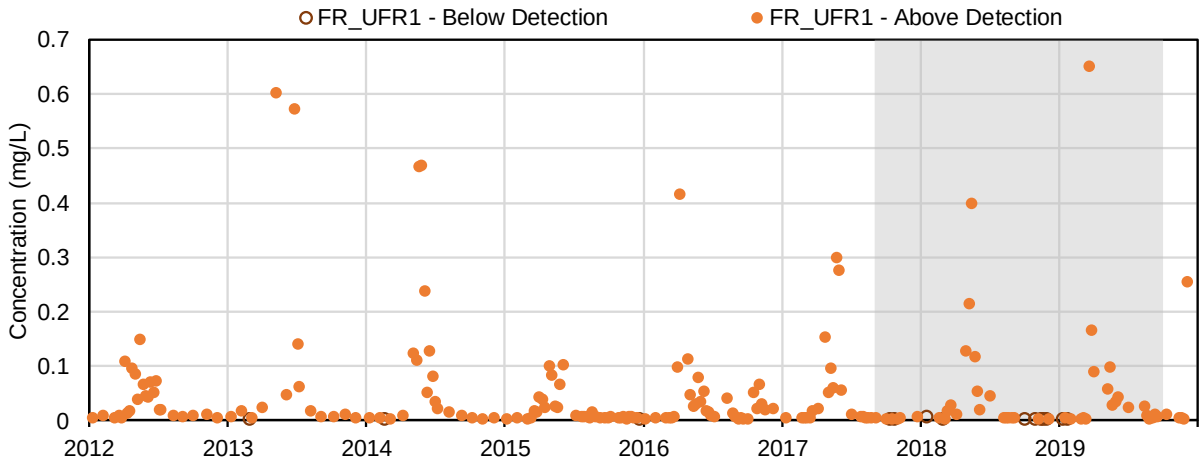
(41) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



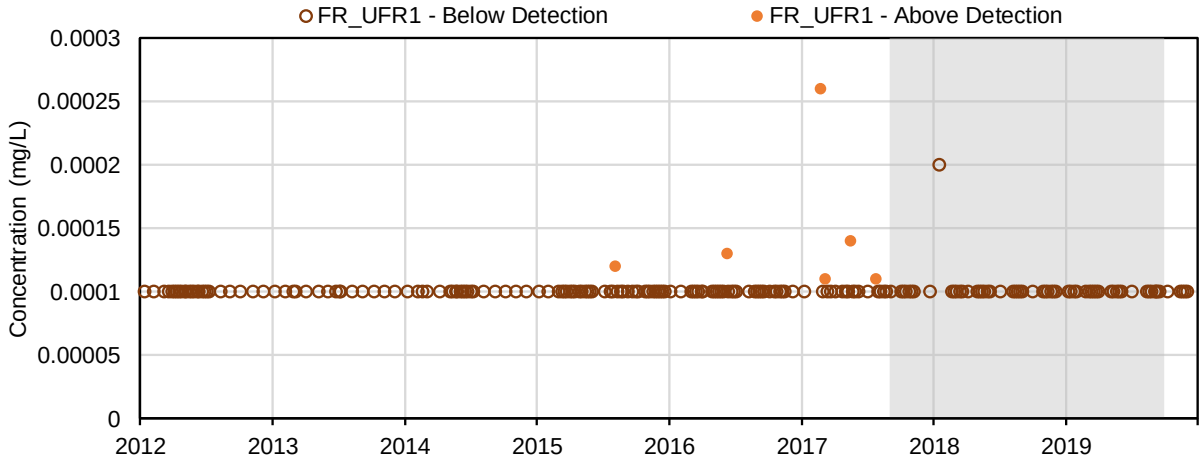
(42) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



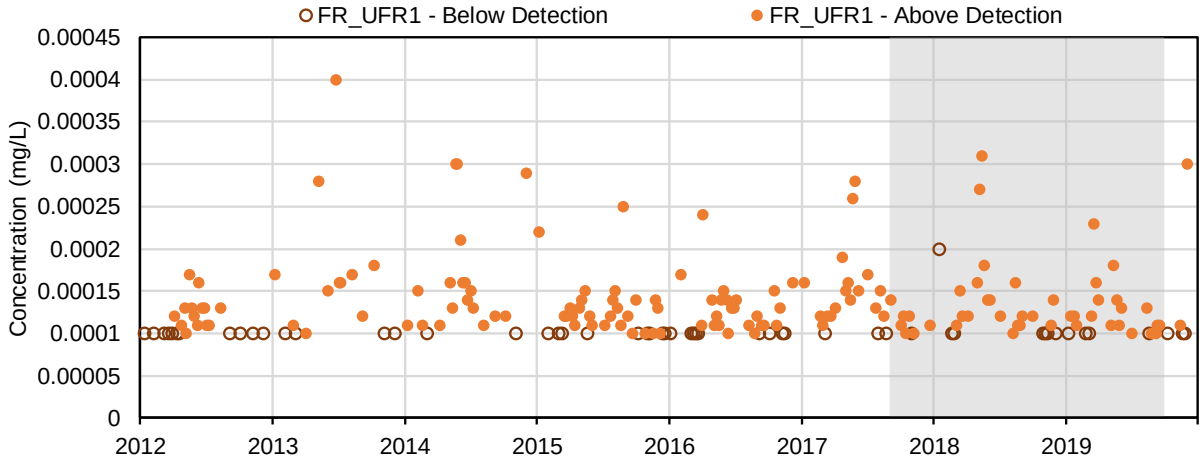
(43) Aluminum (mg/L); Total Metals



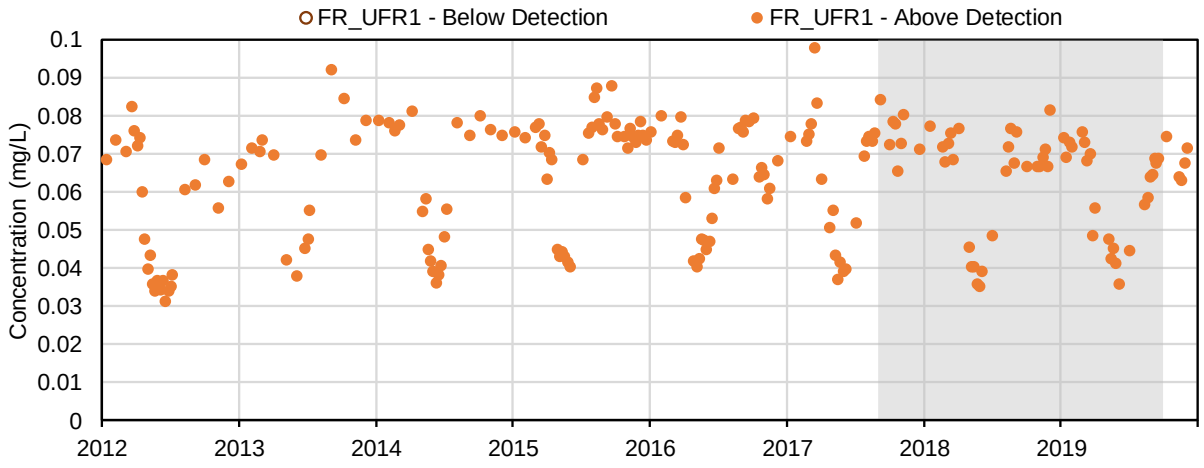
(44) Antimony (mg/L); Total Metals



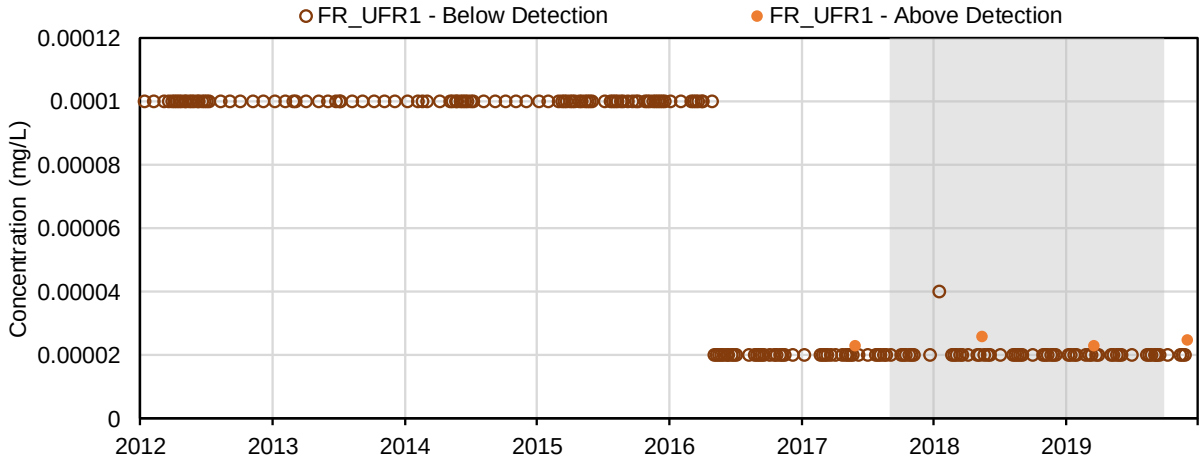
(45) Arsenic (mg/L); Total Metals



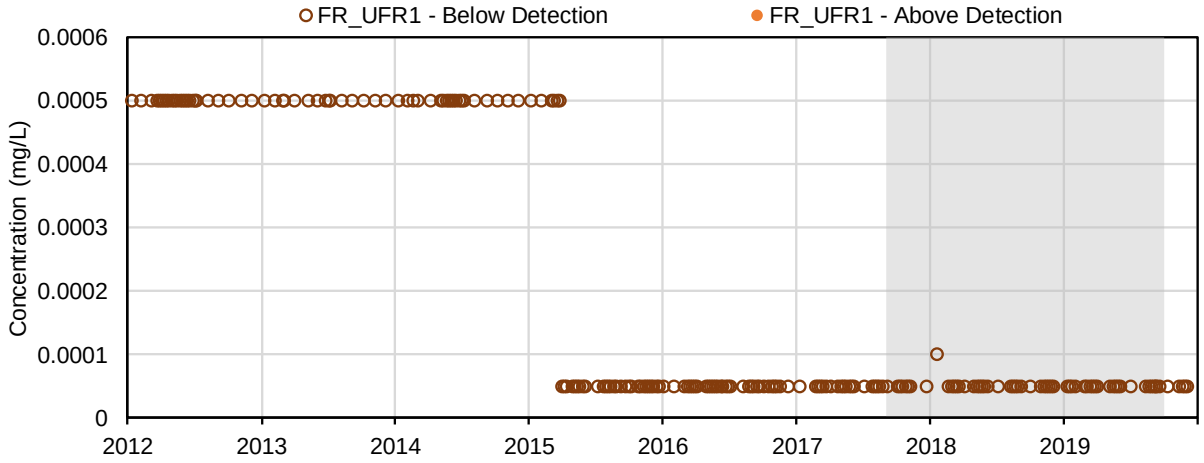
(46) Barium (mg/L); Total Metals



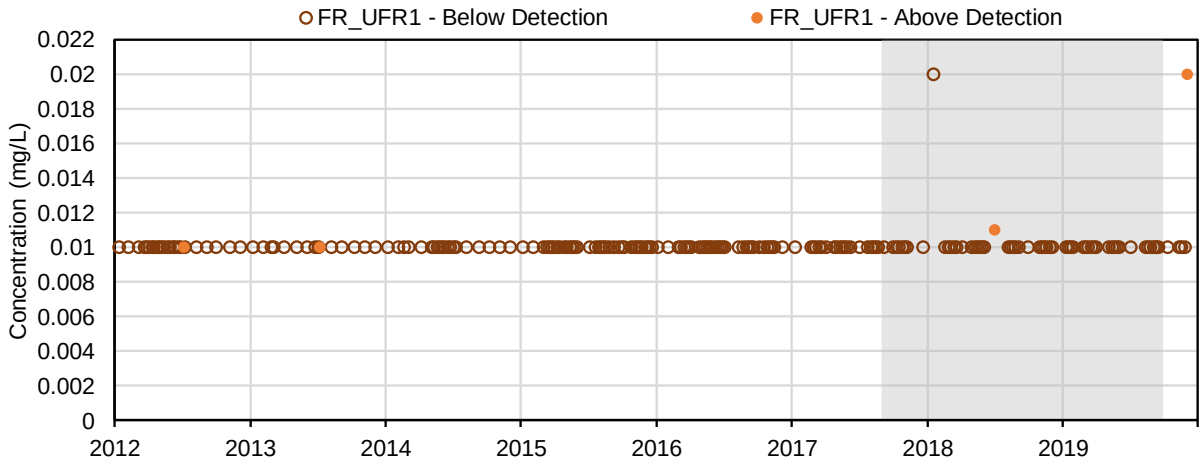
(47) Beryllium (mg/L); Total Metals



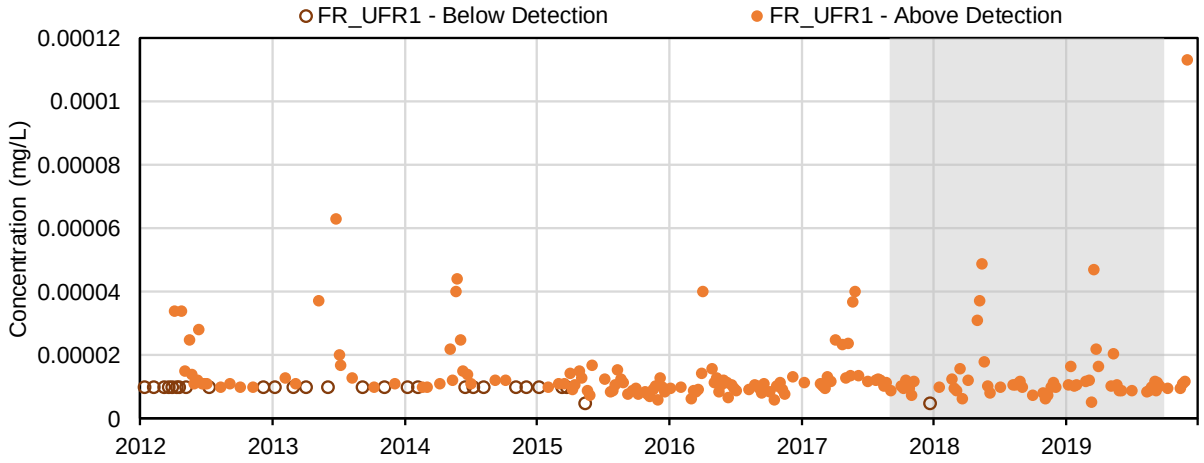
(48) Bismuth (mg/L); Total Metals



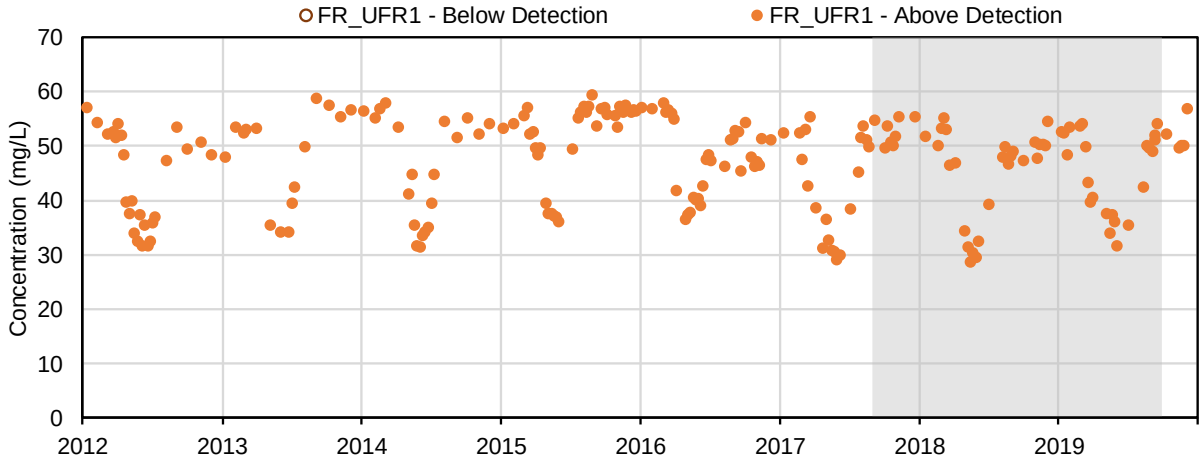
(49) Boron (mg/L); Total Metals



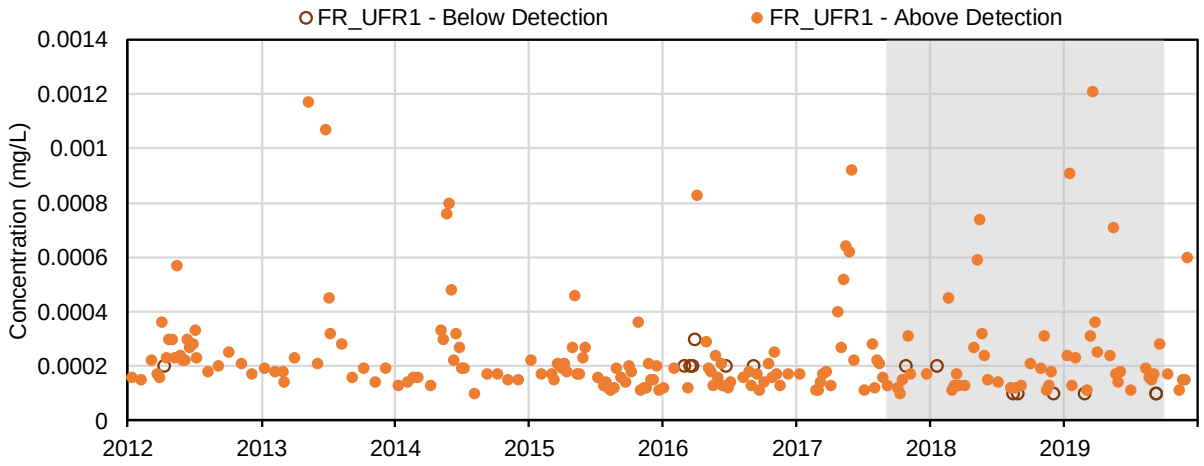
(50) Cadmium (mg/L); Total Metals



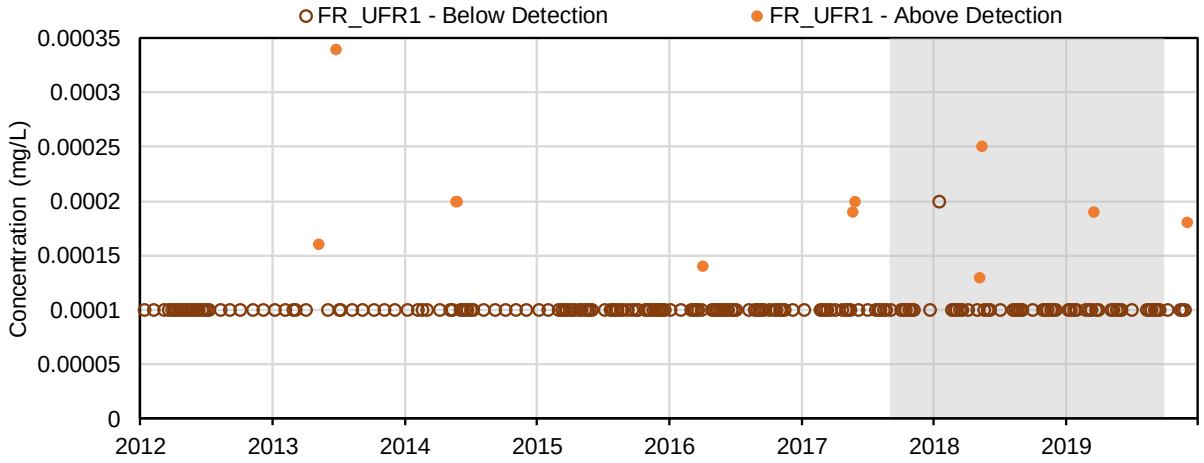
(51) Calcium (mg/L); Total Metals



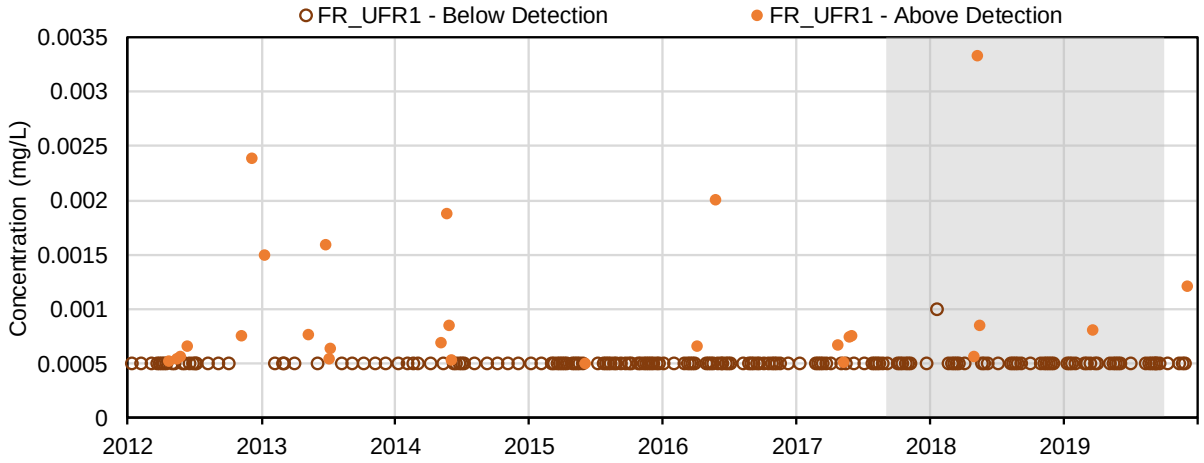
(52) Chromium (mg/L); Total Metals



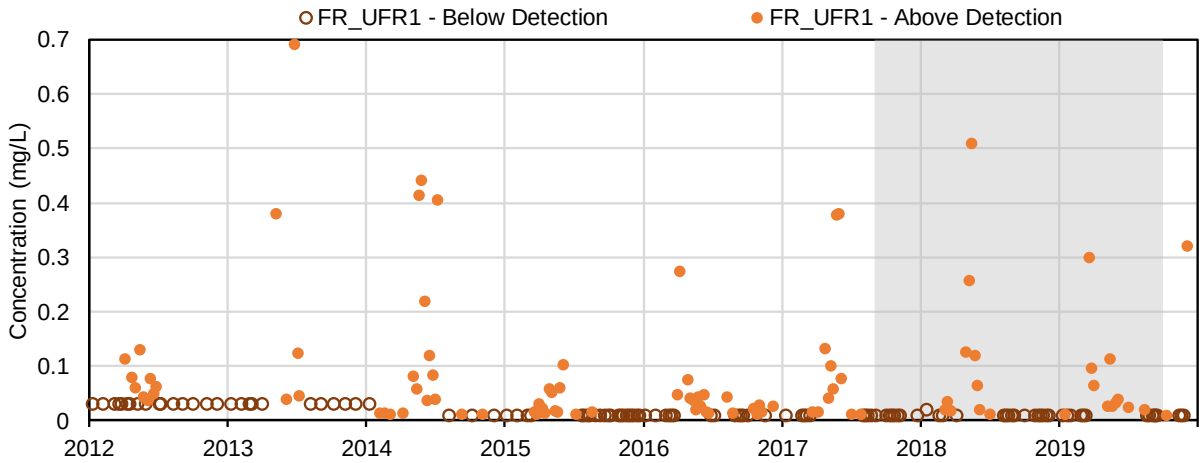
(53) Cobalt (mg/L); Total Metals



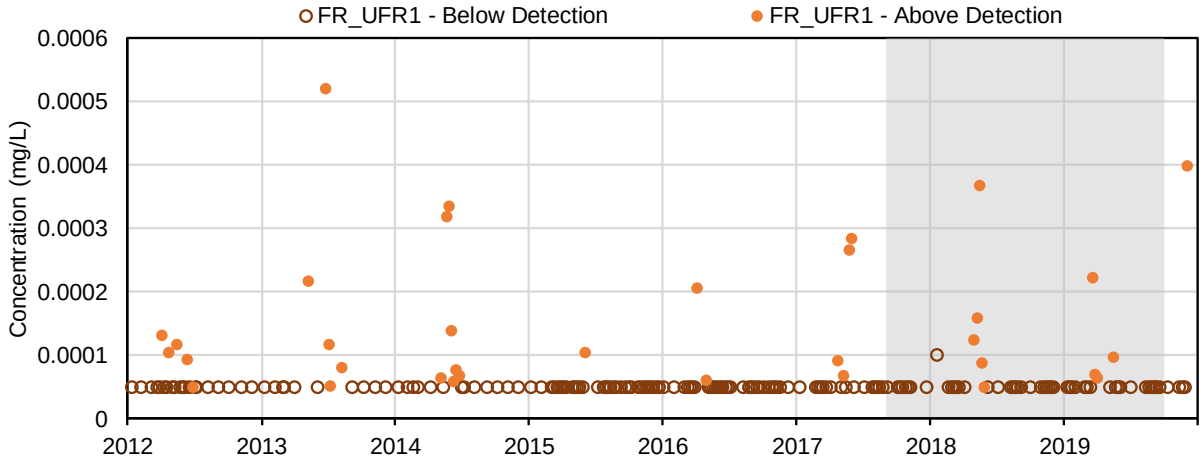
(54) Copper (mg/L); Total Metals



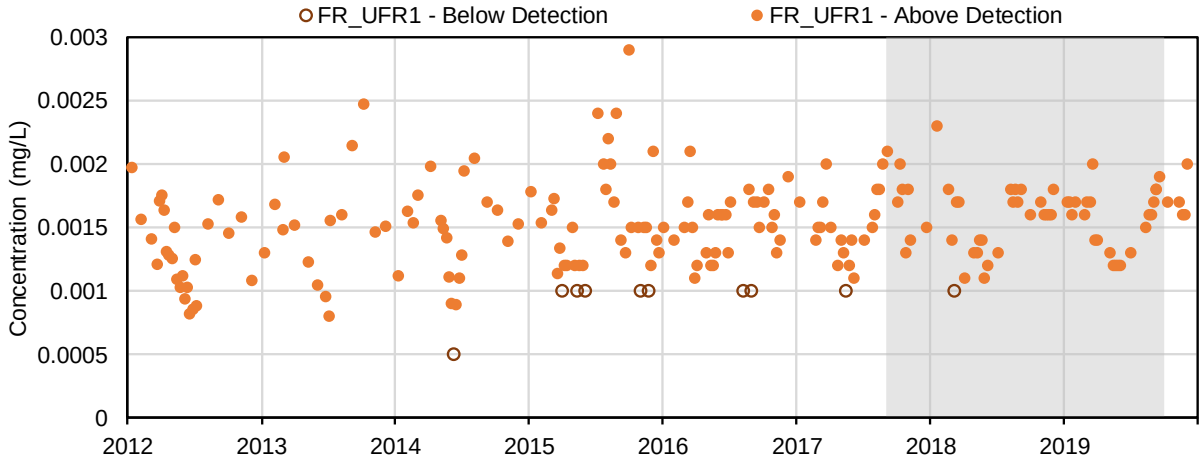
(55) Iron (mg/L); Total Metals



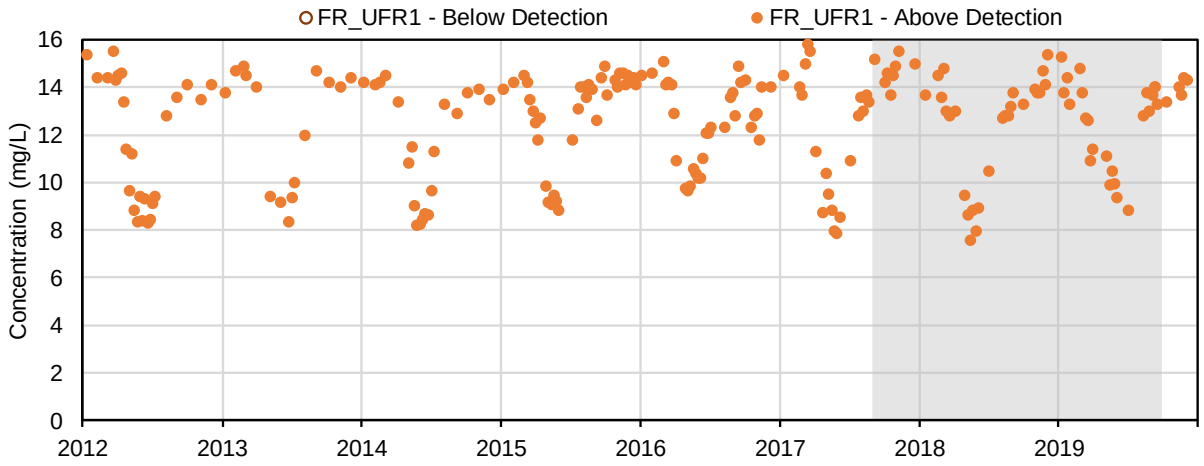
(56) Lead (mg/L); Total Metals



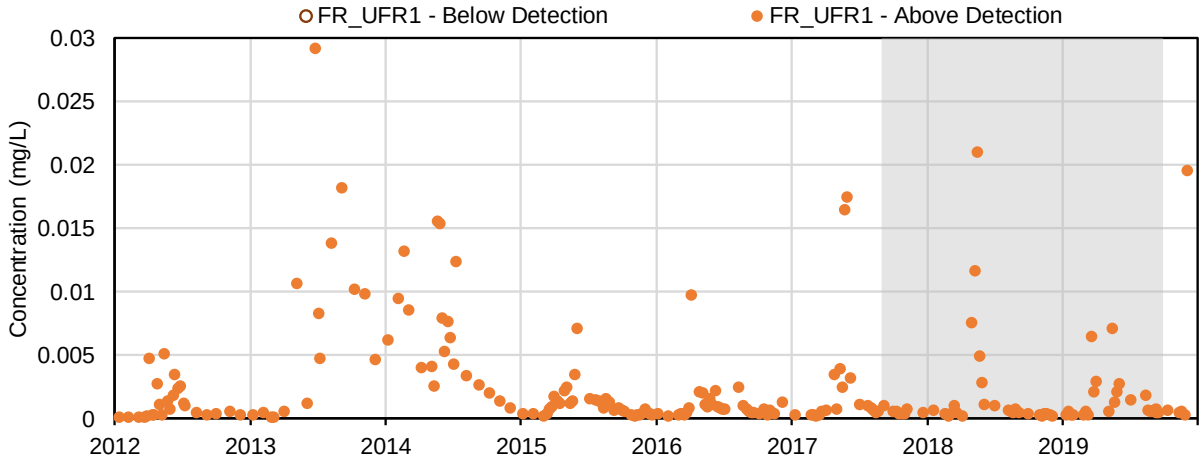
(57) Lithium (mg/L); Total Metals



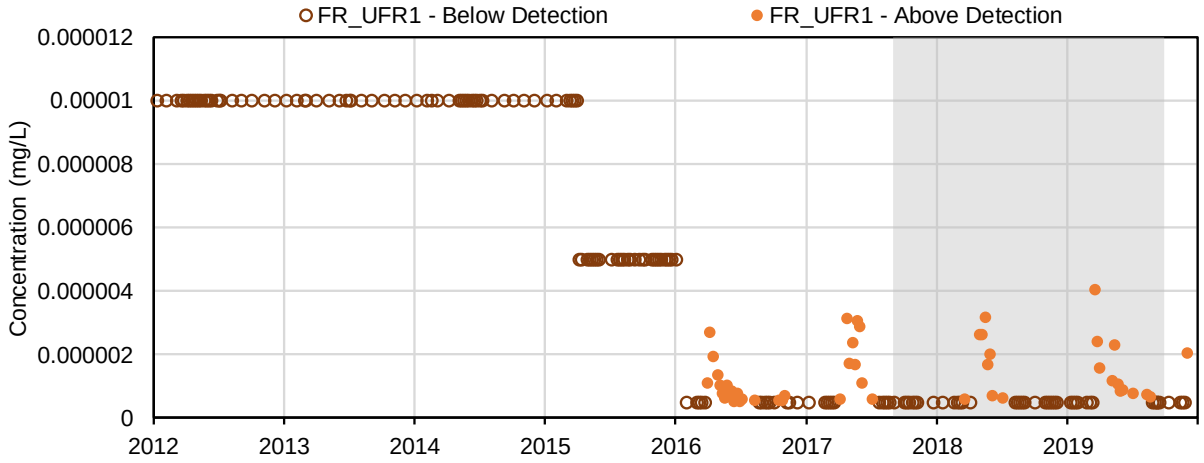
(58) Magnesium (mg/L); Total Metals



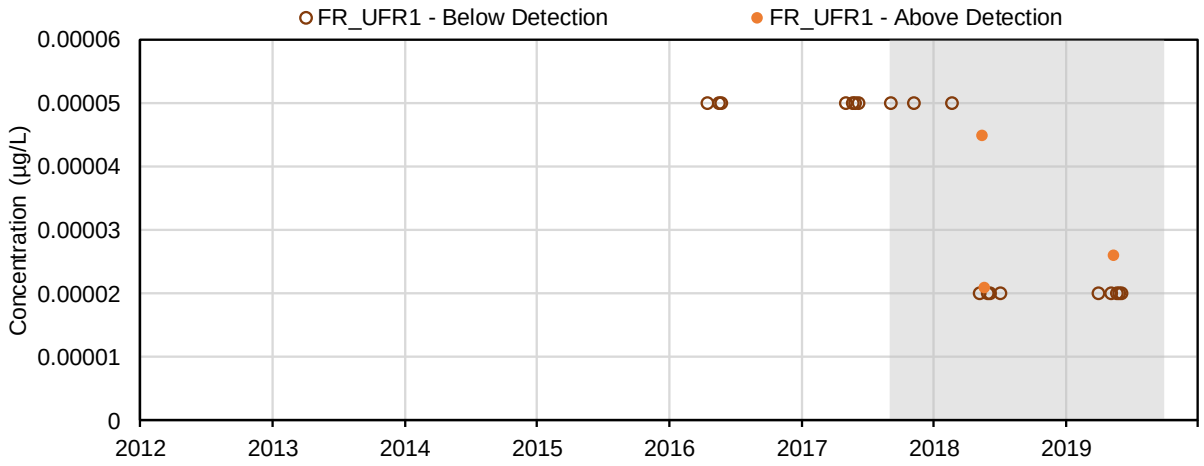
(59) Manganese (mg/L); Total Metals



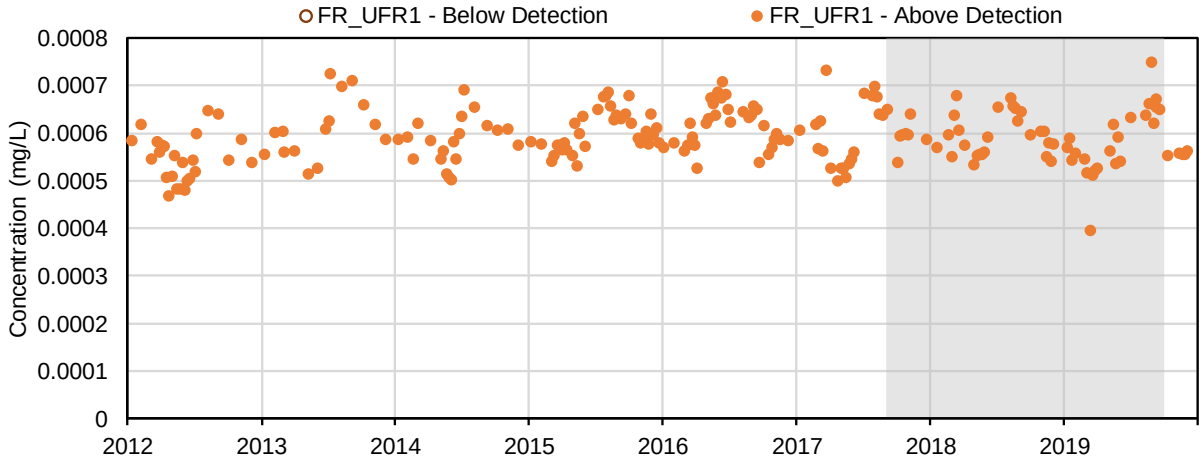
(60) Mercury (mg/L); Total Metals



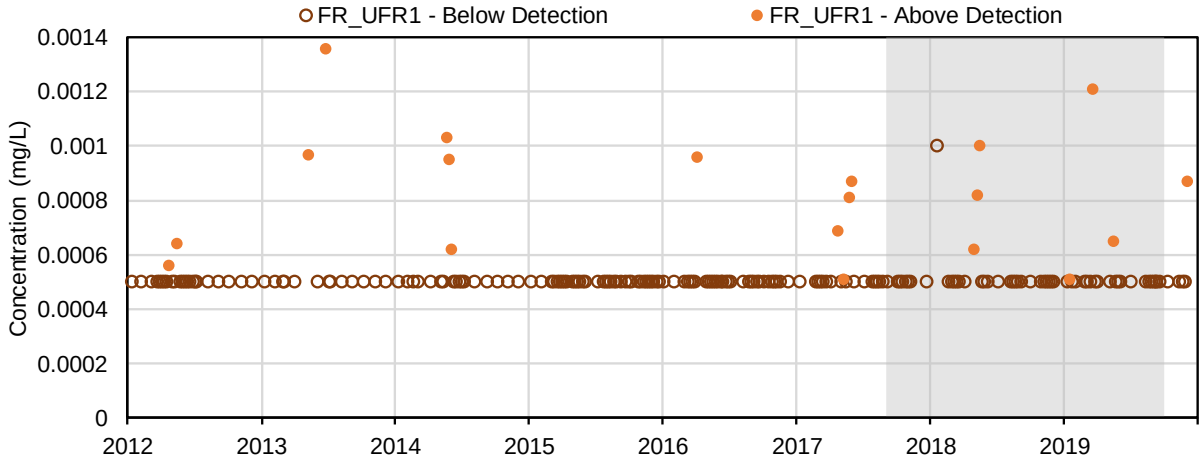
(61) Methyl mercury (µg/L); Total Metals



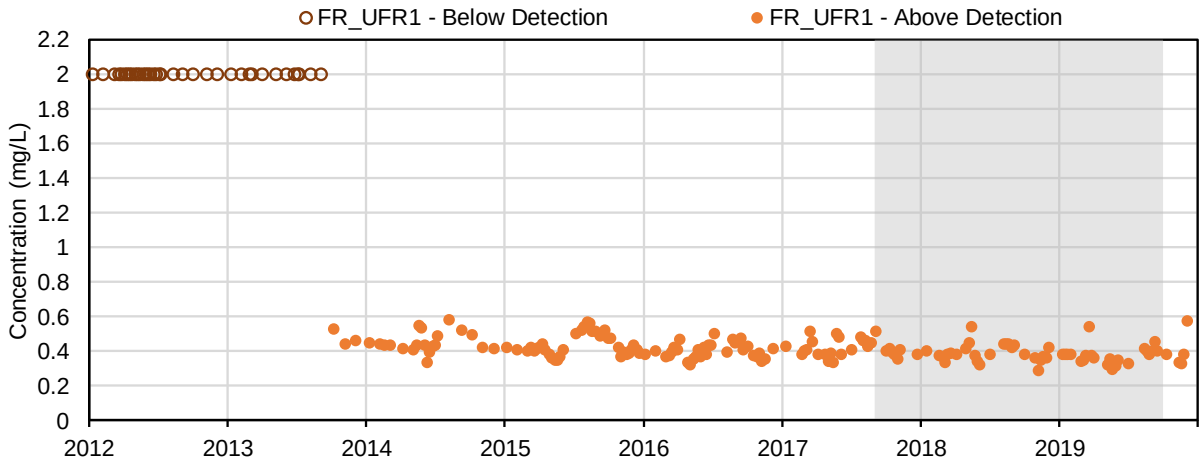
(62) Molybdenum (mg/L); Total Metals



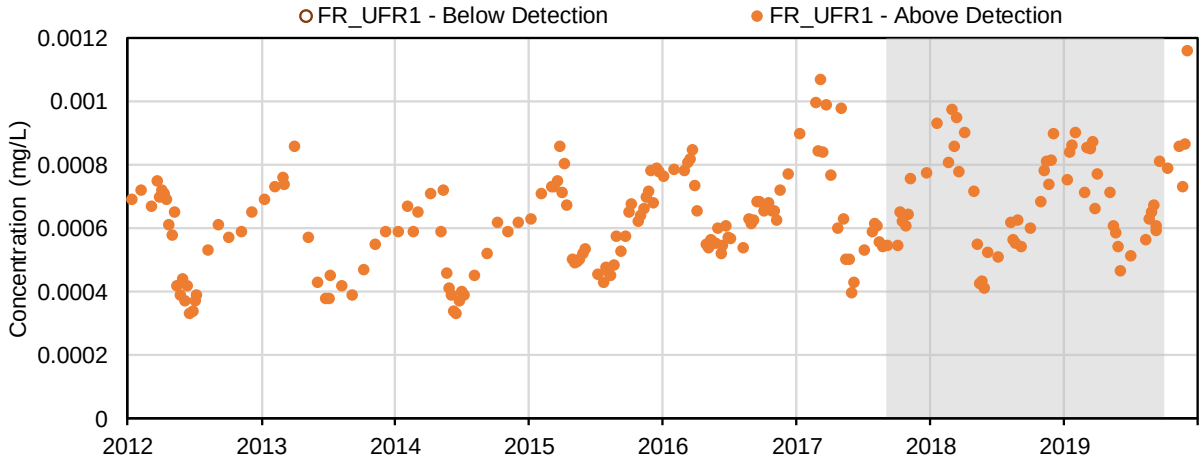
(63) Nickel (mg/L); Total Metals



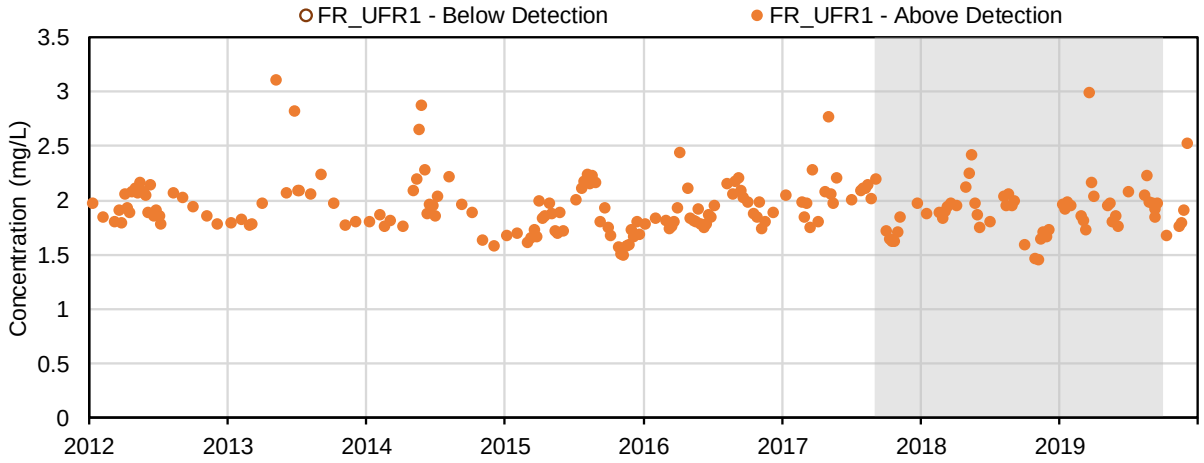
(64) Potassium (mg/L); Total Metals



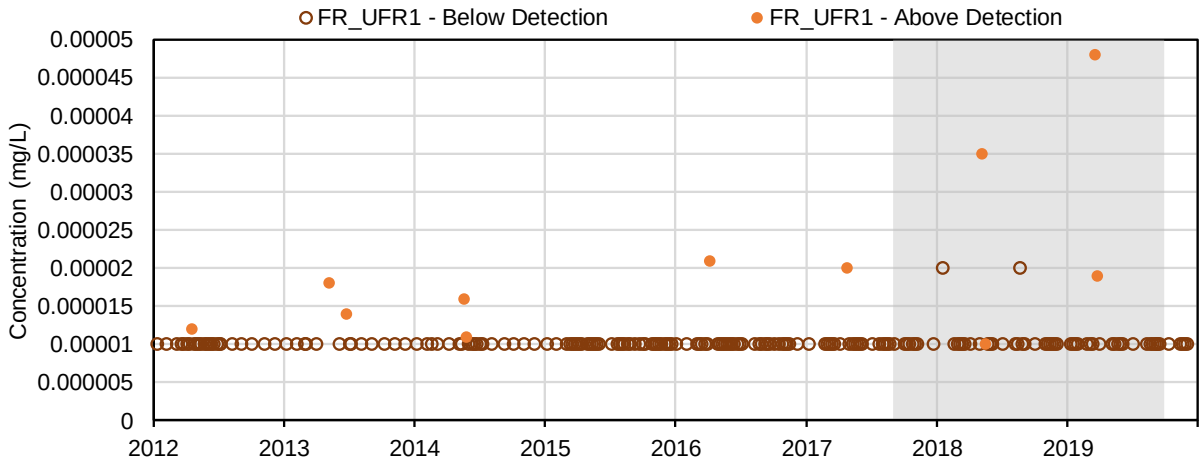
(65) Selenium (mg/L); Total Metals



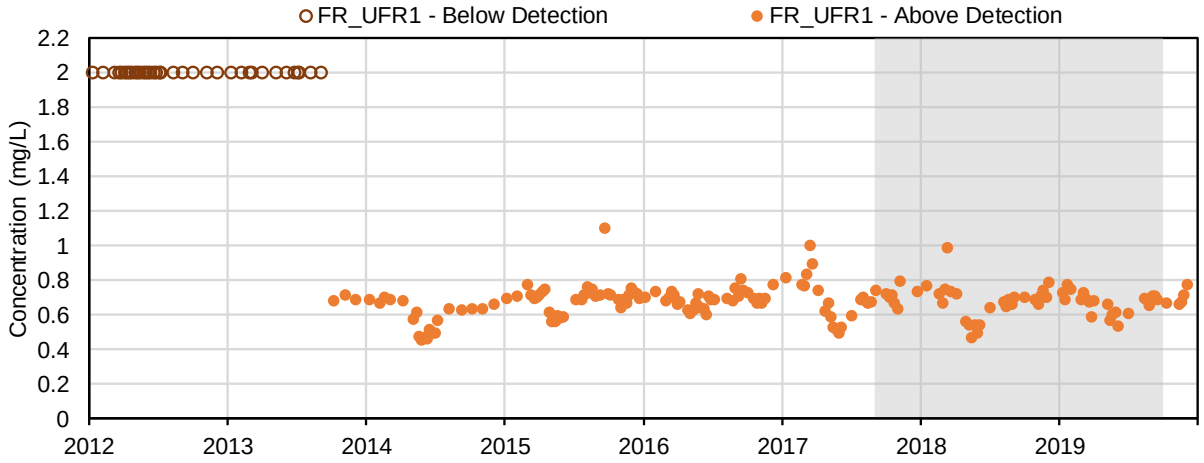
(66) Silicon (mg/L); Total Metals



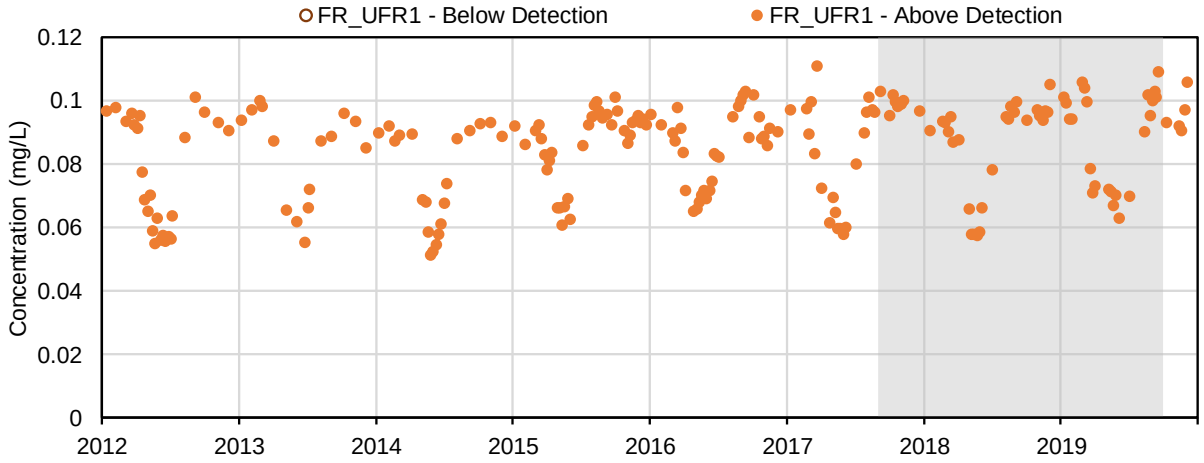
(67) Silver (mg/L); Total Metals



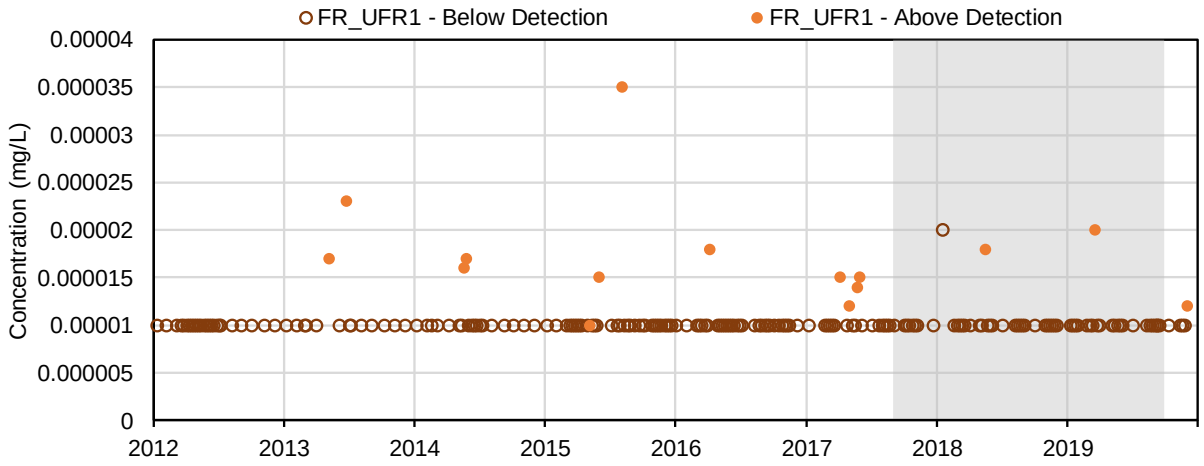
(68) Sodium (mg/L); Total Metals



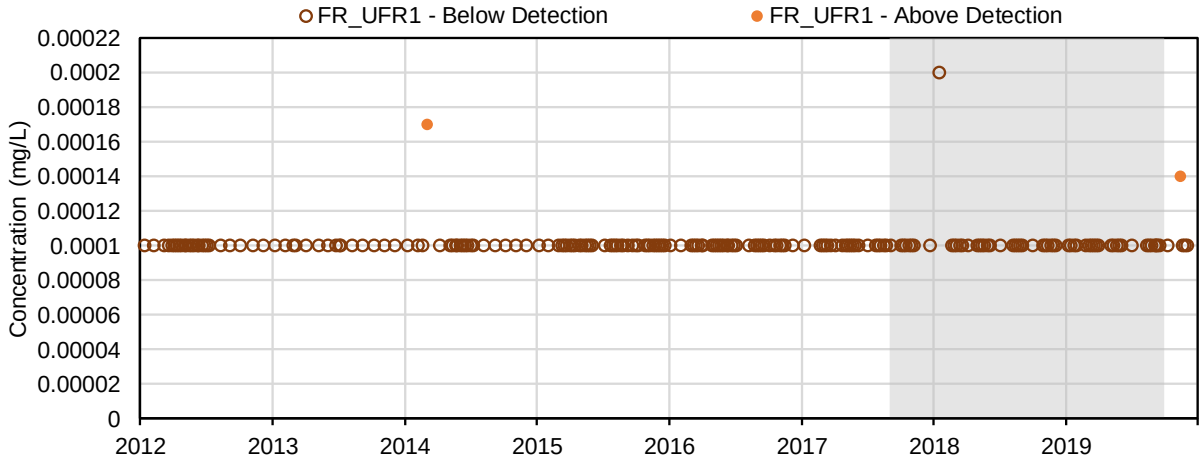
(69) Strontium (mg/L); Total Metals



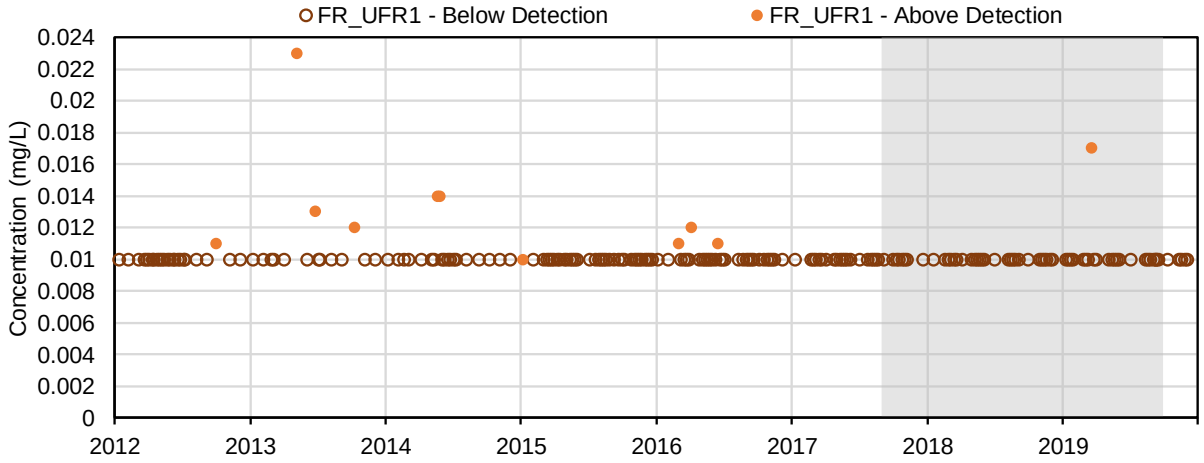
(70) Thallium (mg/L); Total Metals



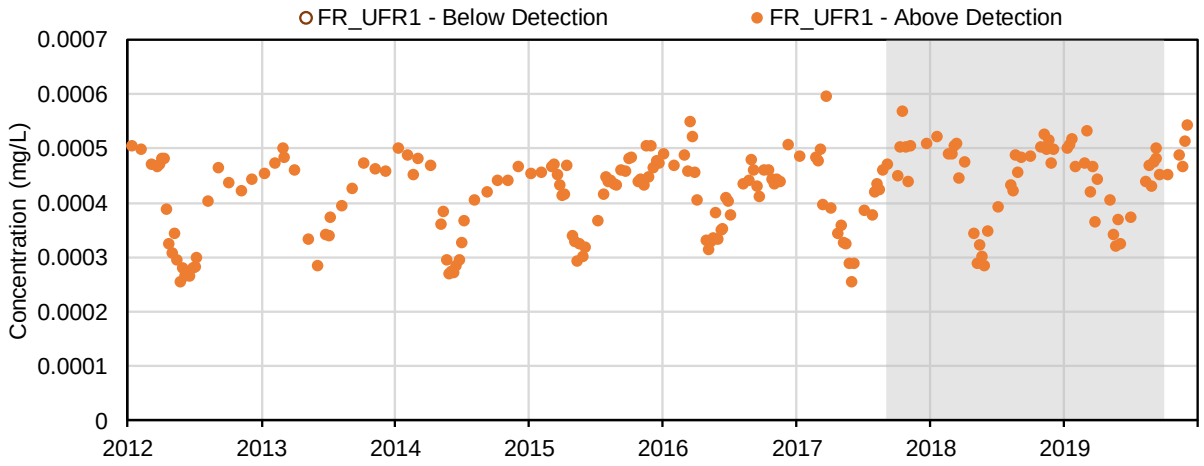
(71) Tin (mg/L); Total Metals



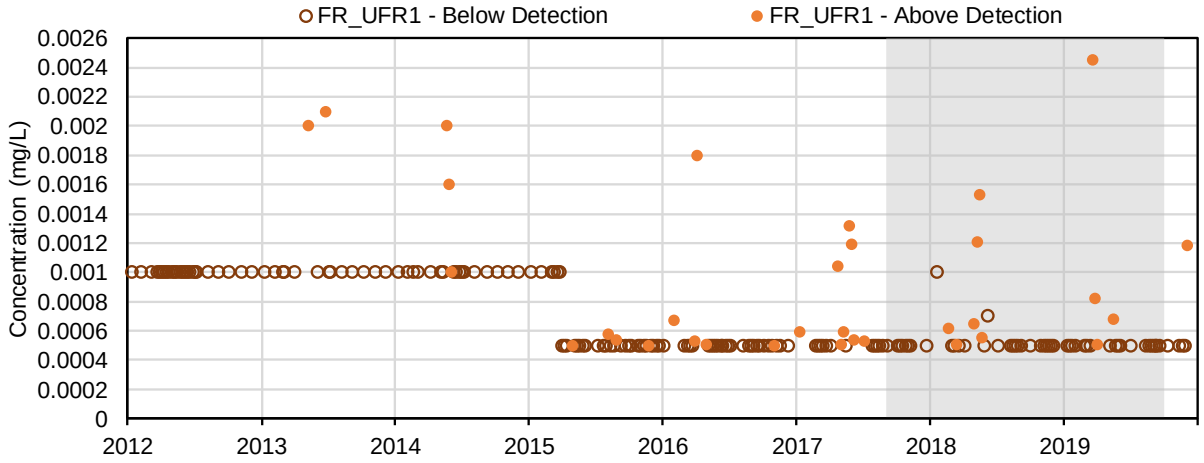
(72) Titanium (mg/L); Total Metals



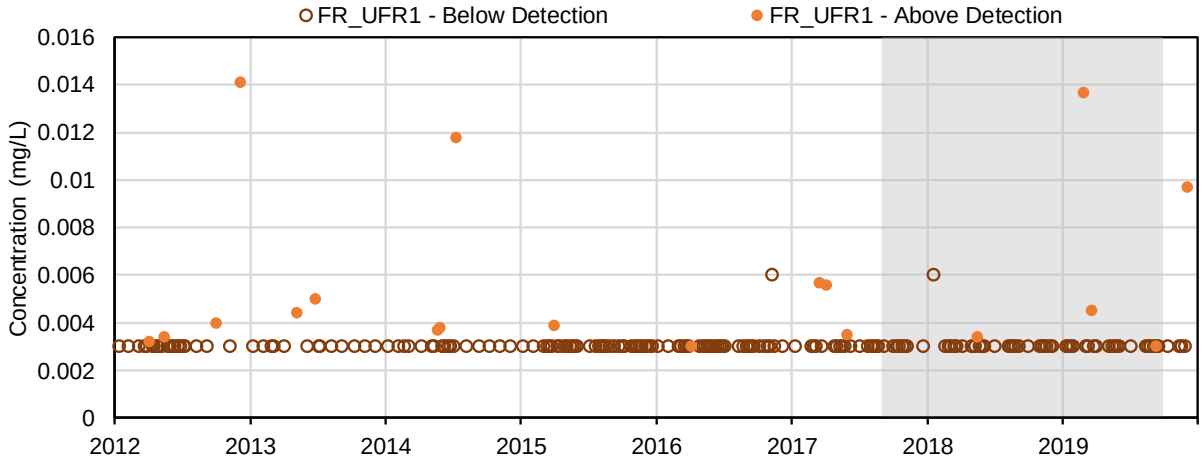
(73) Uranium (mg/L); Total Metals



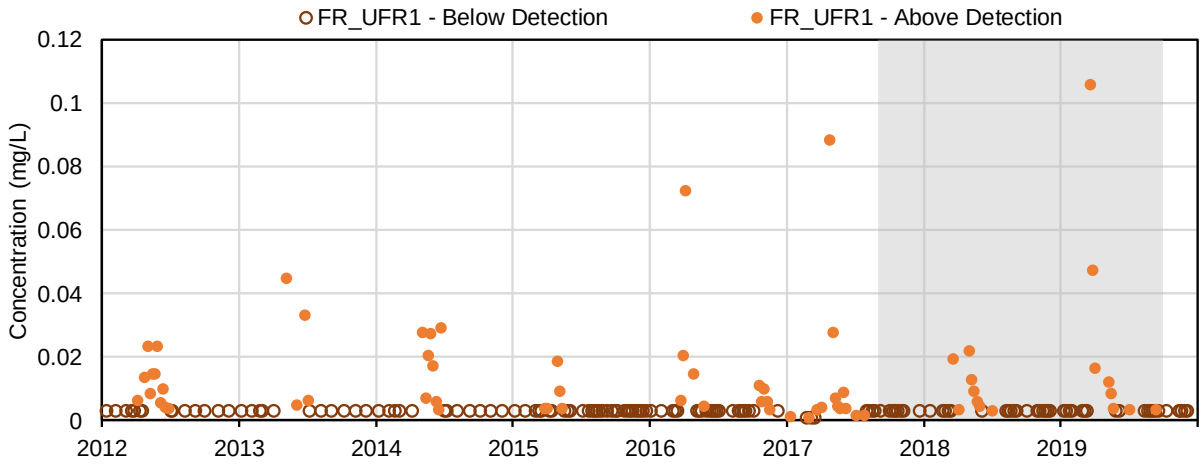
(74) Vanadium (mg/L); Total Metals



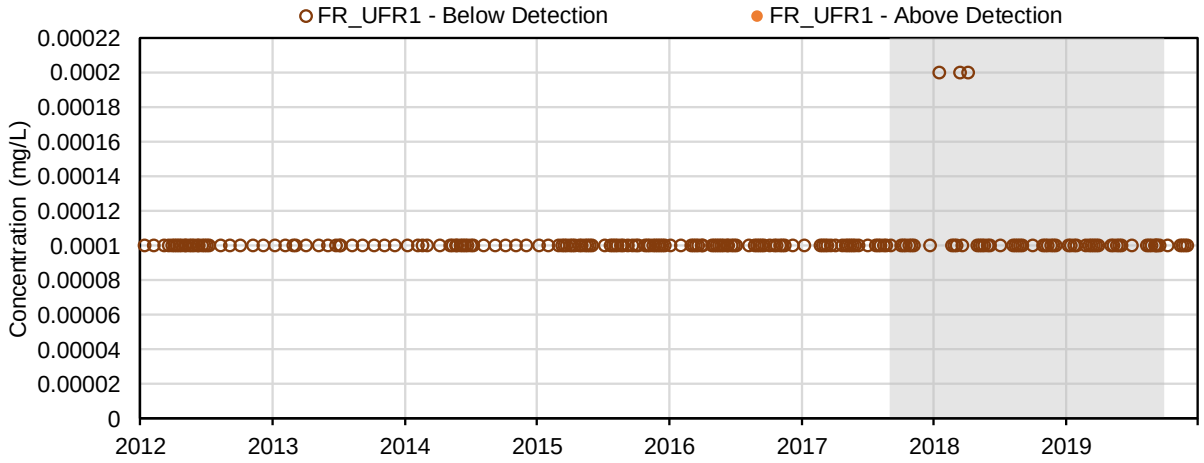
(75) Zinc (mg/L); Total Metals



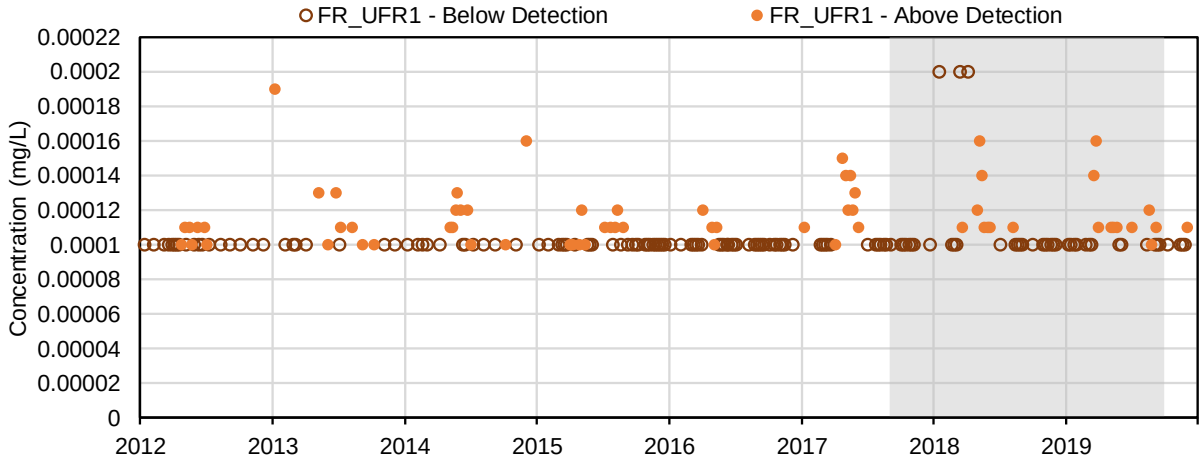
(76) Aluminum (mg/L); Dissolved Metals



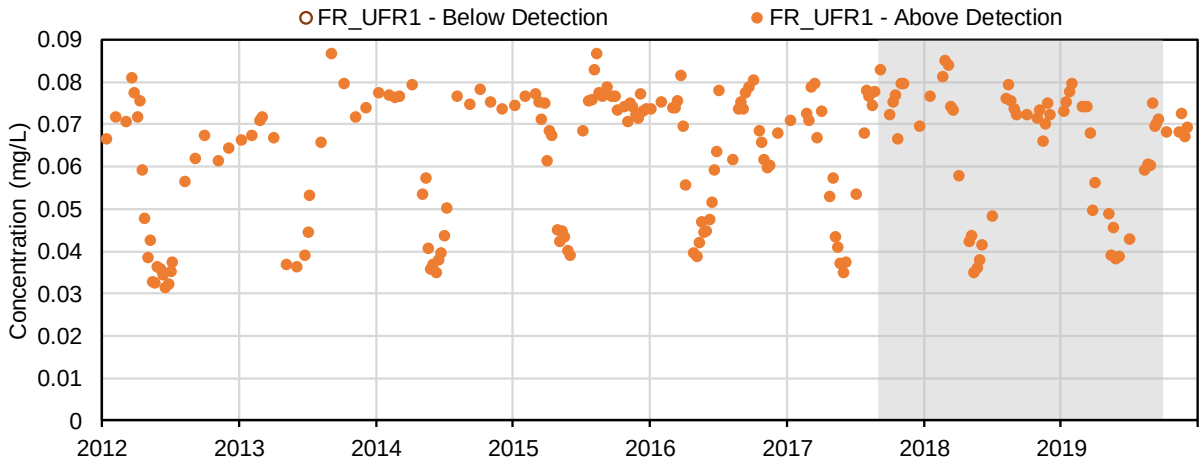
(77) Antimony (mg/L); Dissolved Metals



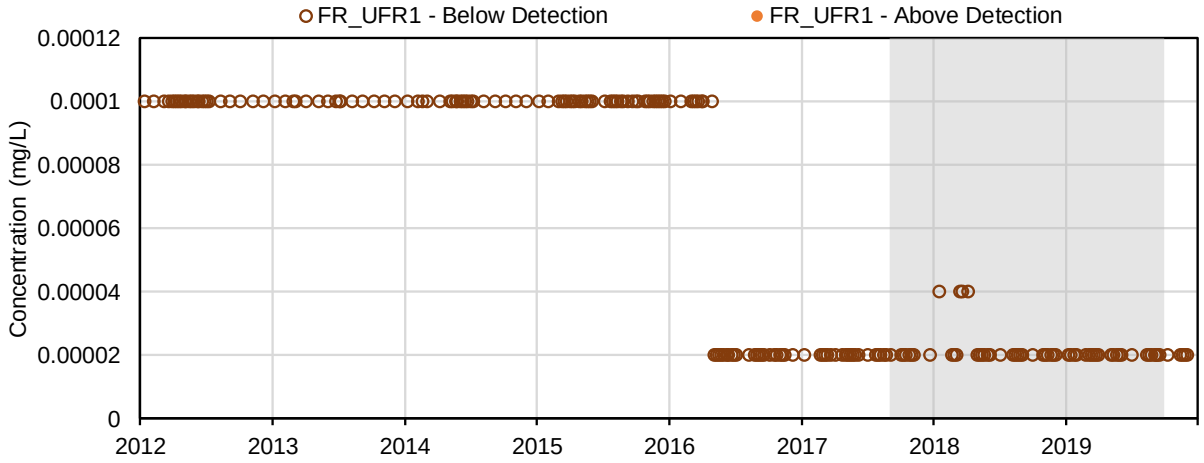
(78) Arsenic (mg/L); Dissolved Metals



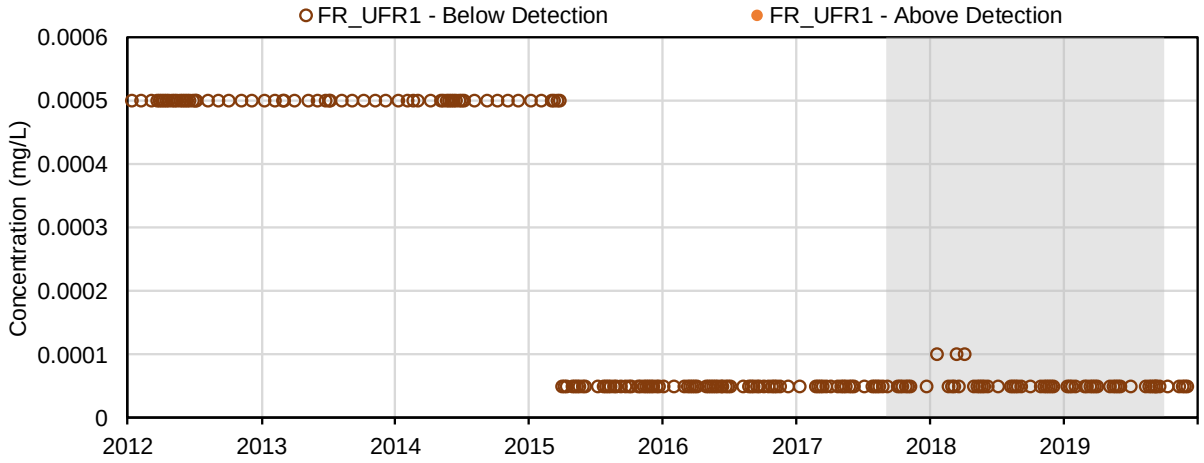
(79) Barium (mg/L); Dissolved Metals



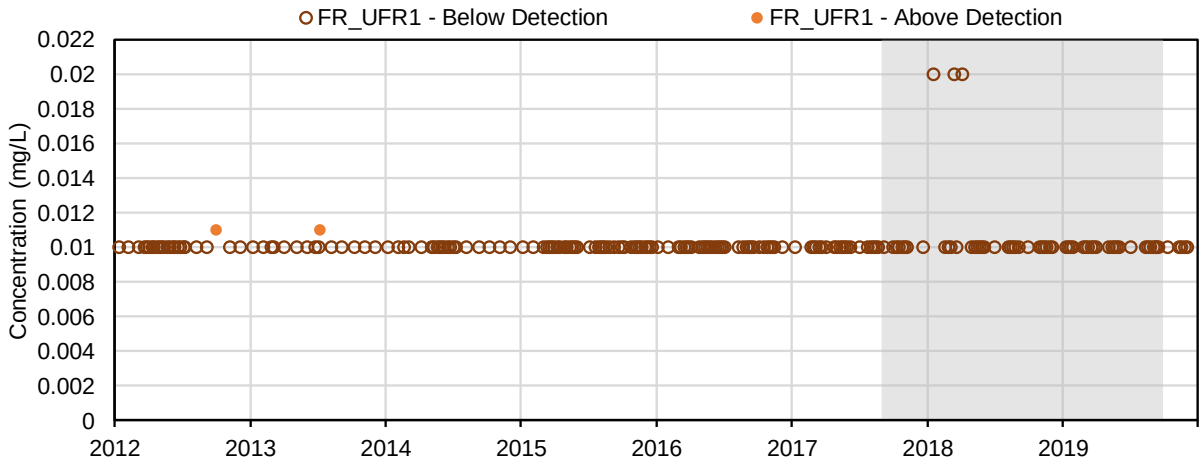
(80) Beryllium (mg/L); Dissolved Metals



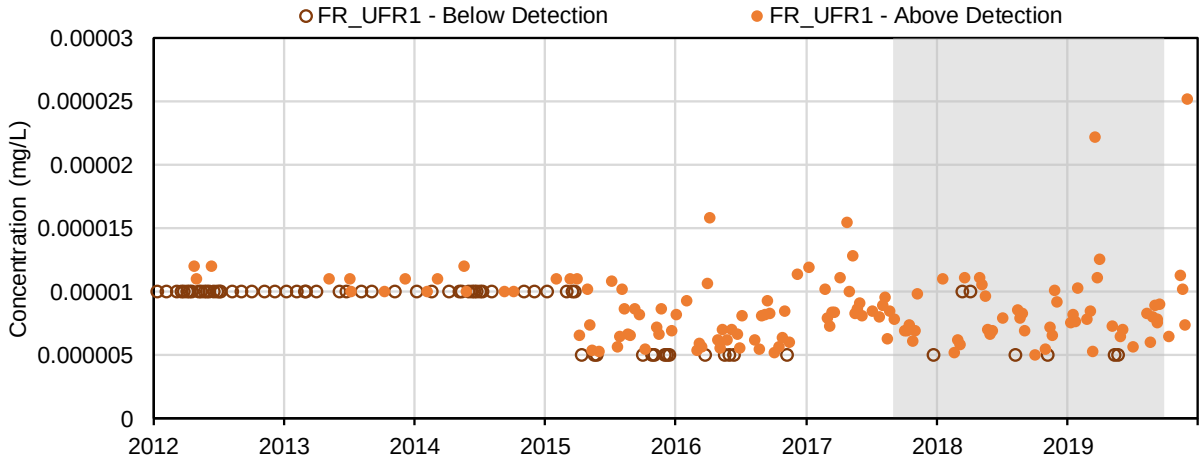
(81) Bismuth (mg/L); Dissolved Metals



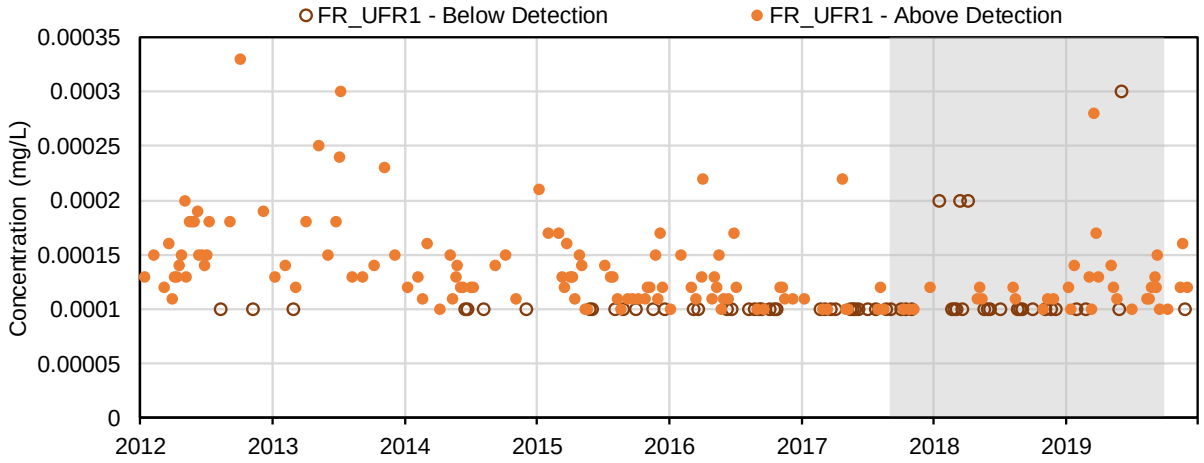
(82) Boron (mg/L); Dissolved Metals



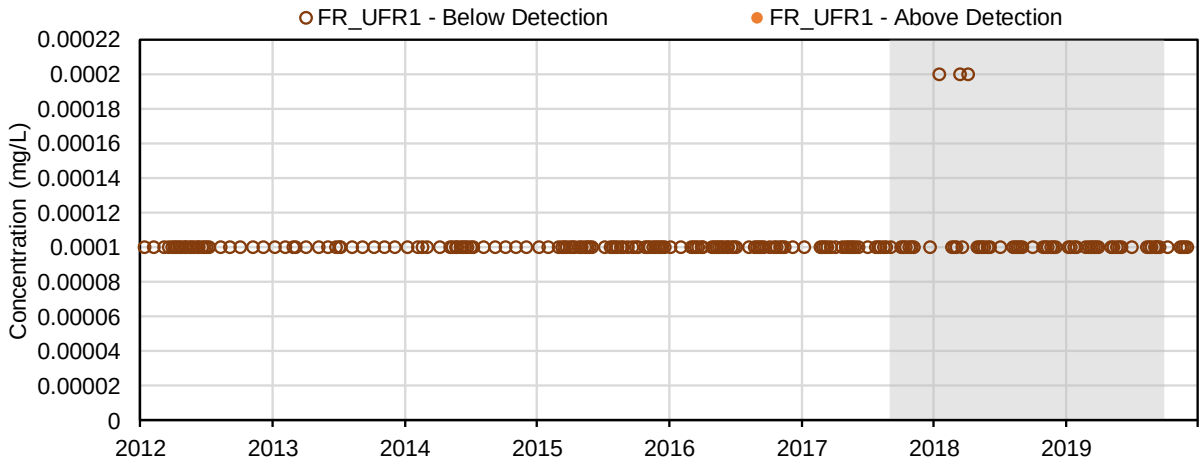
(83) Cadmium (mg/L); Dissolved Metals



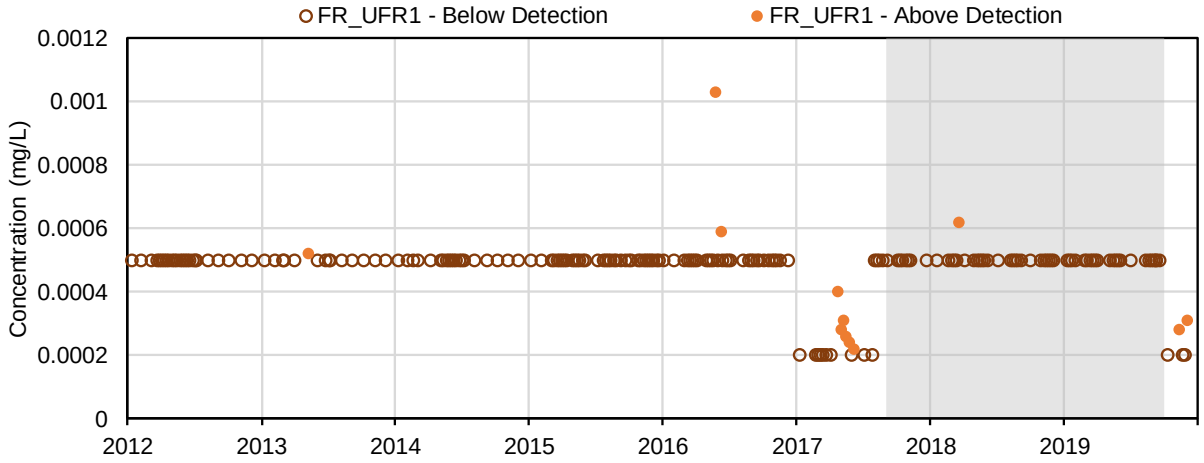
(84) Chromium (mg/L); Dissolved Metals



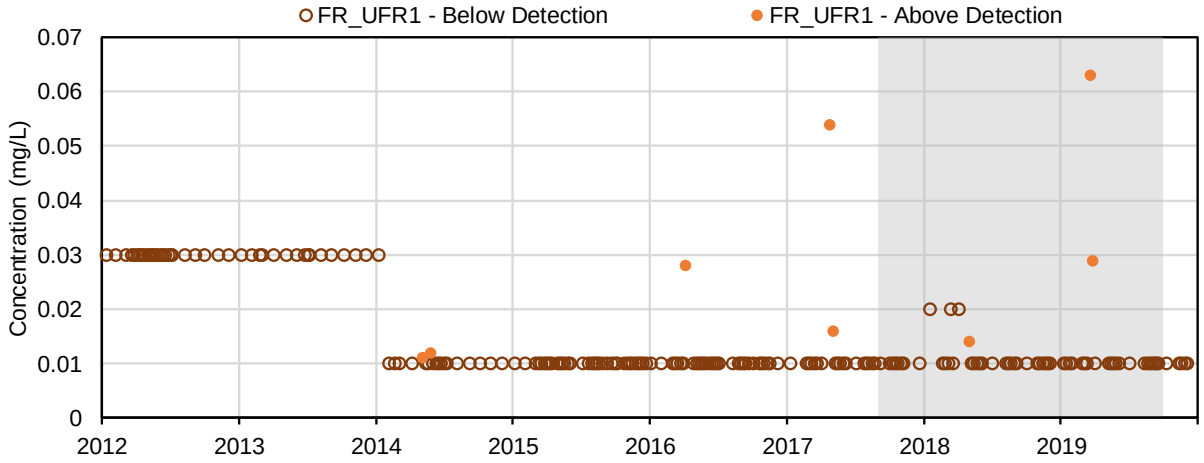
(85) Cobalt (mg/L); Dissolved Metals



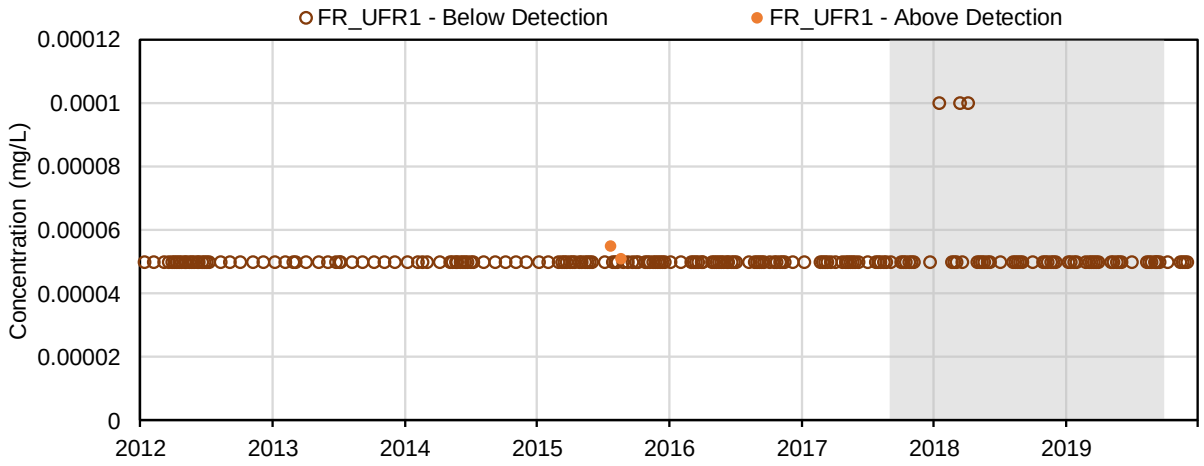
(86) Copper (mg/L); Dissolved Metals



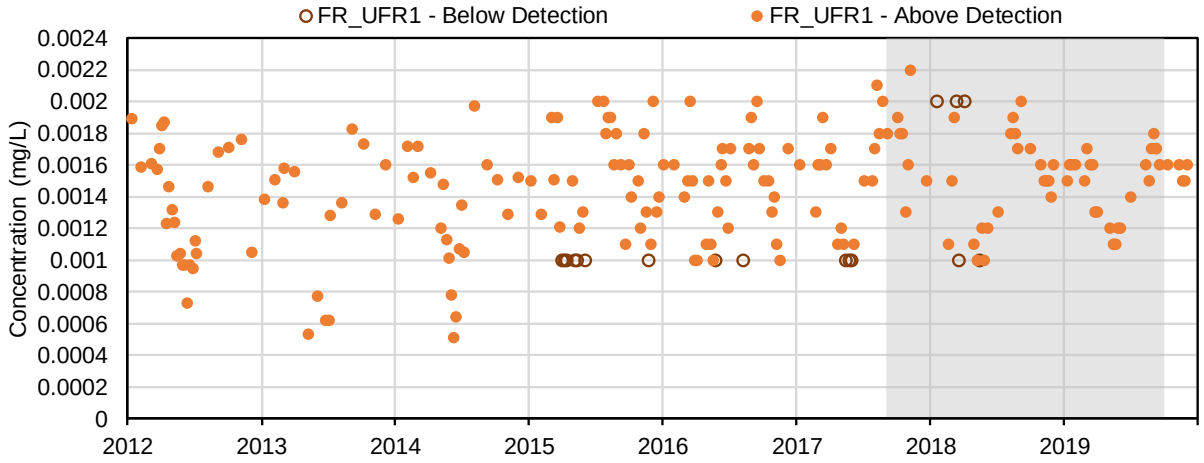
(87) Iron (mg/L); Dissolved Metals



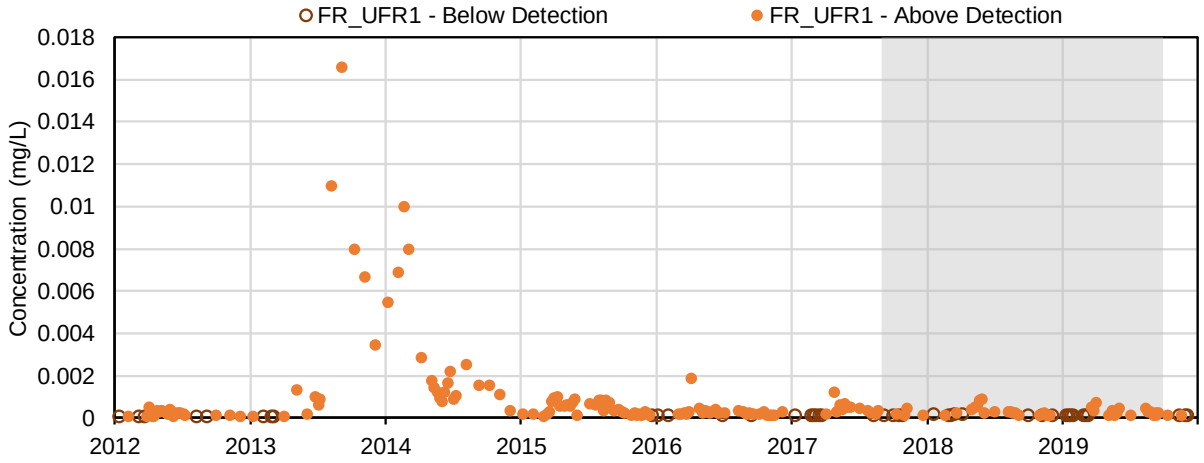
(88) Lead (mg/L); Dissolved Metals



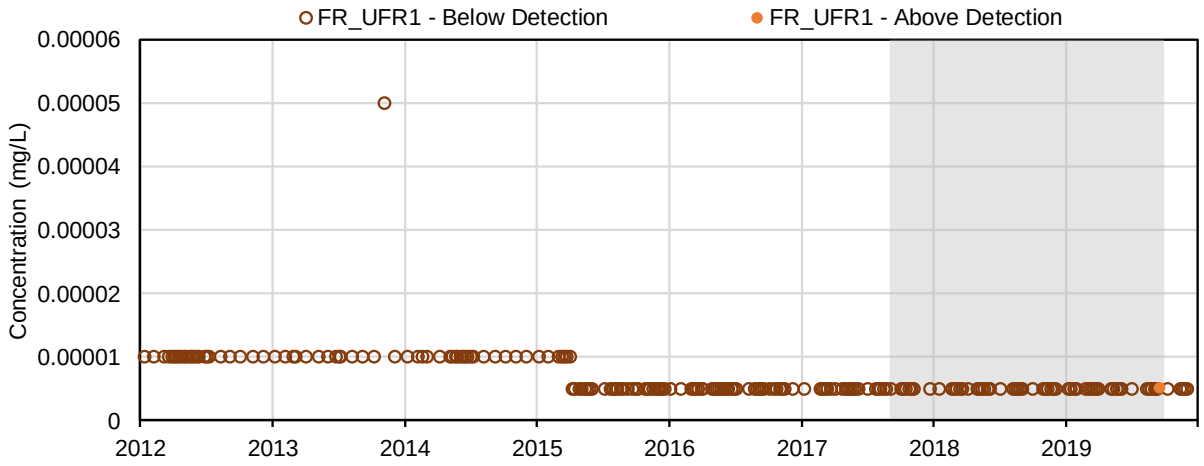
(89) Lithium (mg/L); Dissolved Metals



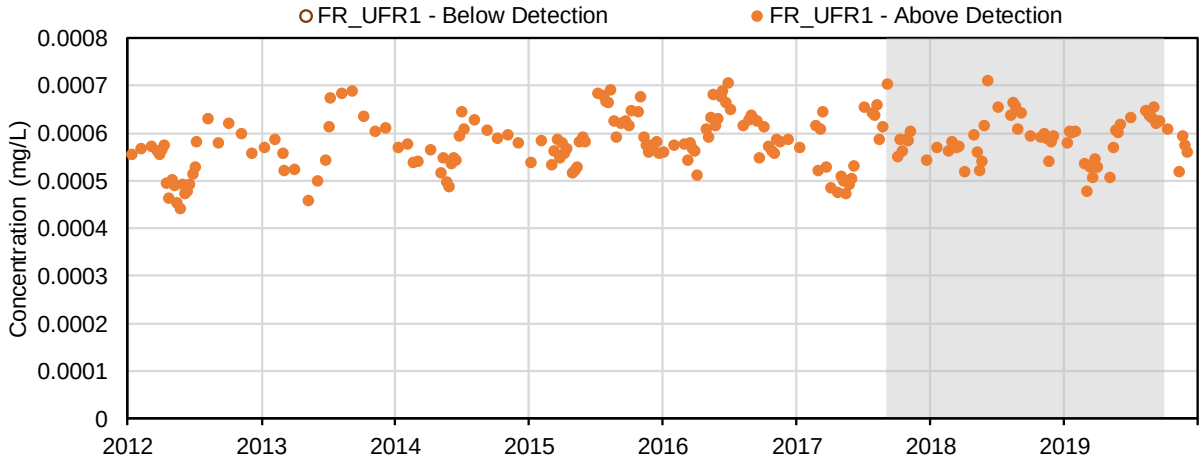
(90) Manganese (mg/L); Dissolved Metals



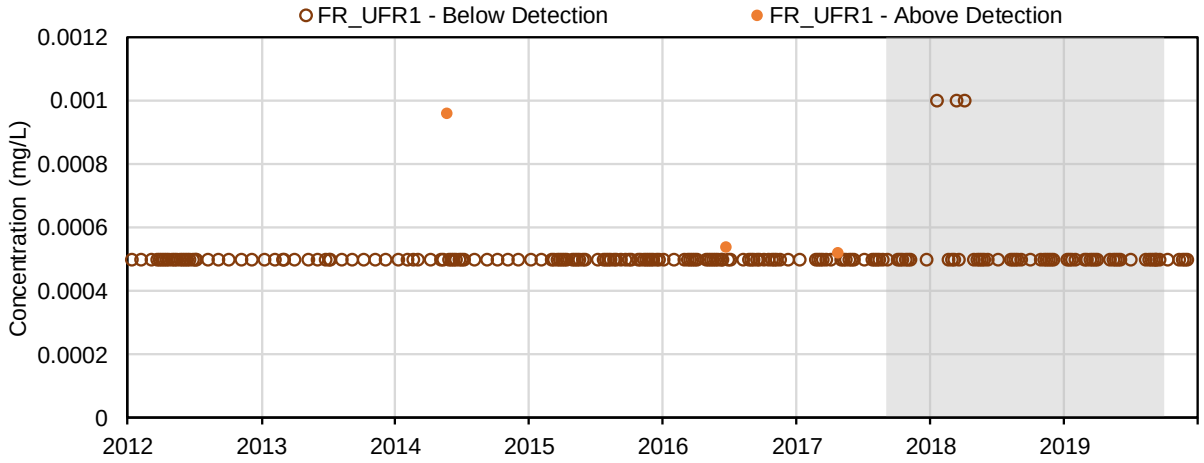
(91) Mercury (mg/L); Dissolved Metals



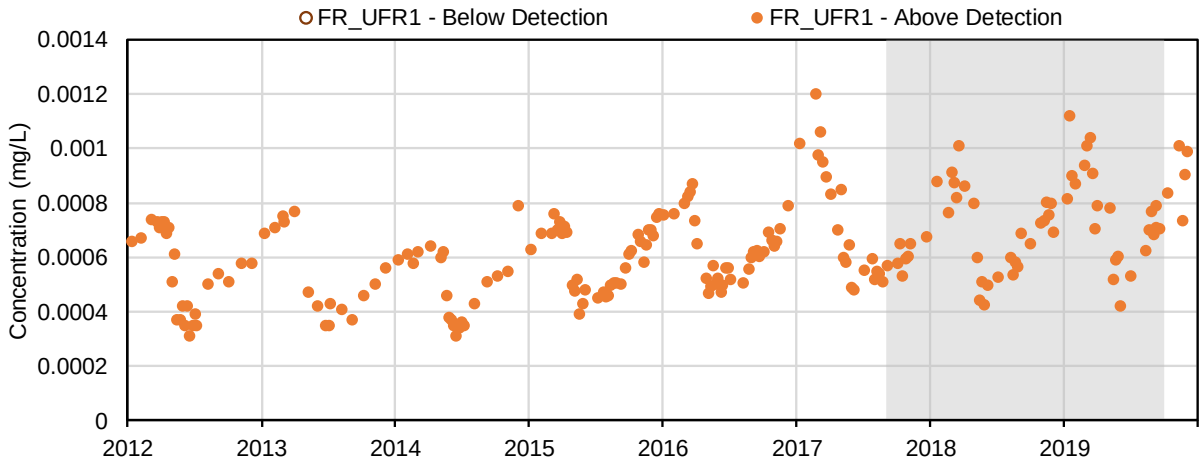
(92) Molybdenum (mg/L); Dissolved Metals



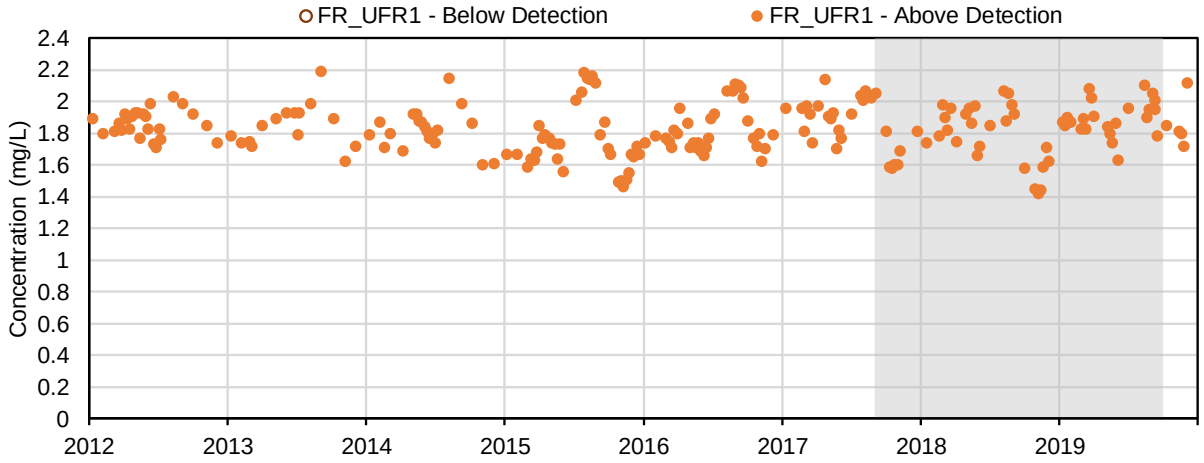
(93) Nickel (mg/L); Dissolved Metals



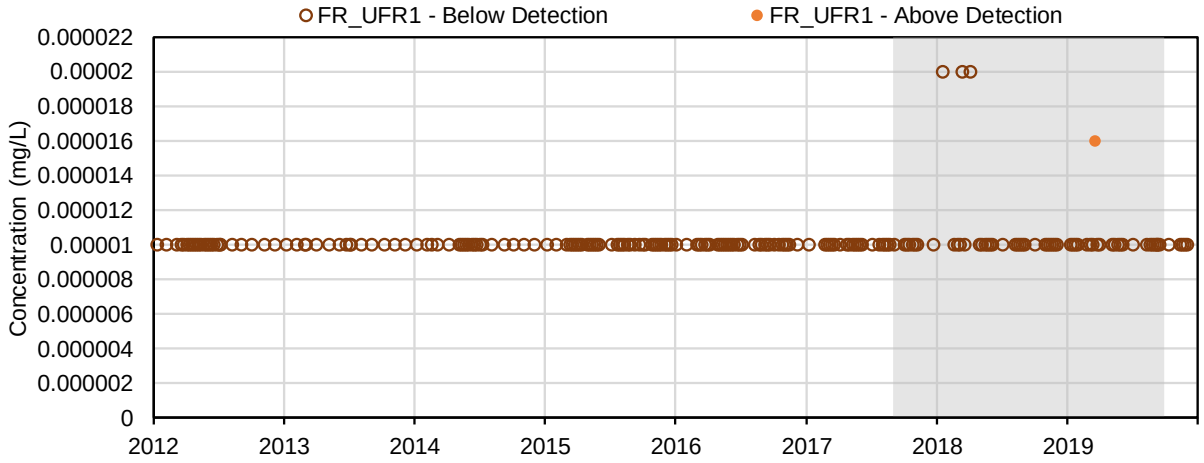
(94) Selenium (mg/L); Dissolved Metals



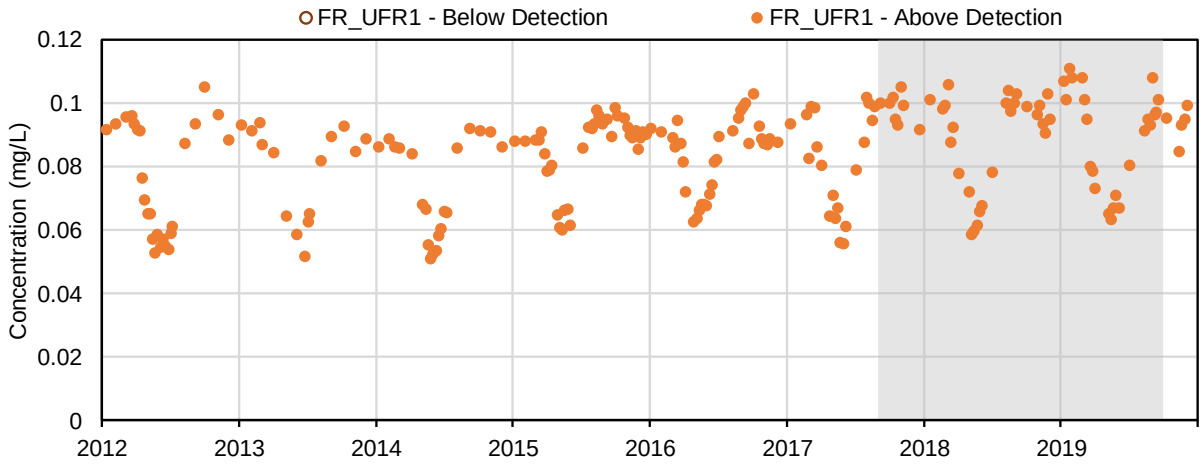
(95) Silicon (mg/L); Dissolved Metals



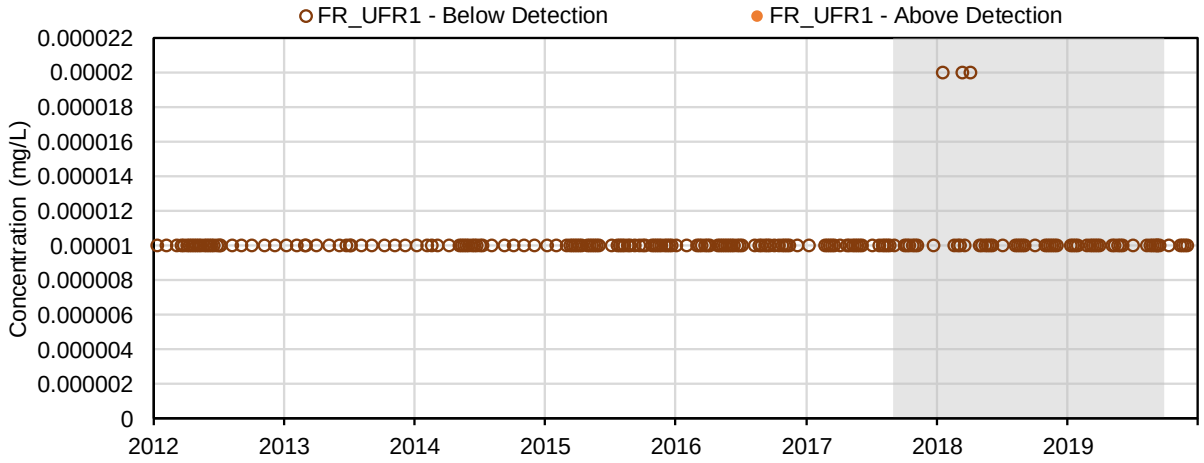
(96) Silver (mg/L); Dissolved Metals



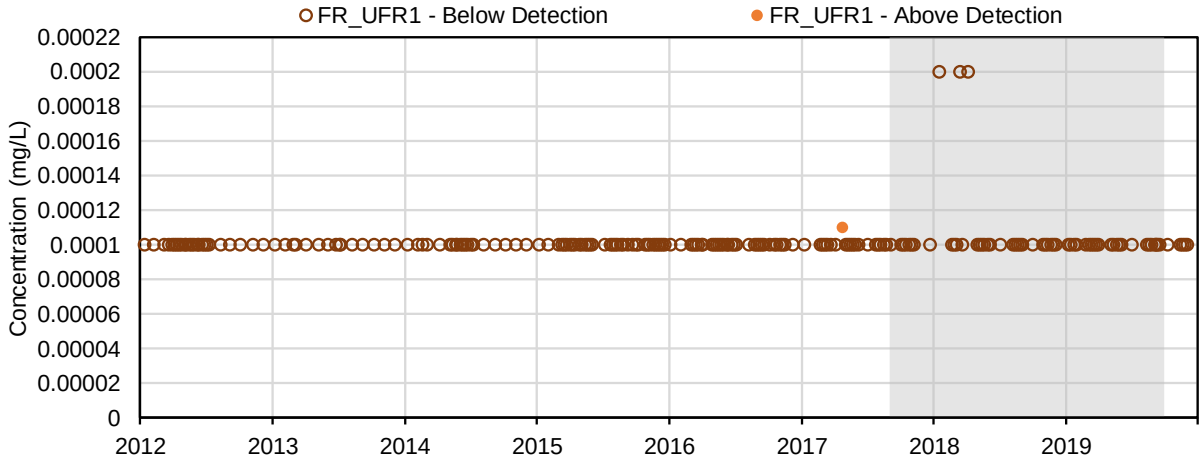
(97) Strontium (mg/L); Dissolved Metals



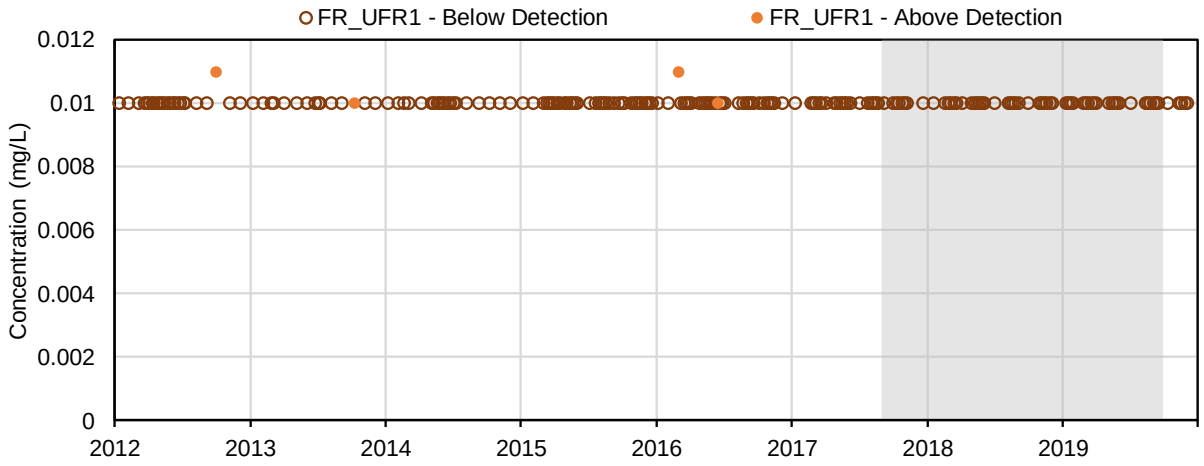
(98) Thallium (mg/L); Dissolved Metals



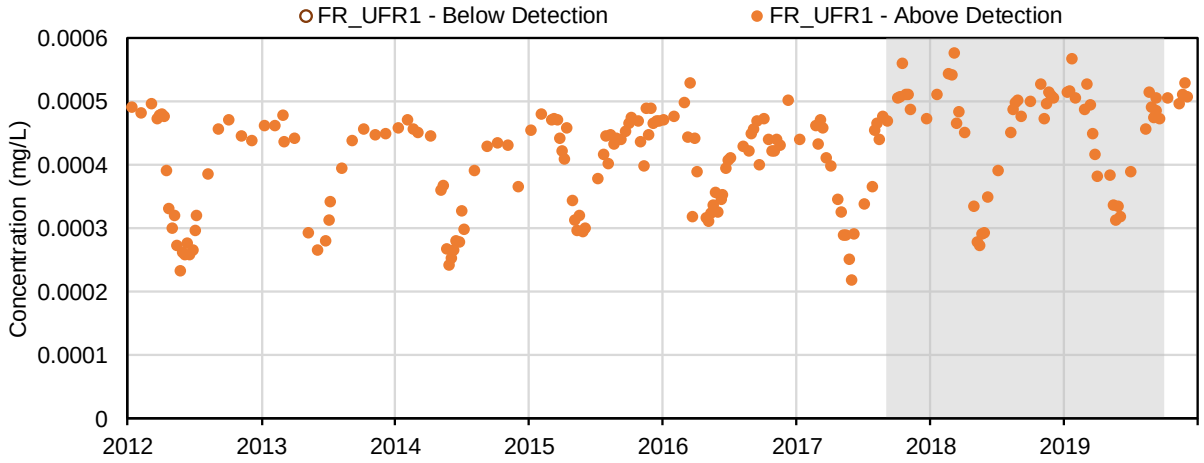
(99) Tin (mg/L); Dissolved Metals



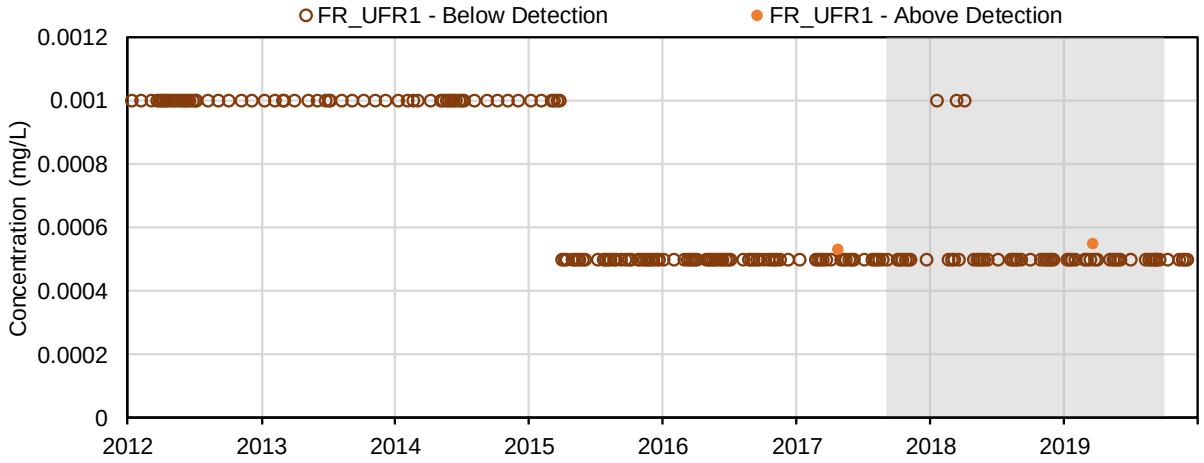
(100) Titanium (mg/L); Dissolved Metals



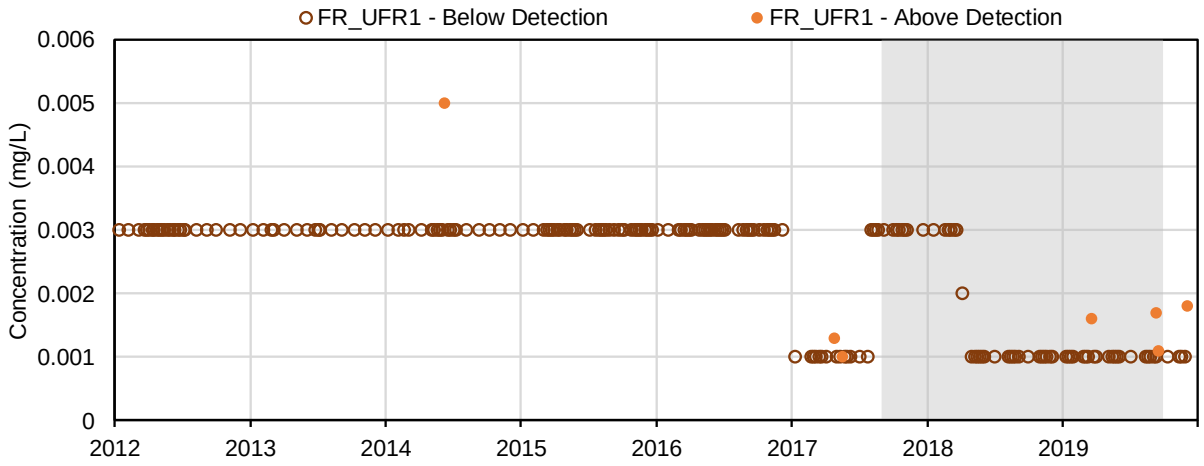
(101) Uranium (mg/L); Dissolved Metals



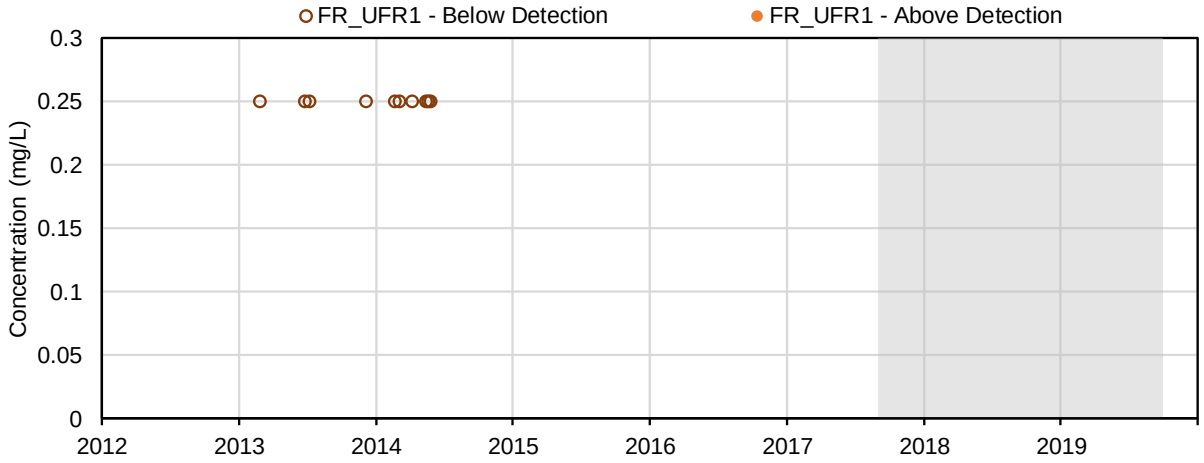
(102) Vanadium (mg/L); Dissolved Metals



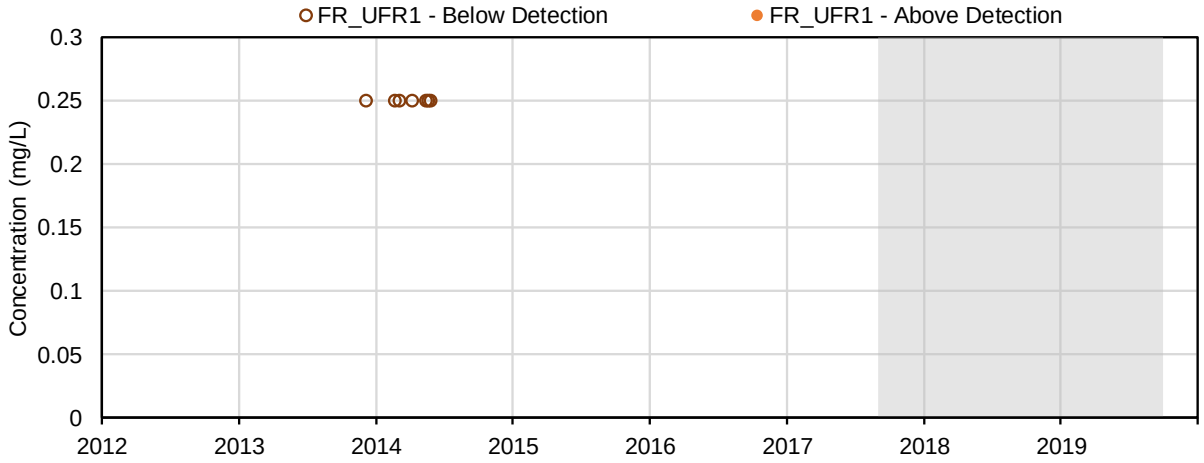
(103) Zinc (mg/L); Dissolved Metals



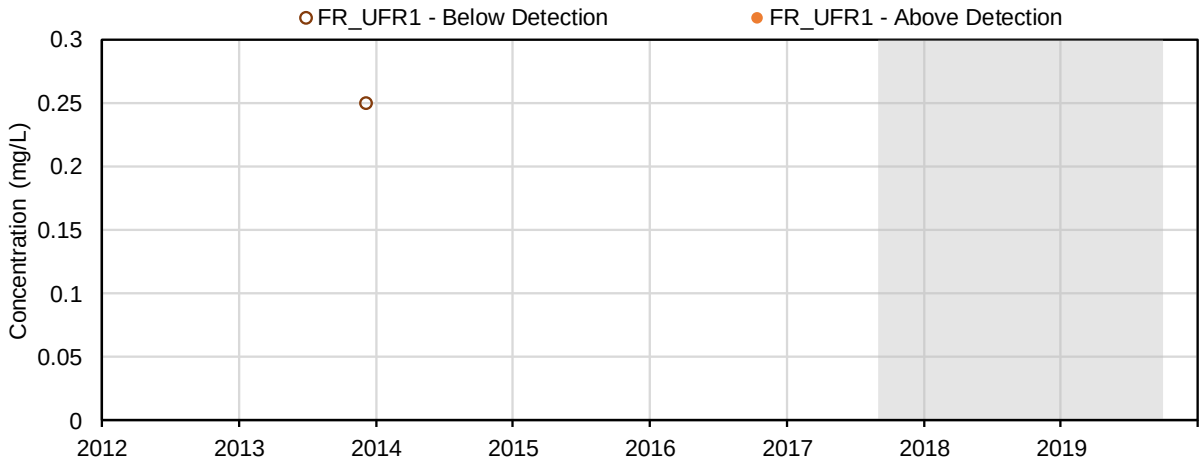
(104) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



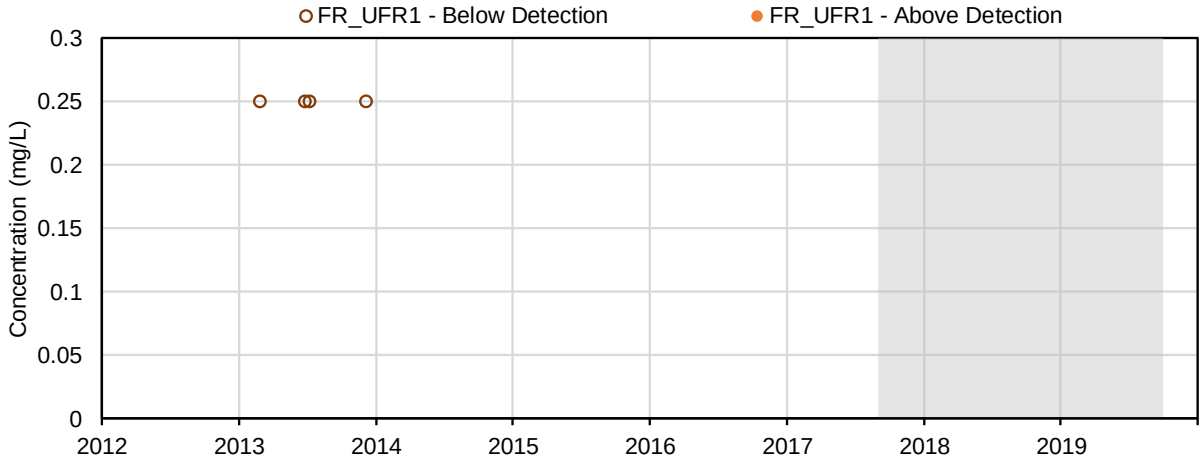
(105) Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



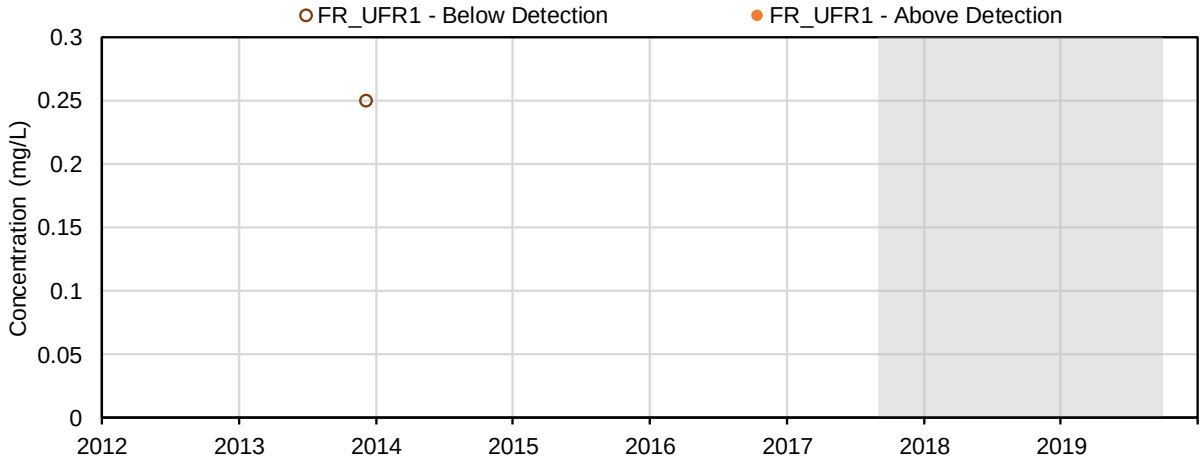
(106) Extracted Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



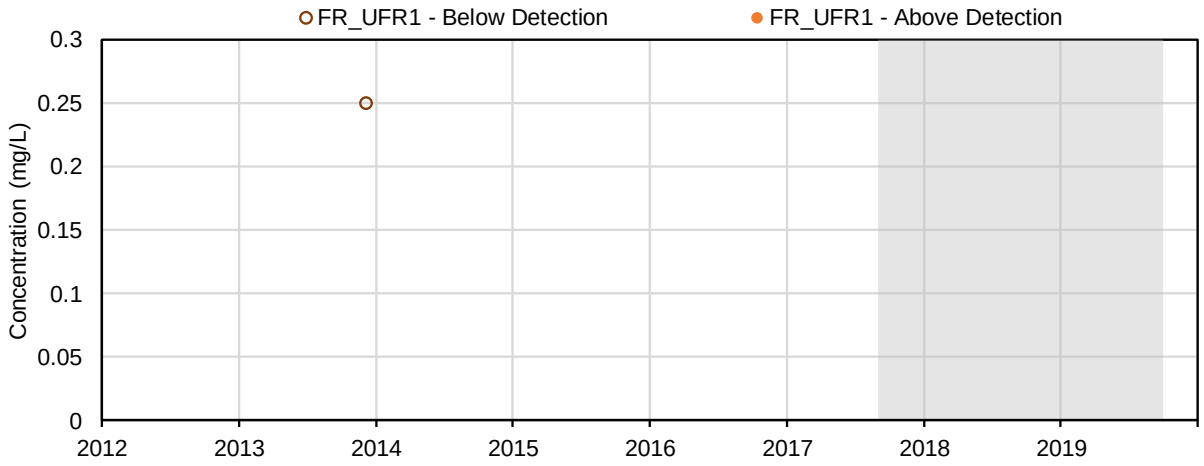
(107) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



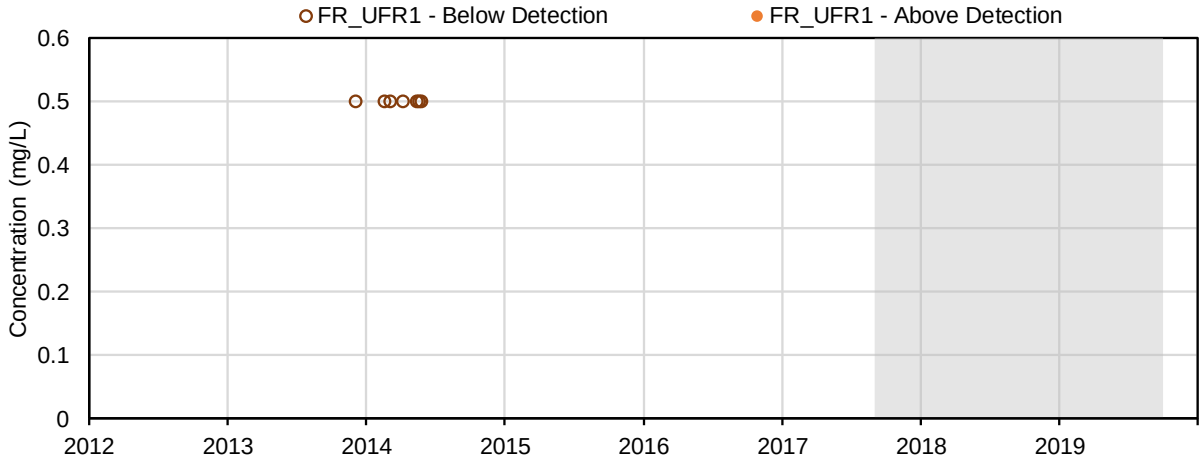
(108) Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L); Volatile Organics



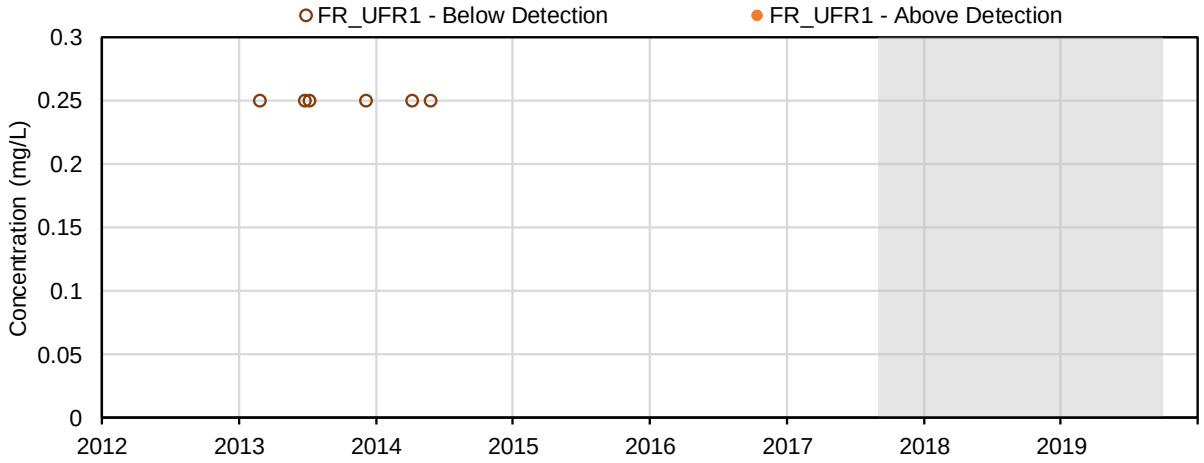
(109) Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L); Volatile Organics



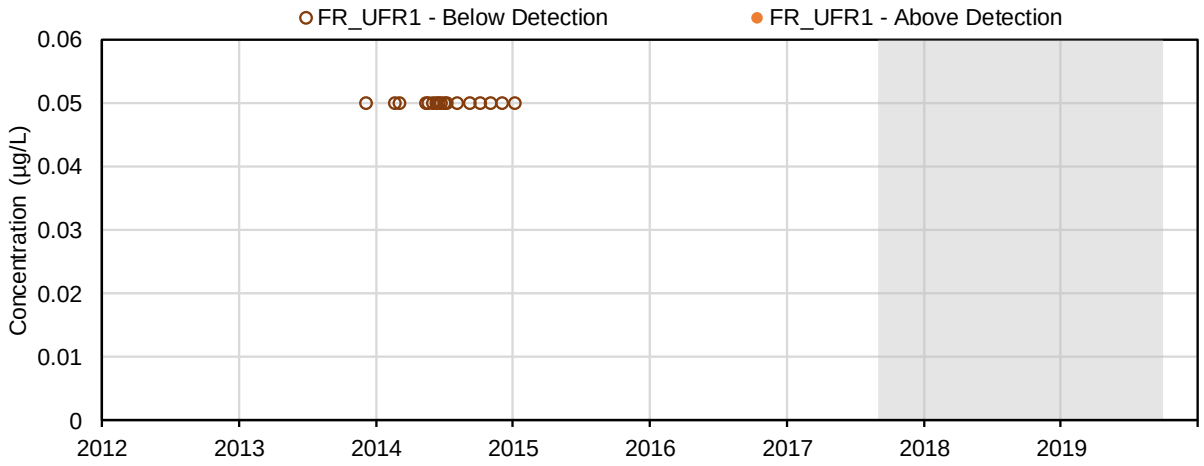
(110) Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L); Volatile Organics



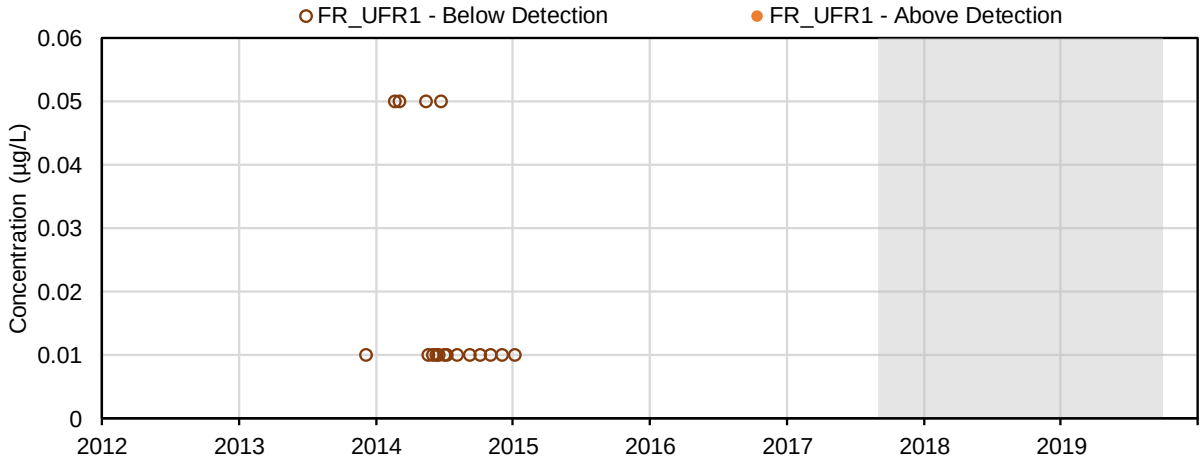
(111) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics



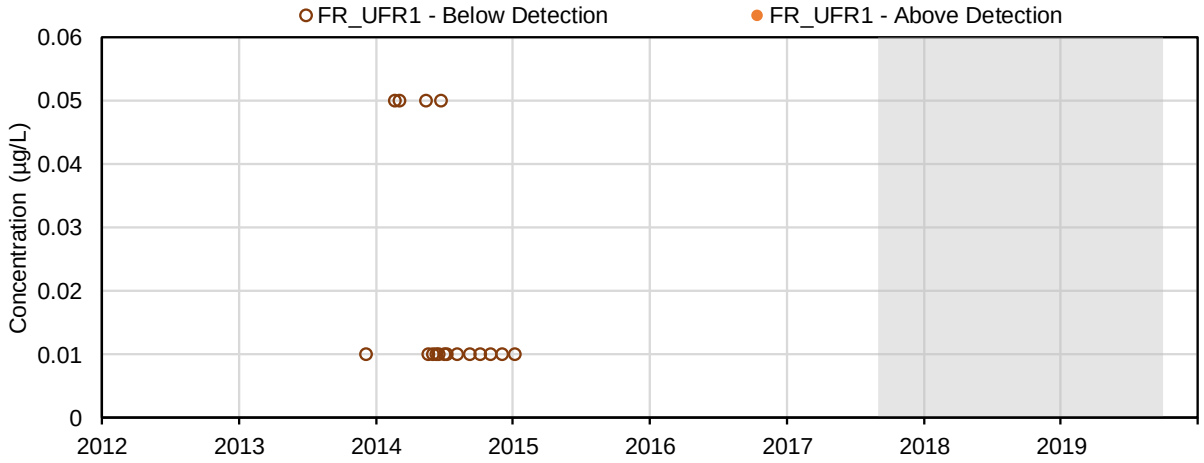
(112) Naphthalene (µg/L); Parent PAHs



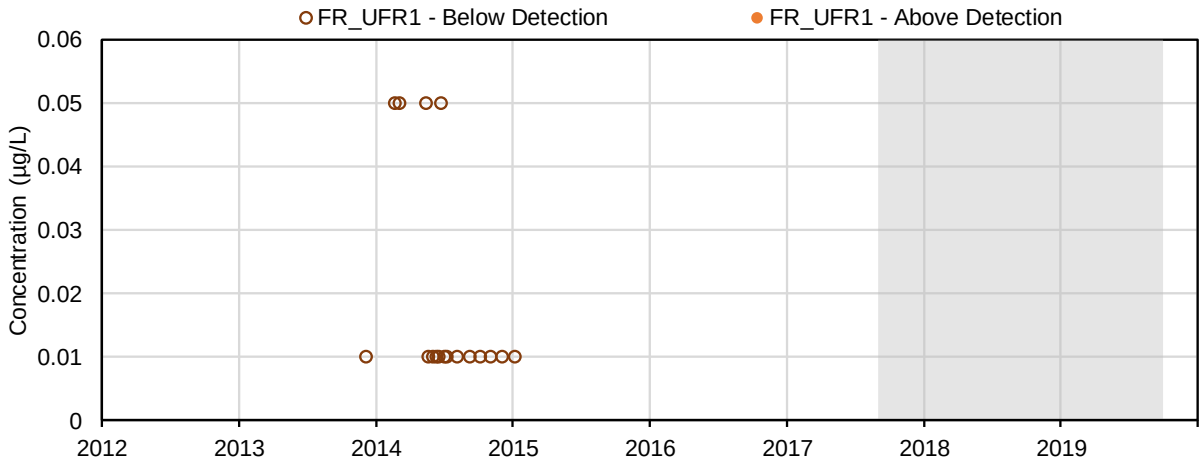
(113) Acenaphthylene (µg/L); Parent PAHs



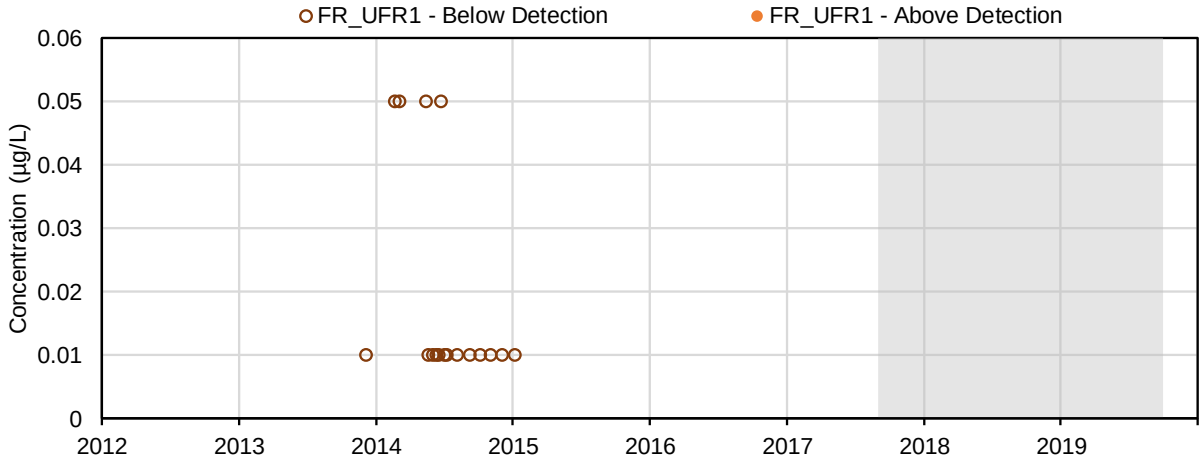
(114) Acenaphthene (µg/L); Parent PAHs



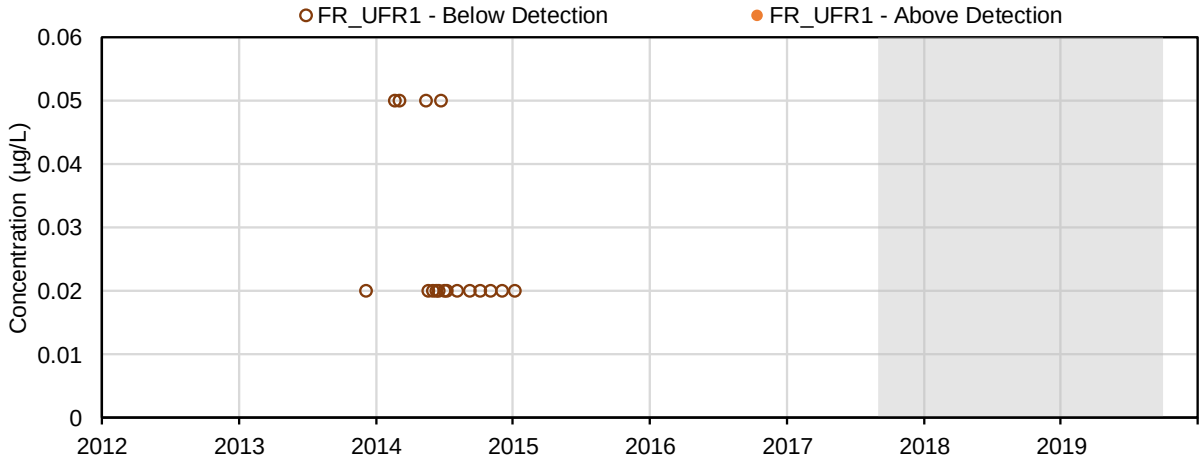
(115) Acridine (µg/L); Parent PAHs



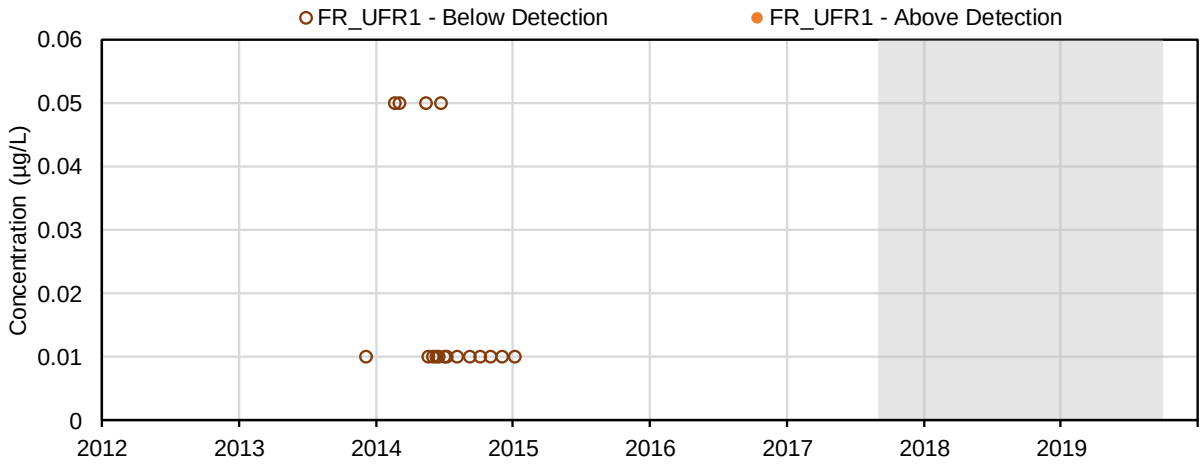
(116) Fluorene (µg/L); Parent PAHs



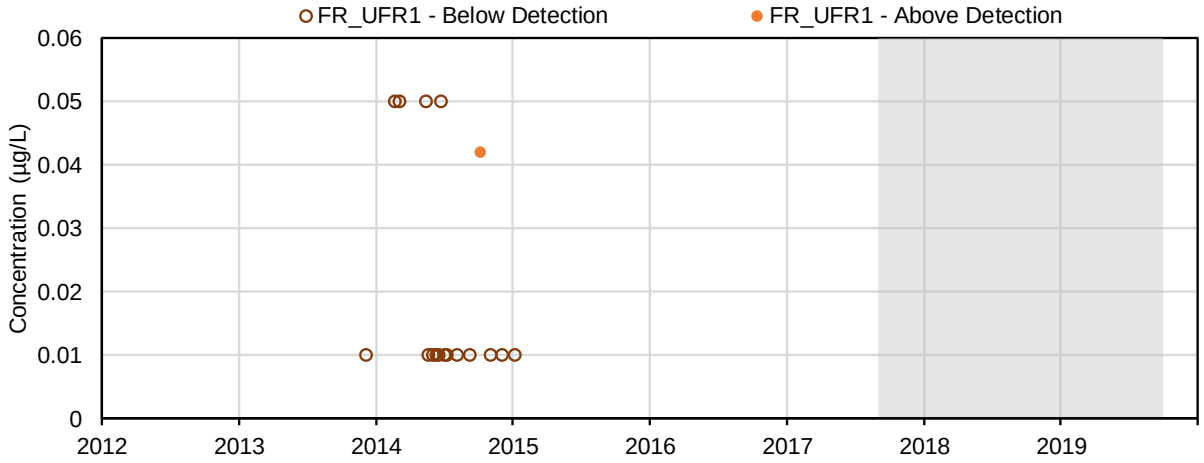
(127) Phenanthrene (µg/L); Parent PAHs



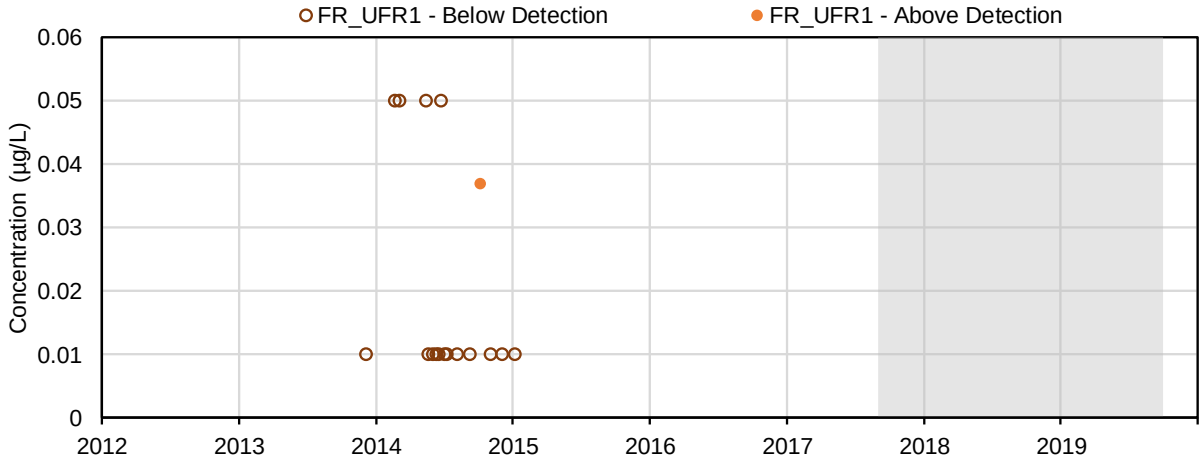
(118) Anthracene (µg/L); Parent PAHs



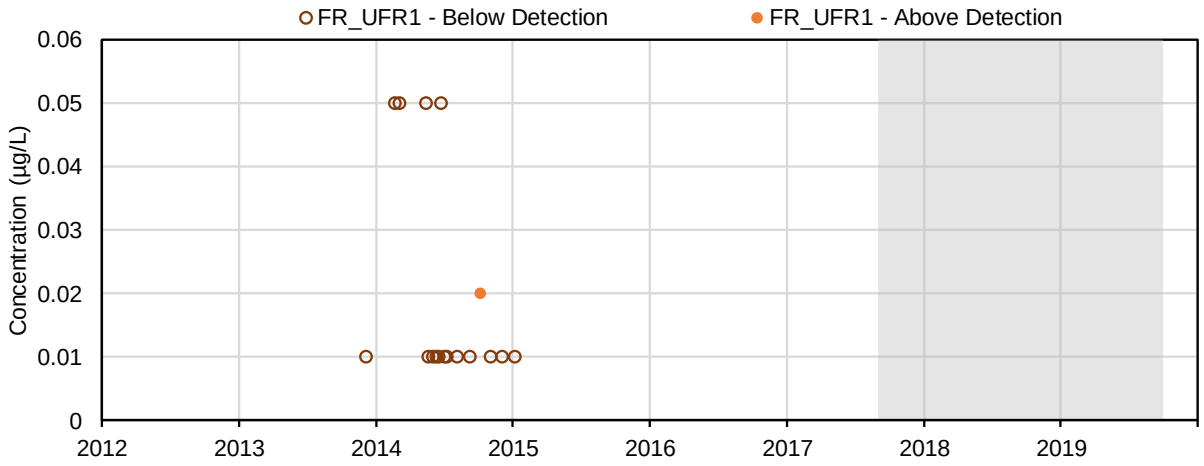
(119) Pyrene (µg/L); Parent PAHs



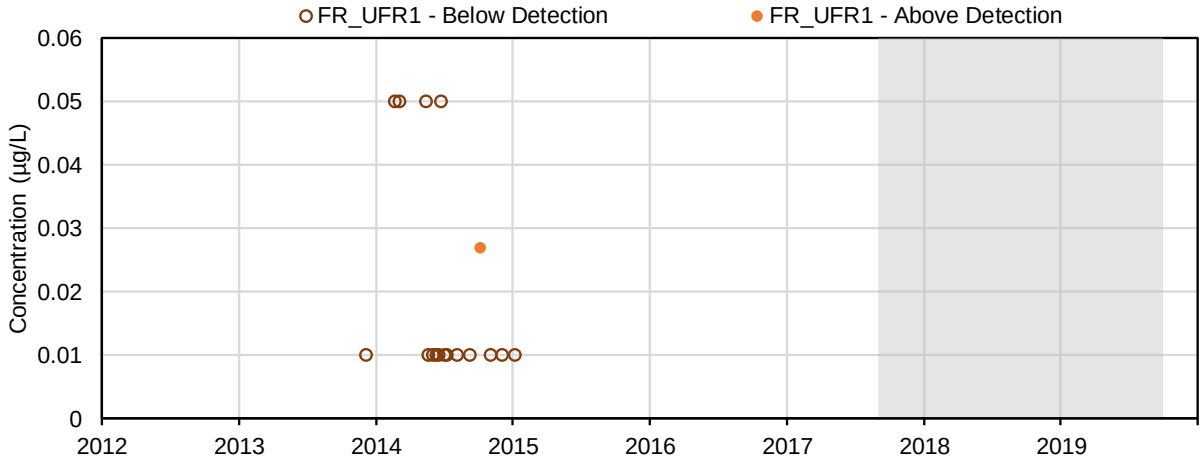
(120) Fluoranthene (µg/L); Parent PAHs



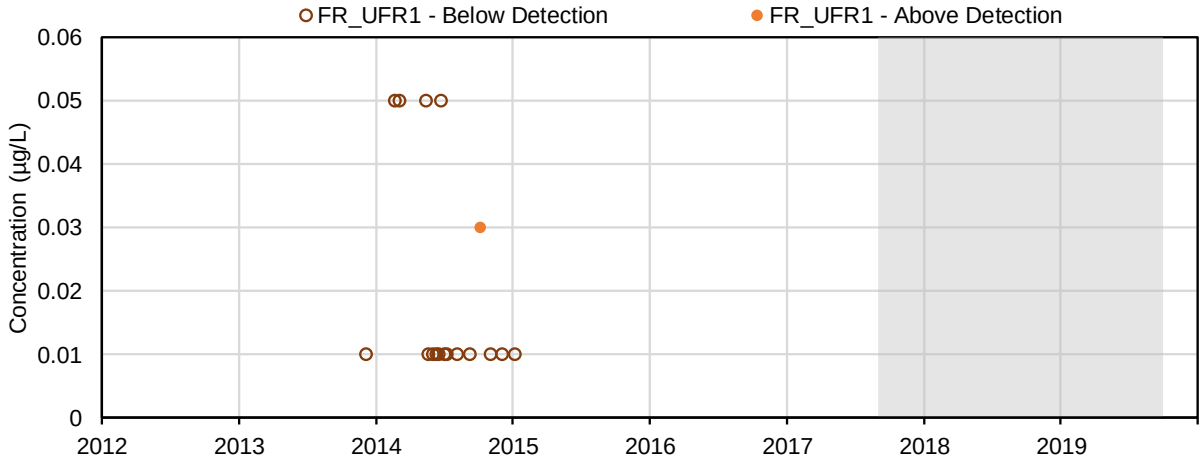
(121) Benzo(a)anthracene (µg/L); Parent PAHs



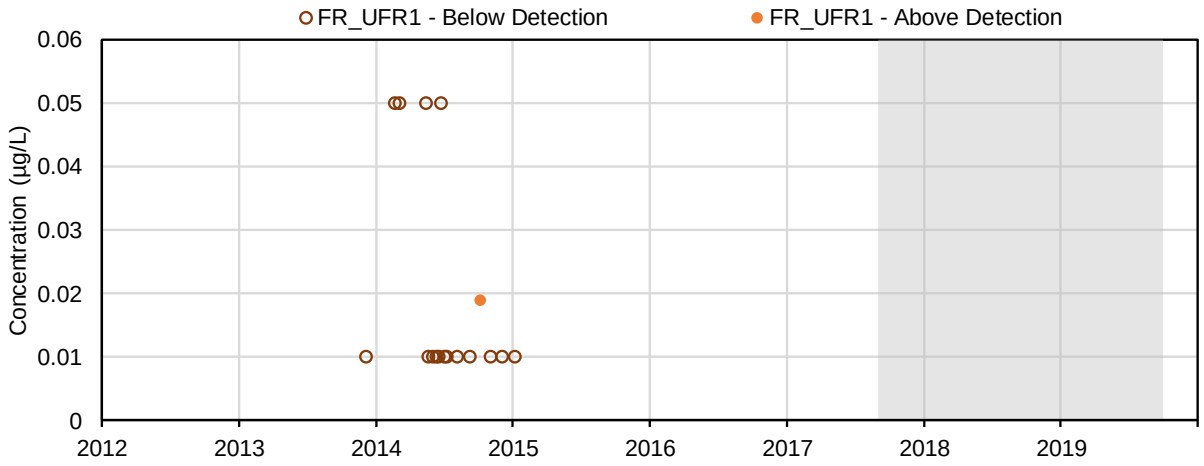
(122) Chrysene (µg/L); Parent PAHs



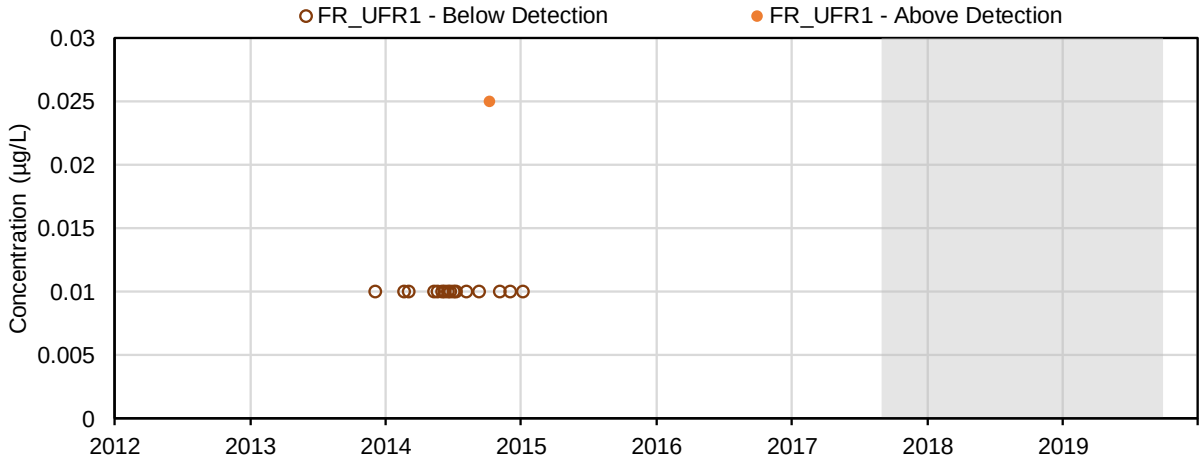
(123) Benzo(b)fluoranthene (µg/L); Parent PAHs



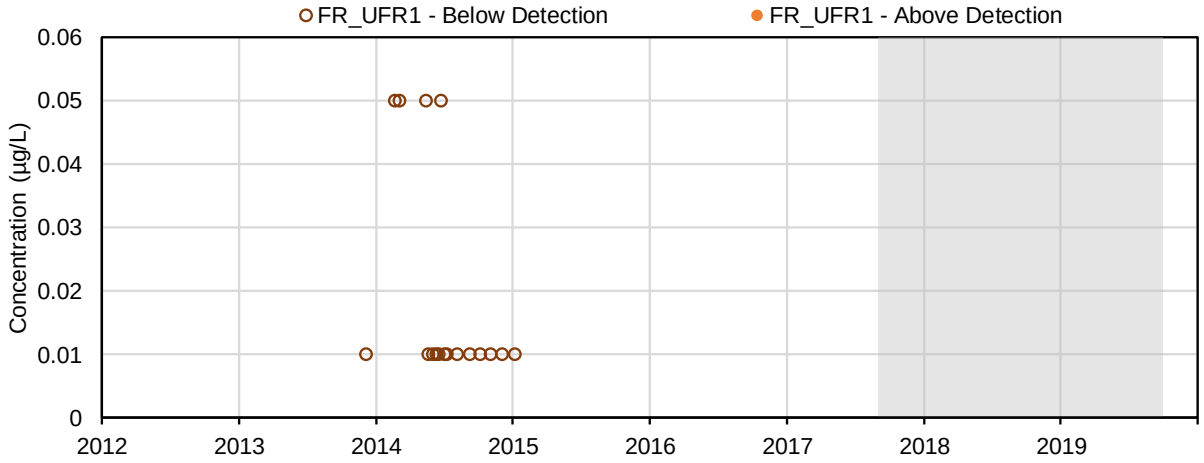
(124) Benzo(k)fluoranthene (µg/L); Parent PAHs



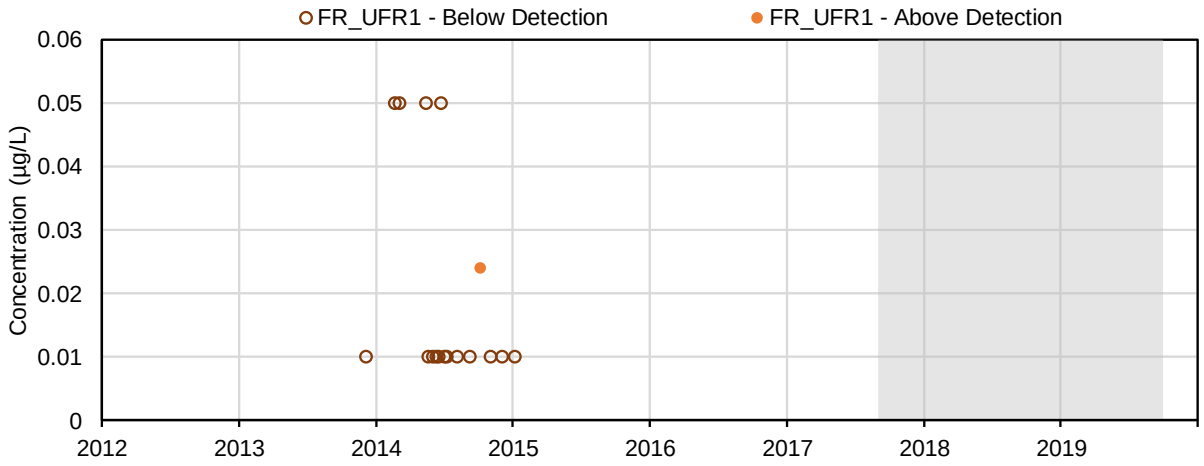
(125) Benzo(a)pyrene (µg/L); Parent PAHs



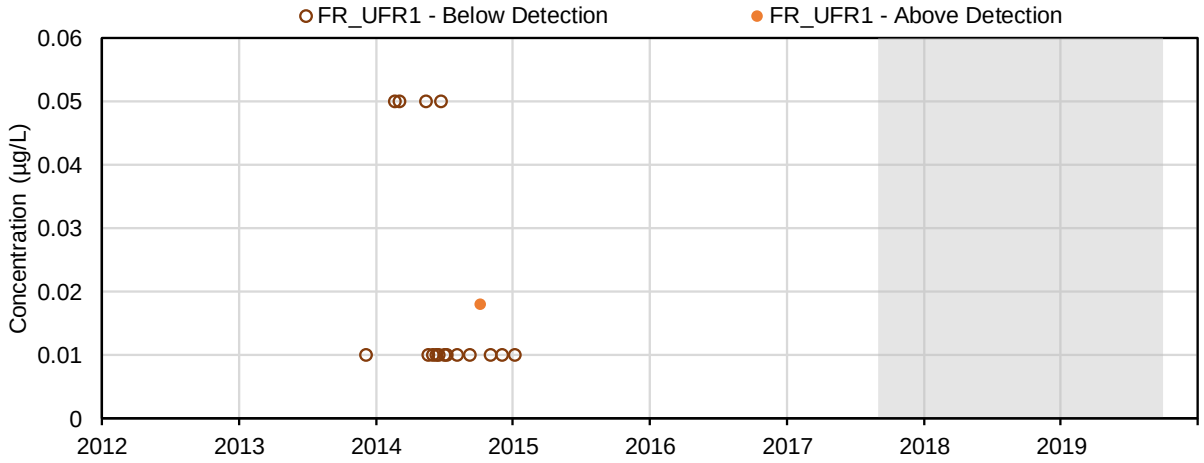
(126) Quinoline (µg/L); Parent PAHs



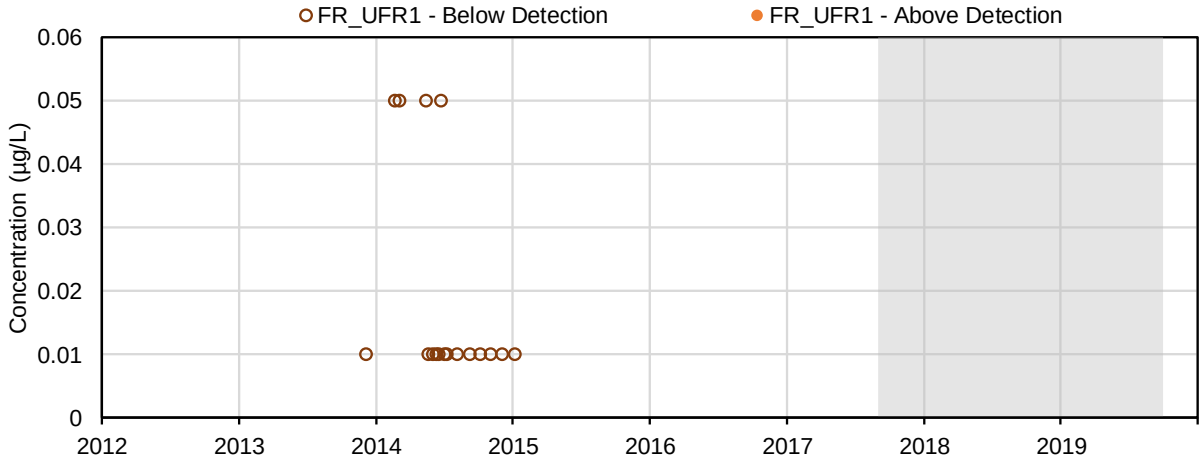
(127) Benzo(g,h,i)perylene (µg/L); Parent PAHs

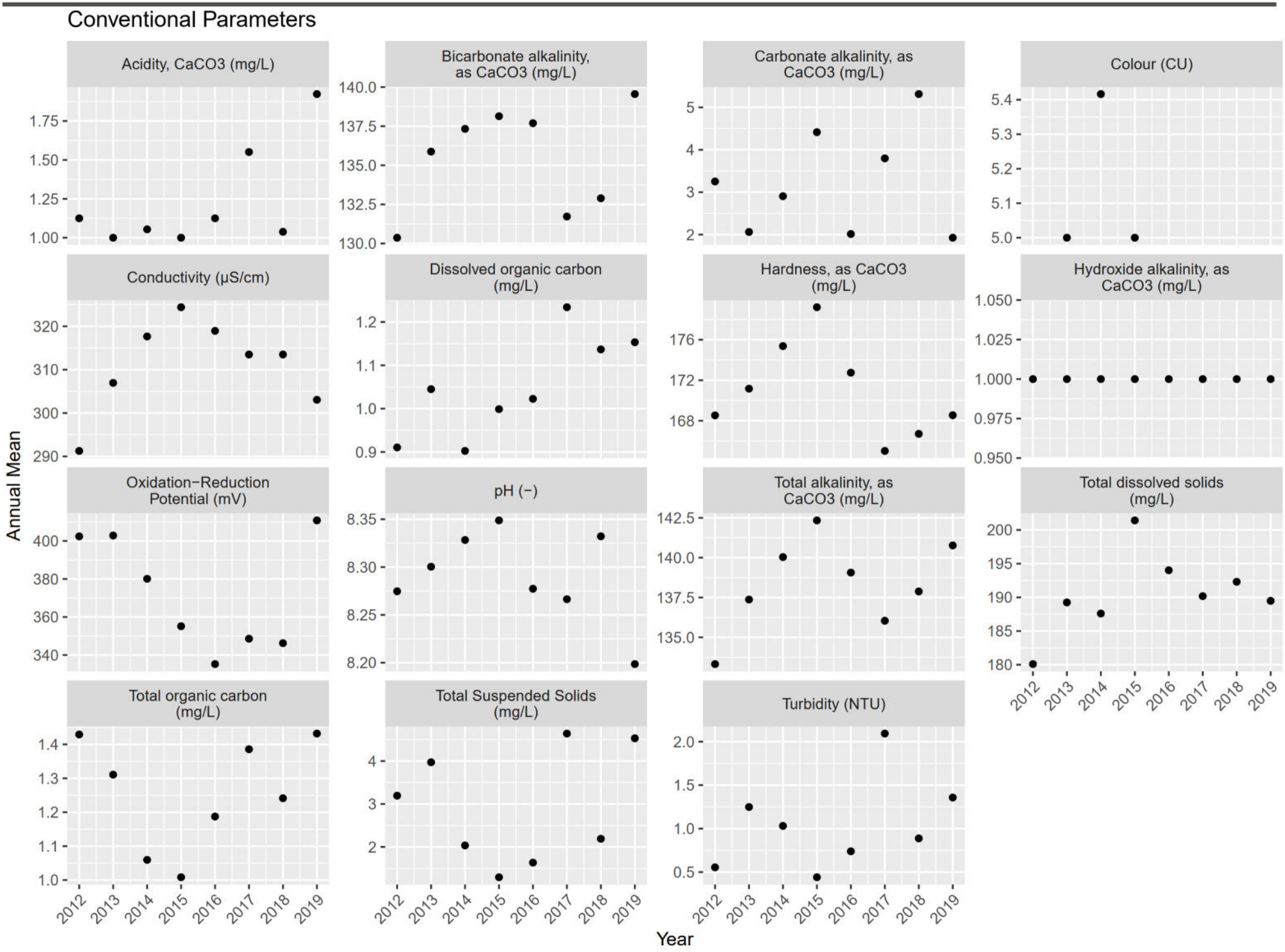


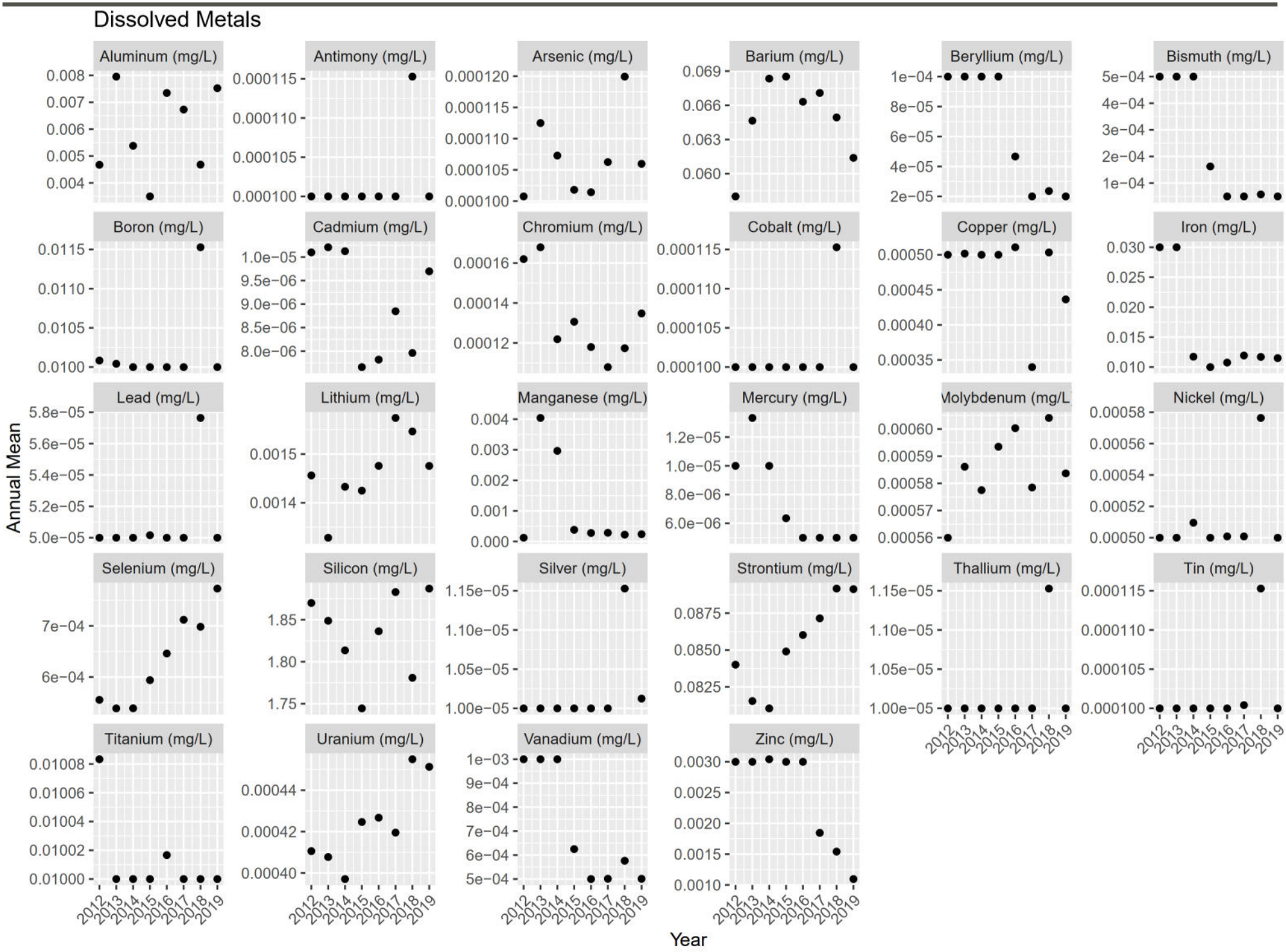
(128) Indeno(c,d-123)pyrene (µg/L); Parent PAHs

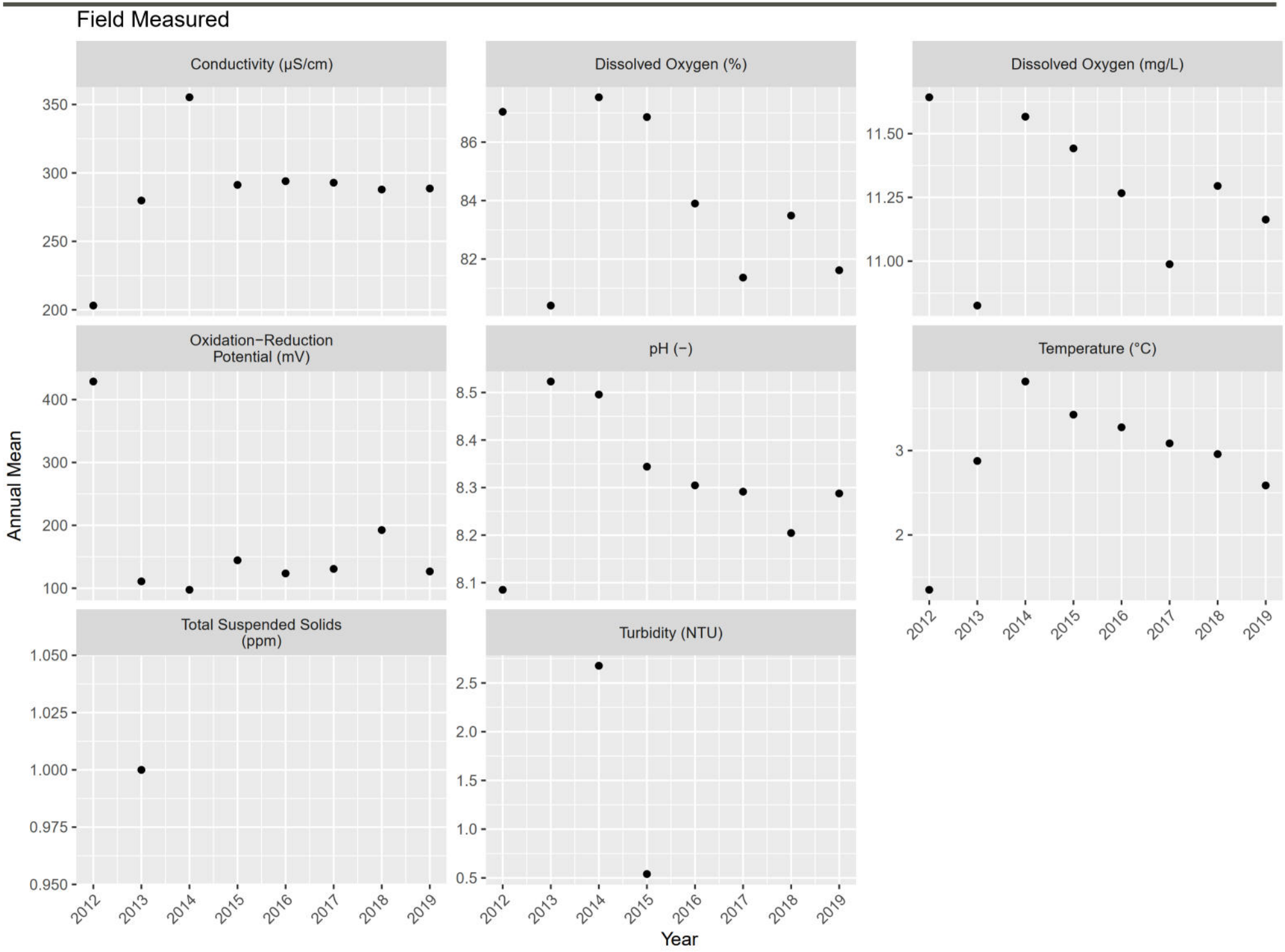


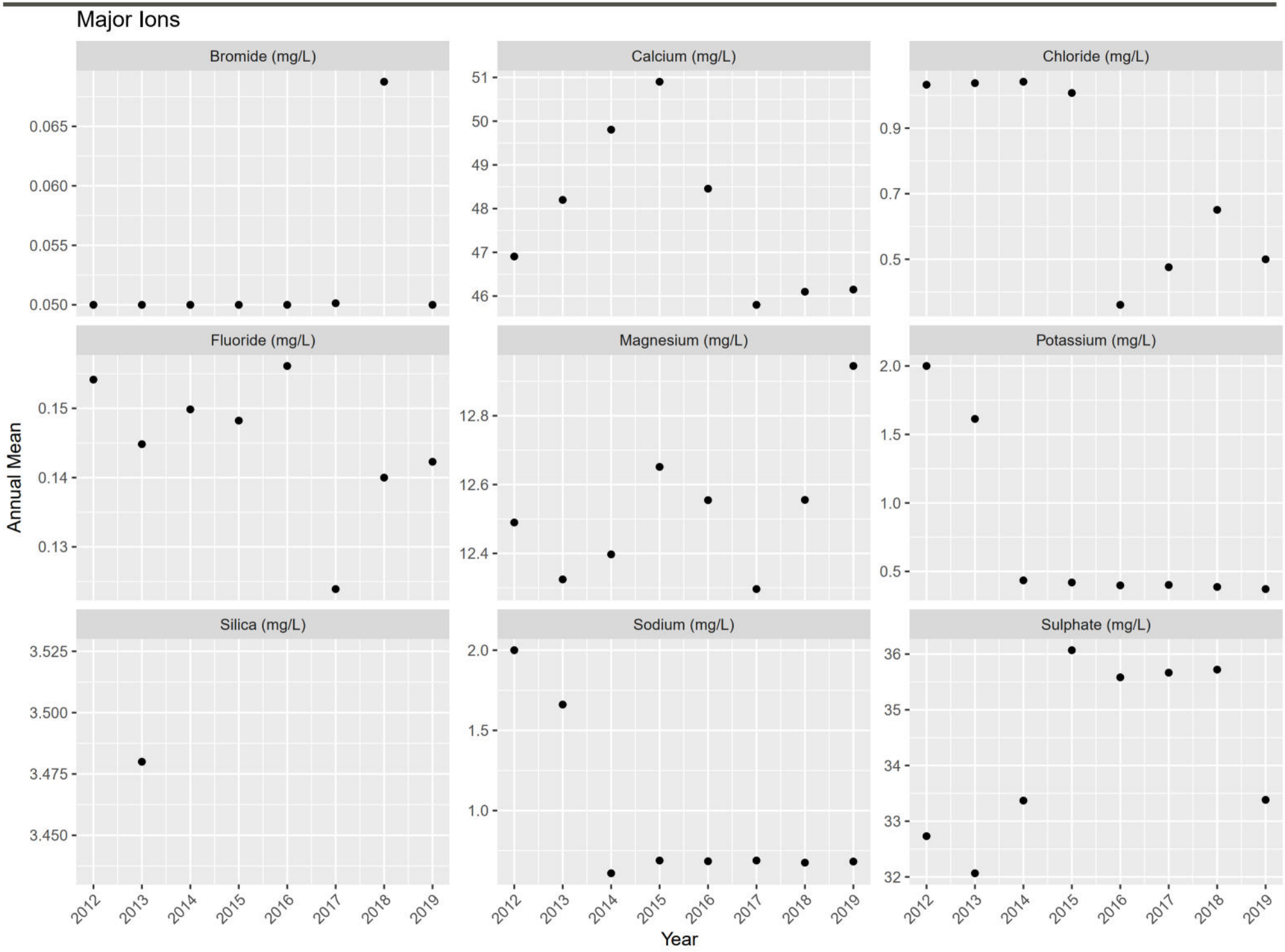
(129) Dibenzo(a,h)anthracene (µg/L); Parent PAHs

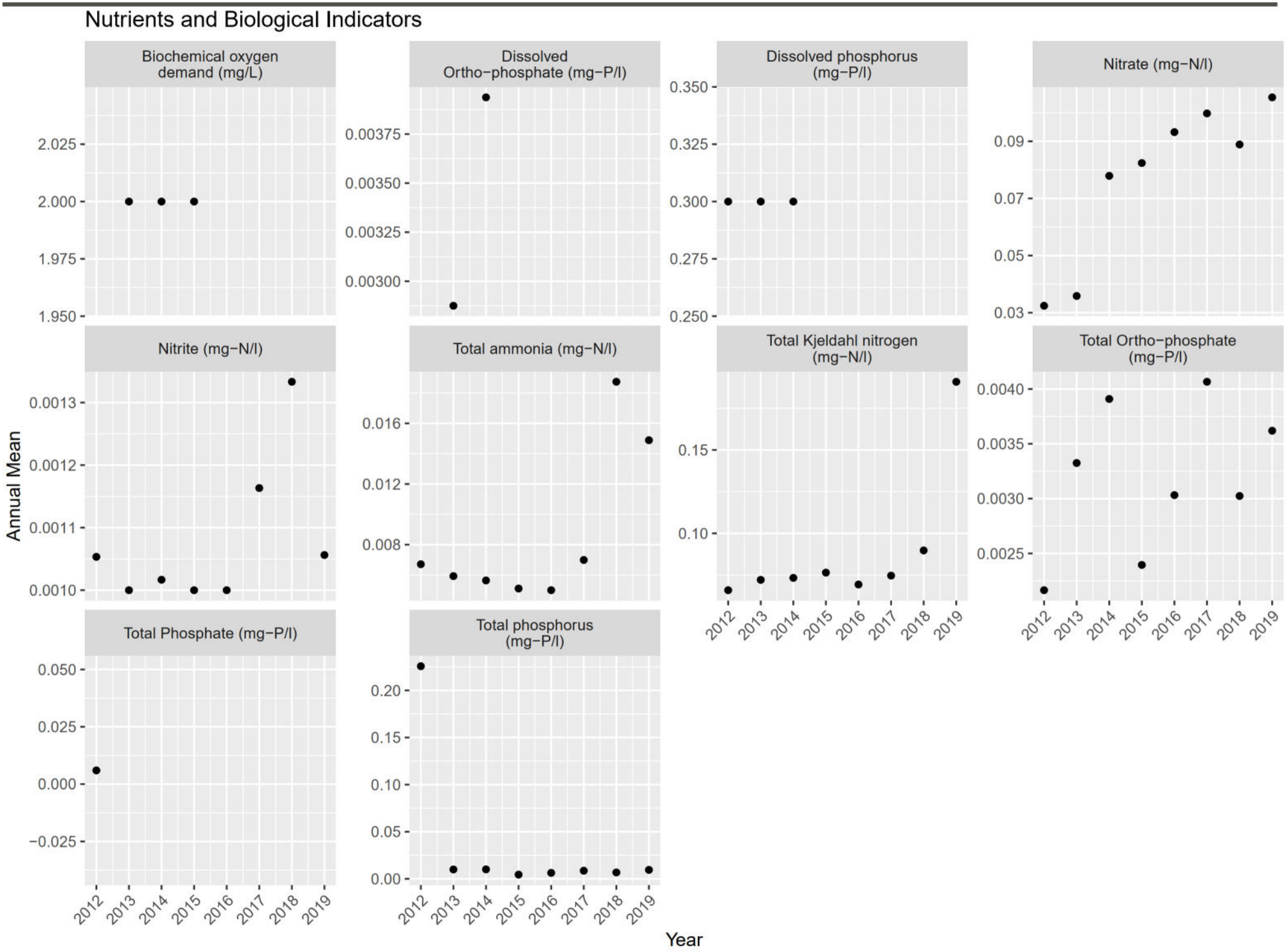


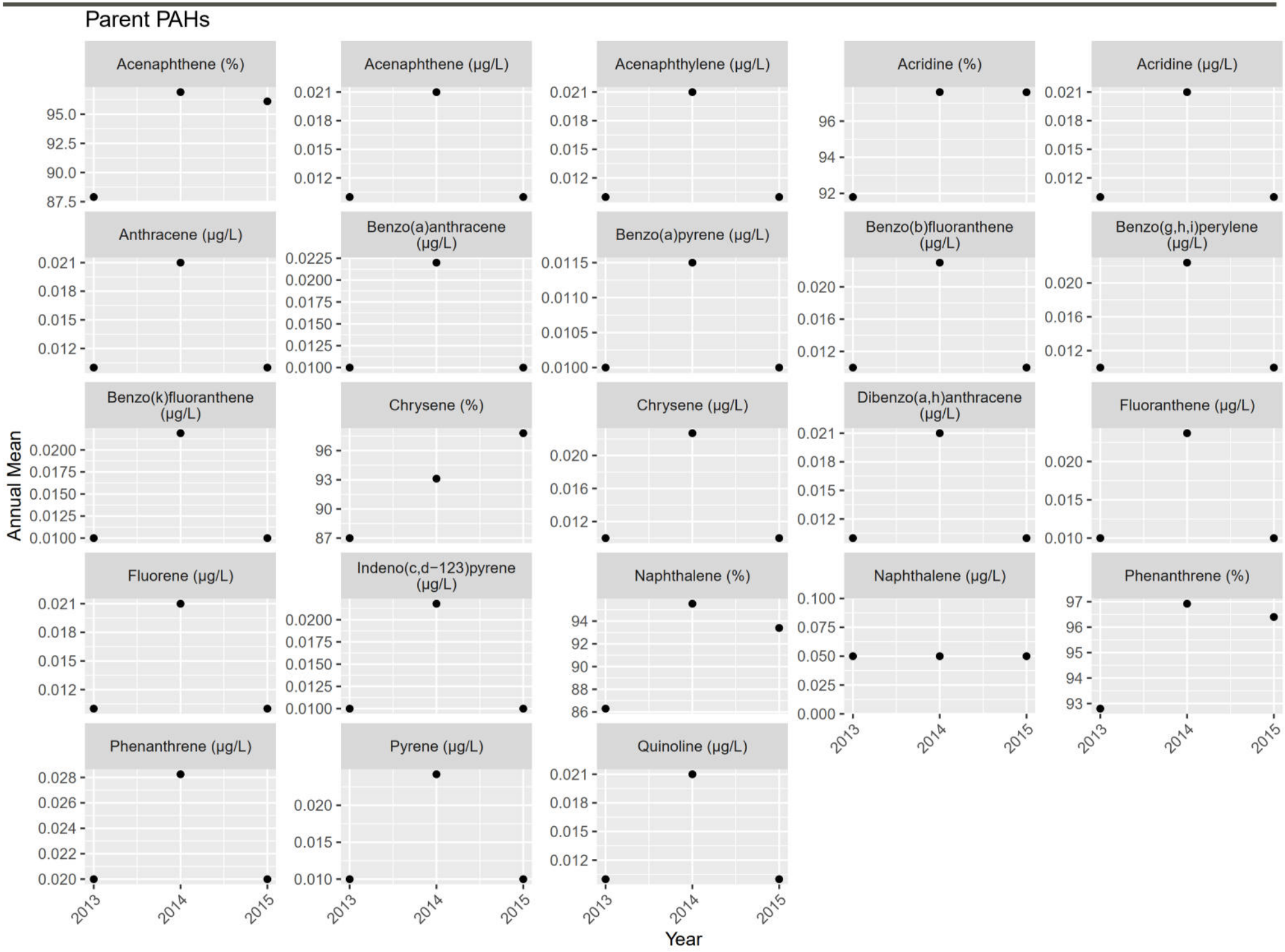

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Colour (CU)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total Suspended Solids (mg/L)
Turbidity (NTU)
Annual Mean
Year

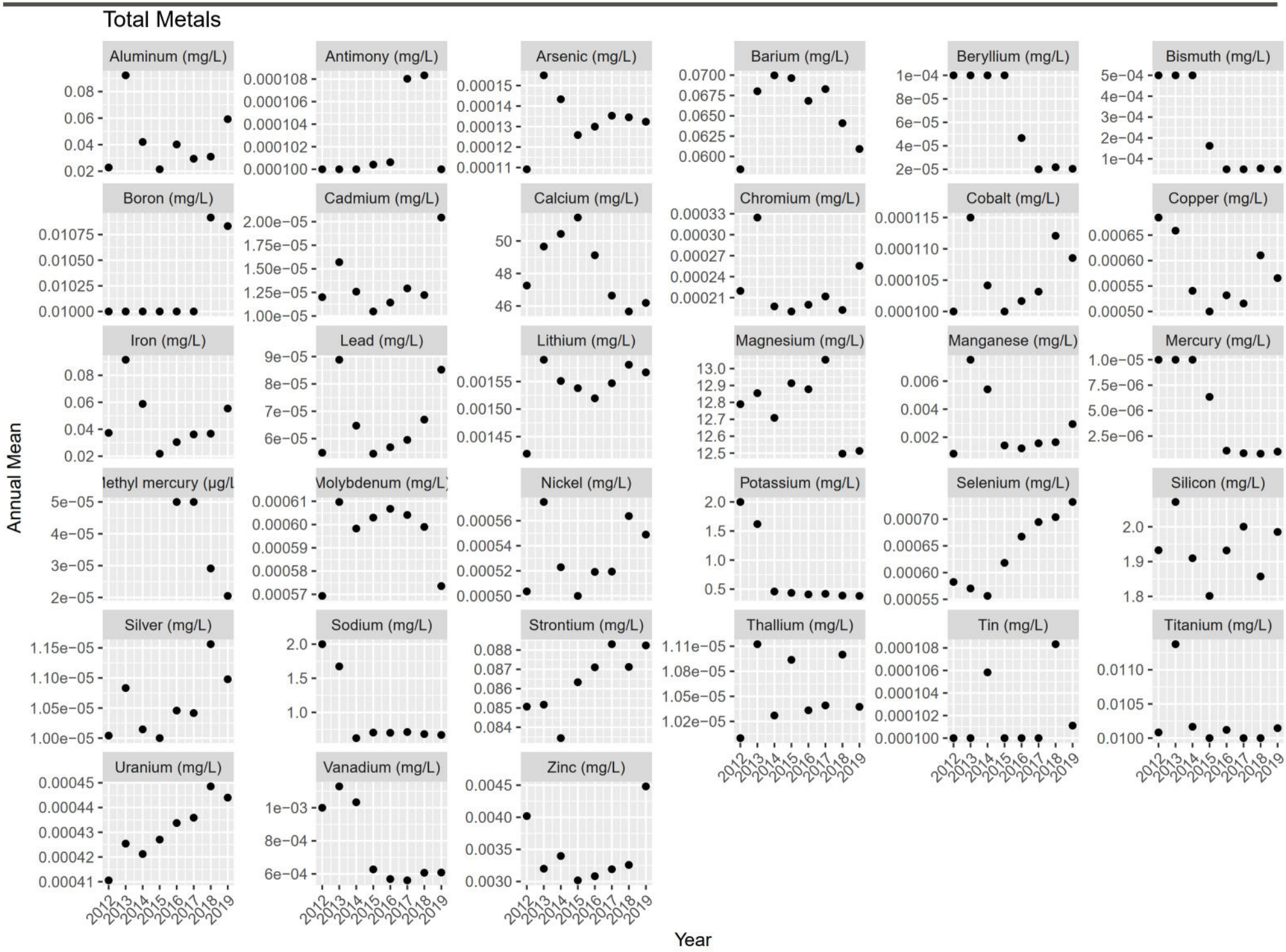

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year

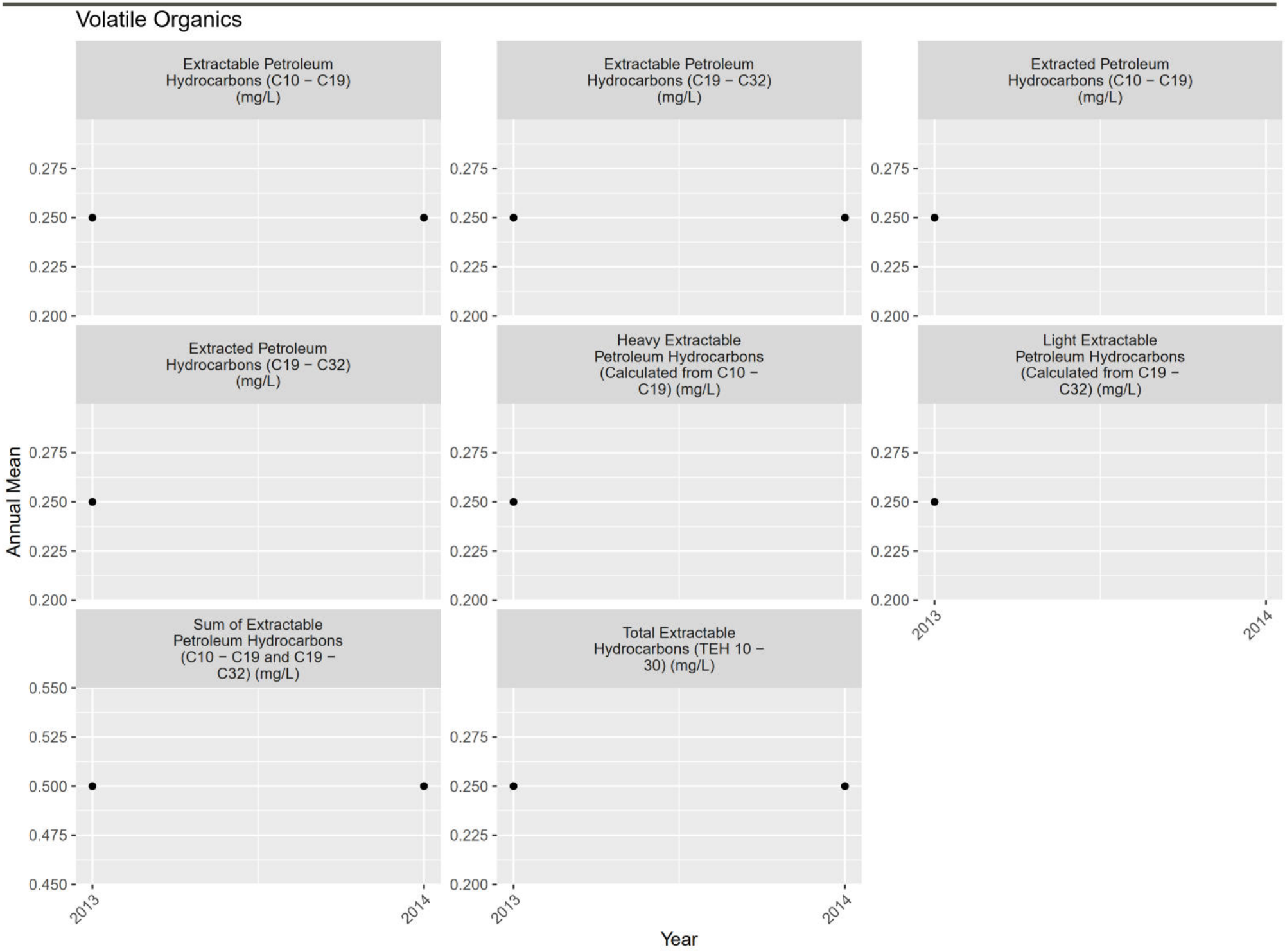

Field Measured
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Temperature (°C)
Total Suspended Solids (ppm)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Silica (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
0.065
0.060
0.055
0.050
51
50
49
48
47
46
0.9
0.7
0.5
0.15
0.14
0.13
12.8
12.6
12.4
2.0
1.5
1.0
0.5
3.525
3.500
3.475
3.450
2.0
1.5
1.0
36
35
34
33
32
2012
2013
2014
2015
2016
2017
2018
2019


Nutrients and Biological Indicators
Biochemical oxygen demand (mg/L)
Dissolved Ortho−phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Parent PAHs
Acenaphthene (%)
Acenaphthene (µg/L)
Acenaphthylene (µg/L)
Acridine (%)
Acridine (µg/L)
Anthracene (µg/L)
Benzo(a)anthracene (µg/L)
Benzo(a)pyrene (µg/L)
Benzo(b)fluoranthene (µg/L)
Benzo(g,h,i)perylene (µg/L)
Benzo(k)fluoranthene (µg/L)
Chrysene (%)
Chrysene (µg/L)
Dibenzo(a,h)anthracene (µg/L)
Fluoranthene (µg/L)
Fluorene (µg/L)
Indeno(c,d−123)pyrene (µg/L)
Naphthalene (%)
Naphthalene (µg/L)
Phenanthrene (%)
Phenanthrene (µg/L)
Pyrene (µg/L)
Quinoline (µg/L)
Annual Mean
Year
2013
2014
2015

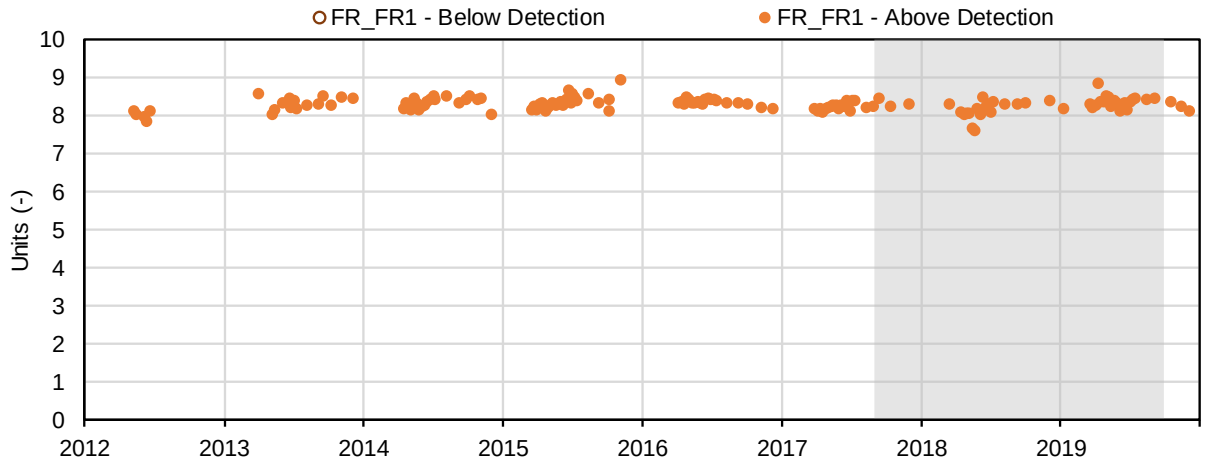

Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
lethyl mercury (µg/l
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extractable Petroleum Hydrocarbons (C19 − C32) (mg/L)
Extracted Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 − C19) (mg/L)
Light Extractable Petroleum Hydrocarbons (Calculated from C19 − C32) (mg/L)
Sum of Extractable Petroleum Hydrocarbons (C10 − C19 and C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
Year
2013
2014

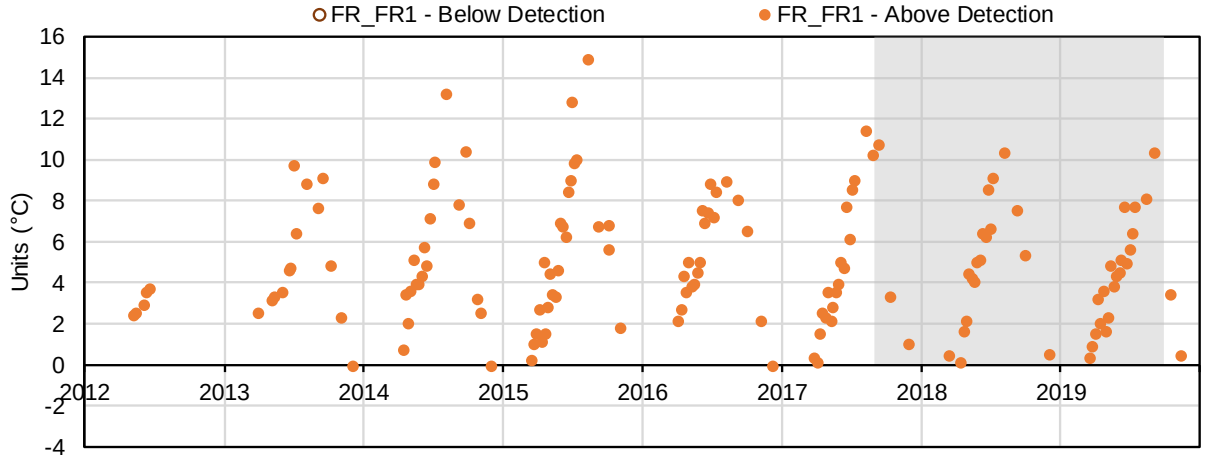
ATTACHMENT F3

FR_FR1 Plots

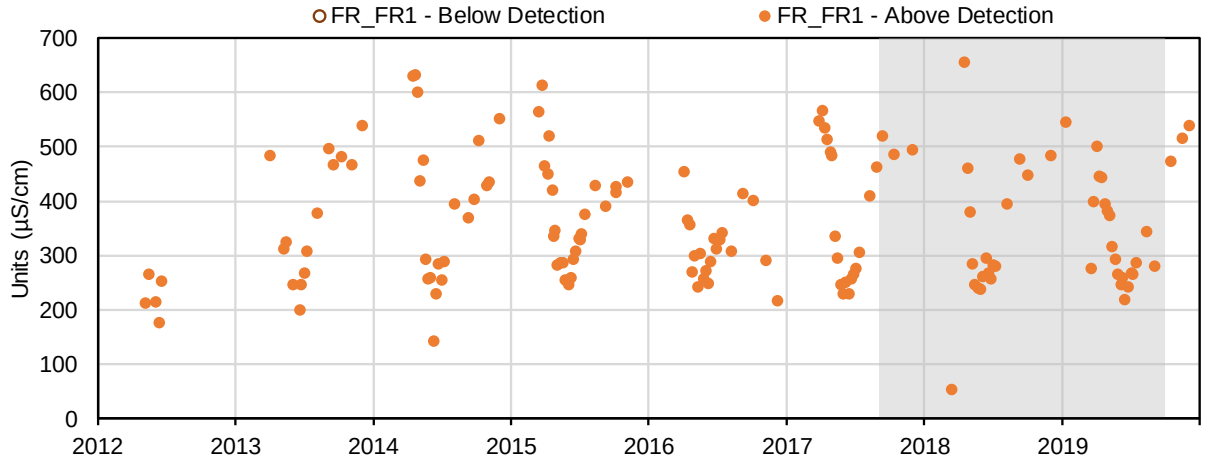
(1) pH (-); Field Measured



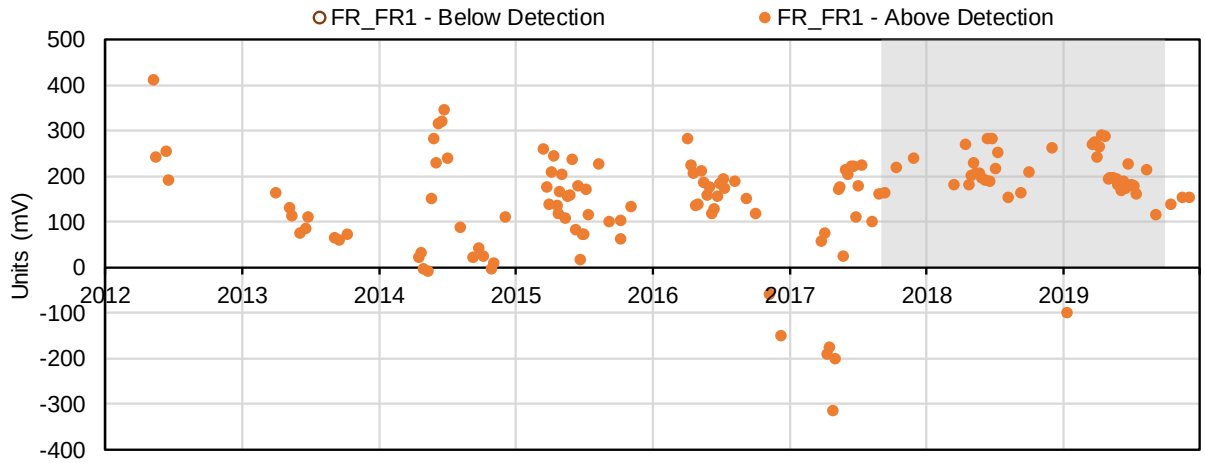
(2) Temperature (°C); Field Measured



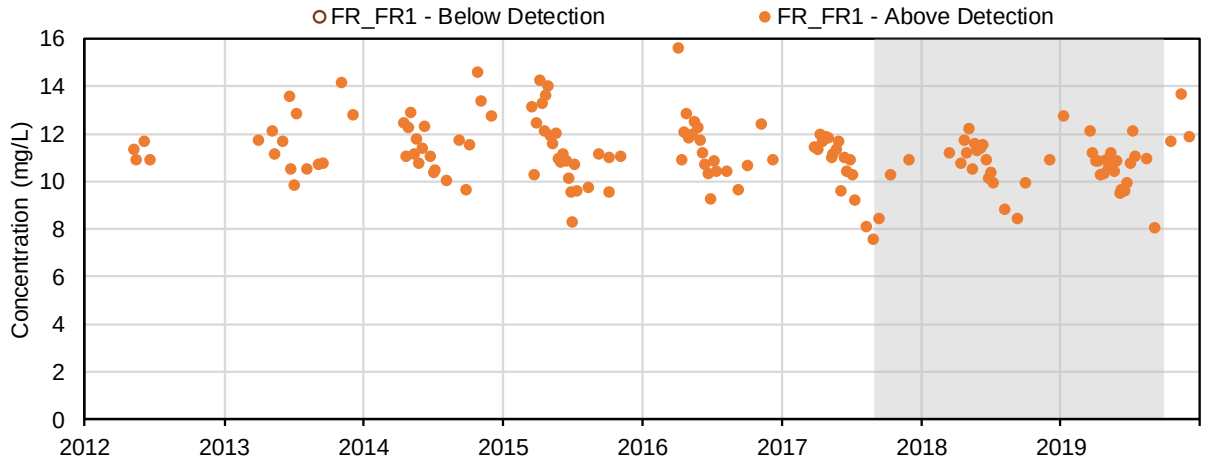
(3) Conductivity (µS/cm); Field Measured



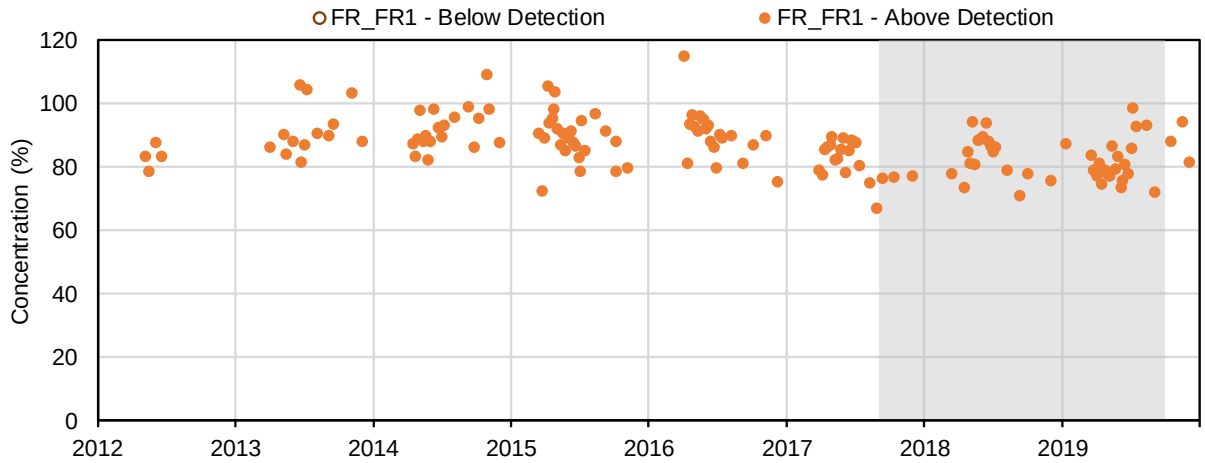
(4) Oxidation-Reduction Potential (mV); Field Measured



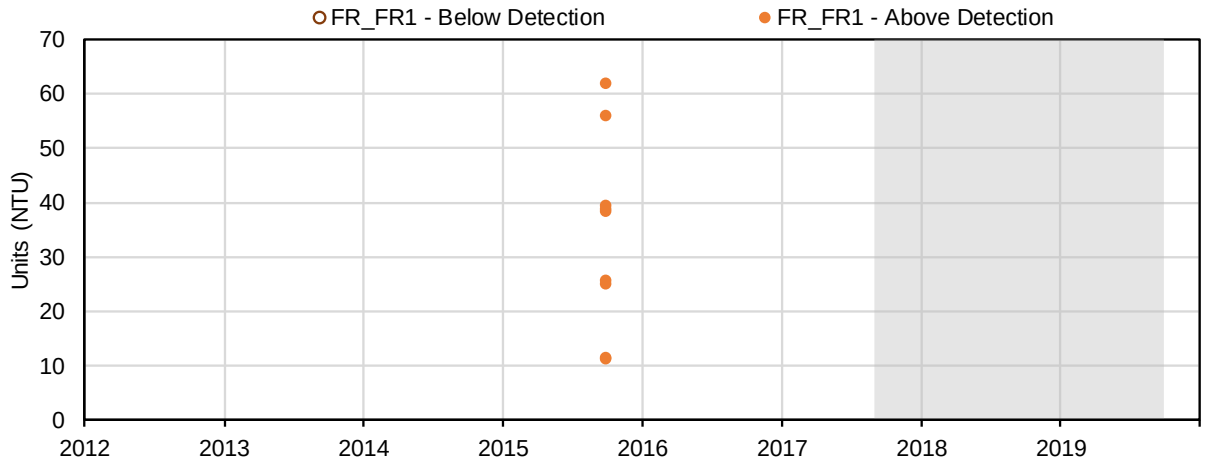
(5) Dissolved Oxygen (mg/L); Field Measured



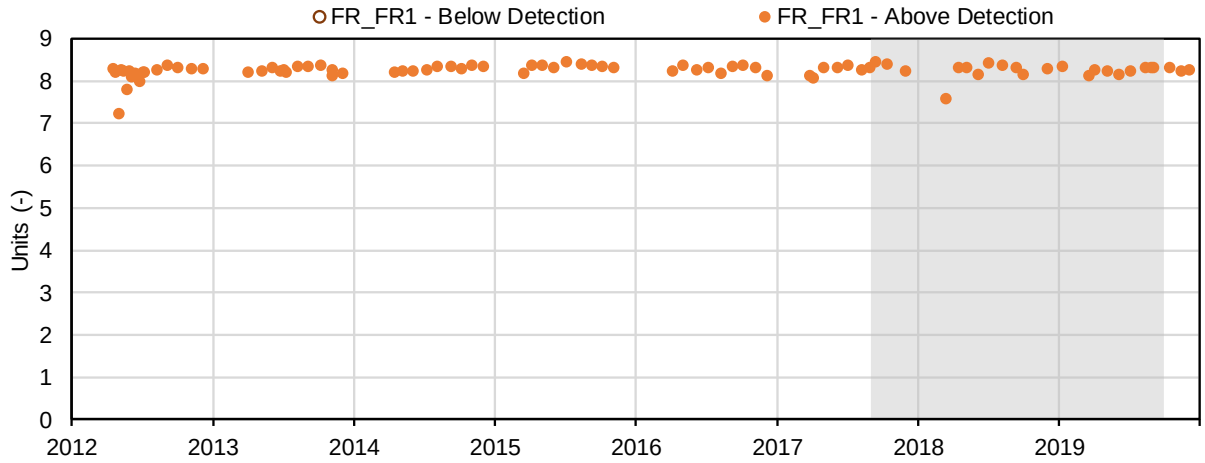
(6) Dissolved Oxygen (%); Field Measured



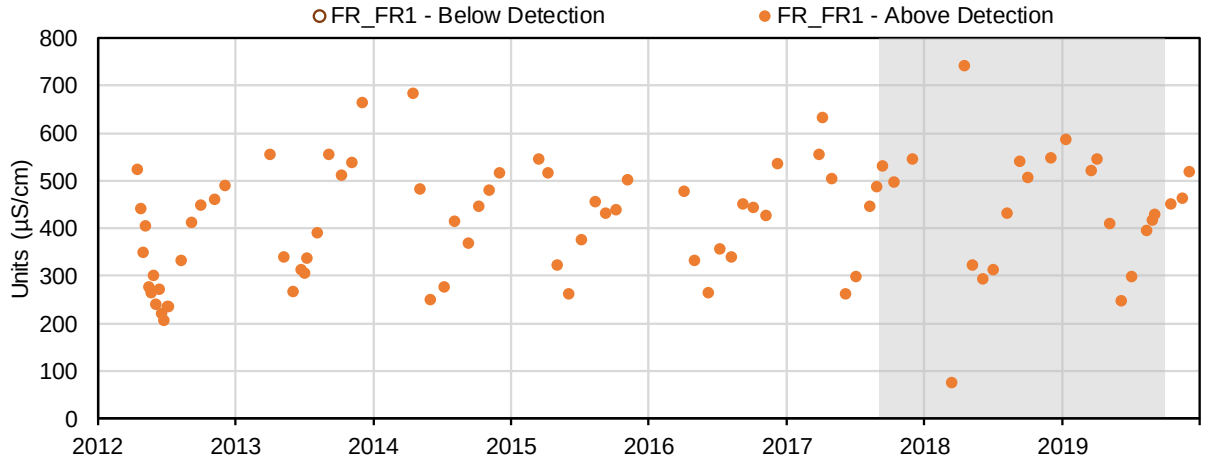
(7) Turbidity (NTU); Field Measured



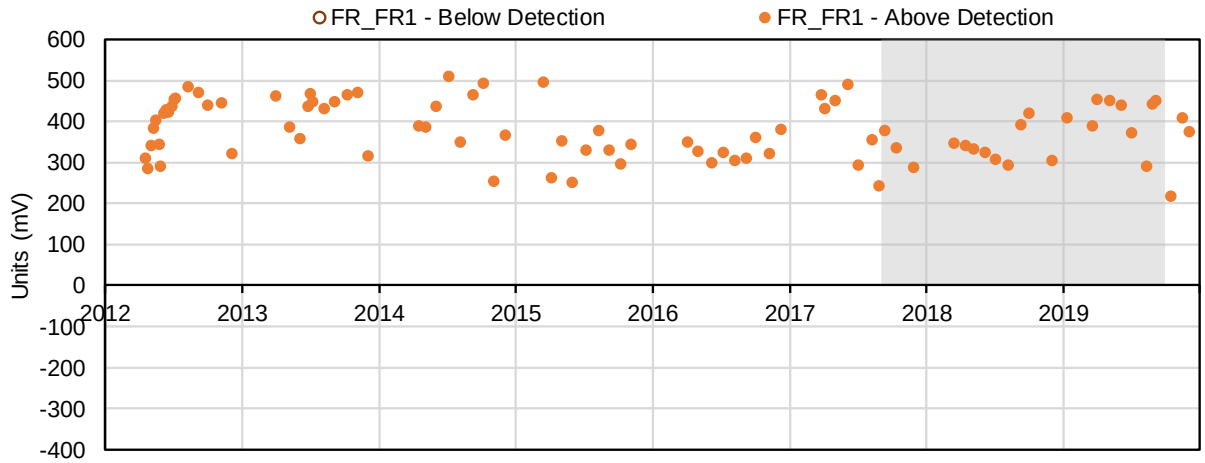
(8) pH (-); Conventional Parameters



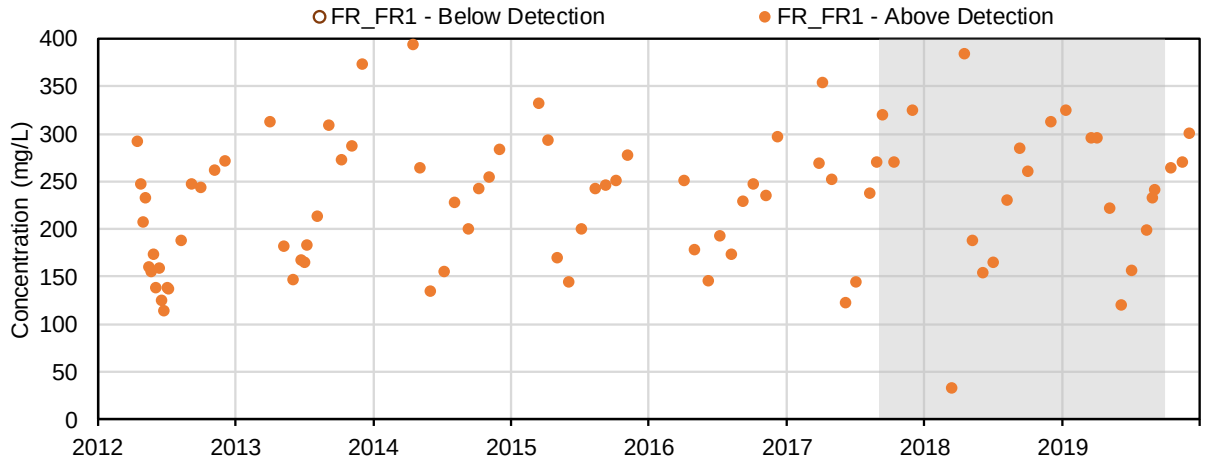
(9) Conductivity (µS/cm); Conventional Parameters



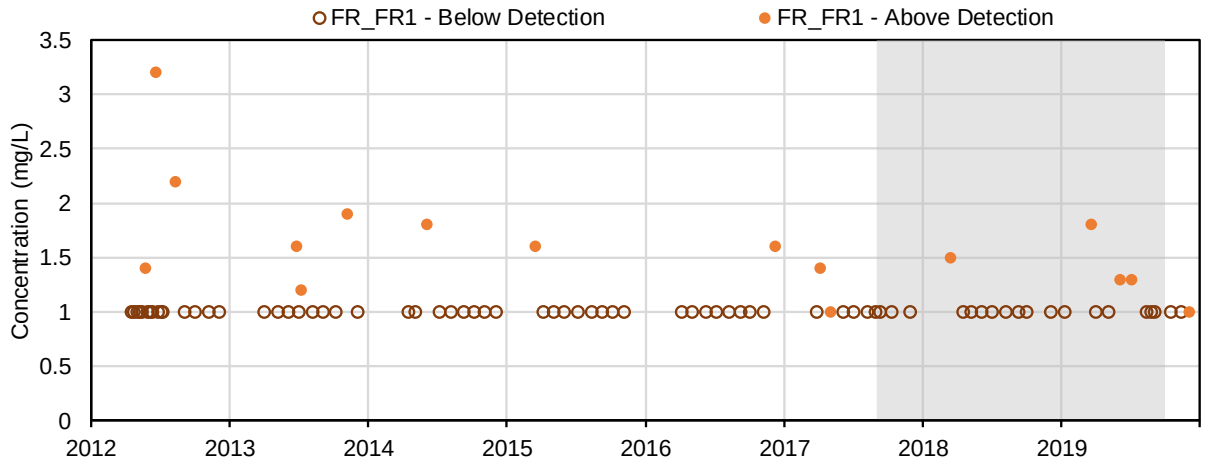
(10) Oxidation-Reduction Potential (mV); Conventional Parameters



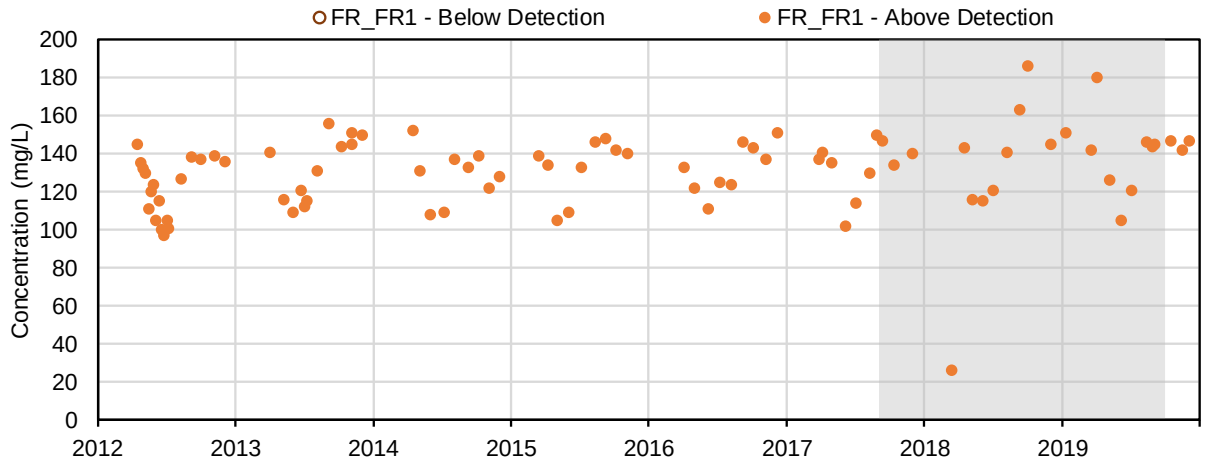
(11) Hardness, as CaCO3 (mg/L); Conventional Parameters



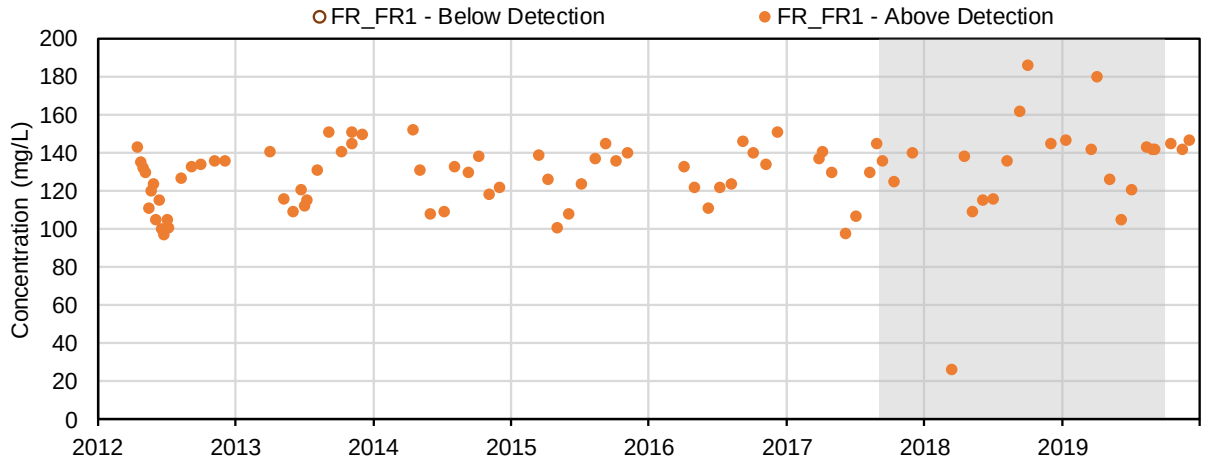
(12) Acidity, CaCO3 (mg/L); Conventional Parameters



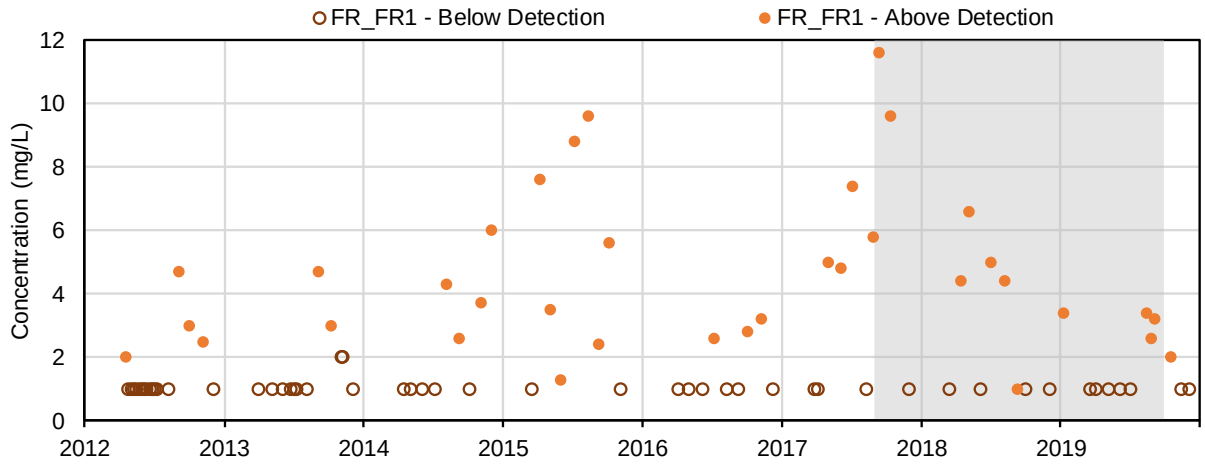
(13) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



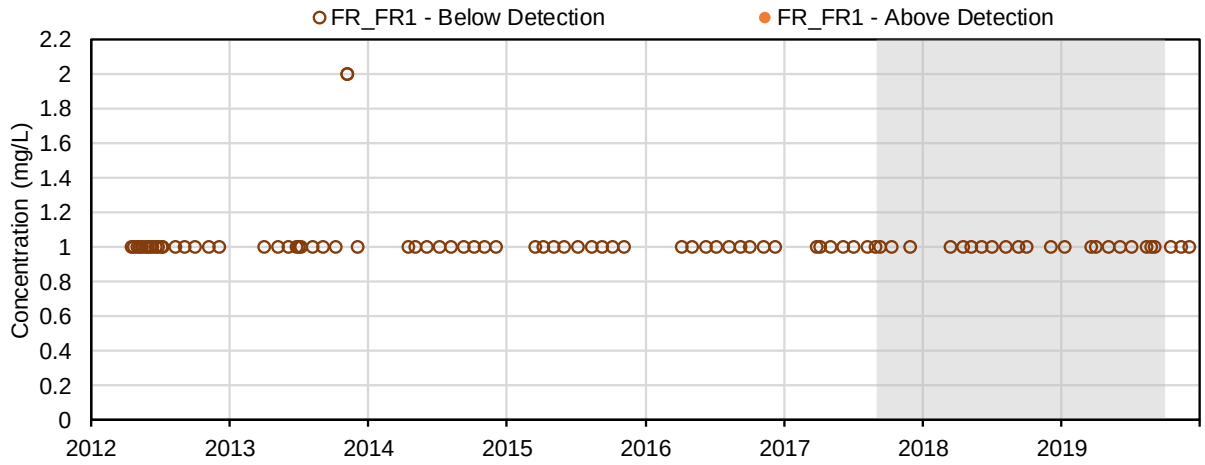
(14) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



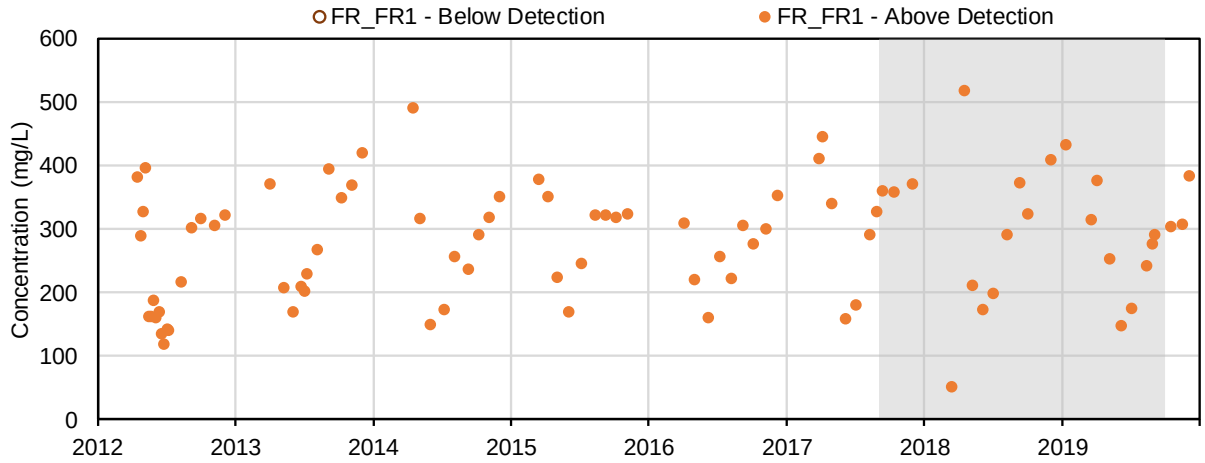
(15) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



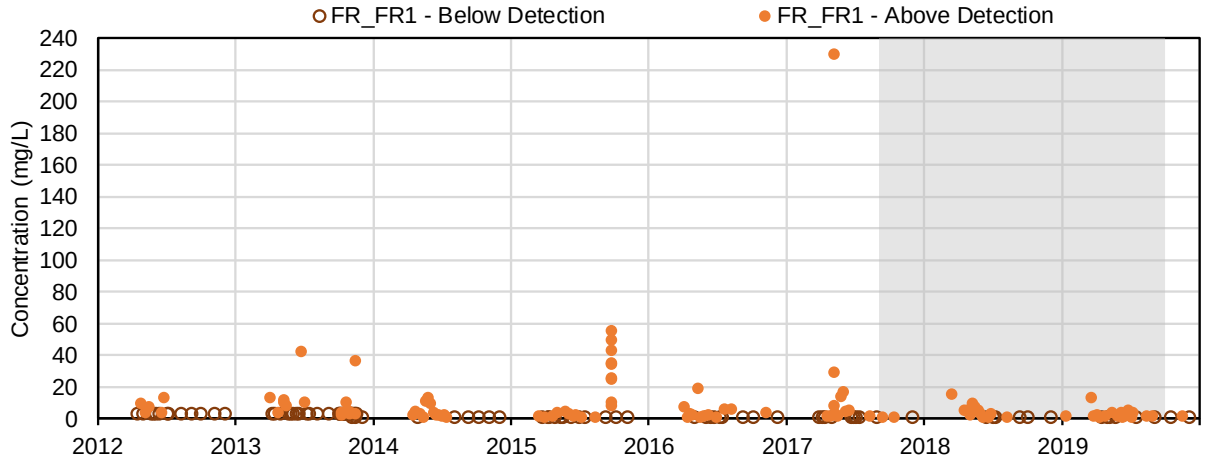
(16) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



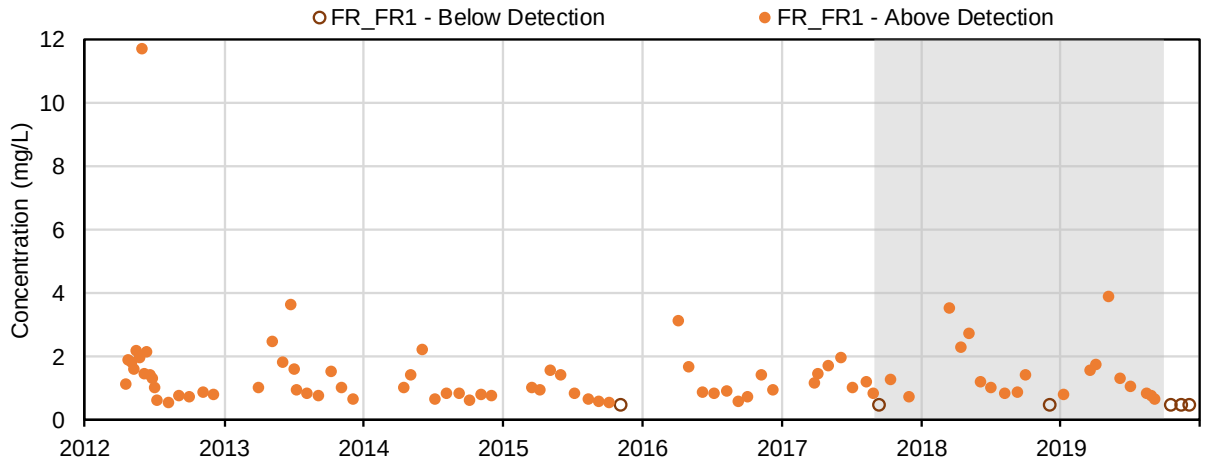
(17) Total dissolved solids (mg/L); Conventional Parameters



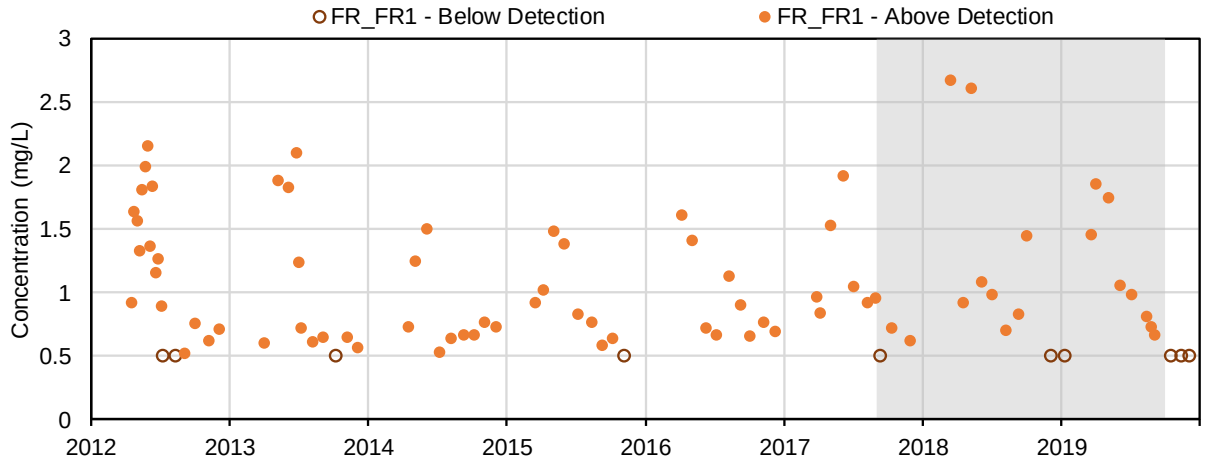
(18) Total suspended solids (mg/L); Conventional Parameters



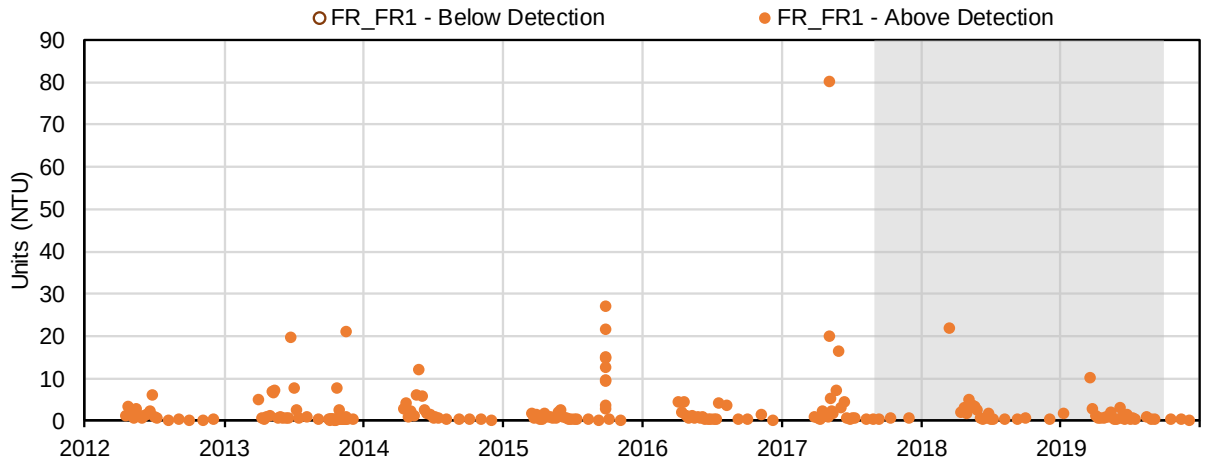
(19) Total organic carbon (mg/L); Conventional Parameters



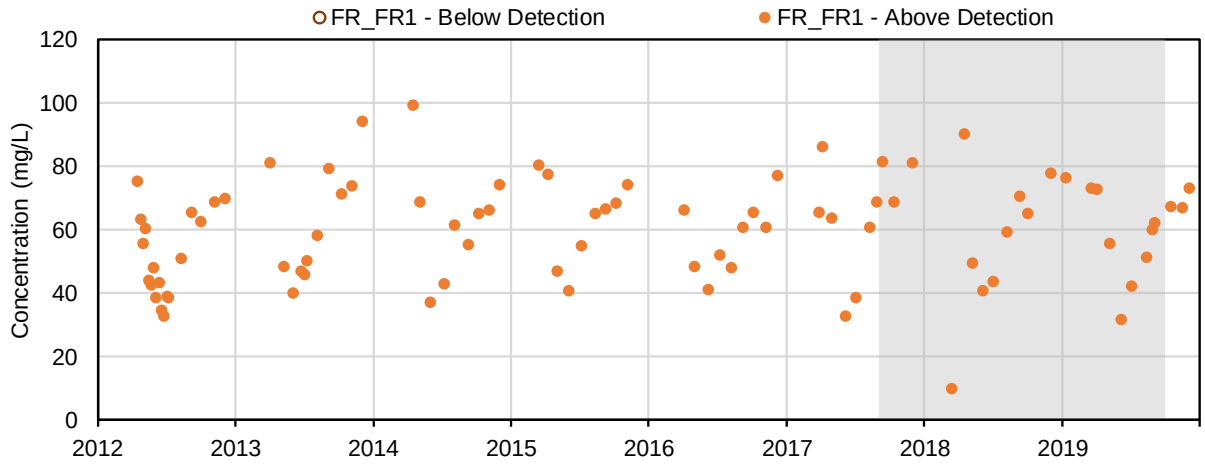
(20) Dissolved organic carbon (mg/L); Conventional Parameters



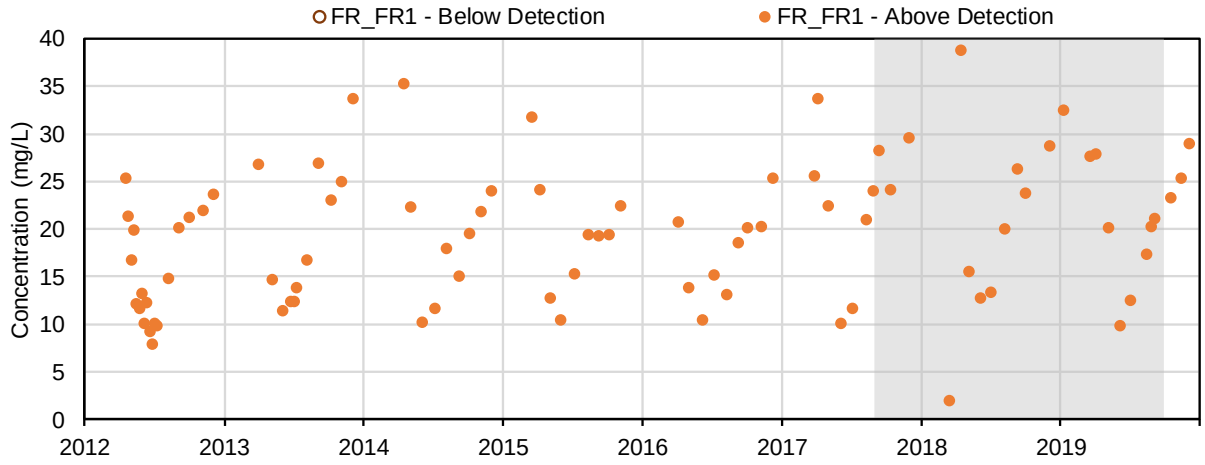
(21) Turbidity (NTU); Conventional Parameters



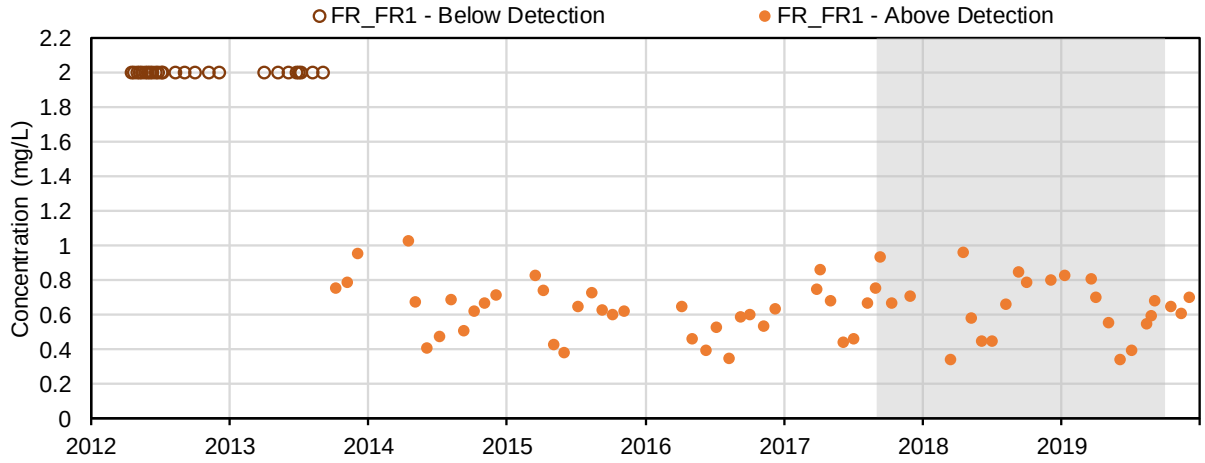
(22) Calcium (mg/L); Major Ions



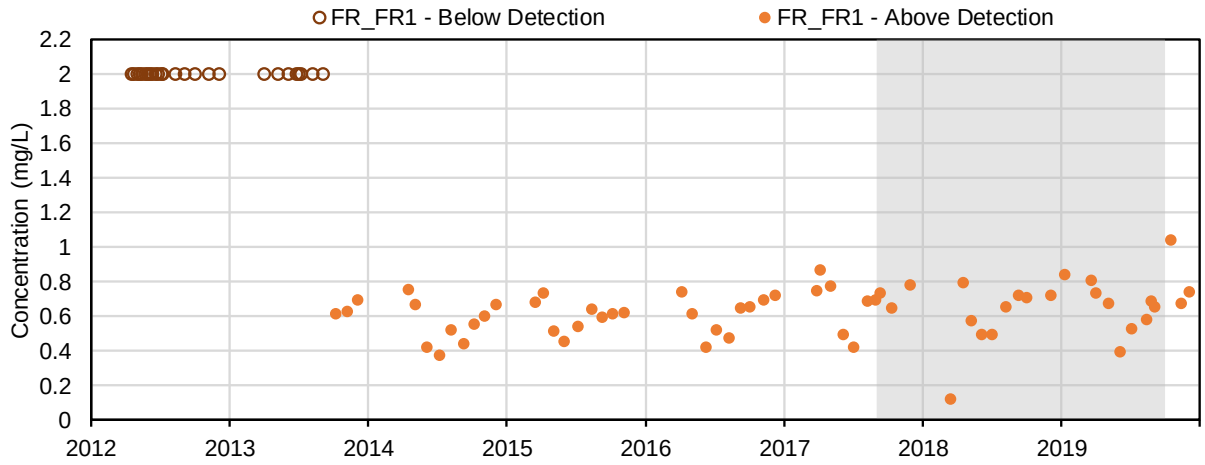
(23) Magnesium (mg/L); Major Ions



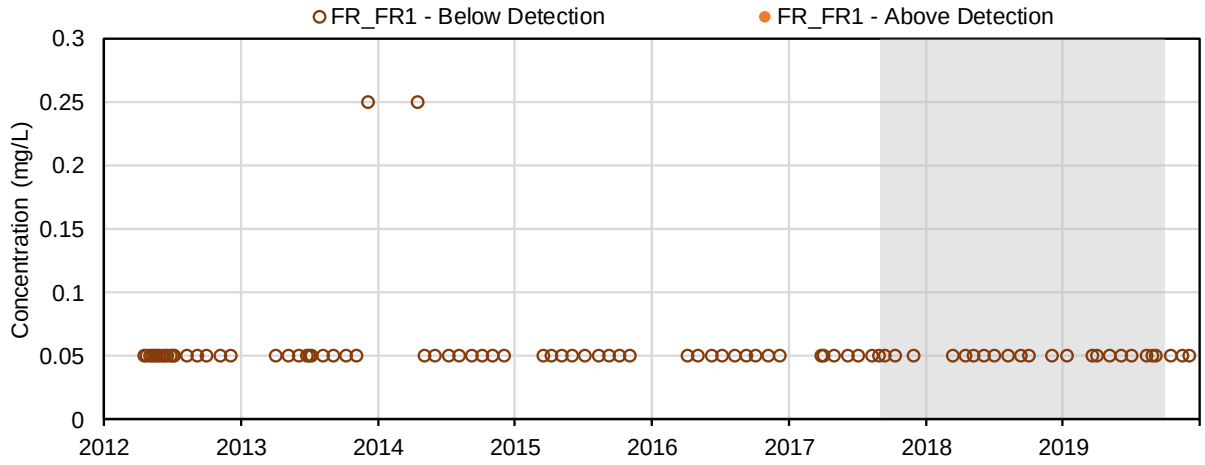
(24) Potassium (mg/L); Major Ions



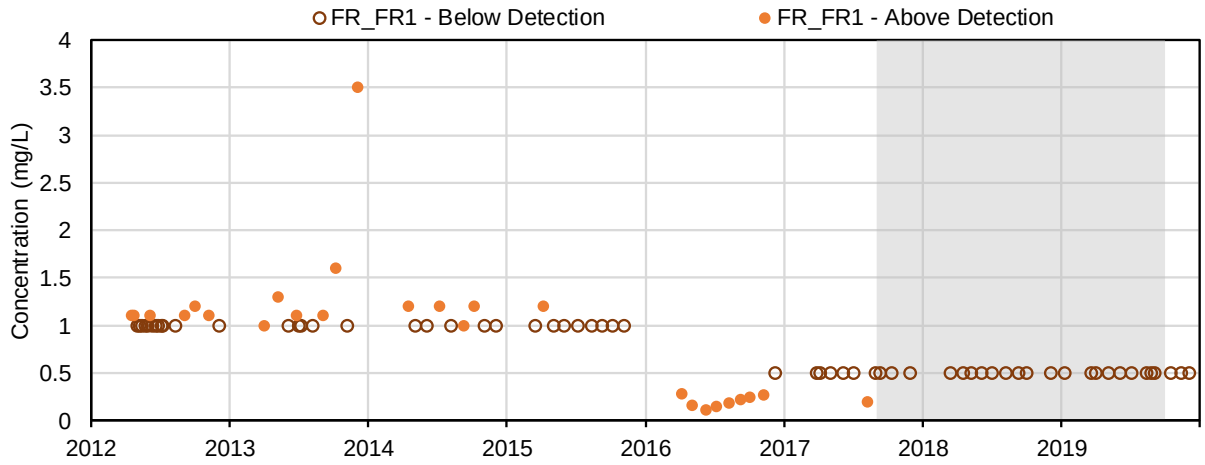
(25) Sodium (mg/L); Major Ions



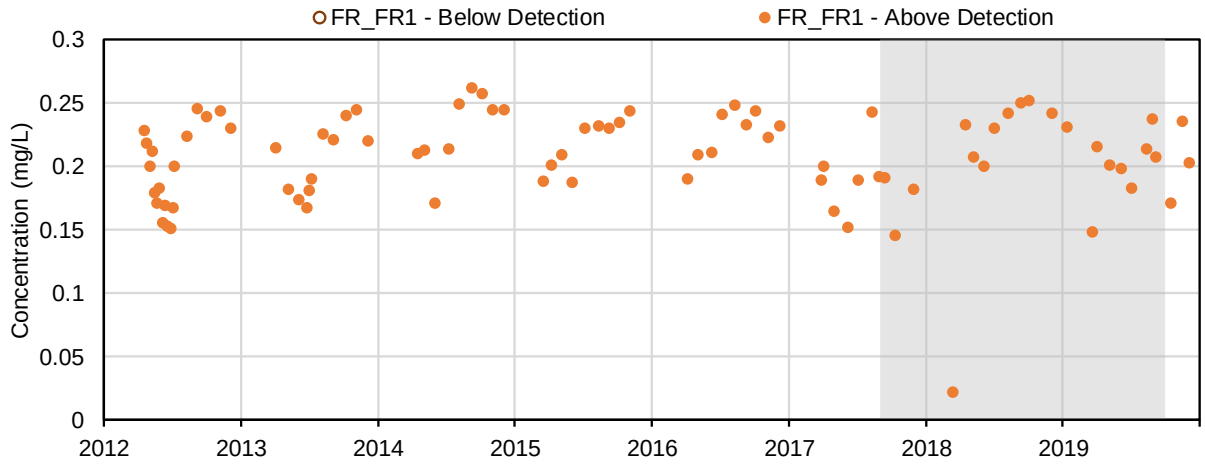
(26) Bromide (mg/L); Major Ions



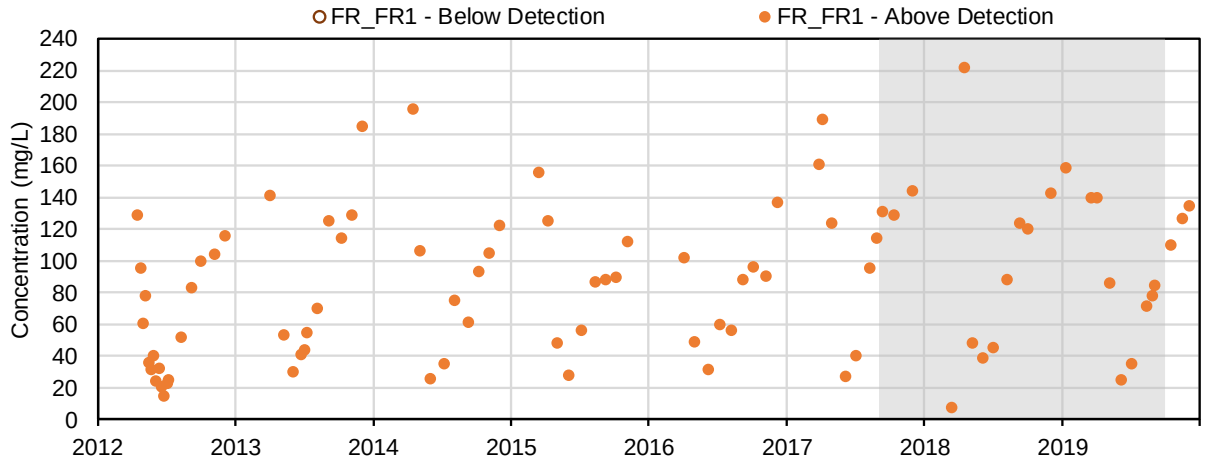
(27) Chloride (mg/L); Major Ions



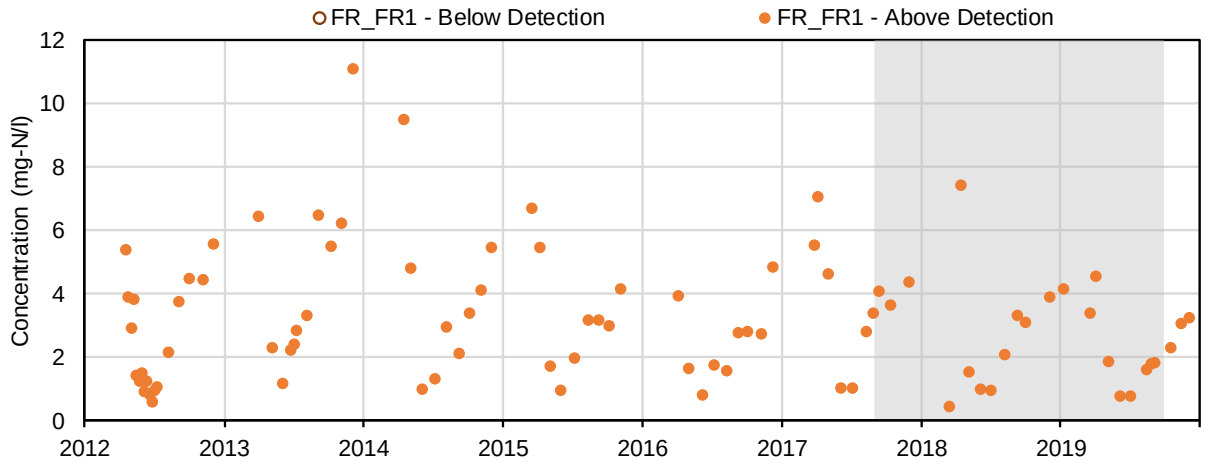
(28) Fluoride (mg/L); Major Ions



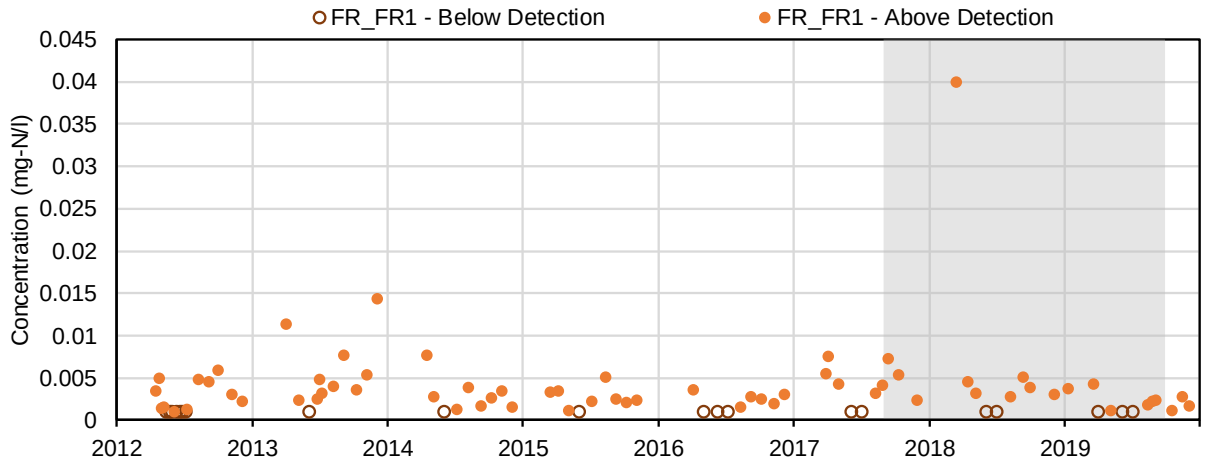
(29) Sulphate (mg/L); Major Ions



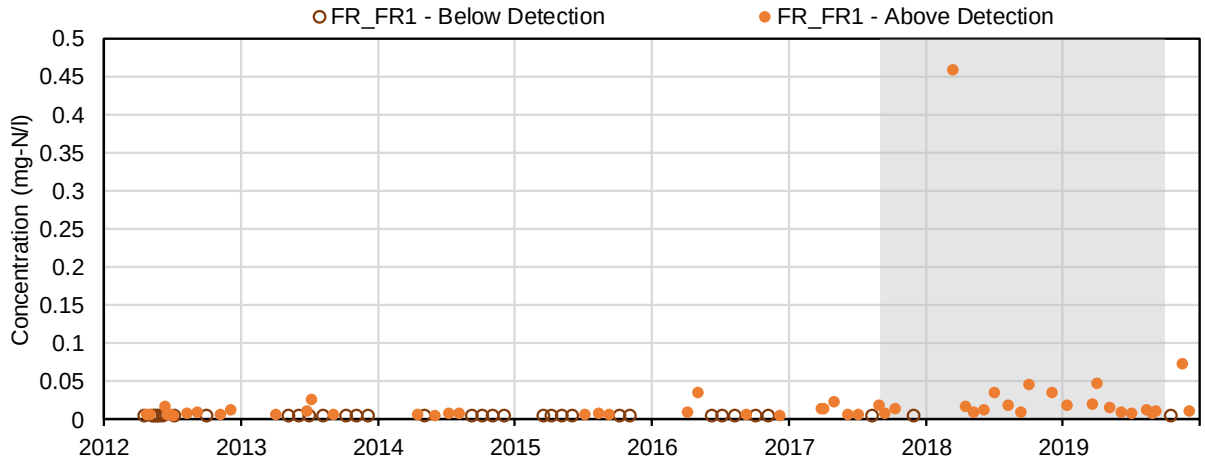
(30) Nitrate (mg-N/l); Nutrients and Biological Indicators



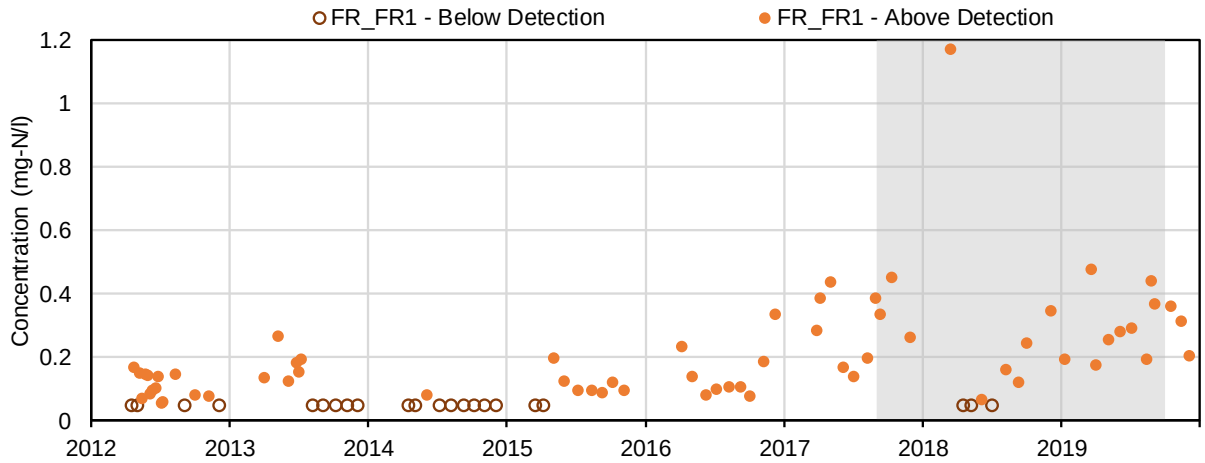
(31) Nitrite (mg-N/l); Nutrients and Biological Indicators



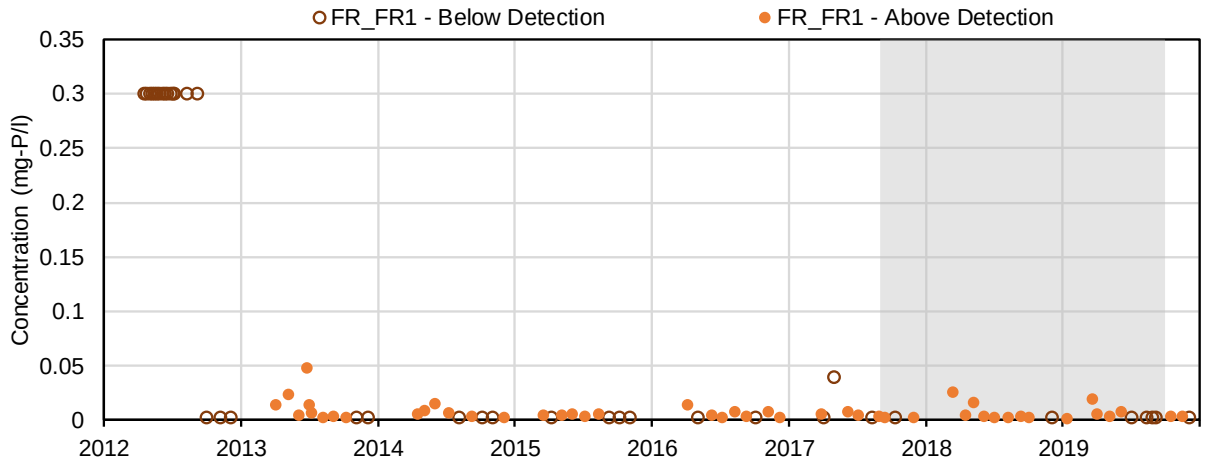
(32) Total ammonia (mg-N/l); Nutrients and Biological Indicators



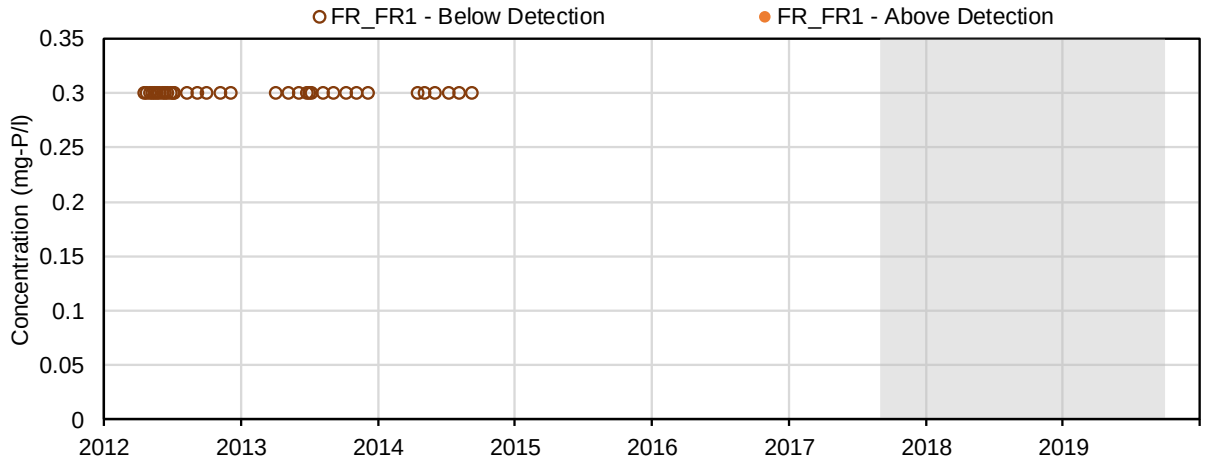
(33) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



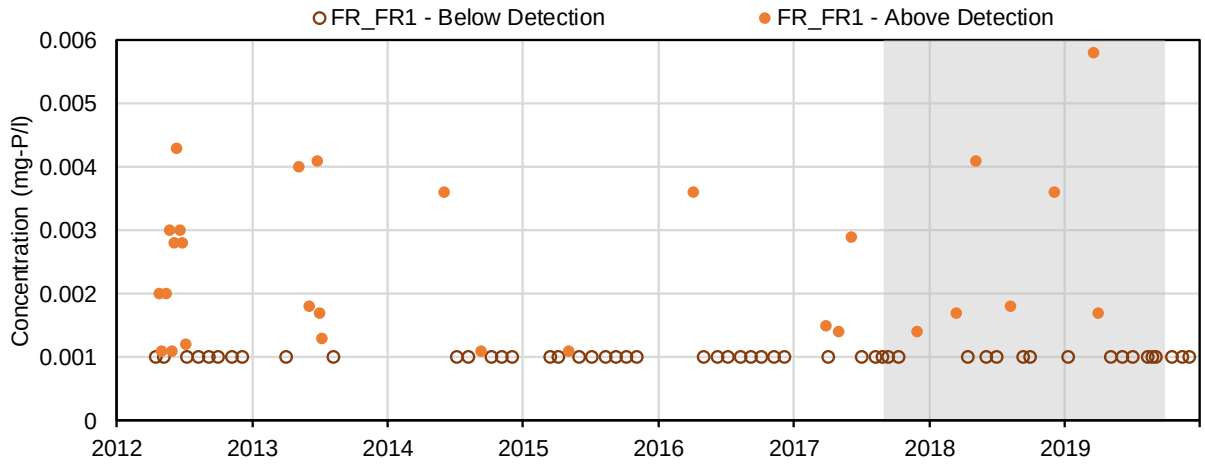
(34) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



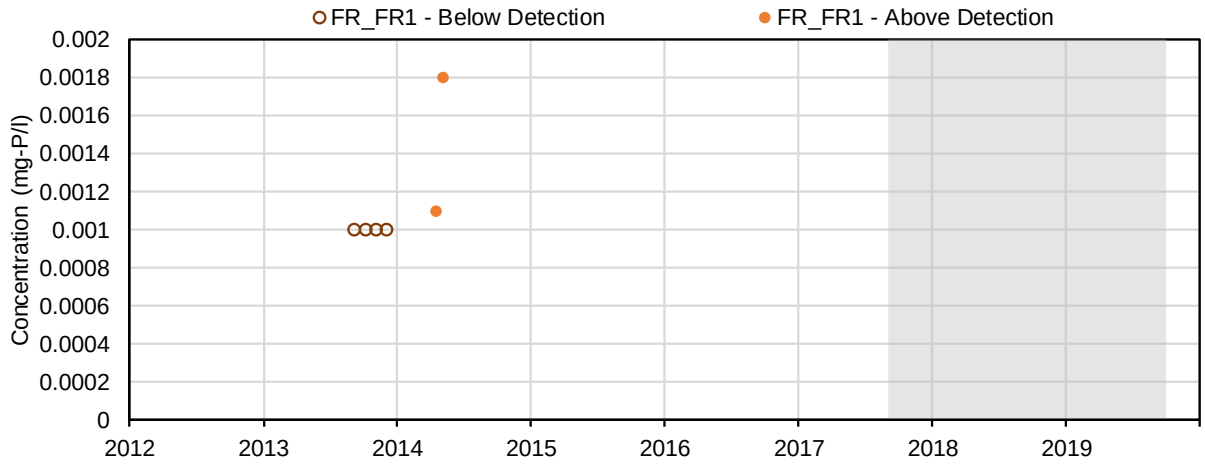
(35) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



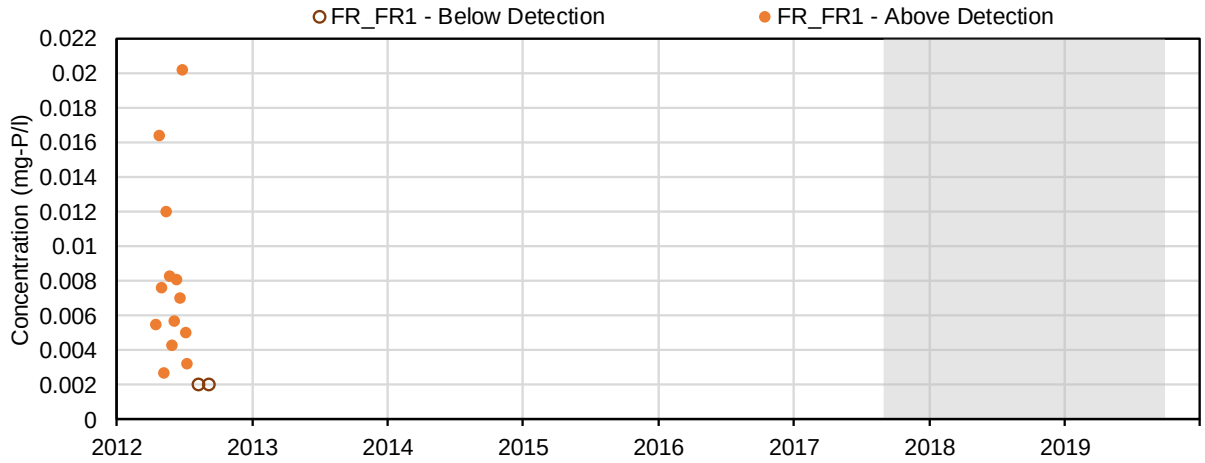
(36) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



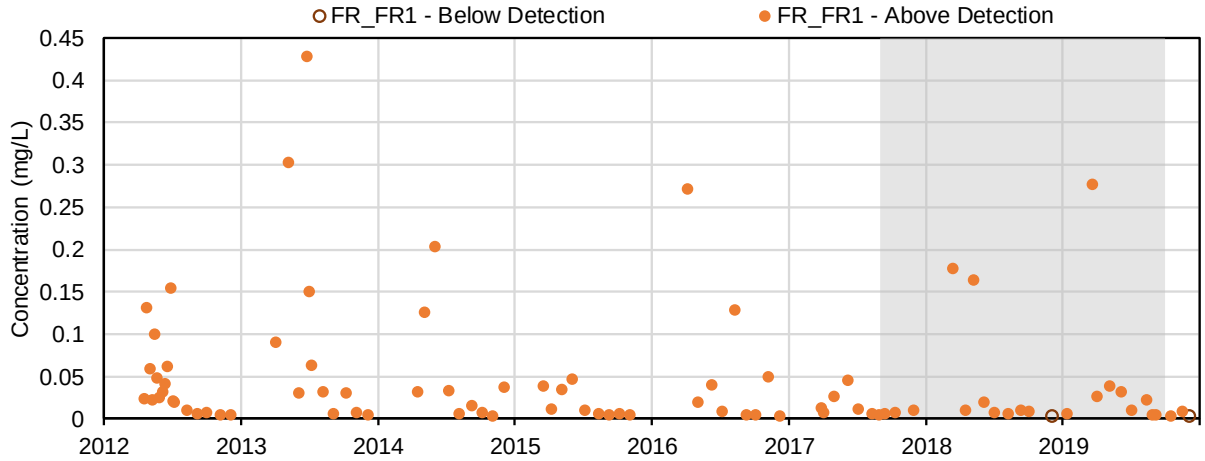
(37) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



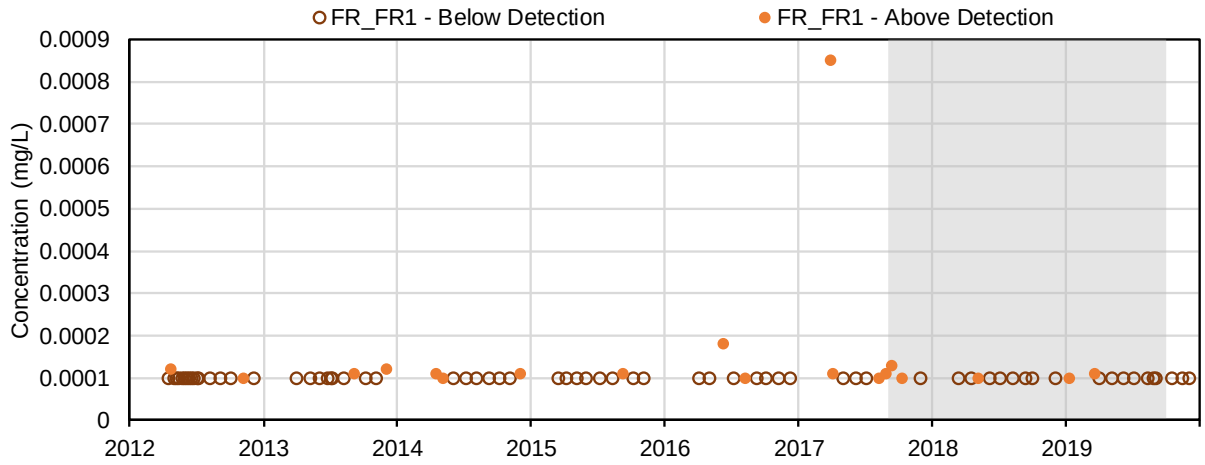
(38) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



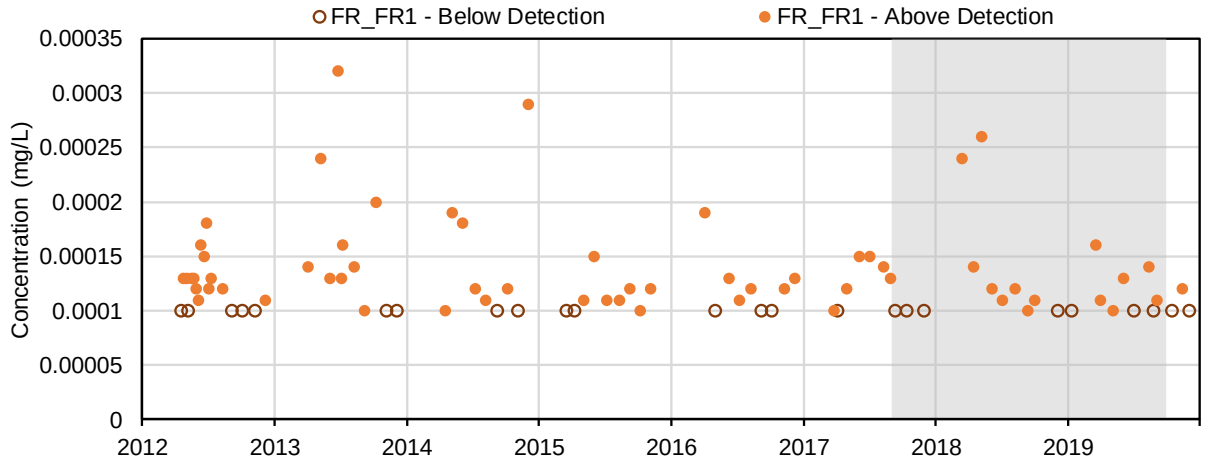
(39) Aluminum (mg/L); Total Metals



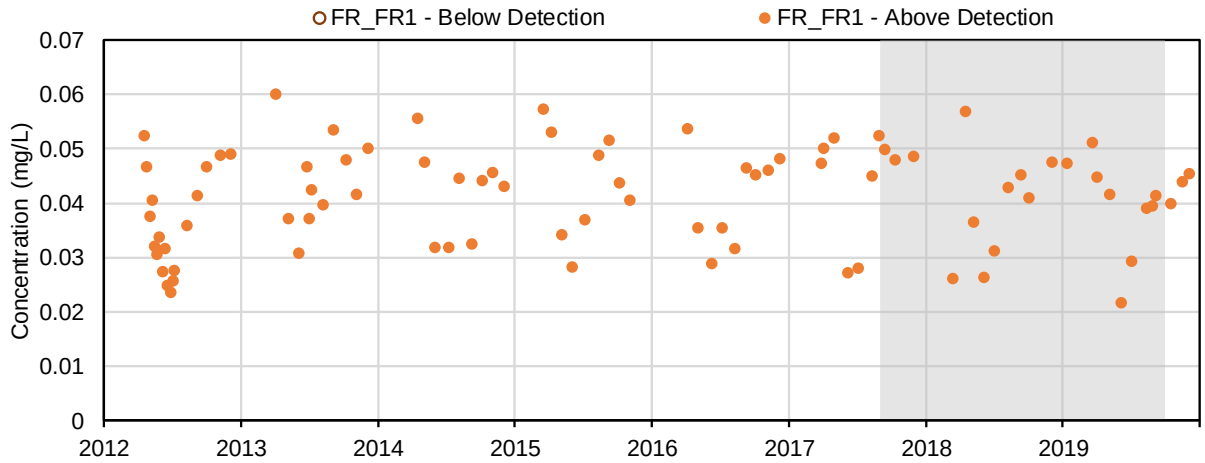
(40) Antimony (mg/L); Total Metals



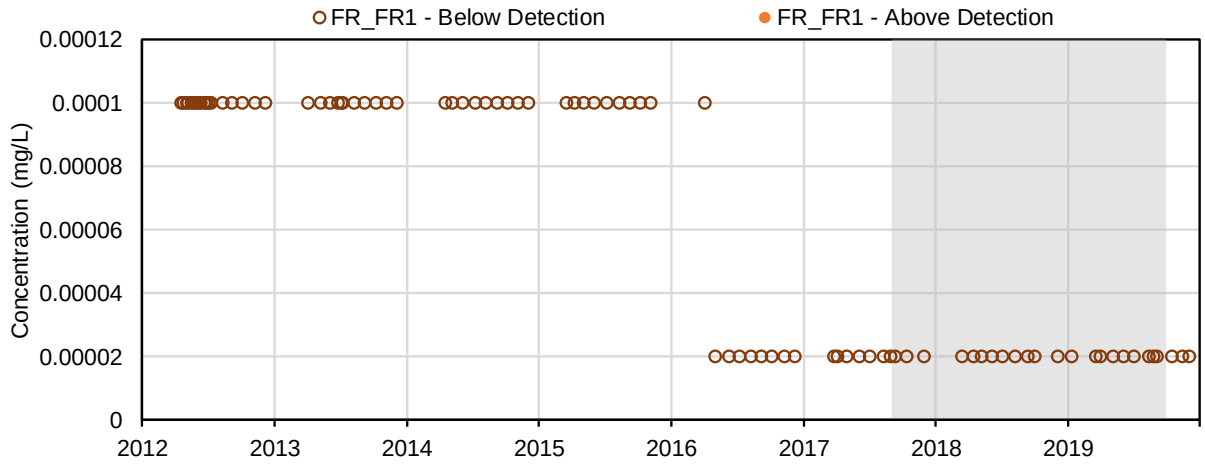
(41) Arsenic (mg/L); Total Metals



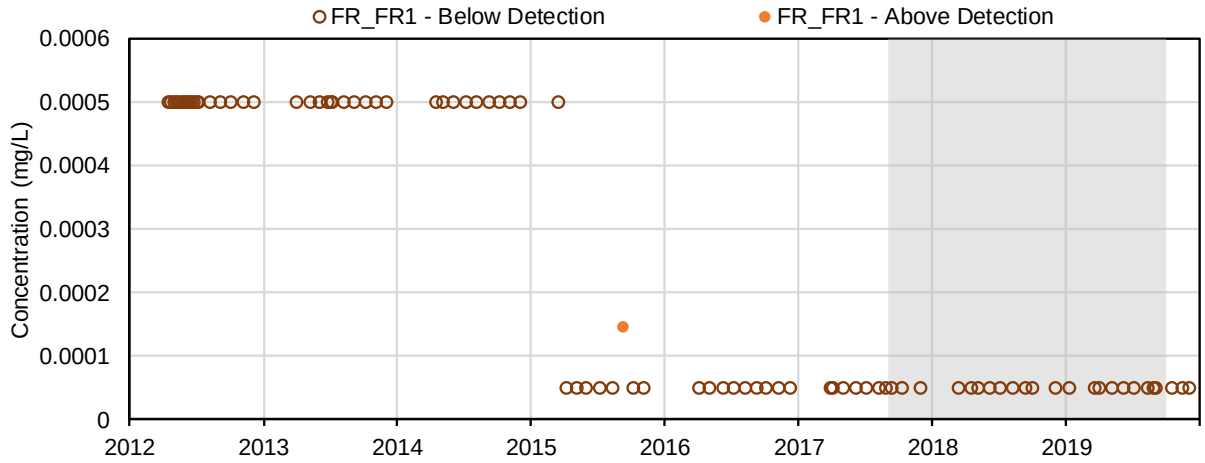
(42) Barium (mg/L); Total Metals



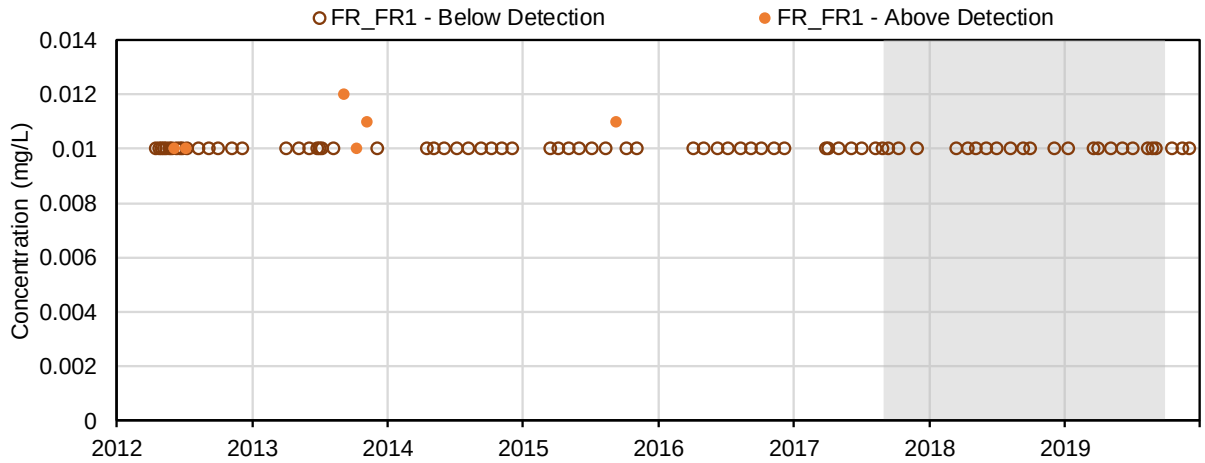
(43) Beryllium (mg/L); Total Metals



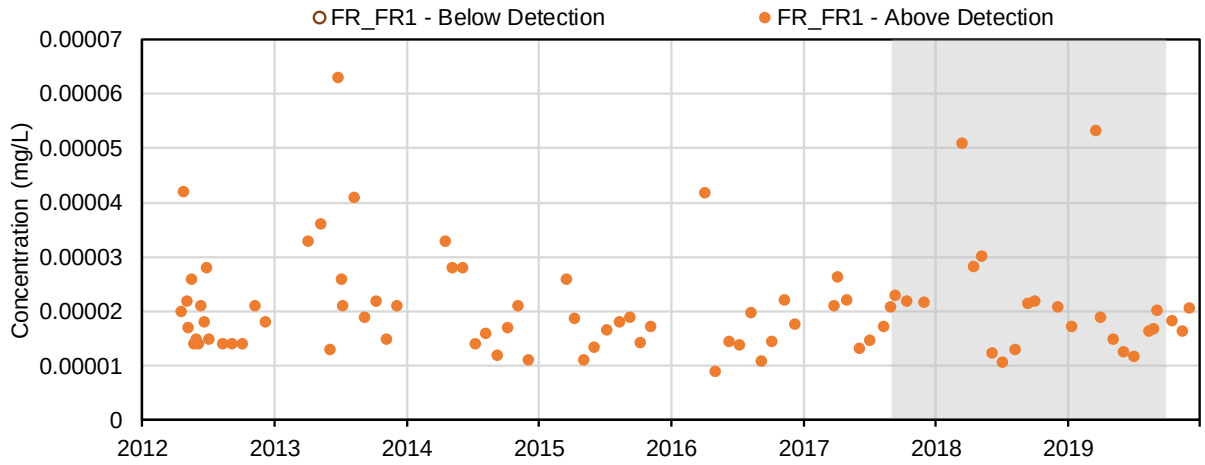
(44) Bismuth (mg/L); Total Metals



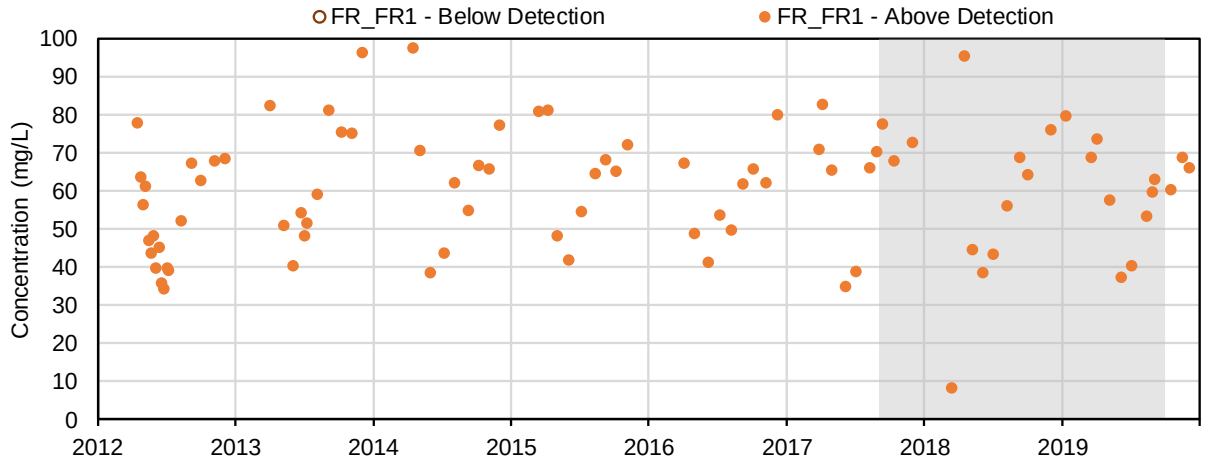
(45) Boron (mg/L); Total Metals



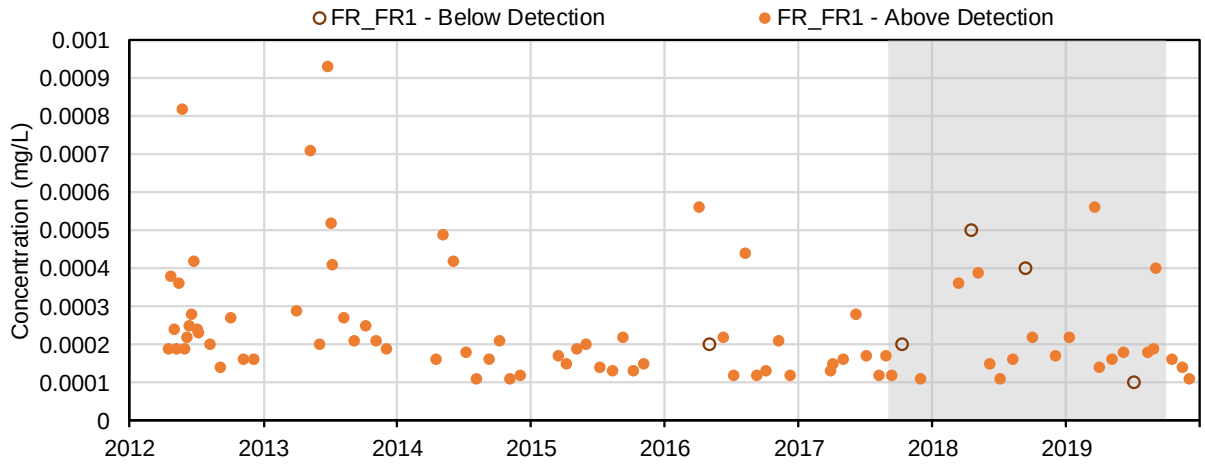
(46) Cadmium (mg/L); Total Metals



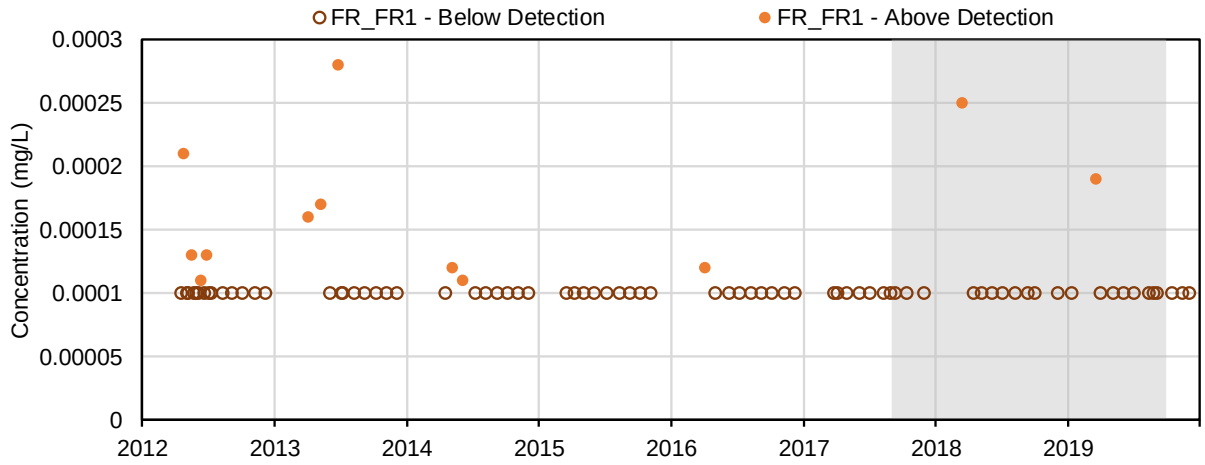
(47) Calcium (mg/L); Total Metals



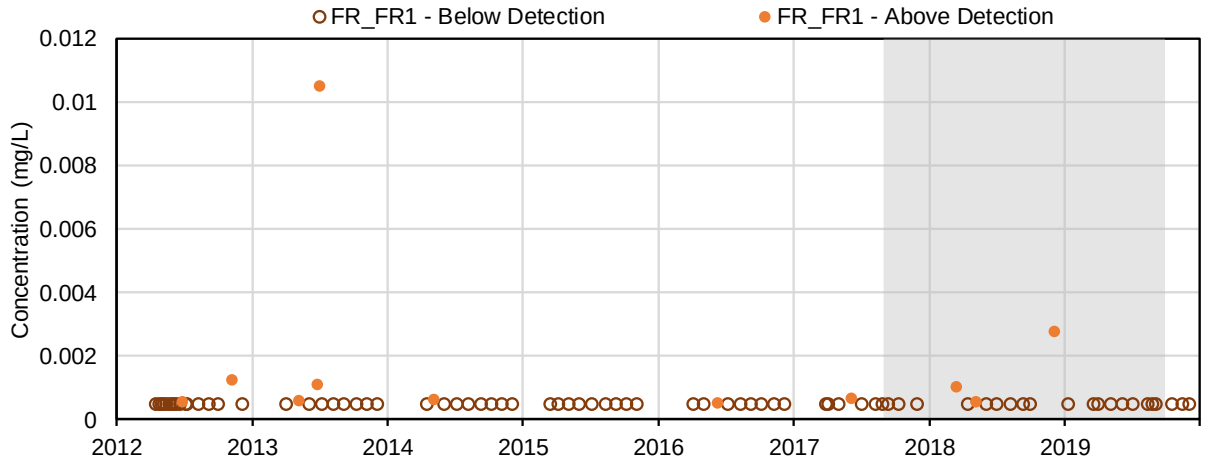
(48) Chromium (mg/L); Total Metals



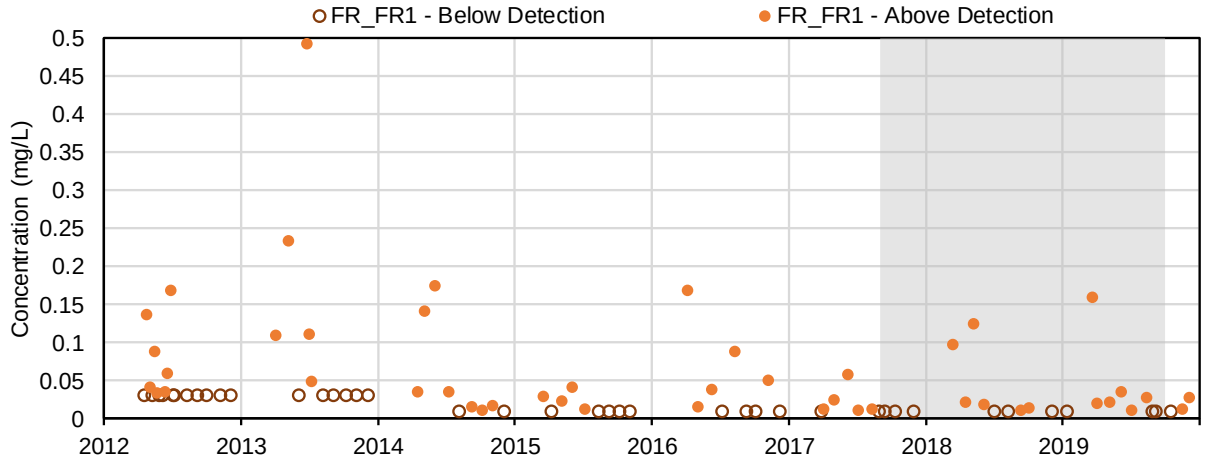
(49) Cobalt (mg/L); Total Metals



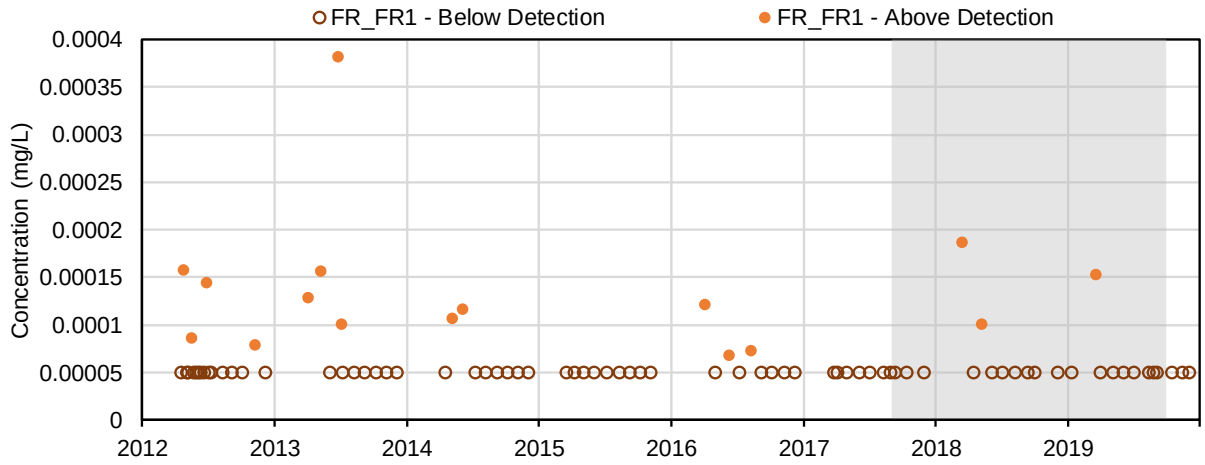
(50) Copper (mg/L); Total Metals



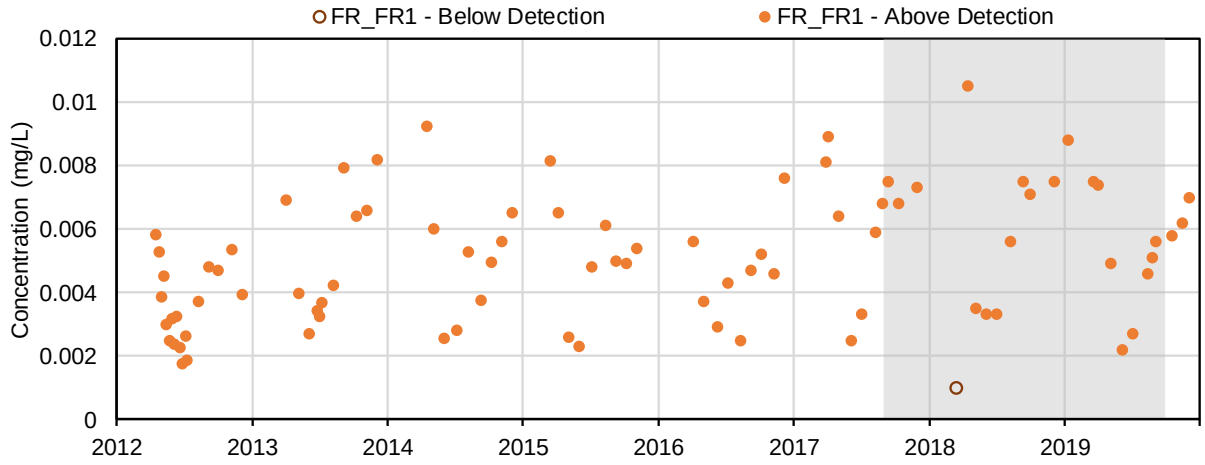
(51) Iron (mg/L); Total Metals



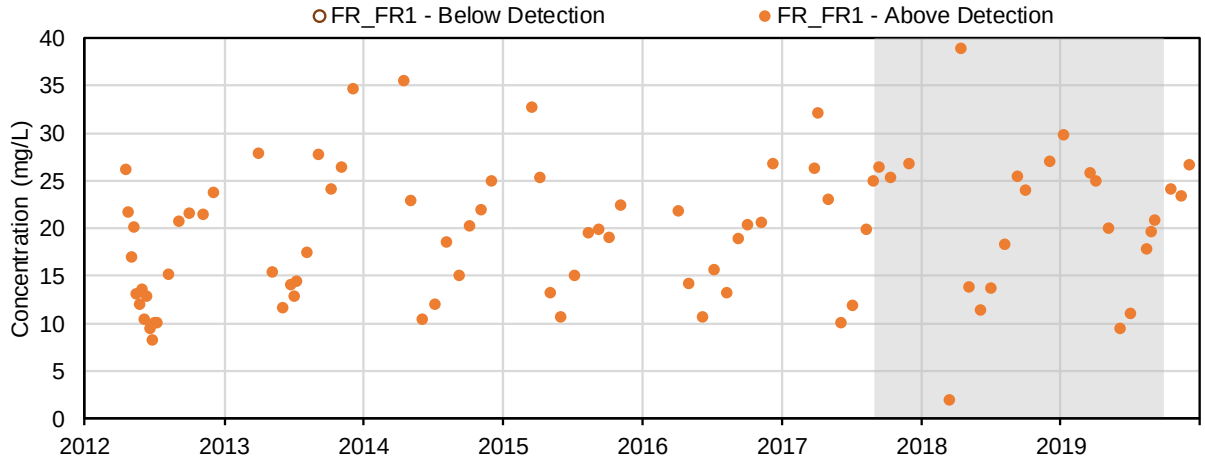
(52) Lead (mg/L); Total Metals



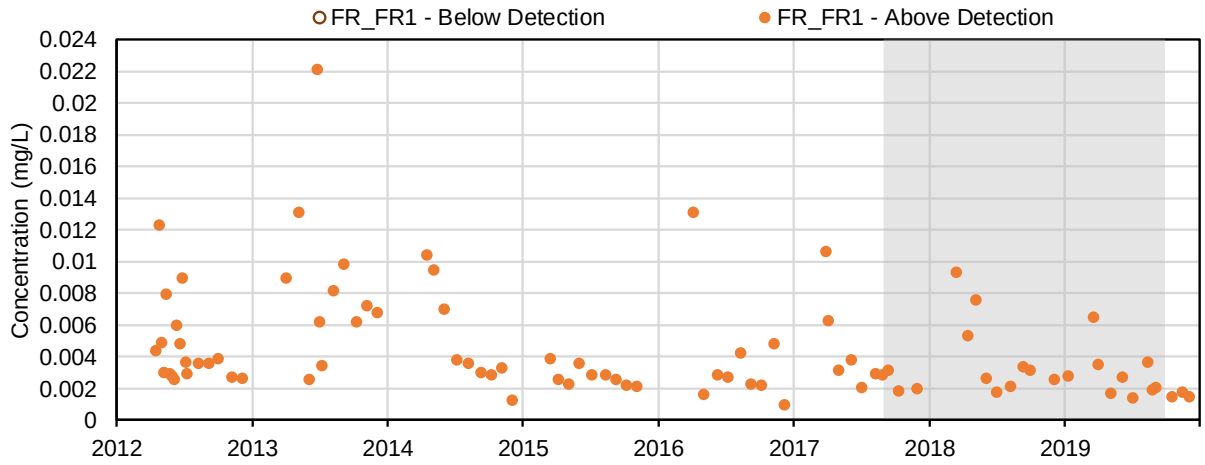
(53) Lithium (mg/L); Total Metals



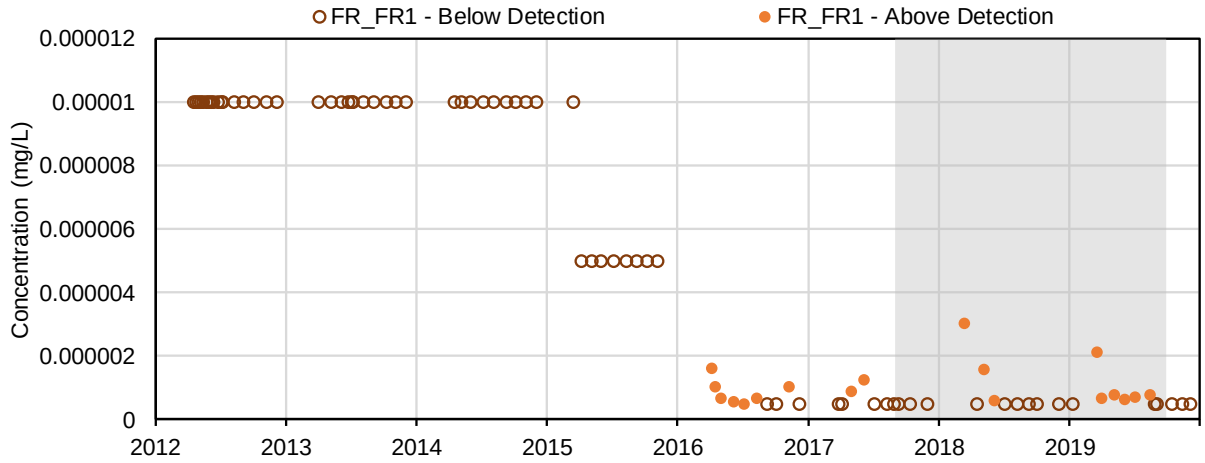
(54) Magnesium (mg/L); Total Metals



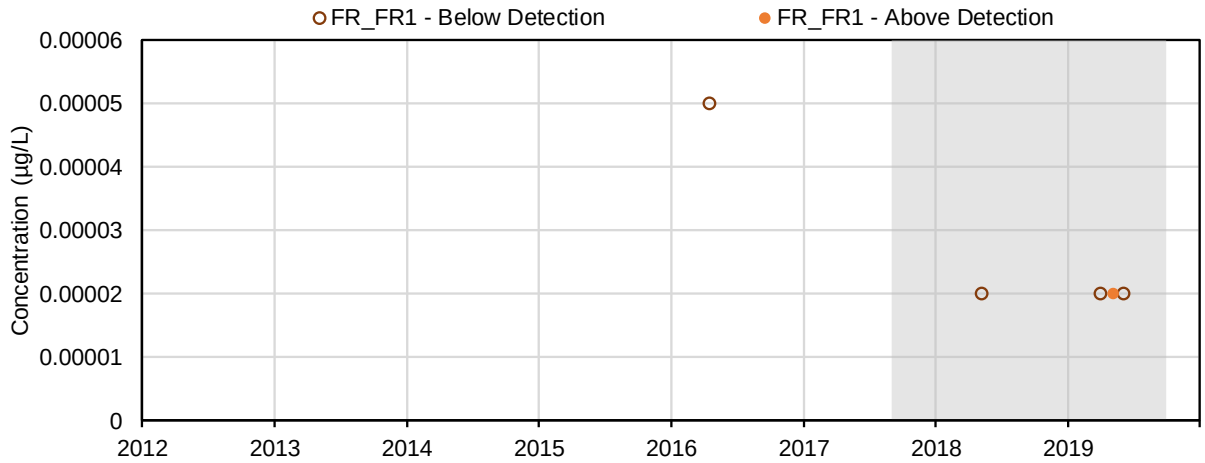
(55) Manganese (mg/L); Total Metals



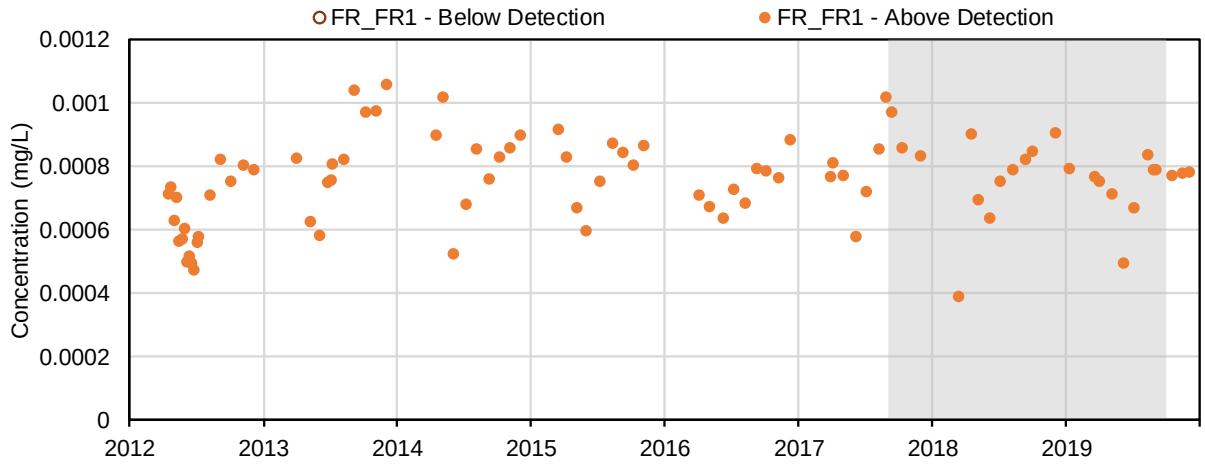
(56) Mercury (mg/L); Total Metals



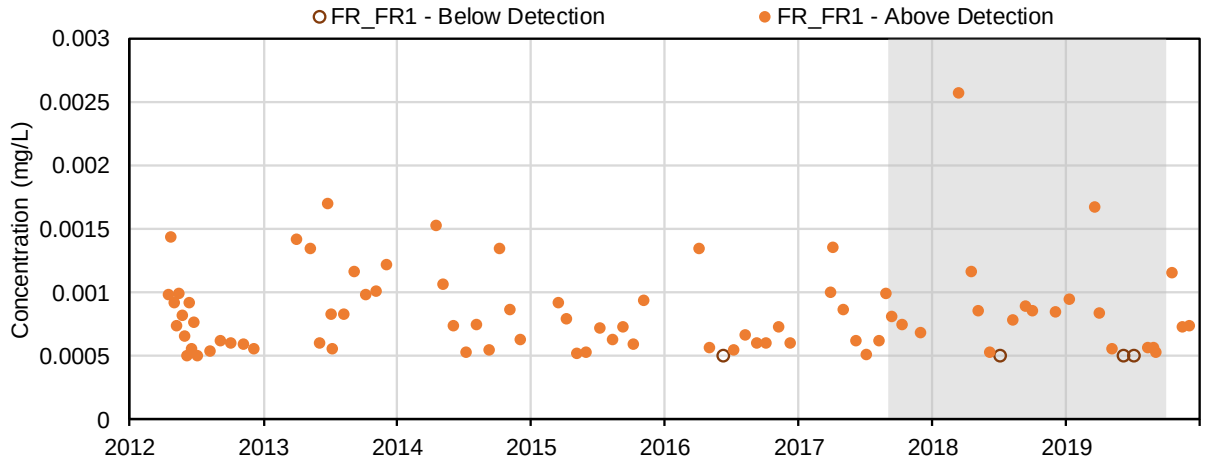
(57) Methyl mercury (µg/L); Total Metals



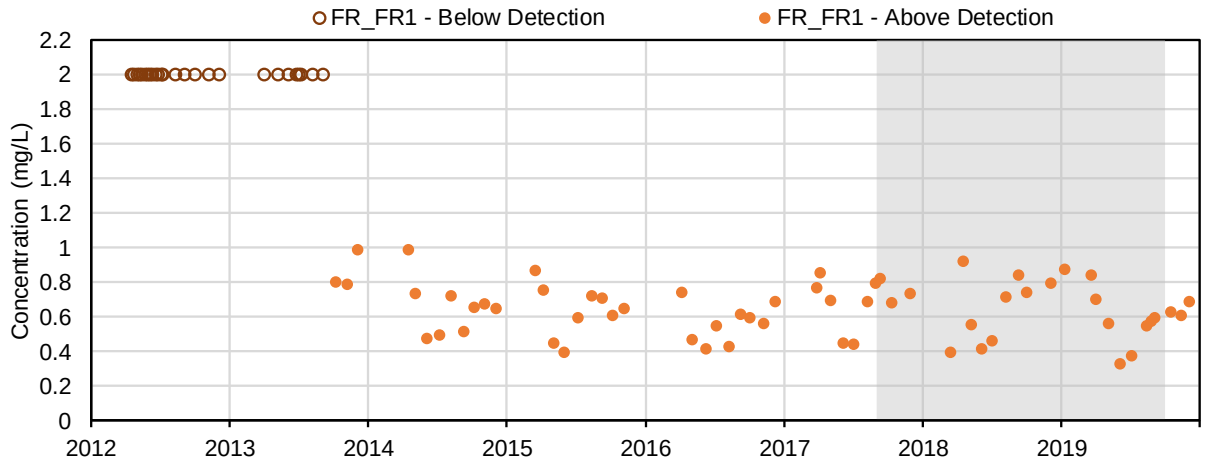
(58) Molybdenum (mg/L); Total Metals



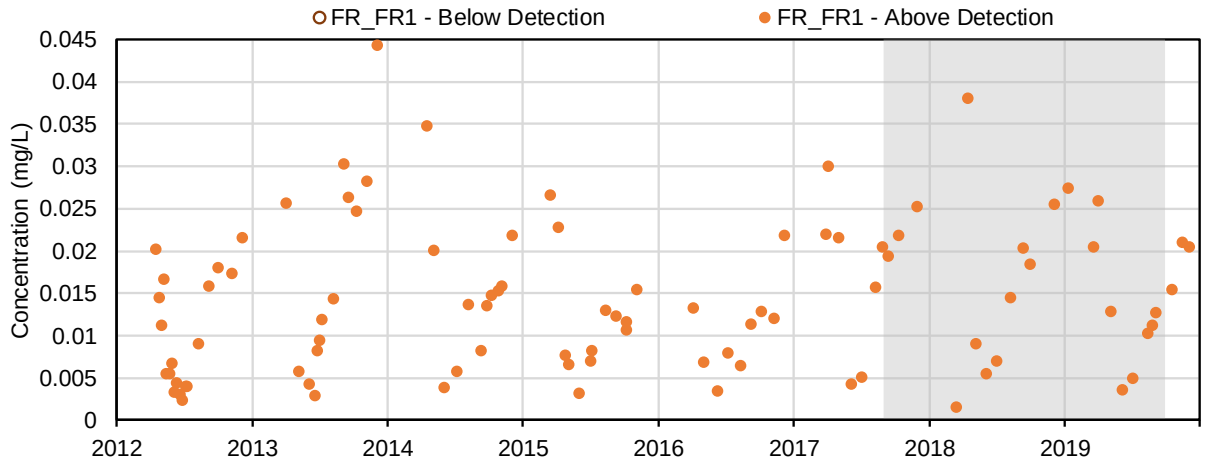
(59) Nickel (mg/L); Total Metals



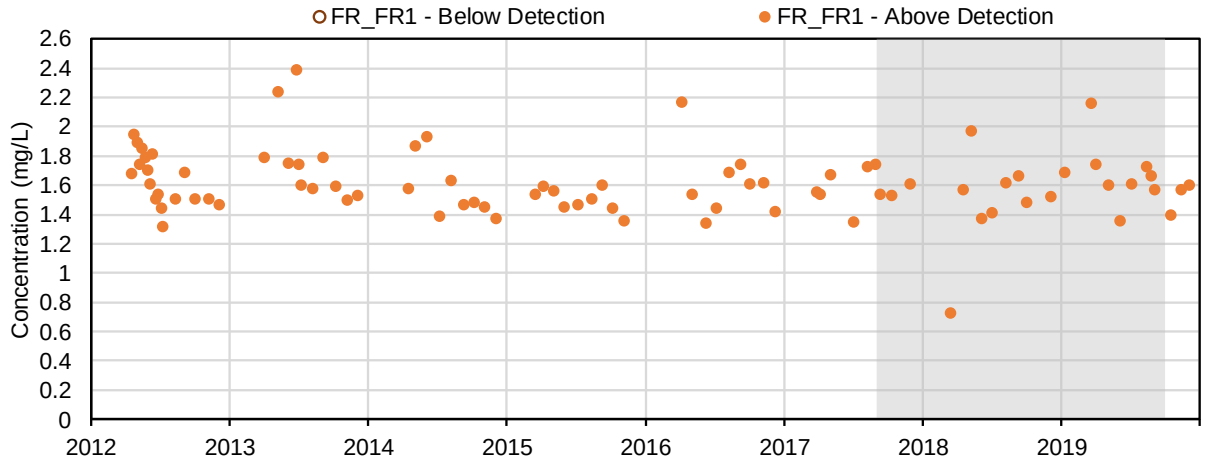
(60) Potassium (mg/L); Total Metals



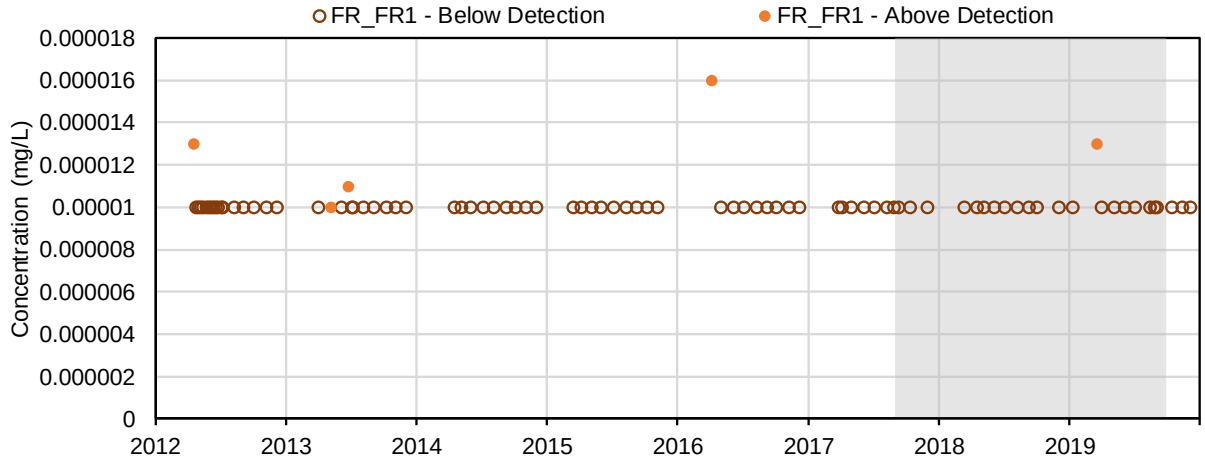
(61) Selenium (mg/L); Total Metals



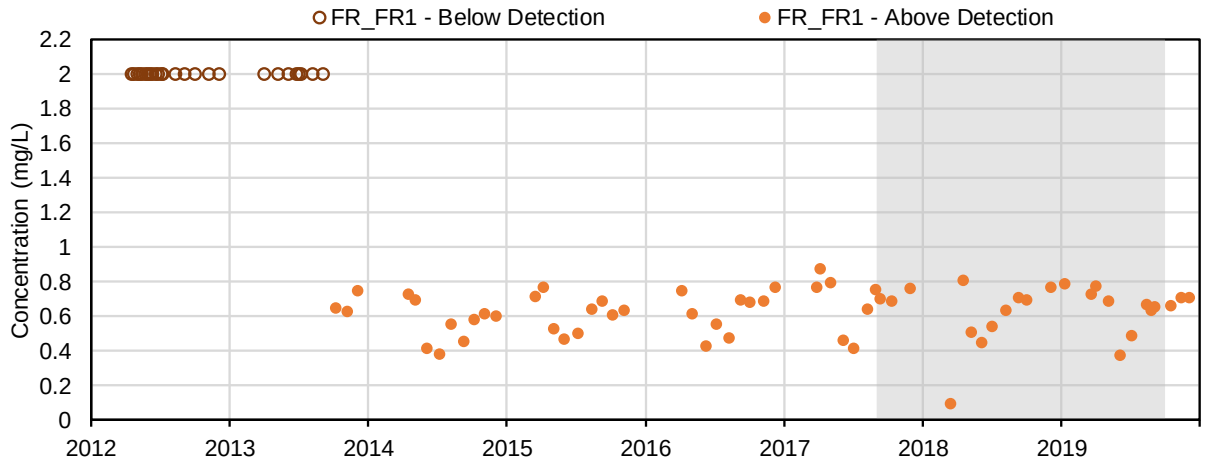
(62) Silicon (mg/L); Total Metals



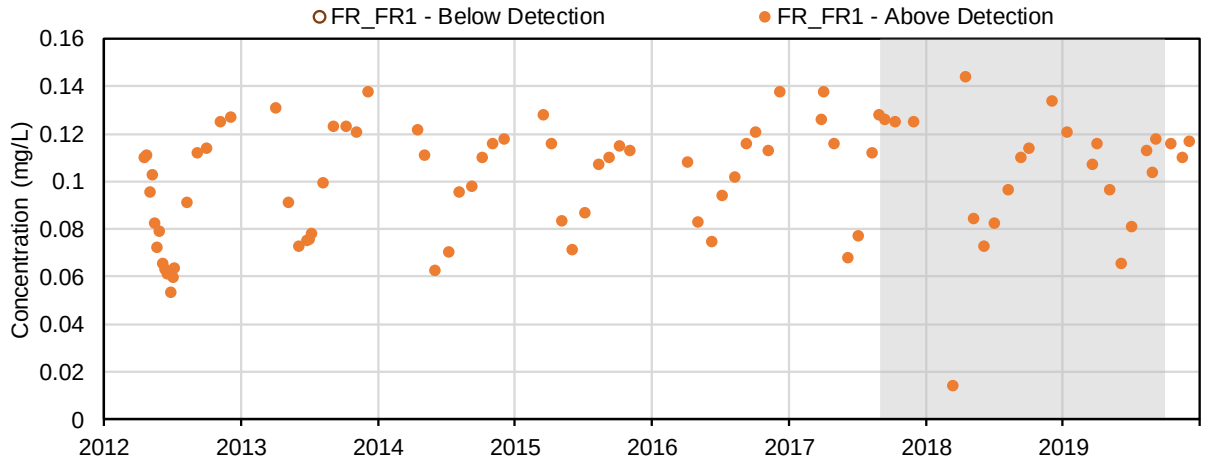
(63) Silver (mg/L); Total Metals



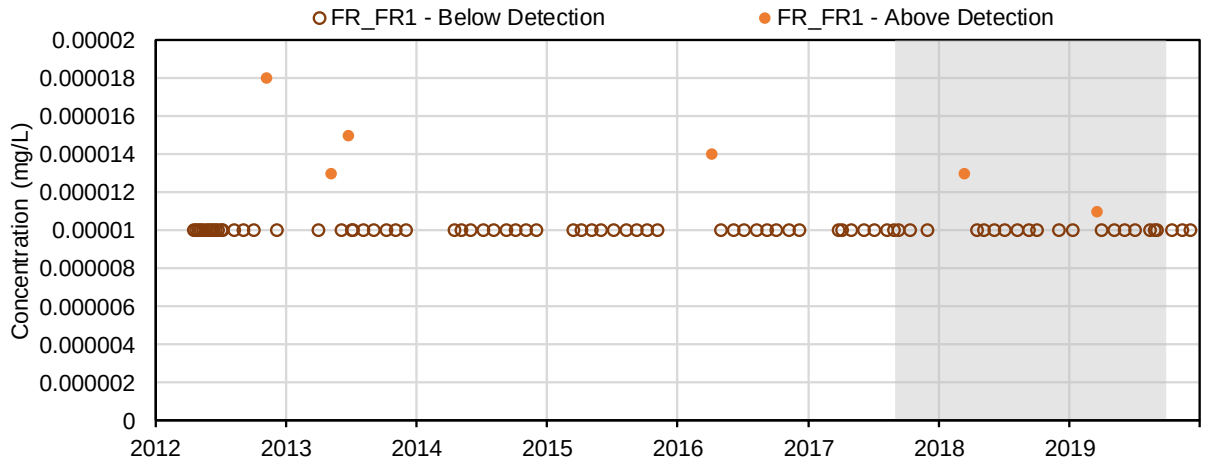
(64) Sodium (mg/L); Total Metals



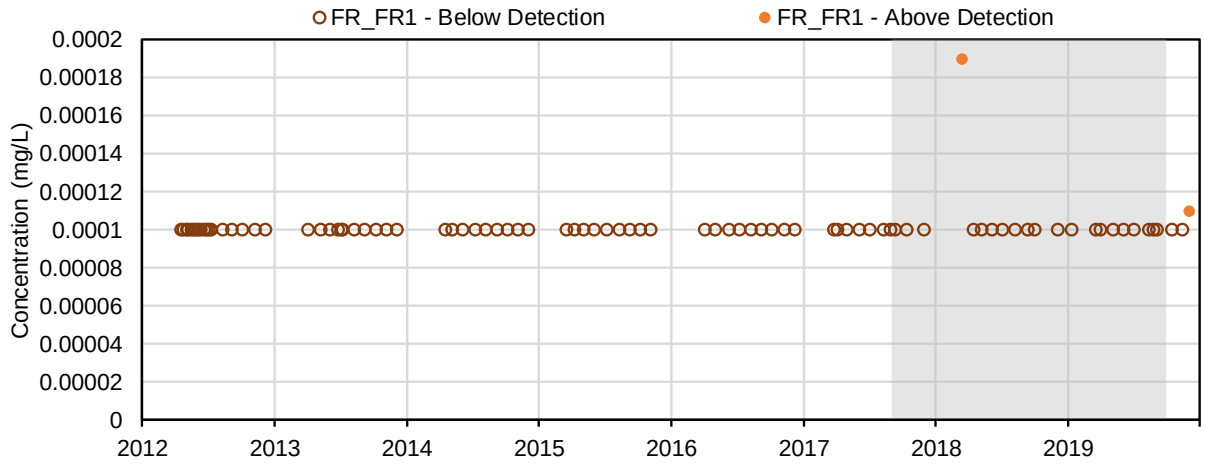
(65) Strontium (mg/L); Total Metals



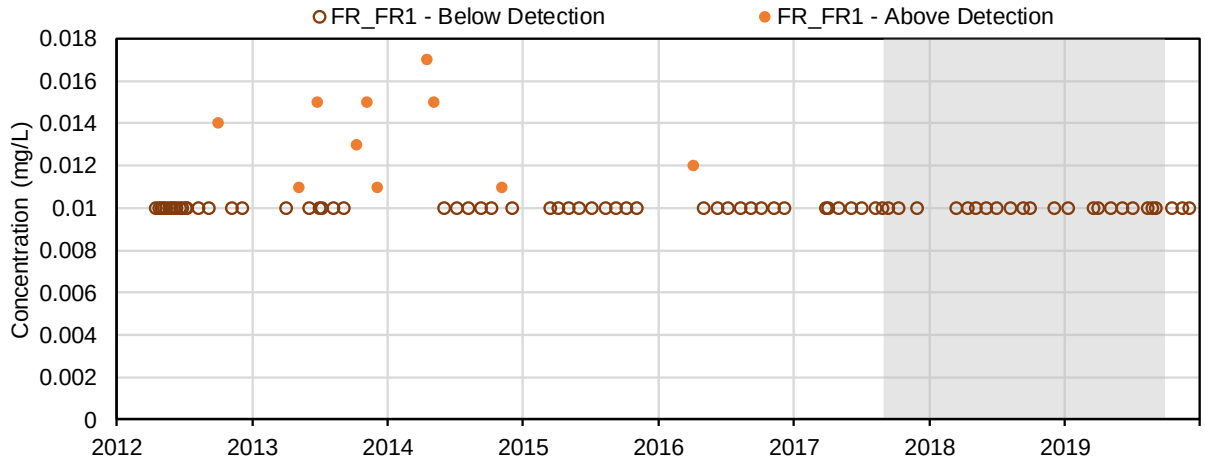
(66) Thallium (mg/L); Total Metals



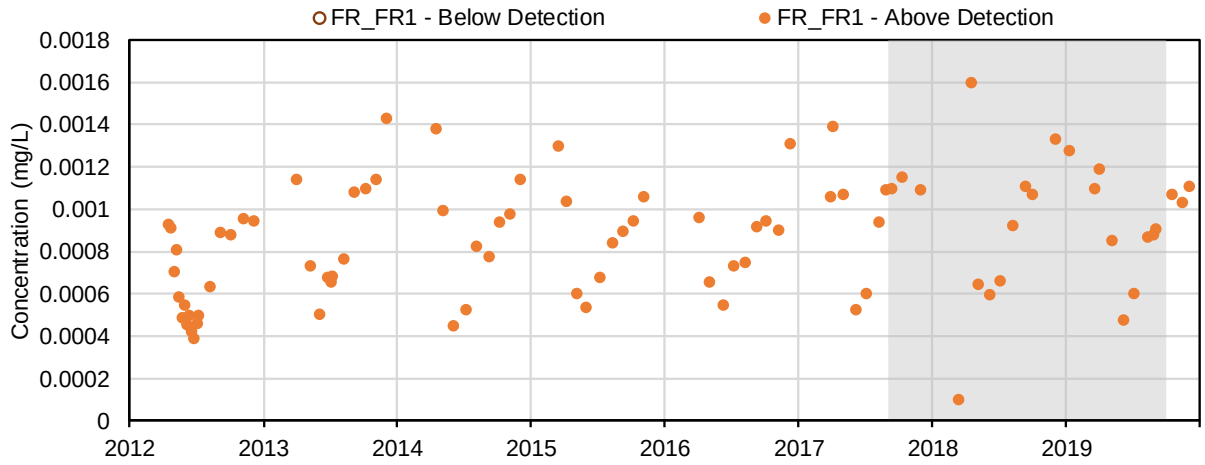
(67) Tin (mg/L); Total Metals



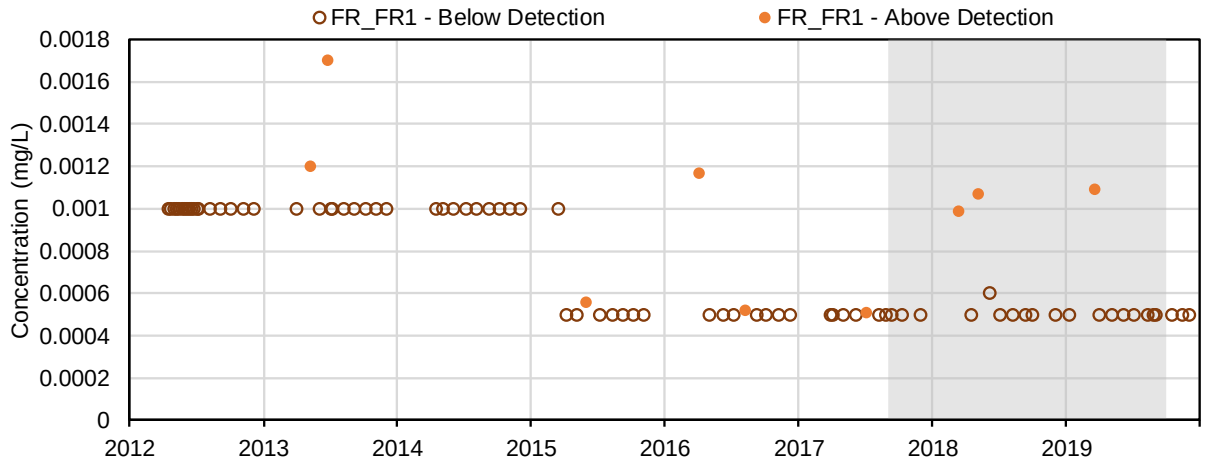
(68) Titanium (mg/L); Total Metals



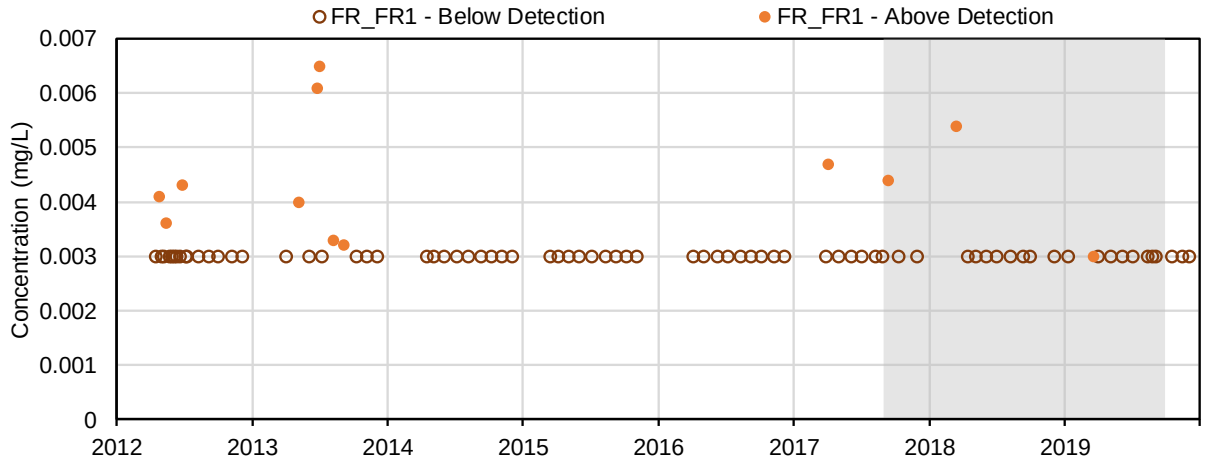
(69) Uranium (mg/L); Total Metals



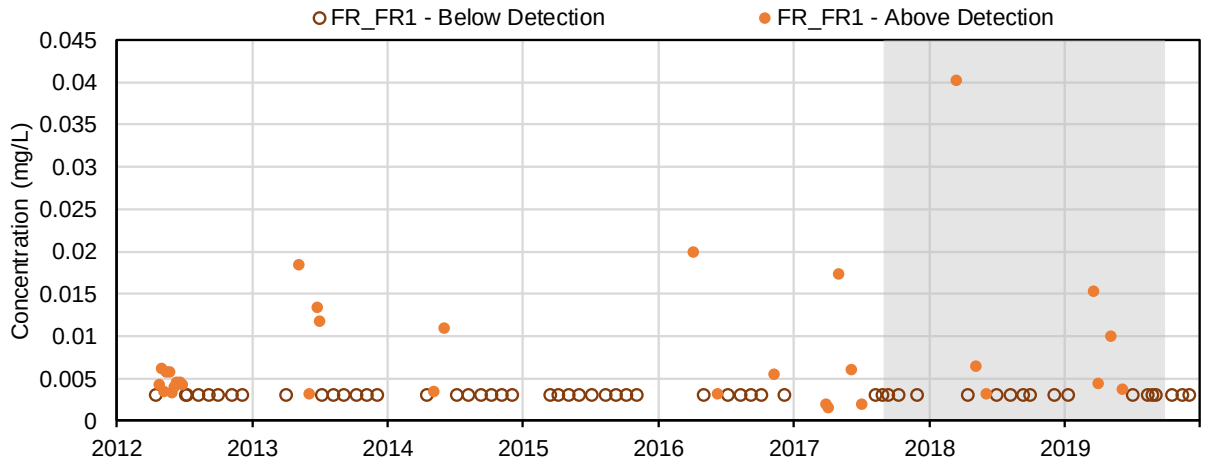
(70) Vanadium (mg/L); Total Metals



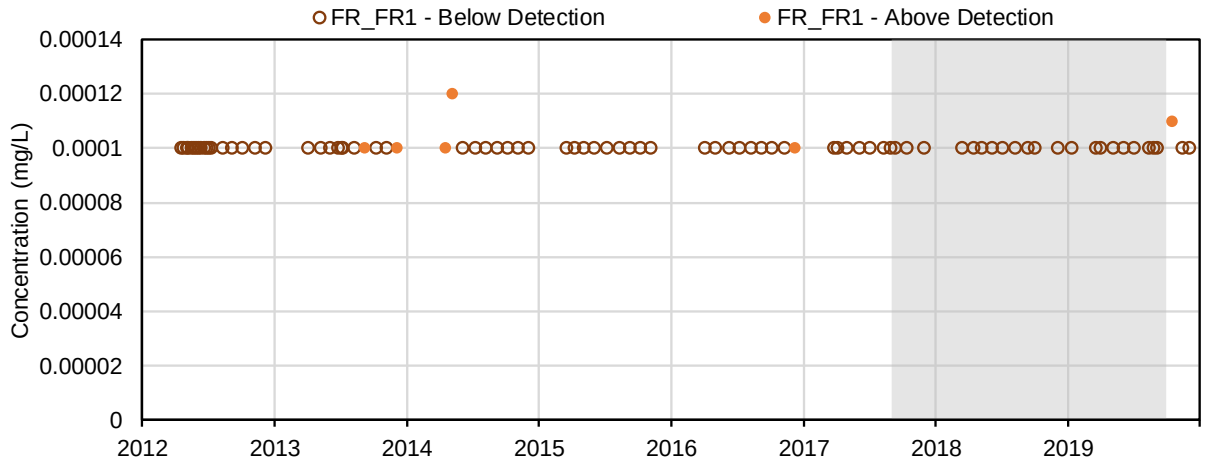
(71) Zinc (mg/L); Total Metals



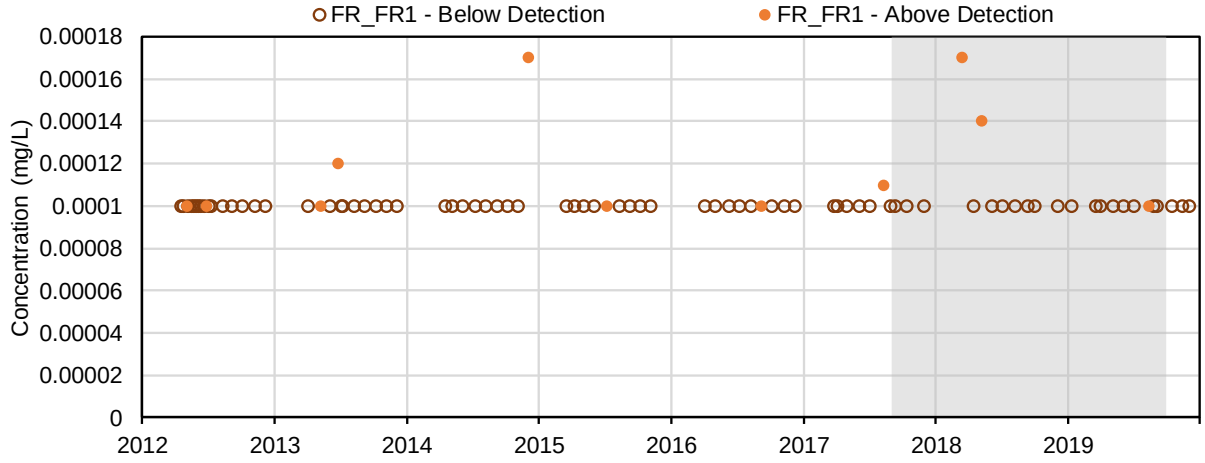
(72) Aluminum (mg/L); Dissolved Metals



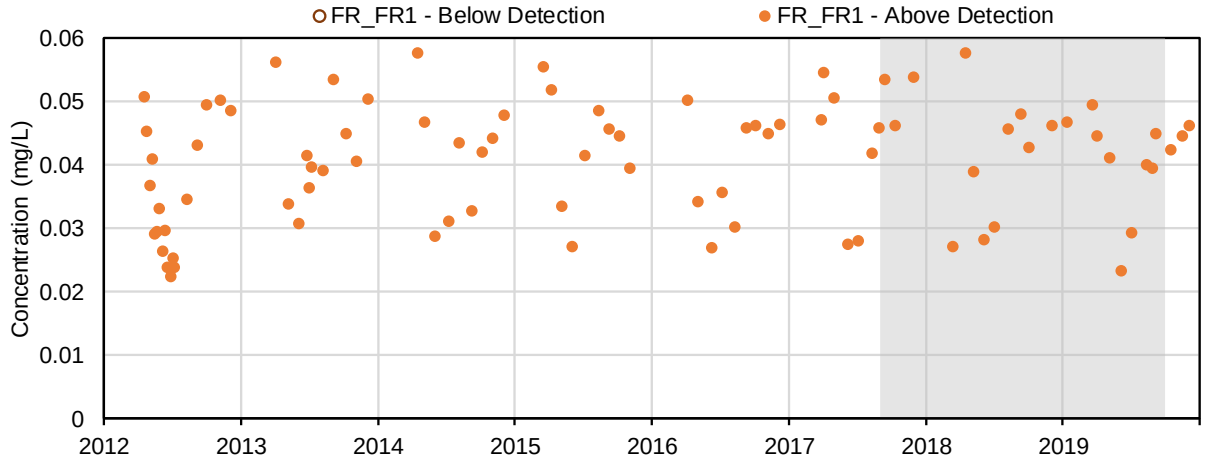
(73) Antimony (mg/L); Dissolved Metals



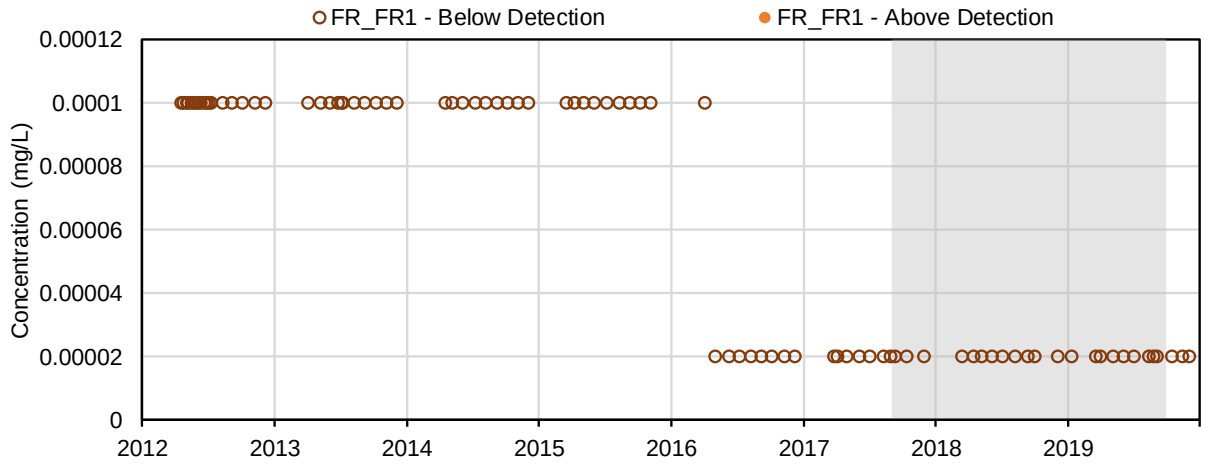
(74) Arsenic (mg/L); Dissolved Metals



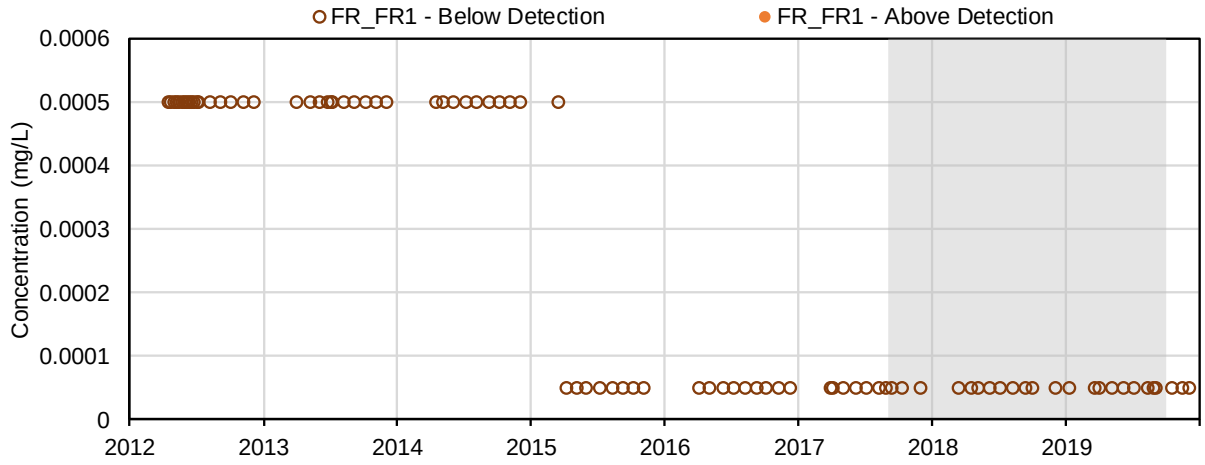
(75) Barium (mg/L); Dissolved Metals



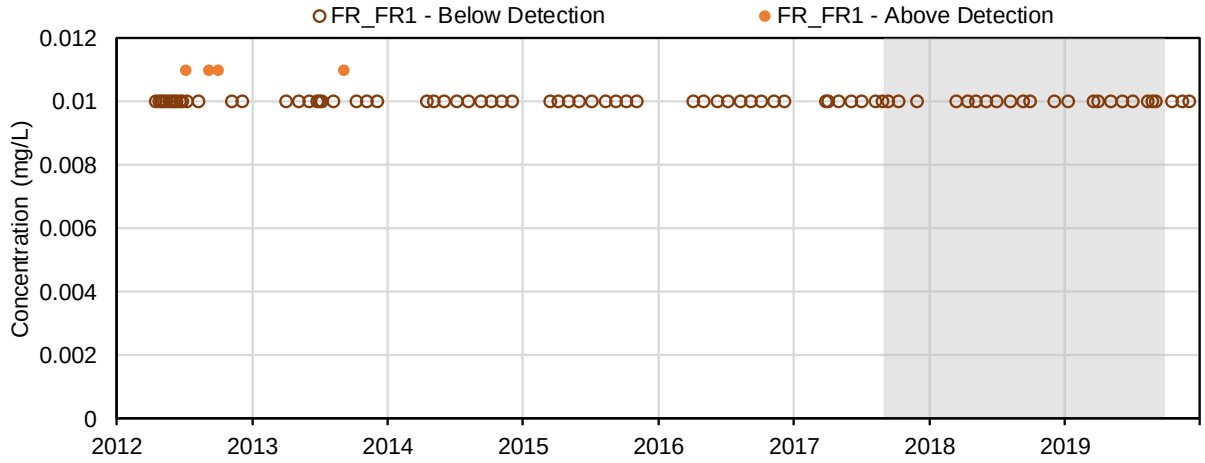
(76) Beryllium (mg/L); Dissolved Metals



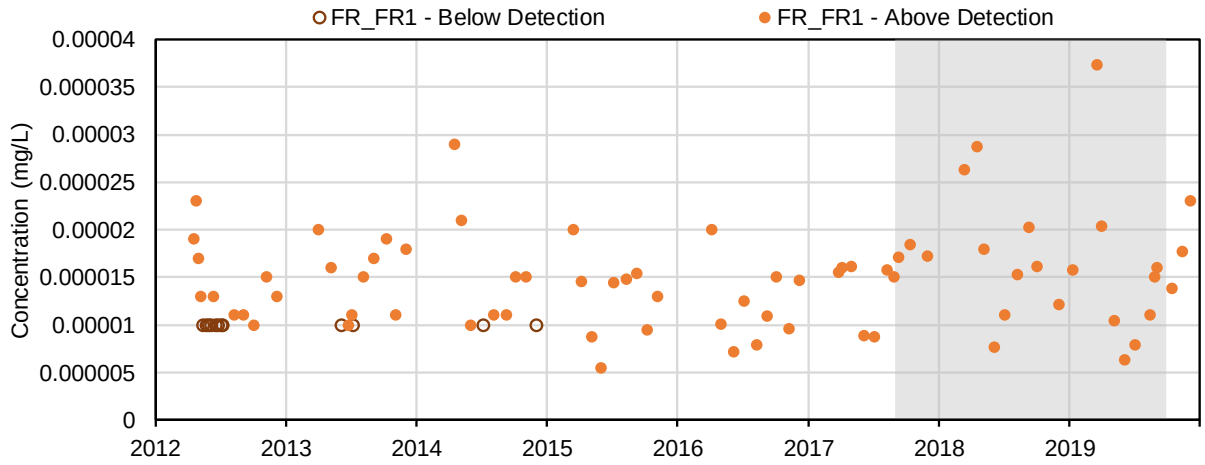
(77) Bismuth (mg/L); Dissolved Metals



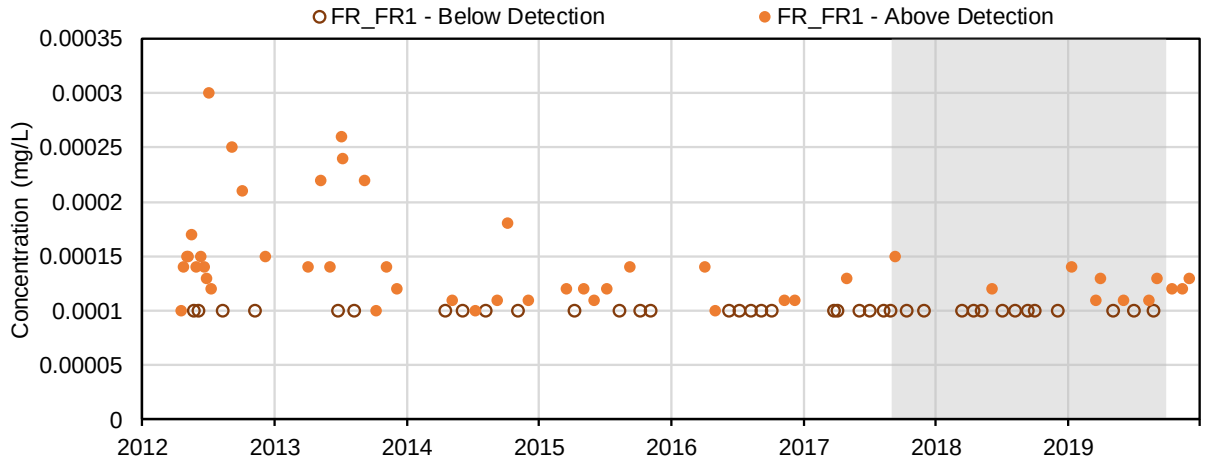
(78) Boron (mg/L); Dissolved Metals



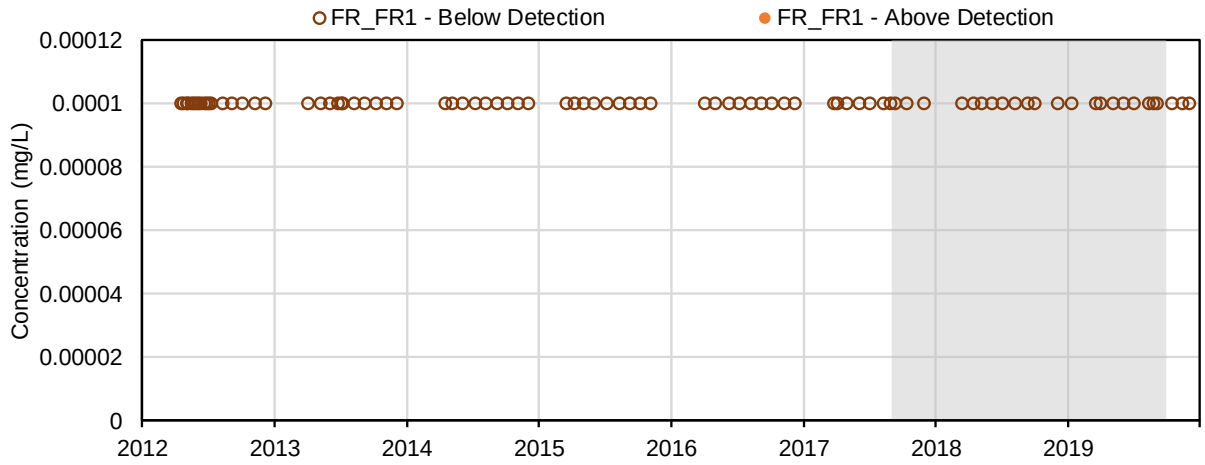
(79) Cadmium (mg/L); Dissolved Metals



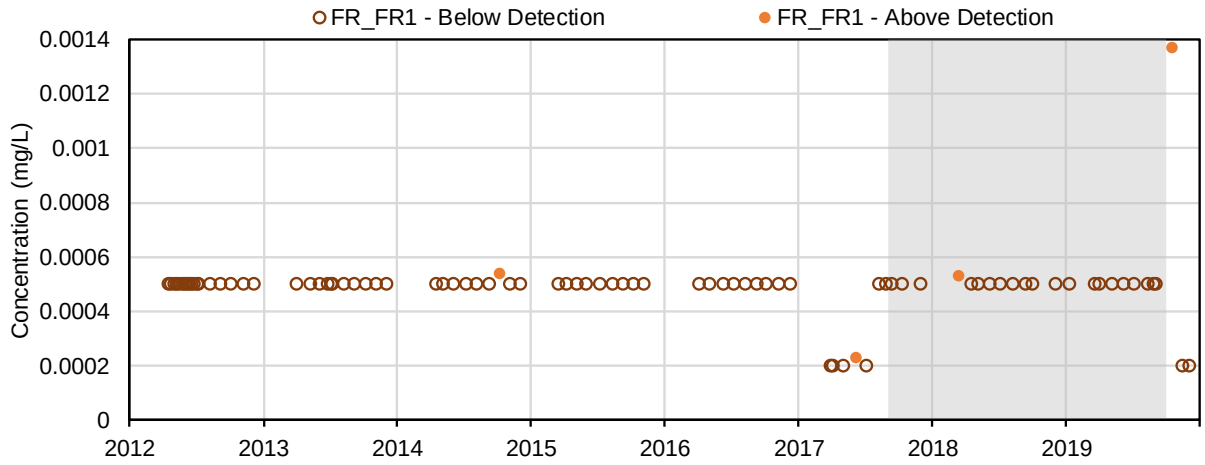
(80) Chromium (mg/L); Dissolved Metals



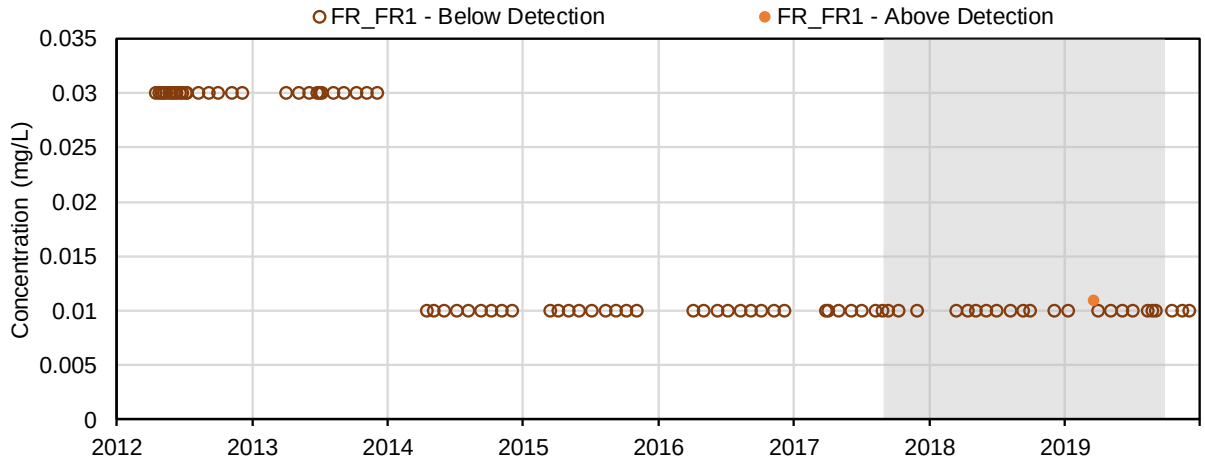
(81) Cobalt (mg/L); Dissolved Metals



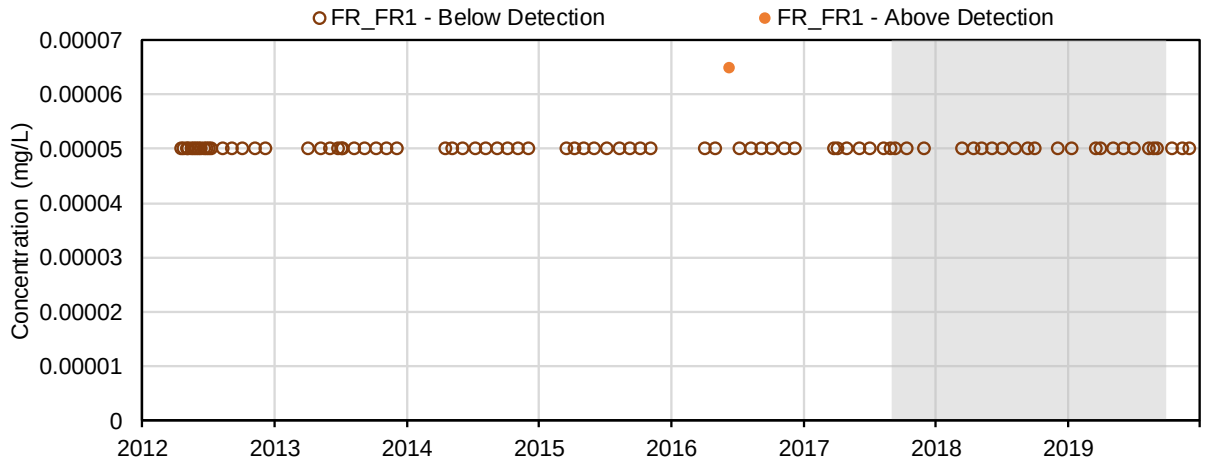
(82) Copper (mg/L); Dissolved Metals



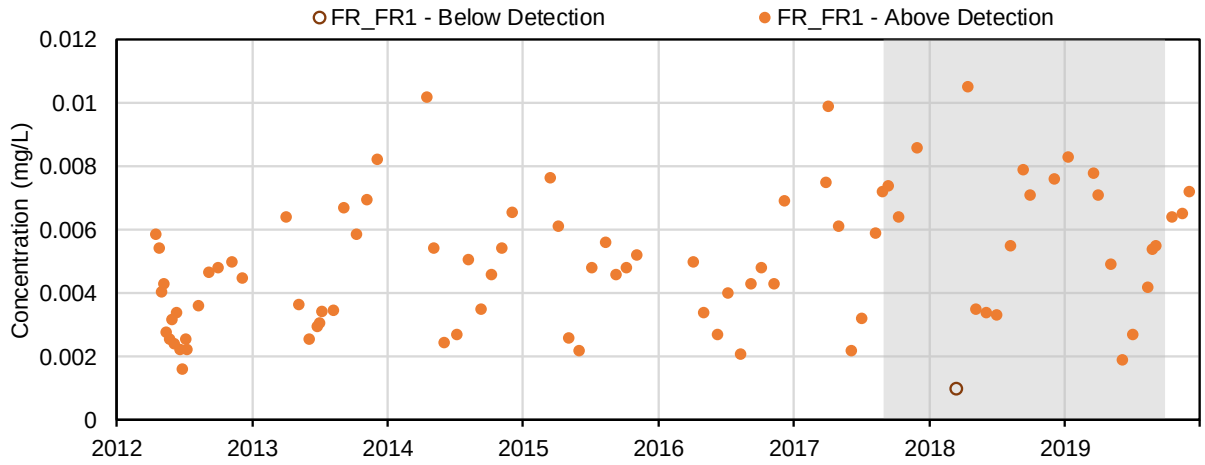
(83) Iron (mg/L); Dissolved Metals



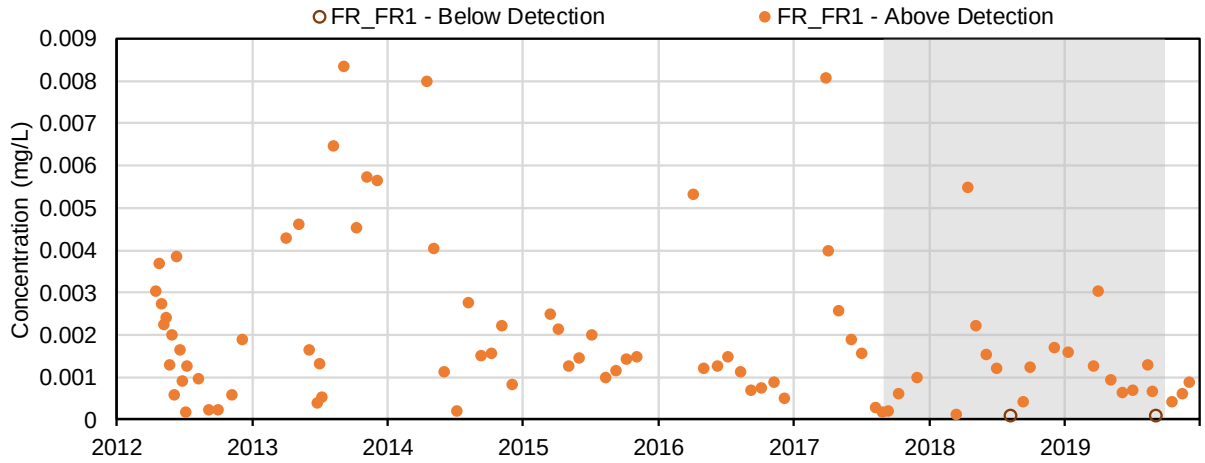
(84) Lead (mg/L); Dissolved Metals



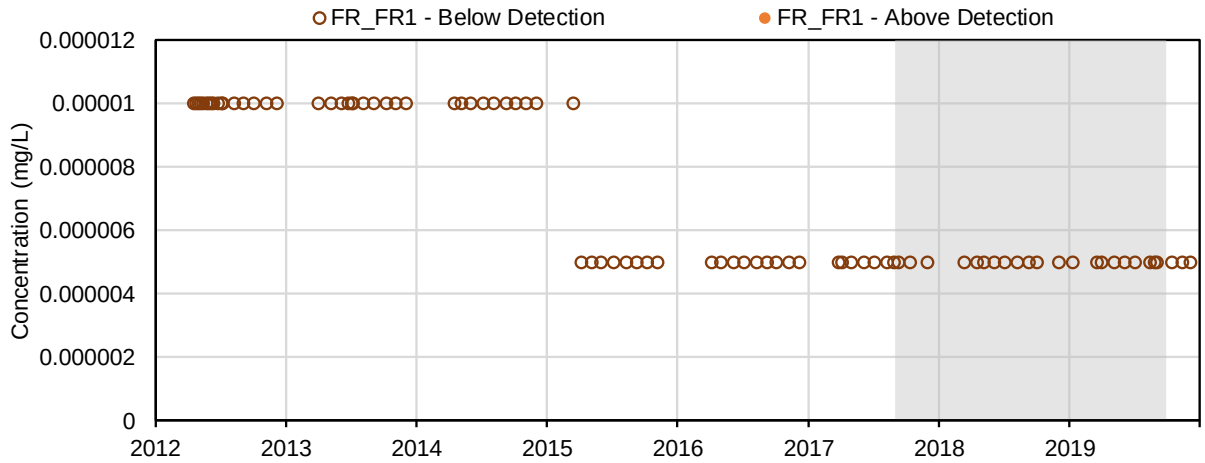
(85) Lithium (mg/L); Dissolved Metals



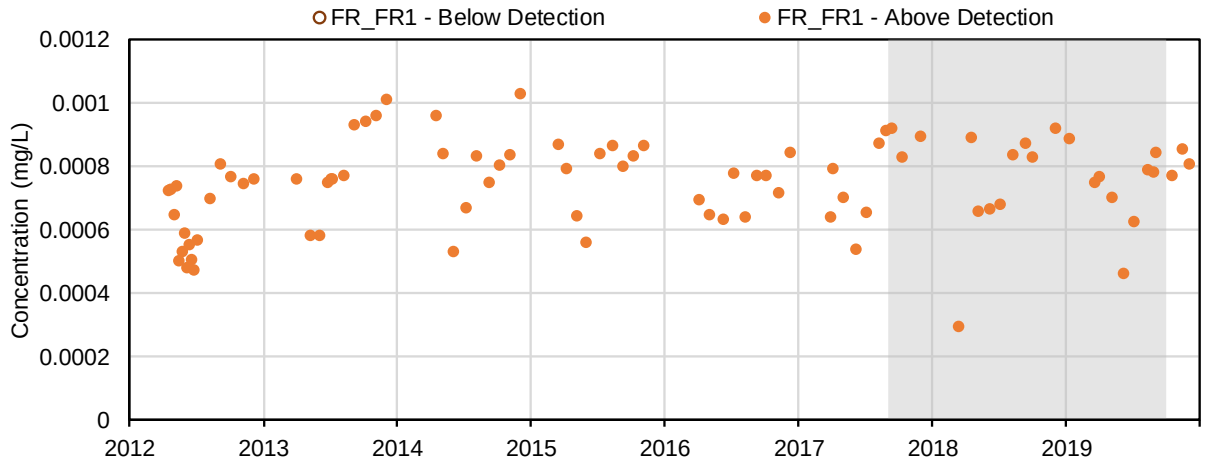
(86) Manganese (mg/L); Dissolved Metals



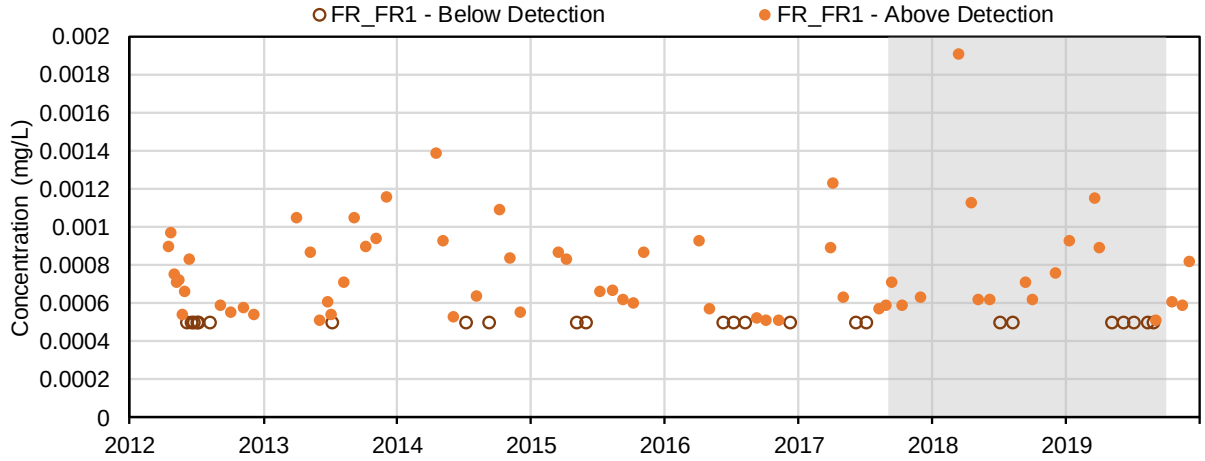
(87) Mercury (mg/L); Dissolved Metals



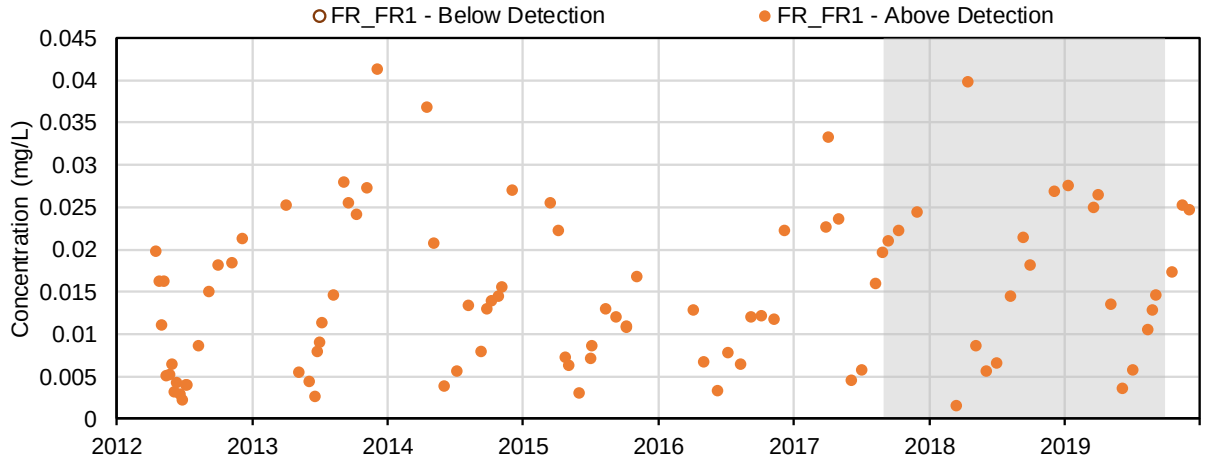
(88) Molybdenum (mg/L); Dissolved Metals



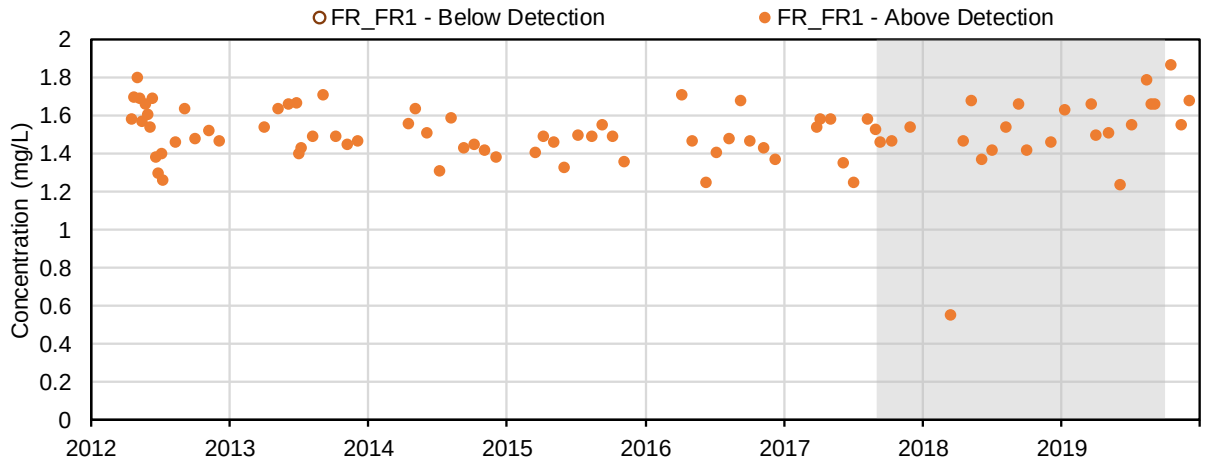
(89) Nickel (mg/L); Dissolved Metals



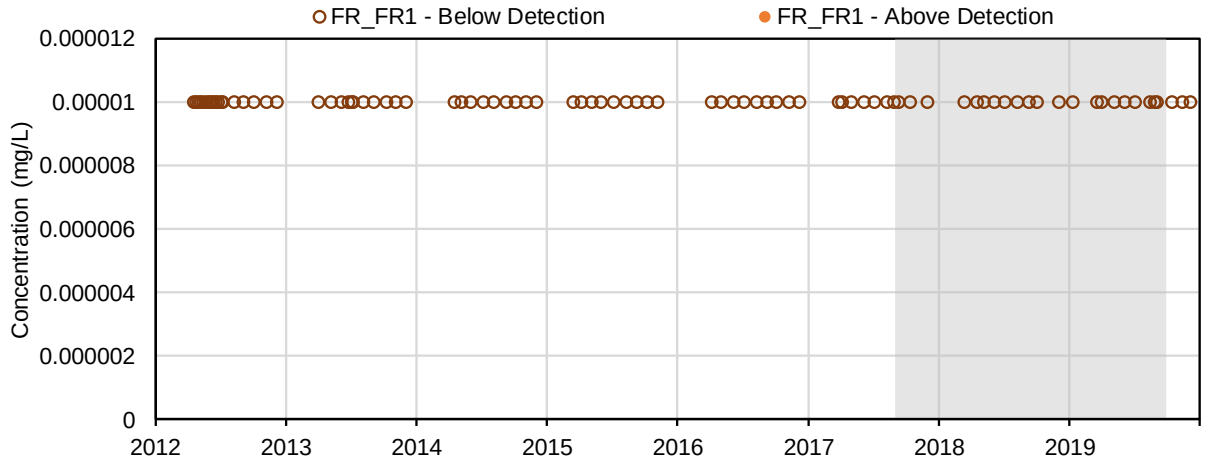
(90) Selenium (mg/L); Dissolved Metals



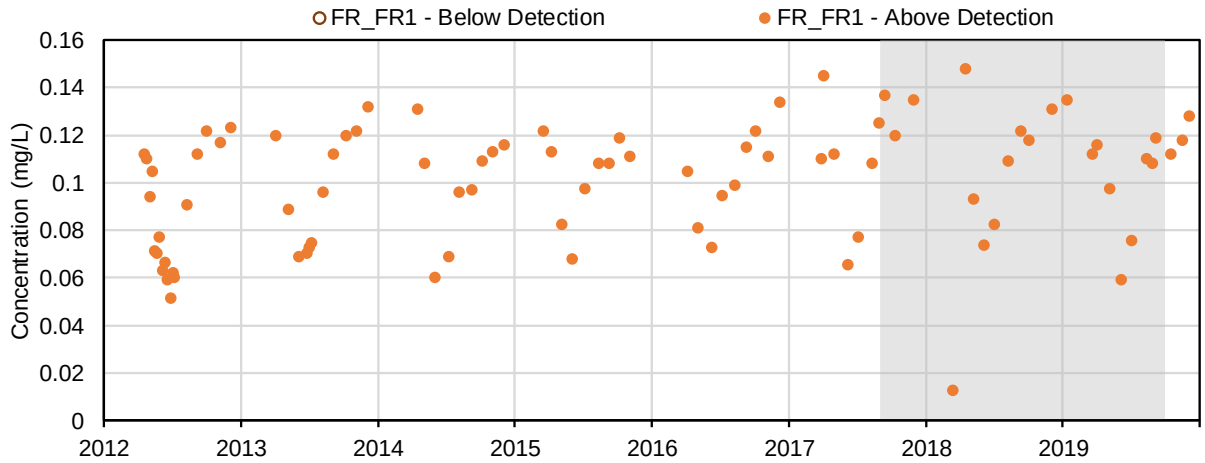
(91) Silicon (mg/L); Dissolved Metals



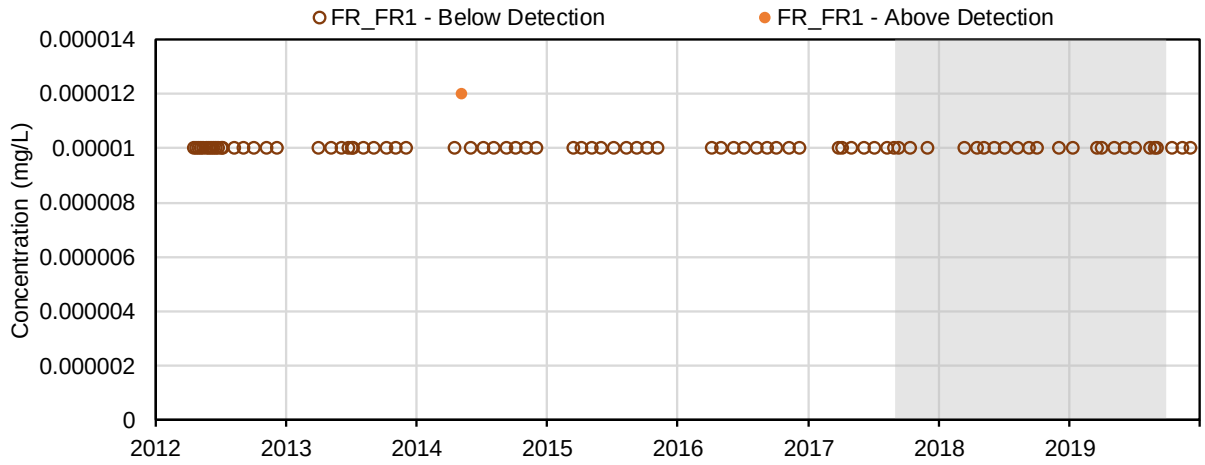
(92) Silver (mg/L); Dissolved Metals



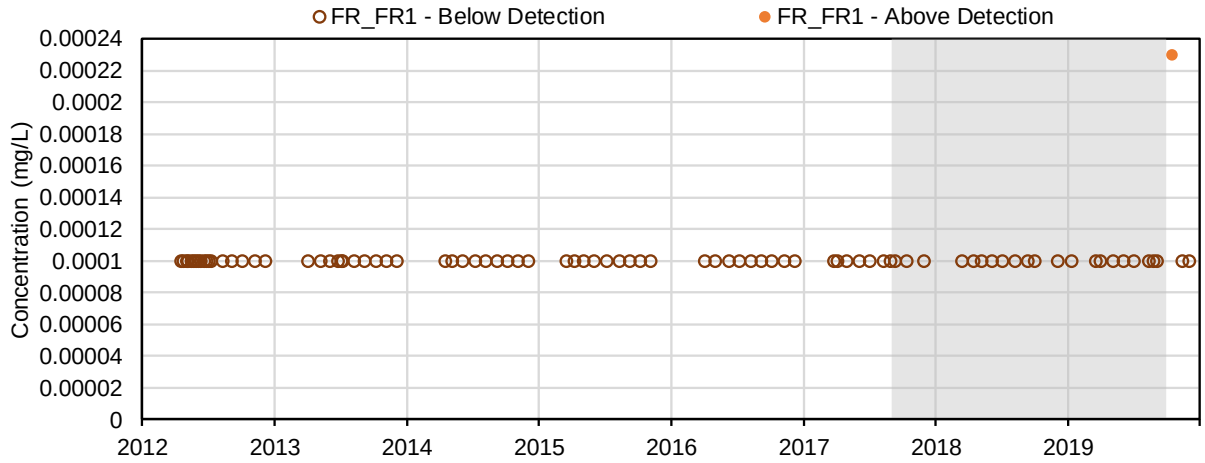
(93) Strontium (mg/L); Dissolved Metals



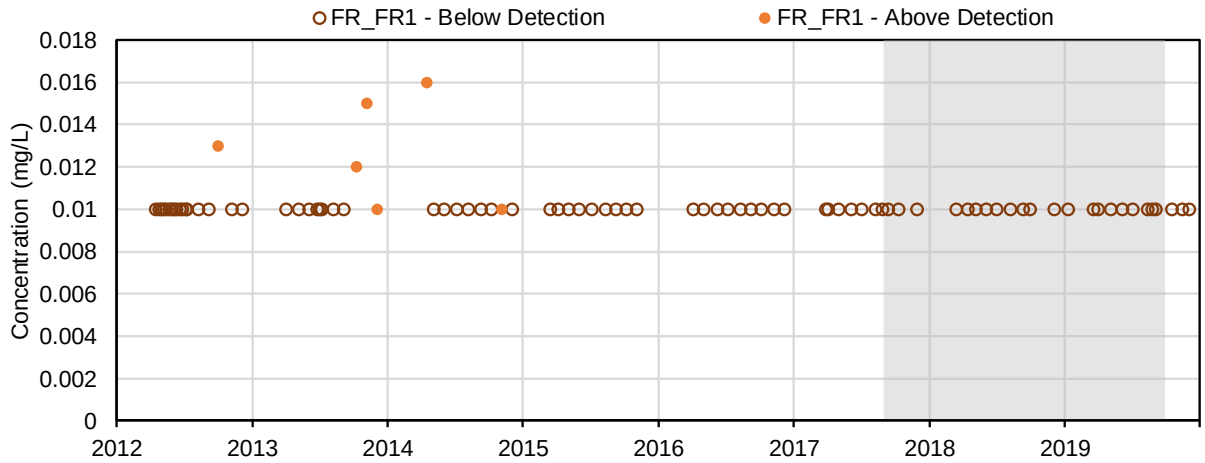
(94) Thallium (mg/L); Dissolved Metals



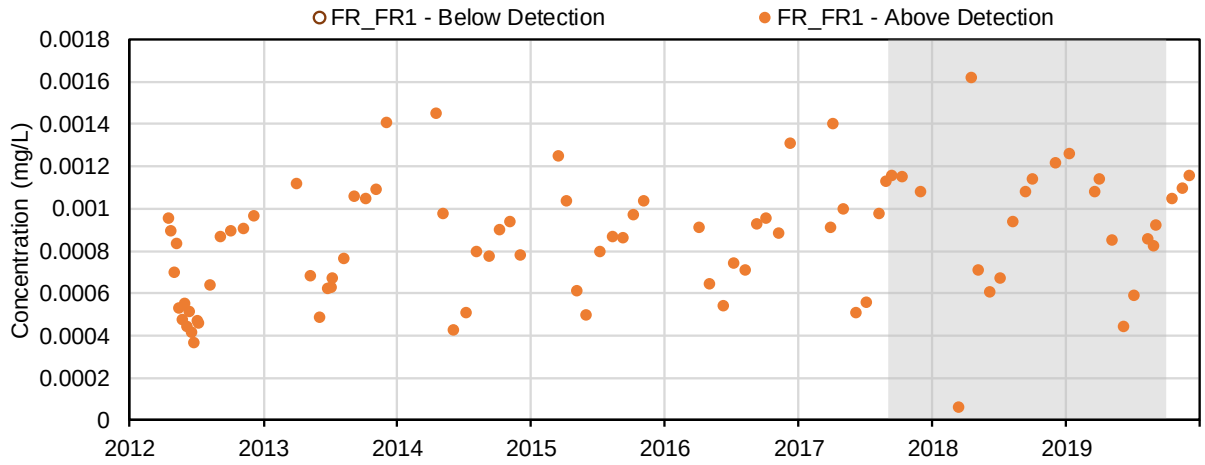
(95) Tin (mg/L); Dissolved Metals



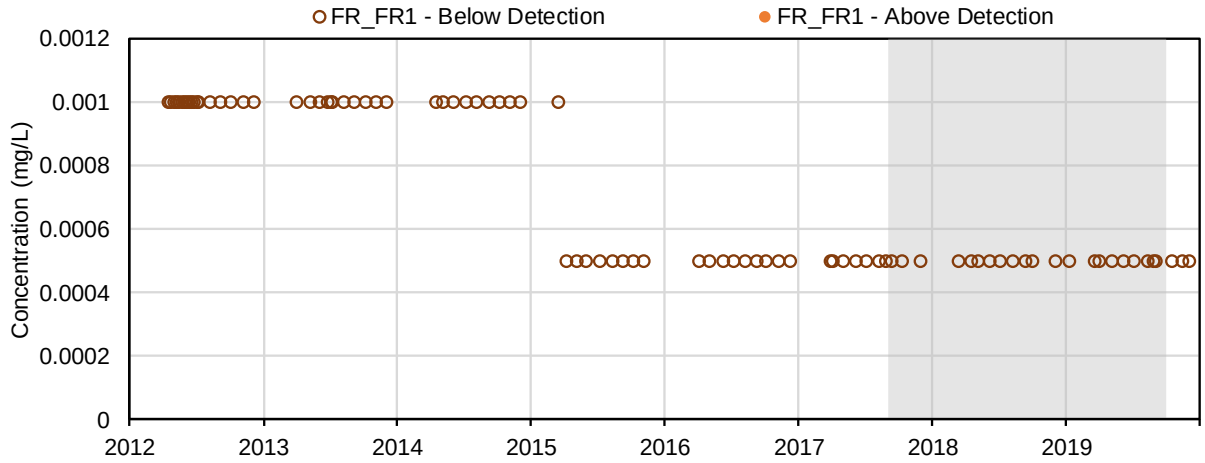
(96) Titanium (mg/L); Dissolved Metals



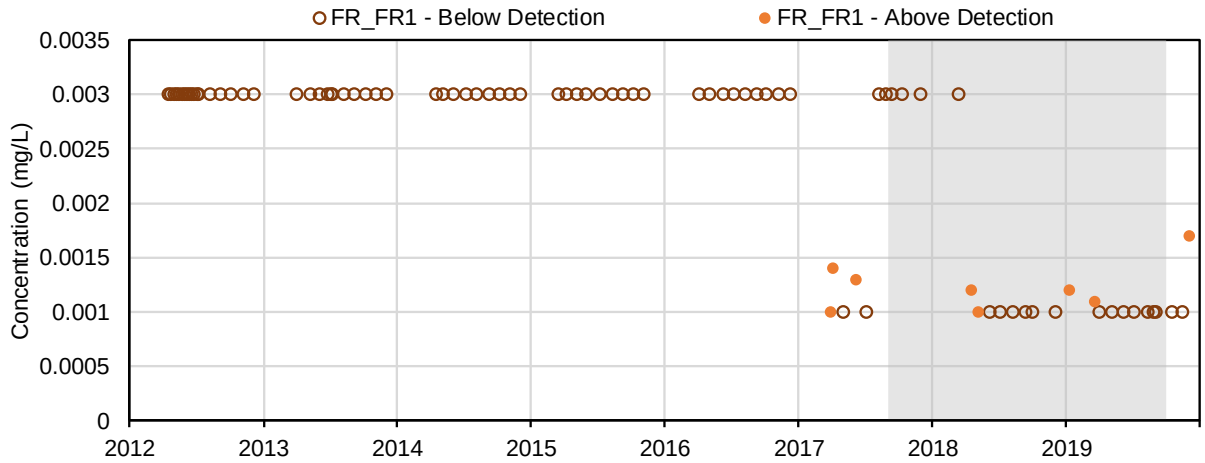
(97) Uranium (mg/L); Dissolved Metals



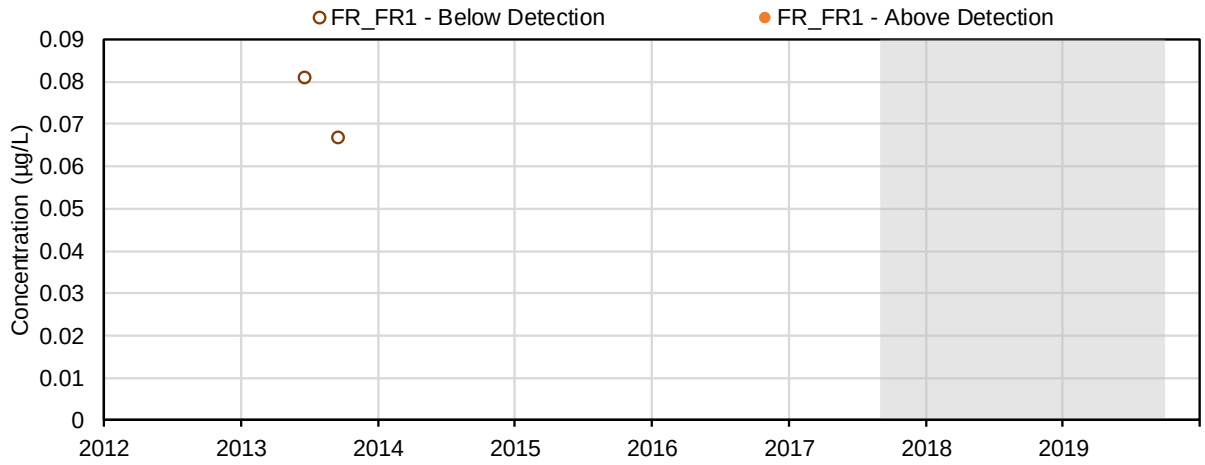
(98) Vanadium (mg/L); Dissolved Metals



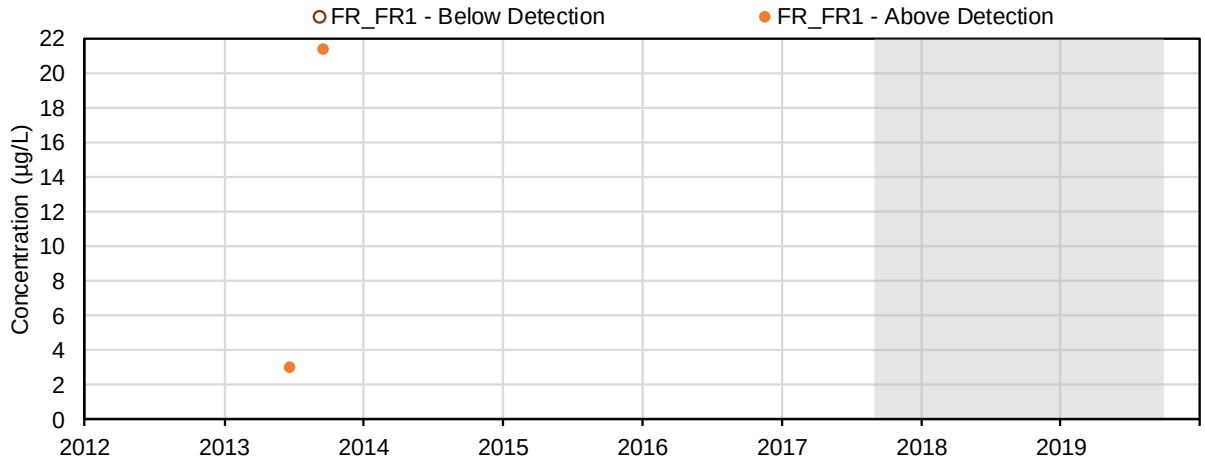
(99) Zinc (mg/L); Dissolved Metals



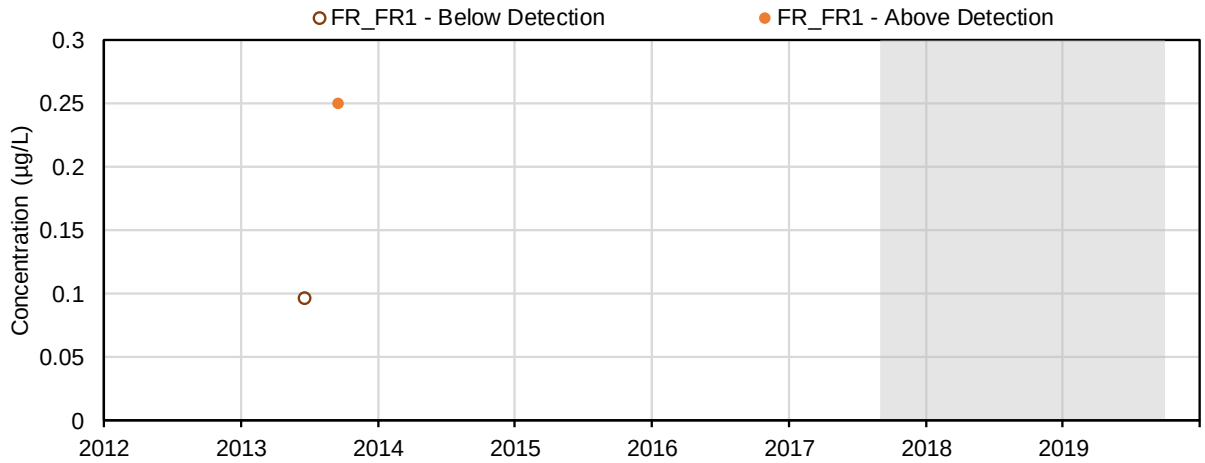
(100) Total Selenocyanate (µg/L); Speciation of Selenium



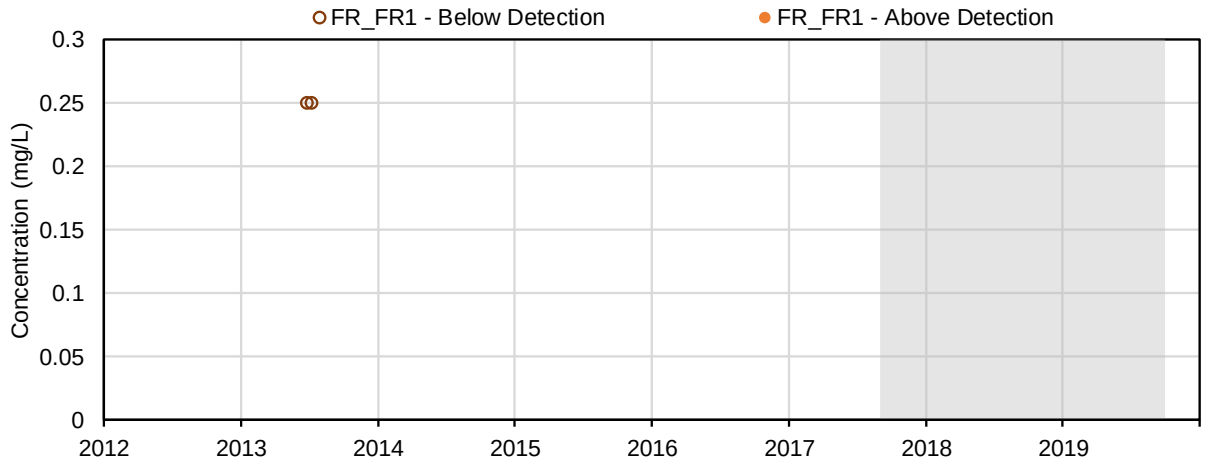
(101) Total Selenium 6+ (µg/L); Speciation of Selenium



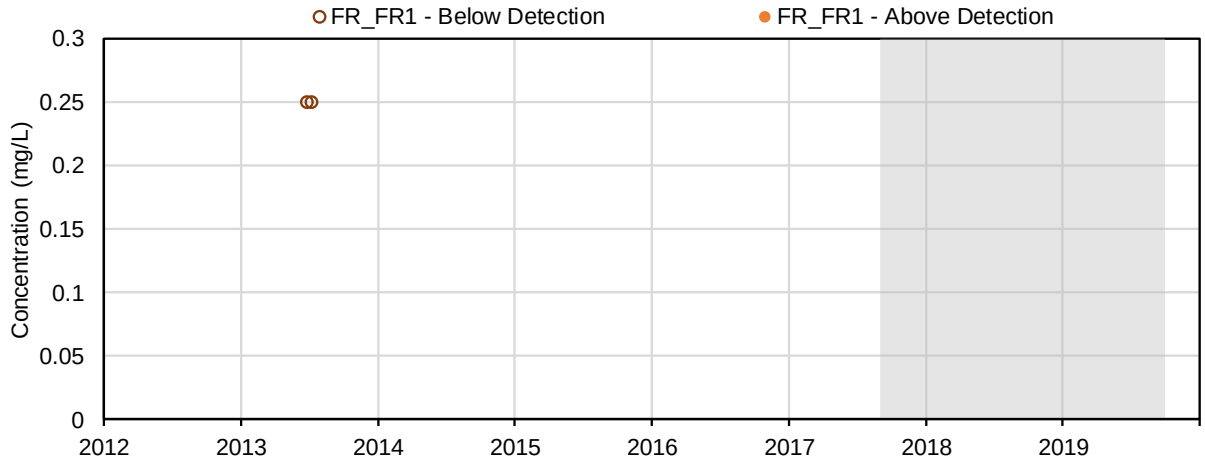
(102) Total Selenium 4+ (µg/L); Speciation of Selenium



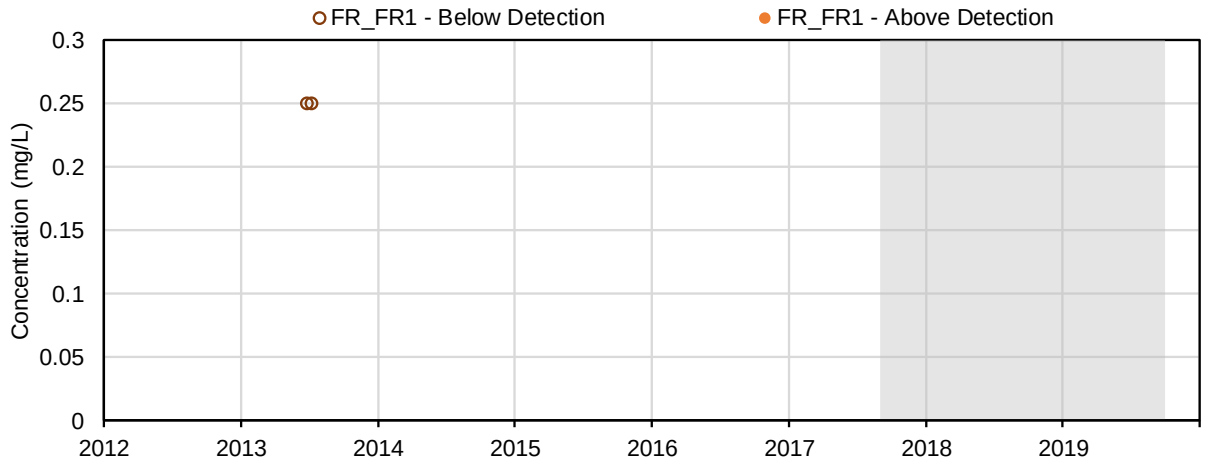
(103) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics

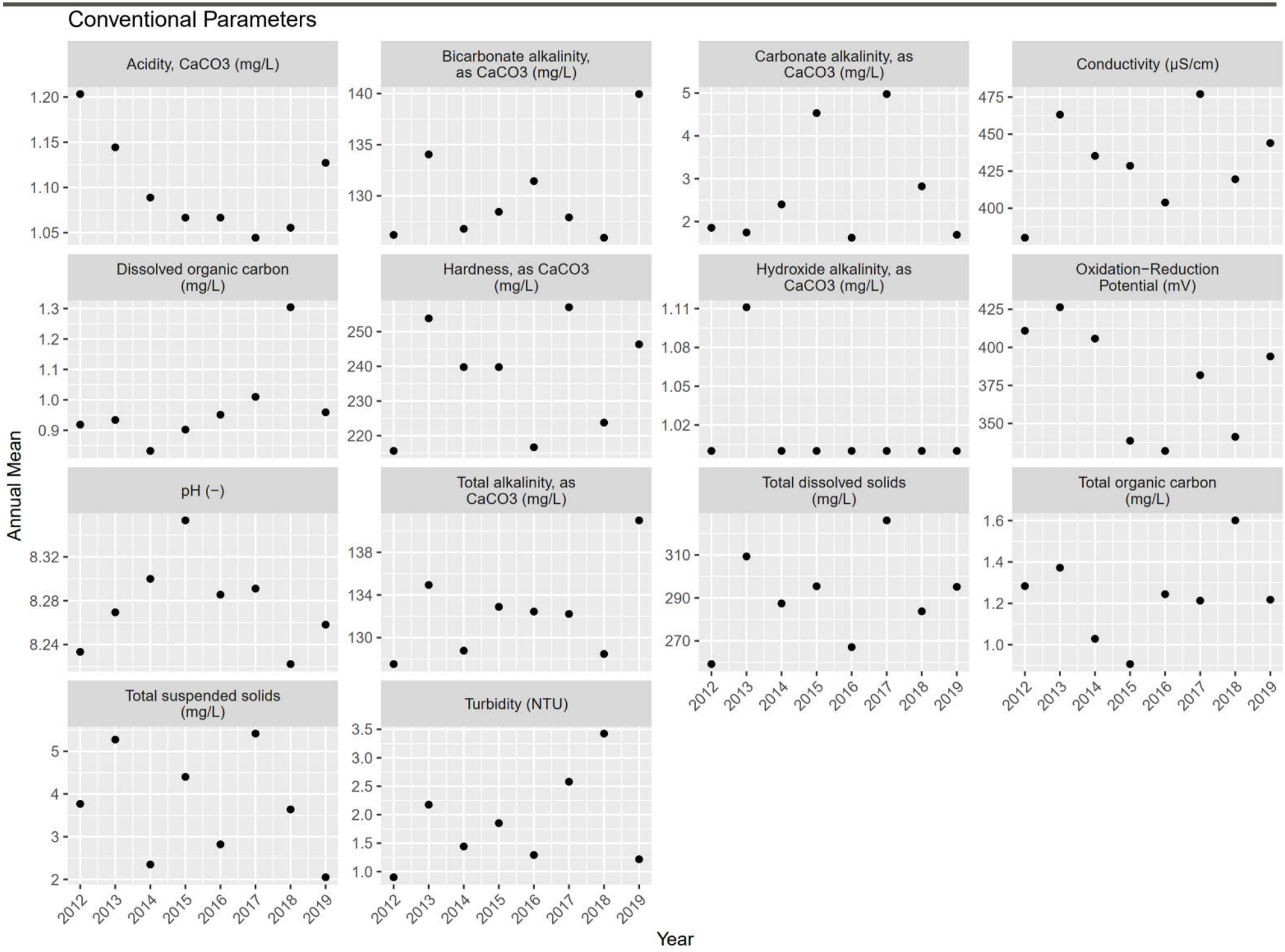


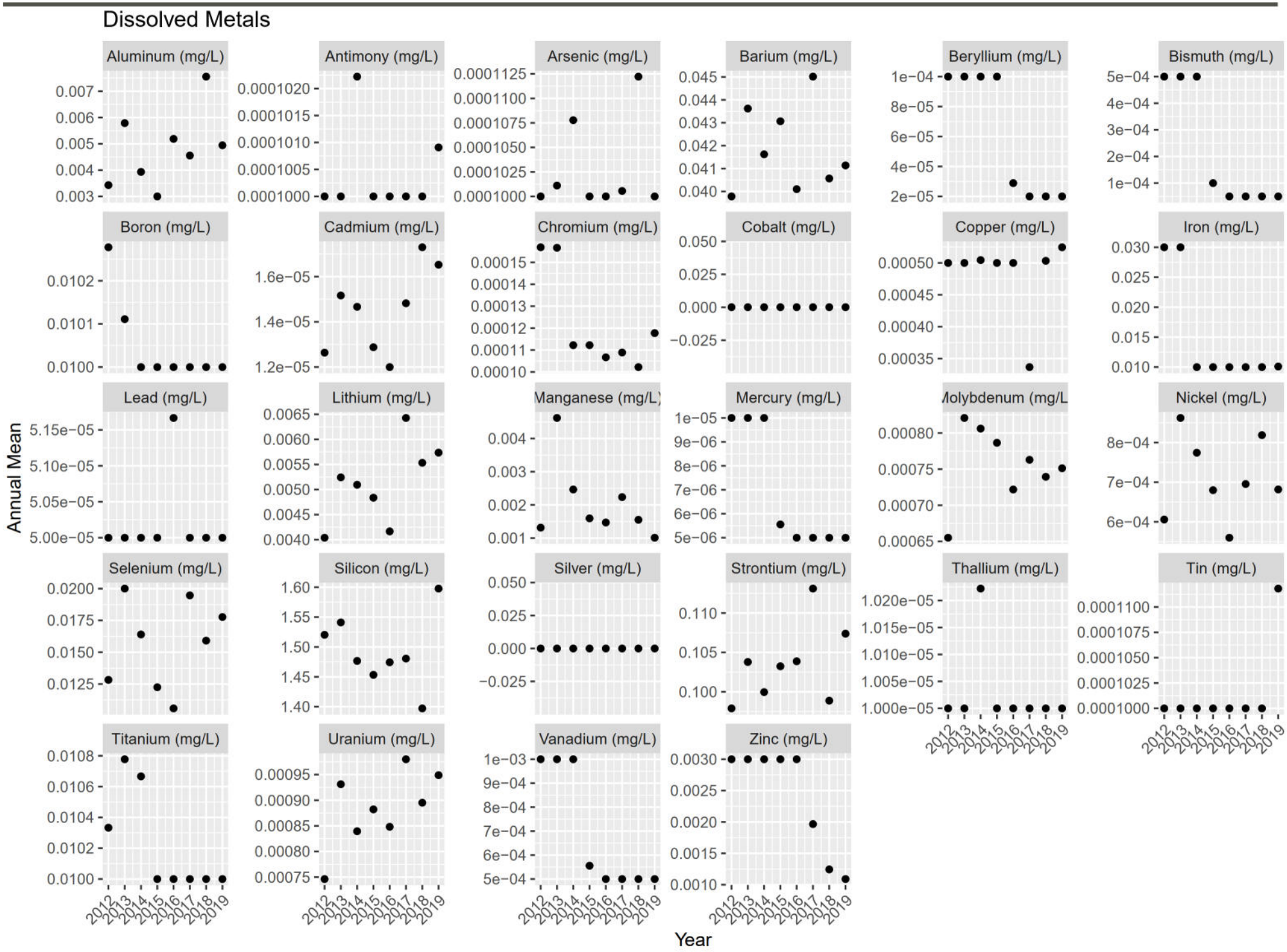
(104) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics

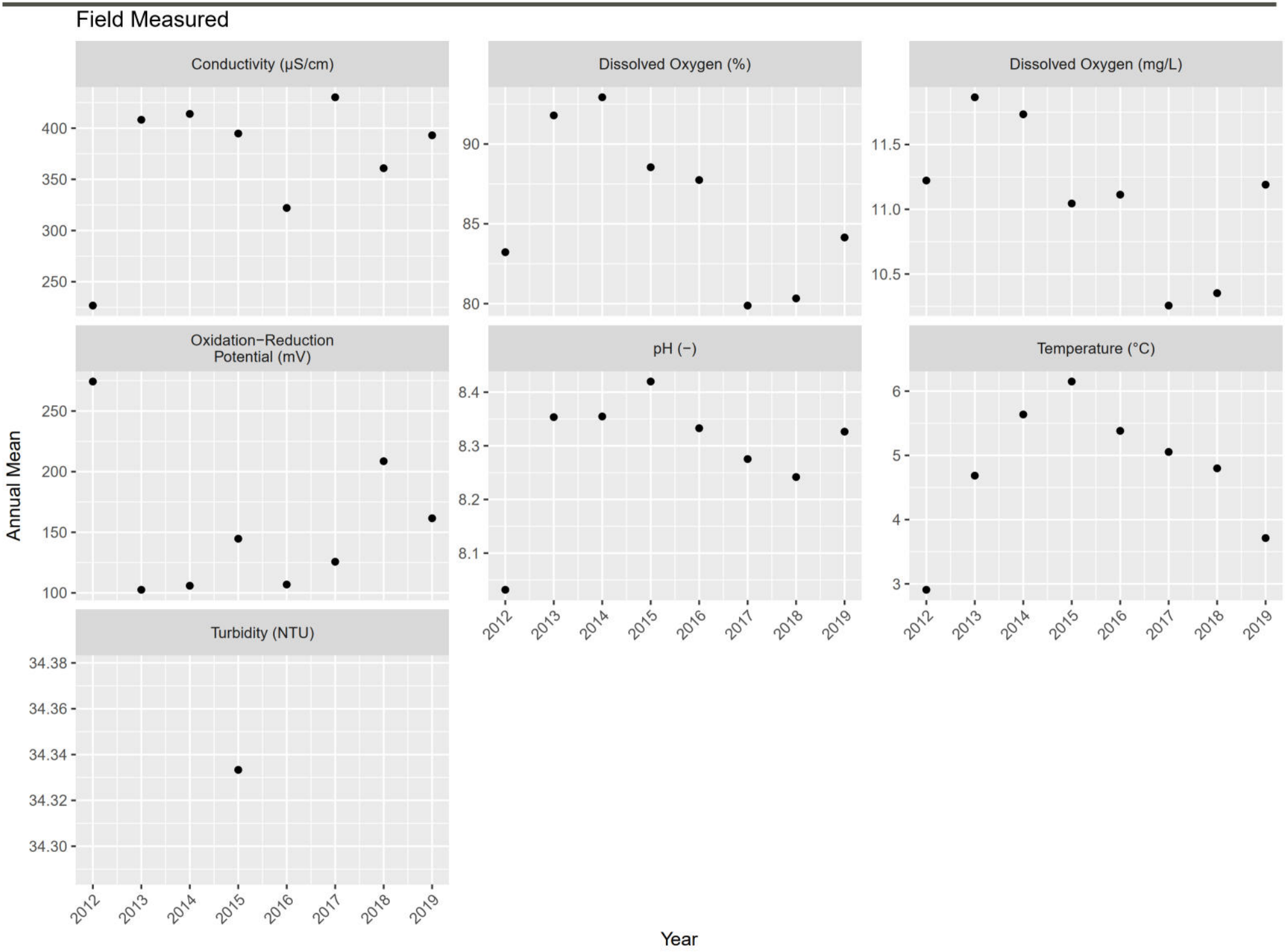


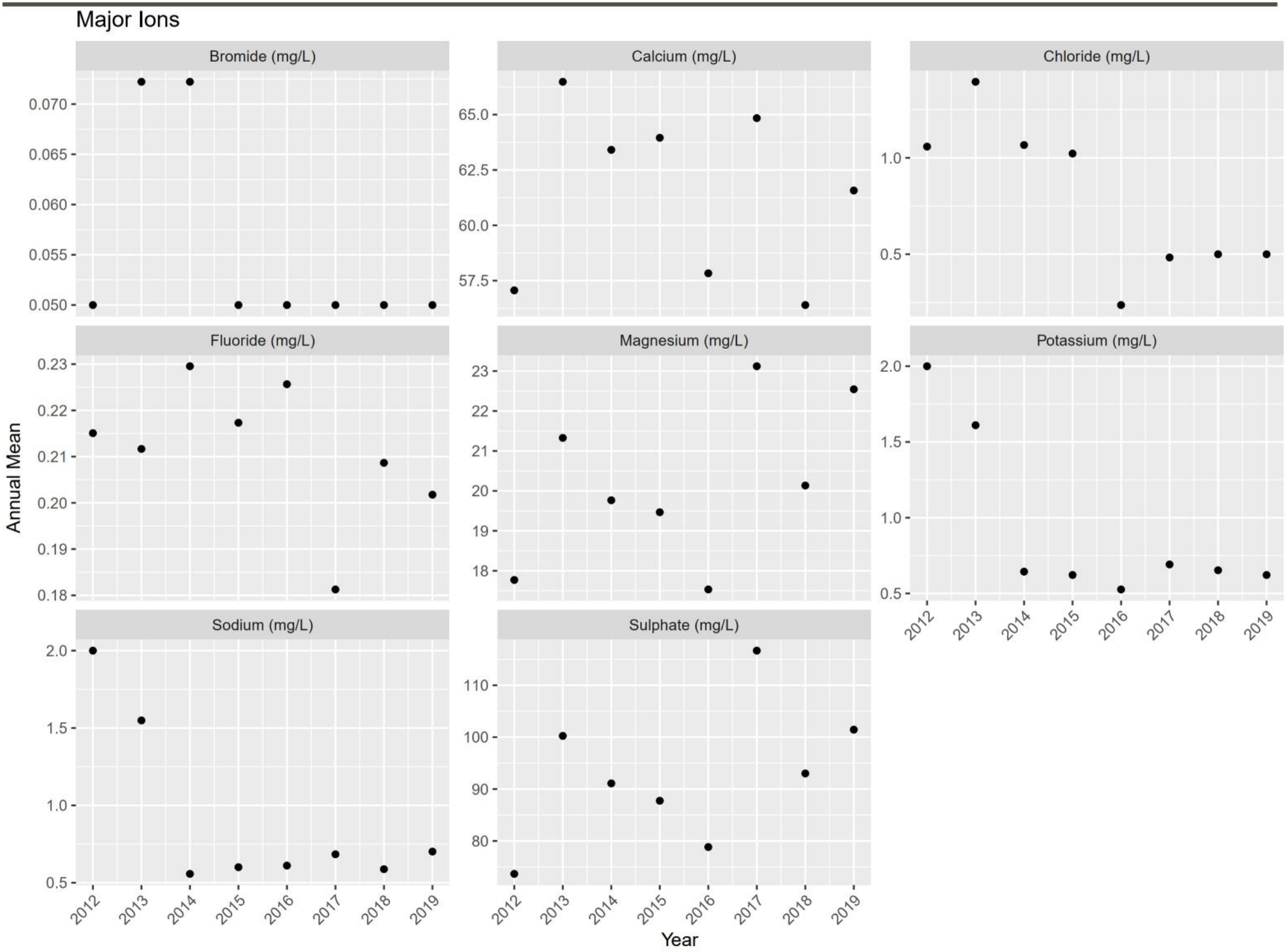
(105) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics

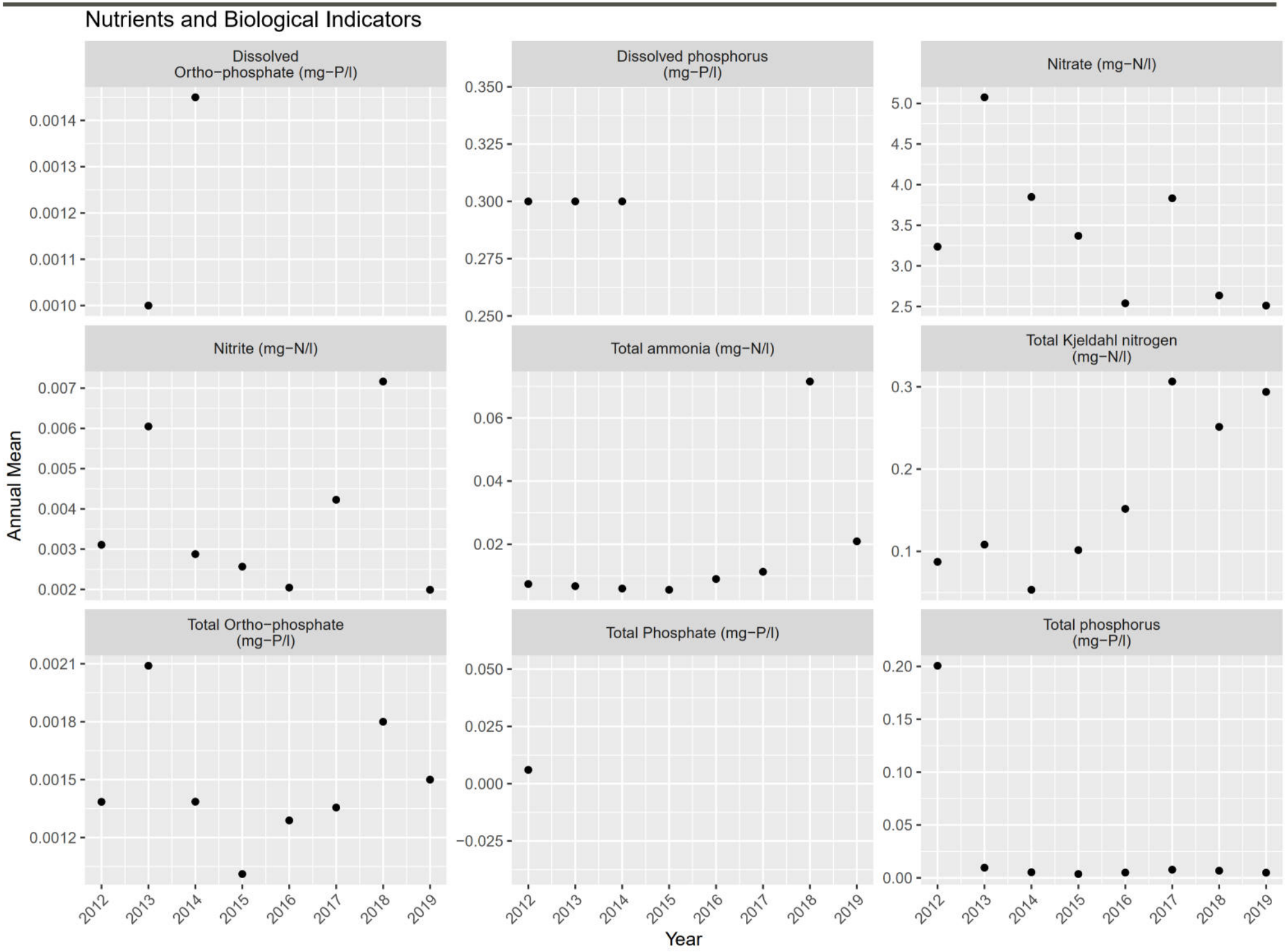


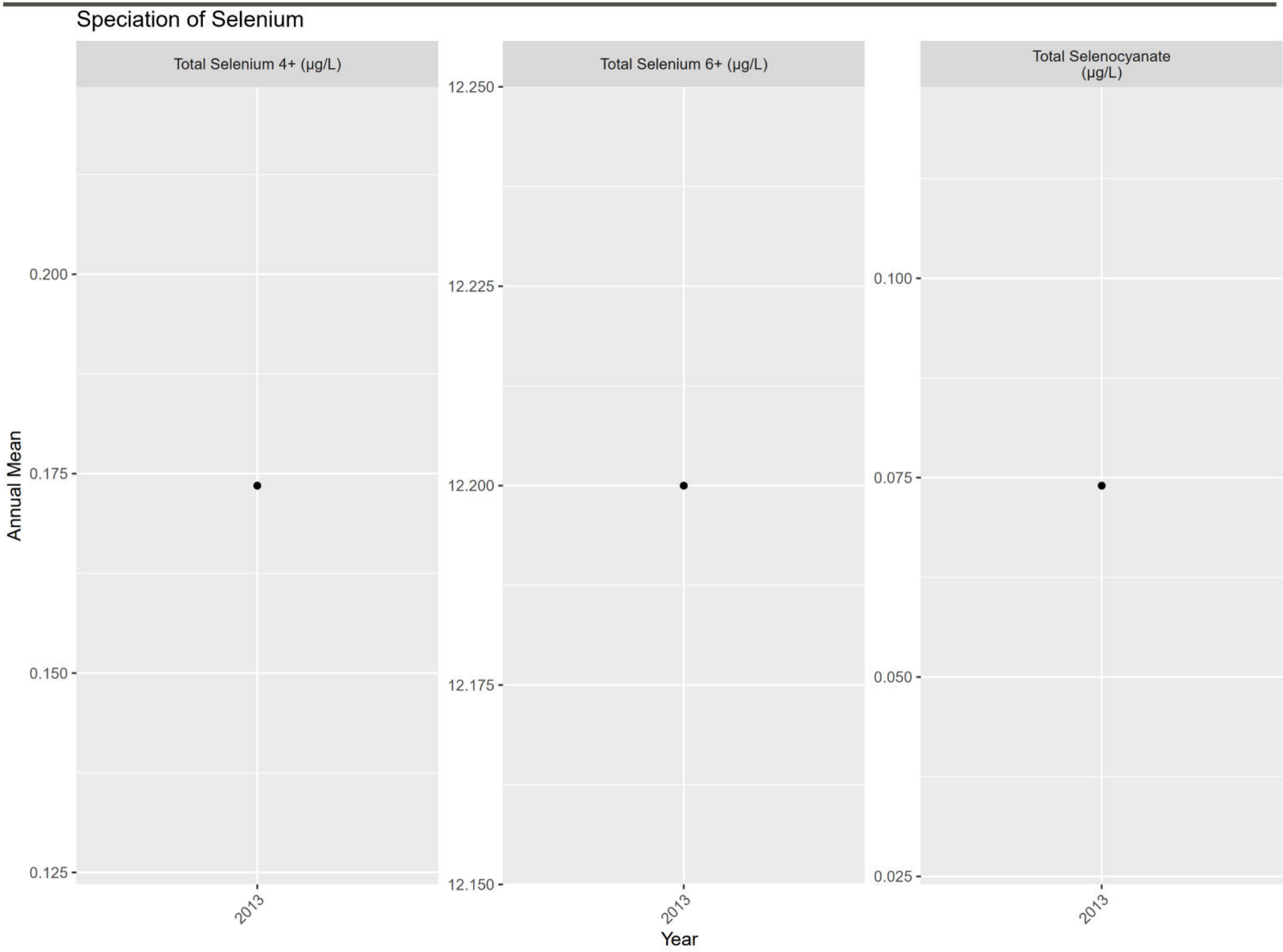

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year

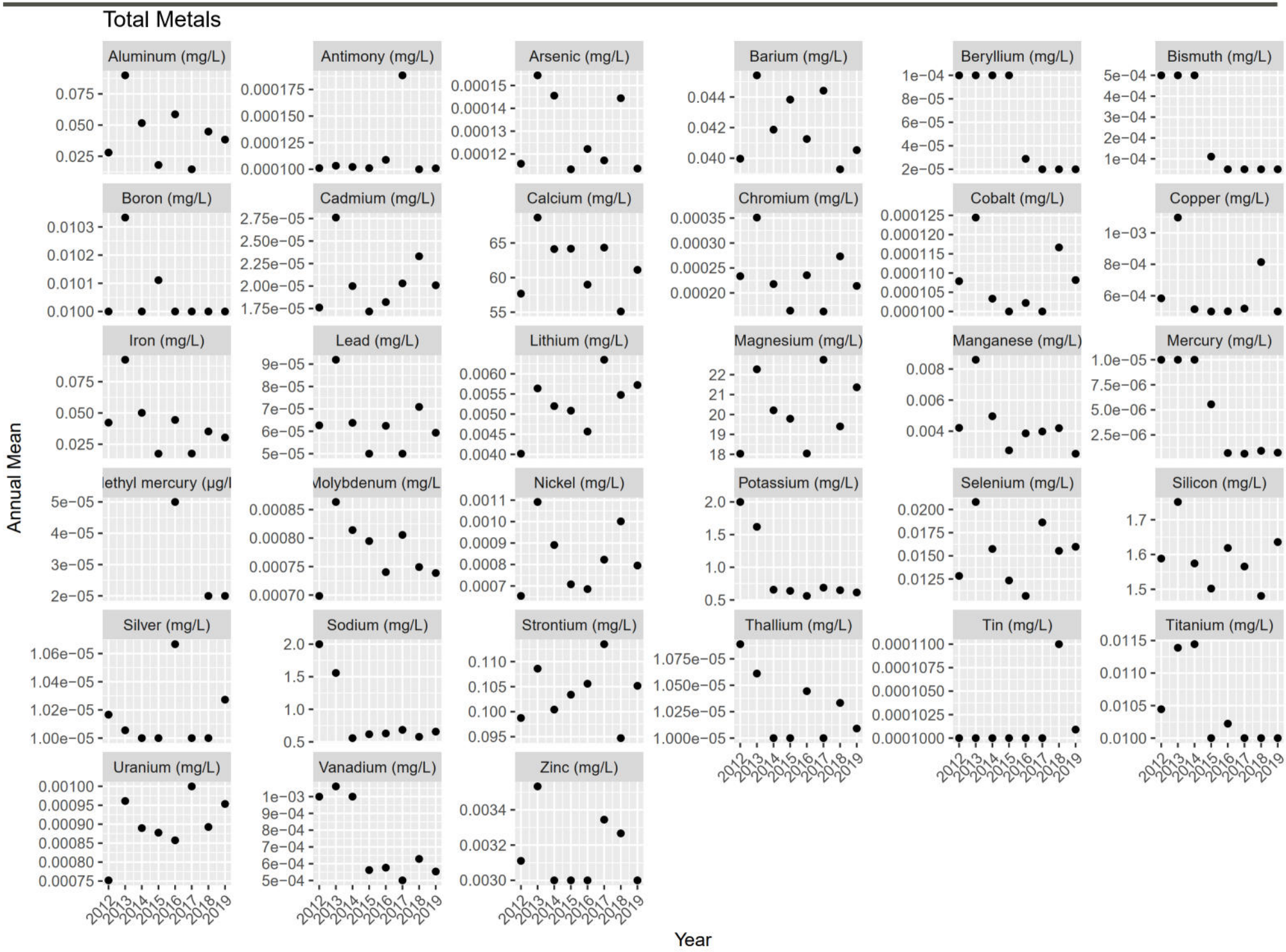

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year

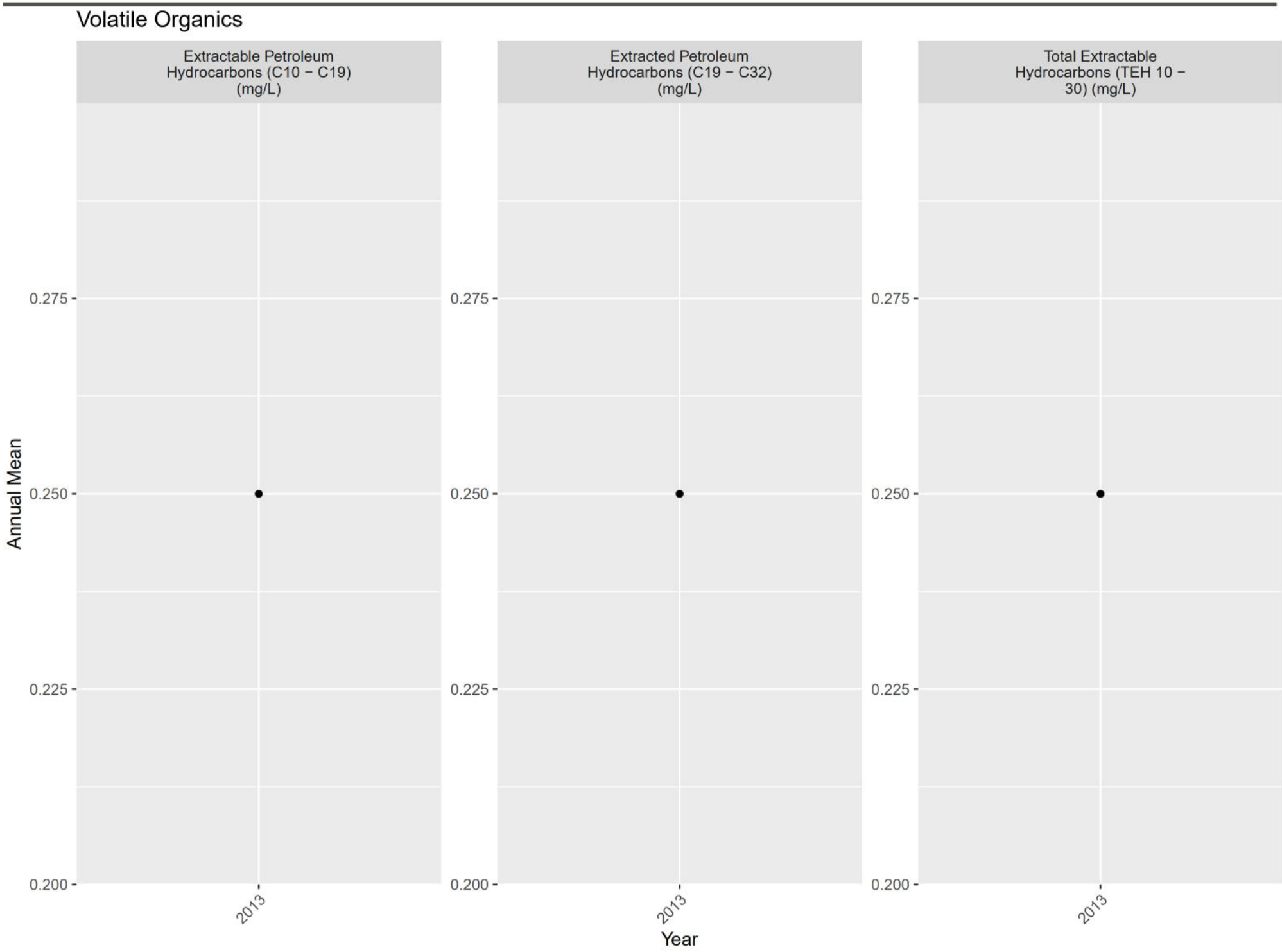

Field Measured
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Temperature (°C)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
0.070
0.065
0.060
0.055
0.050
65.0
62.5
60.0
57.5
1.0
0.5
0.23
0.22
0.21
0.20
0.19
0.18
23
22
21
20
19
18
2.0
1.5
1.0
0.5
110
100
90
80
2012
2013
2014
2015
2016
2017
2018
2019


Nutrients and Biological Indicators
Dissolved Ortho−phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Speciation of Selenium
Total Selenium 4+ (µg/L)
Total Selenium 6+ (µg/L)
Total Selenocyanate (µg/L)
Annual Mean
0.200
0.175
0.150
0.125
12.250
12.225
12.200
12.175
12.150
0.100
0.075
0.050
0.025
2013
Year

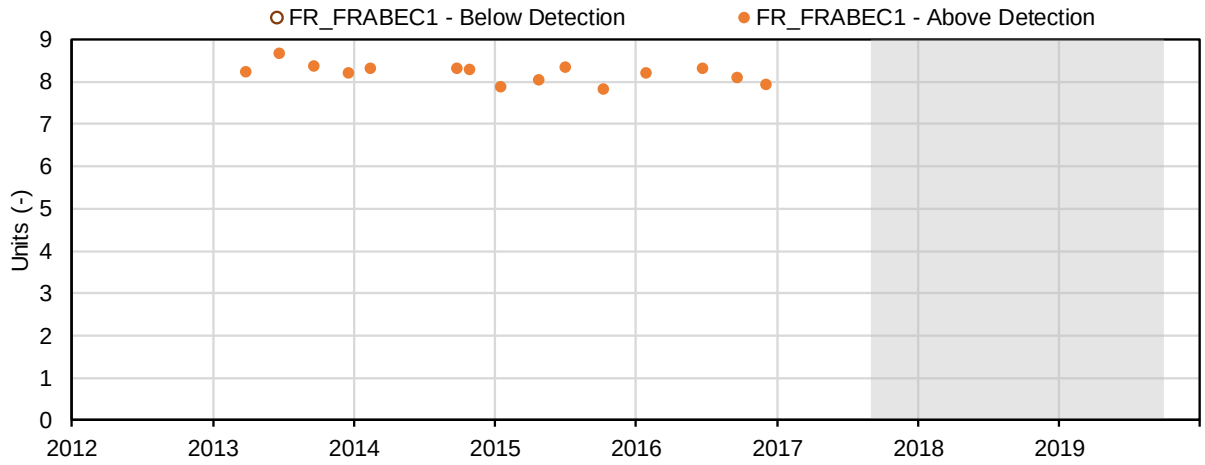

Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
ethyl mercury (µg/l
Molybdenum (mg/L
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
0.275
0.250
0.225
0.200
2013
Year

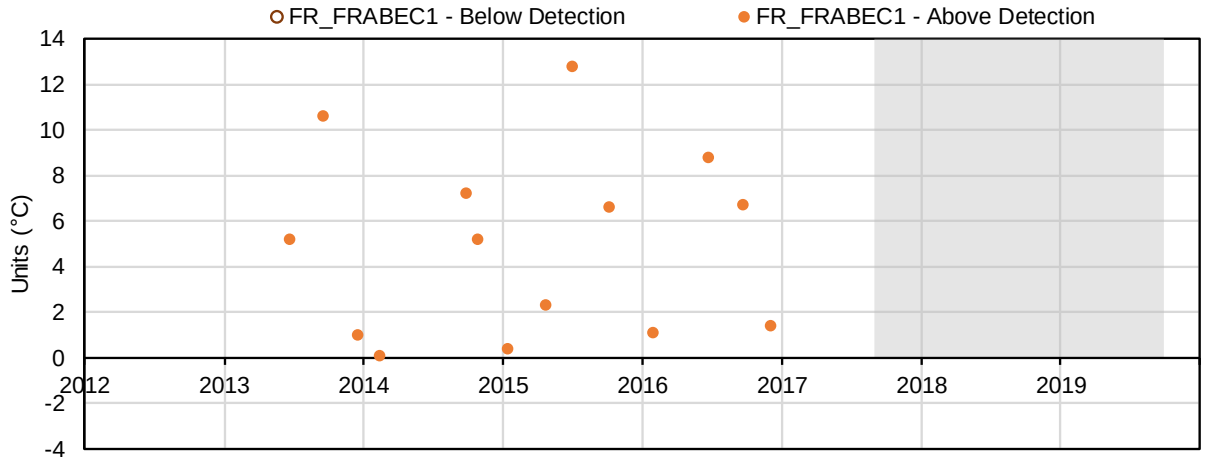
ATTACHMENT F4

FR_FRABEC1 Plots

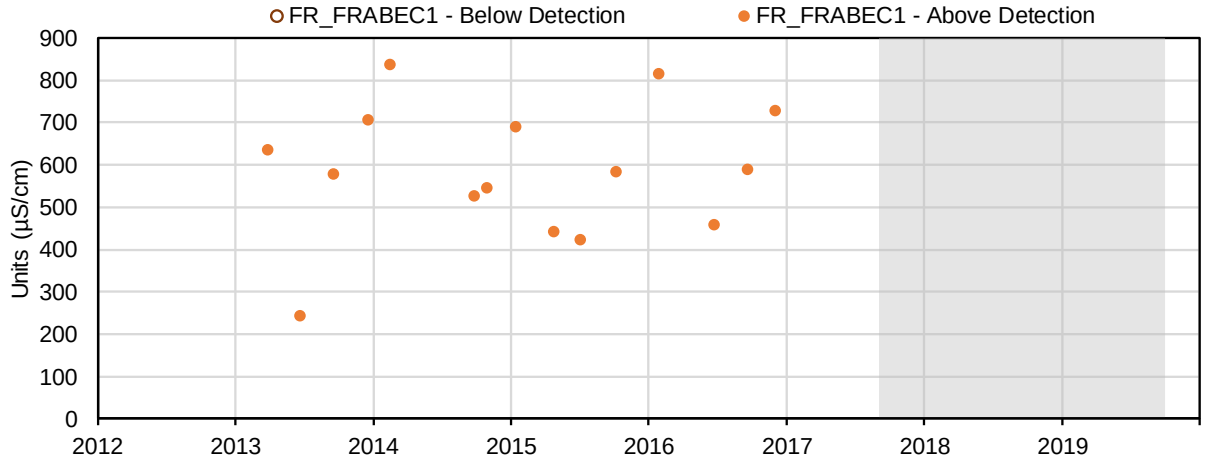
(1) pH (-); Field Measured



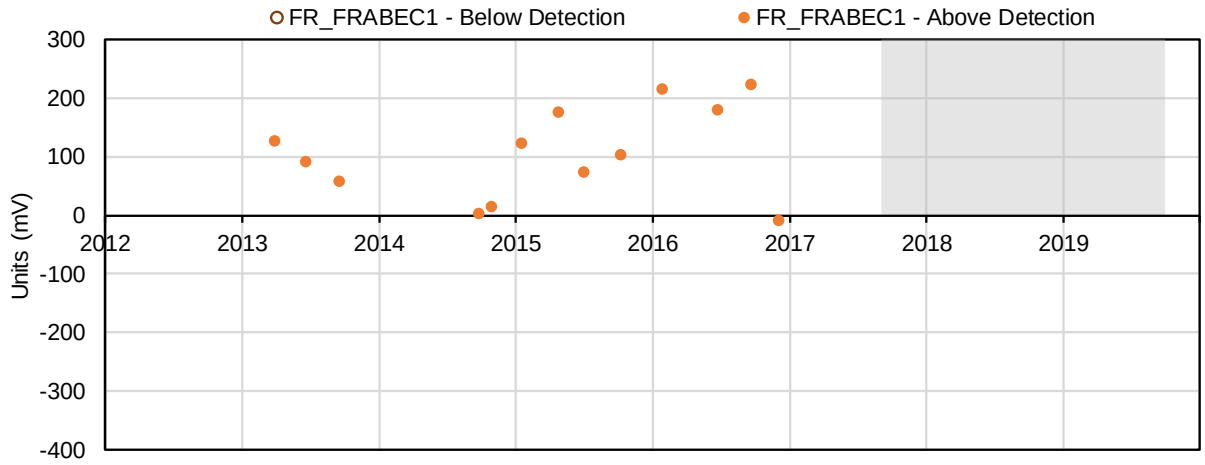
(2) Temperature (°C); Field Measured



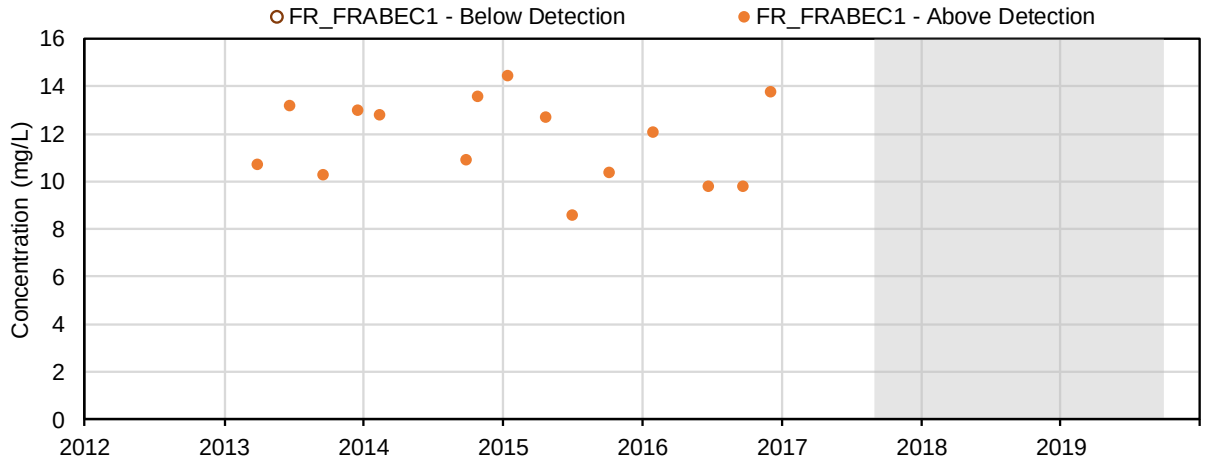
(3) Conductivity (µS/cm); Field Measured



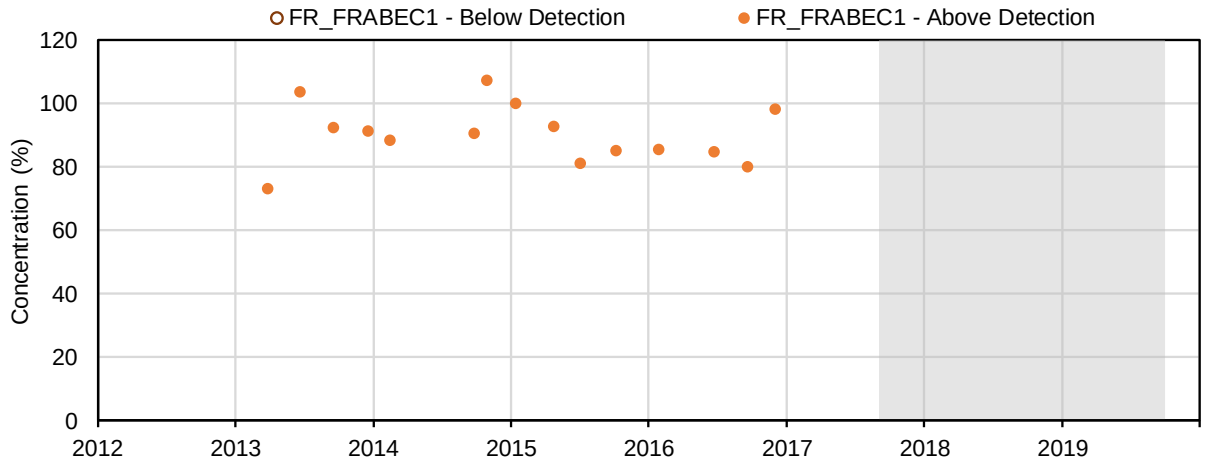
(4) Oxidation-Reduction Potential (mV); Field Measured



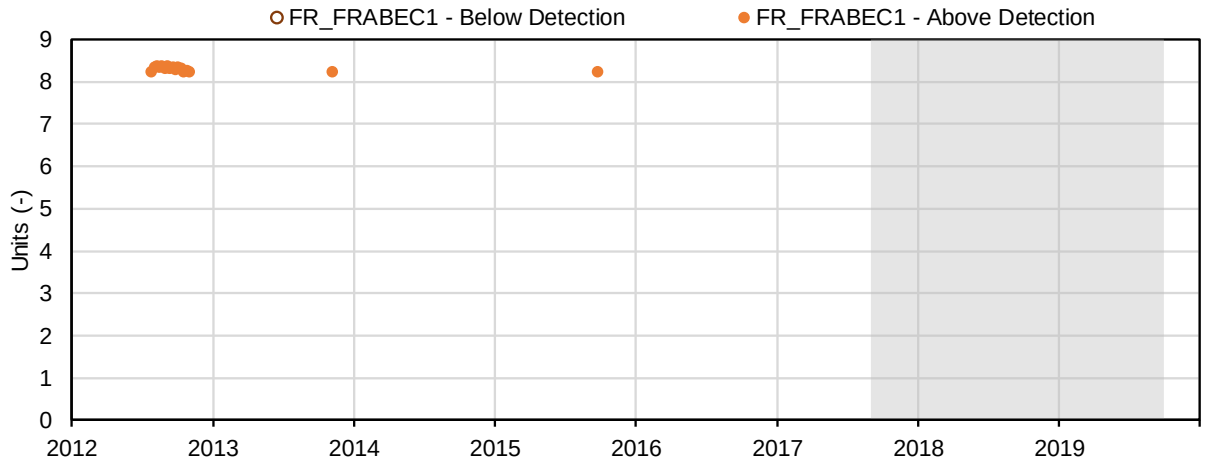
(5) Dissolved Oxygen (mg/L); Field Measured



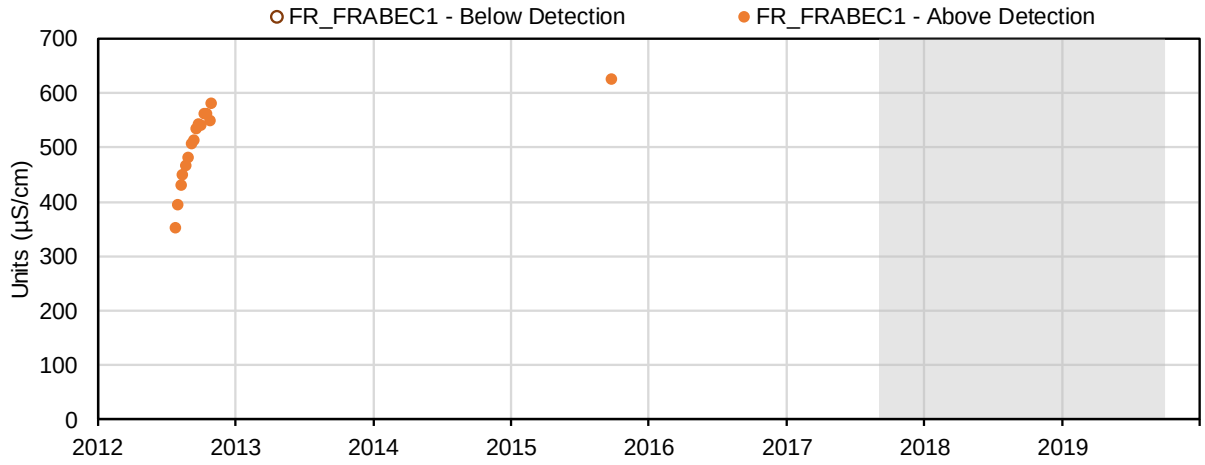
(6) Dissolved Oxygen (%); Field Measured



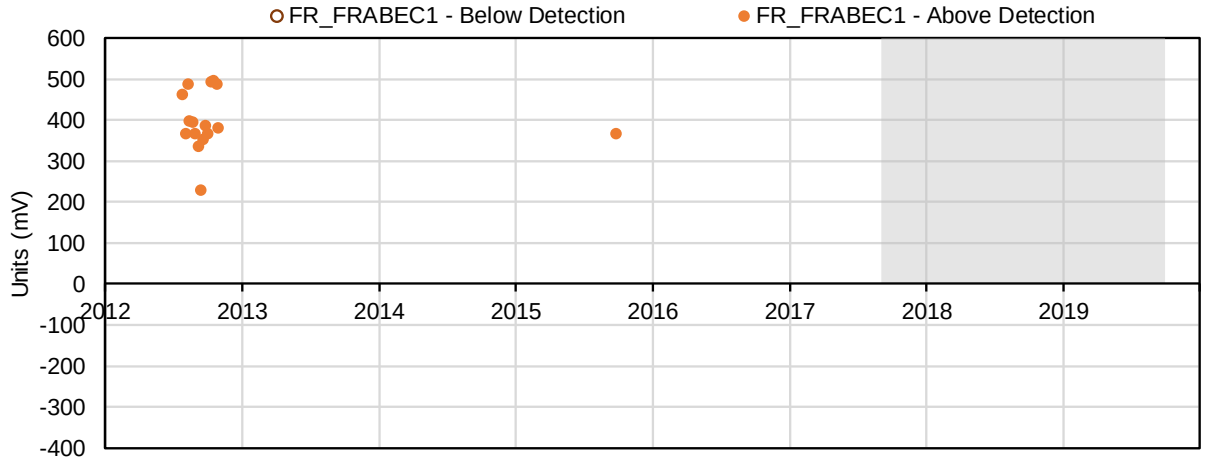
(7) pH (-); Conventional Parameters



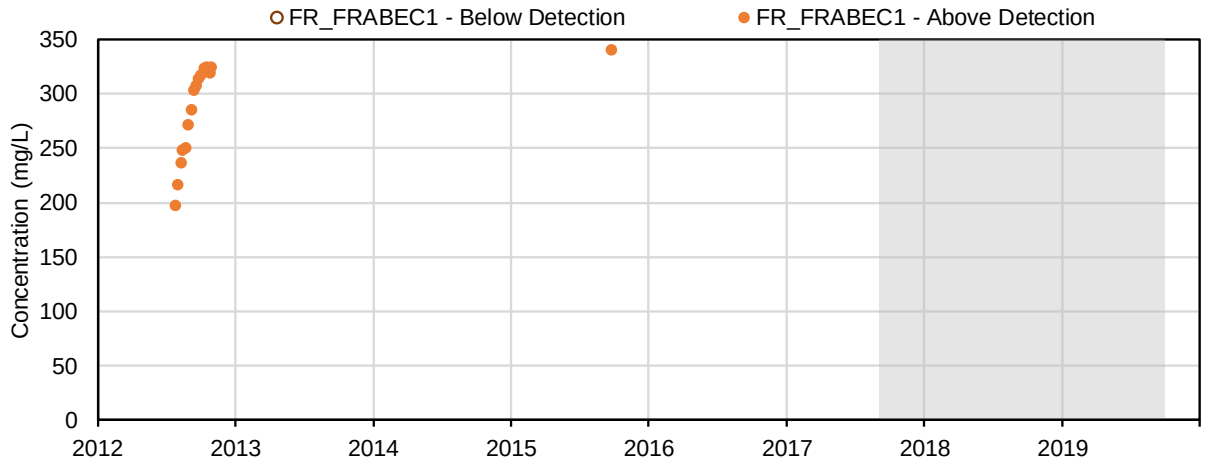
(8) Conductivity (µS/cm); Conventional Parameters



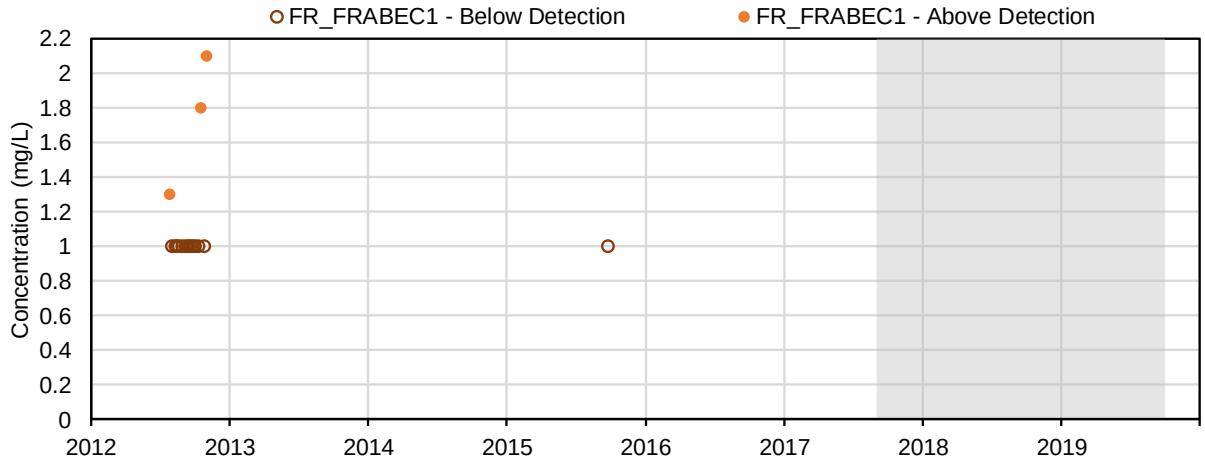
(9) Oxidation-Reduction Potential (mV); Conventional Parameters



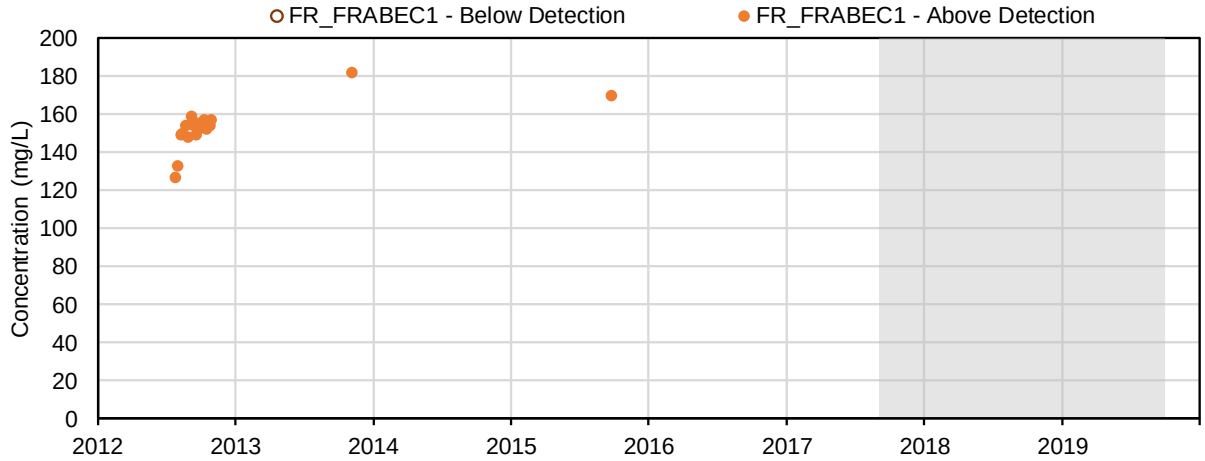
(10) Hardness, as CaCO3 (mg/L); Conventional Parameters



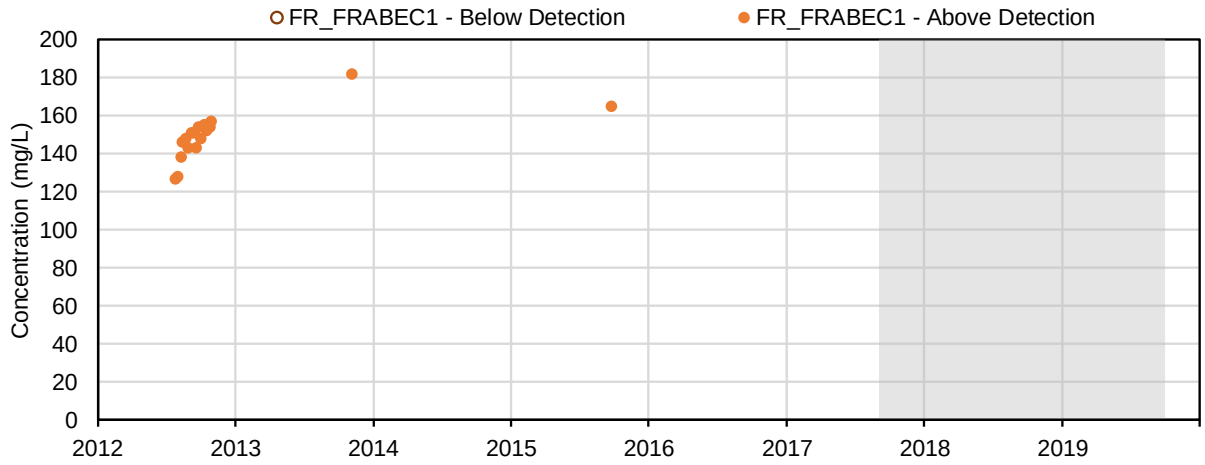
(11) Acidity, CaCO3 (mg/L); Conventional Parameters



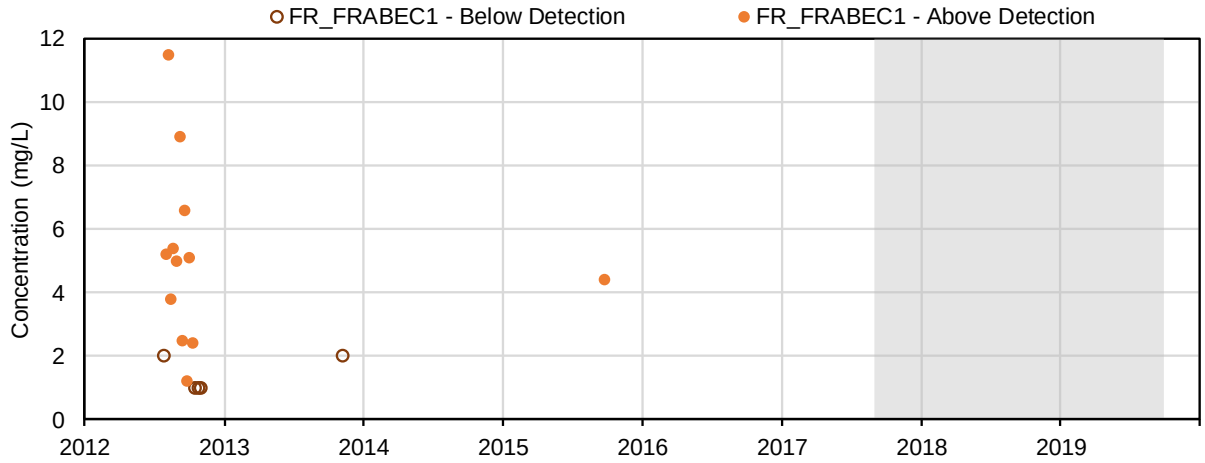
(12) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



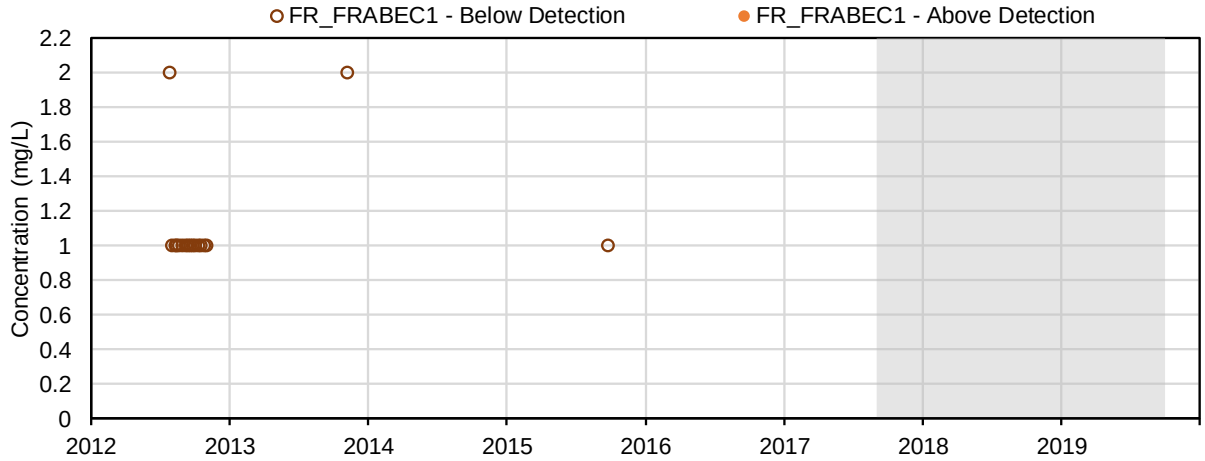
(13) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



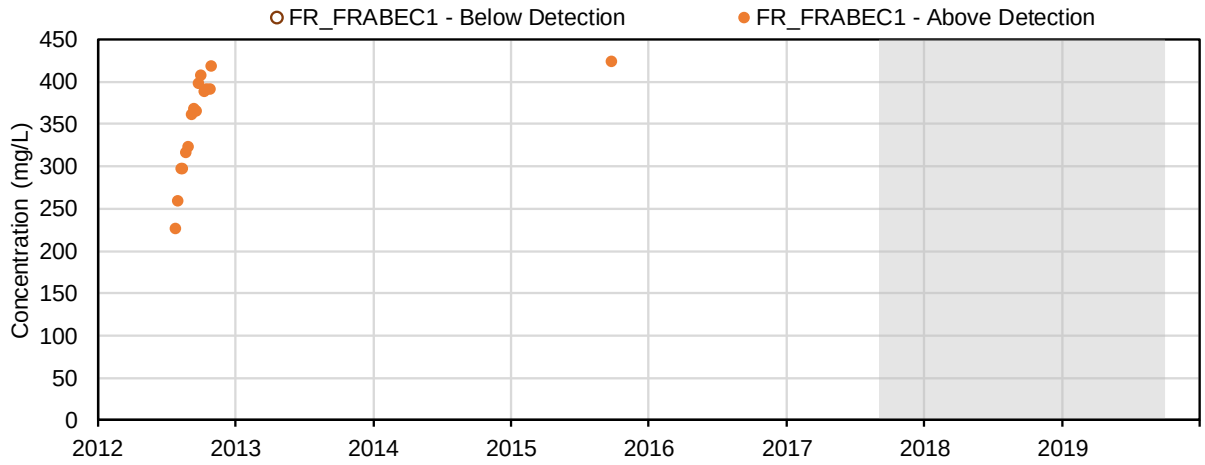
(14) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



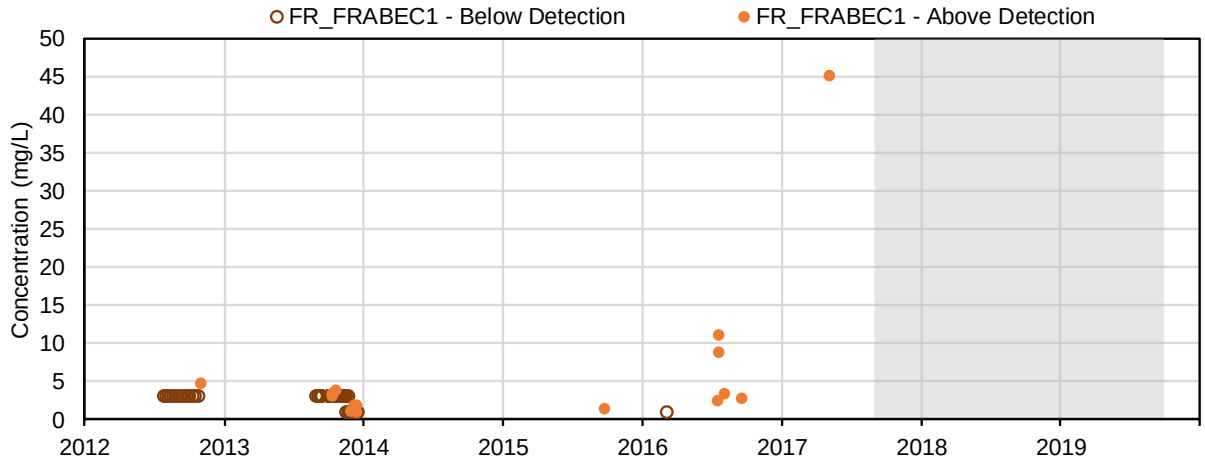
(15) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



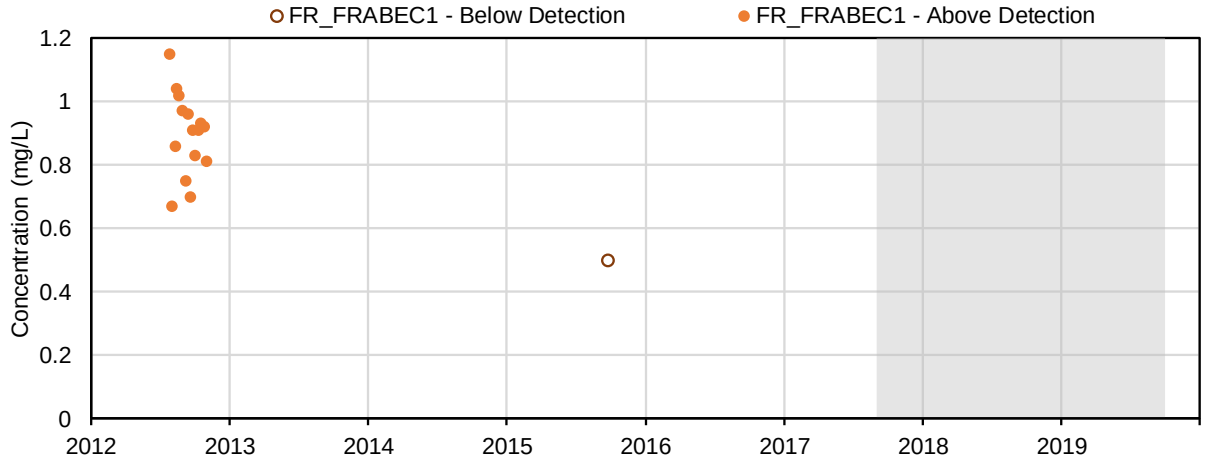
(16) Total dissolved solids (mg/L); Conventional Parameters



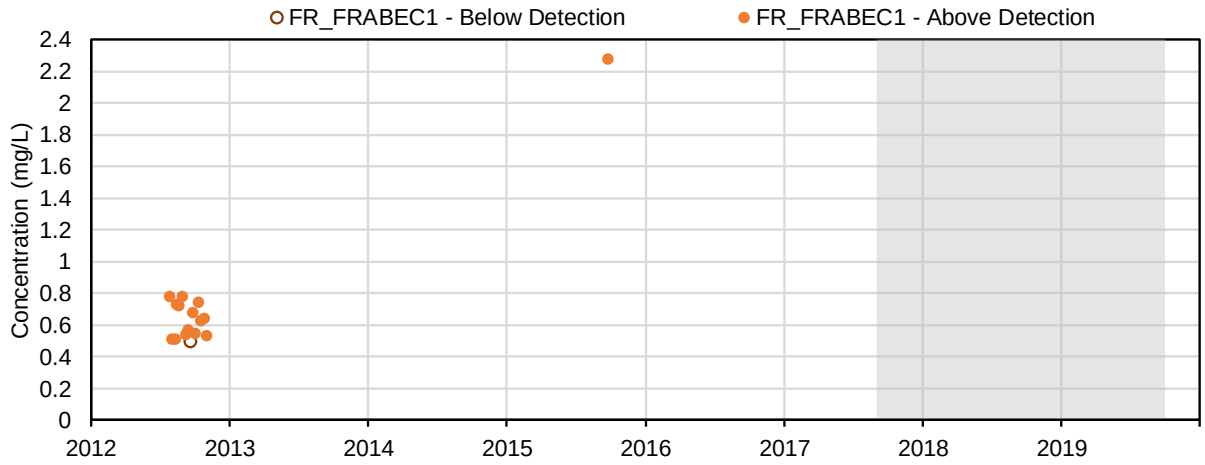
(17) Total suspended solids (mg/L); Conventional Parameters



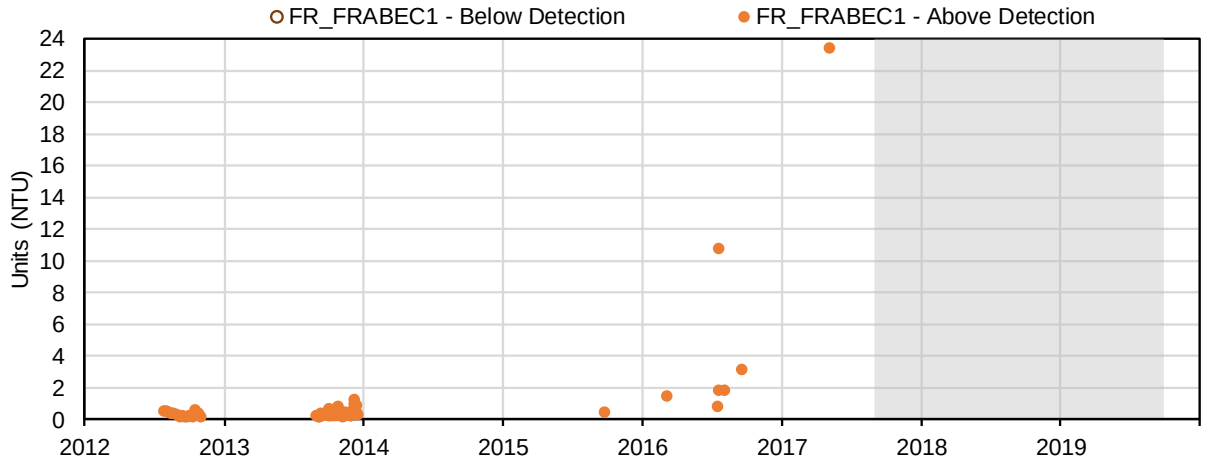
(18) Total organic carbon (mg/L); Conventional Parameters



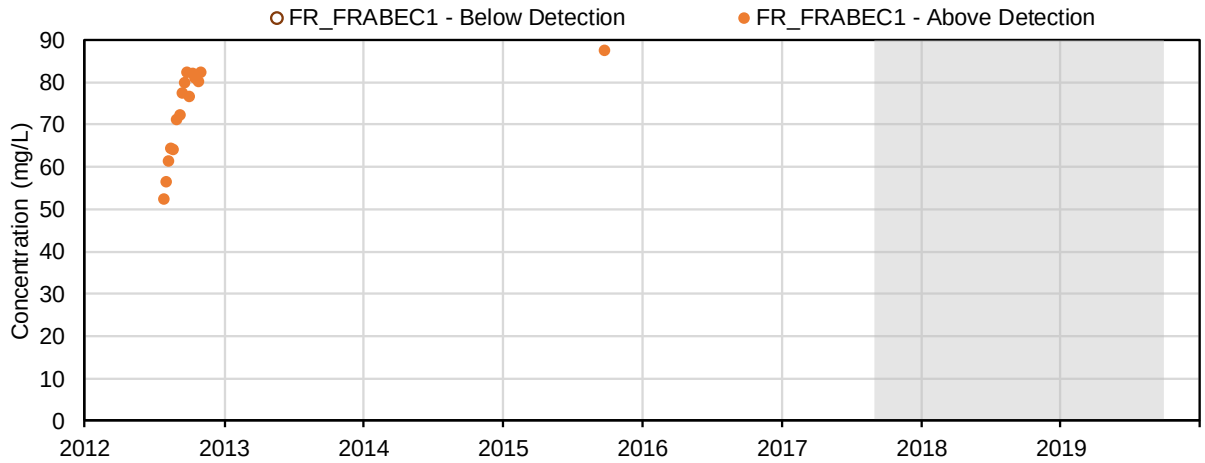
(19) Dissolved organic carbon (mg/L); Conventional Parameters



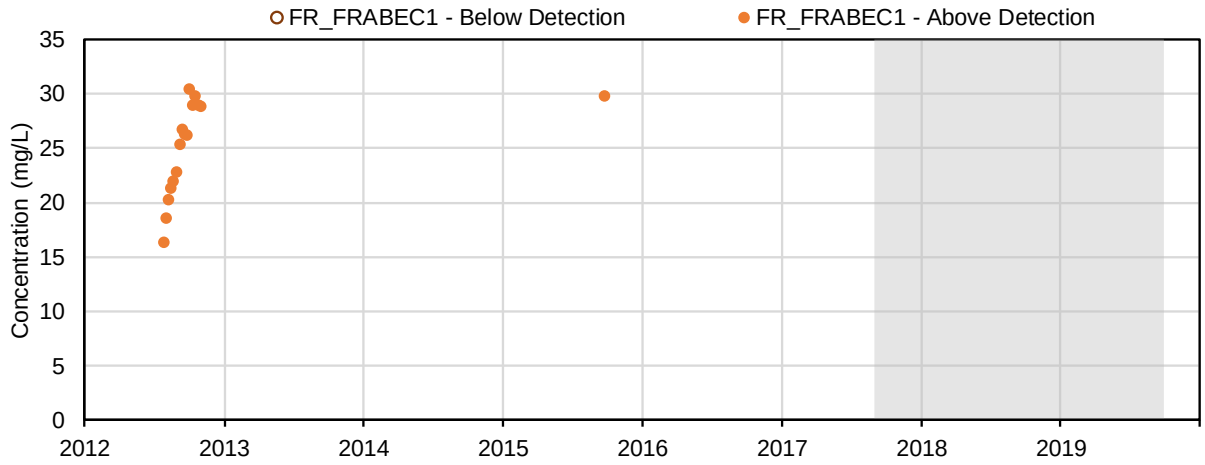
(20) Turbidity (NTU); Conventional Parameters



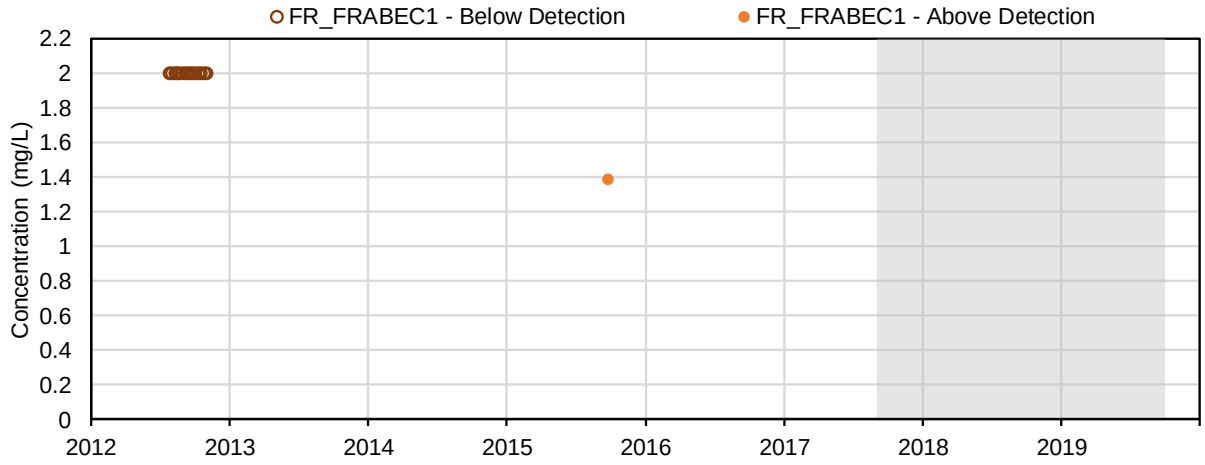
(21) Calcium (mg/L); Major Ions



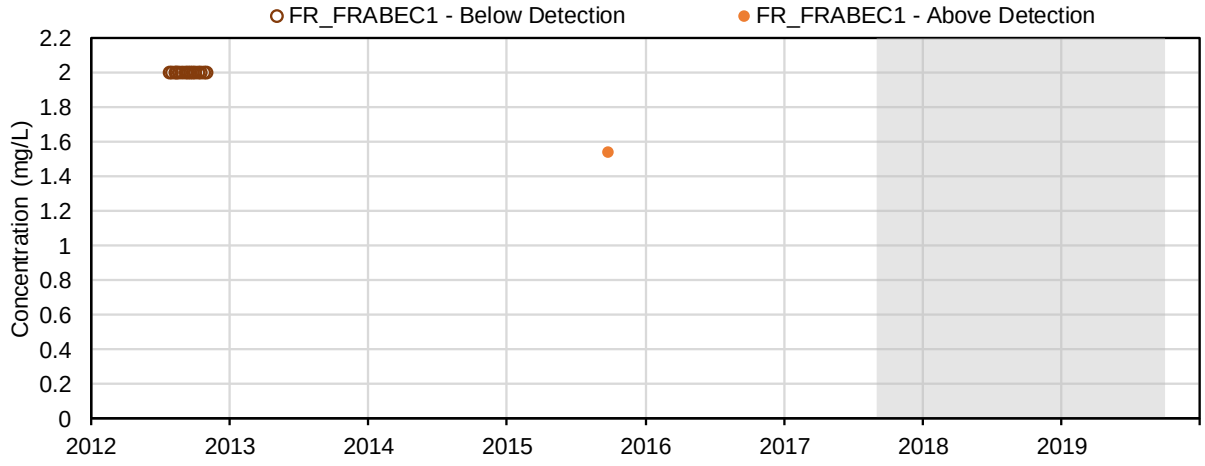
(22) Magnesium (mg/L); Major Ions



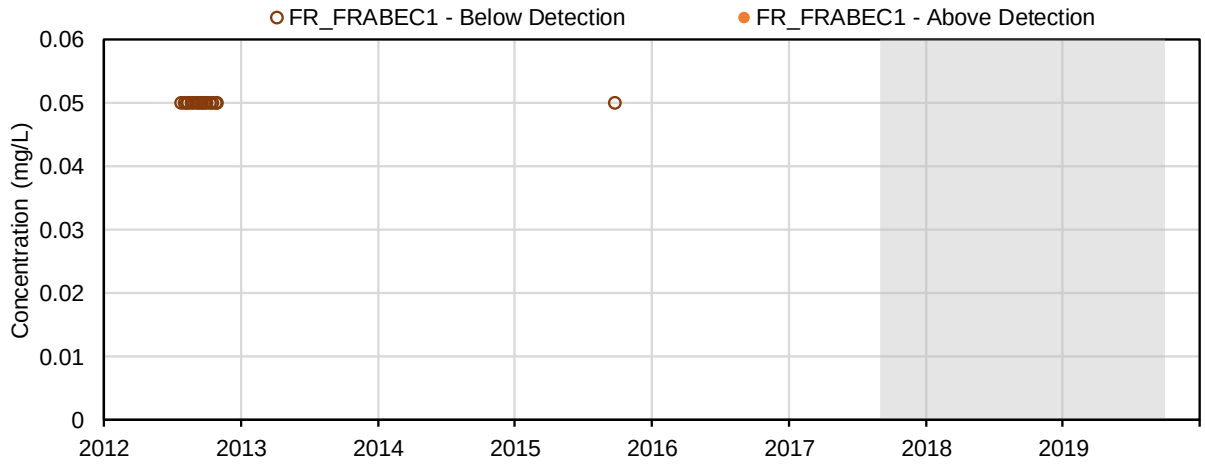
(23) Potassium (mg/L); Major Ions



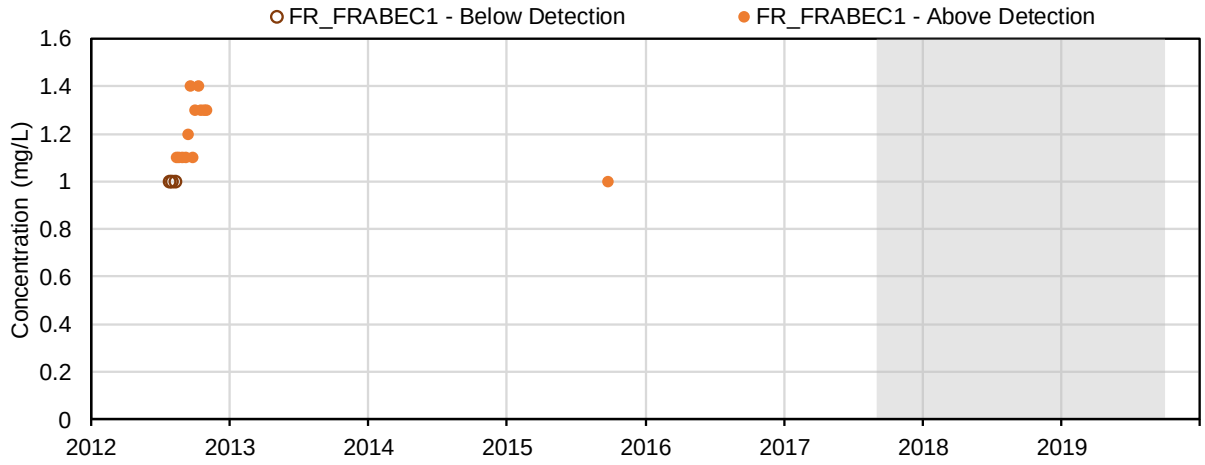
(24) Sodium (mg/L); Major Ions



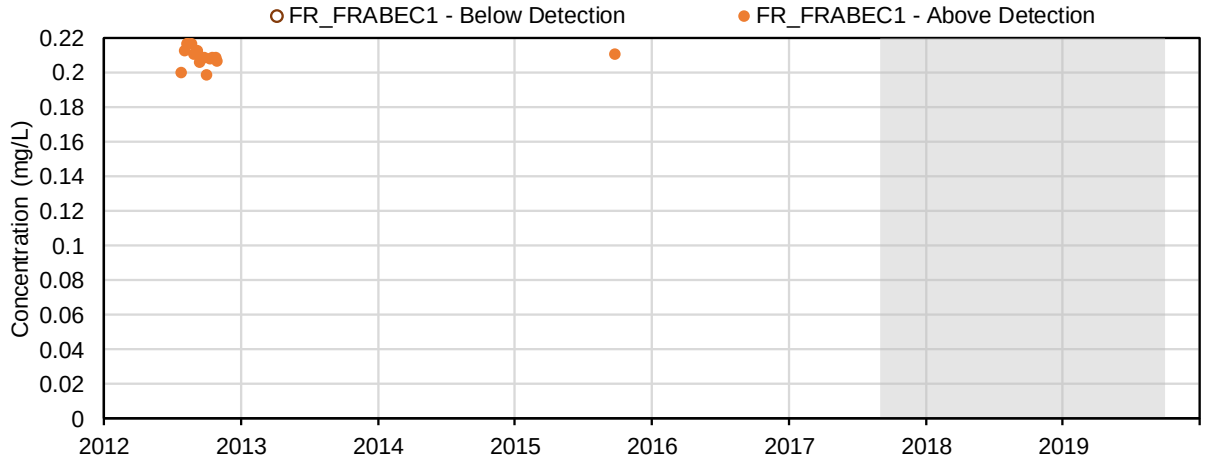
(25) Bromide (mg/L); Major Ions



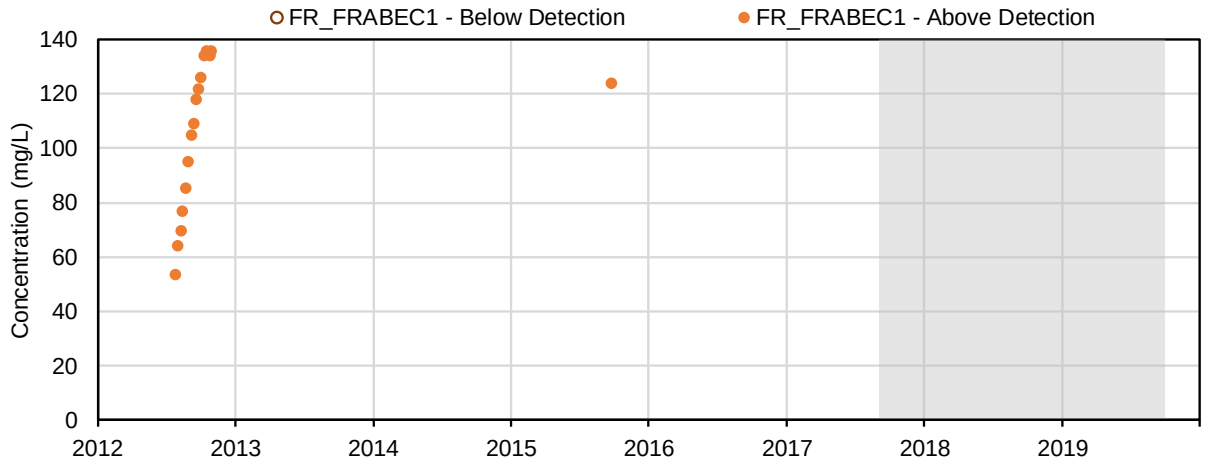
(26) Chloride (mg/L); Major Ions



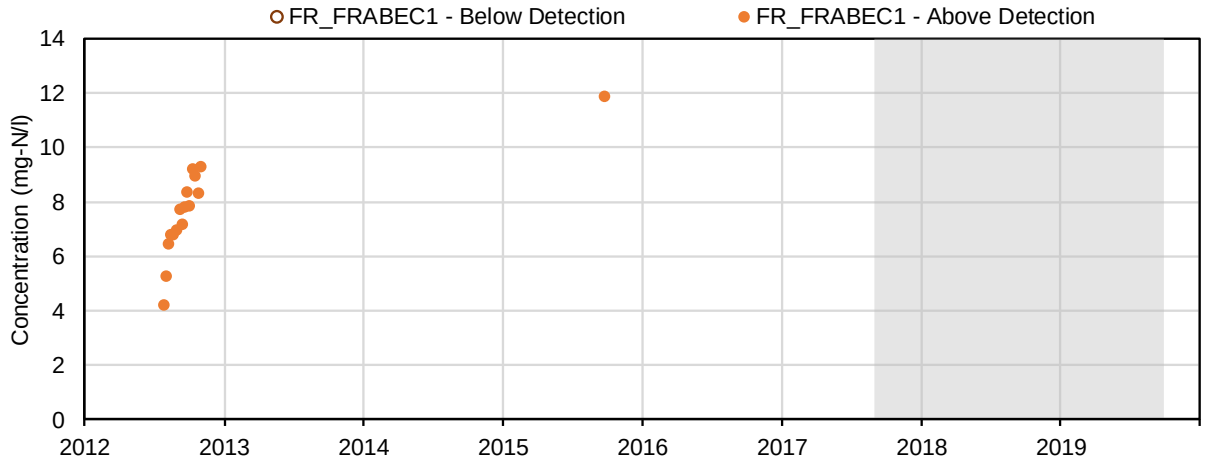
(27) Fluoride (mg/L); Major Ions



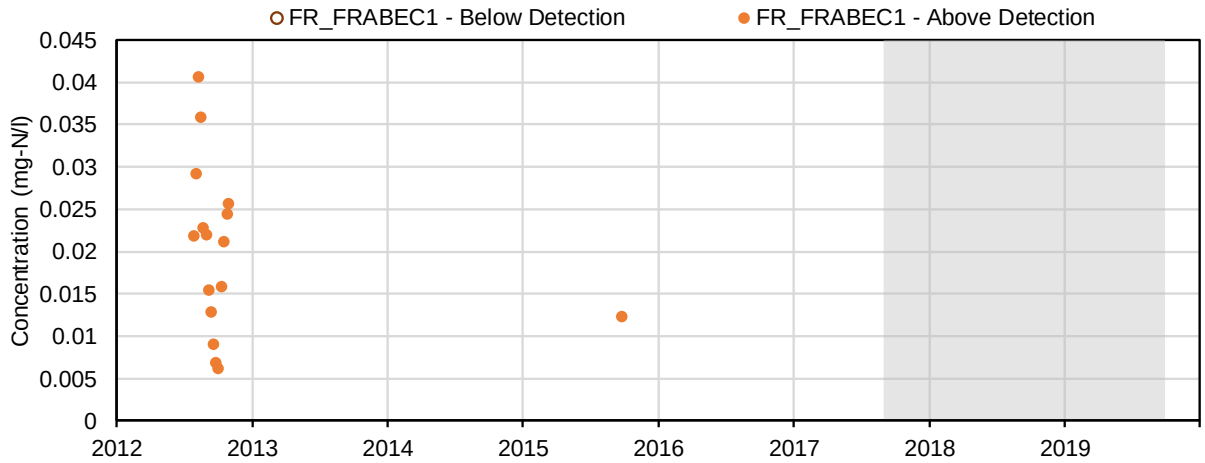
(28) Sulphate (mg/L); Major Ions



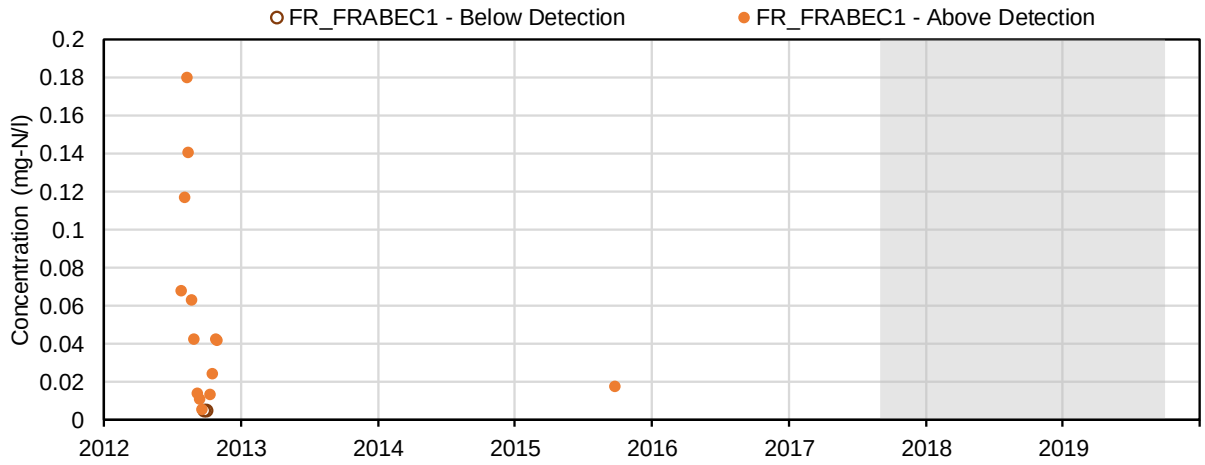
(29) Nitrate (mg-N/l); Nutrients and Biological Indicators



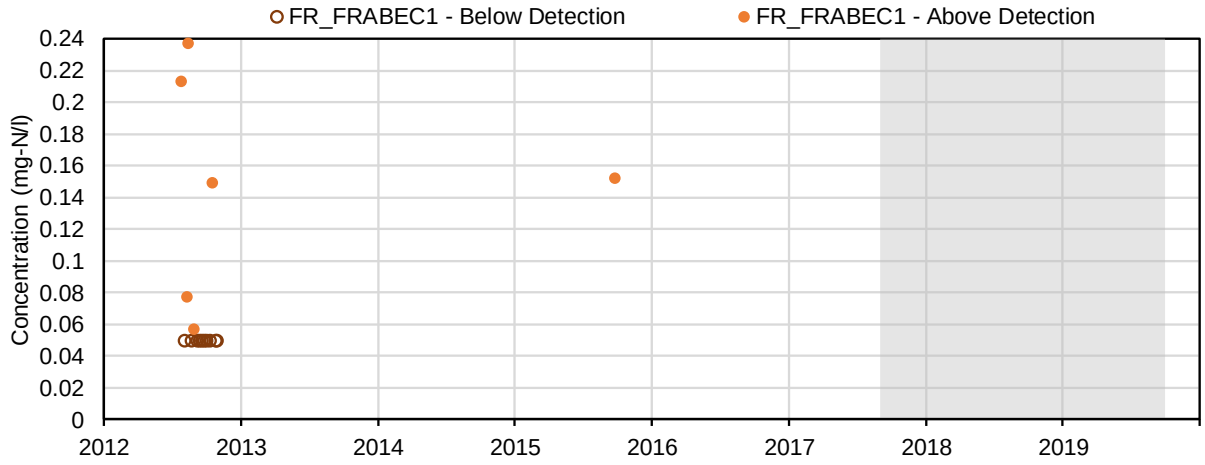
(30) Nitrite (mg-N/l); Nutrients and Biological Indicators



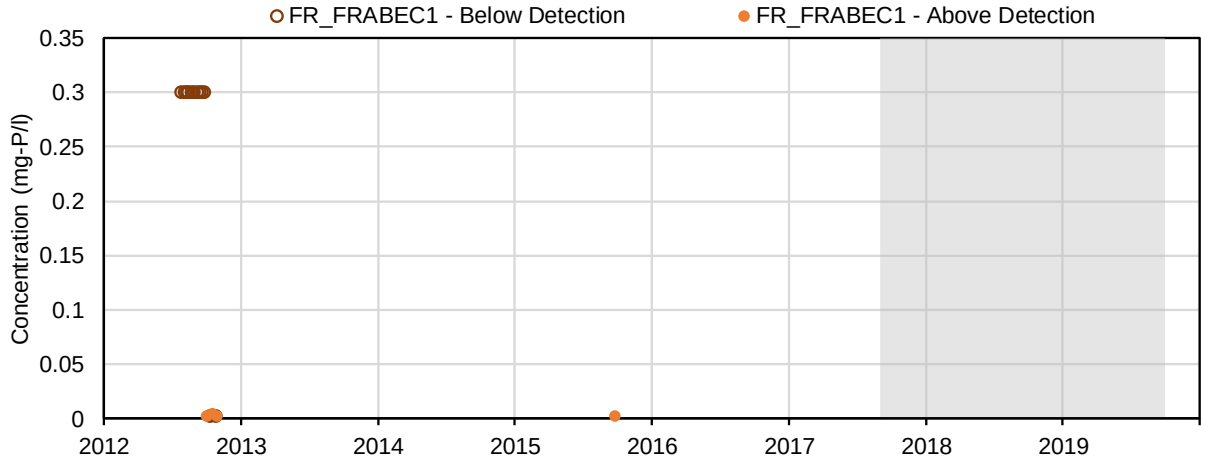
(31) Total ammonia (mg-N/l); Nutrients and Biological Indicators



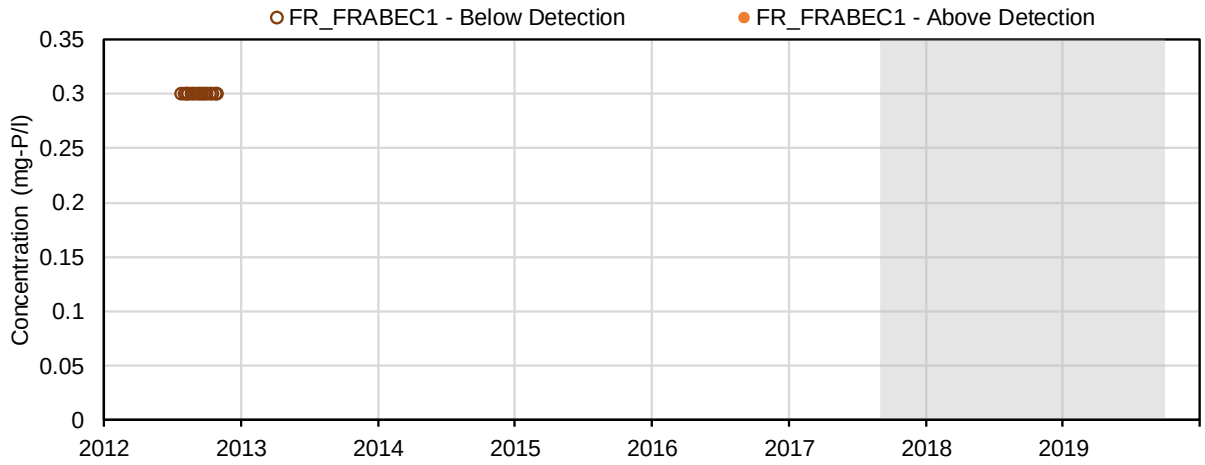
(32) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



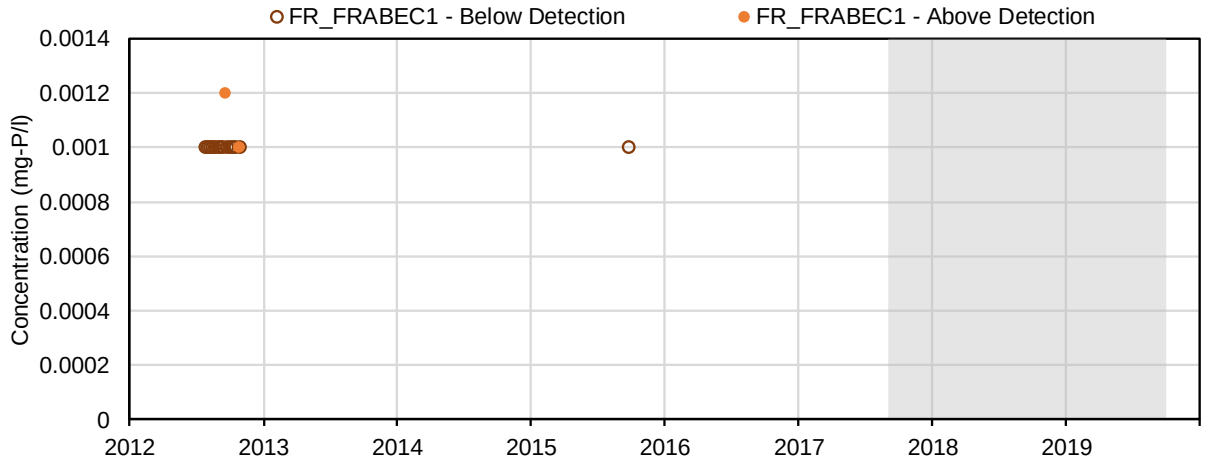
(33) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



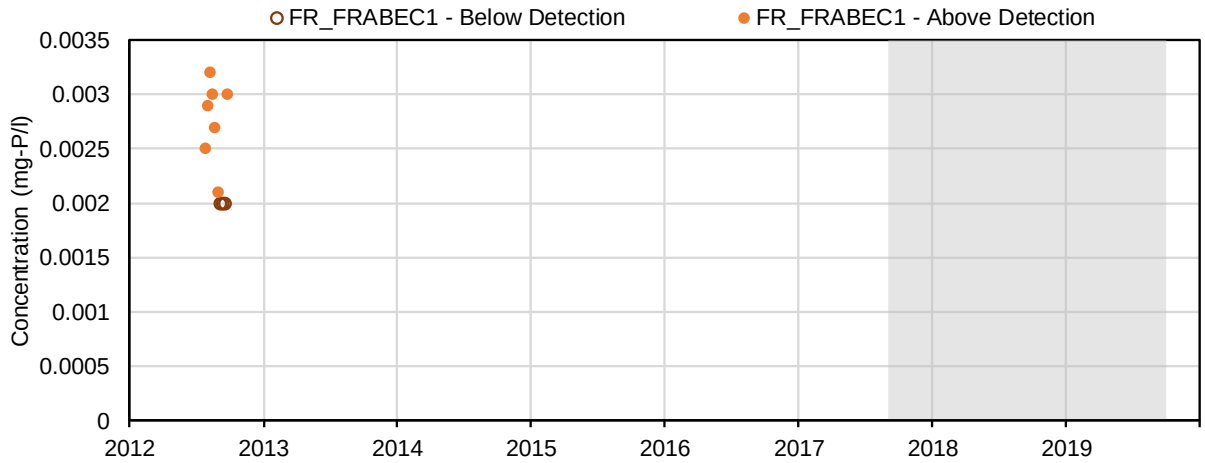
(34) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



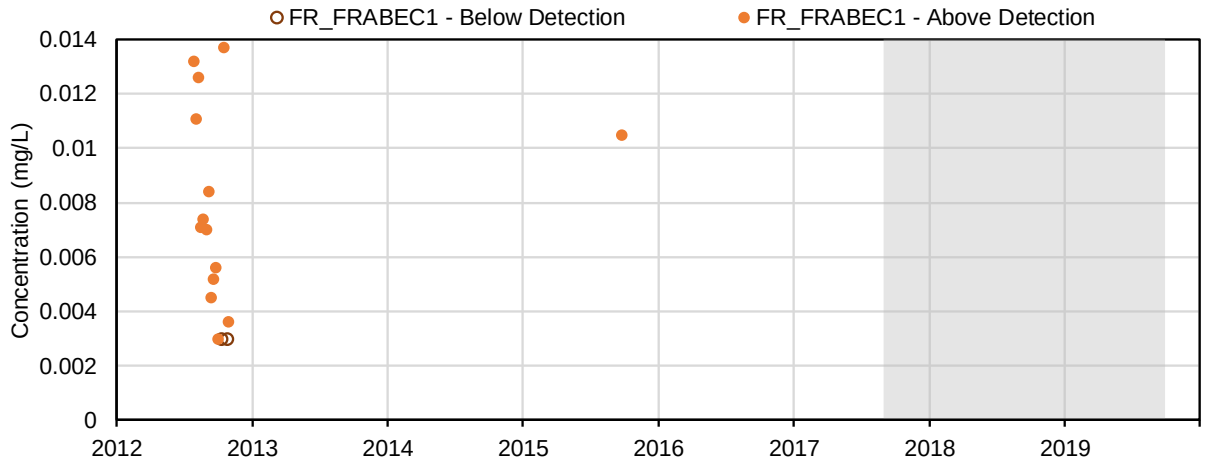
(35) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



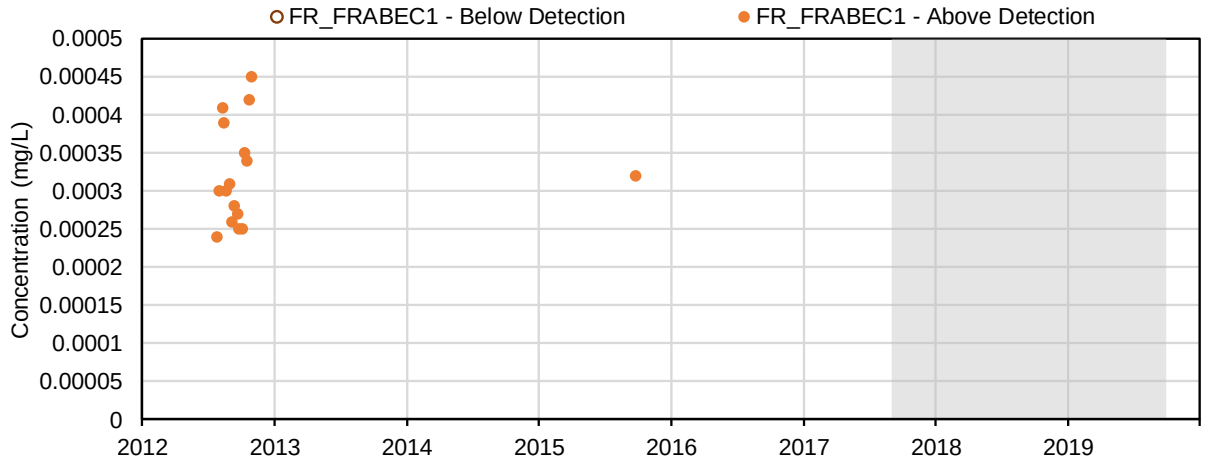
(36) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



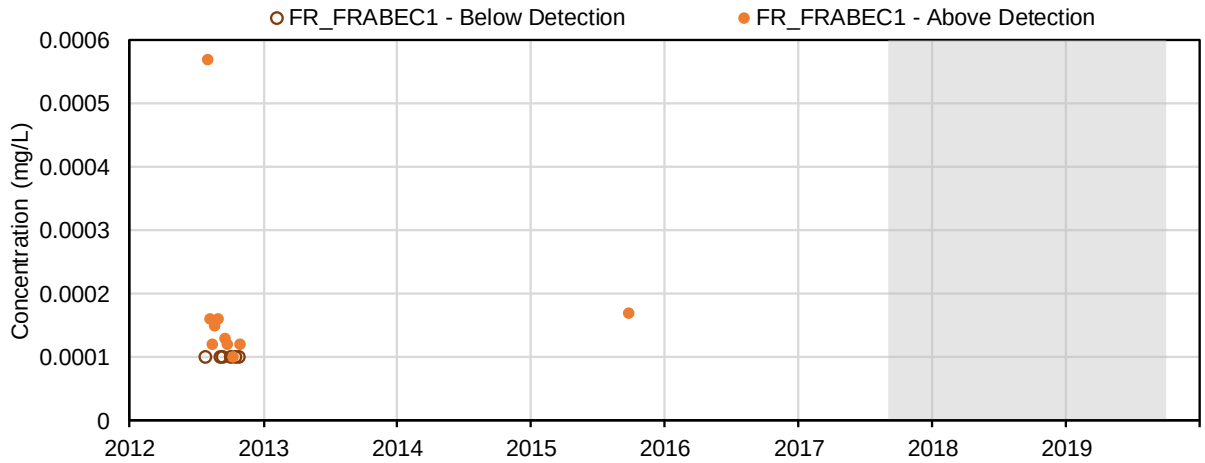
(37) Aluminum (mg/L); Total Metals



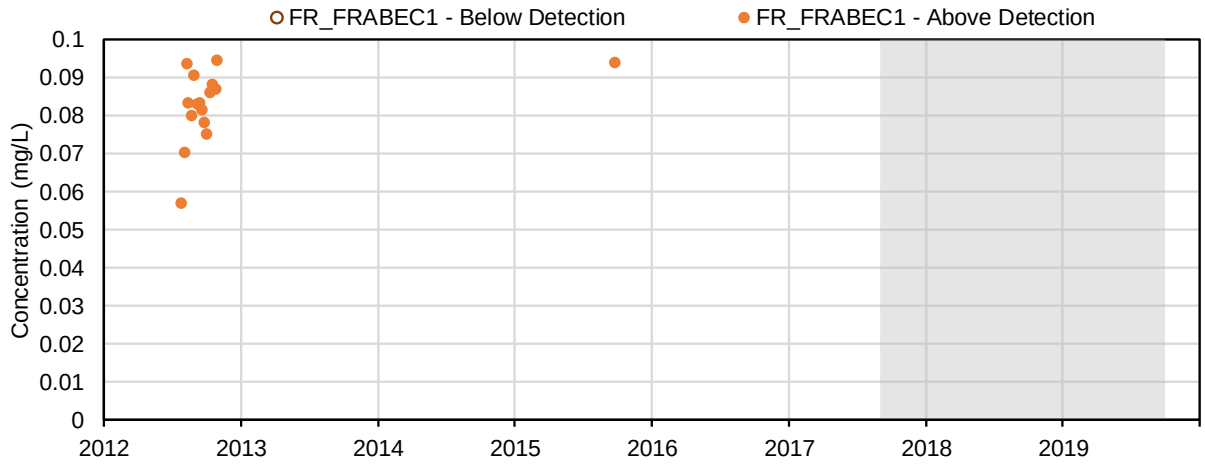
(38) Antimony (mg/L); Total Metals



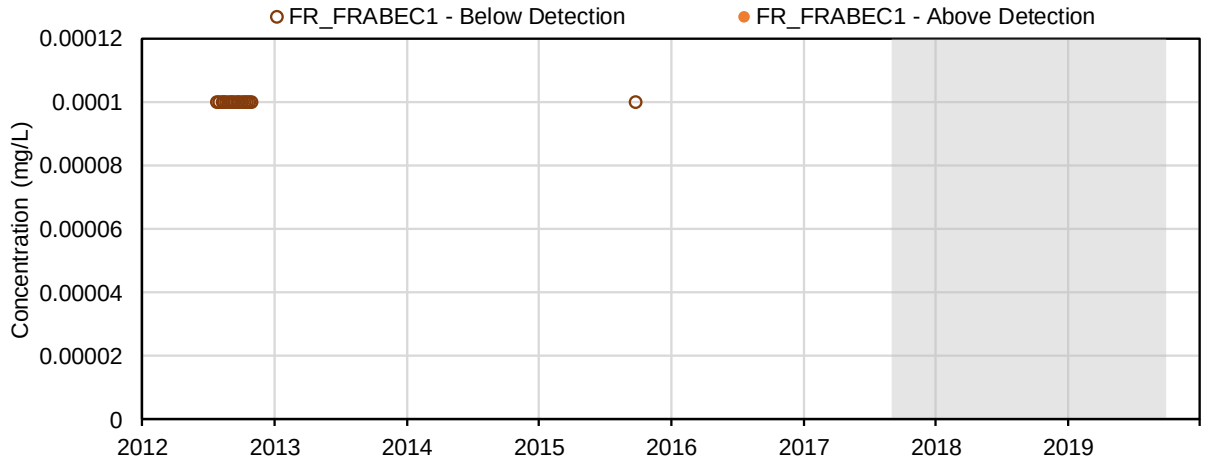
(39) Arsenic (mg/L); Total Metals



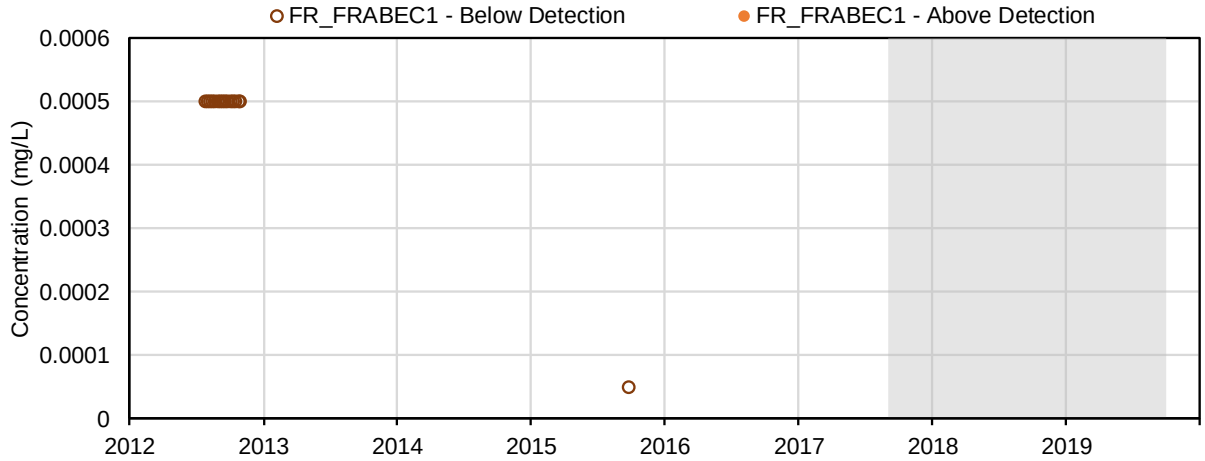
(40) Barium (mg/L); Total Metals



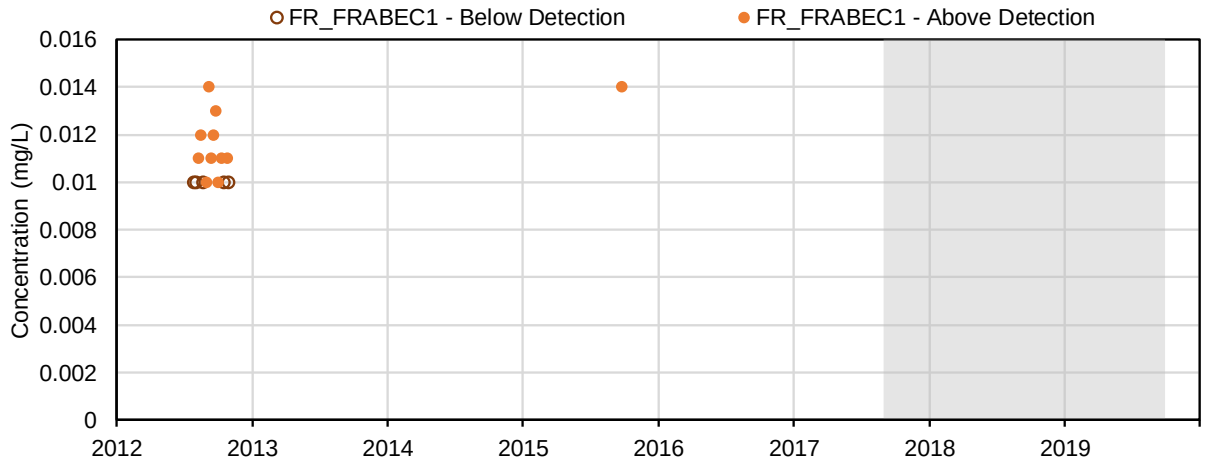
(41) Beryllium (mg/L); Total Metals



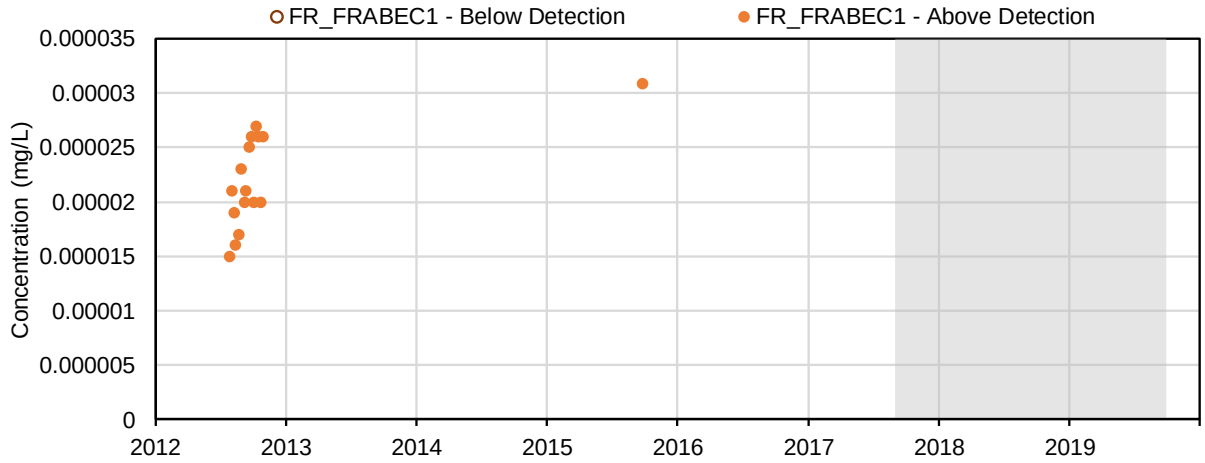
(42) Bismuth (mg/L); Total Metals



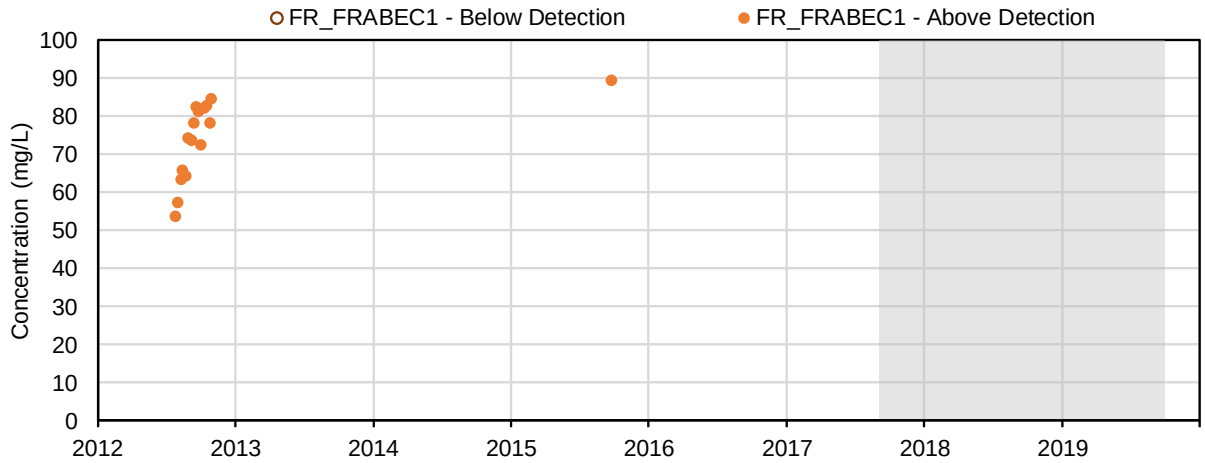
(43) Boron (mg/L); Total Metals



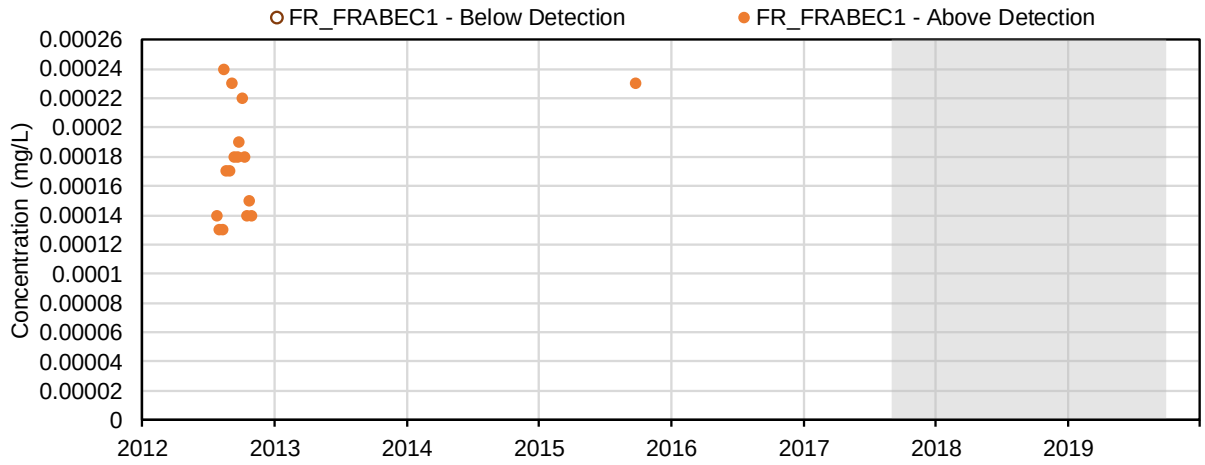
(44) Cadmium (mg/L); Total Metals



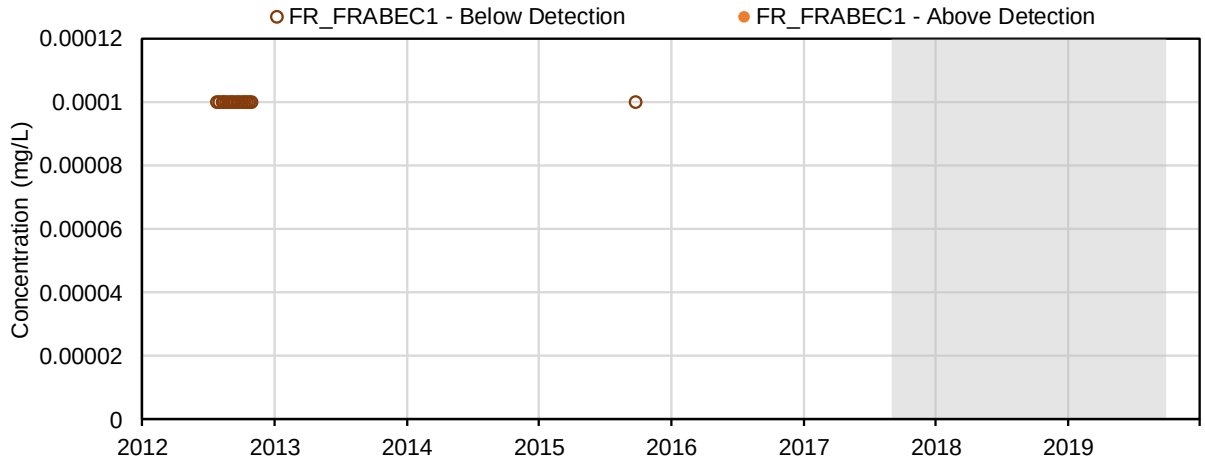
(45) Calcium (mg/L); Total Metals



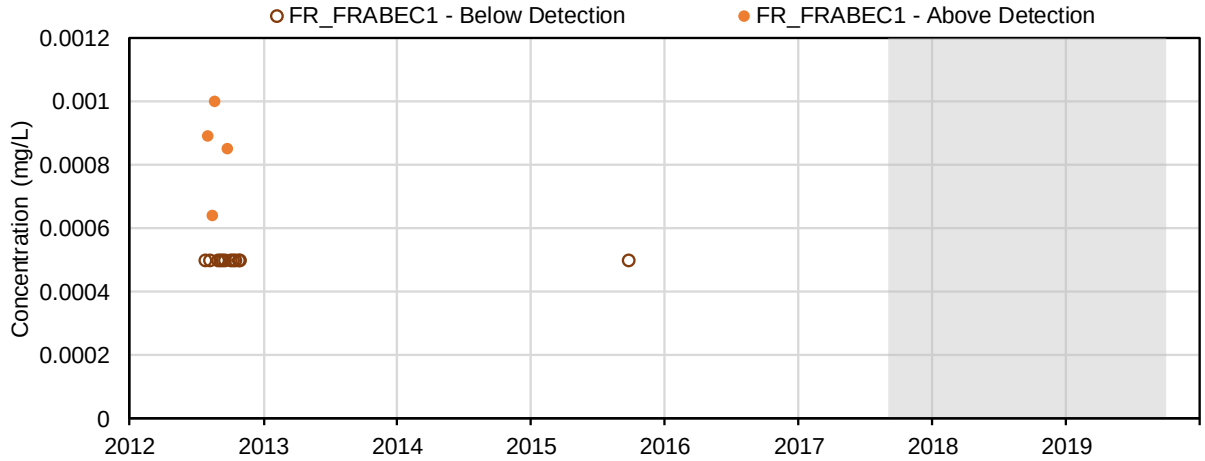
(46) Chromium (mg/L); Total Metals



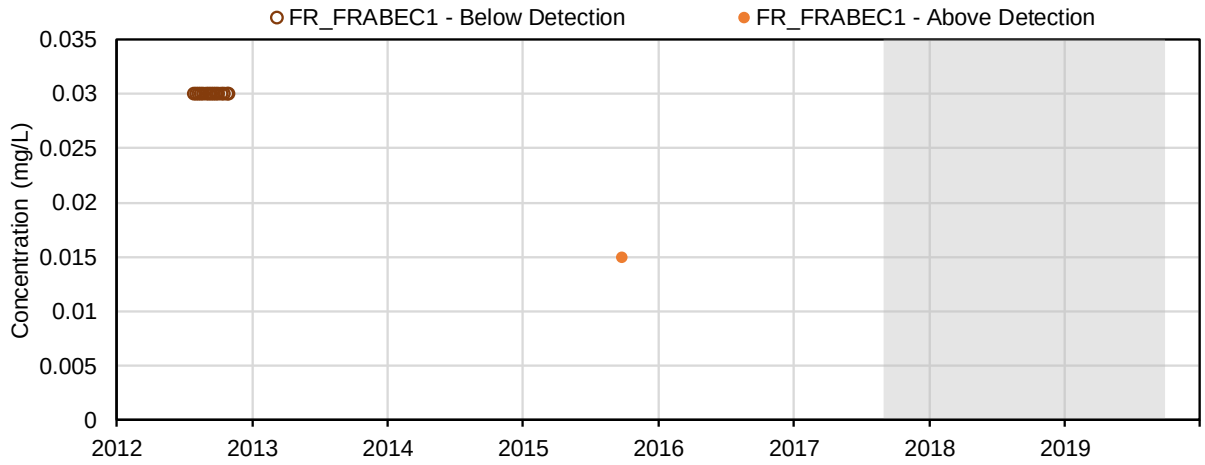
(47) Cobalt (mg/L); Total Metals



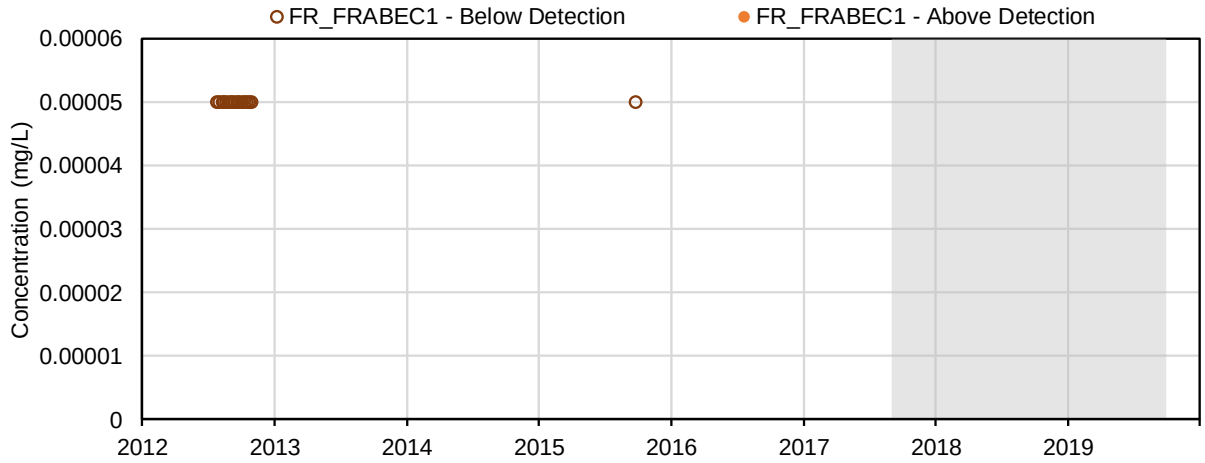
(48) Copper (mg/L); Total Metals



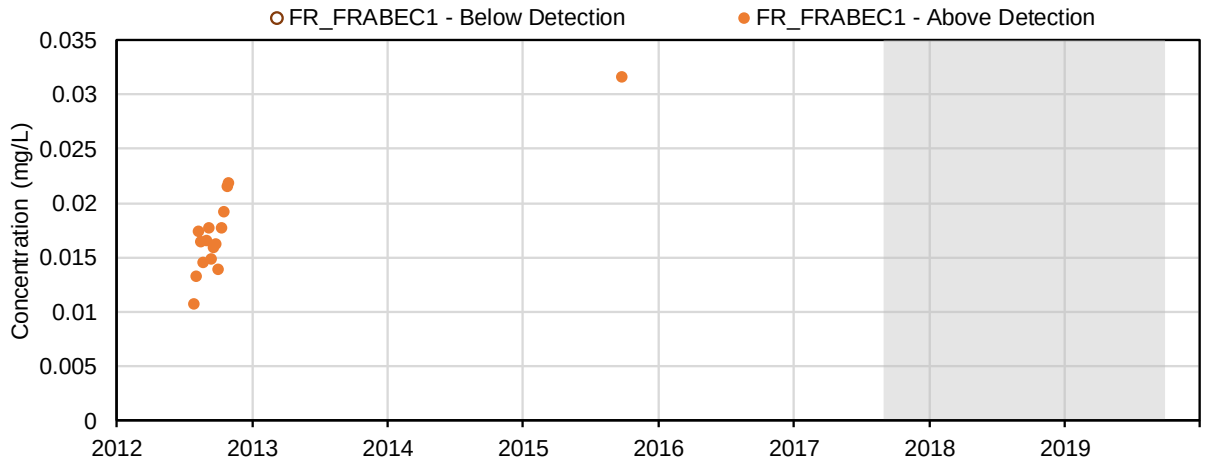
(49) Iron (mg/L); Total Metals



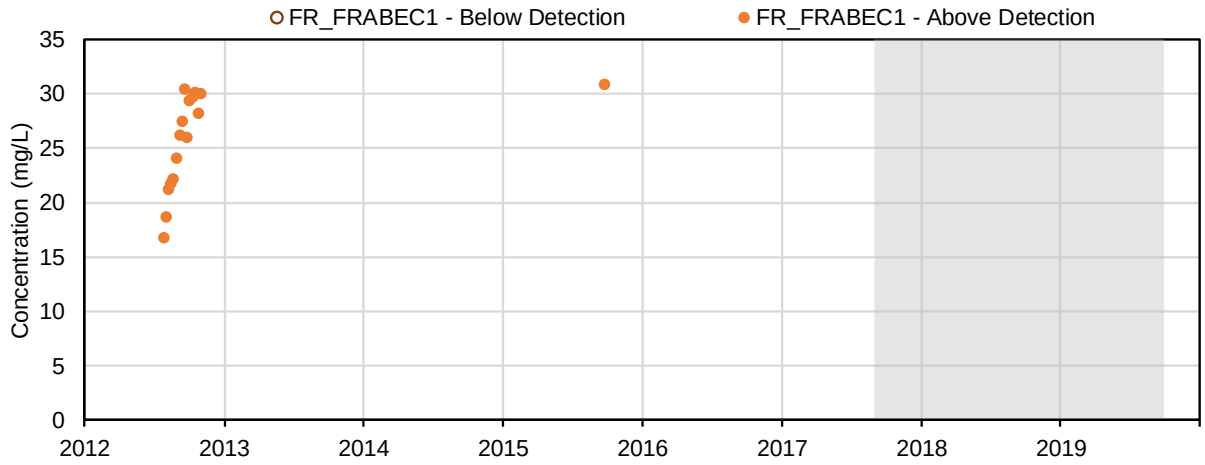
(50) Lead (mg/L); Total Metals



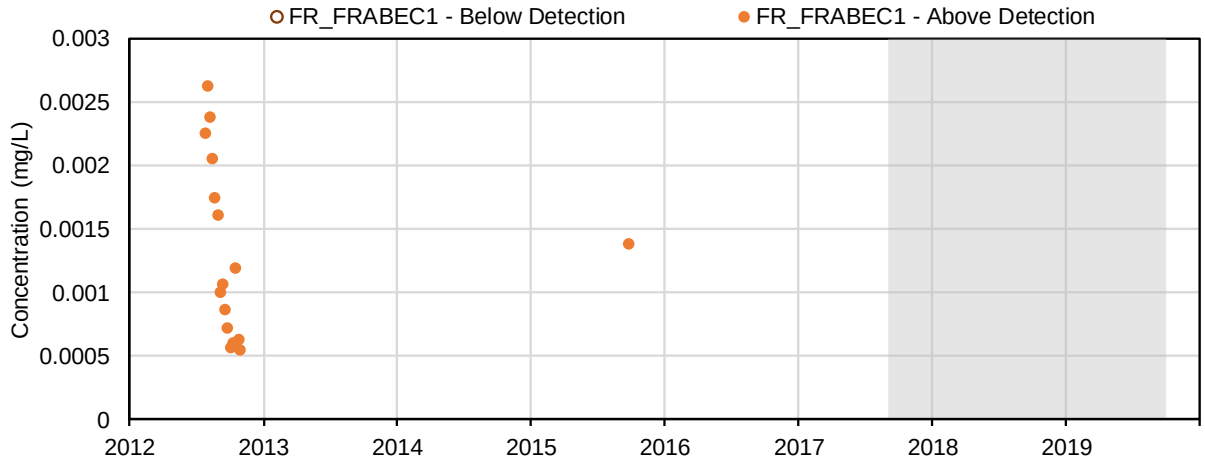
(51) Lithium (mg/L); Total Metals



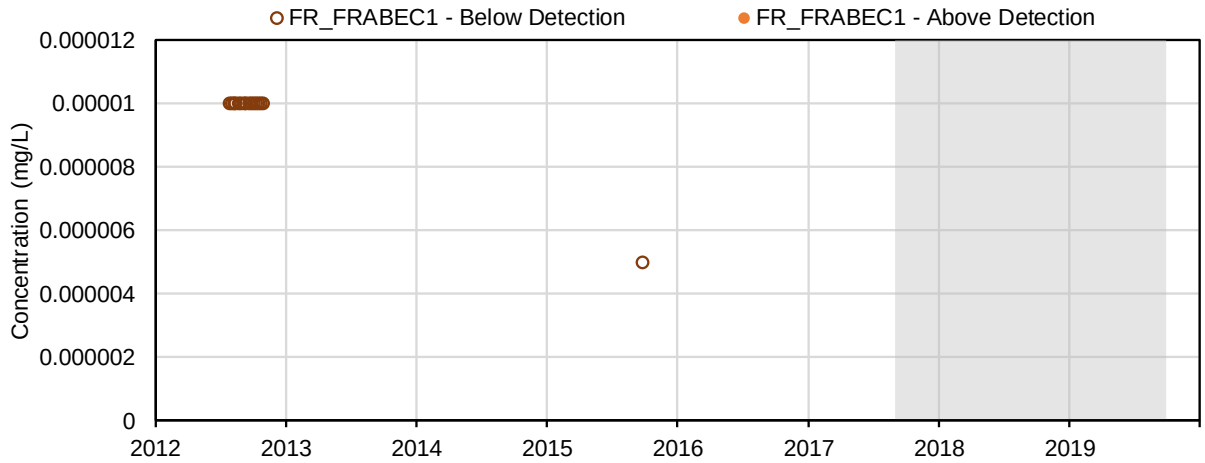
(52) Magnesium (mg/L); Total Metals



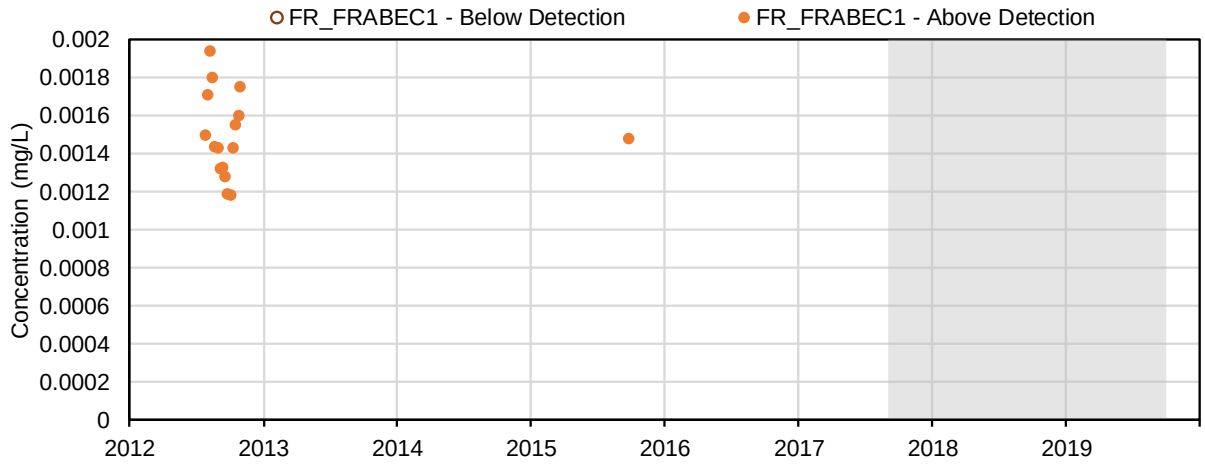
(53) Manganese (mg/L); Total Metals



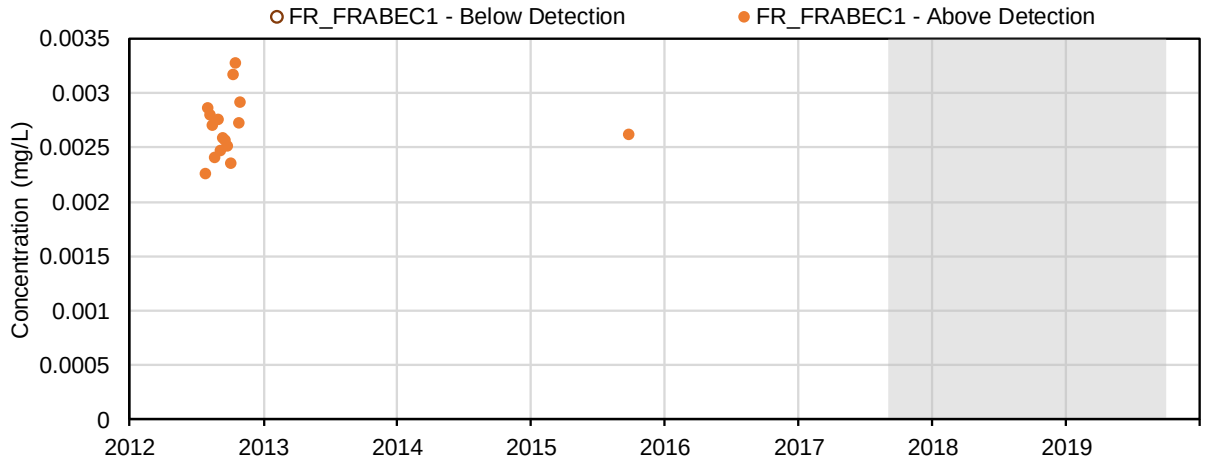
(54) Mercury (mg/L); Total Metals



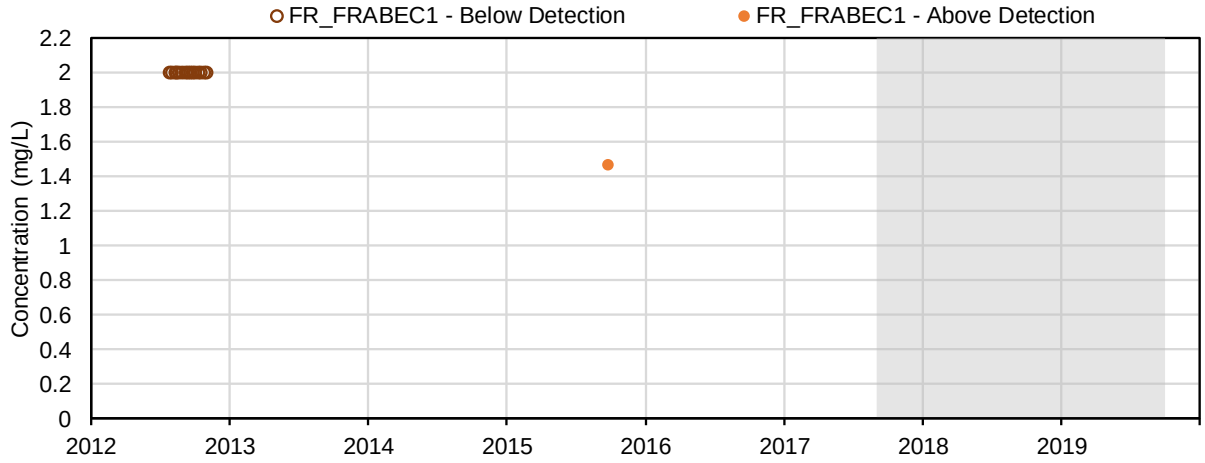
(55) Molybdenum (mg/L); Total Metals



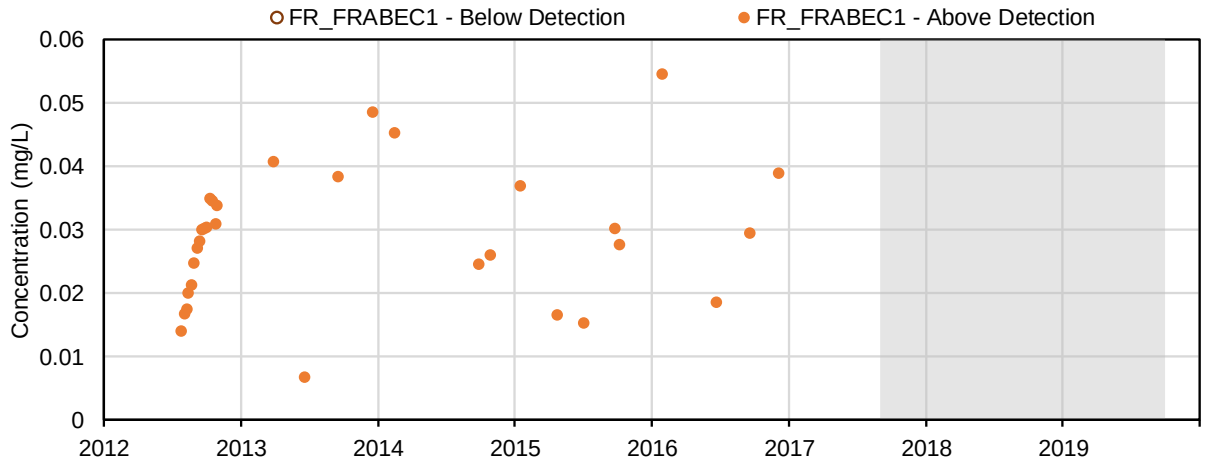
(56) Nickel (mg/L); Total Metals



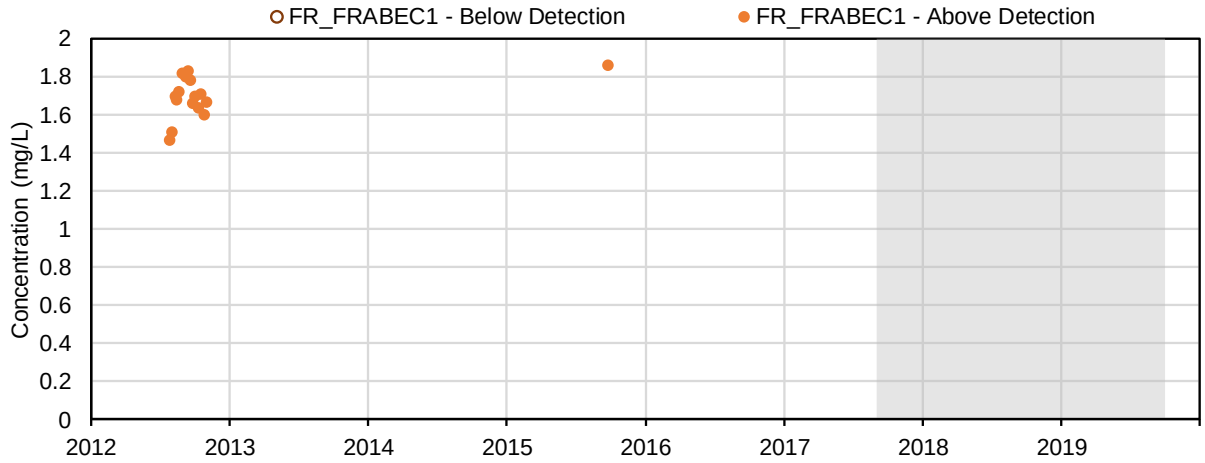
(57) Potassium (mg/L); Total Metals



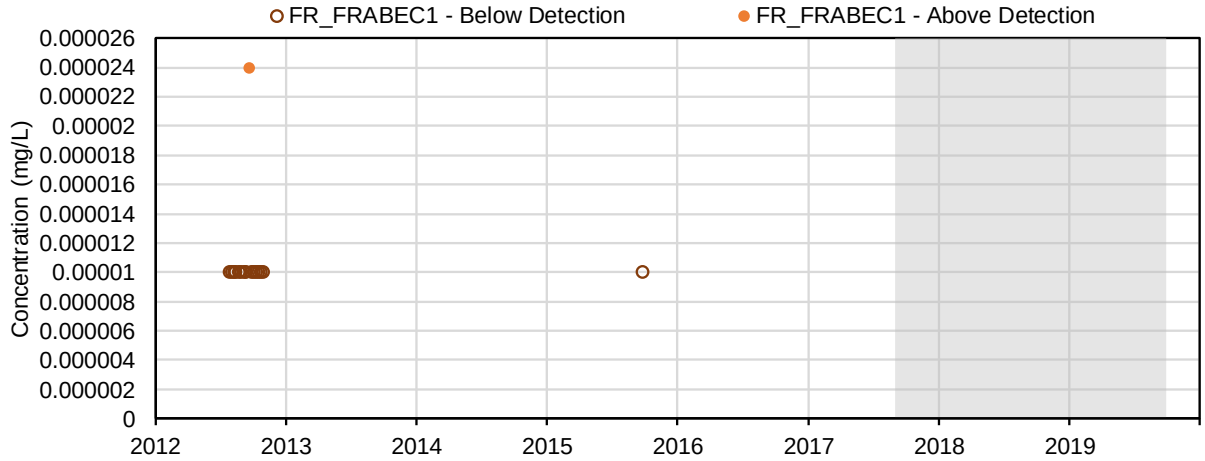
(58) Selenium (mg/L); Total Metals



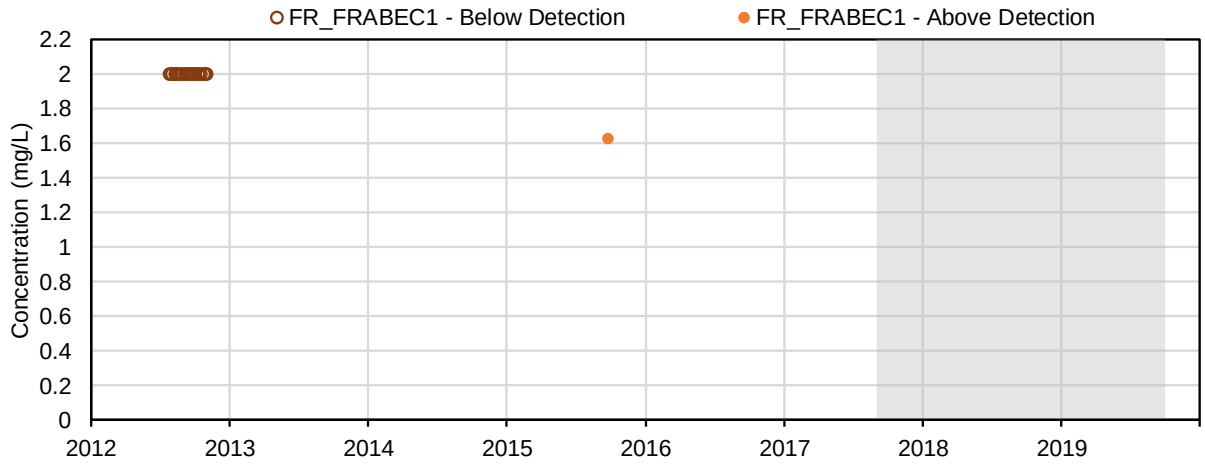
(59) Silicon (mg/L); Total Metals



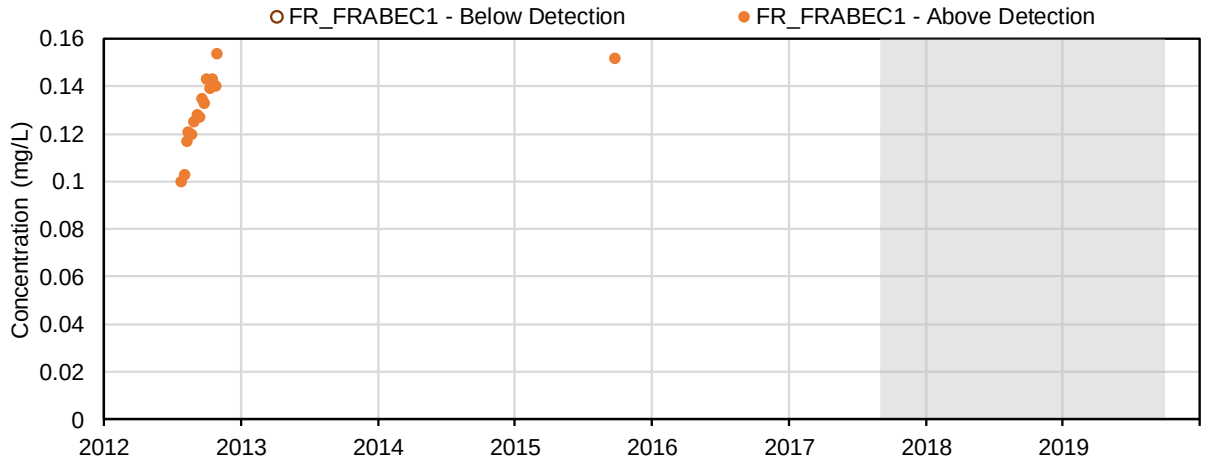
(60) Silver (mg/L); Total Metals



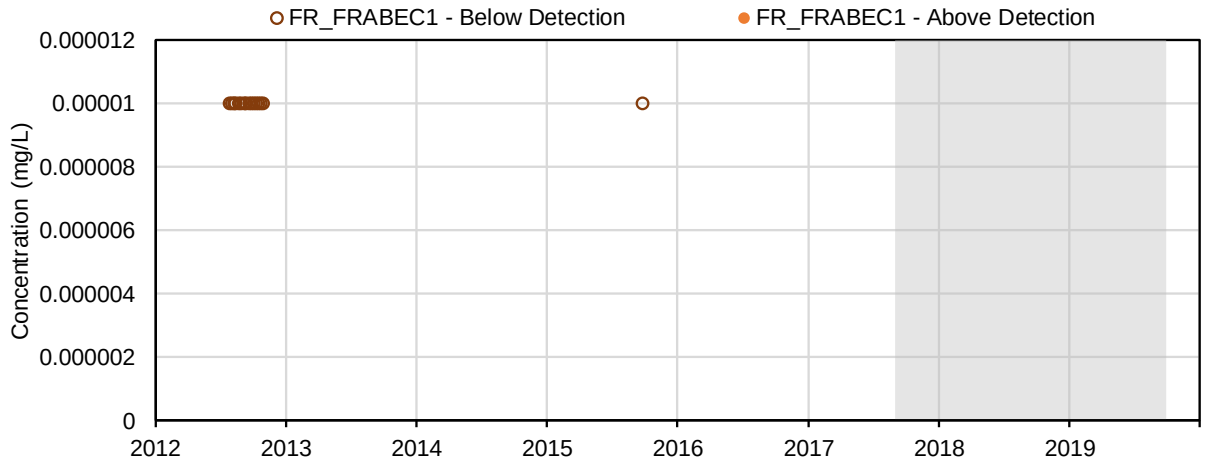
(61) Sodium (mg/L); Total Metals



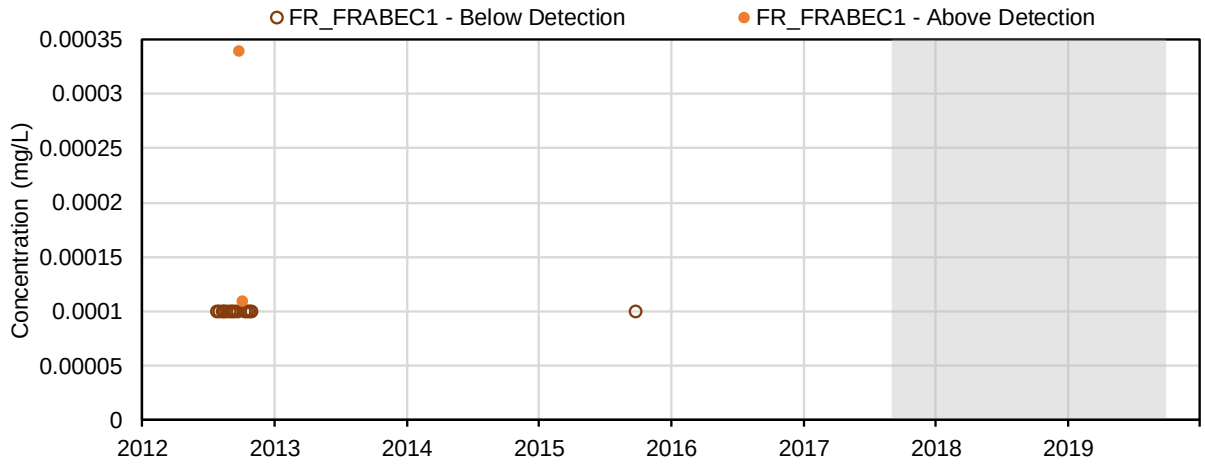
(62) Strontium (mg/L); Total Metals



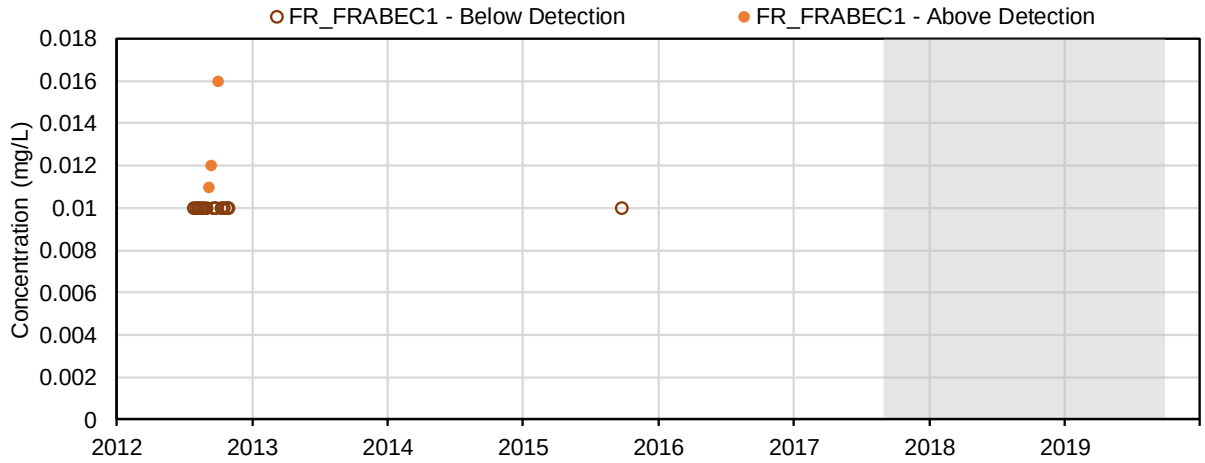
(63) Thallium (mg/L); Total Metals



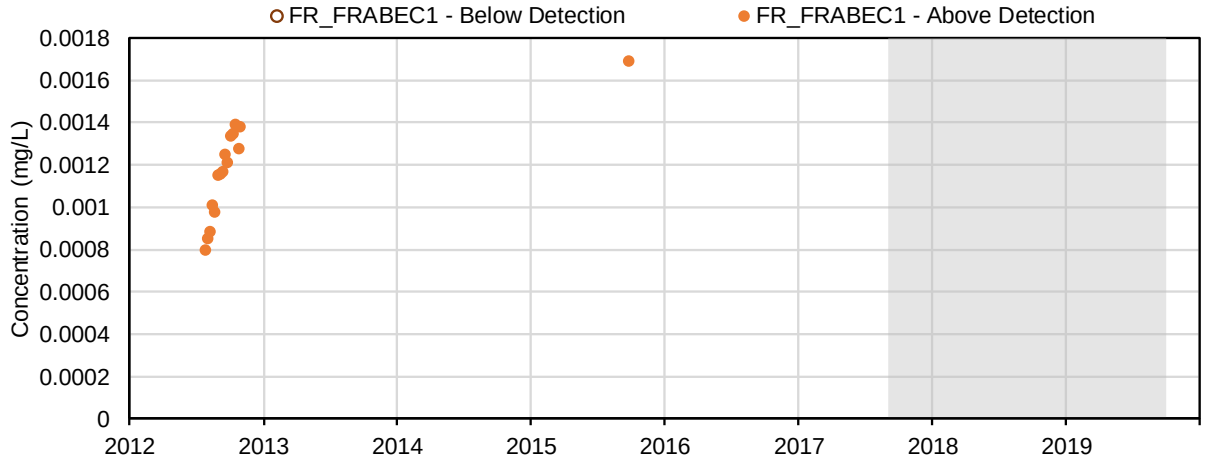
(64) Tin (mg/L); Total Metals



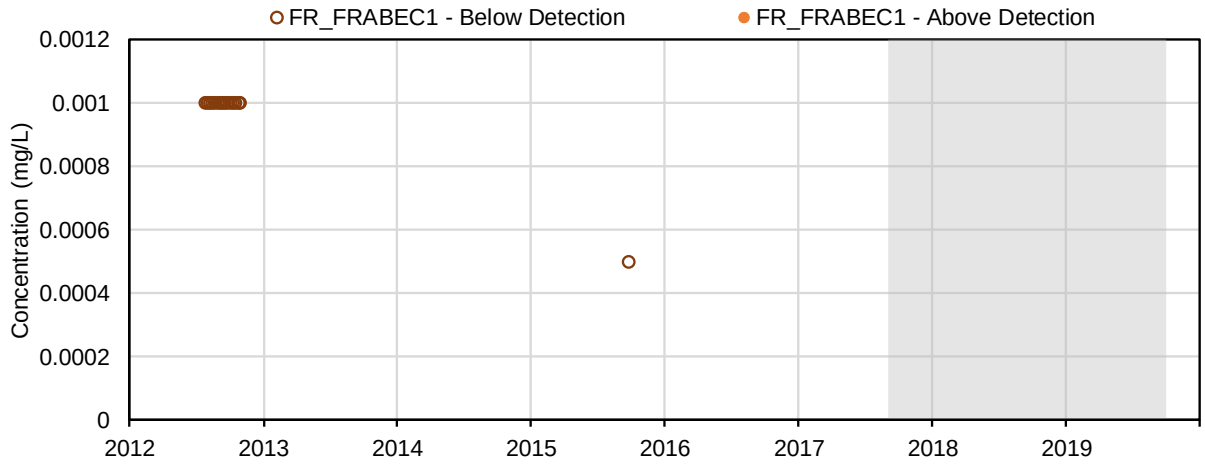
(65) Titanium (mg/L); Total Metals



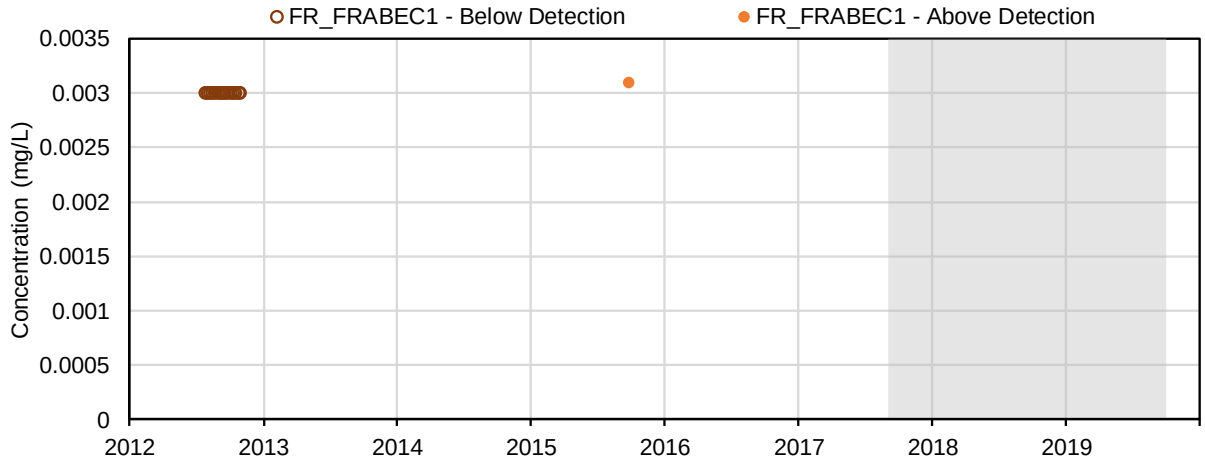
(66) Uranium (mg/L); Total Metals



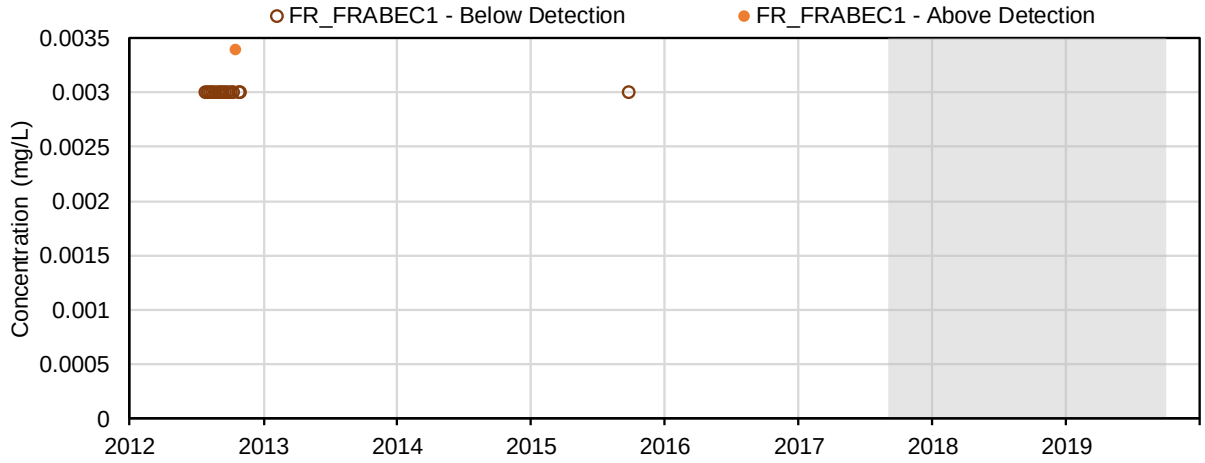
(67) Vanadium (mg/L); Total Metals



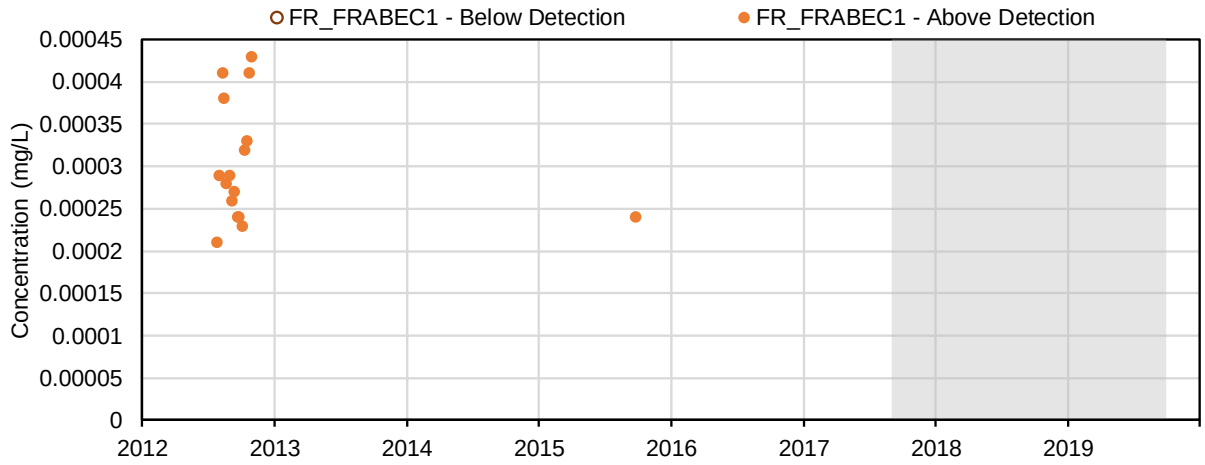
(68) Zinc (mg/L); Total Metals



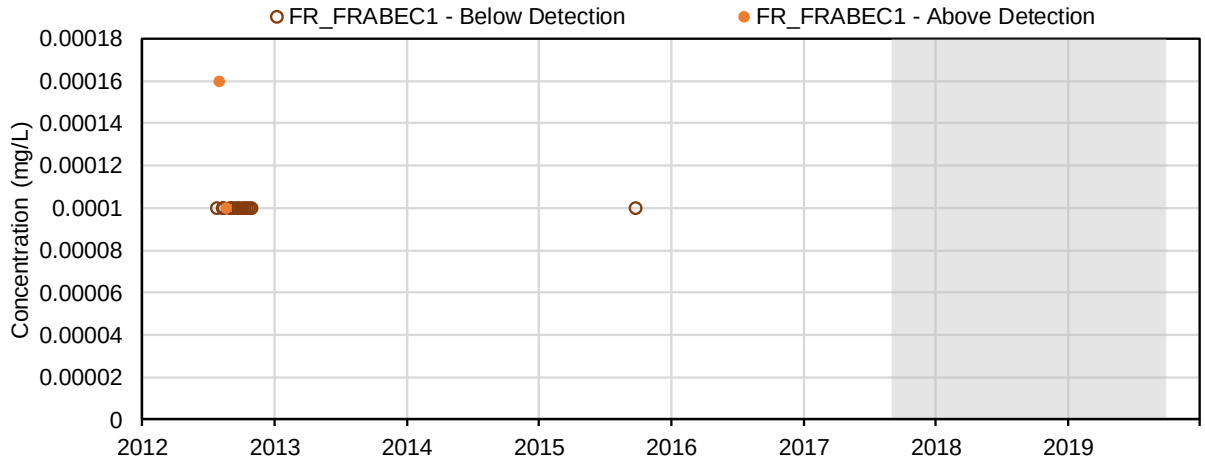
(69) Aluminum (mg/L); Dissolved Metals



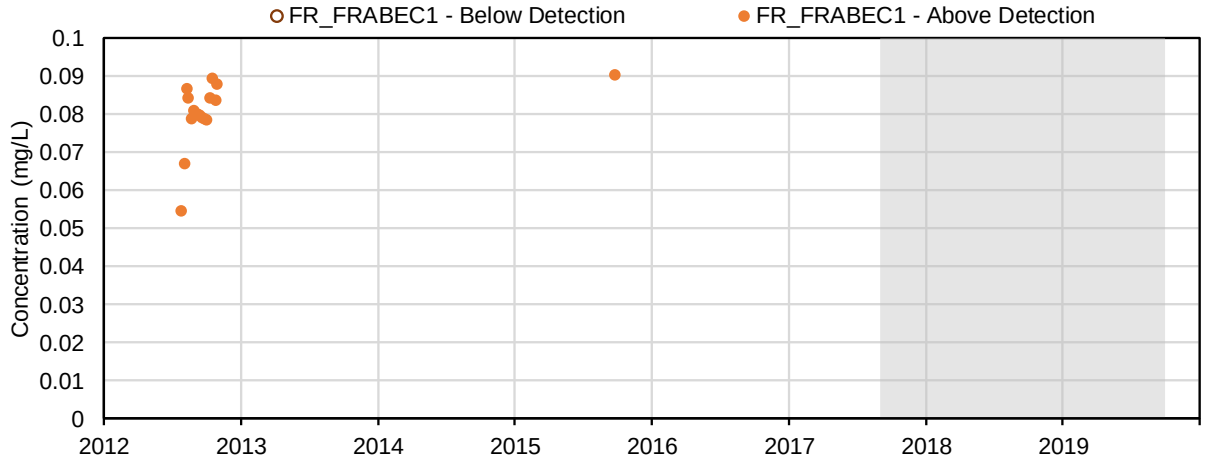
(70) Antimony (mg/L); Dissolved Metals



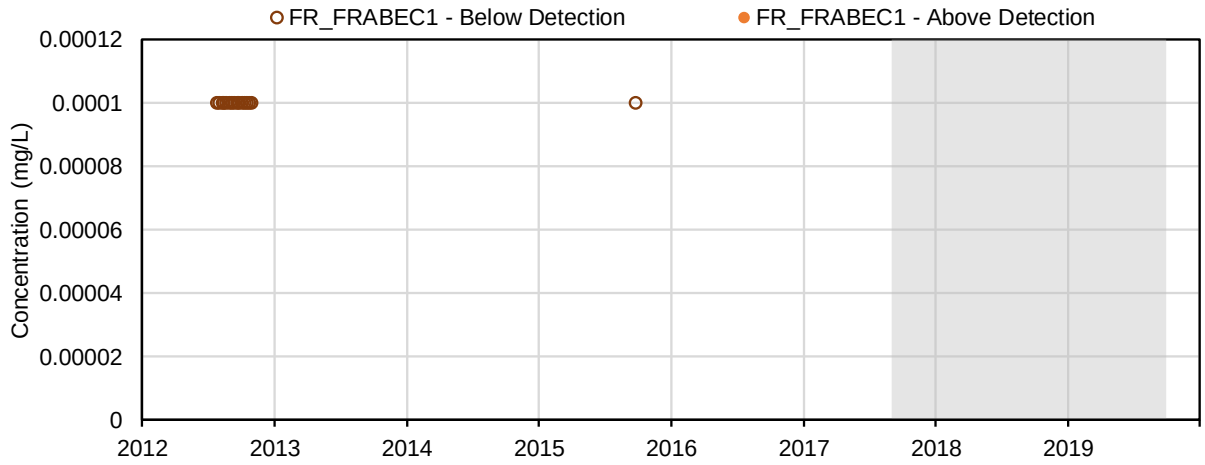
(71) Arsenic (mg/L); Dissolved Metals



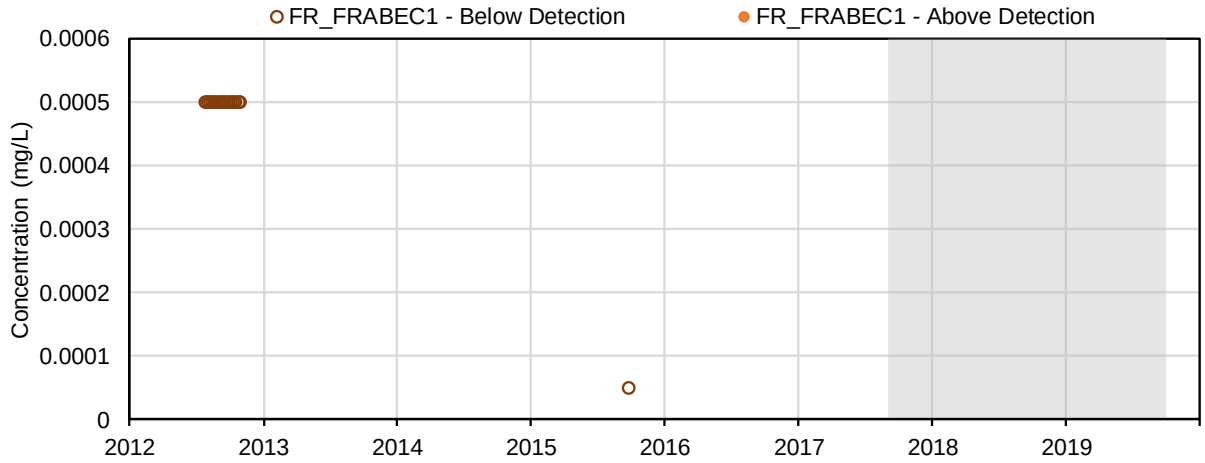
(72) Barium (mg/L); Dissolved Metals



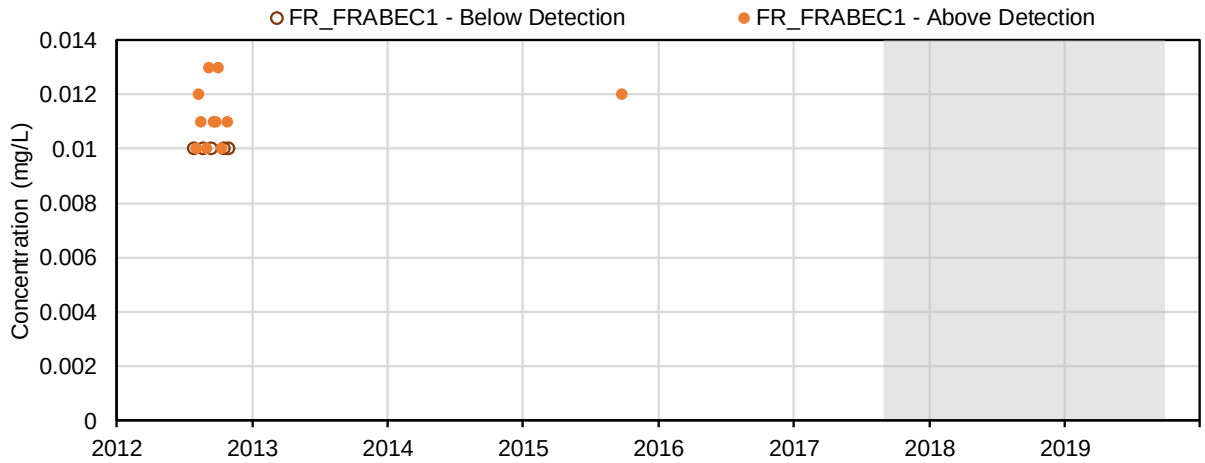
(73) Beryllium (mg/L); Dissolved Metals



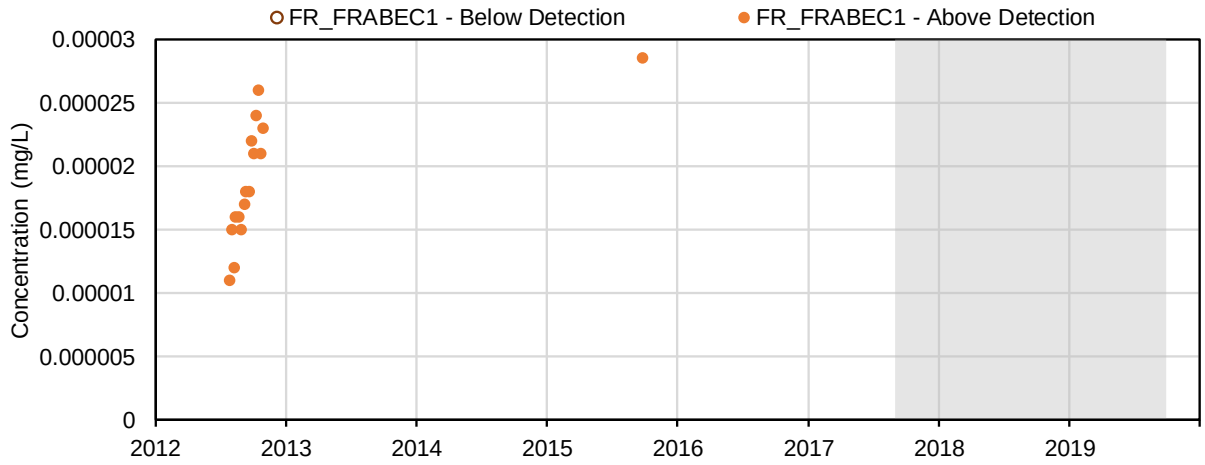
(74) Bismuth (mg/L); Dissolved Metals



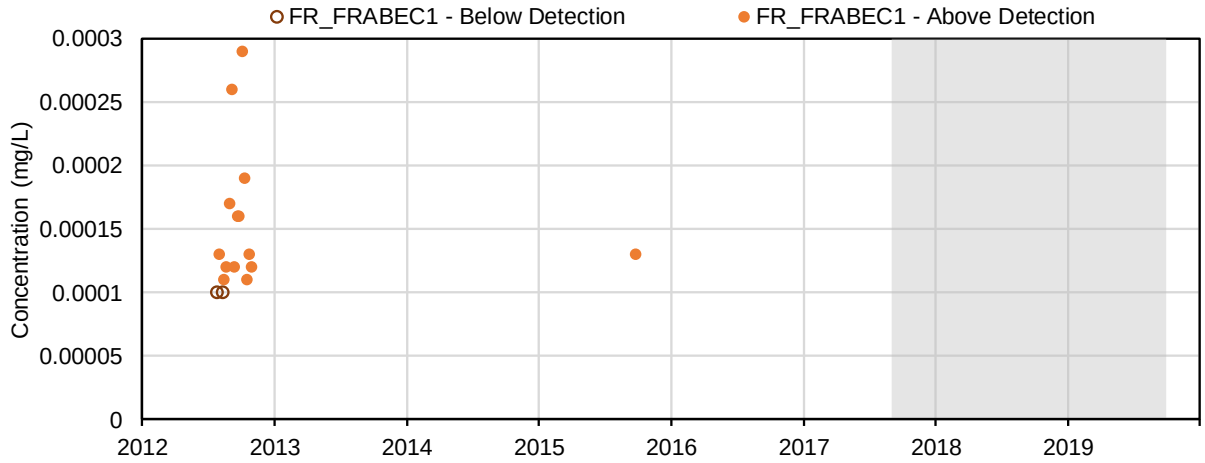
(75) Boron (mg/L); Dissolved Metals



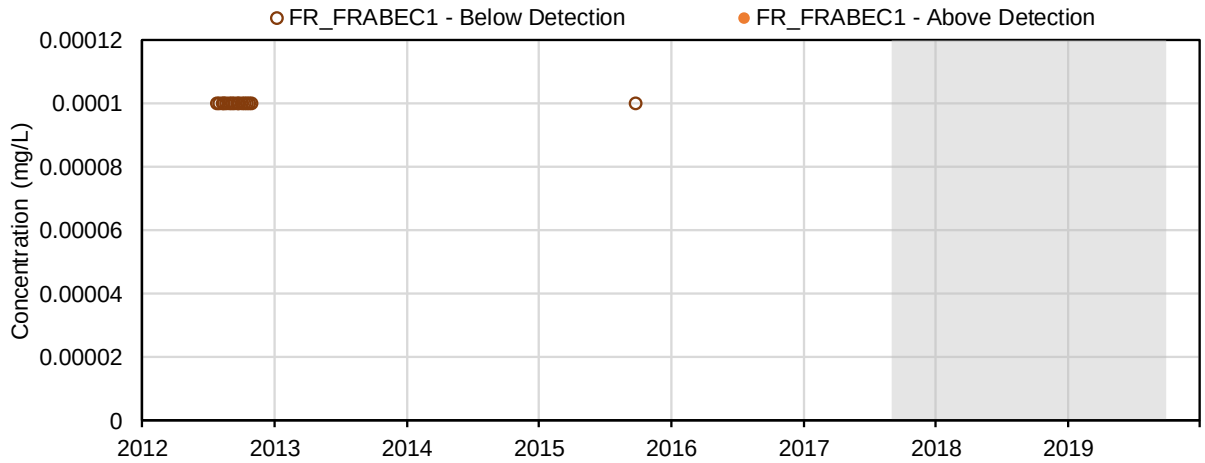
(76) Cadmium (mg/L); Dissolved Metals



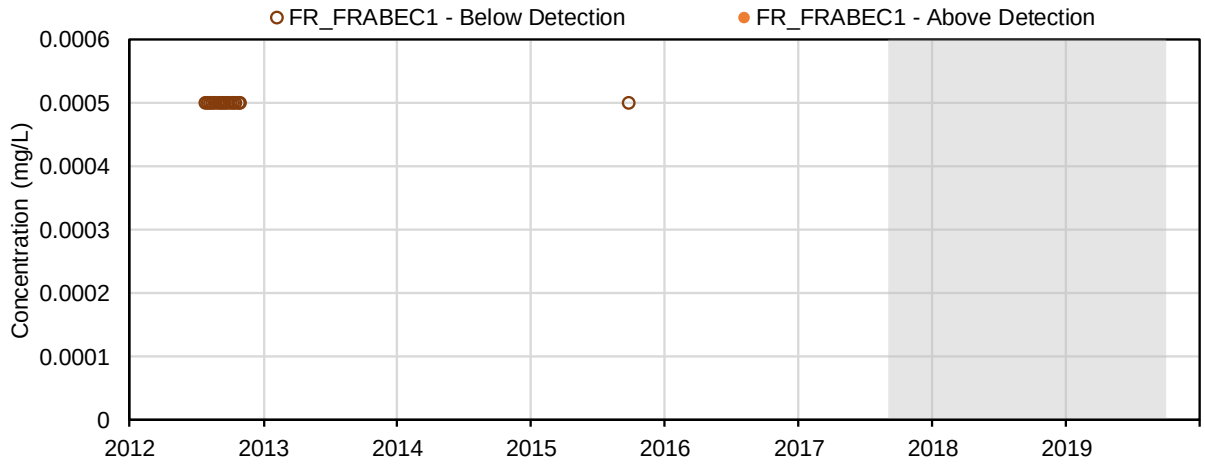
(77) Chromium (mg/L); Dissolved Metals



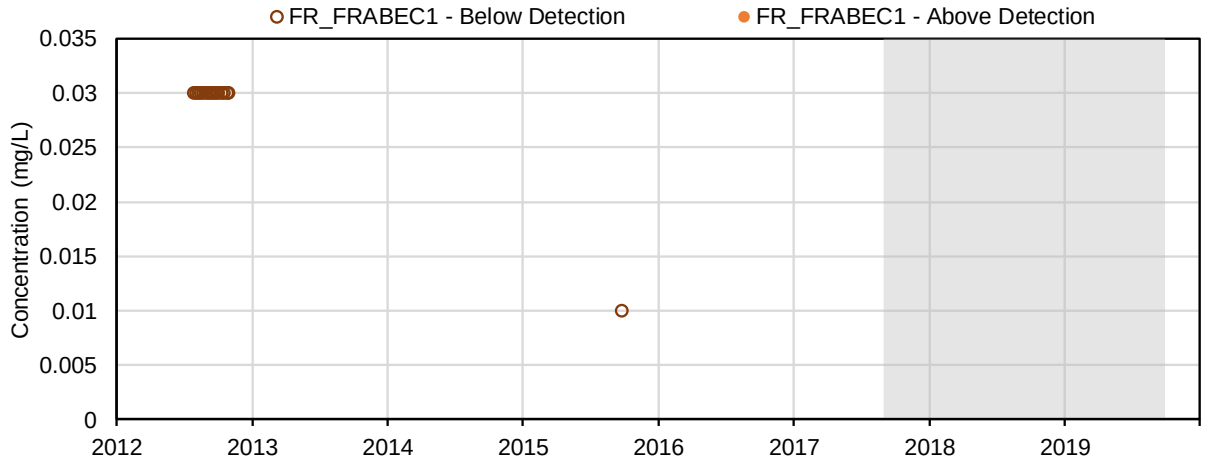
(78) Cobalt (mg/L); Dissolved Metals



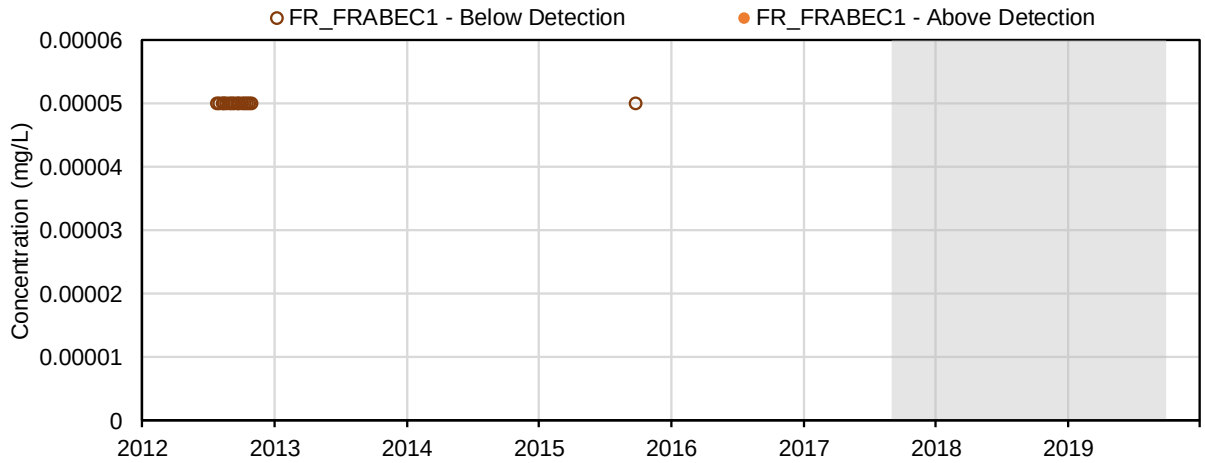
(79) Copper (mg/L); Dissolved Metals



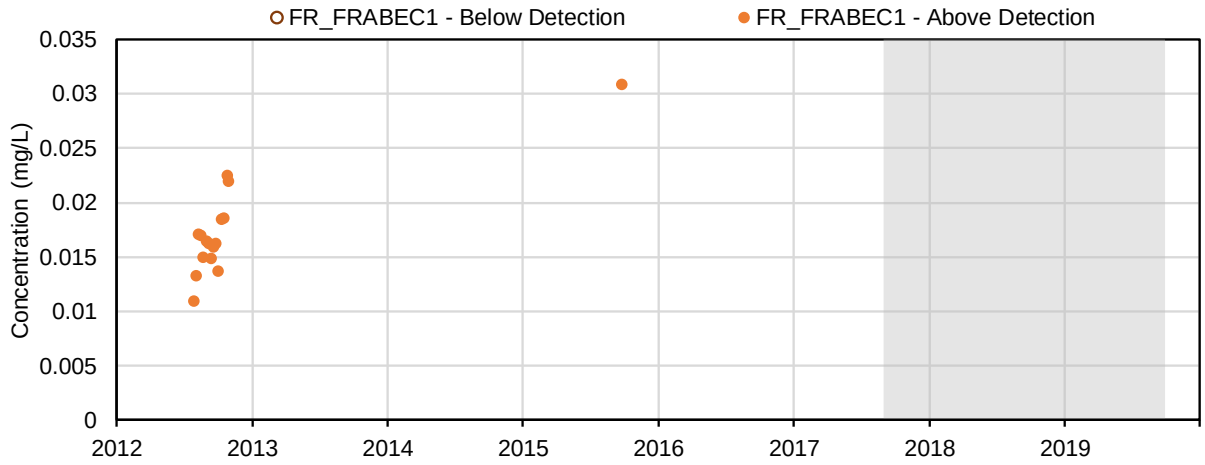
(80) Iron (mg/L); Dissolved Metals



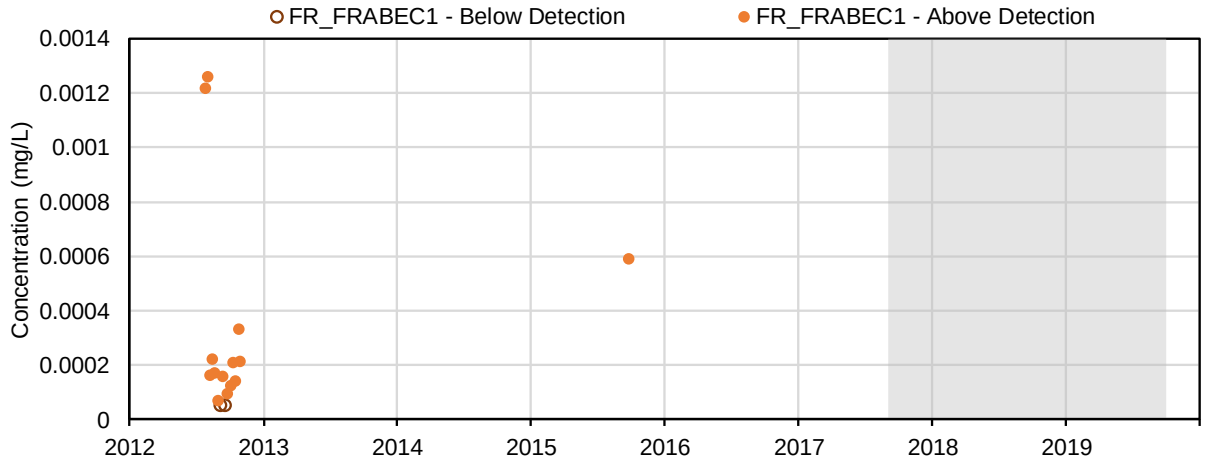
(81) Lead (mg/L); Dissolved Metals



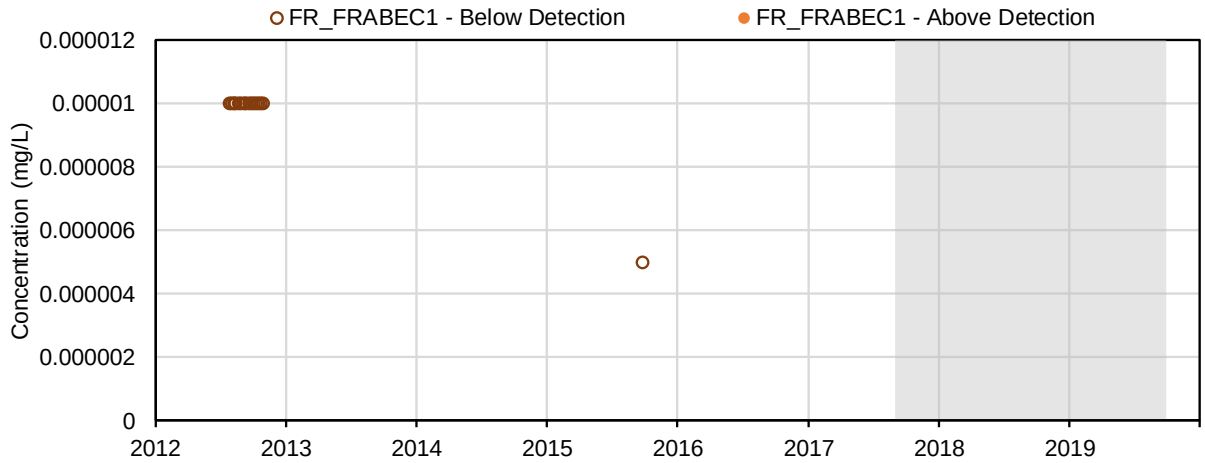
(82) Lithium (mg/L); Dissolved Metals



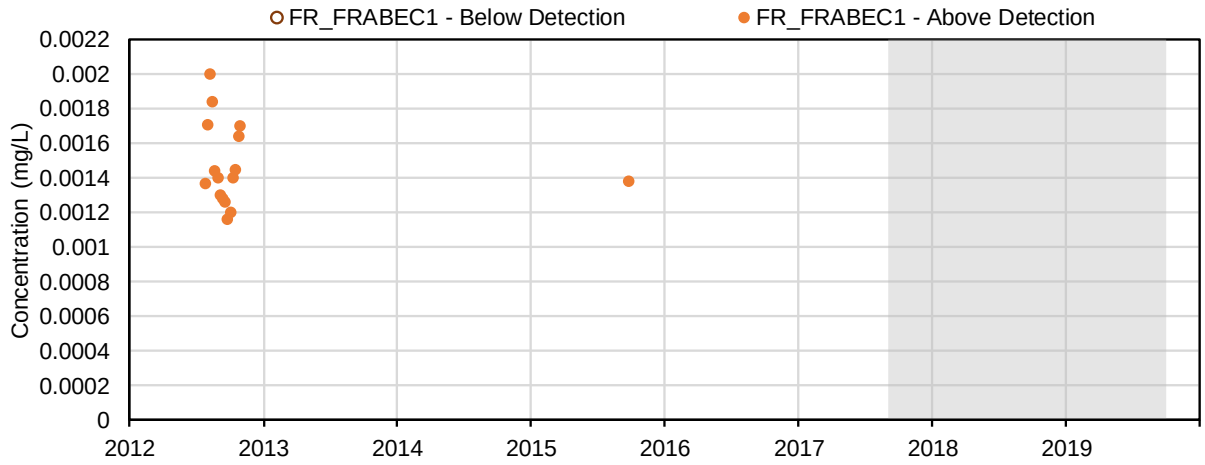
(83) Manganese (mg/L); Dissolved Metals



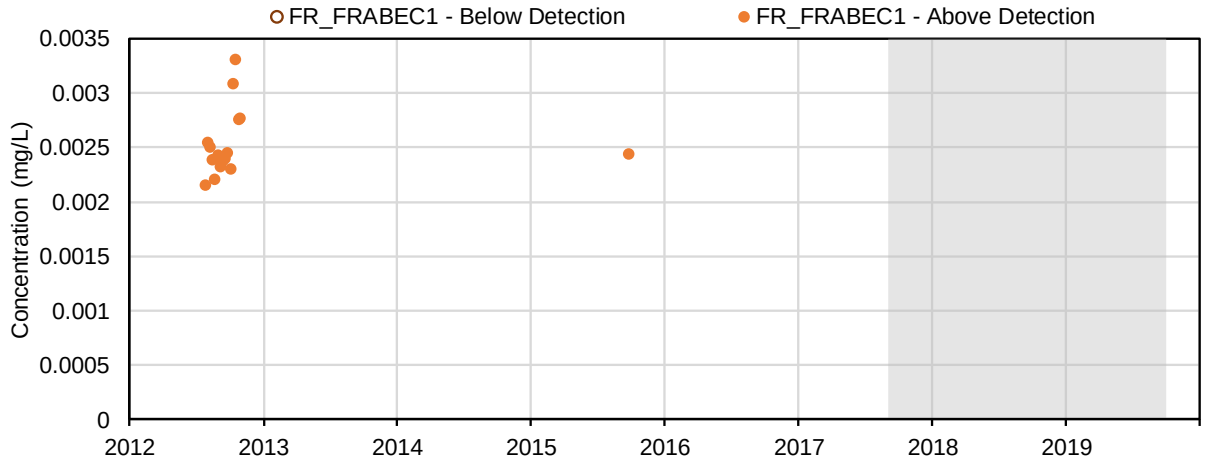
(84) Mercury (mg/L); Dissolved Metals



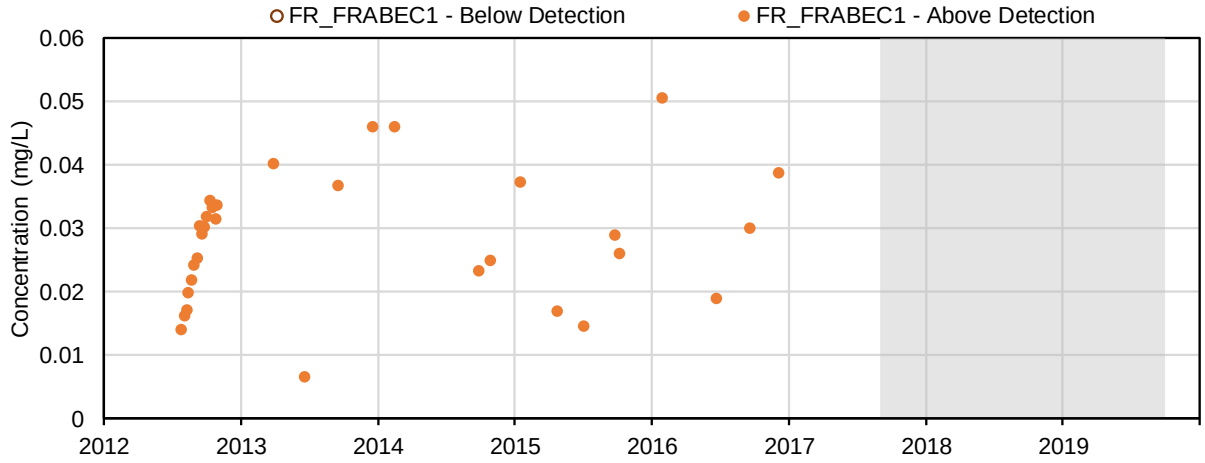
(85) Molybdenum (mg/L); Dissolved Metals



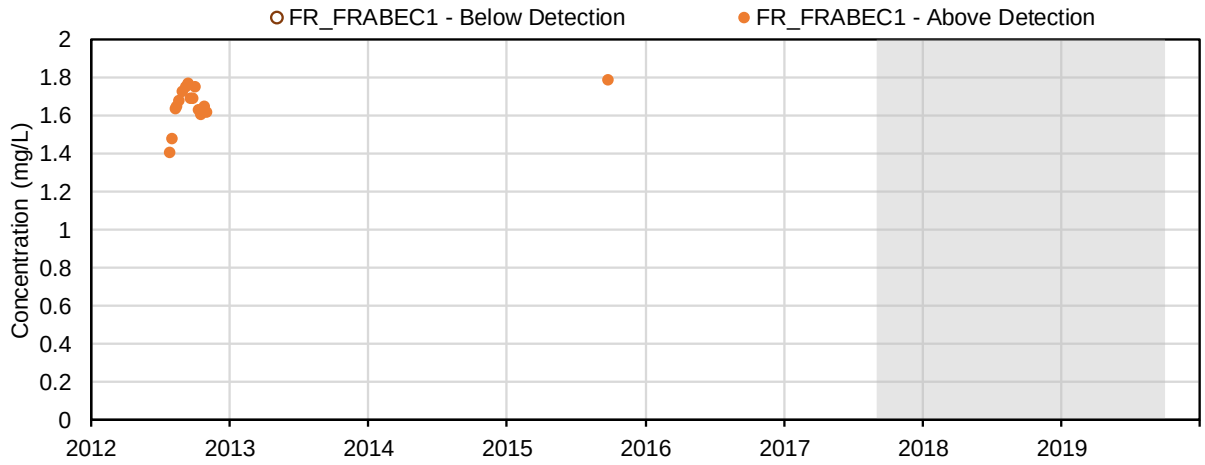
(86) Nickel (mg/L); Dissolved Metals



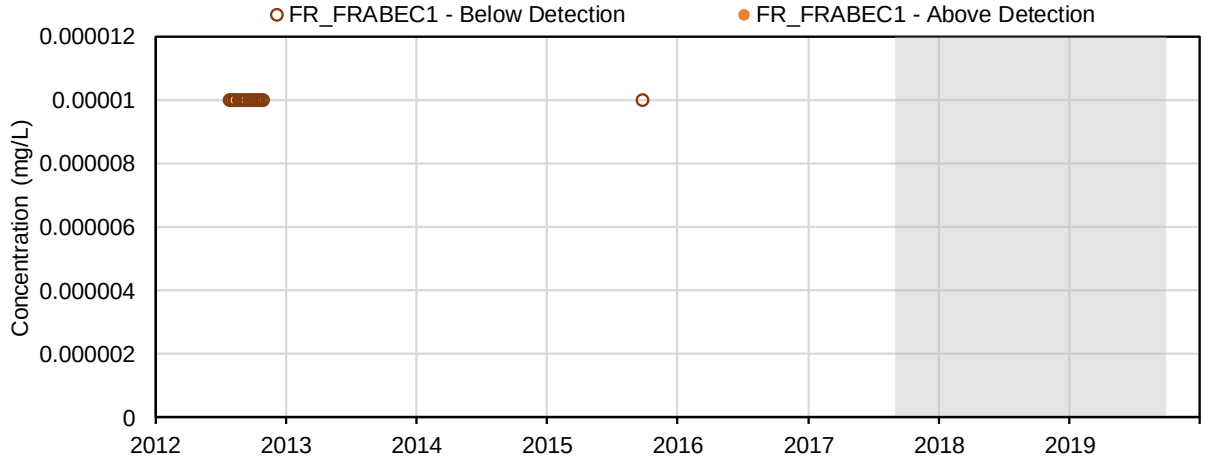
(87) Selenium (mg/L); Dissolved Metals



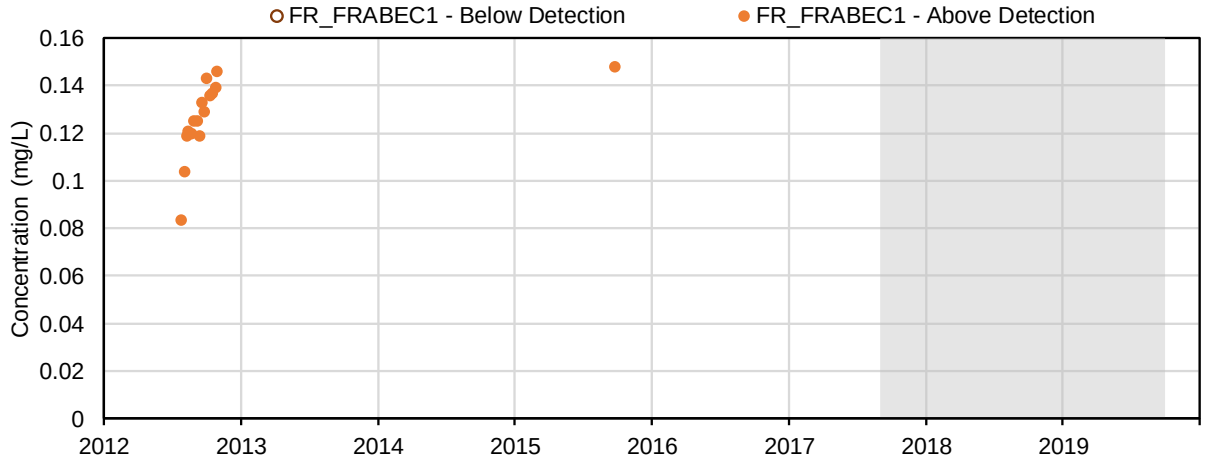
(88) Silicon (mg/L); Dissolved Metals



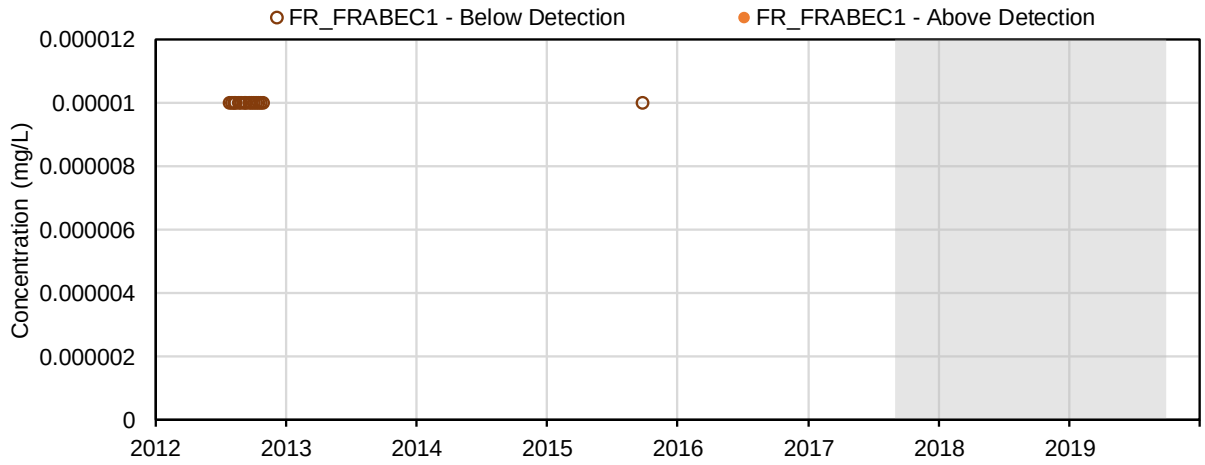
(89) Silver (mg/L); Dissolved Metals



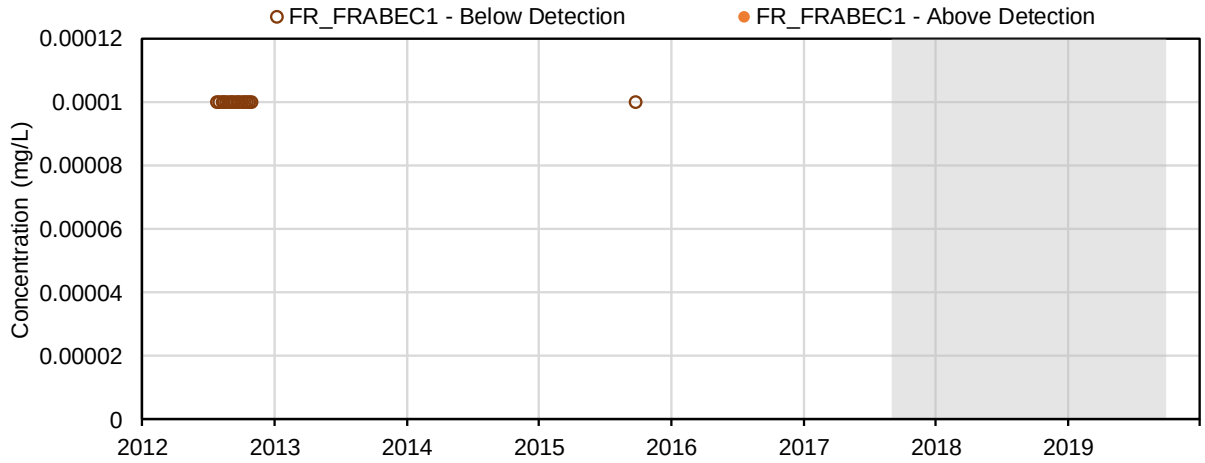
(90) Strontium (mg/L); Dissolved Metals



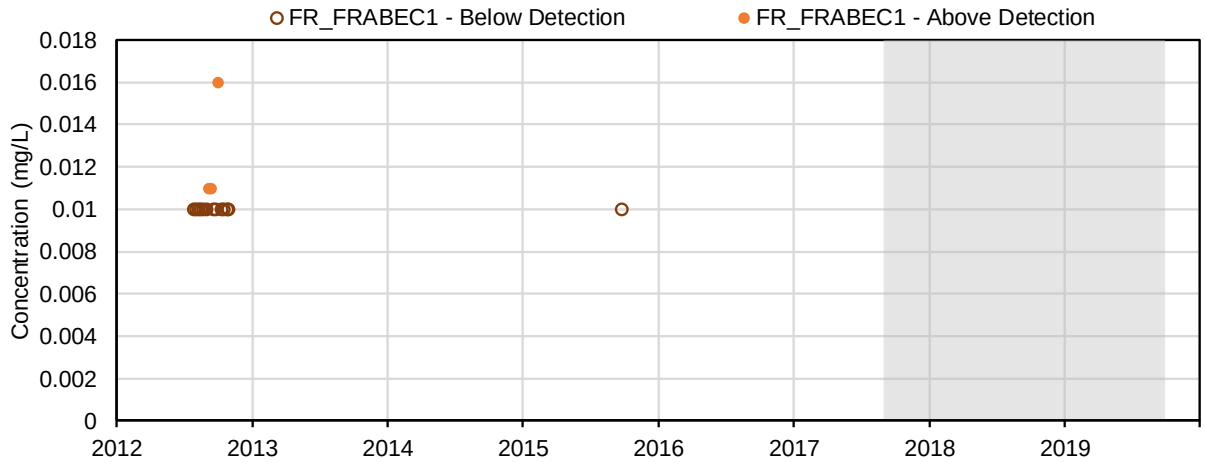
(91) Thallium (mg/L); Dissolved Metals



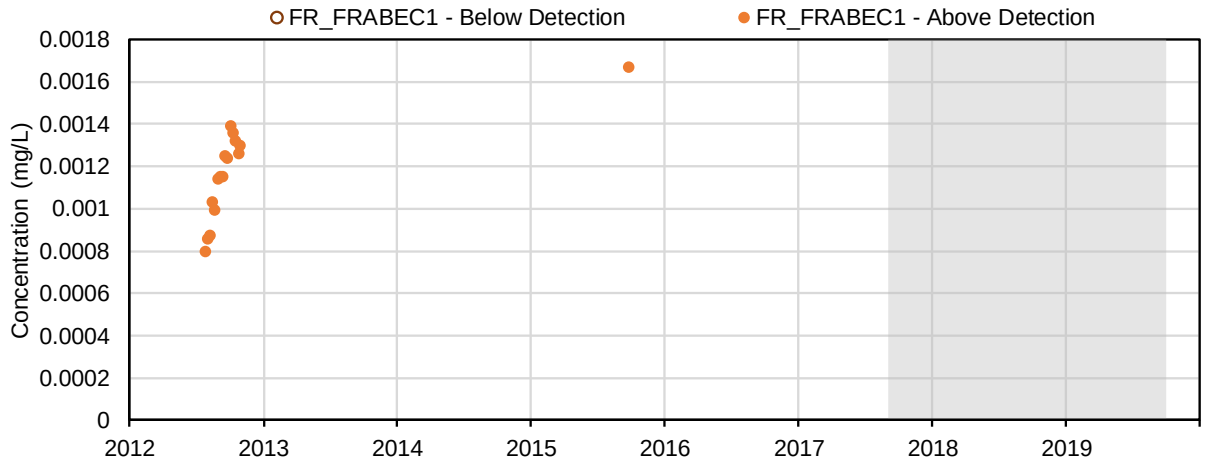
(92) Tin (mg/L); Dissolved Metals



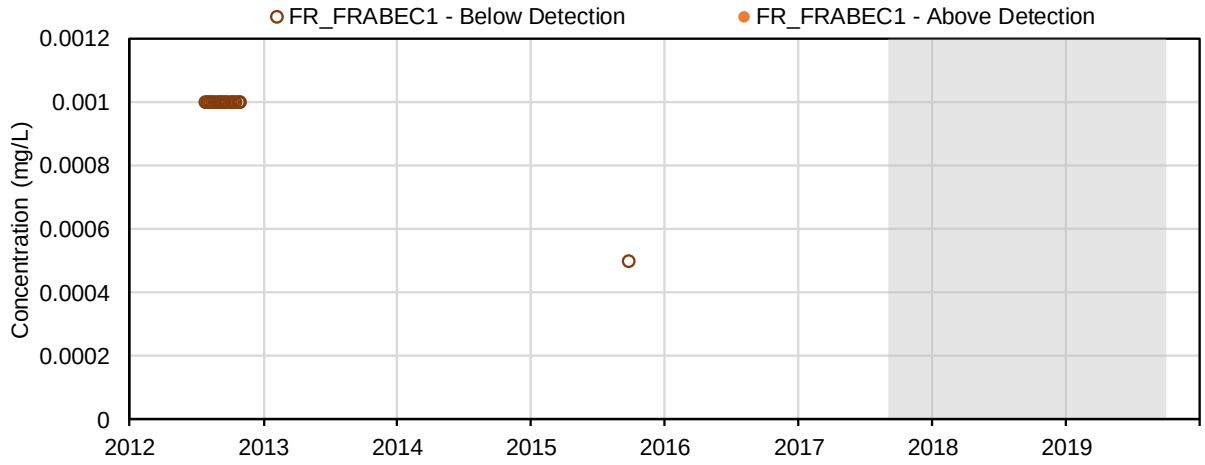
(93) Titanium (mg/L); Dissolved Metals



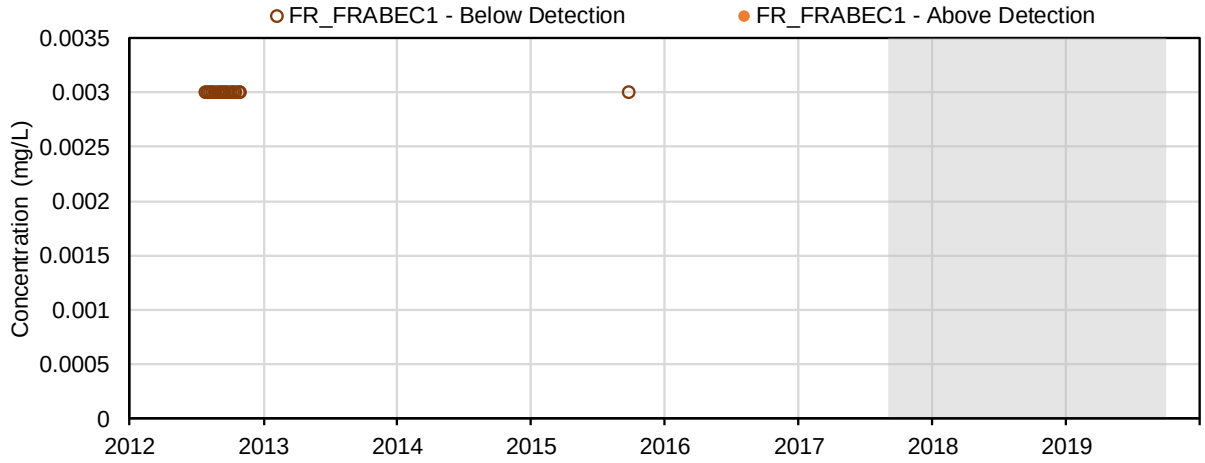
(94) Uranium (mg/L); Dissolved Metals



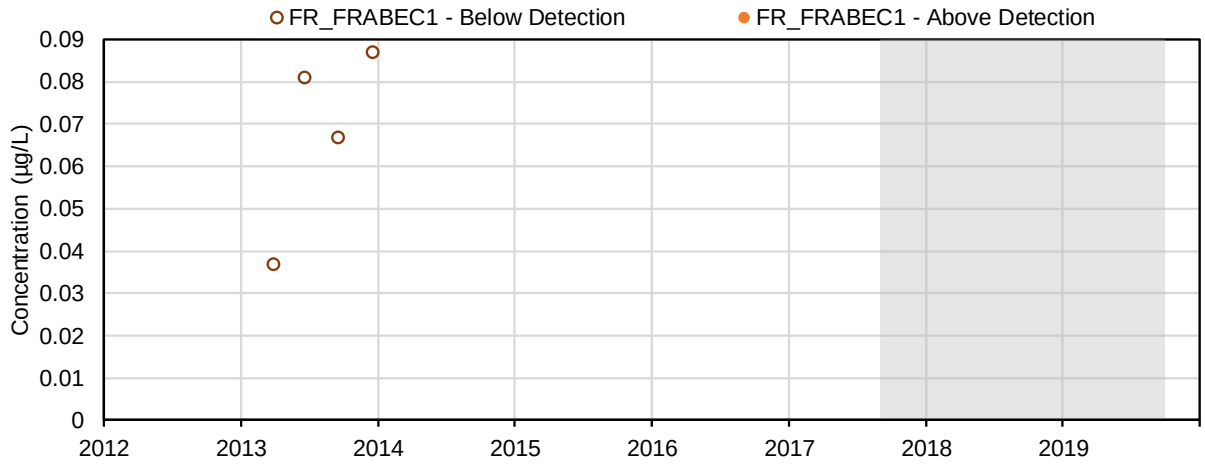
(95) Vanadium (mg/L); Dissolved Metals



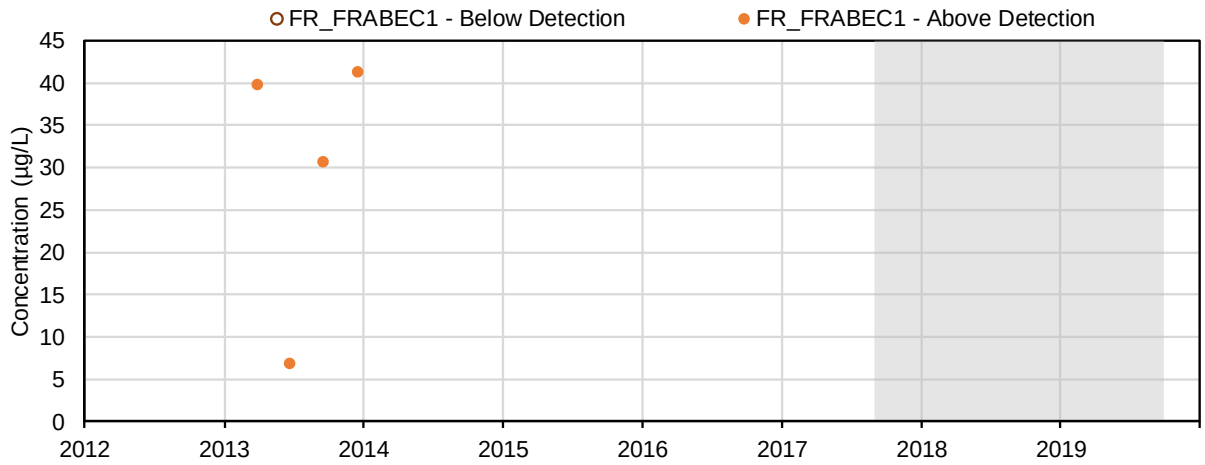
(96) Zinc (mg/L); Dissolved Metals



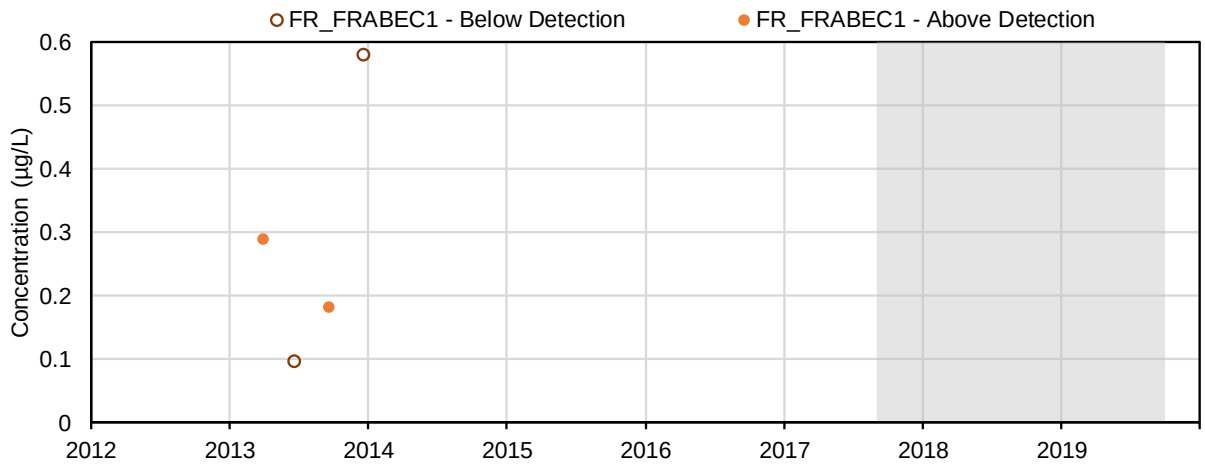
(97) Total Selenocyanate (µg/L); Speciation of Selenium



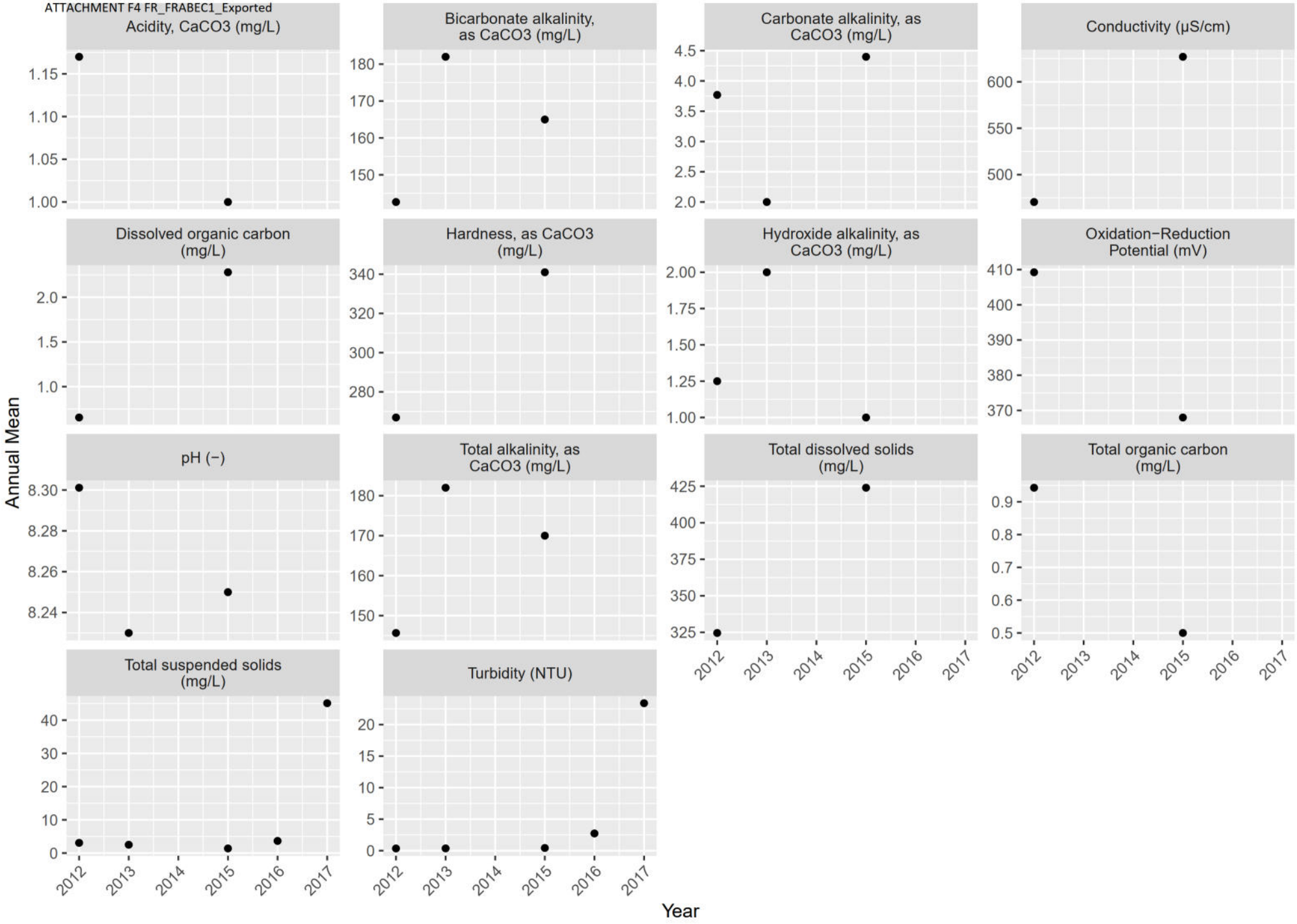
(98) Total Selenium 6+ (µg/L); Speciation of Selenium

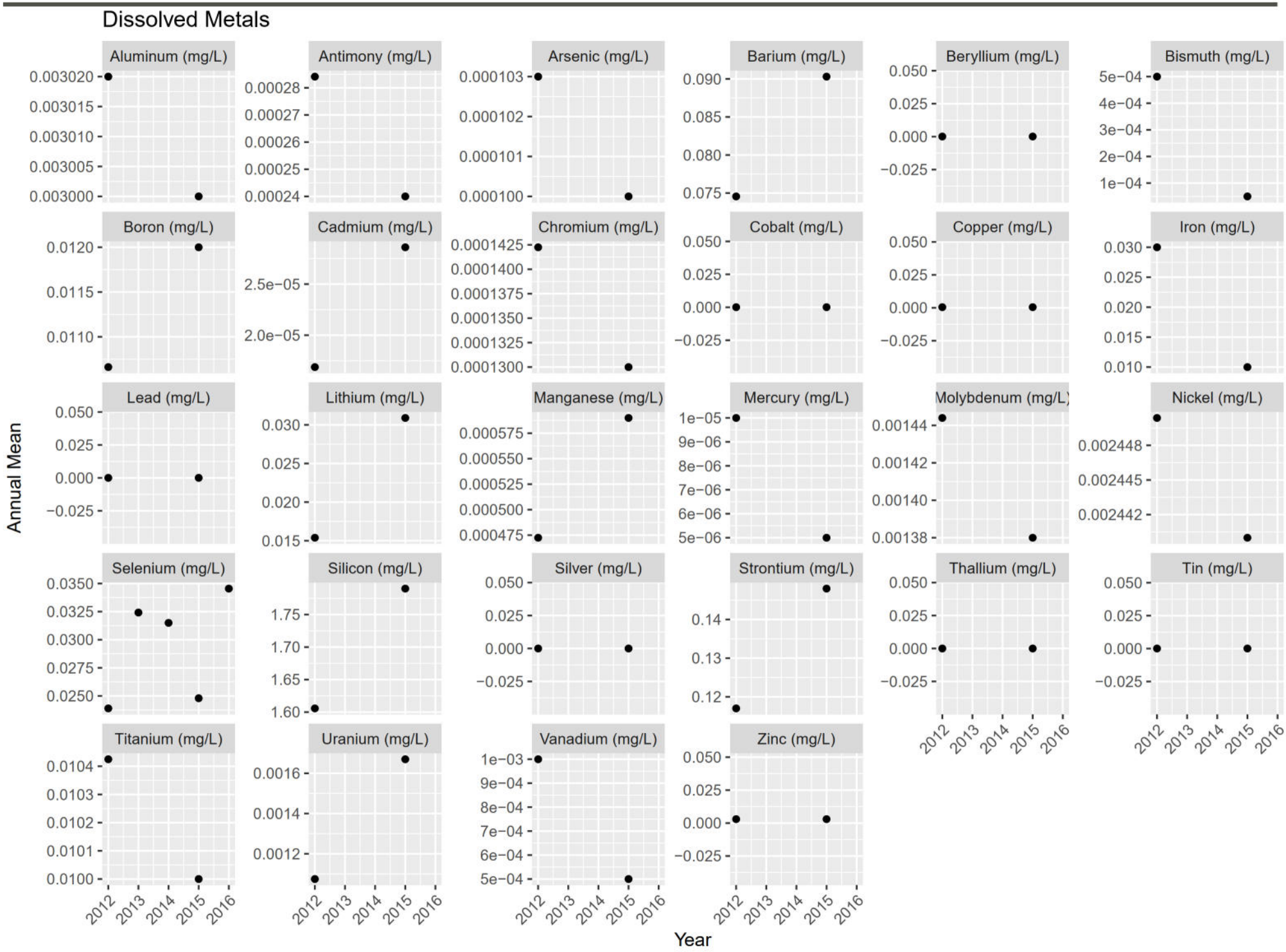


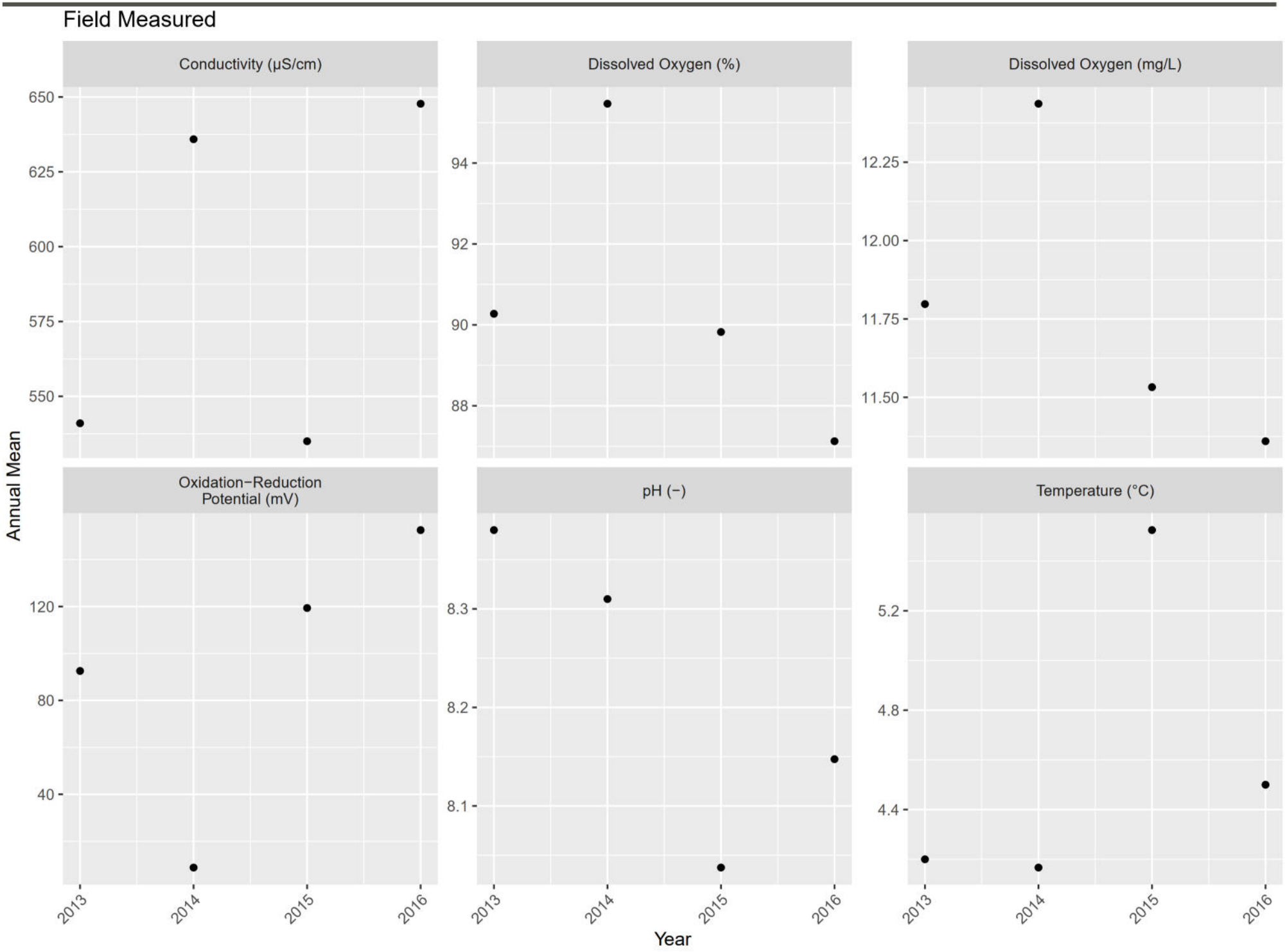
(99) Total Selenium 4+ (µg/L); Speciation of Selenium

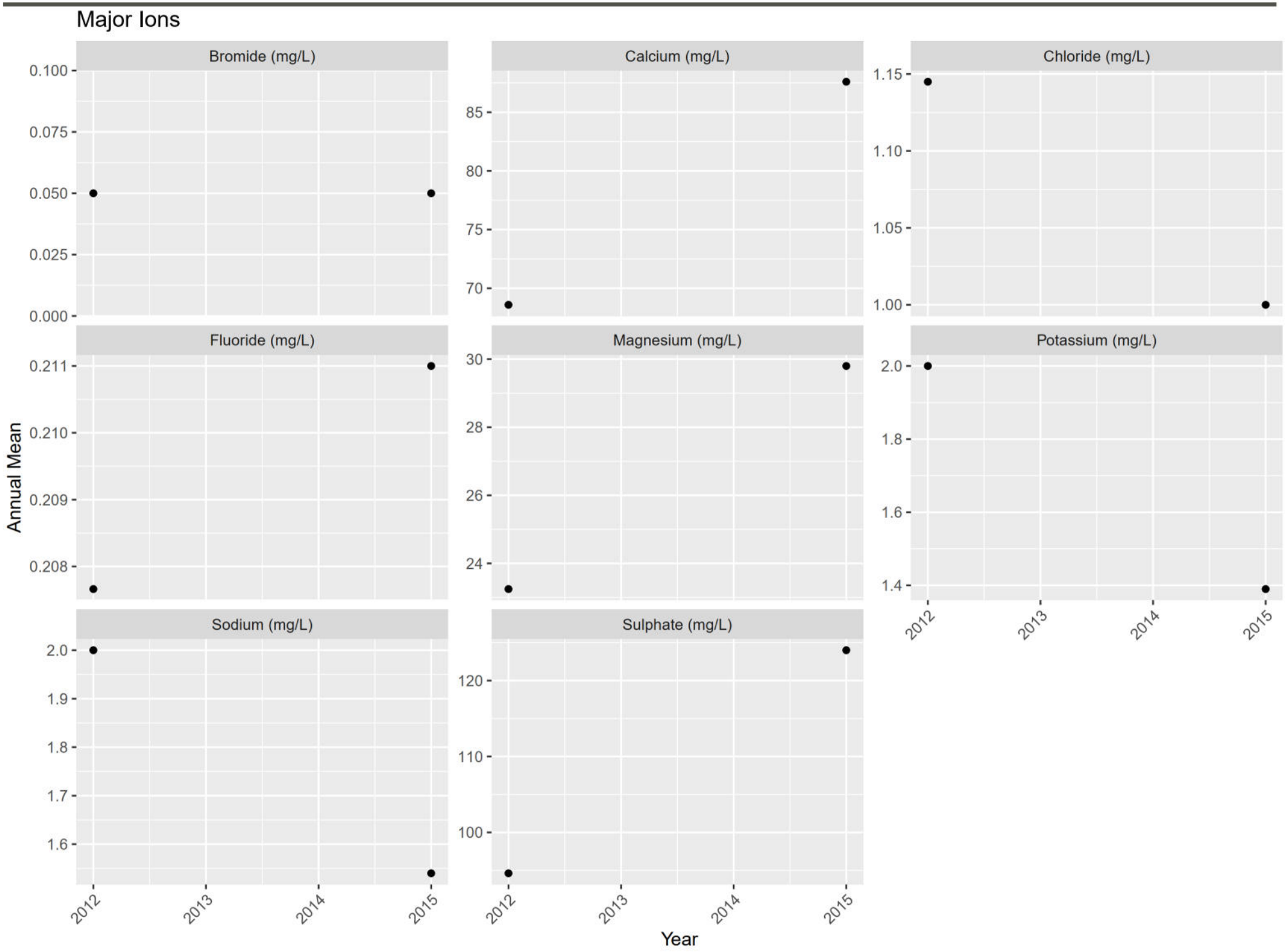


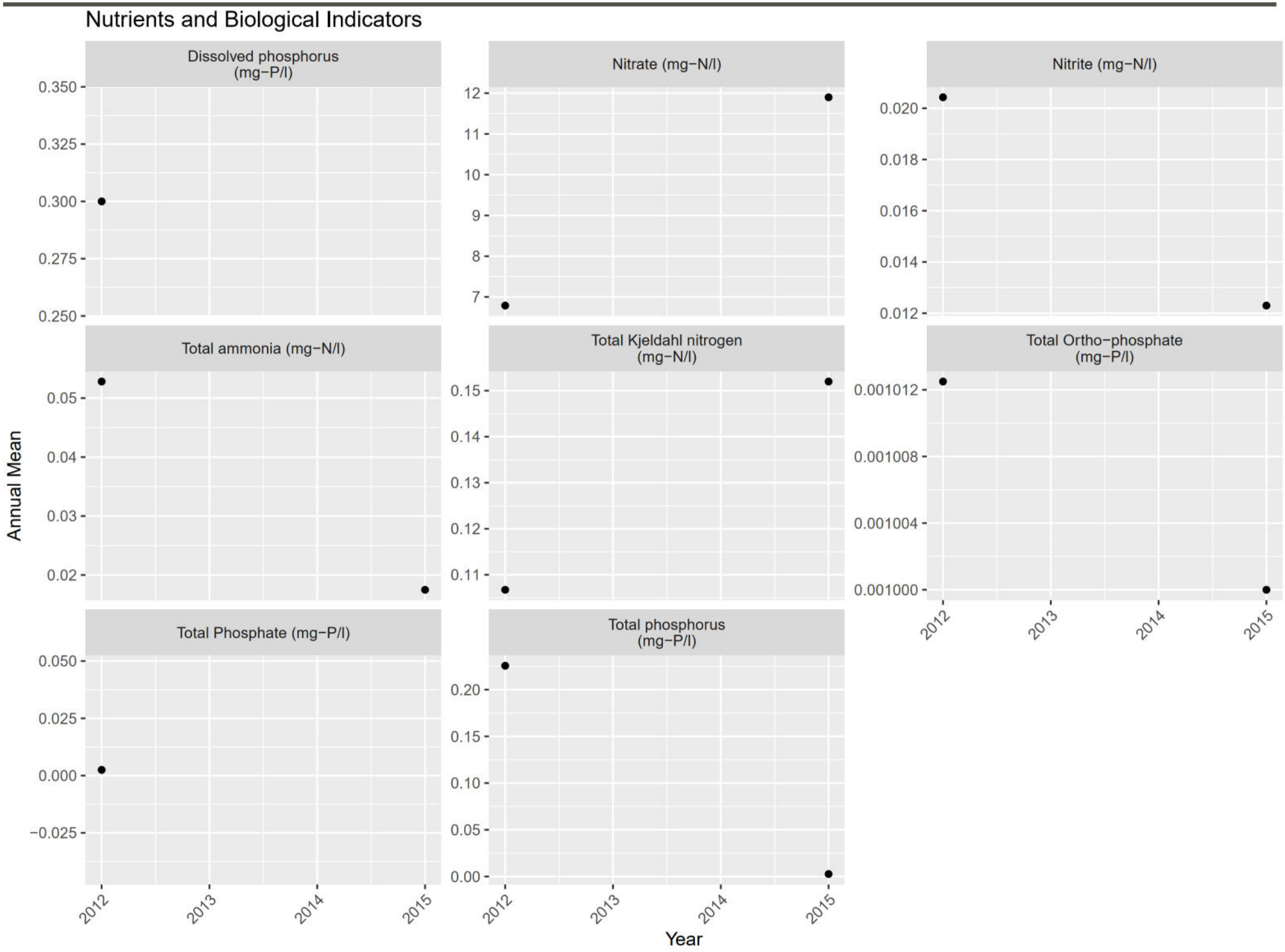
Conventional Parameters

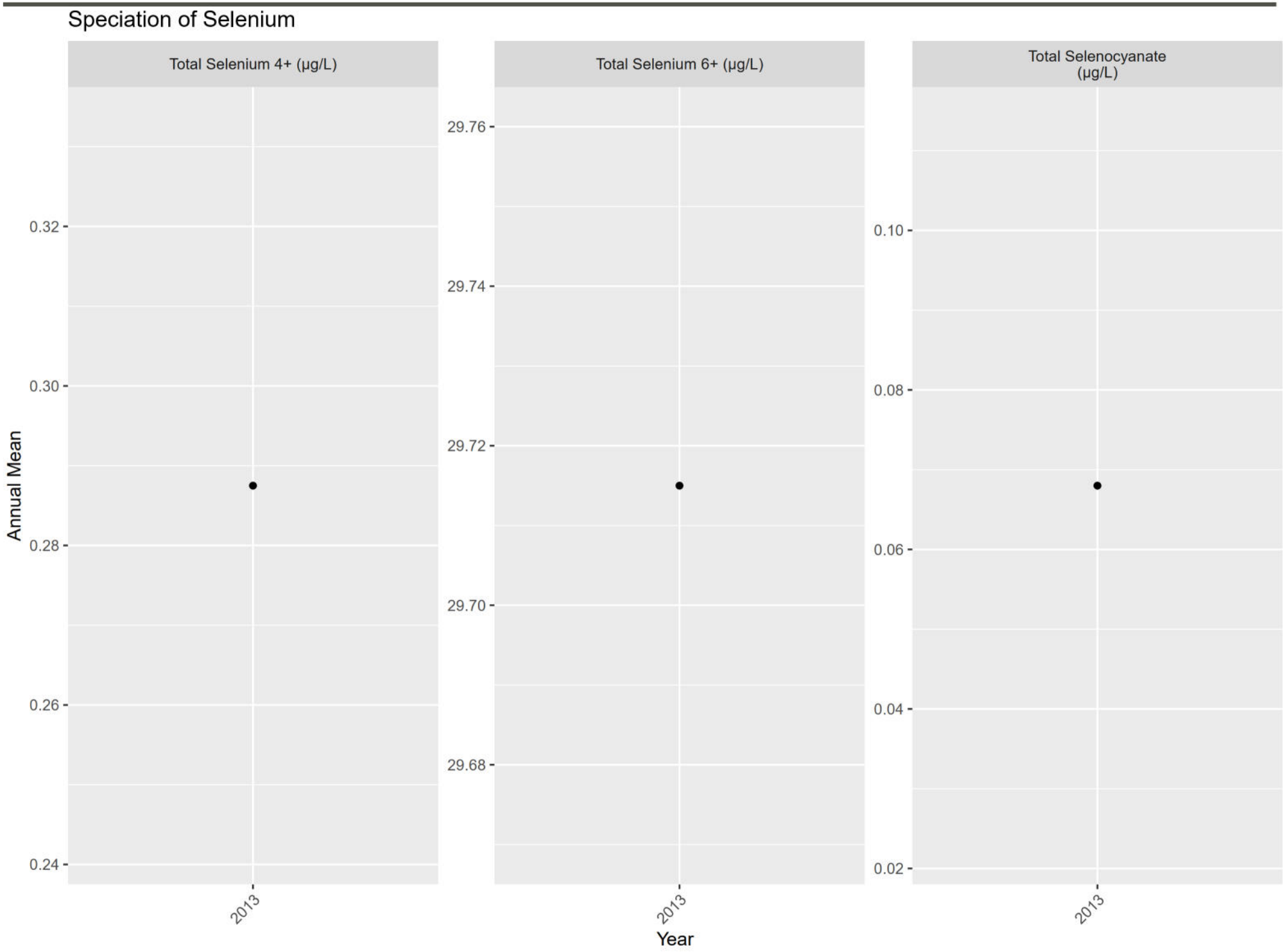


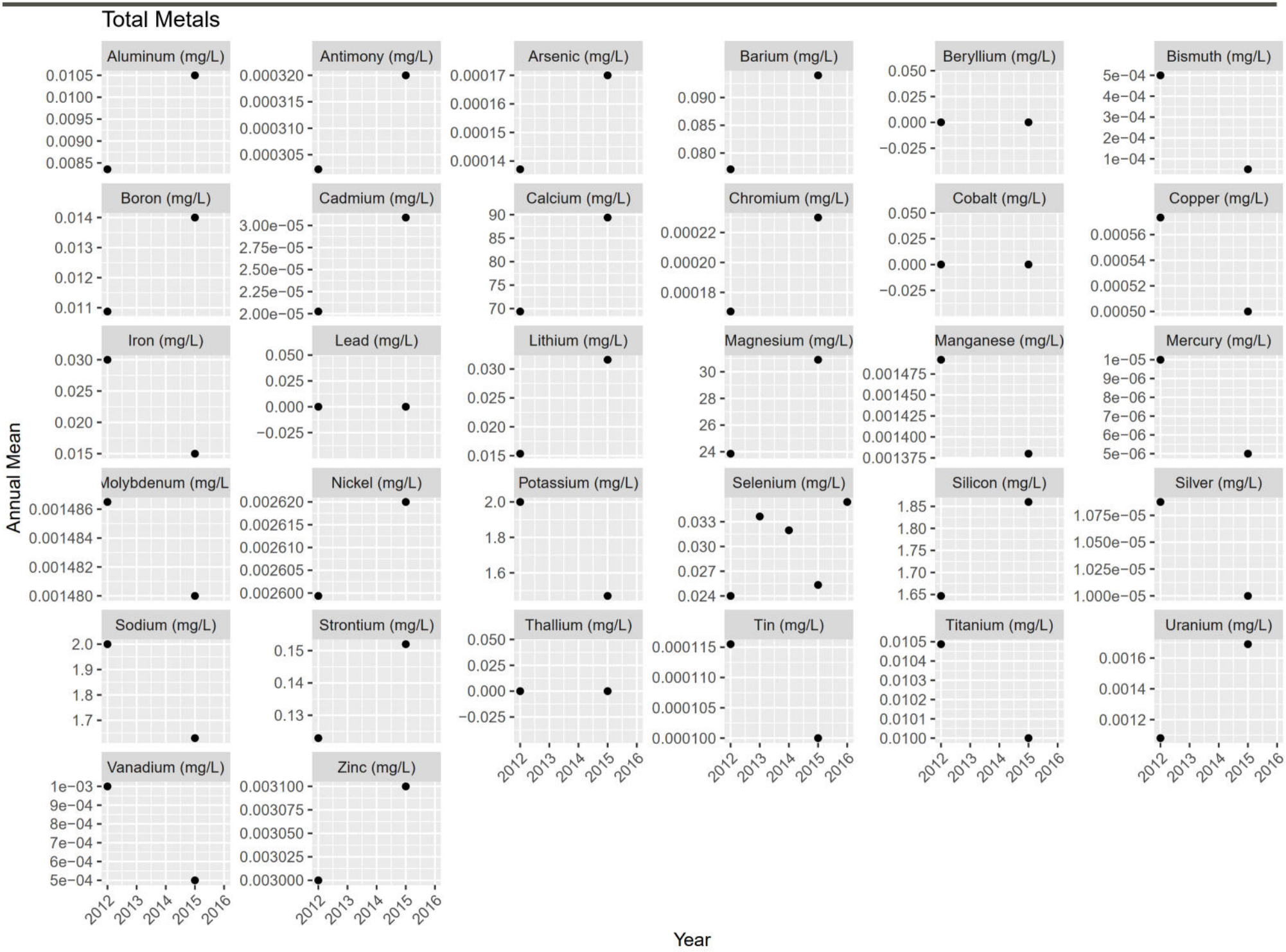

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016

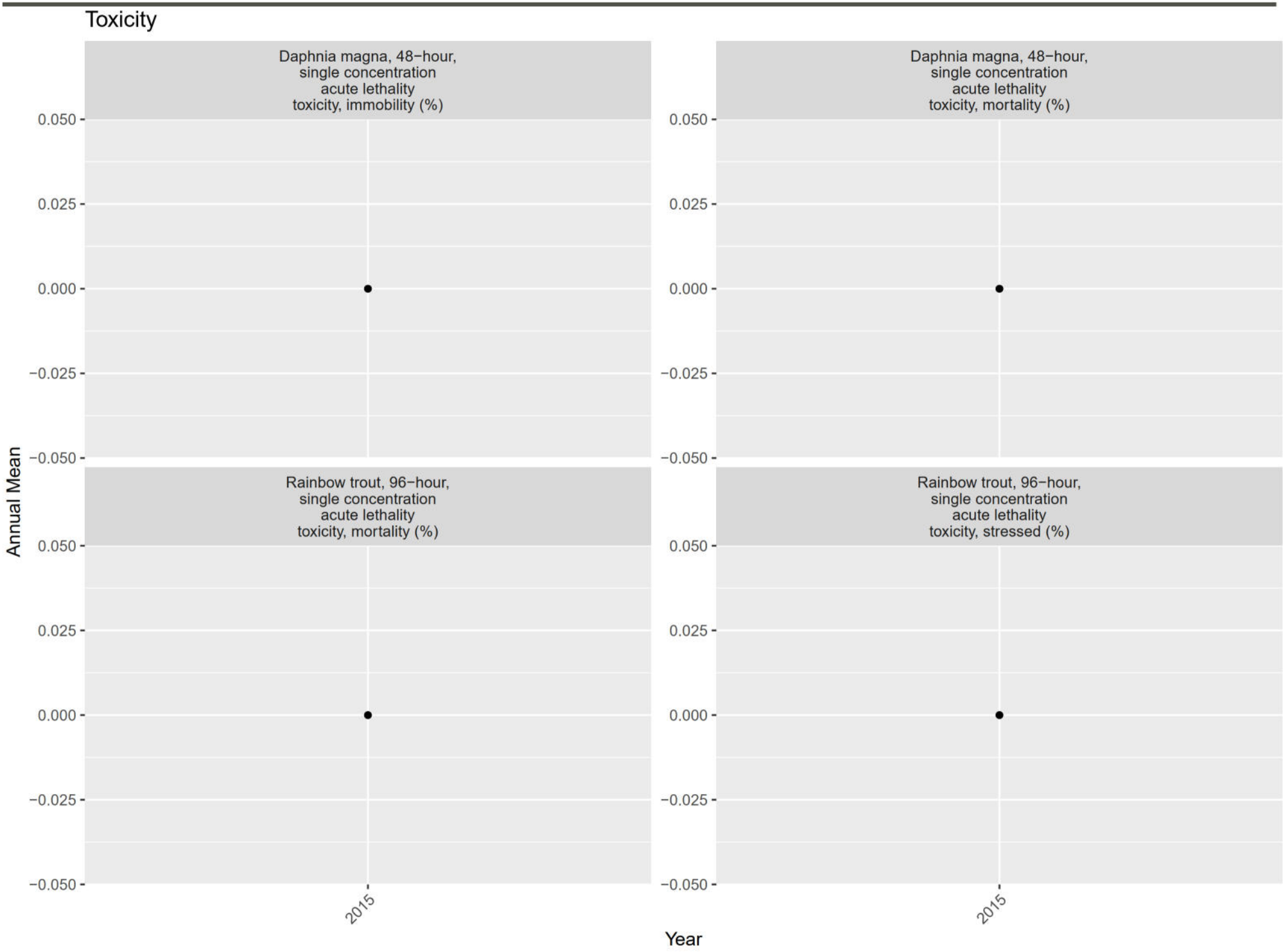

Field Measured
Conductivity (µS/cm)
650
625
600
575
550
Dissolved Oxygen (%)
94
92
90
88
Dissolved Oxygen (mg/L)
12.25
12.00
11.75
11.50
Oxidation−Reduction Potential (mV)
120
80
40
pH (−)
8.3
8.2
8.1
Temperature (°C)
5.2
4.8
4.4
2013
2014
2015
2016
Annual Mean
Year


Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
2012
2013
2014
2015


Nutrients and Biological Indicators
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015


Speciation of Selenium
Total Selenium 4+ (µg/L)
Total Selenium 6+ (µg/L)
Total Selenocyanate (µg/L)
Annual Mean
0.32
0.30
0.28
0.26
0.24
29.76
29.74
29.72
29.70
29.68
0.10
0.08
0.06
0.04
0.02
2013
2013
2013
Year

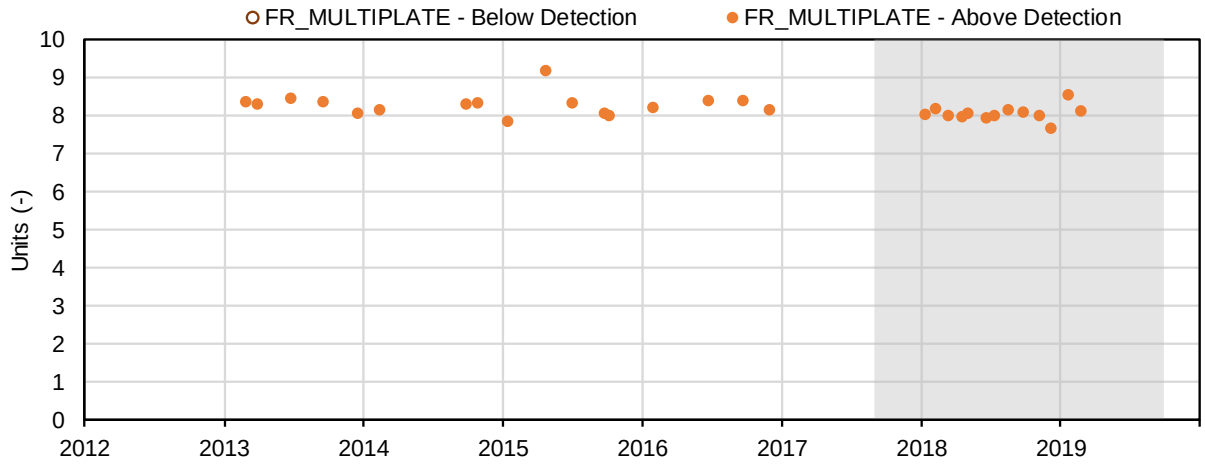

Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016


Toxicity
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, immobility (%)
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, stressed (%)
Annual Mean
0.050
0.025
0.000
−0.025
−0.050
2015
Year

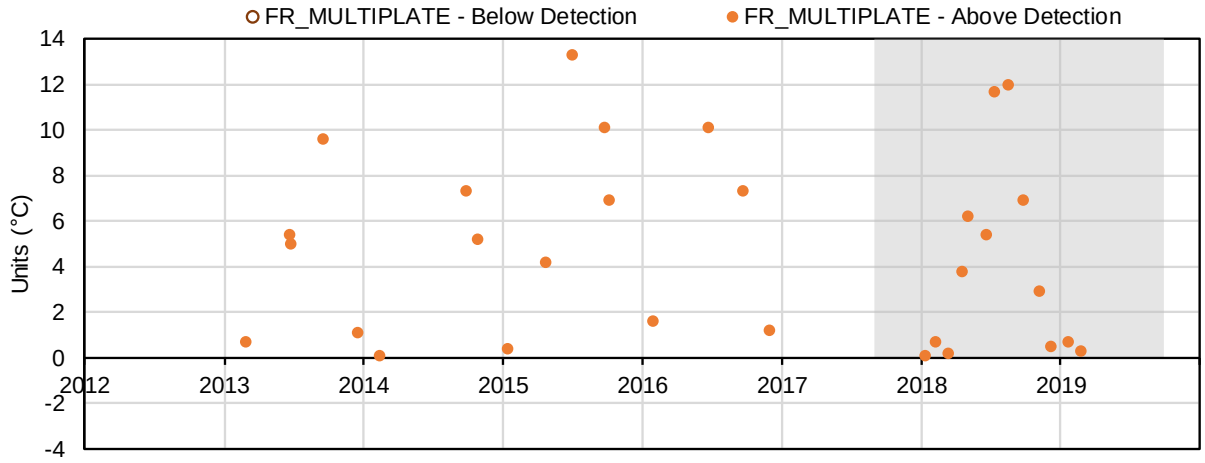
ATTACHMENT F5

F5 FR_MULTIPLATE Plots

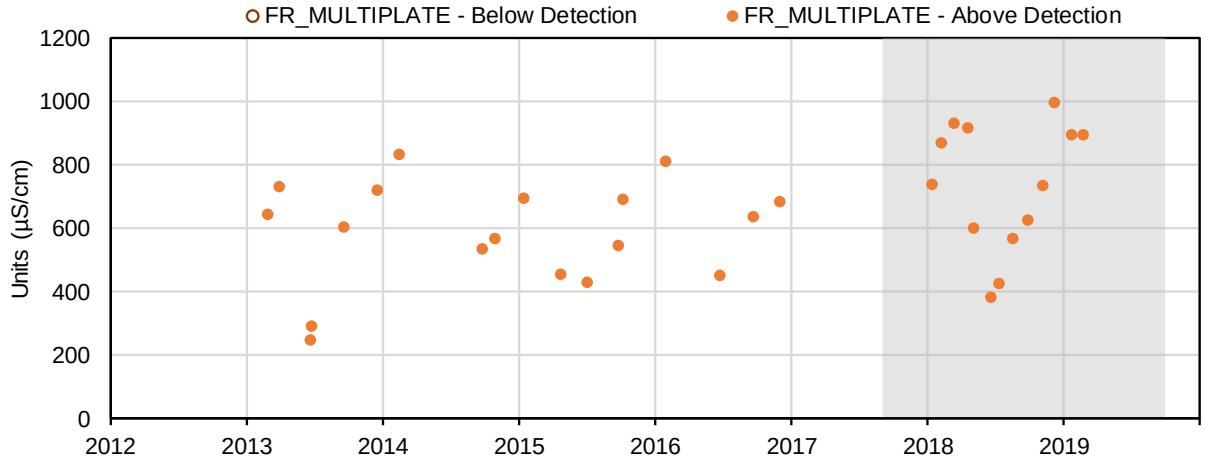
(1) pH (-); Field Measured



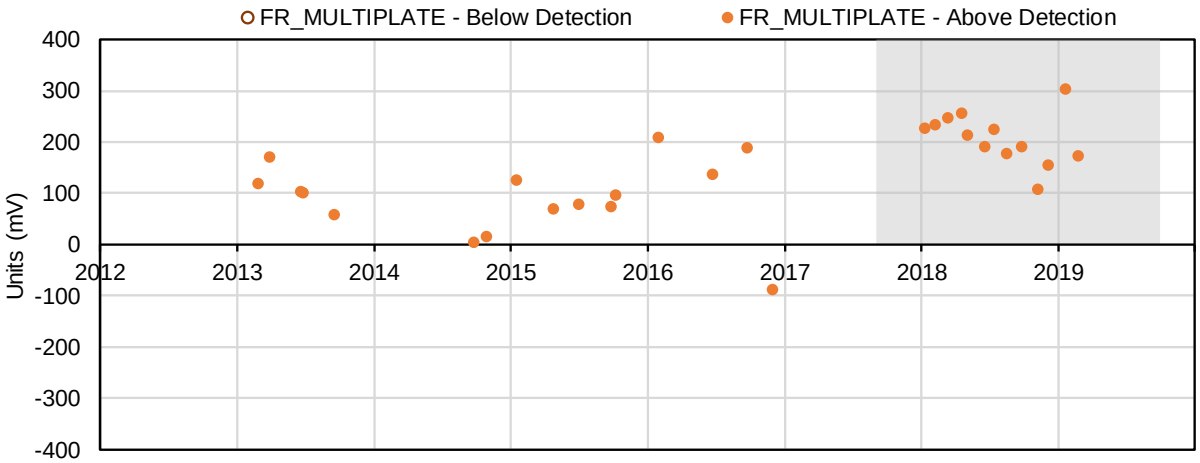
(2) Temperature (°C); Field Measured



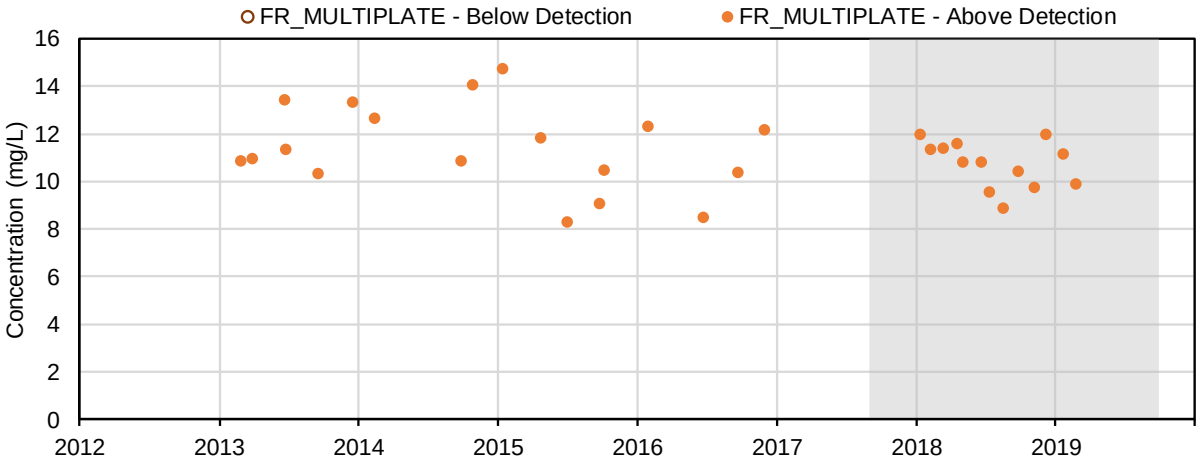
(3) Conductivity (µS/cm); Field Measured



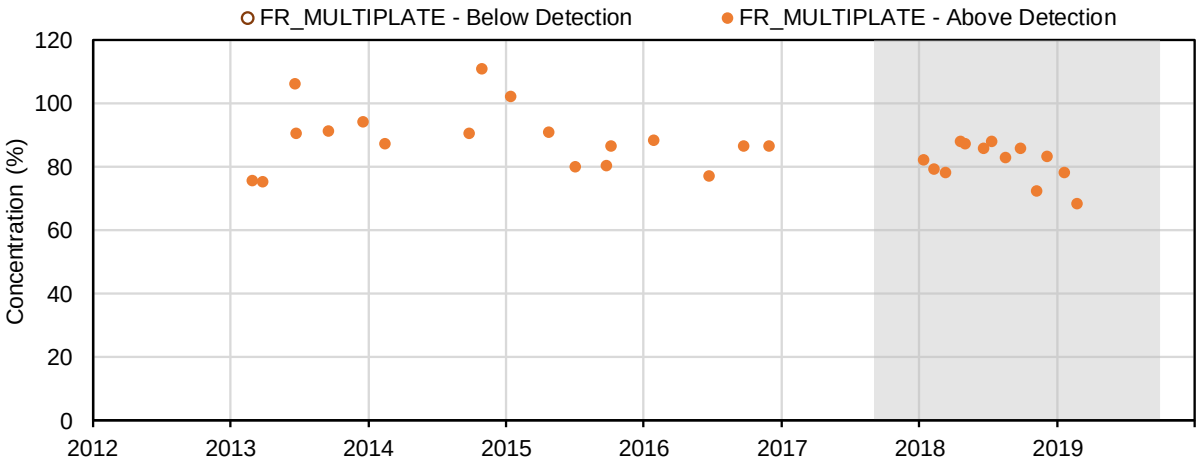
(4) Oxidation-Reduction Potential (mV); Field Measured



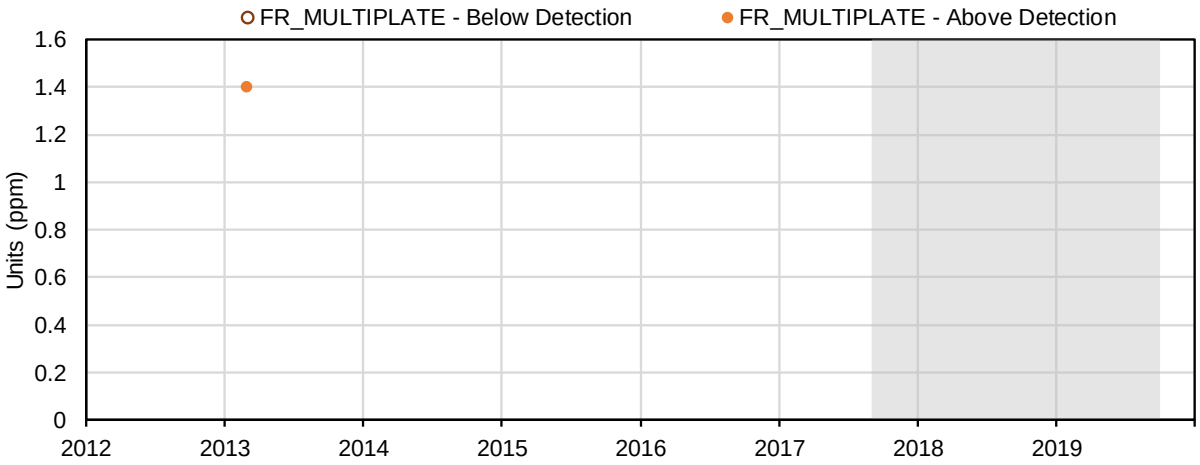
(5) Dissolved Oxygen (mg/L); Field Measured



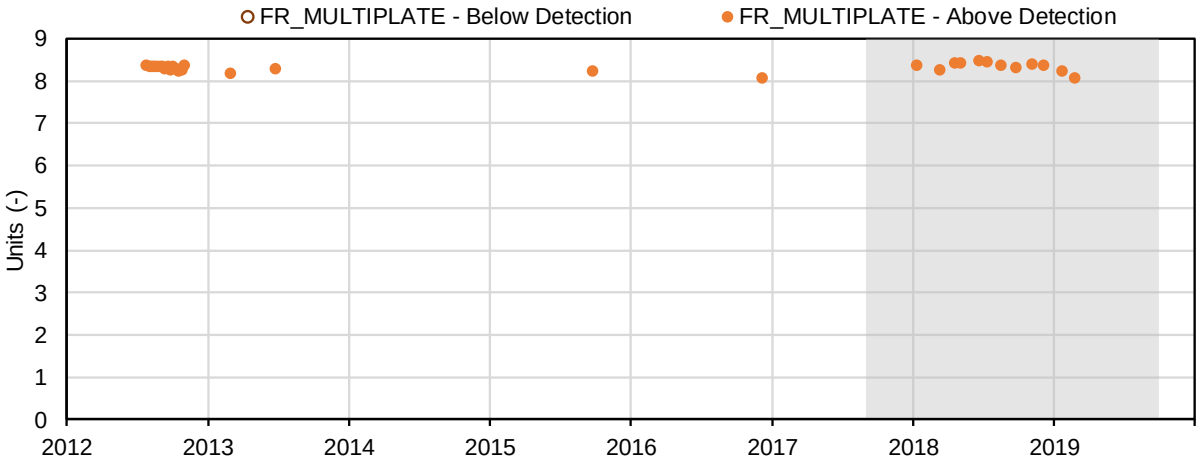
(6) Dissolved Oxygen (%); Field Measured



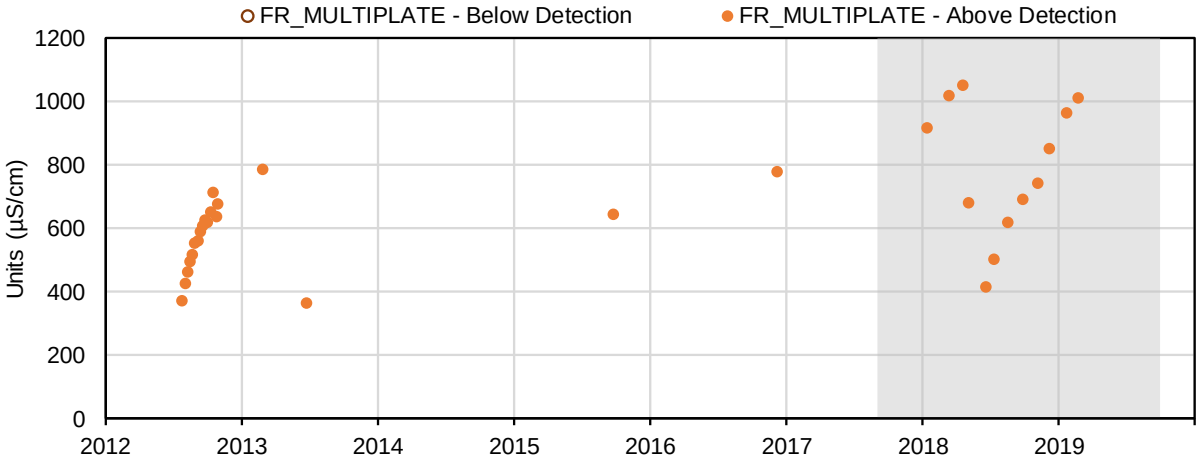
(7) Total Suspended Solids (ppm); Field Measured



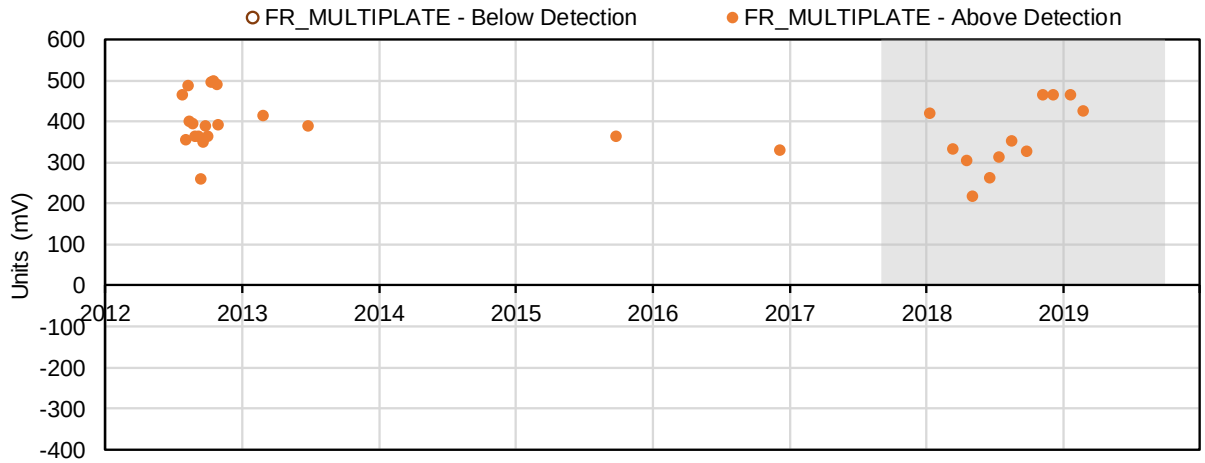
(8) pH (-); Conventional Parameters



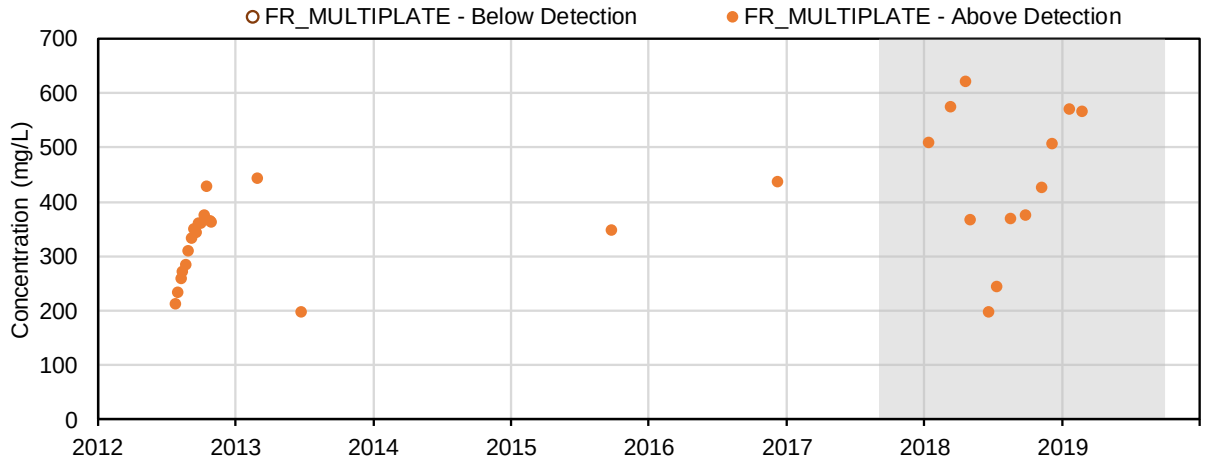
(9) Conductivity (µS/cm); Conventional Parameters



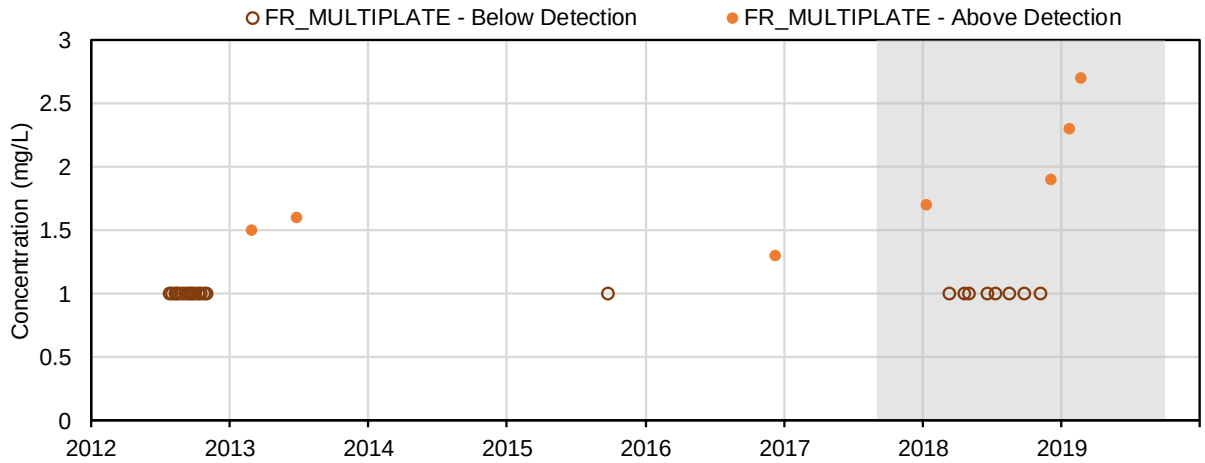
(10) Oxidation-Reduction Potential (mV); Conventional Parameters



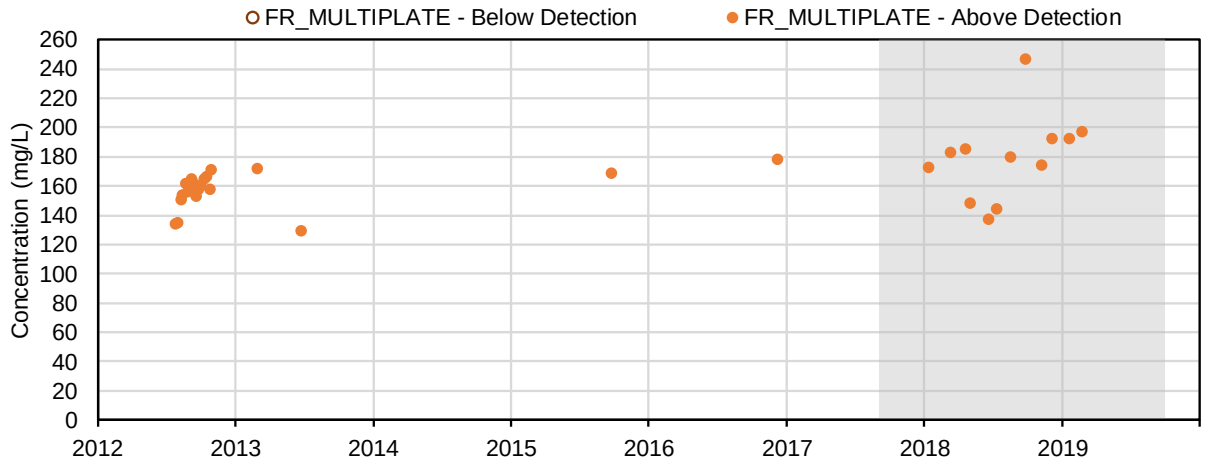
(11) Hardness, as CaCO3 (mg/L); Conventional Parameters



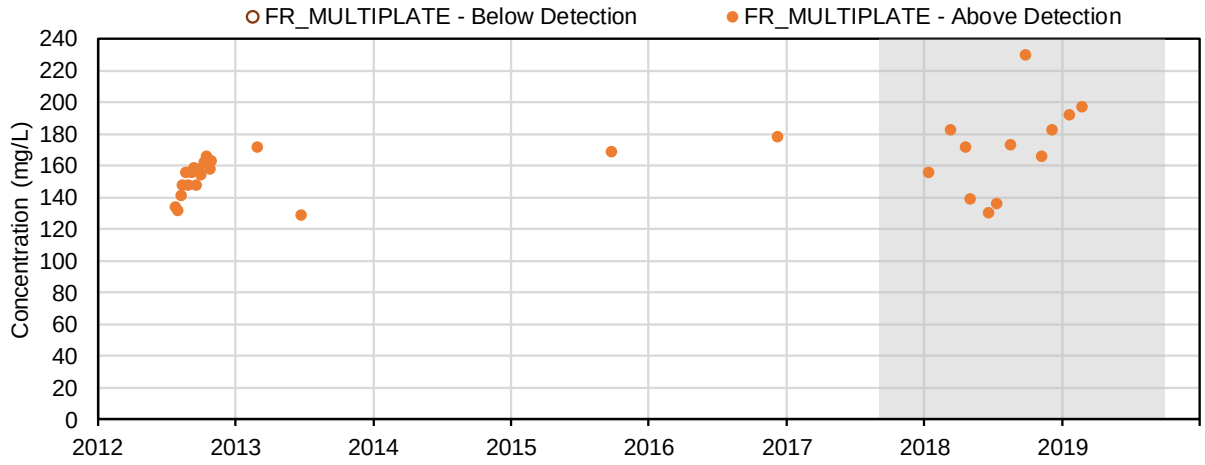
(12) Acidity, CaCO3 (mg/L); Conventional Parameters



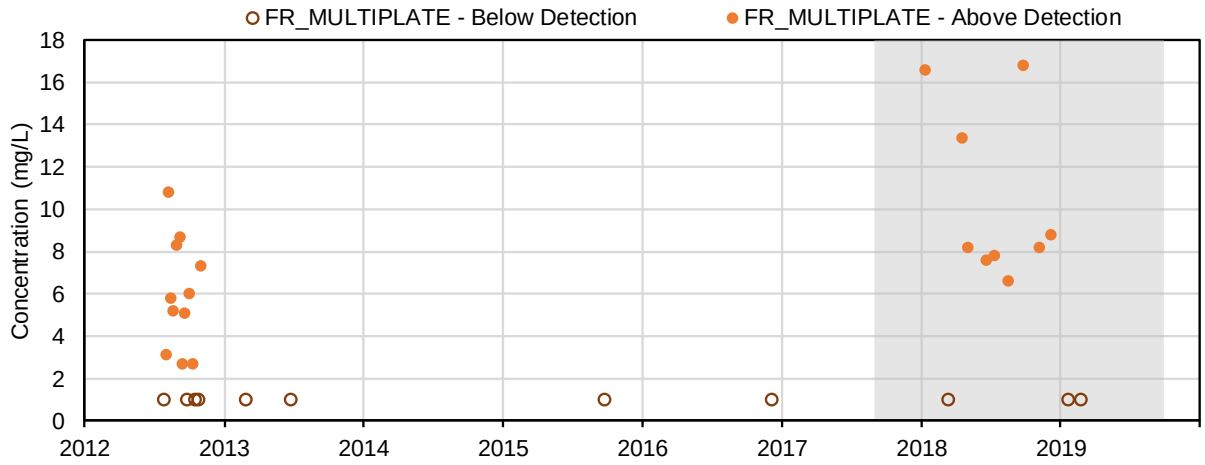
(13) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



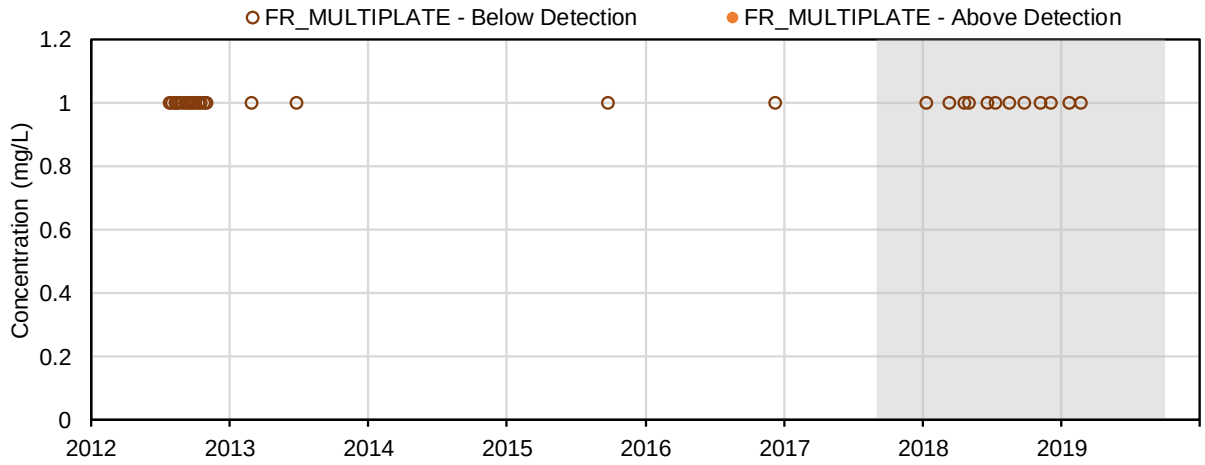
(14) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



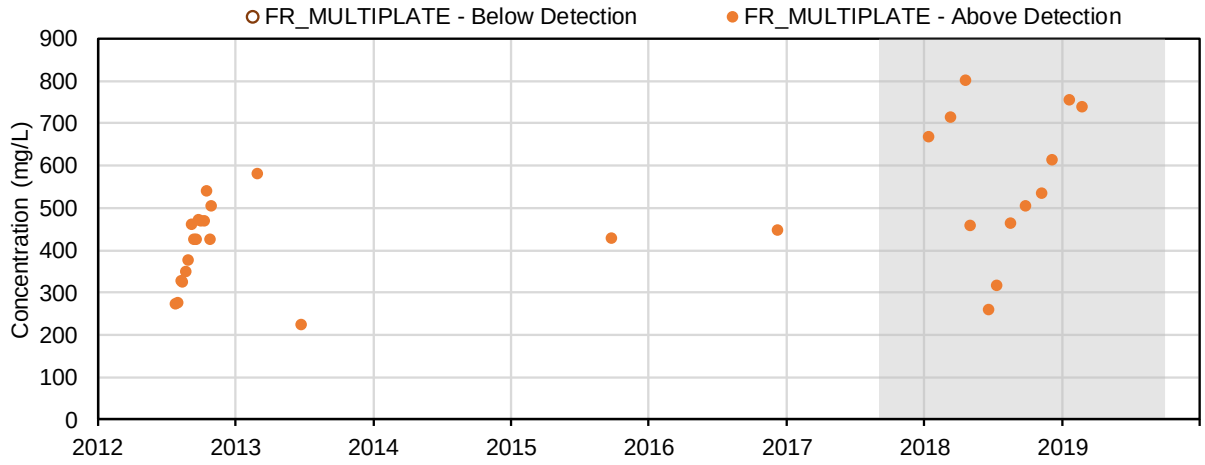
(15) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



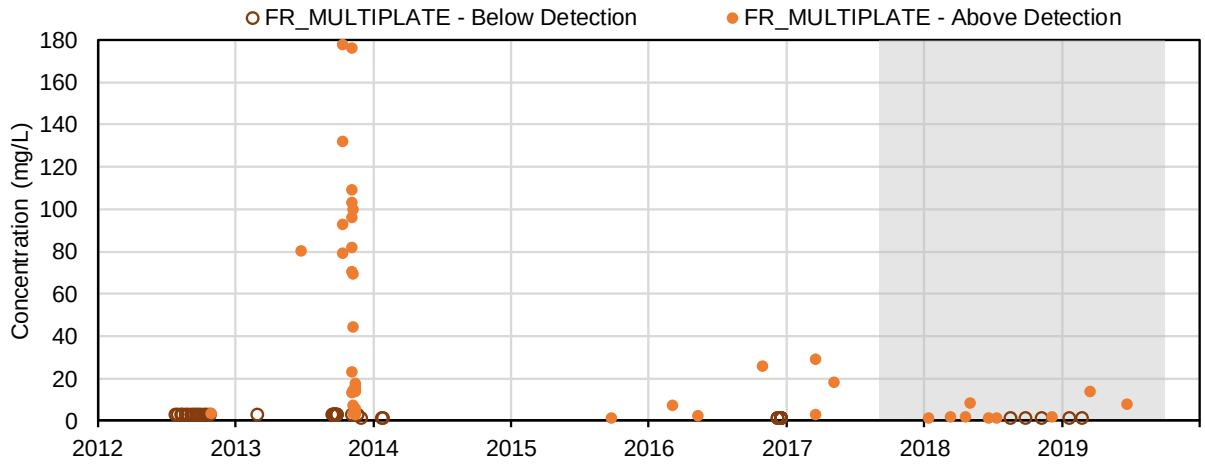
(16) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



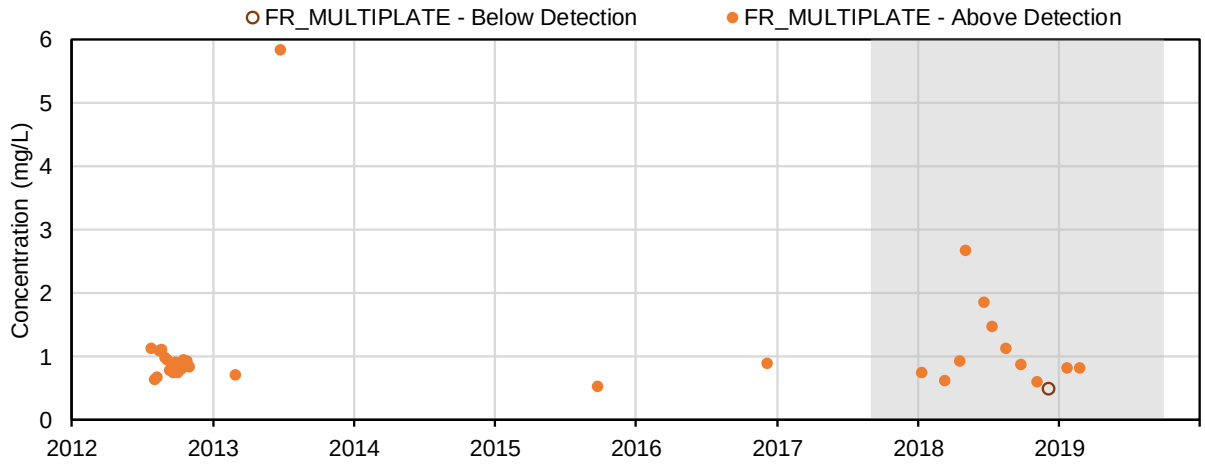
(17) Total dissolved solids (mg/L); Conventional Parameters



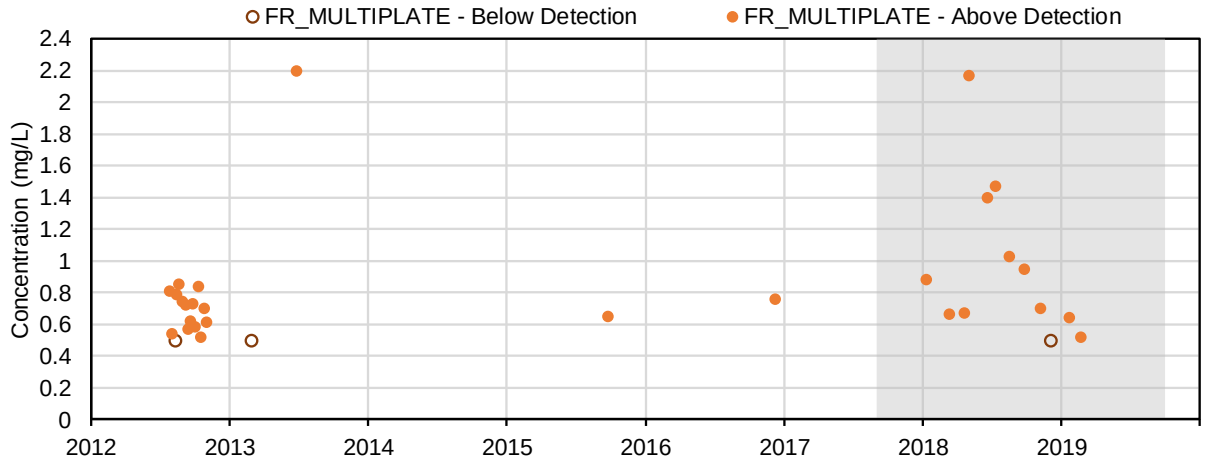
(18) Total suspended solids (mg/L); Conventional Parameters



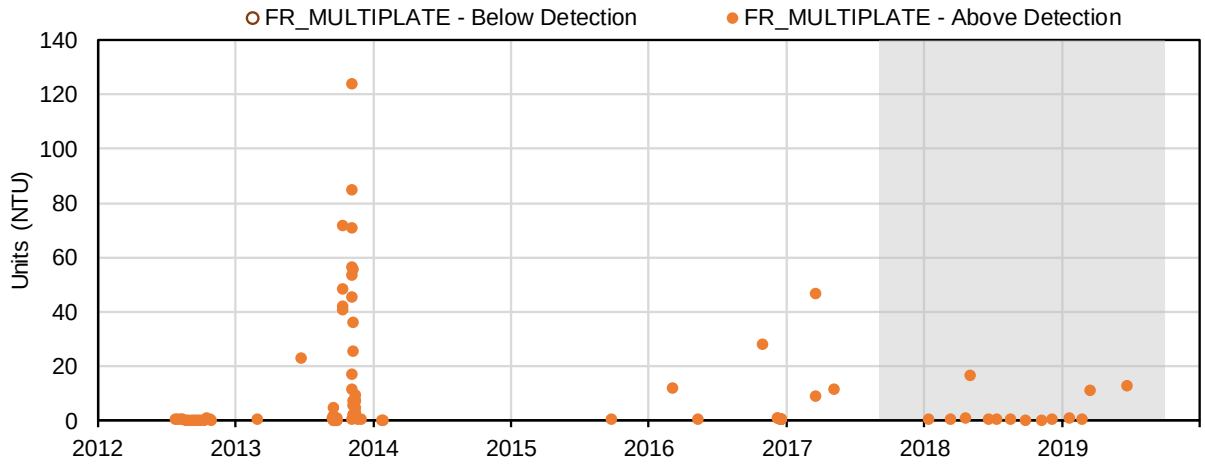
(19) Total organic carbon (mg/L); Conventional Parameters



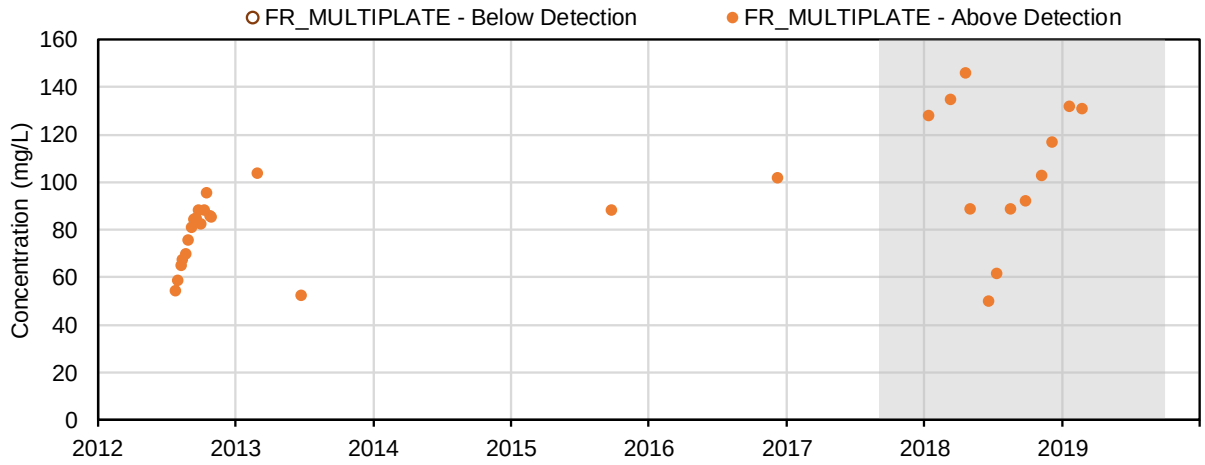
(20) Dissolved organic carbon (mg/L); Conventional Parameters



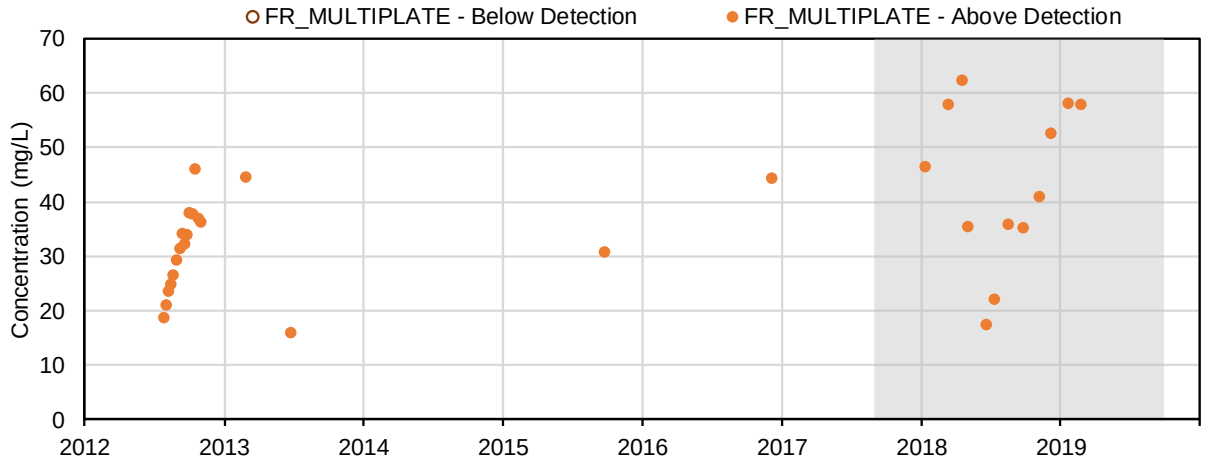
(21) Turbidity (NTU); Conventional Parameters



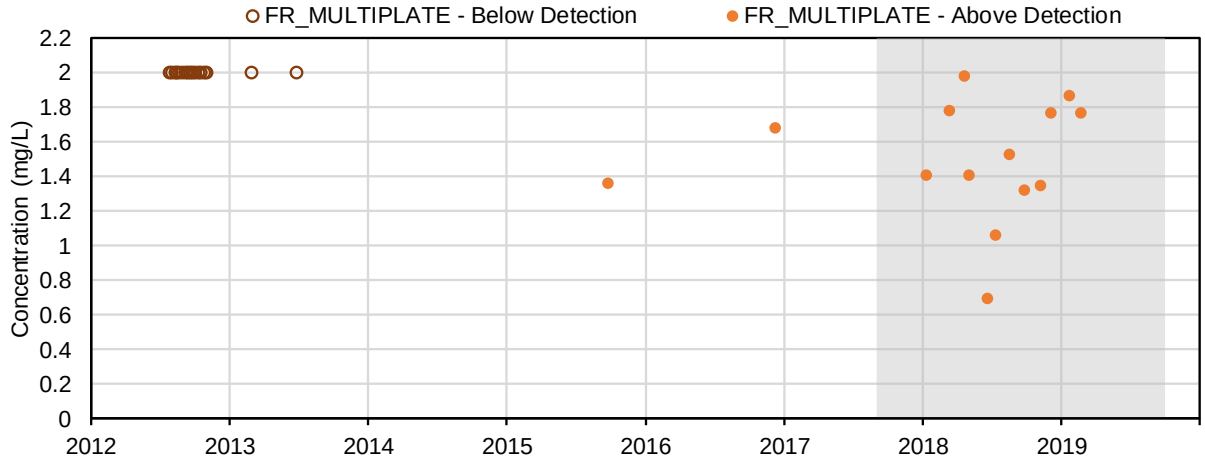
(22) Calcium (mg/L); Major Ions



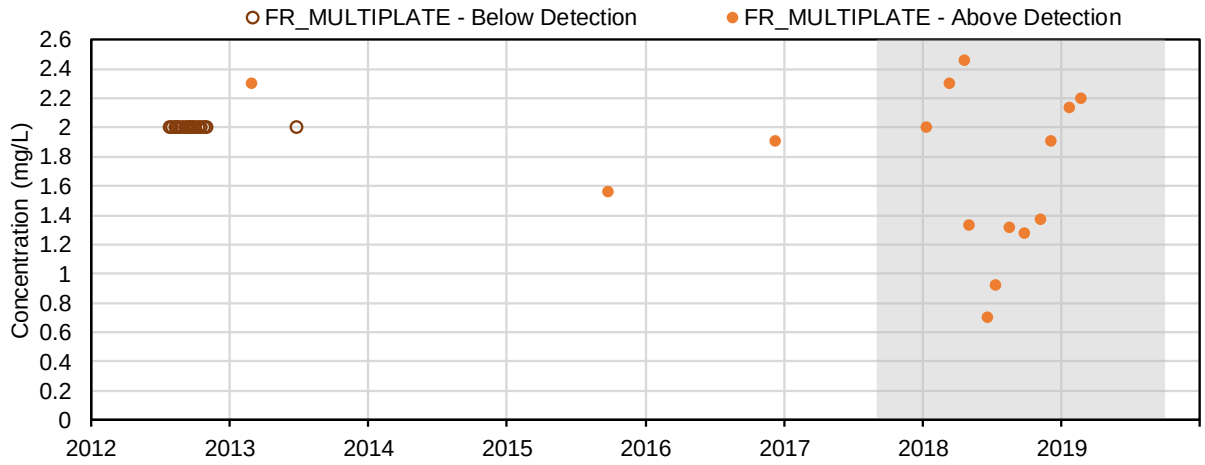
(23) Magnesium (mg/L); Major Ions



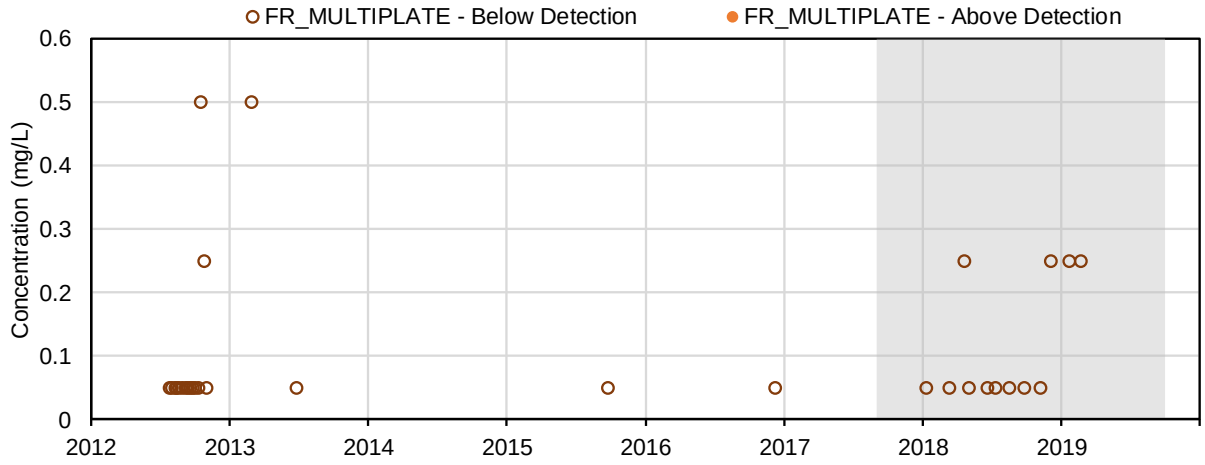
(24) Potassium (mg/L); Major Ions



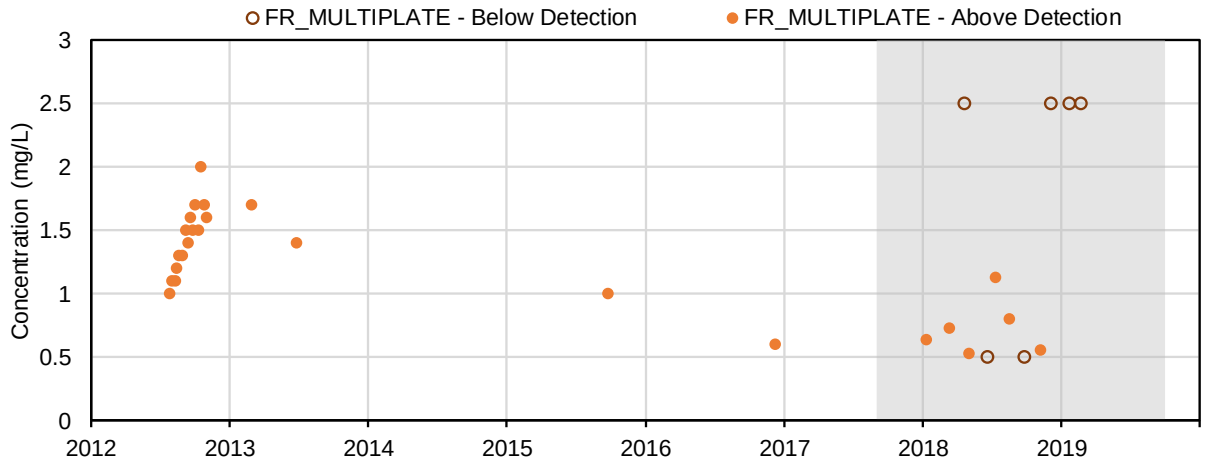
(25) Sodium (mg/L); Major Ions



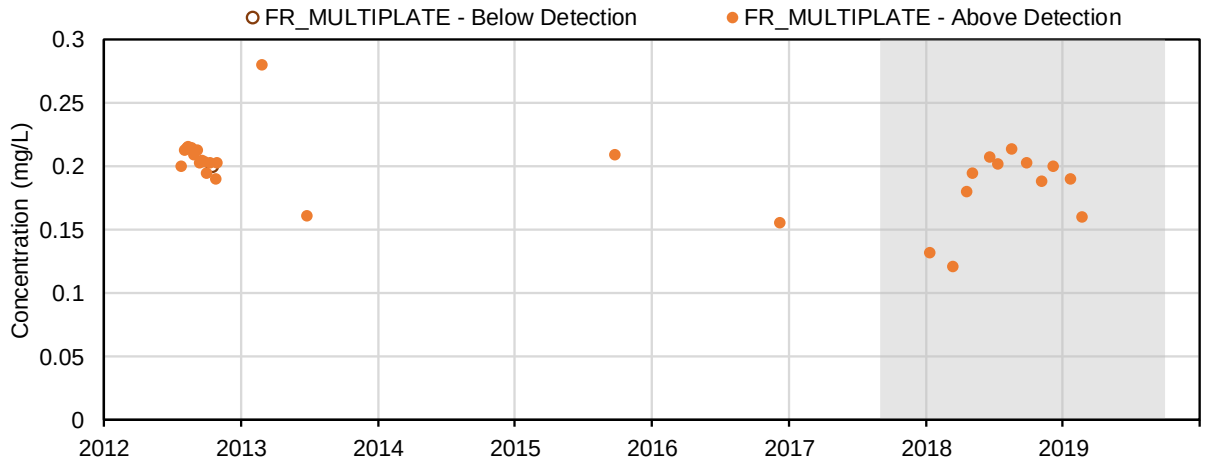
(26) Bromide (mg/L); Major Ions



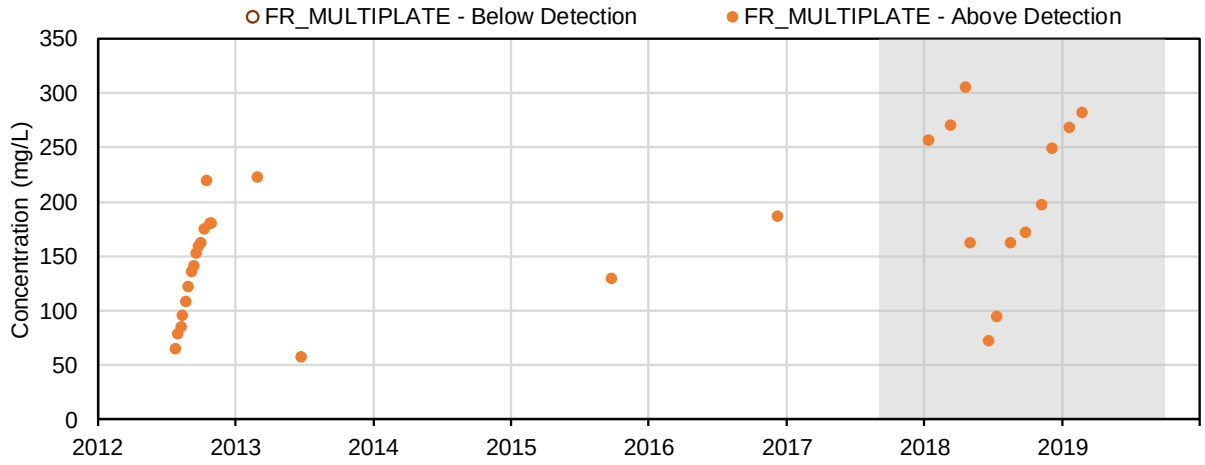
(27) Chloride (mg/L); Major Ions



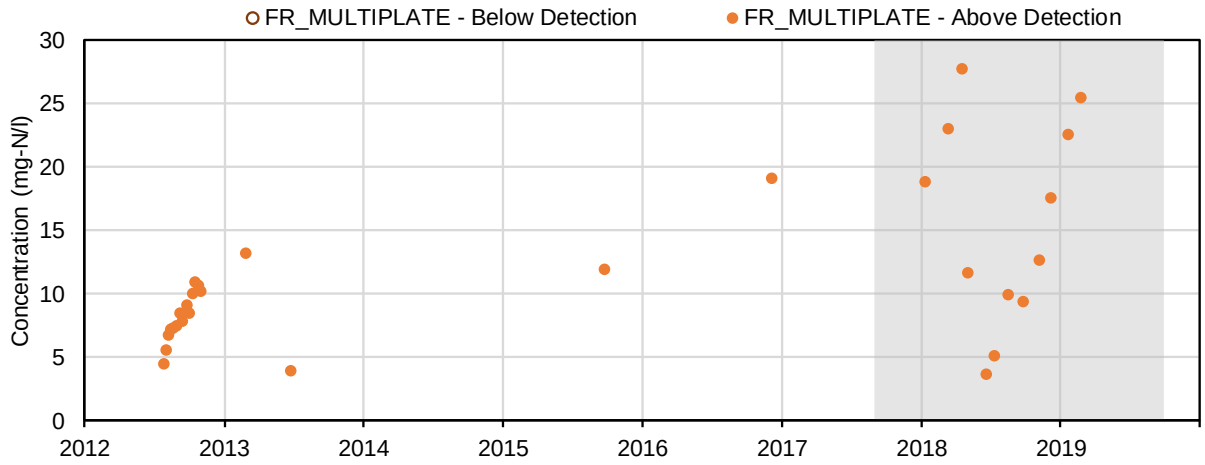
(28) Fluoride (mg/L); Major Ions



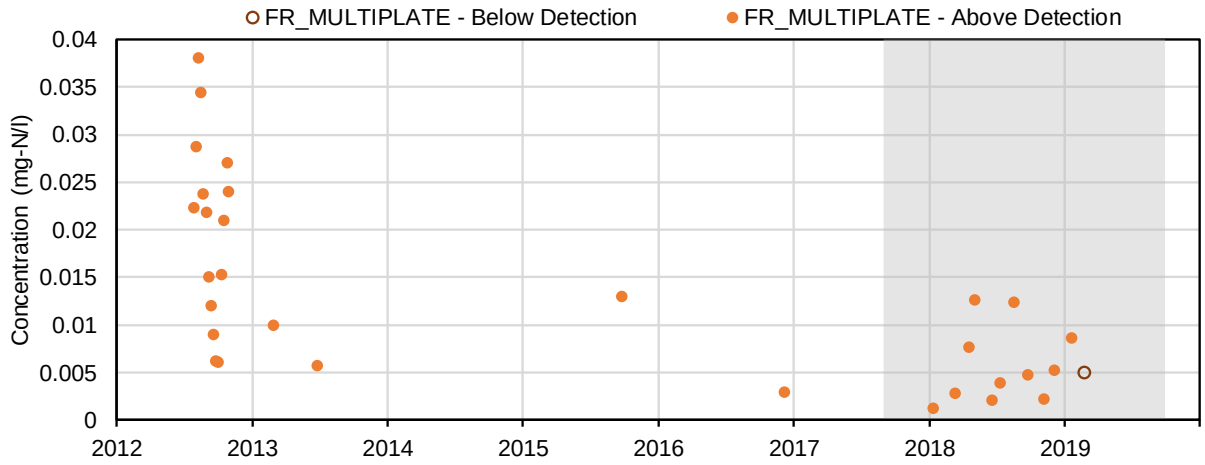
(29) Sulphate (mg/L); Major Ions



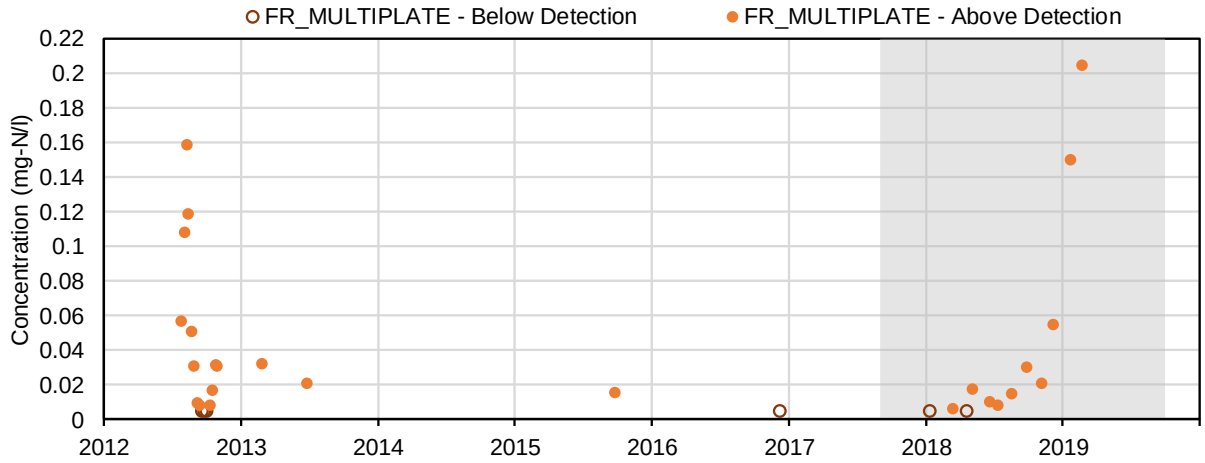
(30) Nitrate (mg-N/l); Nutrients and Biological Indicators



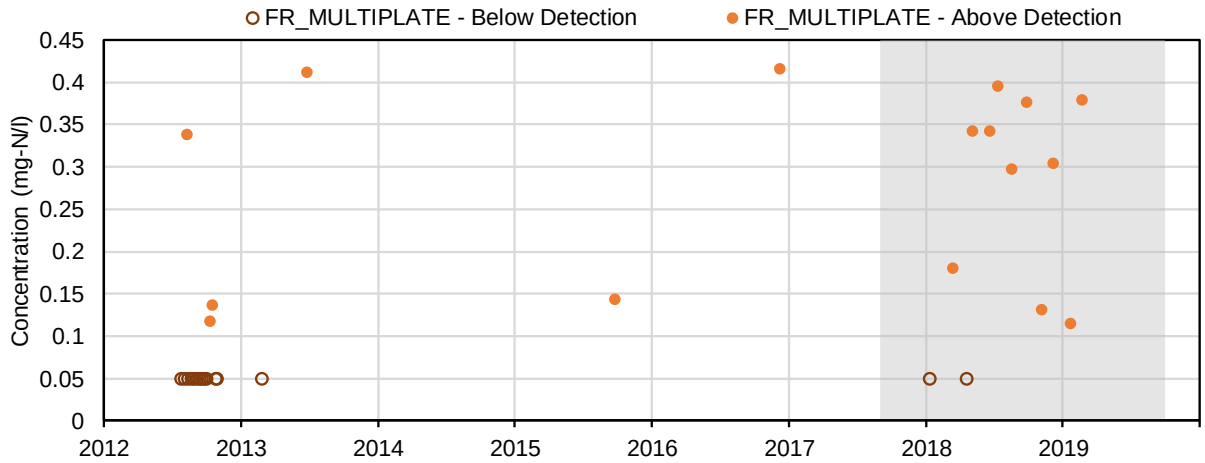
(31) Nitrite (mg-N/l); Nutrients and Biological Indicators



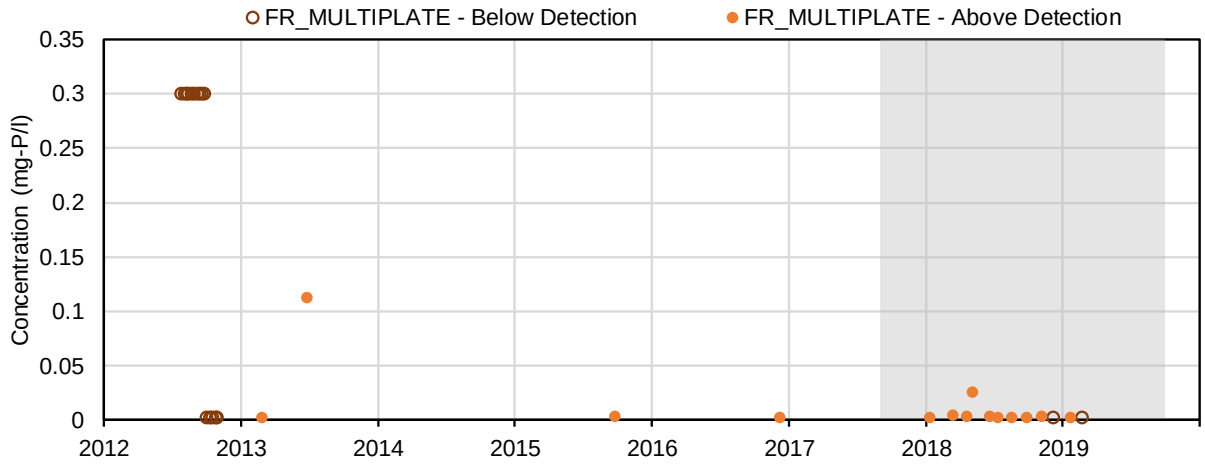
(32) Total ammonia (mg-N/l); Nutrients and Biological Indicators



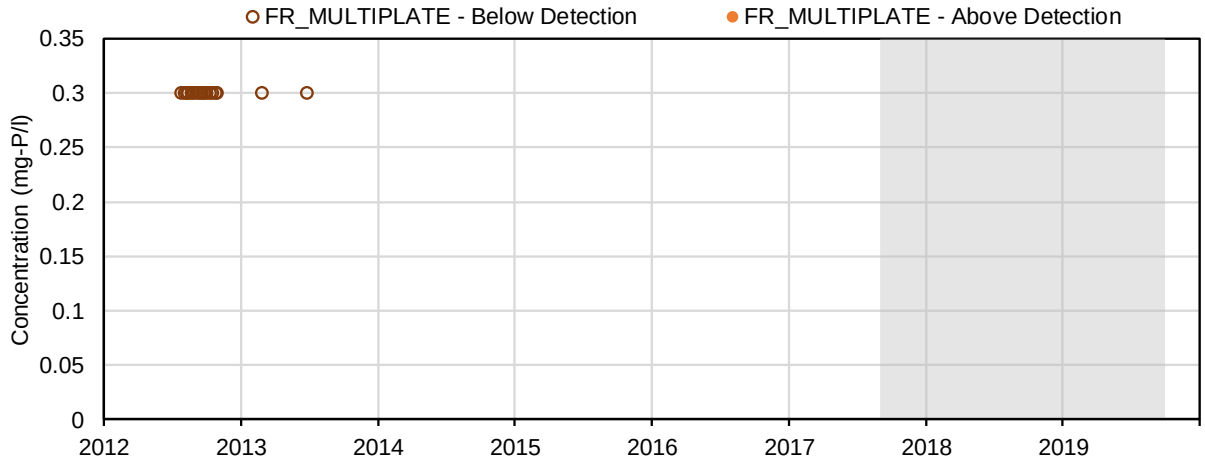
(33) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



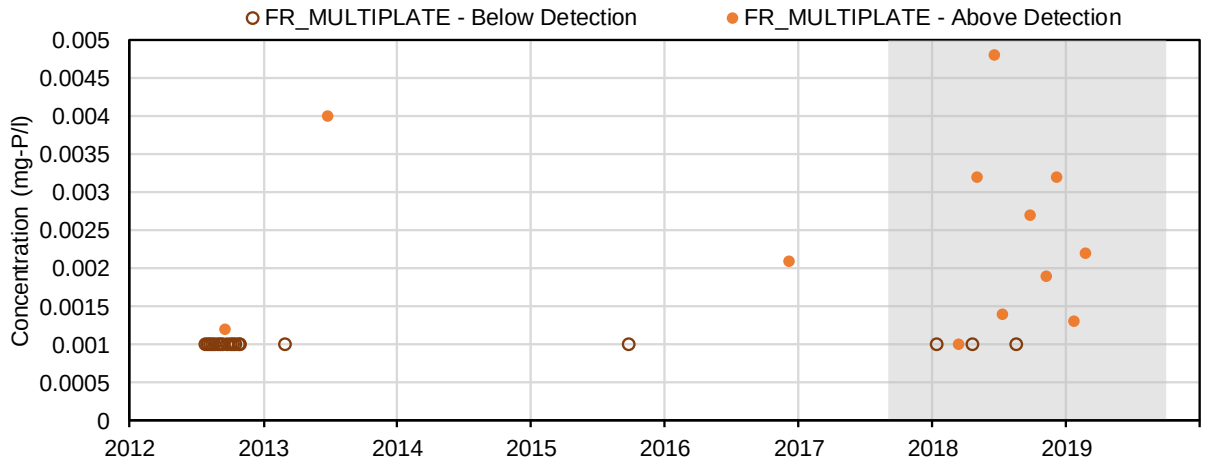
(34) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



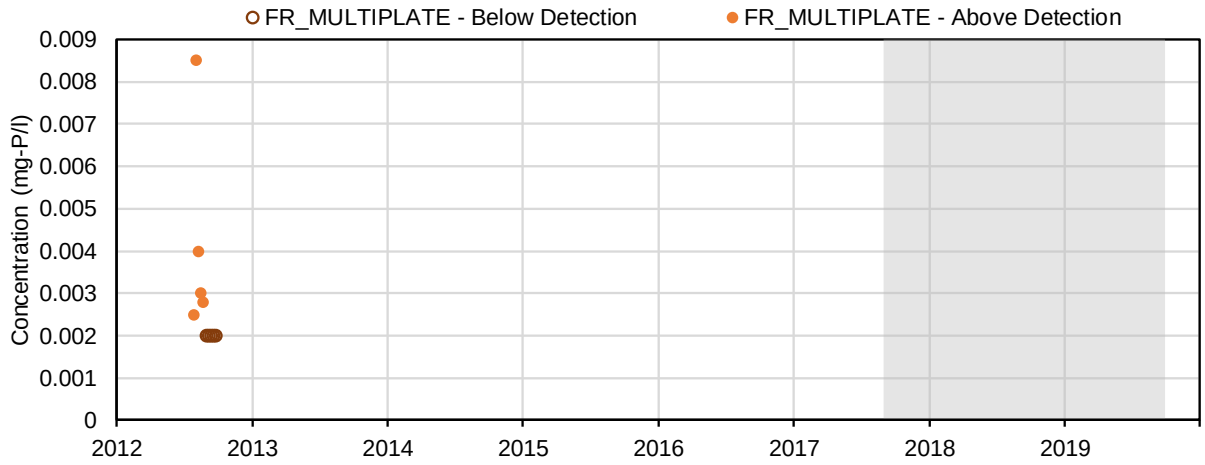
(35) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



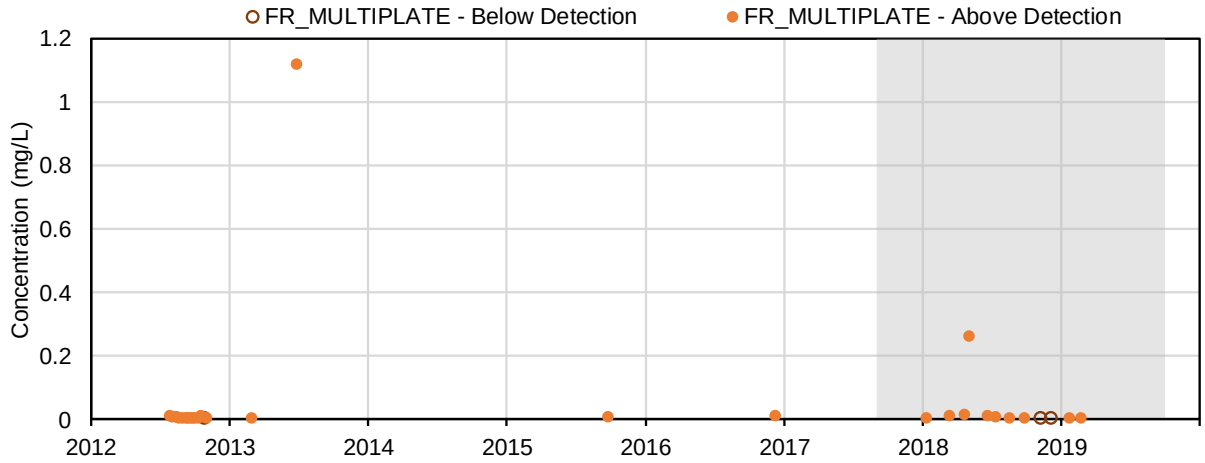
(36) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



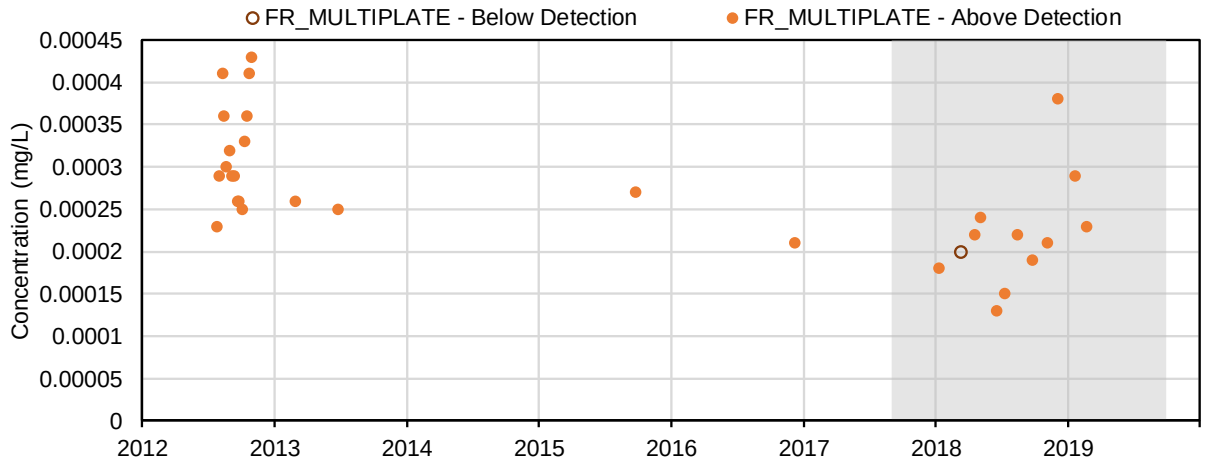
(37) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



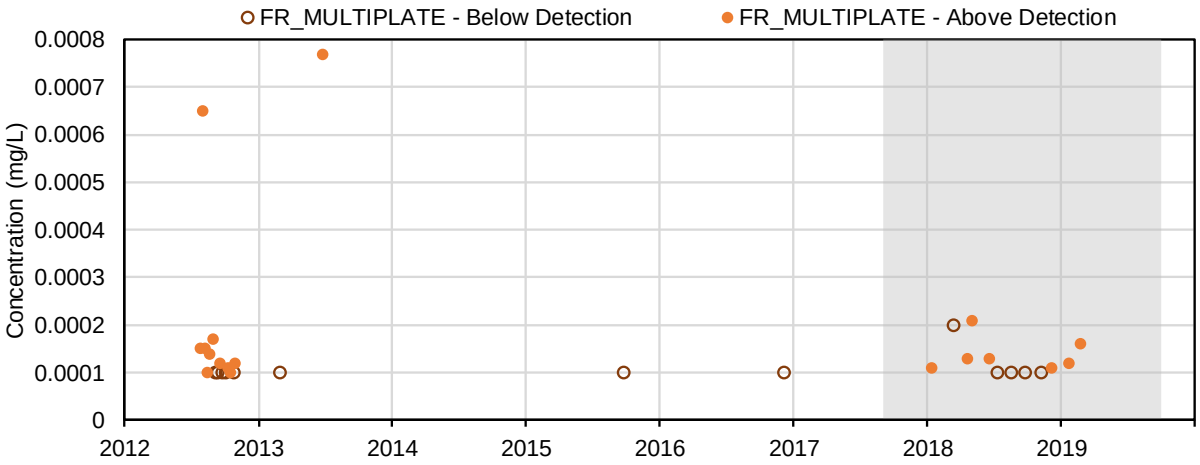
(38) Aluminum (mg/L); Total Metals



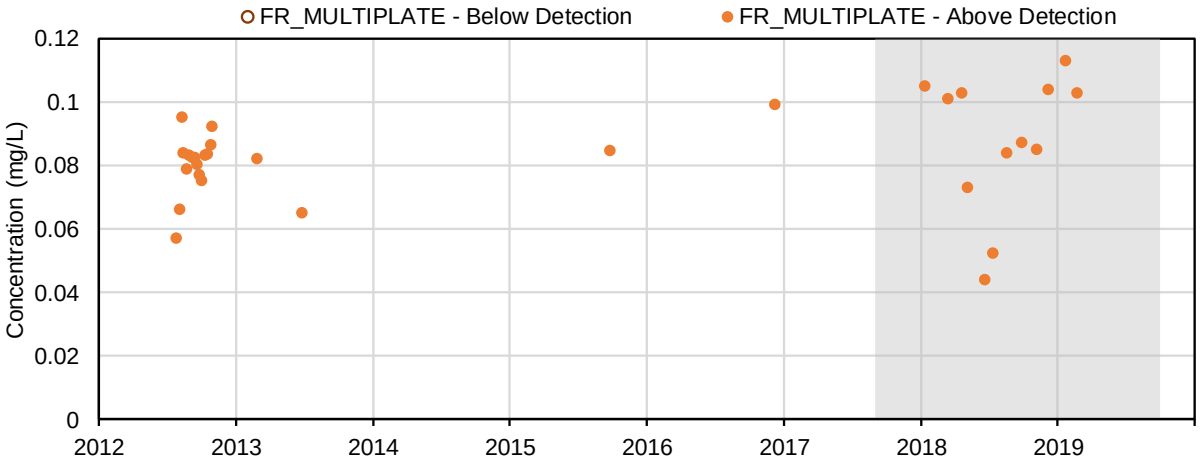
(39) Antimony (mg/L); Total Metals



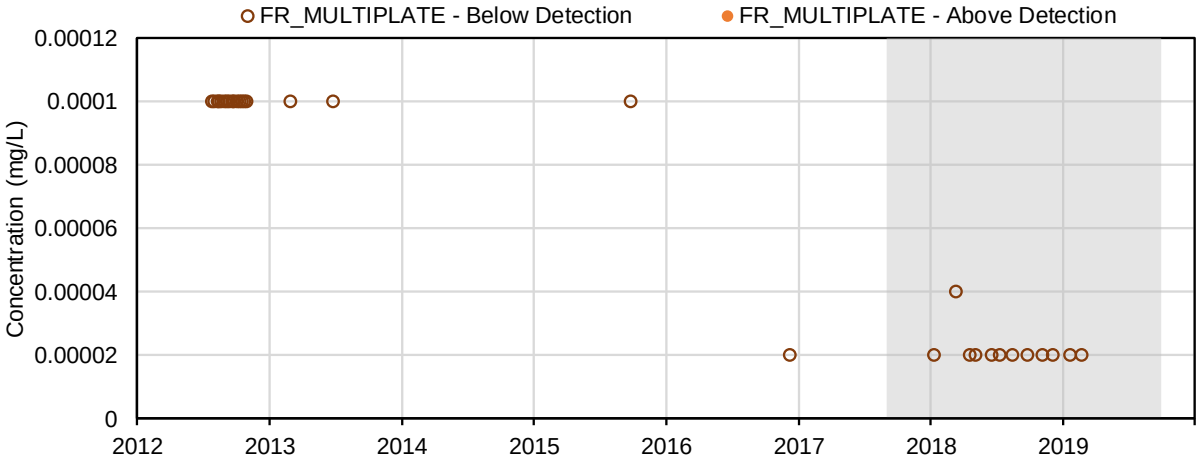
(40) Arsenic (mg/L); Total Metals



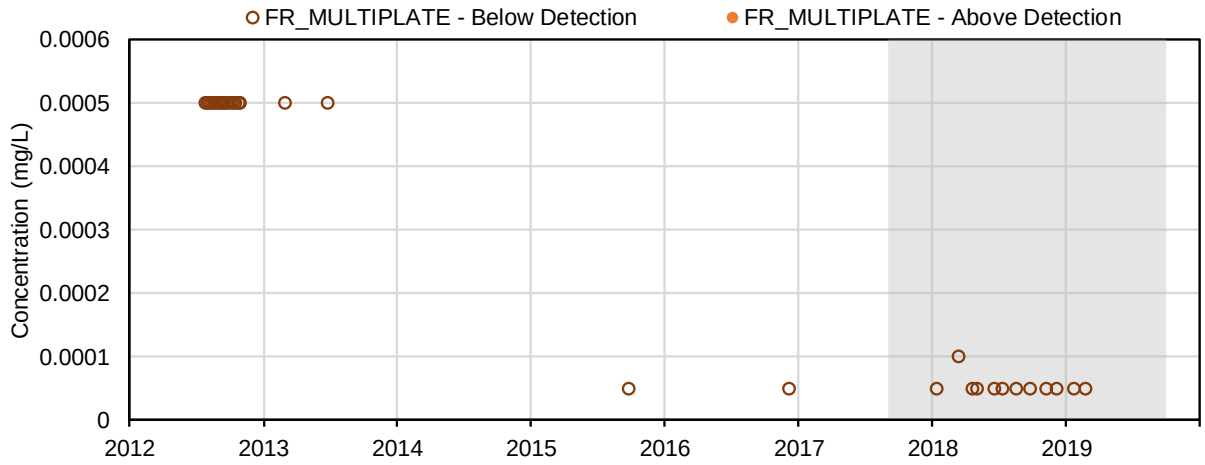
(41) Barium (mg/L); Total Metals



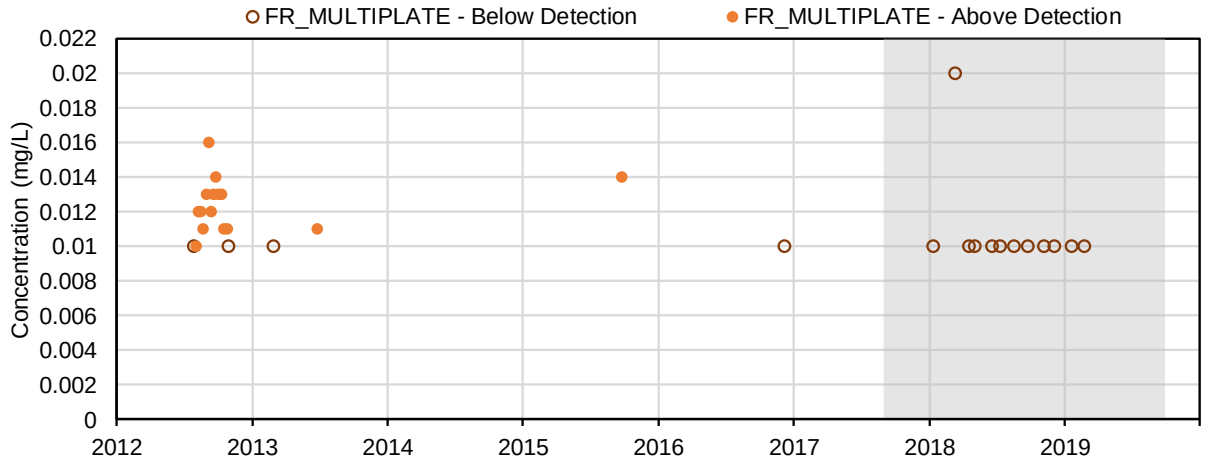
(42) Beryllium (mg/L); Total Metals



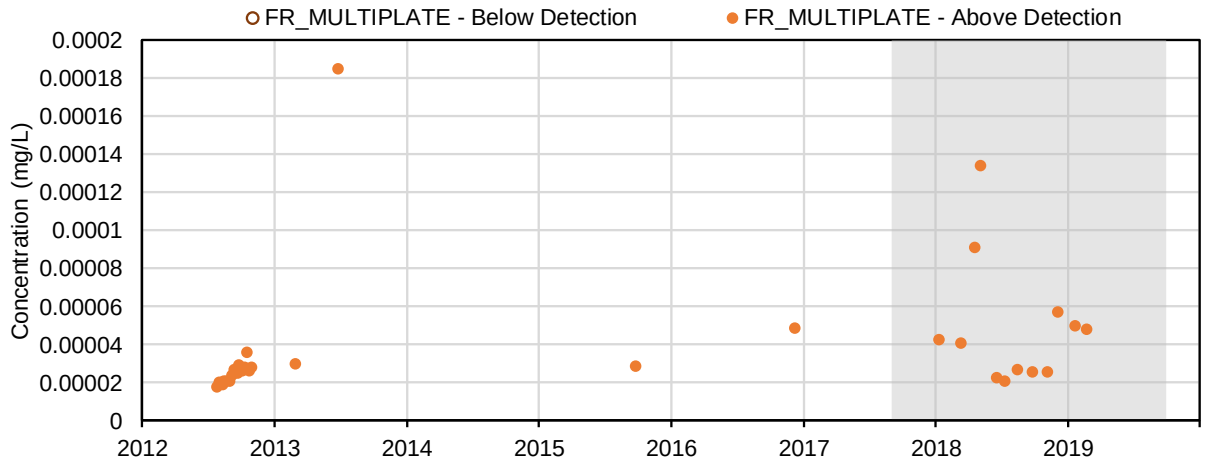
(43) Bismuth (mg/L); Total Metals



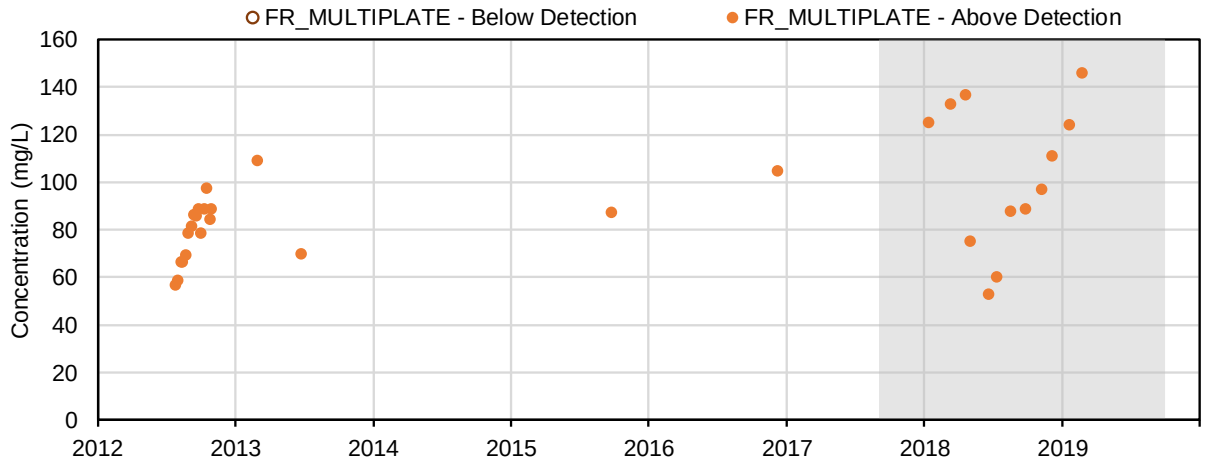
(44) Boron (mg/L); Total Metals



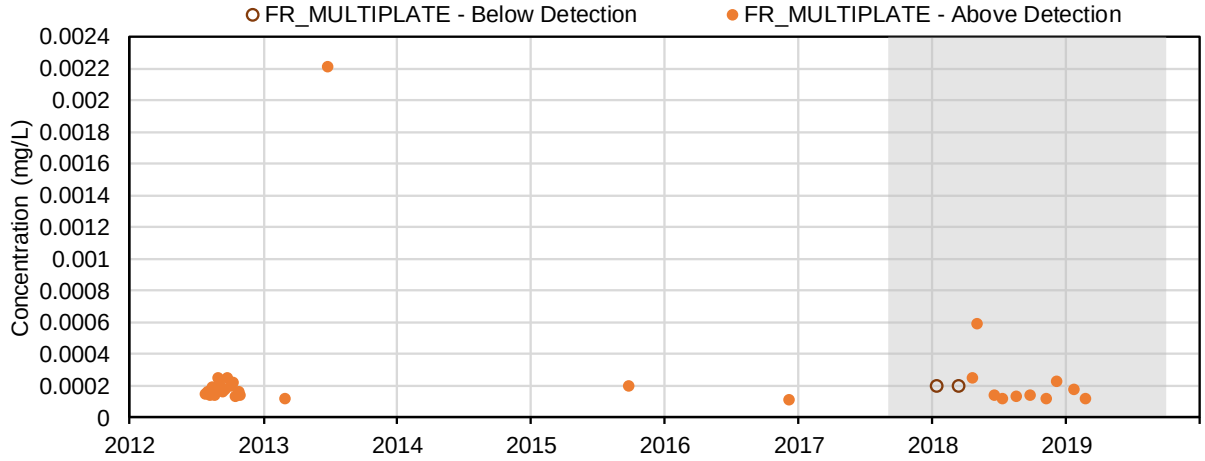
(45) Cadmium (mg/L); Total Metals



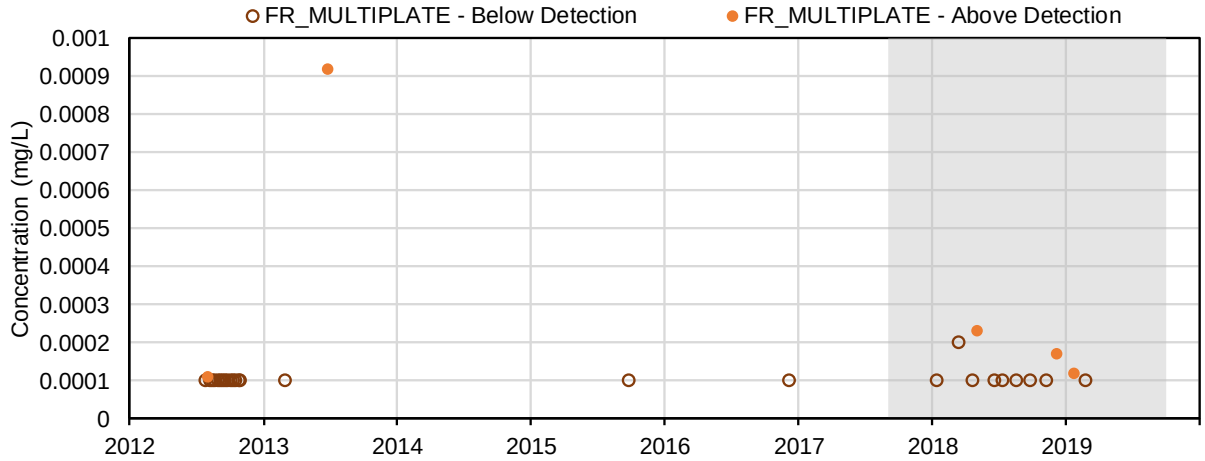
(46) Calcium (mg/L); Total Metals



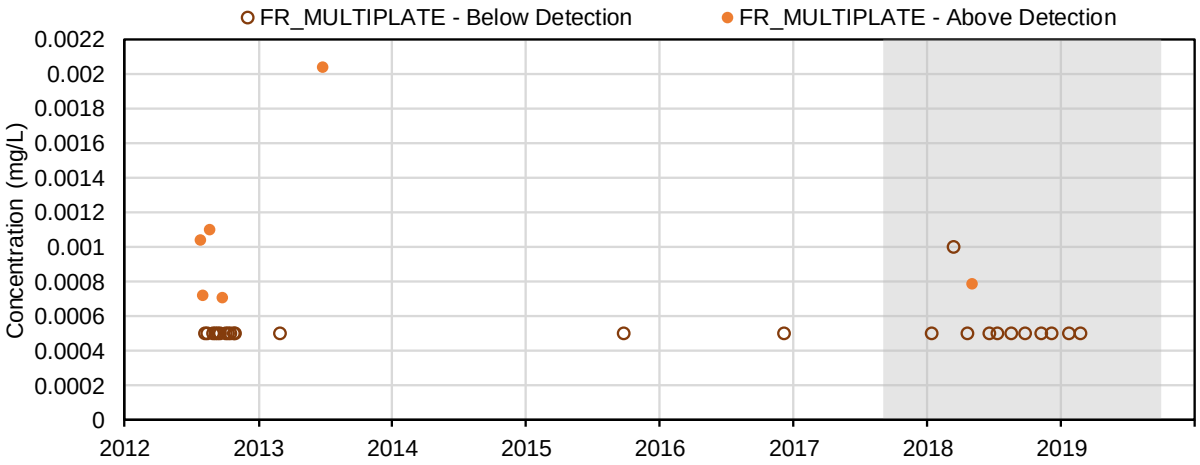
(47) Chromium (mg/L); Total Metals



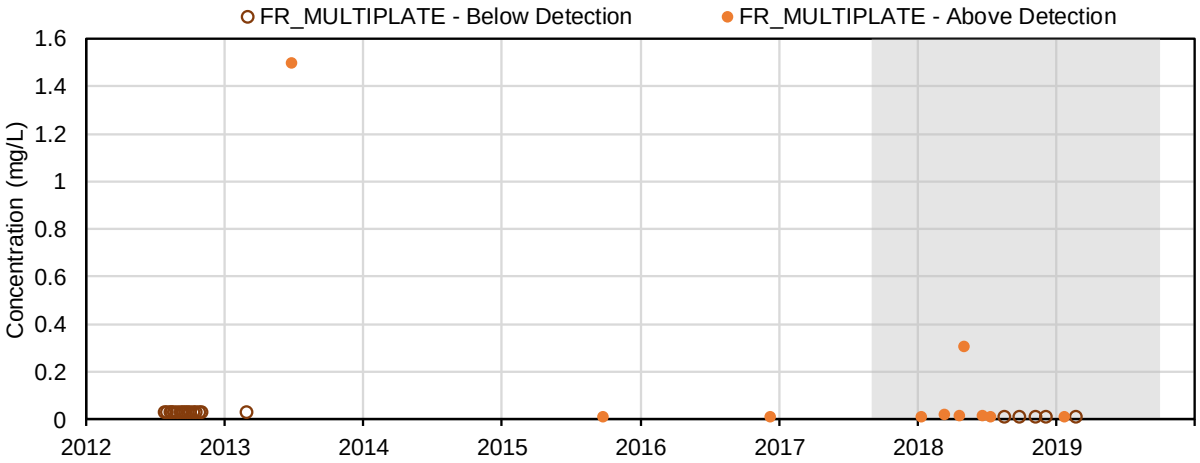
(48) Cobalt (mg/L); Total Metals



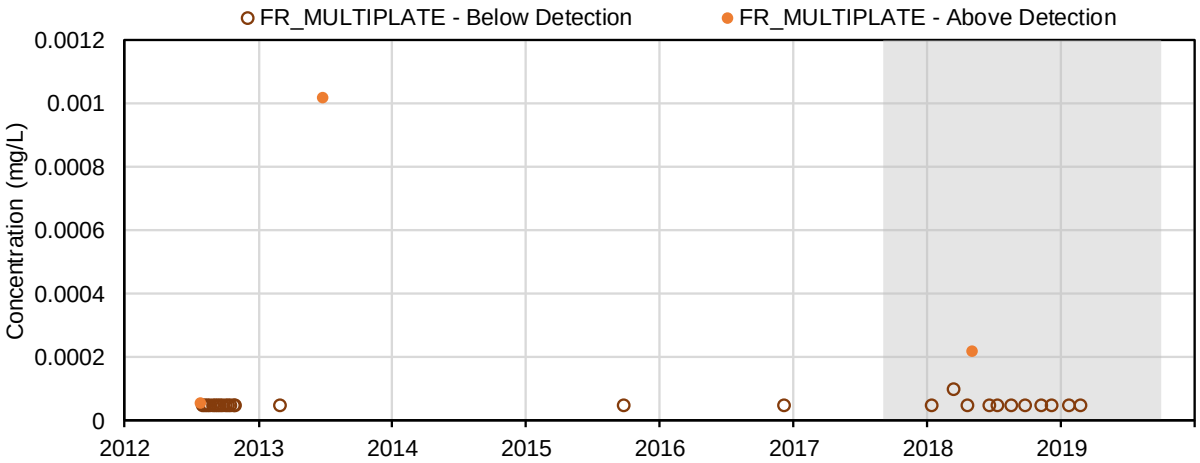
(49) Copper (mg/L); Total Metals



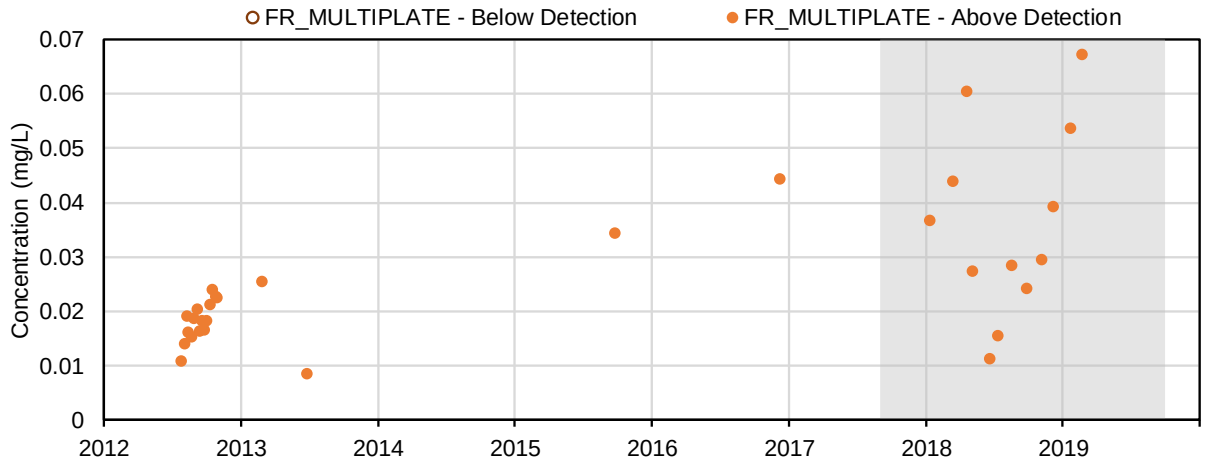
(50) Iron (mg/L); Total Metals



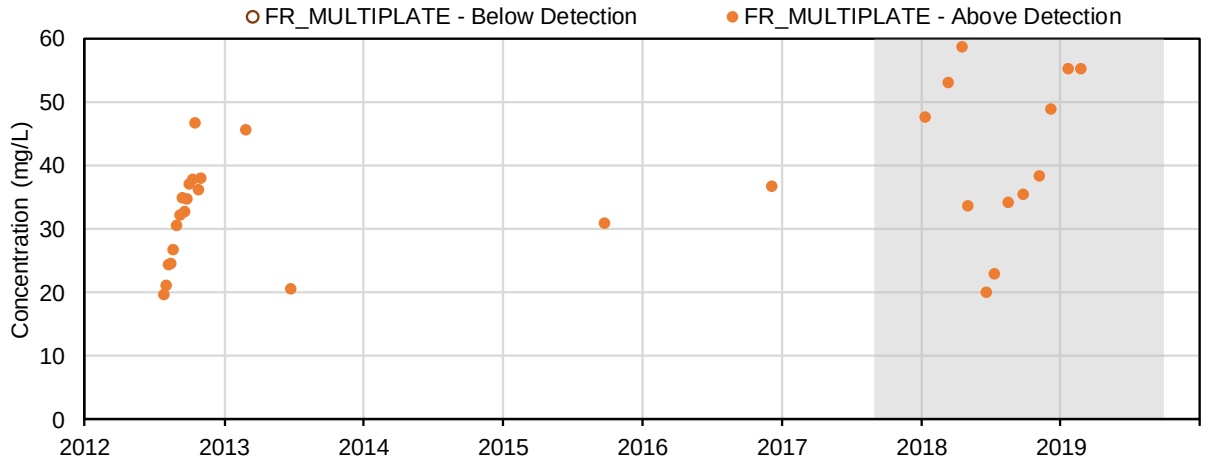
(51) Lead (mg/L); Total Metals



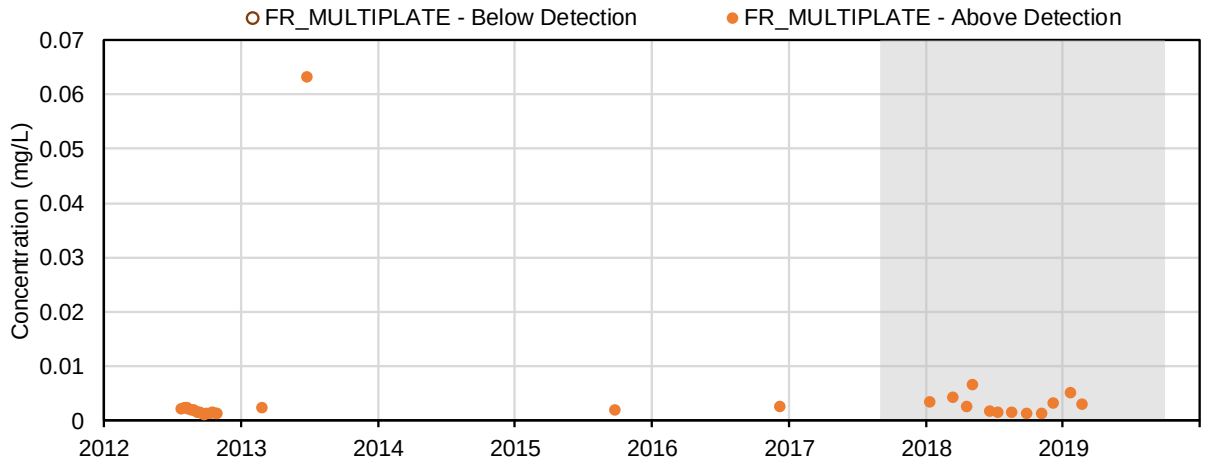
(52) Lithium (mg/L); Total Metals



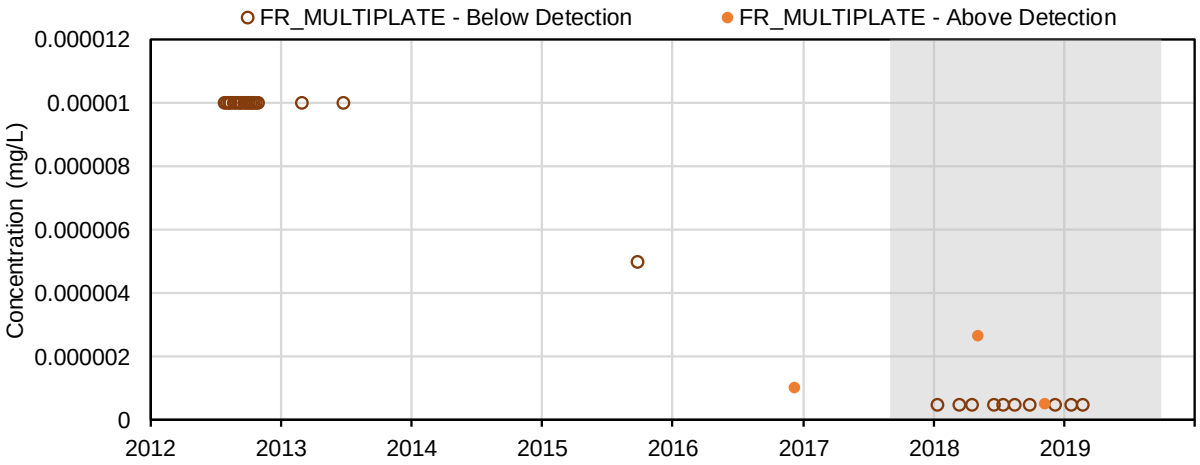
(53) Magnesium (mg/L); Total Metals



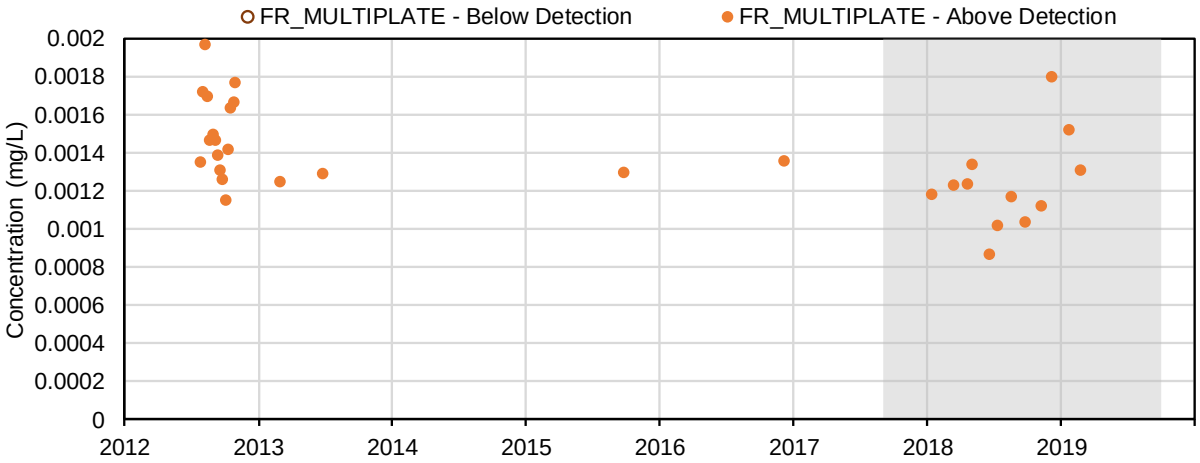
(54) Manganese (mg/L); Total Metals



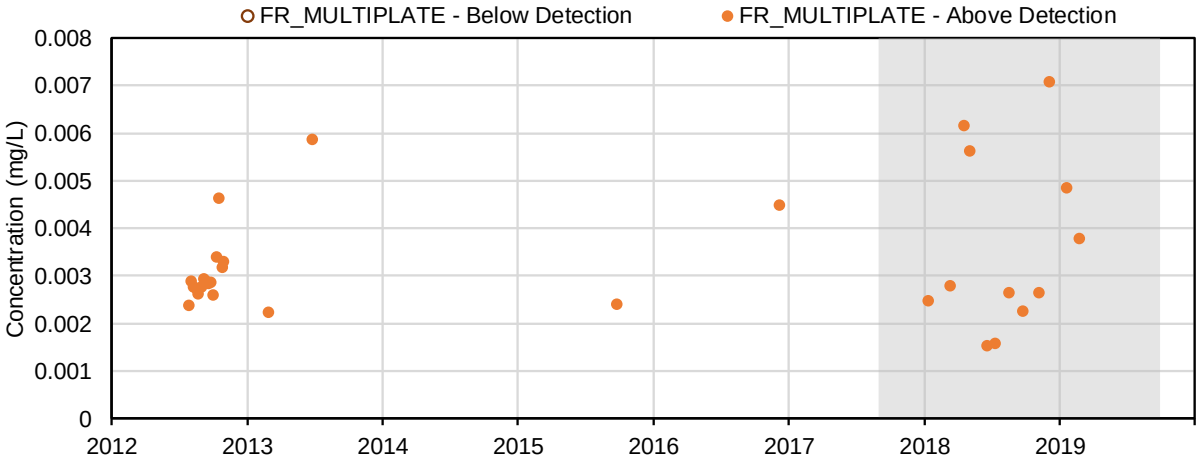
(55) Mercury (mg/L); Total Metals



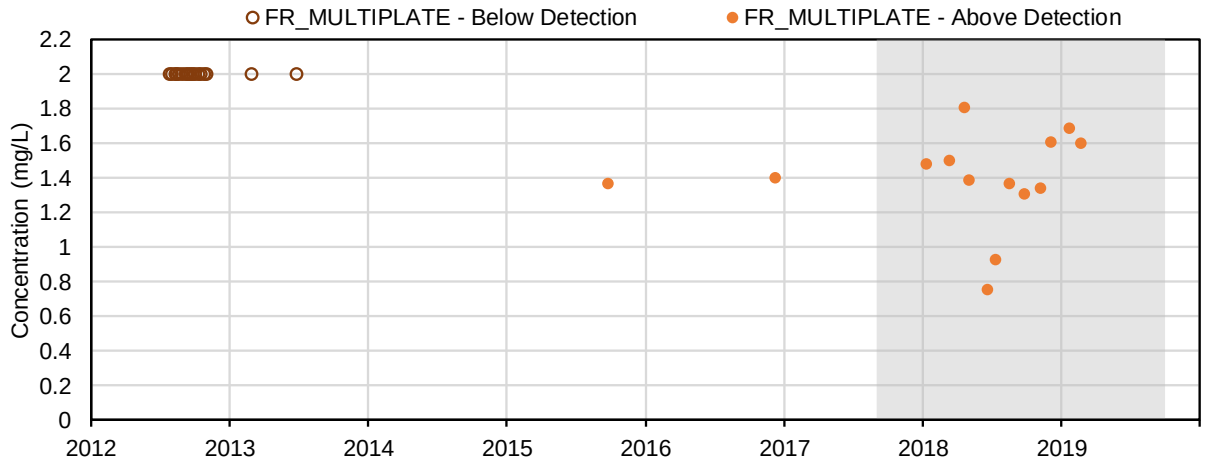
(56) Molybdenum (mg/L); Total Metals



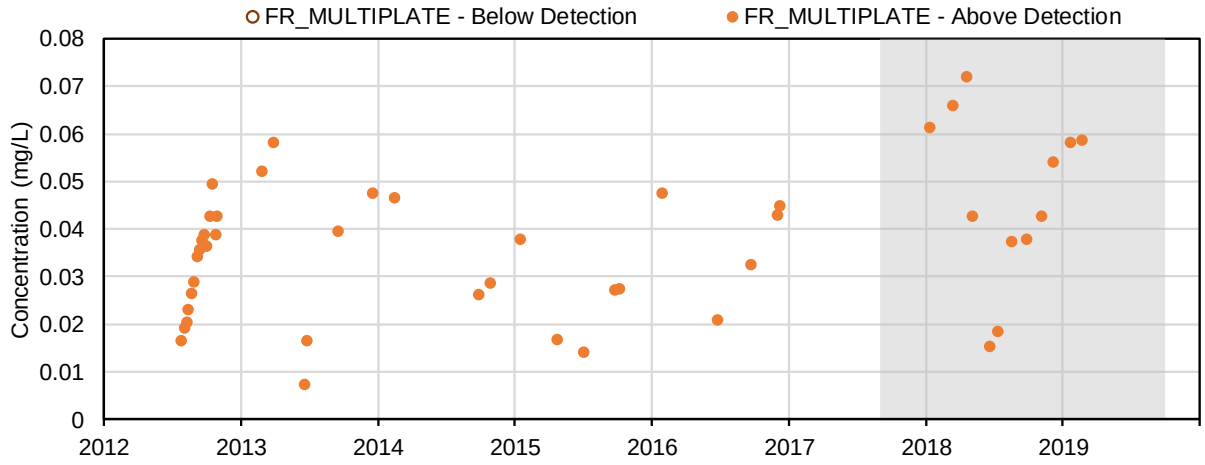
(57) Nickel (mg/L); Total Metals



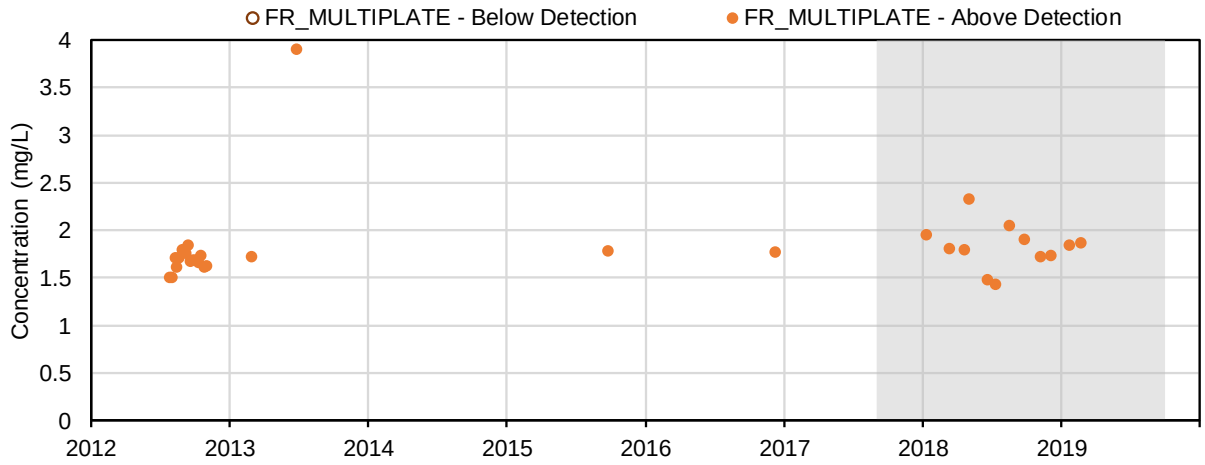
(58) Potassium (mg/L); Total Metals



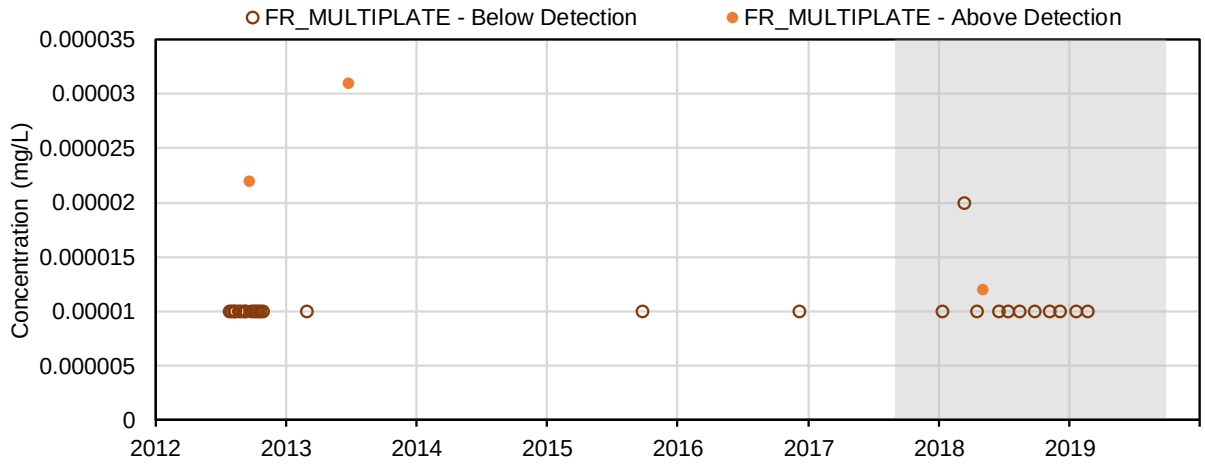
(59) Selenium (mg/L); Total Metals



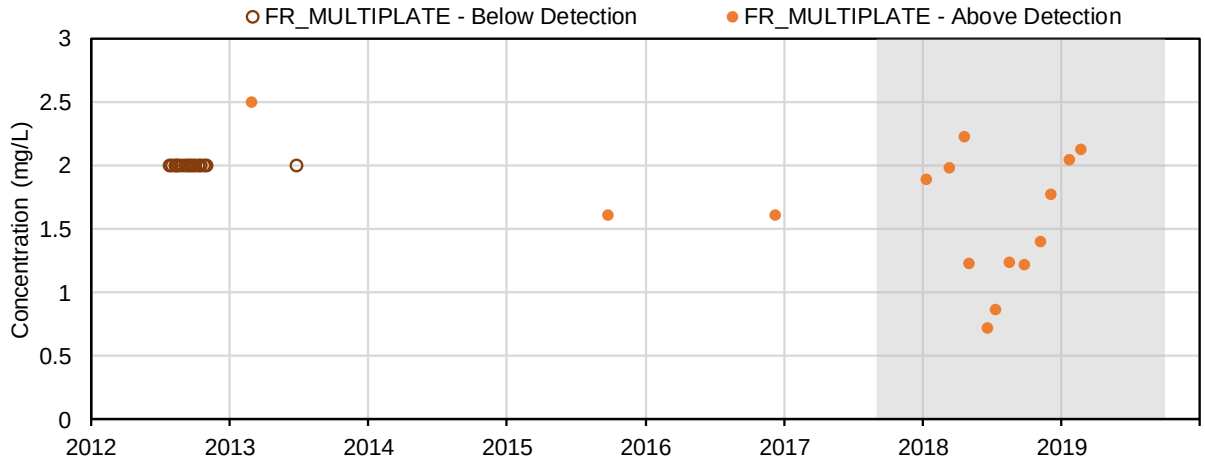
(60) Silicon (mg/L); Total Metals



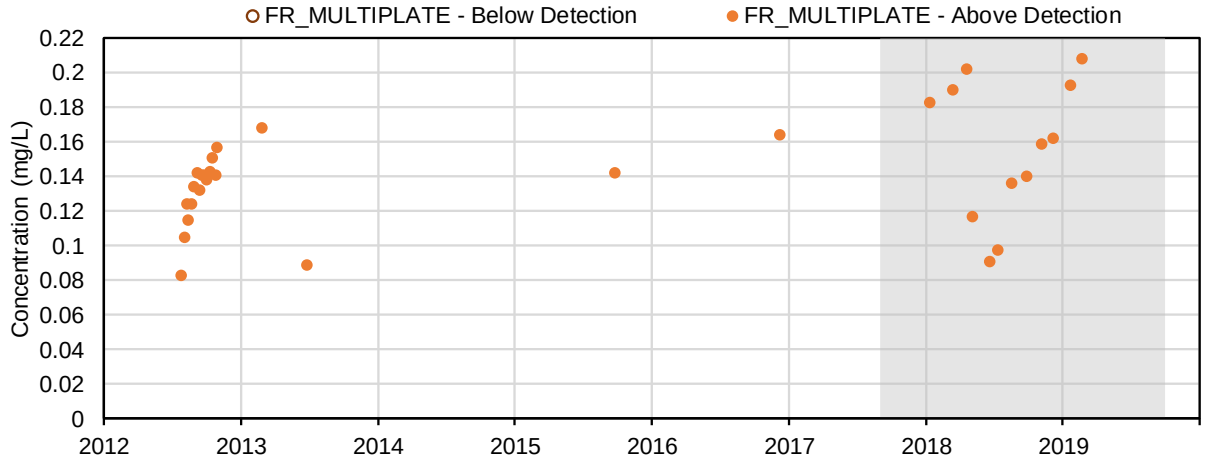
(61) Silver (mg/L); Total Metals



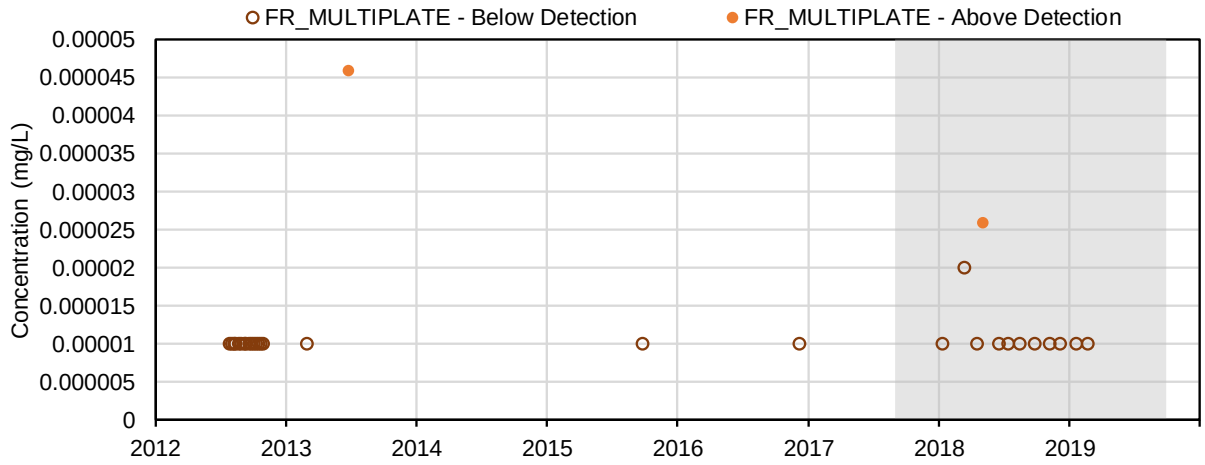
(62) Sodium (mg/L); Total Metals



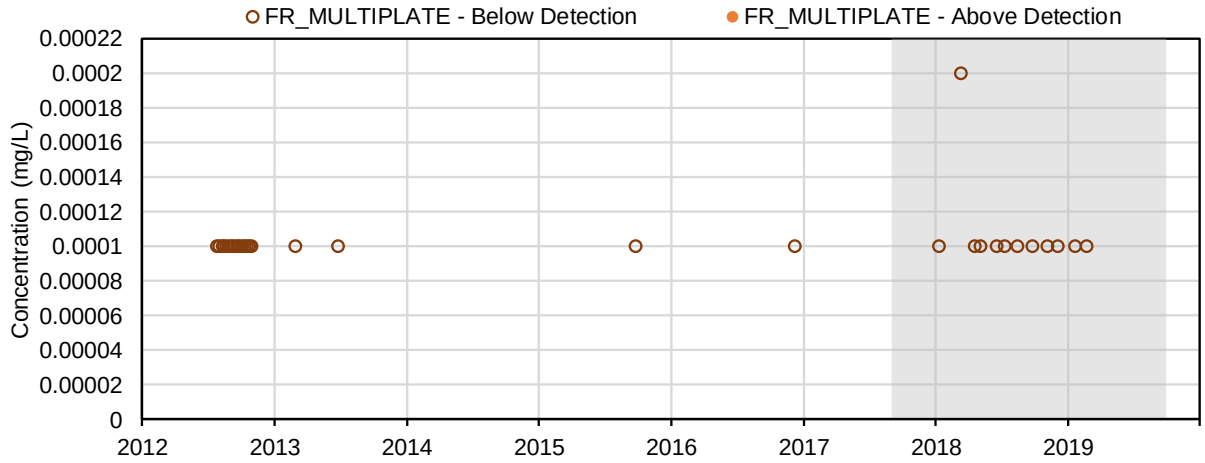
(63) Strontium (mg/L); Total Metals



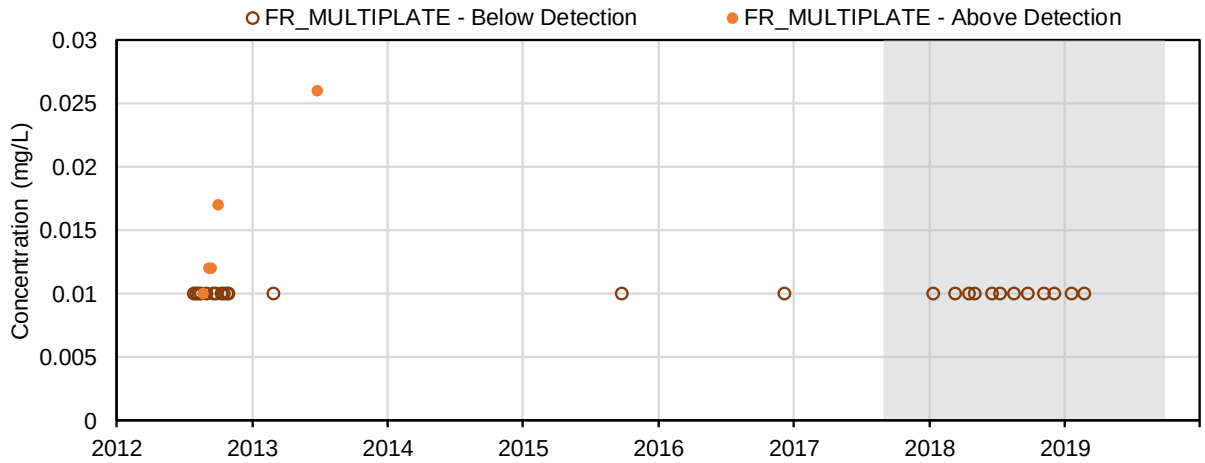
(64) Thallium (mg/L); Total Metals



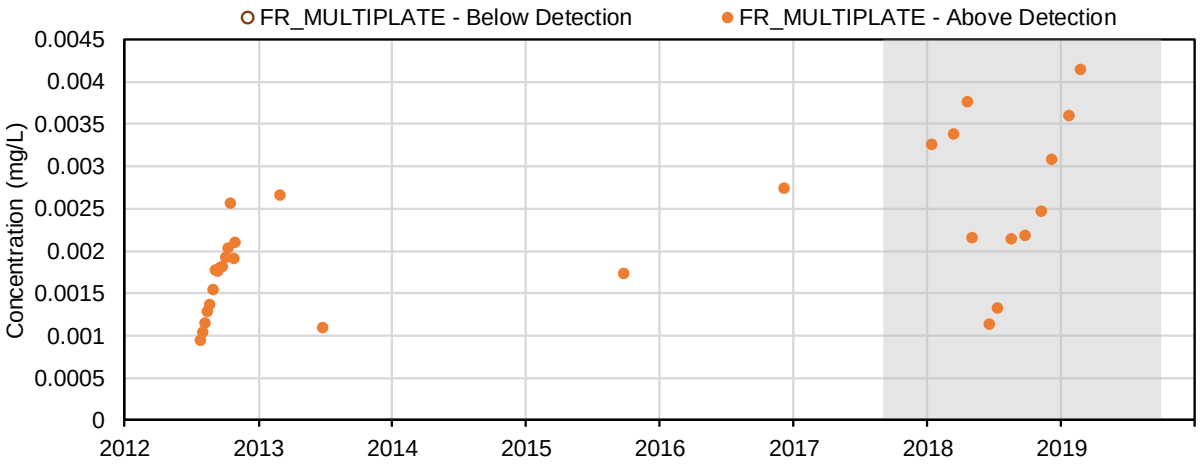
(65) Tin (mg/L); Total Metals



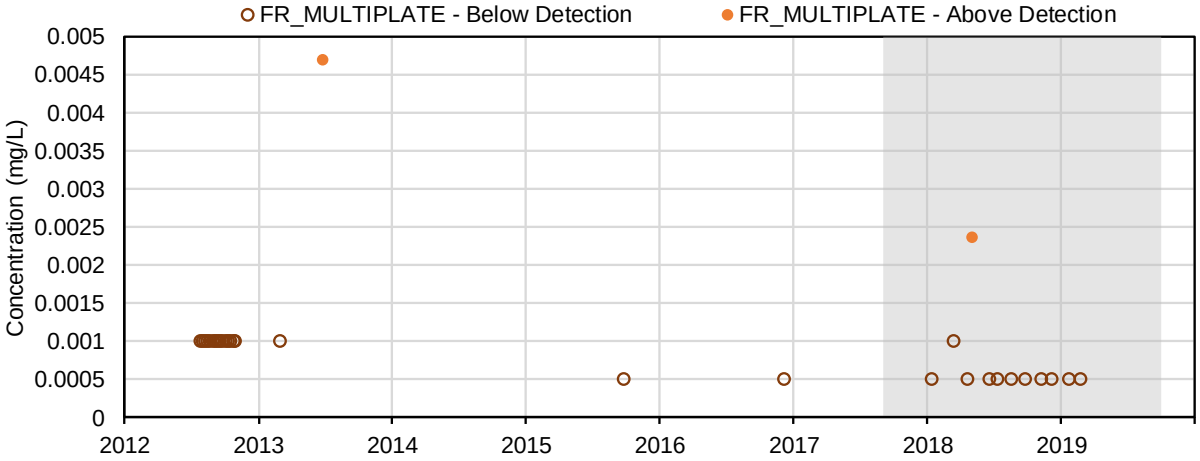
(66) Titanium (mg/L); Total Metals



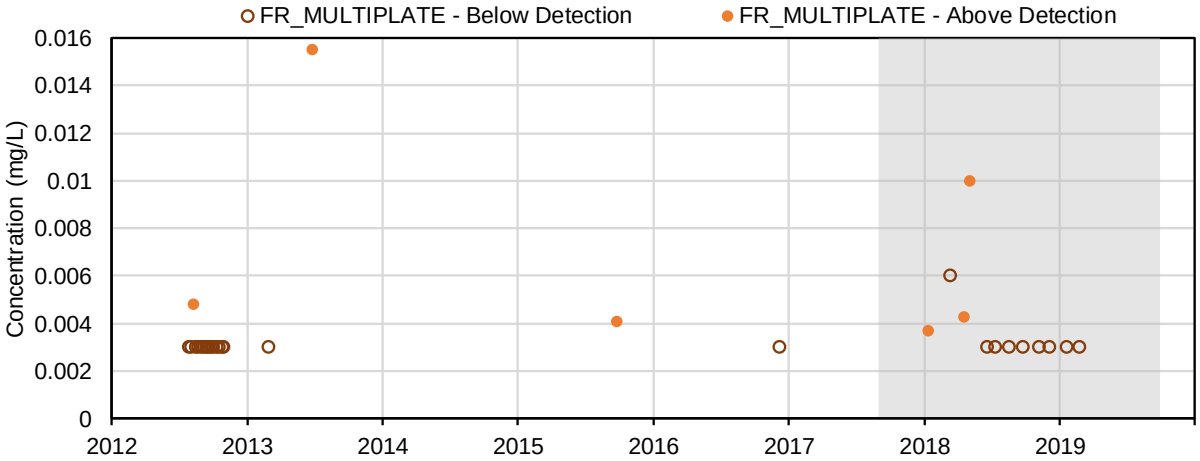
(67) Uranium (mg/L); Total Metals



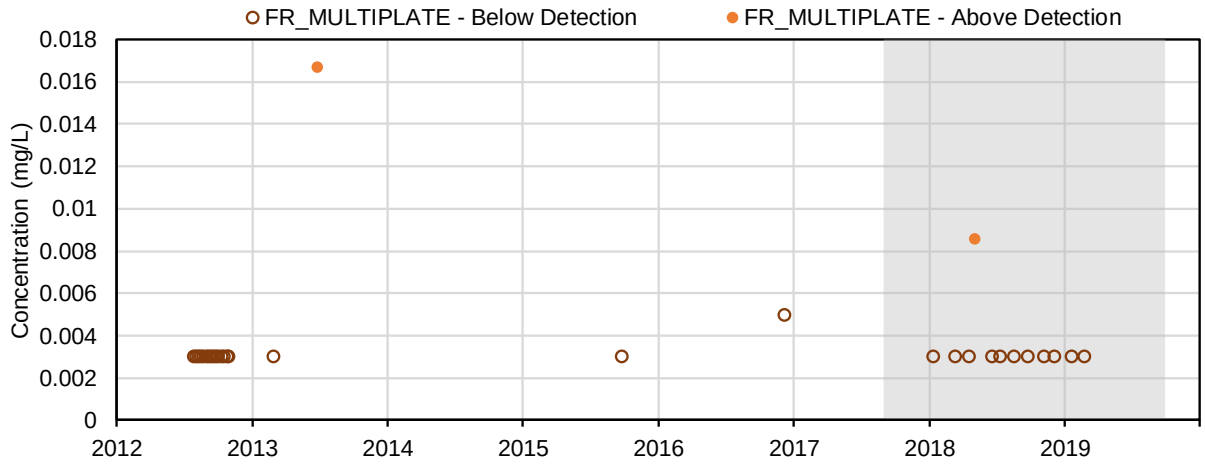
(68) Vanadium (mg/L); Total Metals



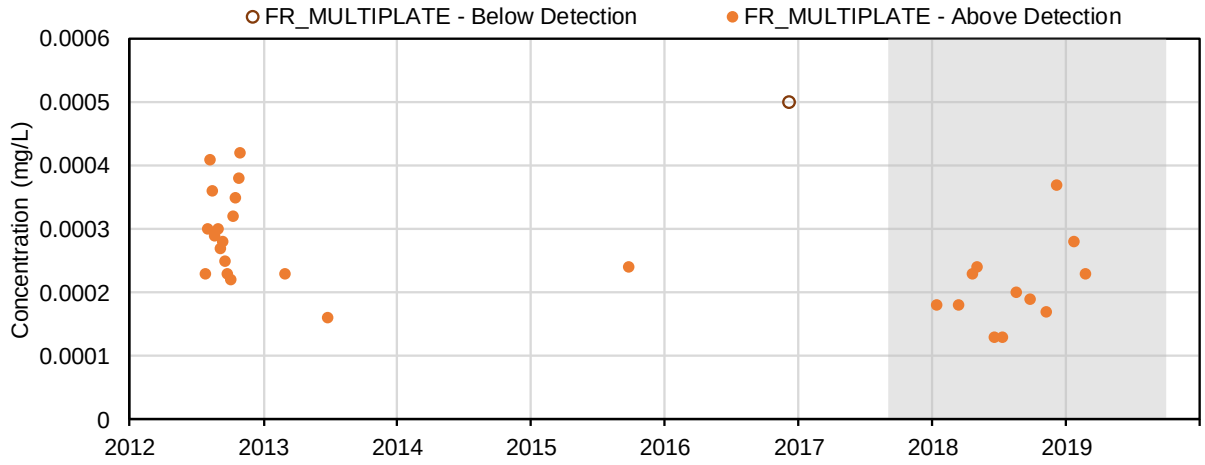
(69) Zinc (mg/L); Total Metals



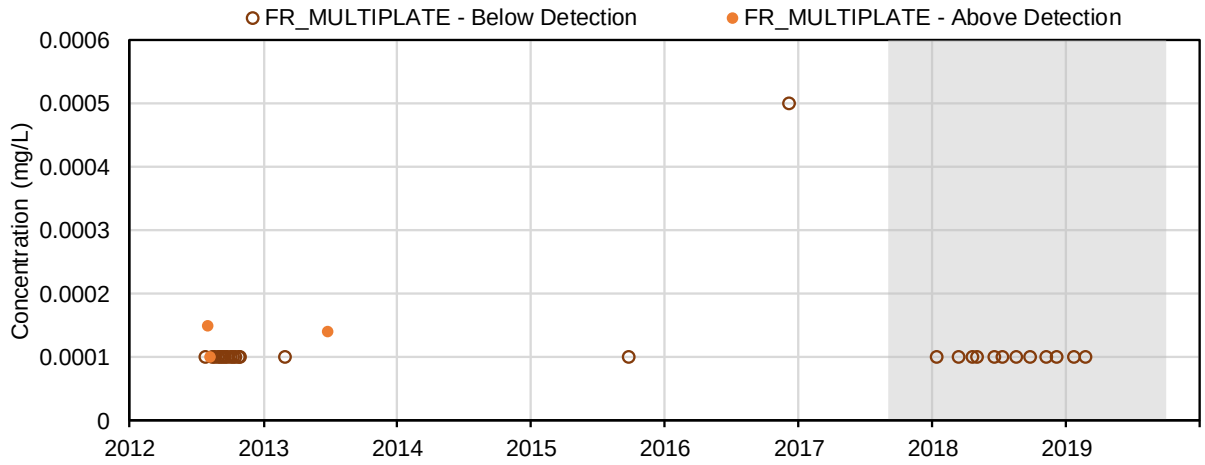
(70) Aluminum (mg/L); Dissolved Metals



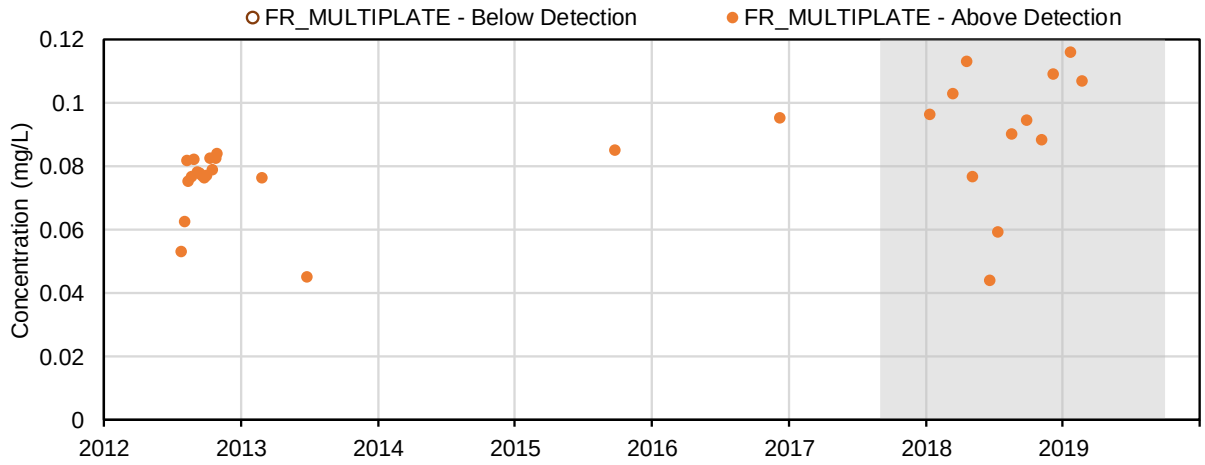
(71) Antimony (mg/L); Dissolved Metals



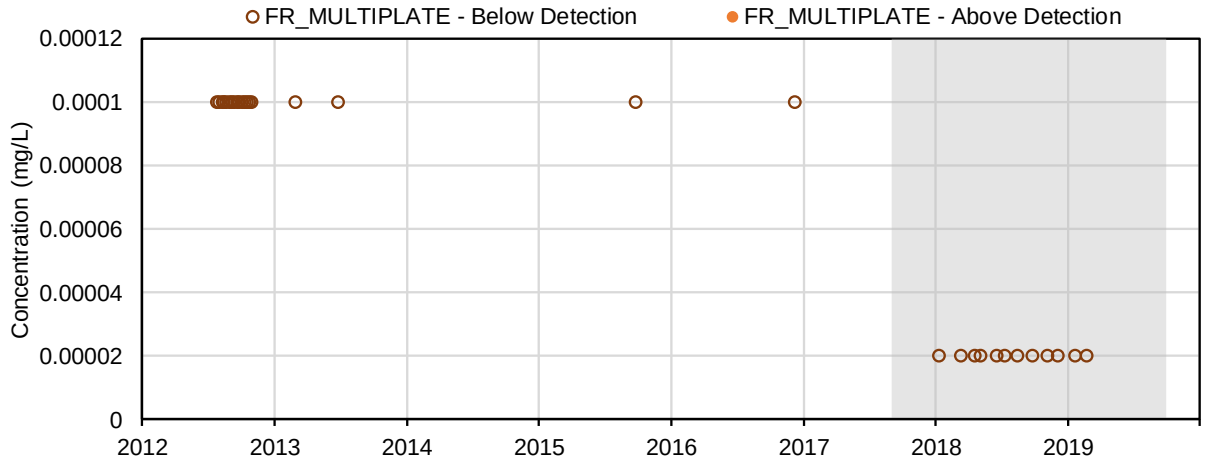
(72) Arsenic (mg/L); Dissolved Metals



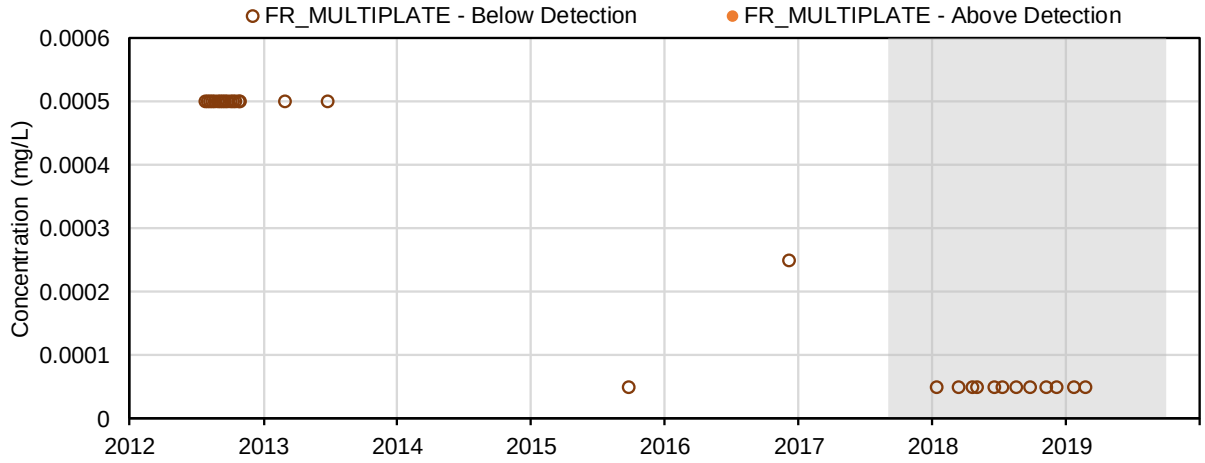
(73) Barium (mg/L); Dissolved Metals



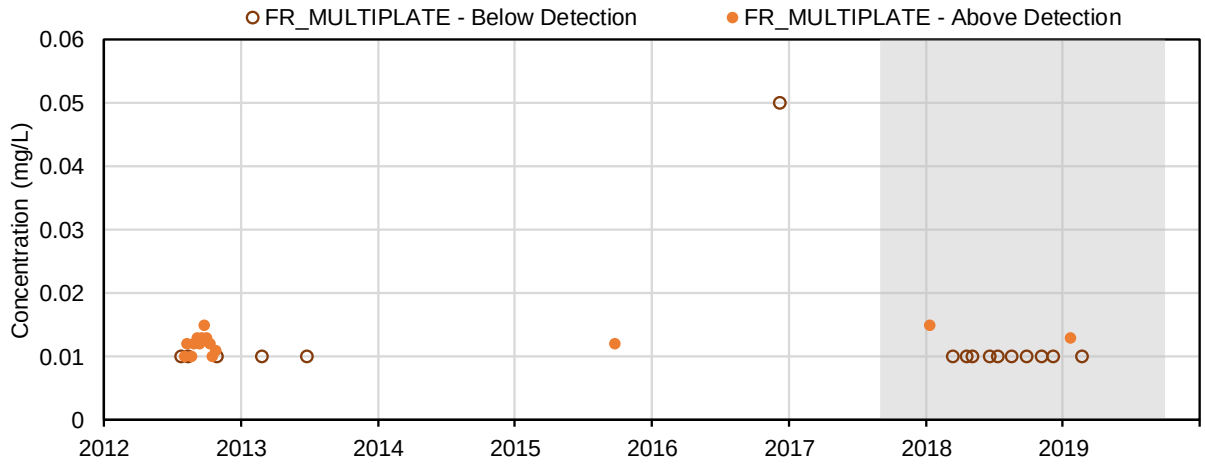
(74) Beryllium (mg/L); Dissolved Metals



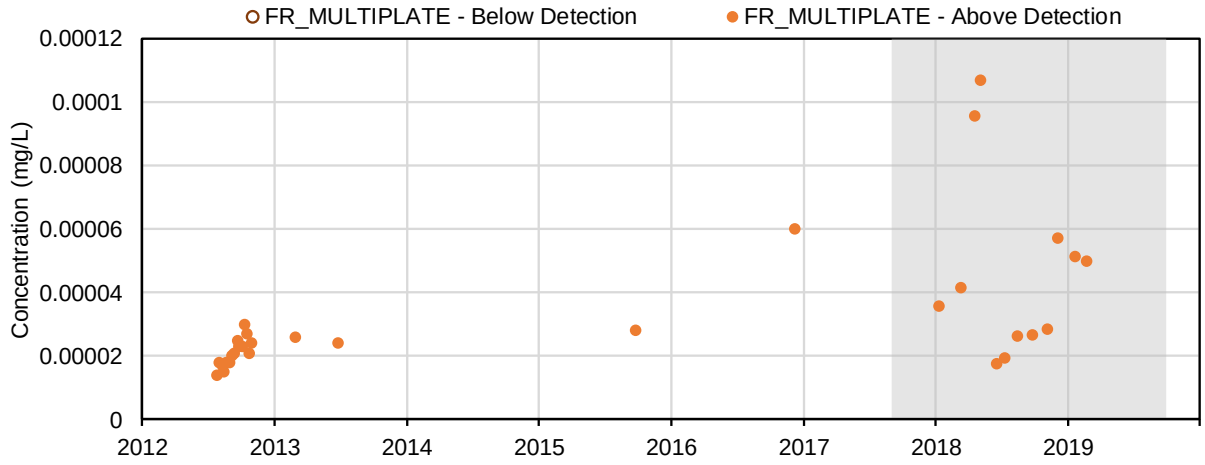
(75) Bismuth (mg/L); Dissolved Metals



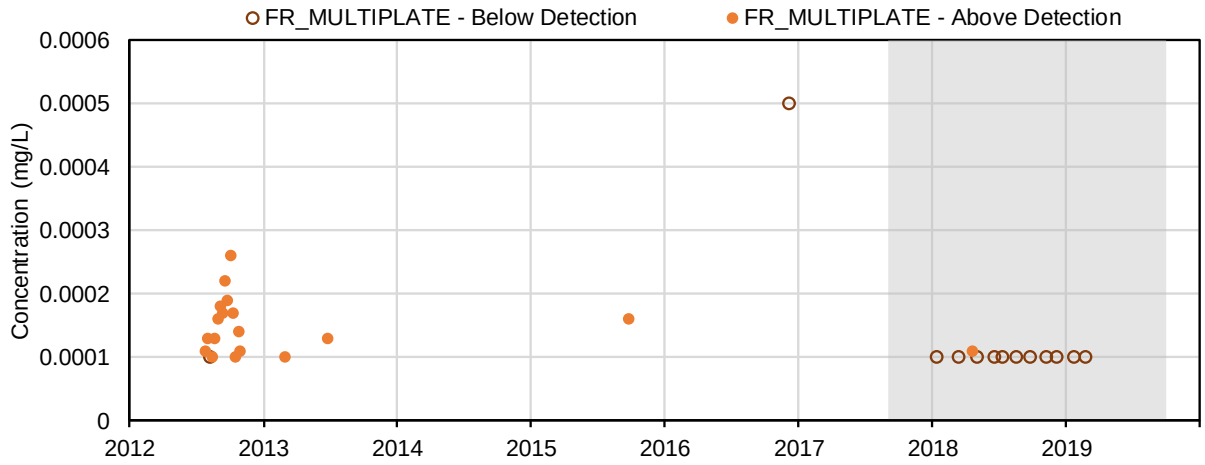
(76) Boron (mg/L); Dissolved Metals



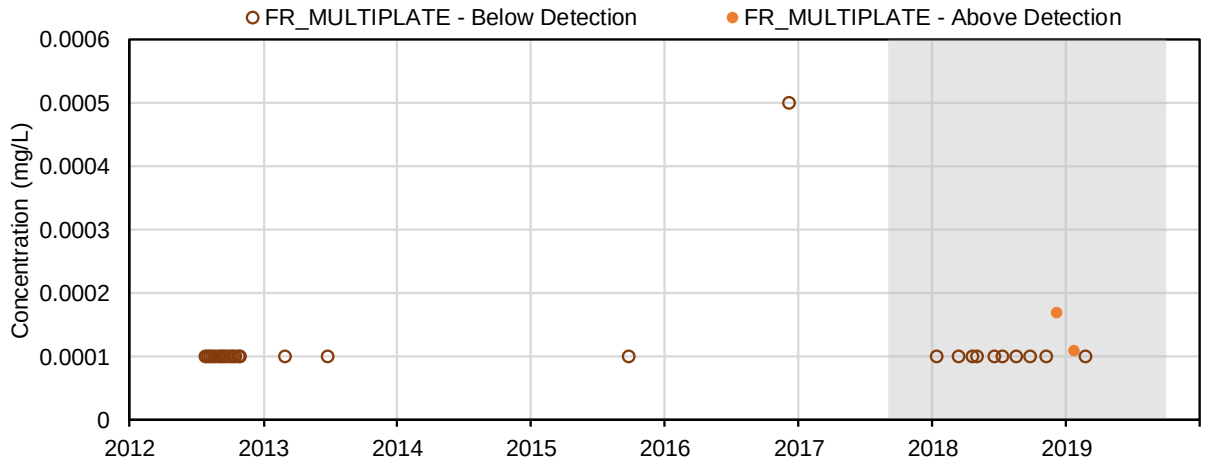
(77) Cadmium (mg/L); Dissolved Metals



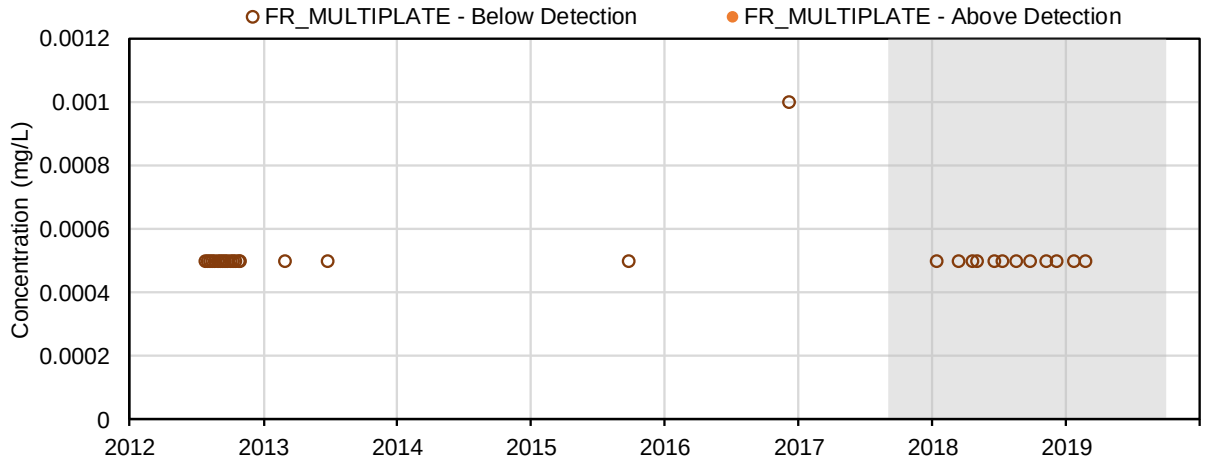
(78) Chromium (mg/L); Dissolved Metals



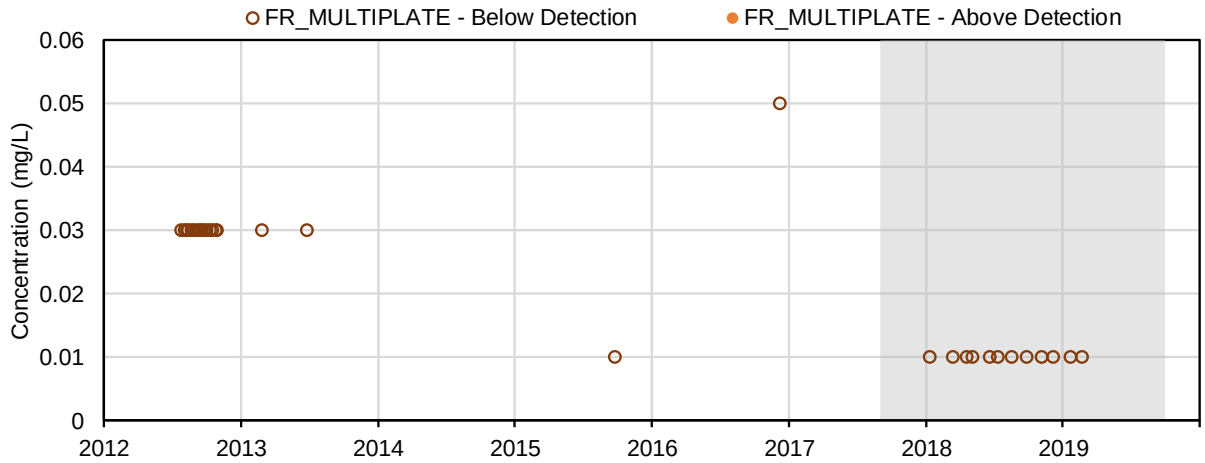
(79) Cobalt (mg/L); Dissolved Metals



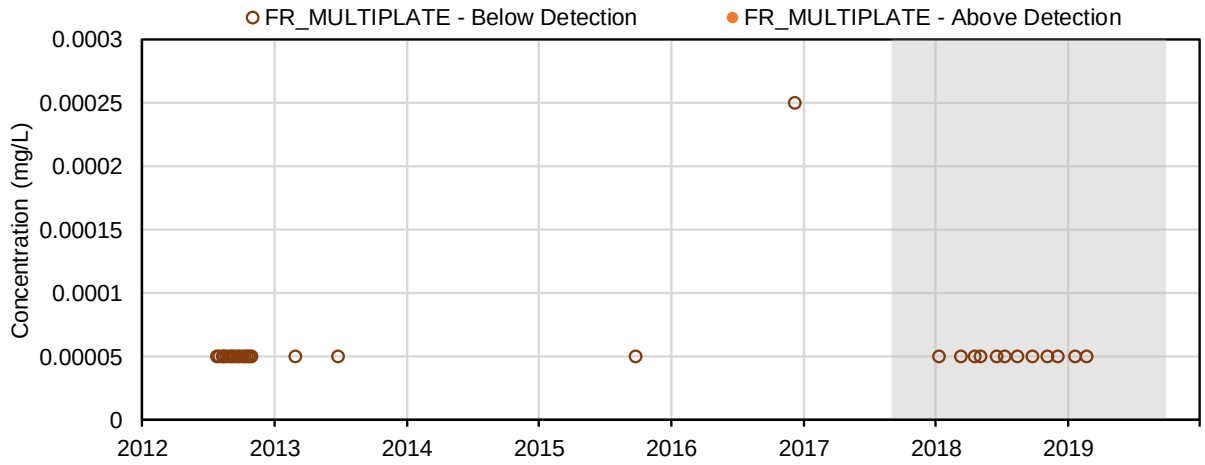
(80) Copper (mg/L); Dissolved Metals



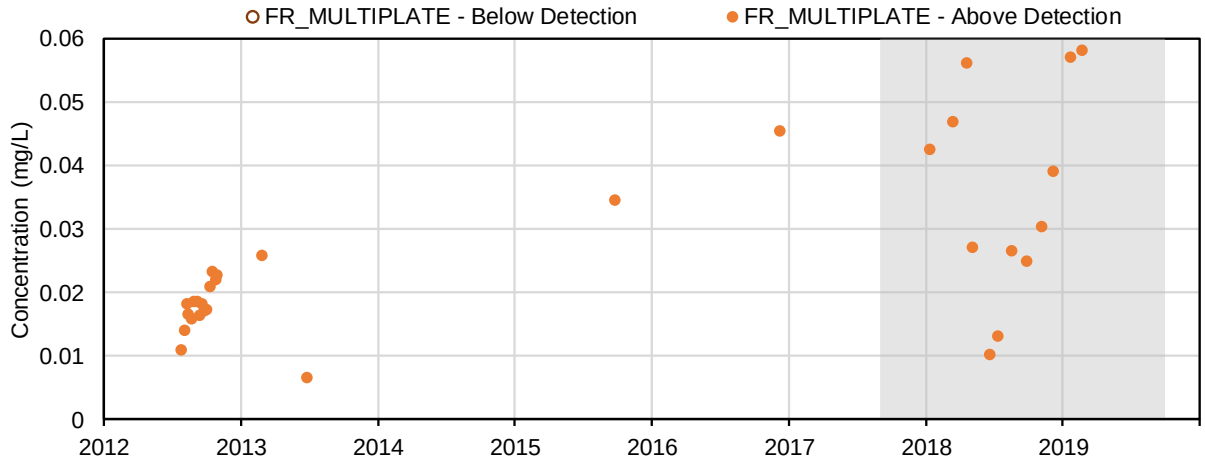
(81) Iron (mg/L); Dissolved Metals



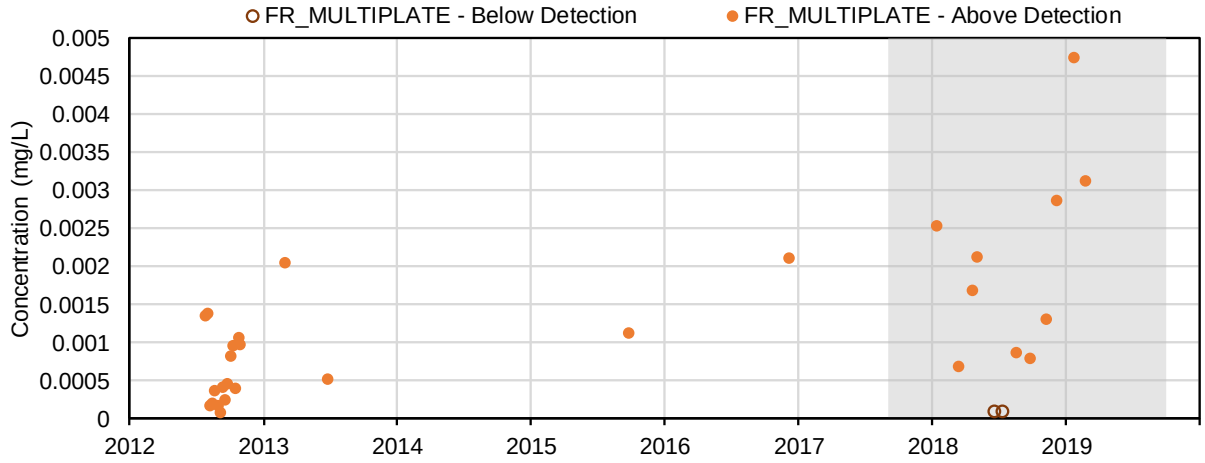
(82) Lead (mg/L); Dissolved Metals



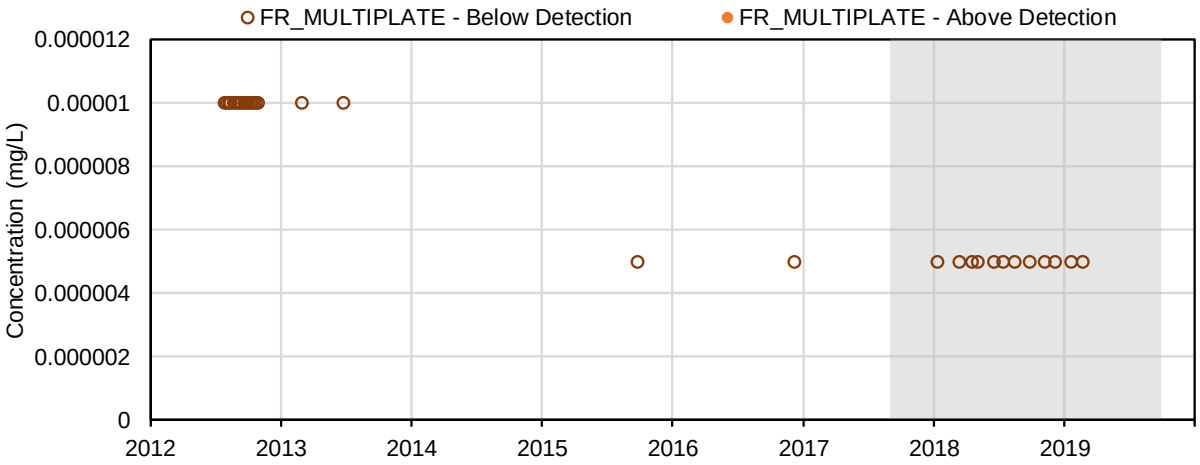
(83) Lithium (mg/L); Dissolved Metals



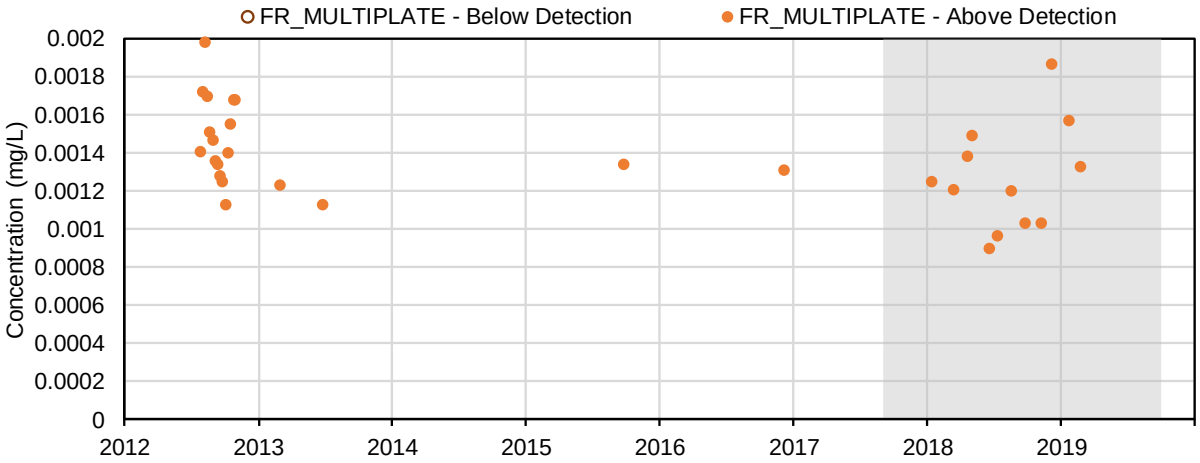
(84) Manganese (mg/L); Dissolved Metals



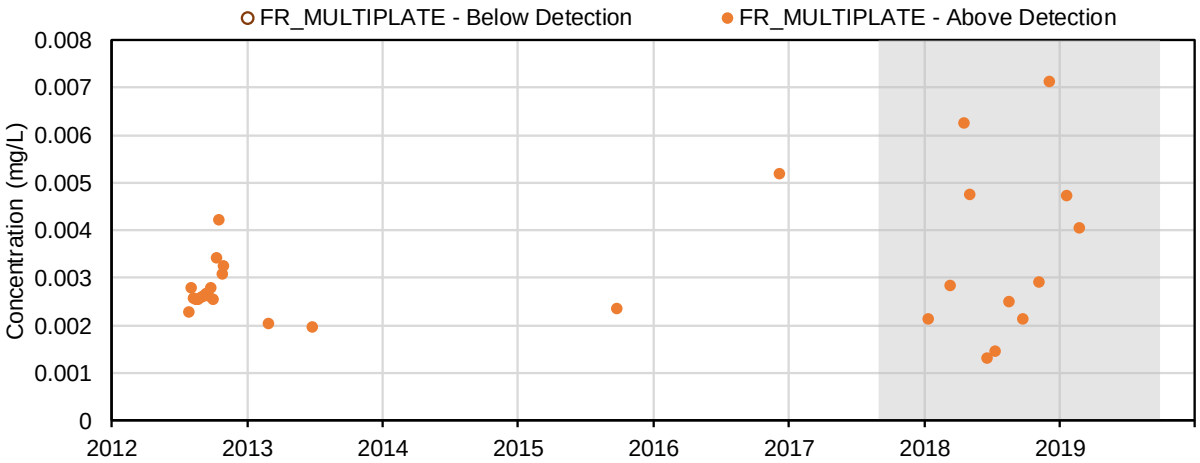
(85) Mercury (mg/L); Dissolved Metals



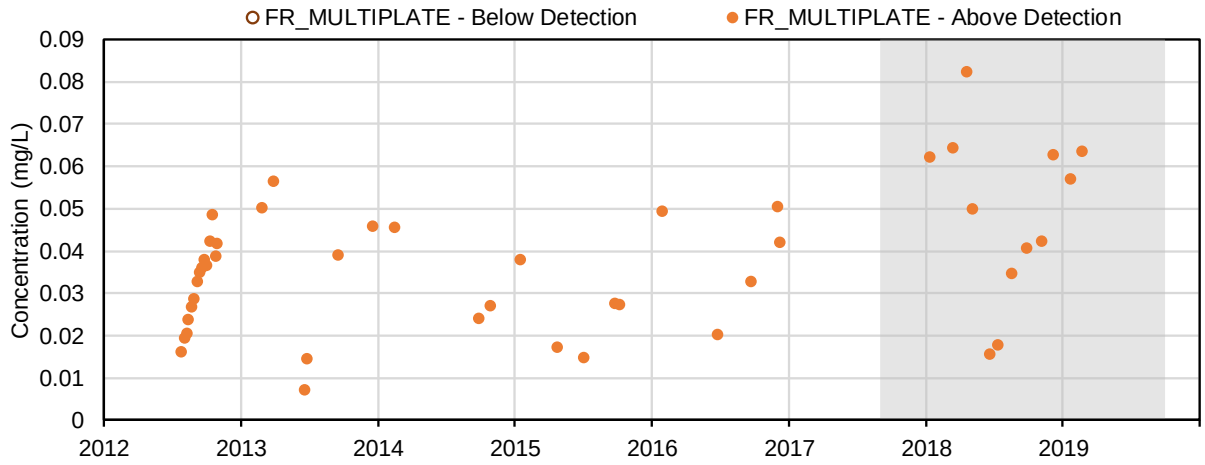
(86) Molybdenum (mg/L); Dissolved Metals



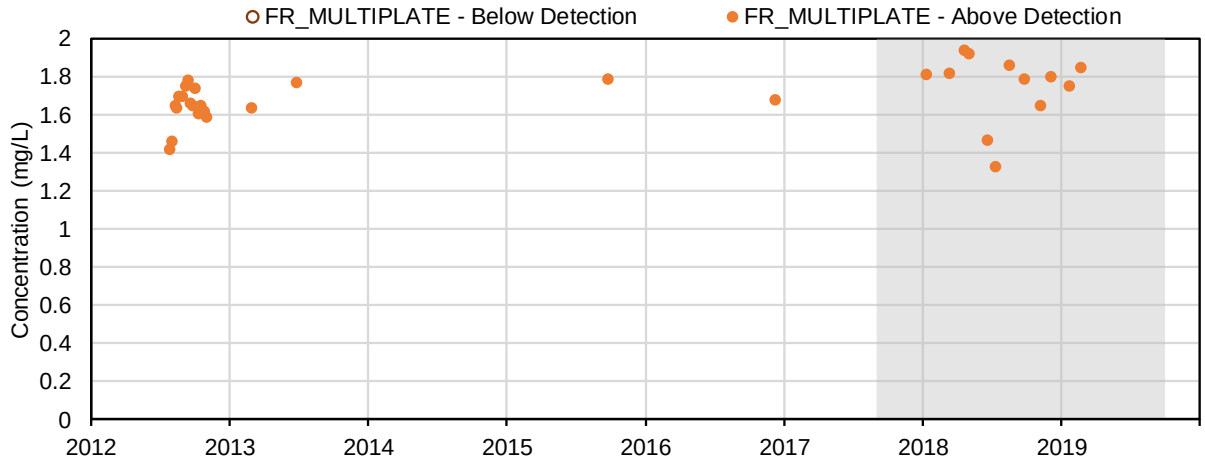
(87) Nickel (mg/L); Dissolved Metals



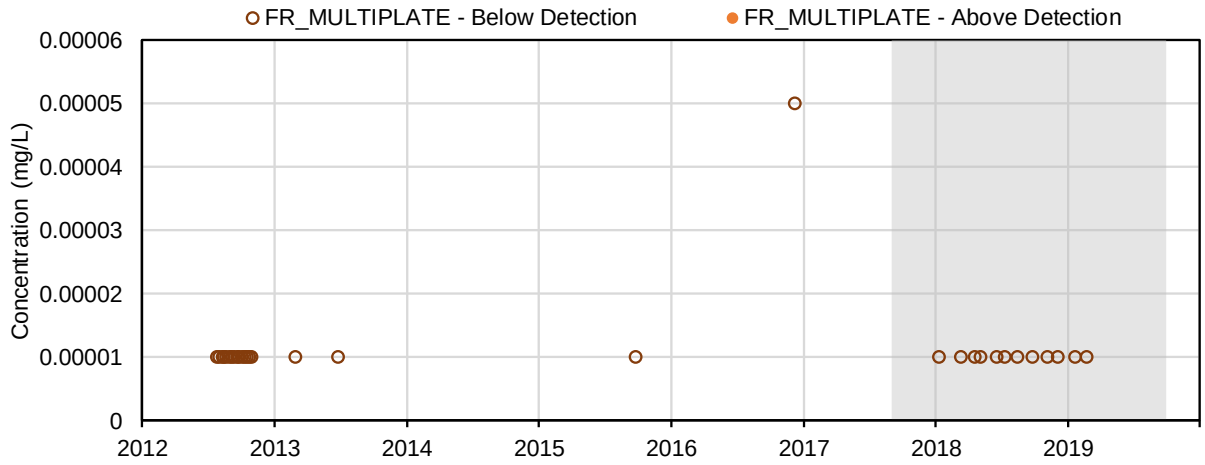
(88) Selenium (mg/L); Dissolved Metals



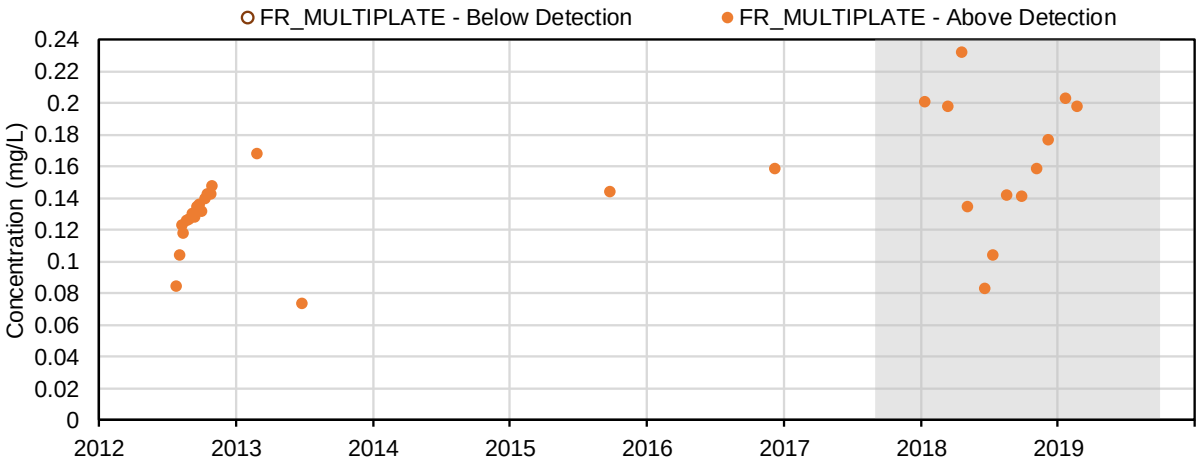
(89) Silicon (mg/L); Dissolved Metals



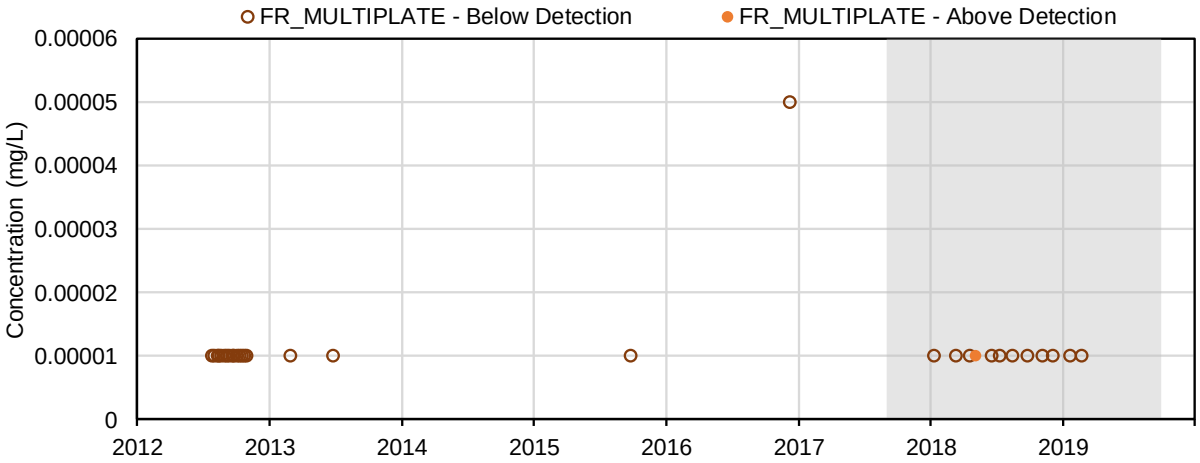
(90) Silver (mg/L); Dissolved Metals



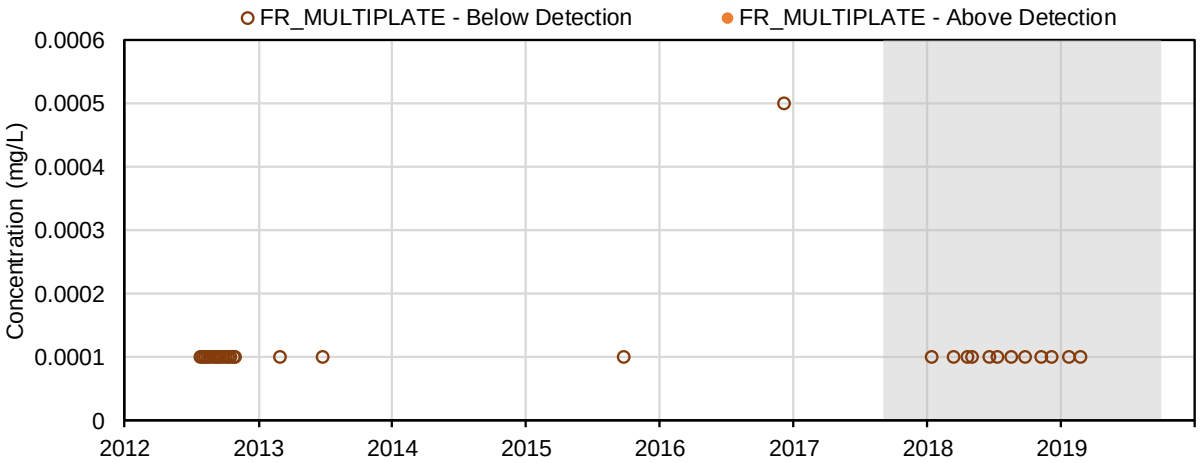
(91) Strontium (mg/L); Dissolved Metals



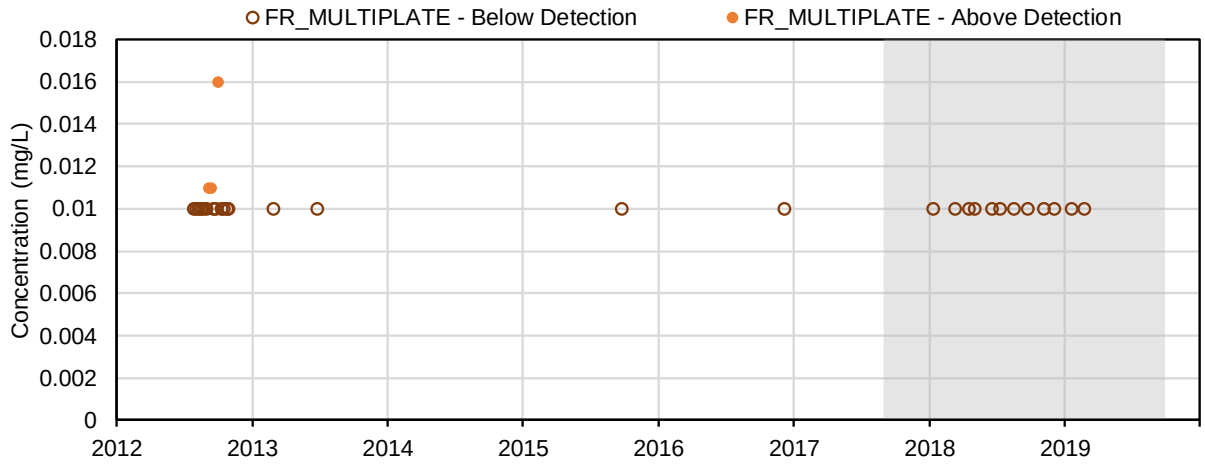
(92) Thallium (mg/L); Dissolved Metals



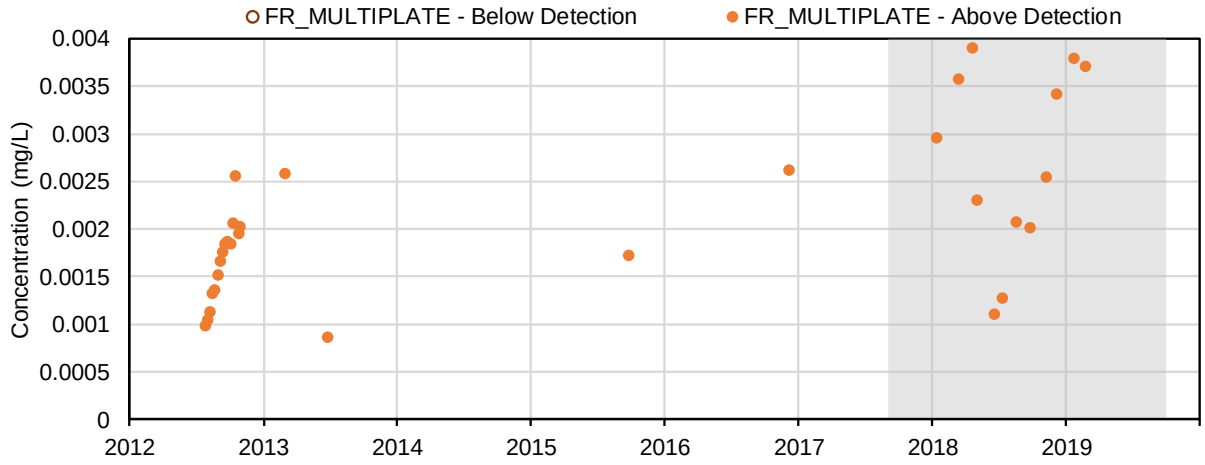
(93) Tin (mg/L); Dissolved Metals



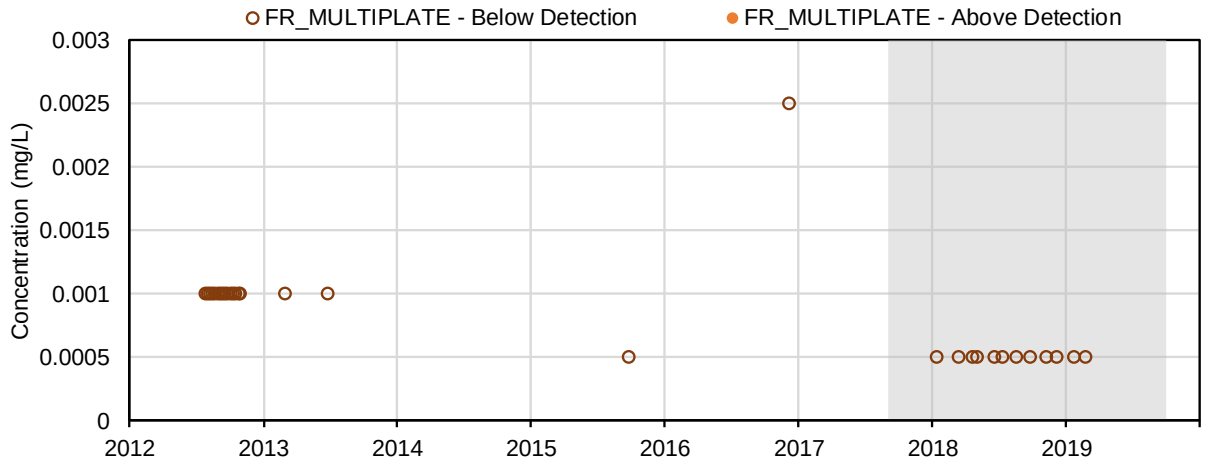
(94) Titanium (mg/L); Dissolved Metals



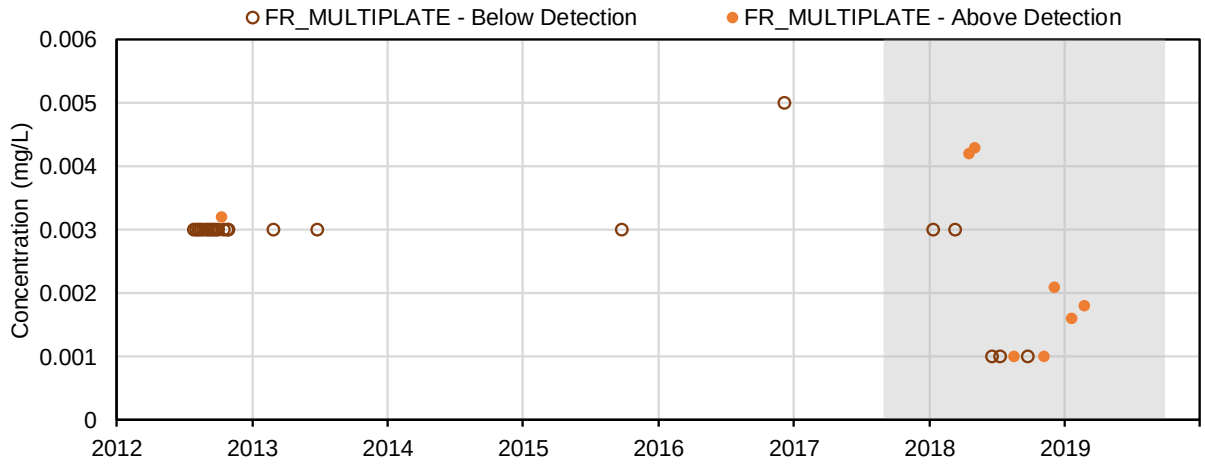
(95) Uranium (mg/L); Dissolved Metals



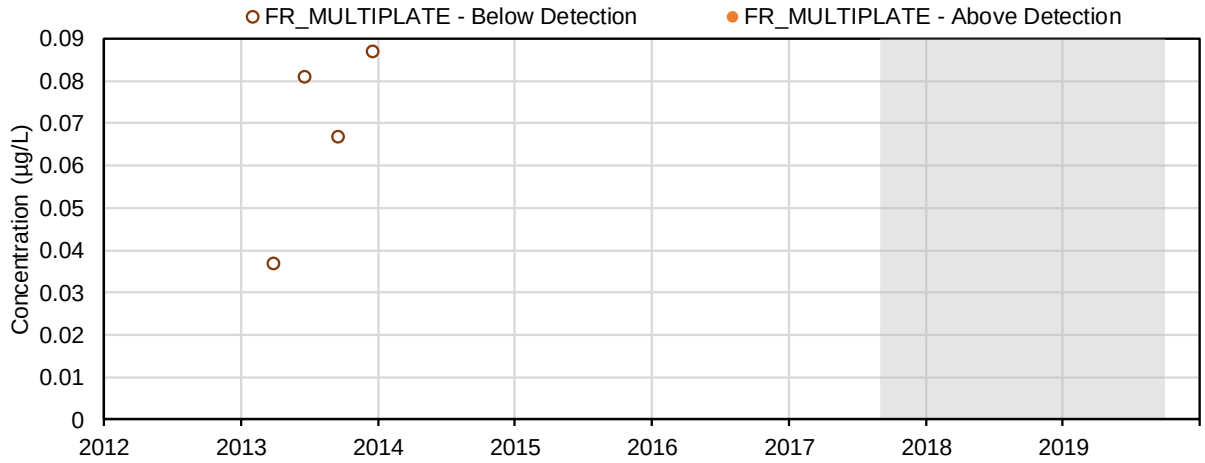
(96) Vanadium (mg/L); Dissolved Metals



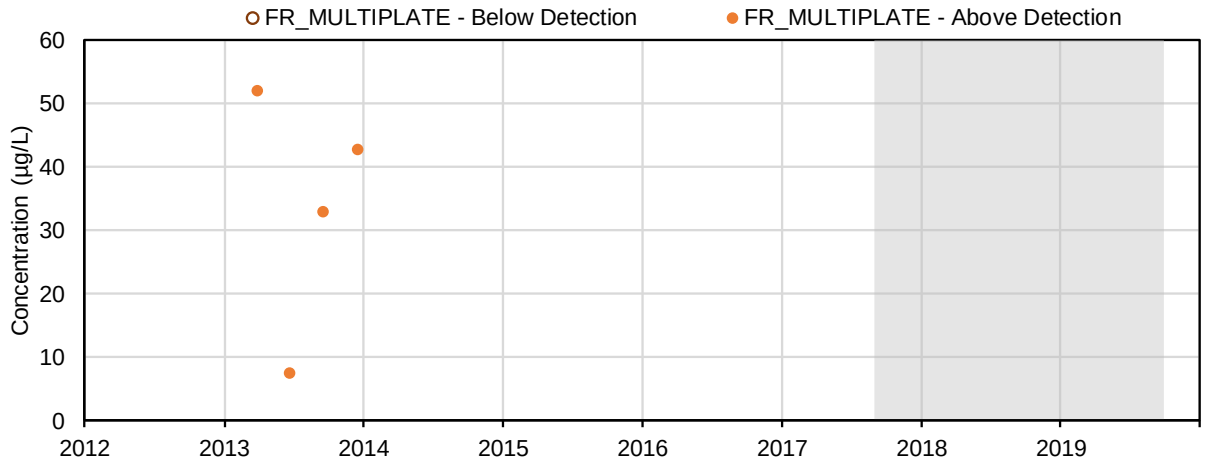
(97) Zinc (mg/L); Dissolved Metals



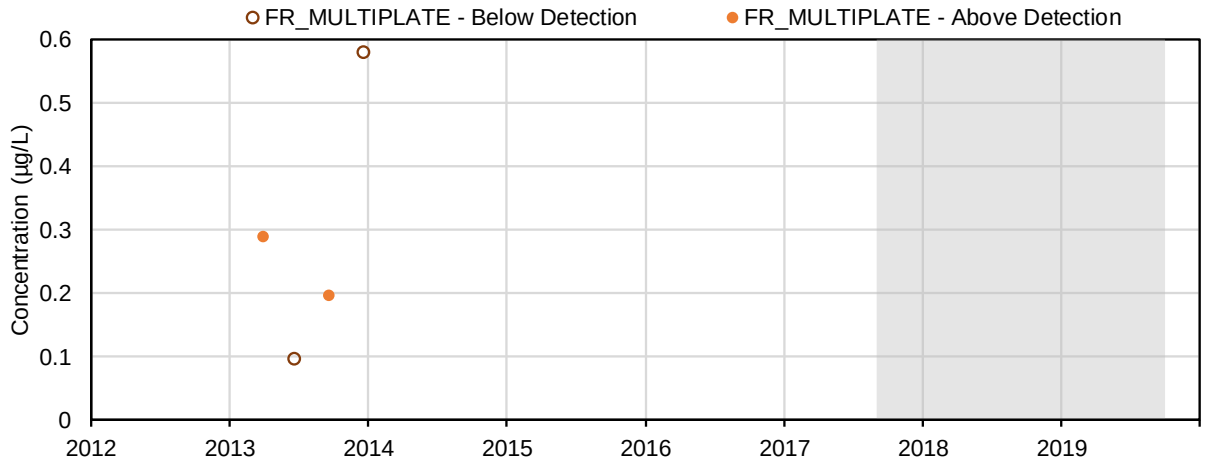
(98) Total Selenocyanate (µg/L); Speciation of Selenium



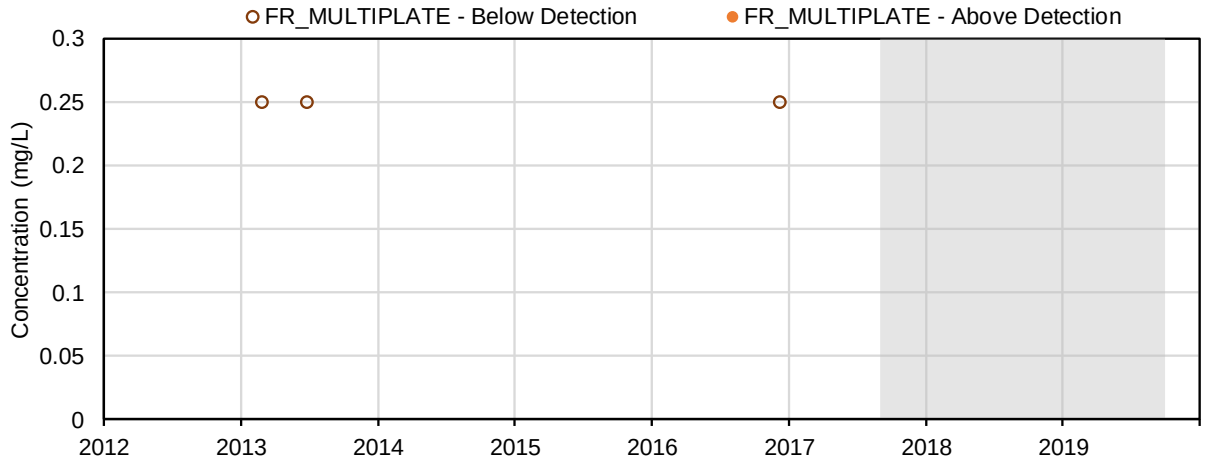
(99) Total Selenium 6+ (µg/L); Speciation of Selenium



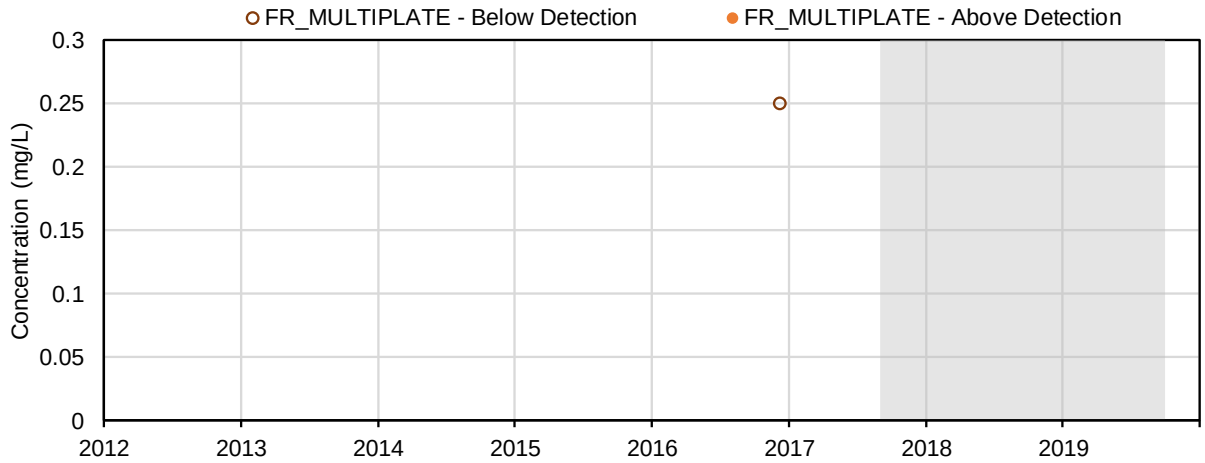
(100) Total Selenium 4+ (µg/L); Speciation of Selenium



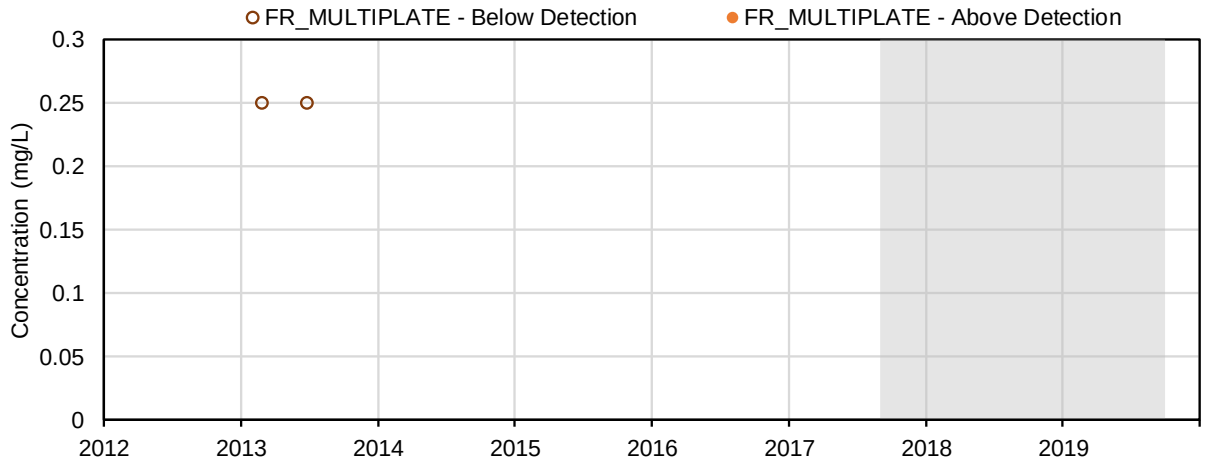
(101) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



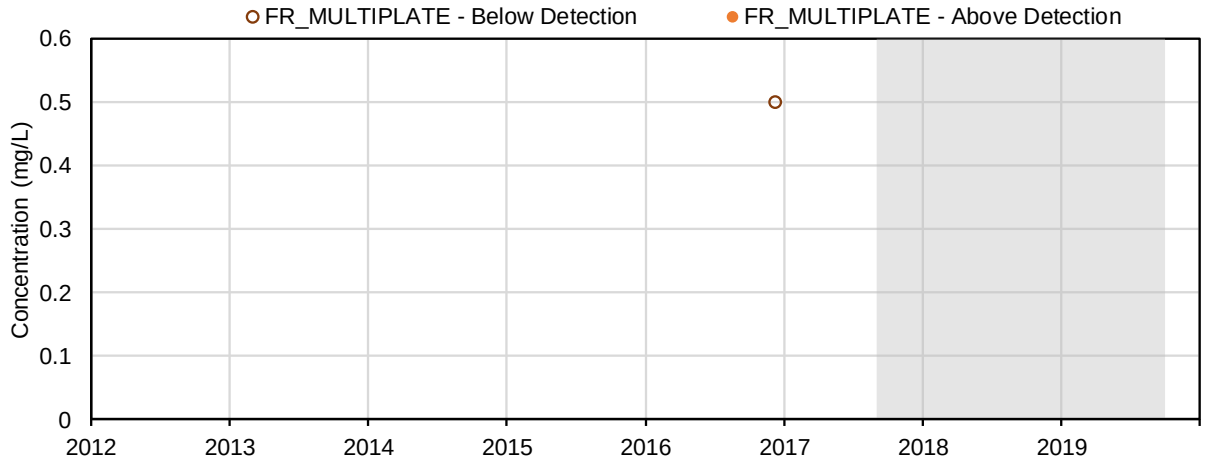
(102) Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



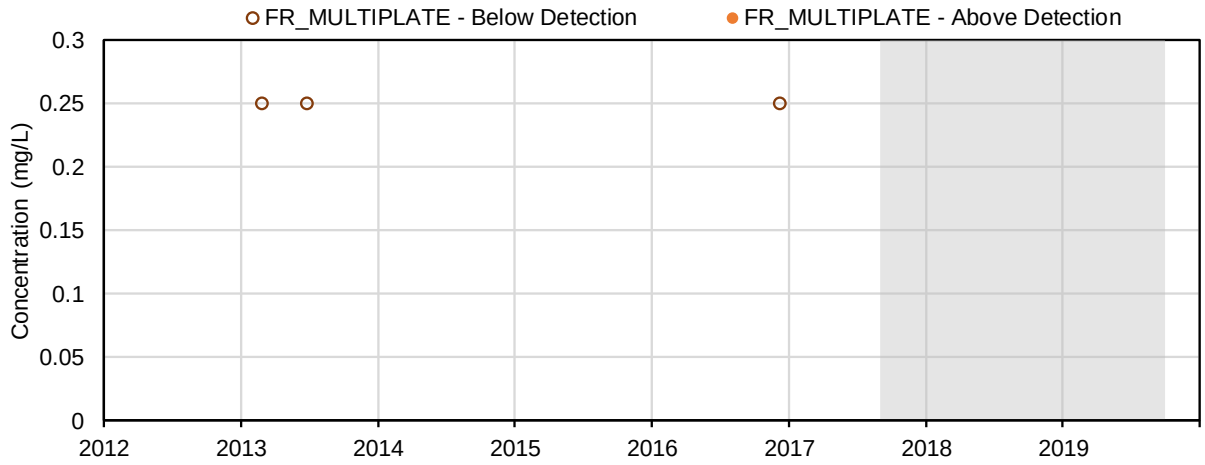
(103) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



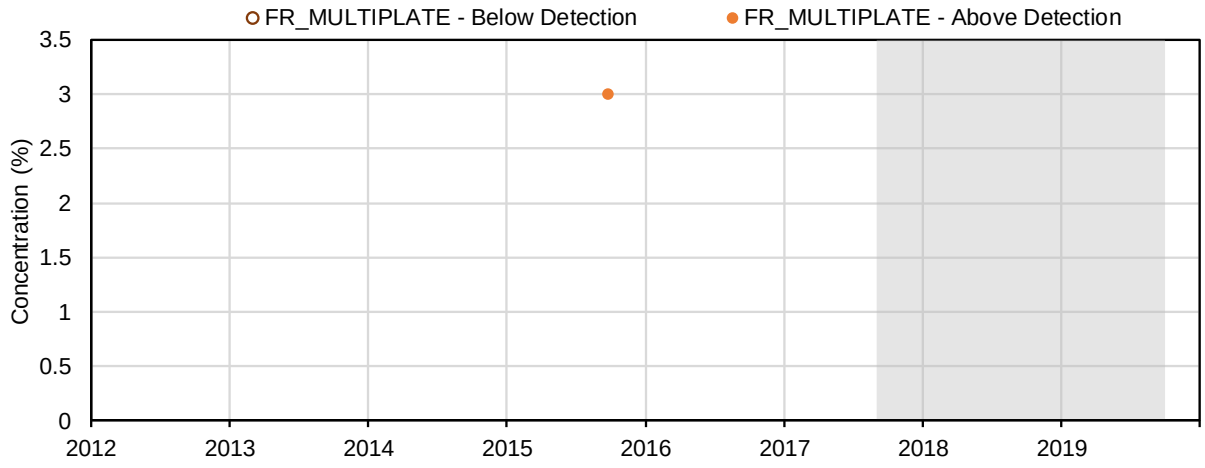
(104) Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L); Volatile Organics

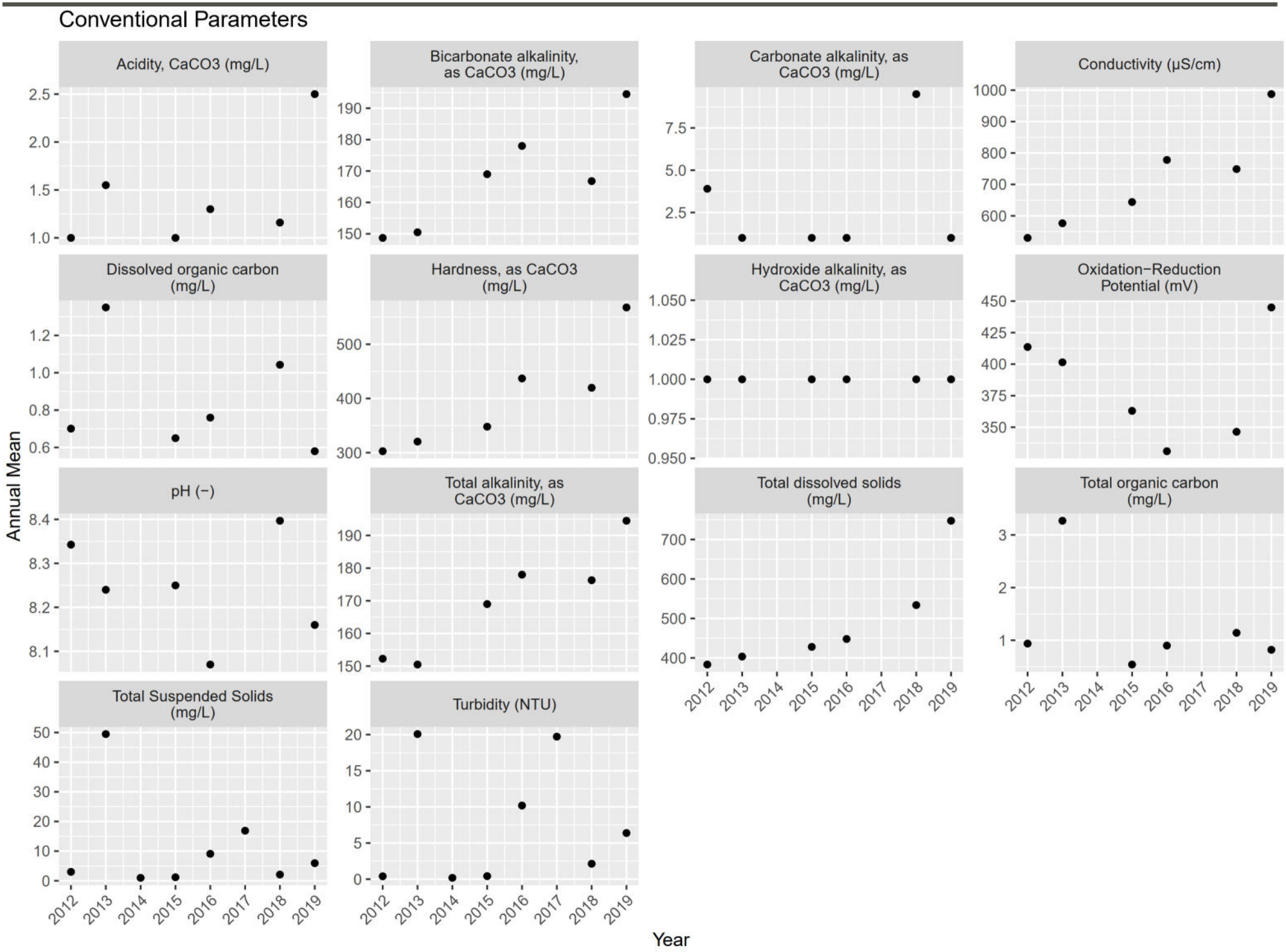


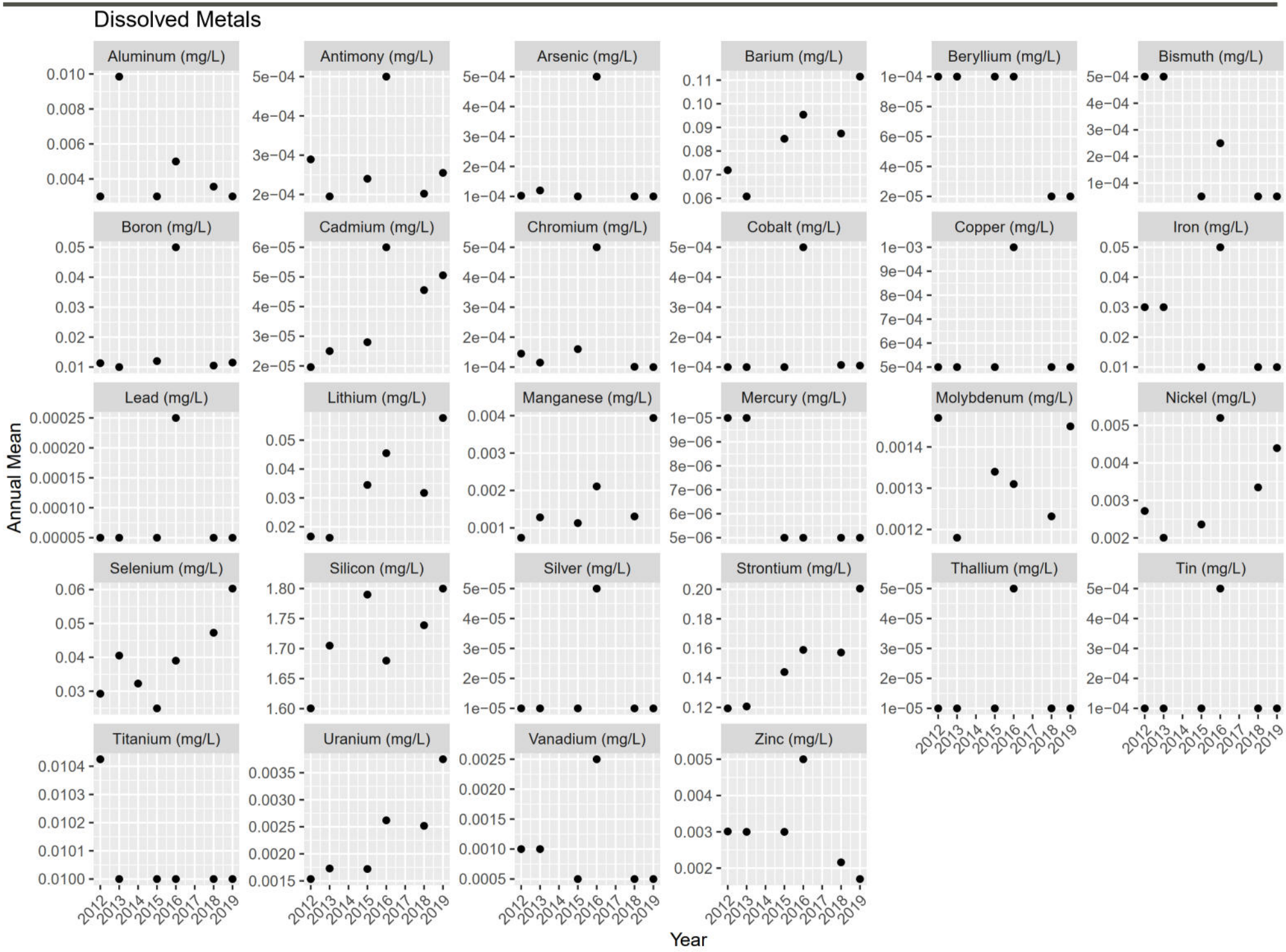
(105) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics

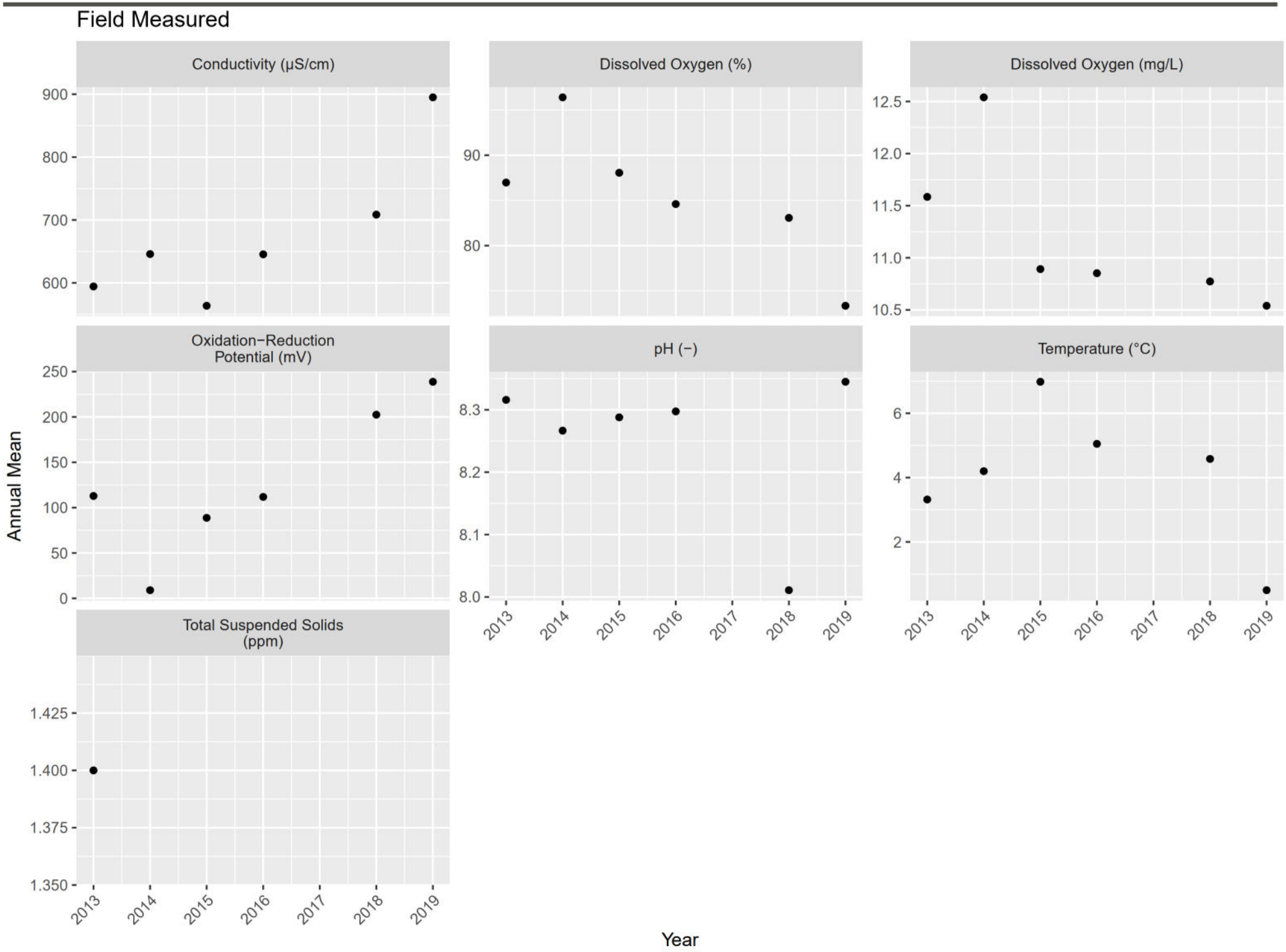


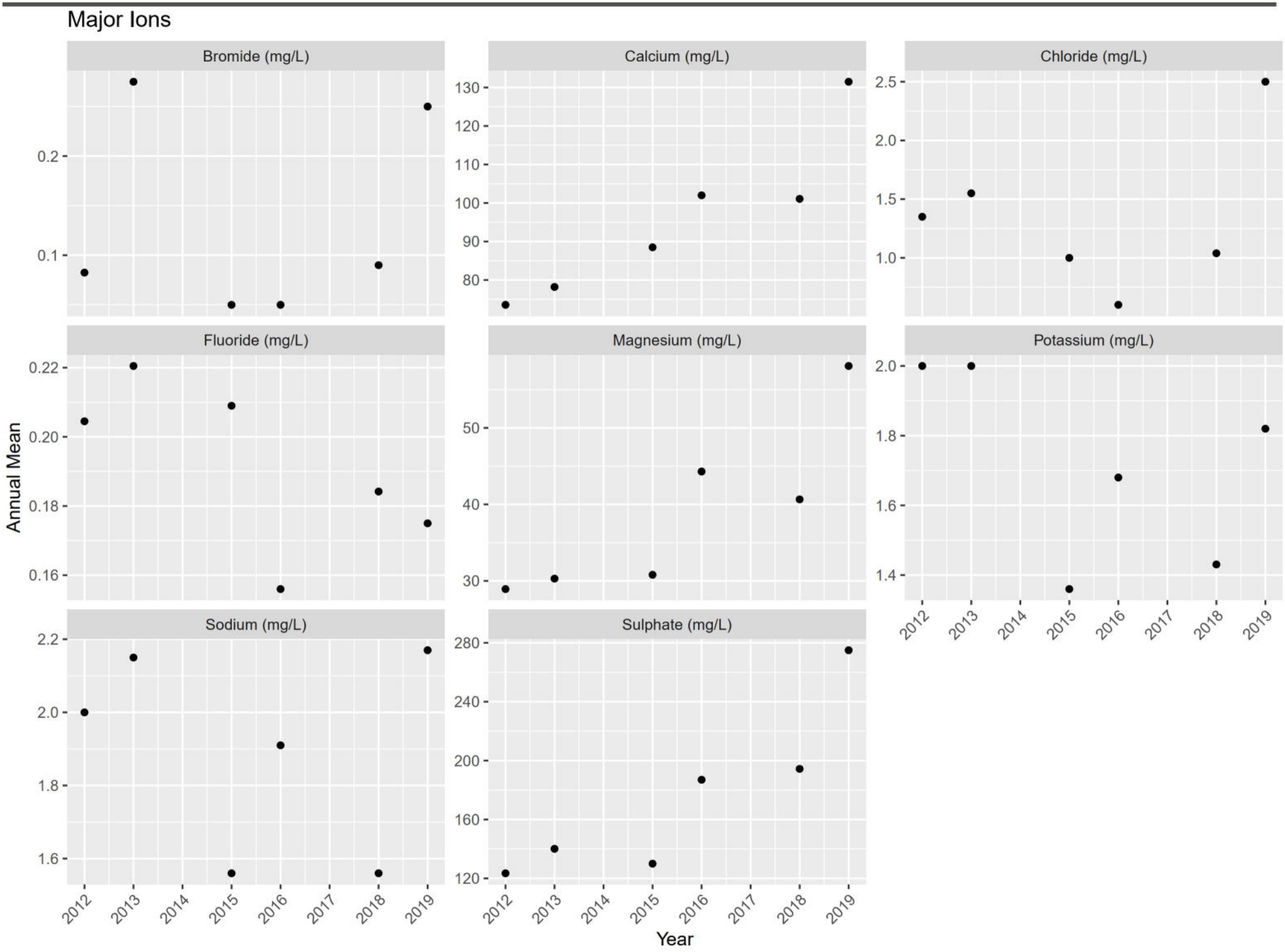
(106) Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%); Toxicity

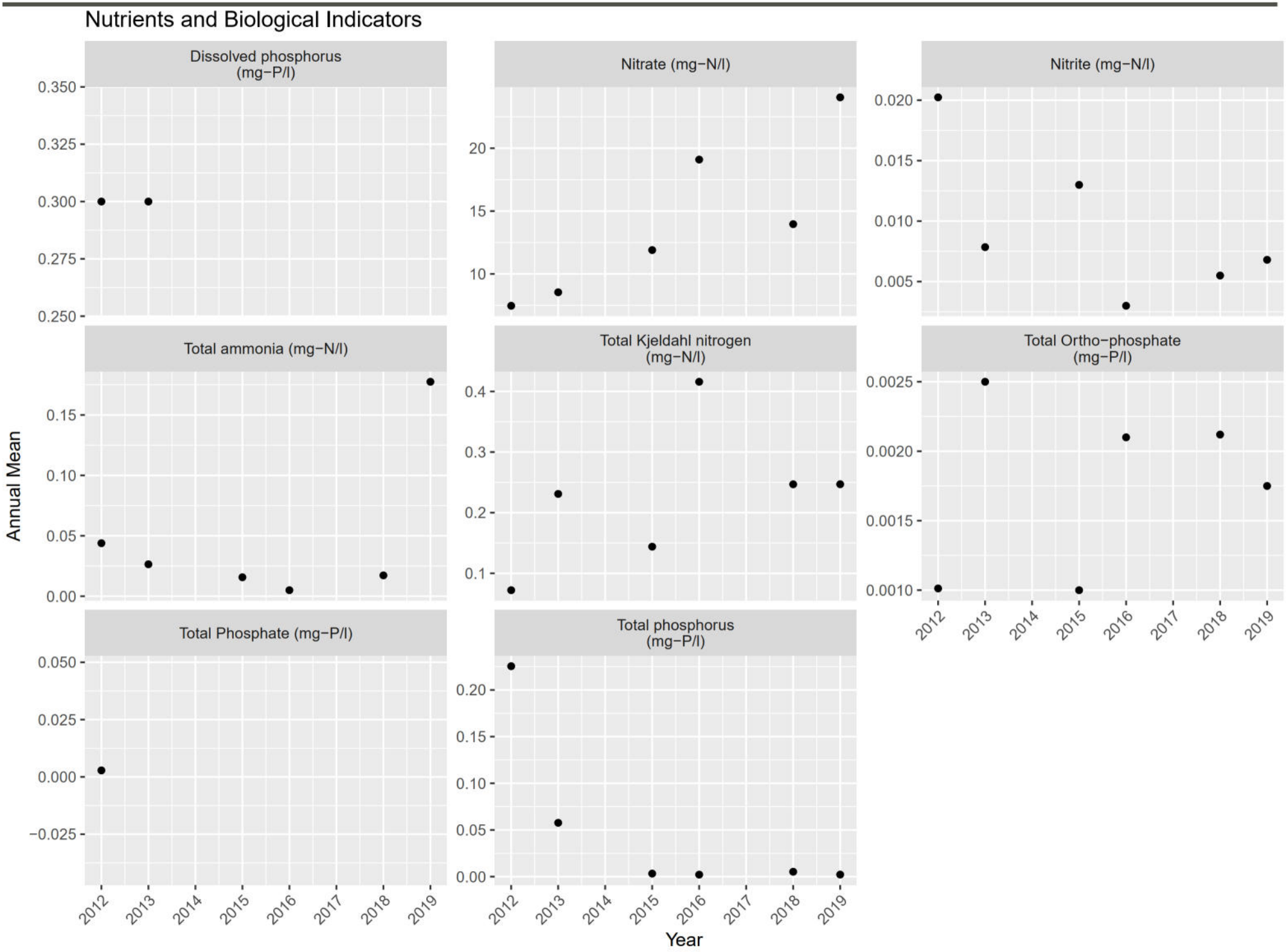


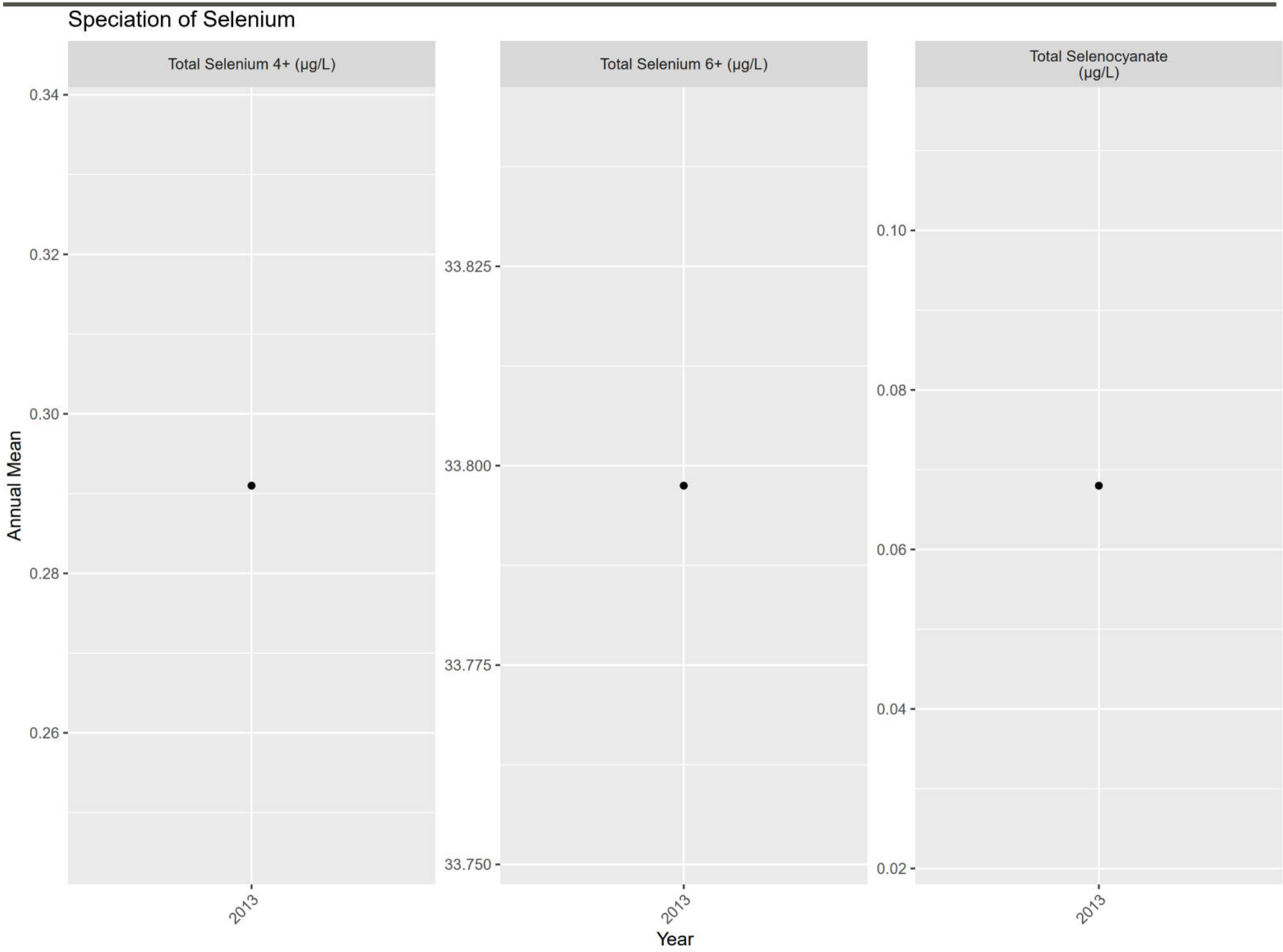

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total Suspended Solids (mg/L)
Turbidity (NTU)
Annual Mean
Year

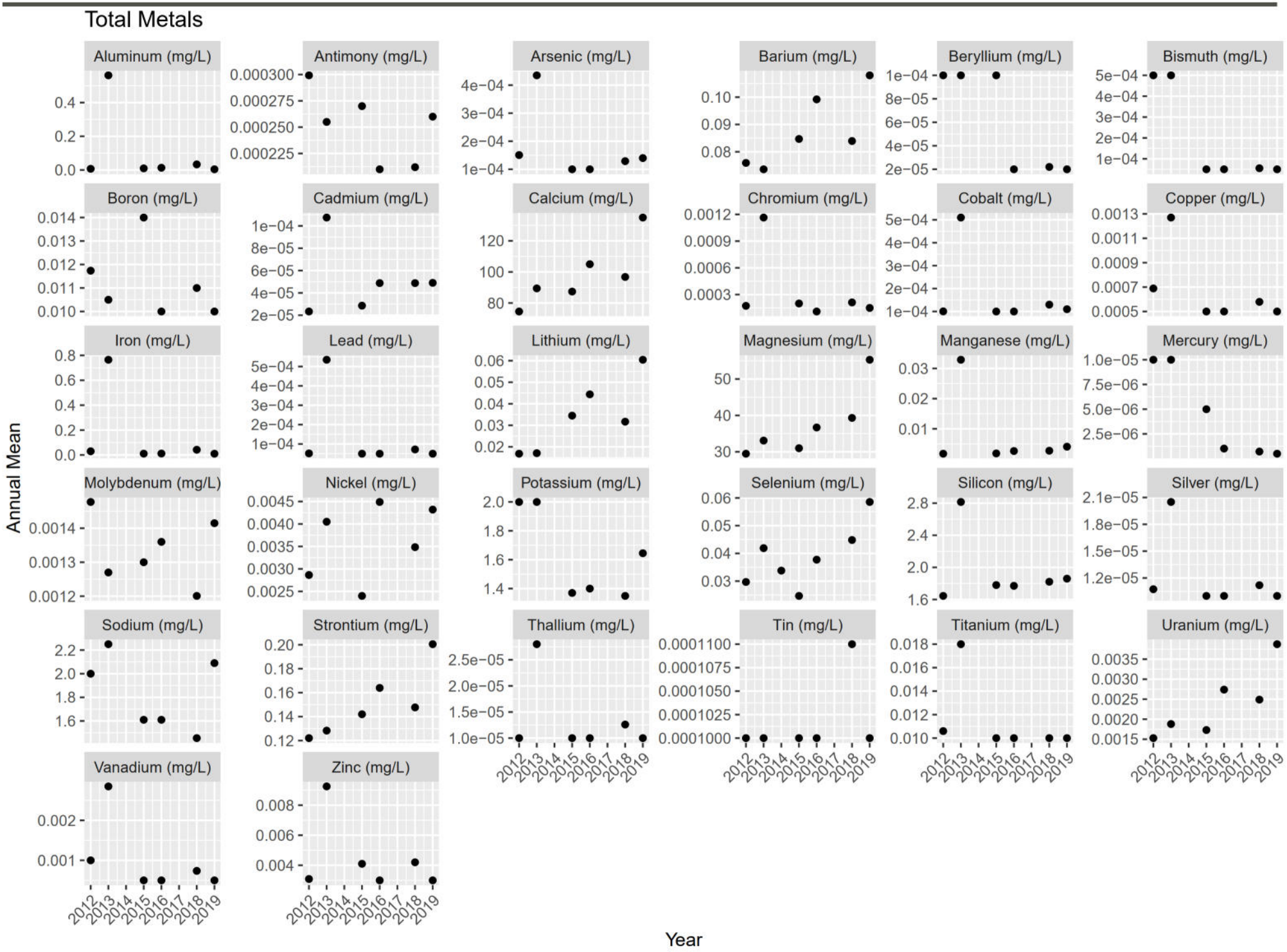

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

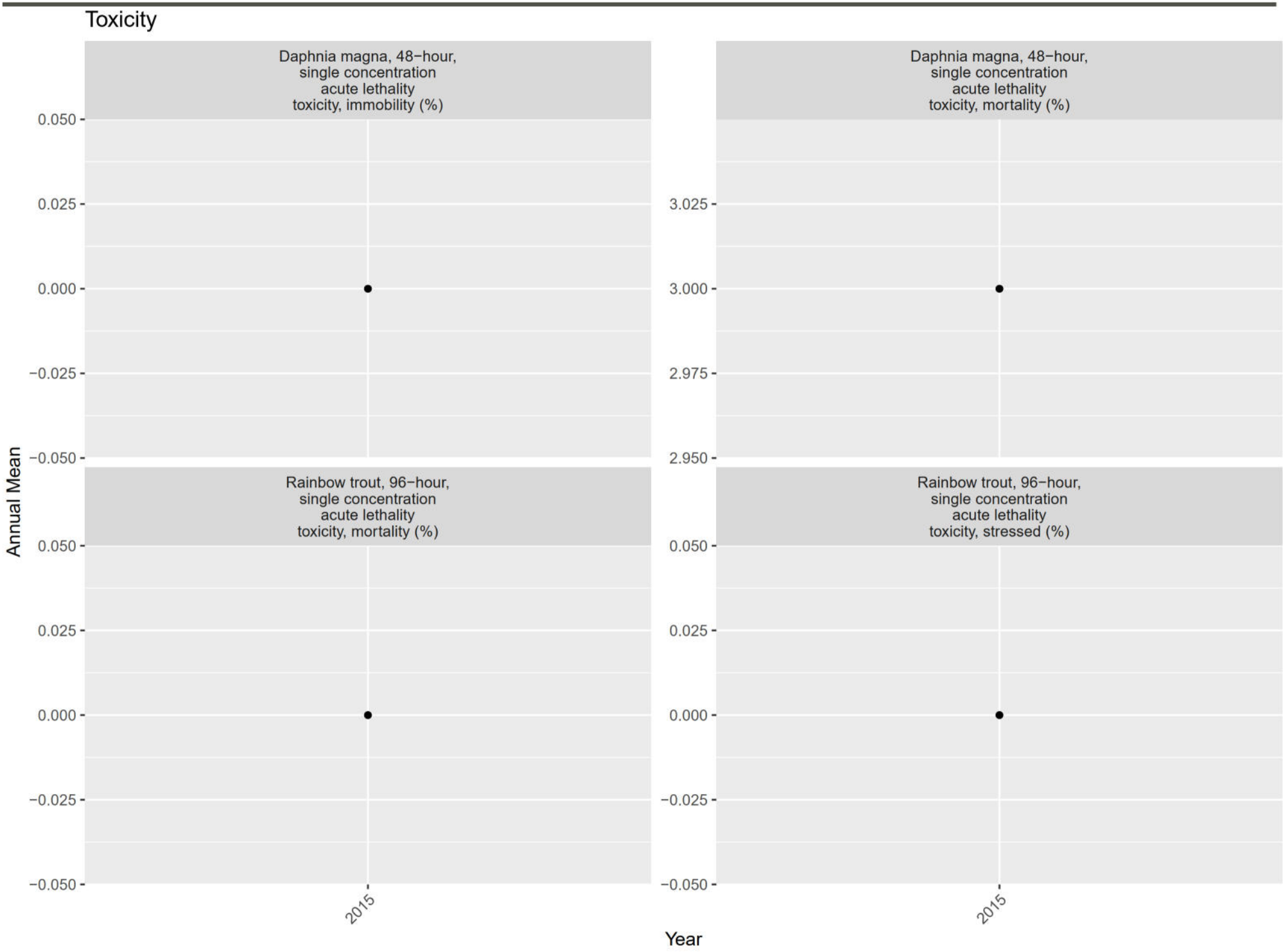

Field Measured
Conductivity (µS/cm)
900
800
700
600
Dissolved Oxygen (%)
90
80
Dissolved Oxygen (mg/L)
12.5
12.0
11.5
11.0
10.5
Oxidation−Reduction Potential (mV)
250
200
150
100
50
0
pH (−)
8.3
8.2
8.1
8.0
Temperature (°C)
6
4
2
Total Suspended Solids (ppm)
1.425
1.400
1.375
1.350
2013
2014
2015
2016
2017
2018
2019
Annual Mean
Year

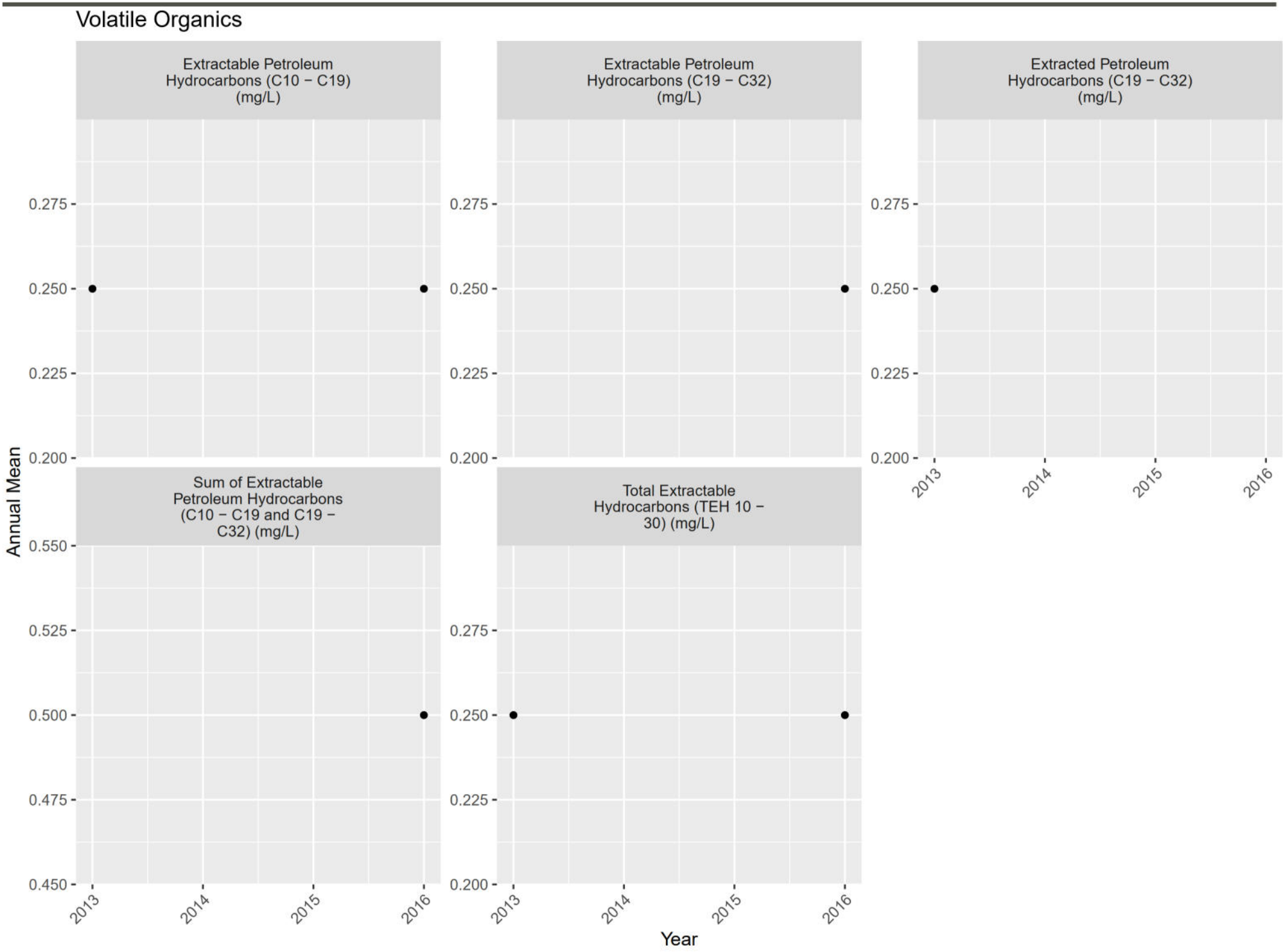

Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Nutrients and Biological Indicators
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
0.350
0.325
0.300
0.275
0.250
20
15
10
0.020
0.015
0.010
0.005
0.15
0.10
0.05
0.00
0.4
0.3
0.2
0.1
0.0025
0.0020
0.0015
0.0010
0.050
0.025
0.000
−0.025
0.20
0.15
0.10
0.05
0.00
2012
2013
2014
2015
2016
2017
2018
2019


Speciation of Selenium
Total Selenium 4+ (µg/L)
Total Selenium 6+ (µg/L)
Total Selenocyanate (µg/L)
Annual Mean
0.34
0.32
0.30
0.28
0.26
33.825
33.800
33.775
33.750
0.10
0.08
0.06
0.04
0.02
2013
Year


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

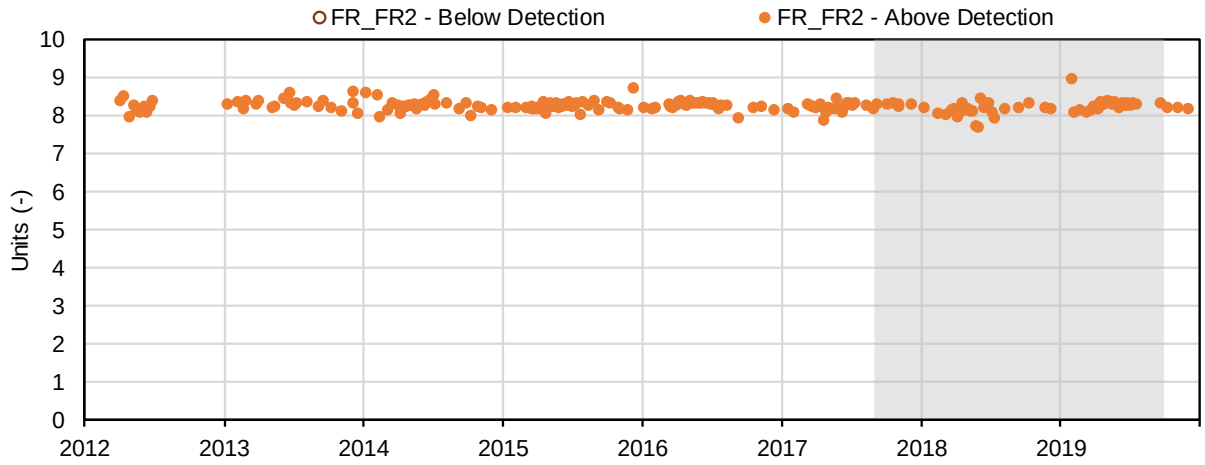

Toxicity
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, immobility (%)
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, stressed (%)
Annual Mean
0.050
0.025
0.000
−0.025
−0.050
3.025
3.000
2.975
2.950
2015
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extractable Petroleum Hydrocarbons (C19 − C32) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Sum of Extractable Petroleum Hydrocarbons (C10 − C19 and C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
Year
0.275
0.250
0.225
0.200
0.550
0.525
0.500
0.475
0.450
2013
2014
2015
2016

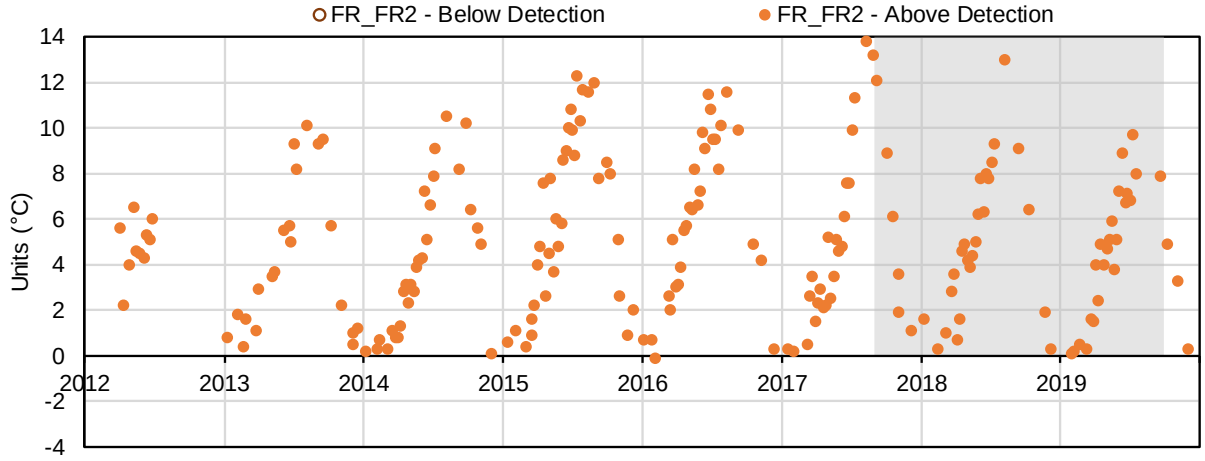
ATTACHMENT F6

FR_FR2 Plots

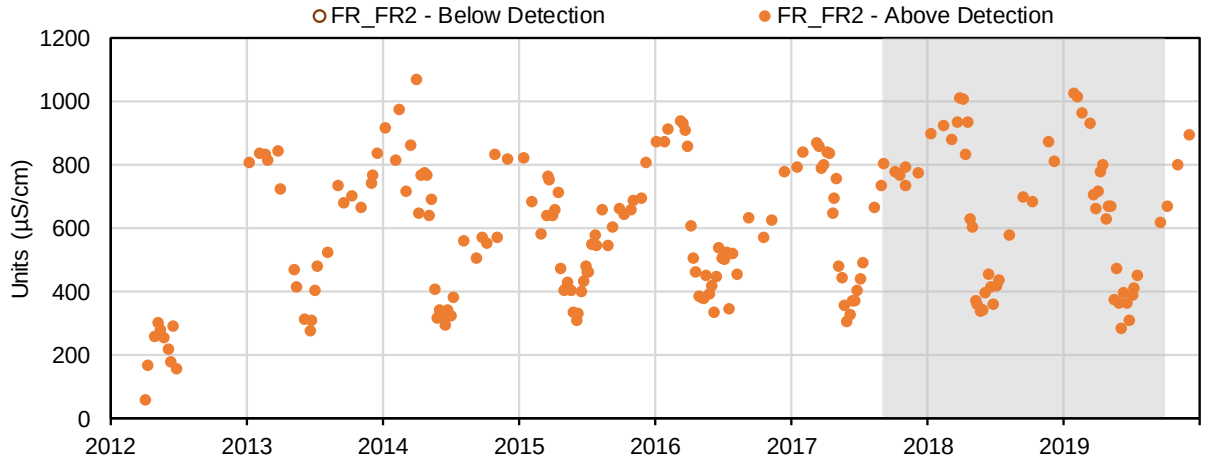
(1) pH (-); Field Measured



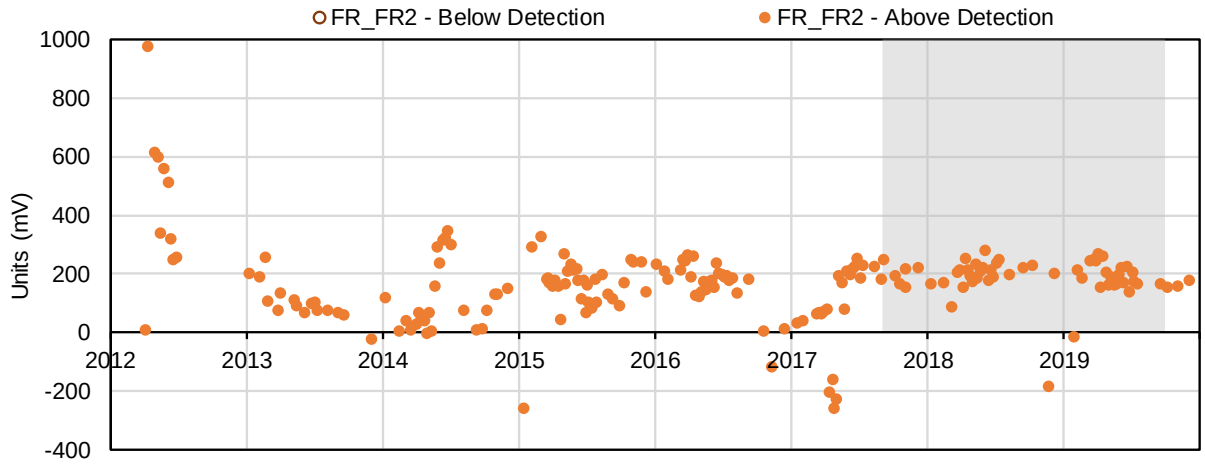
(2) Temperature (°C); Field Measured



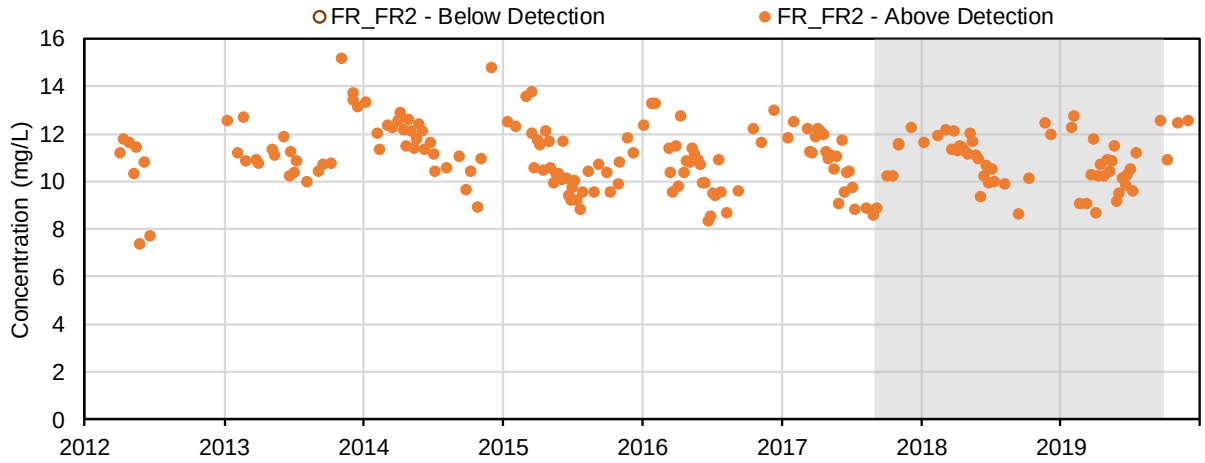
(3) Conductivity (µS/cm); Field Measured



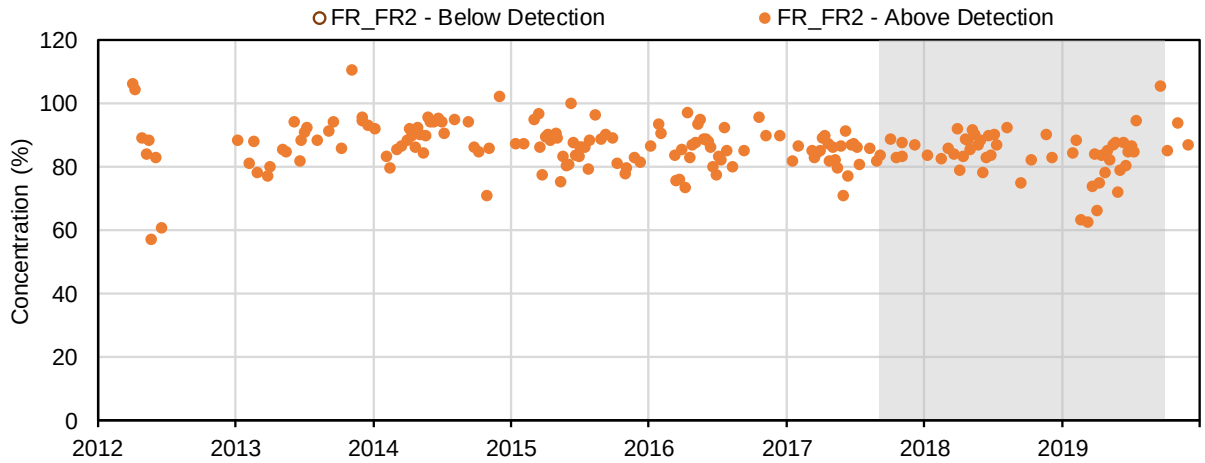
(4) Oxidation-Reduction Potential (mV); Field Measured



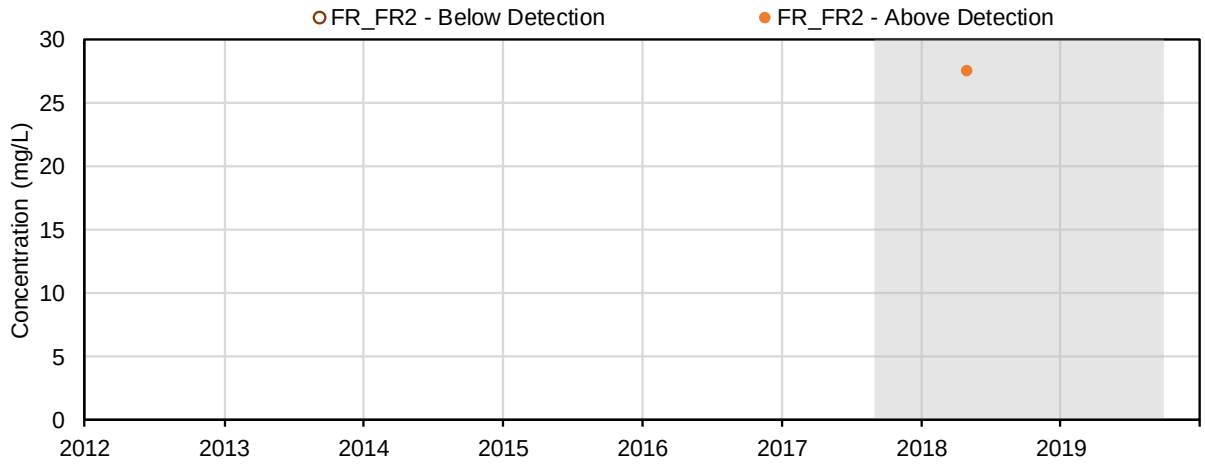
(5) Dissolved Oxygen (mg/L); Field Measured



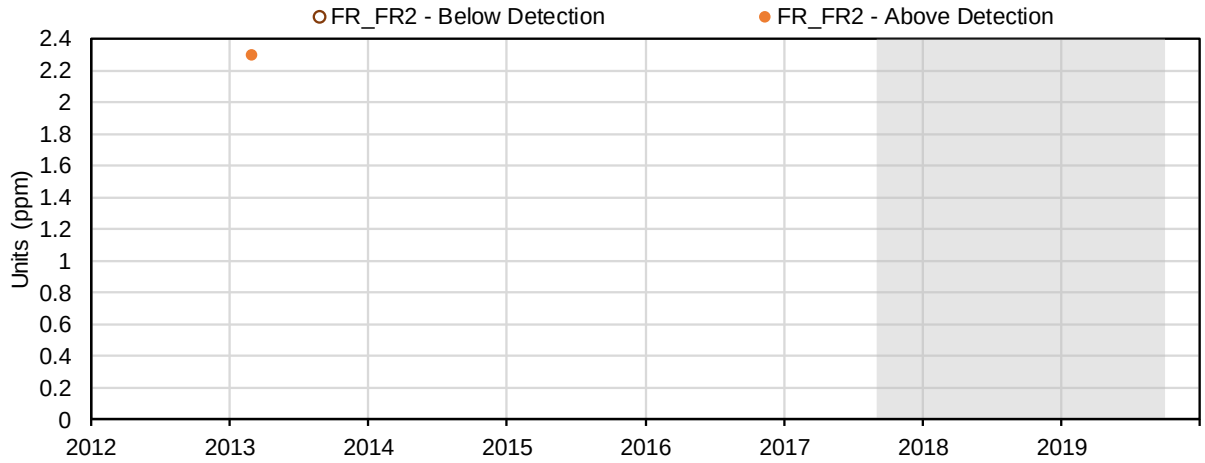
(6) Dissolved Oxygen (%); Field Measured



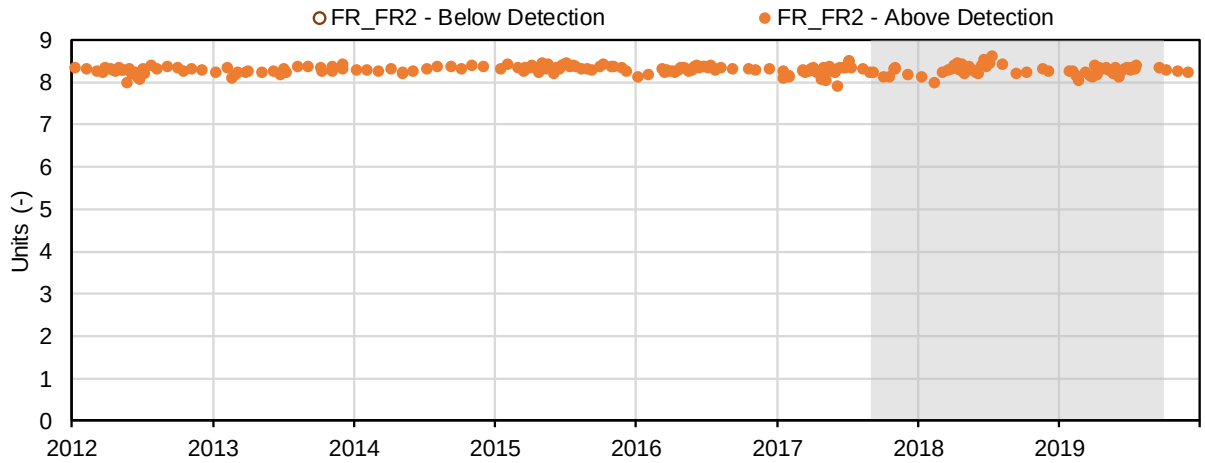
(7) Total Suspended Solids (mg/L); Field Measured



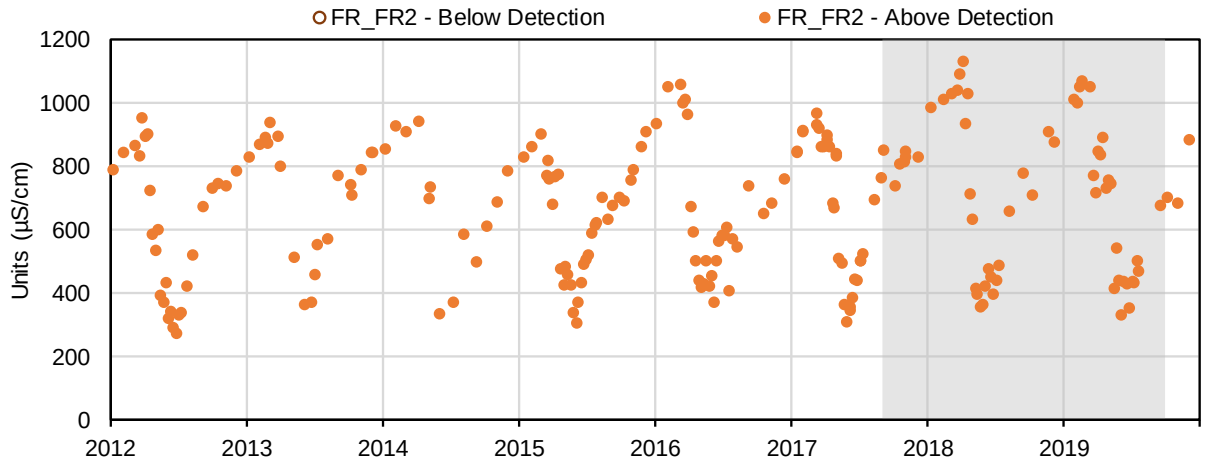
(8) Total Suspended Solids (ppm); Field Measured



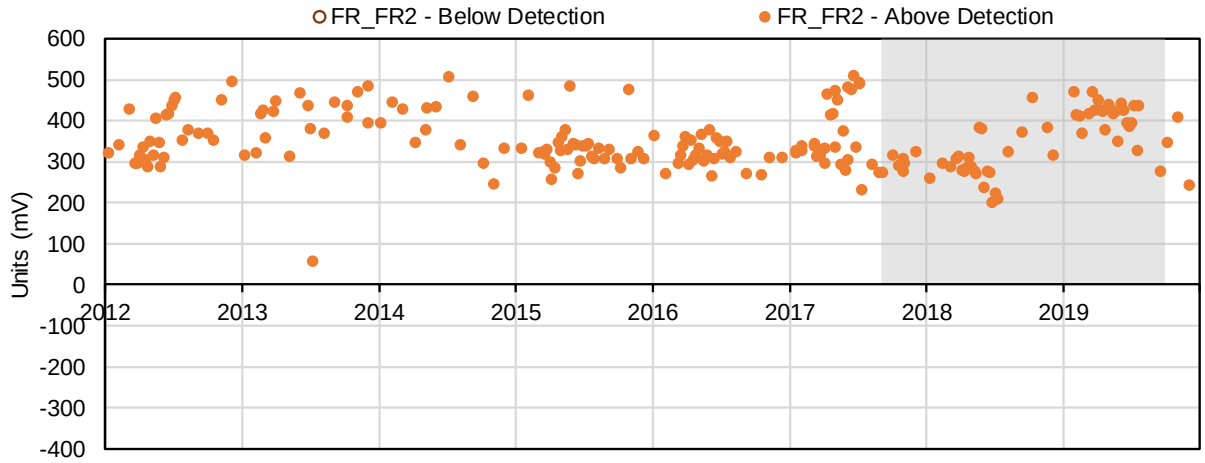
(9) pH (-); Conventional Parameters



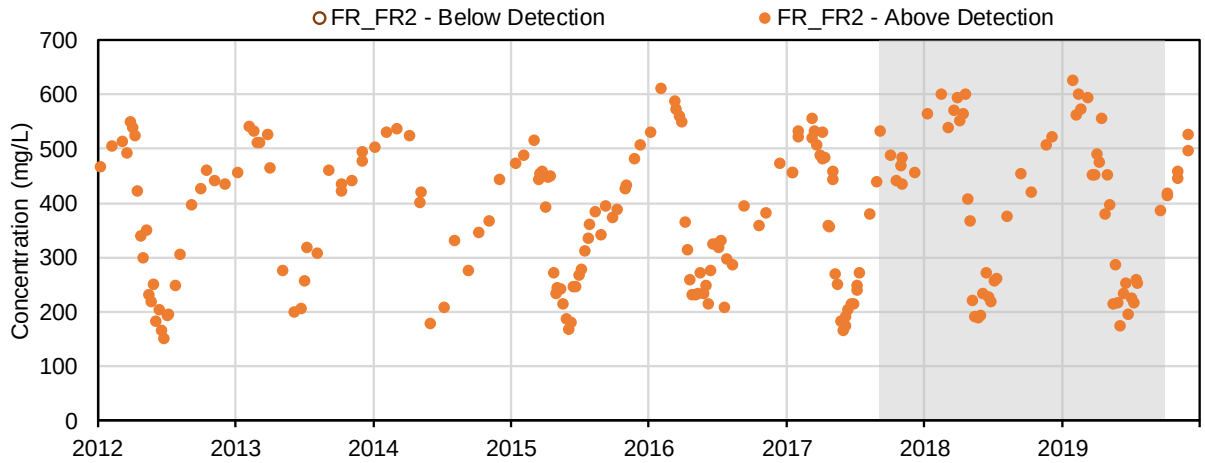
(10) Conductivity (µS/cm); Conventional Parameters



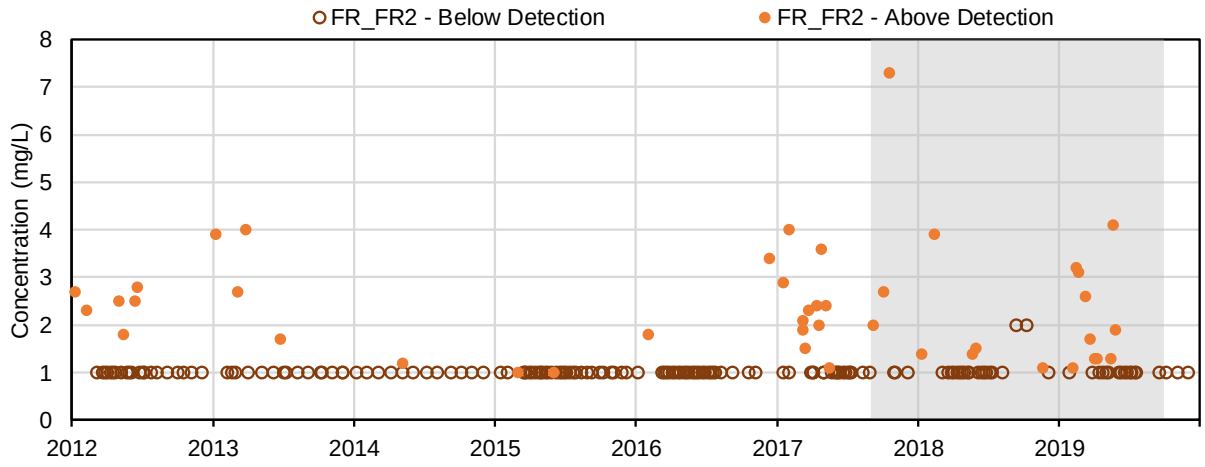
(11) Oxidation-Reduction Potential (mV); Conventional Parameters



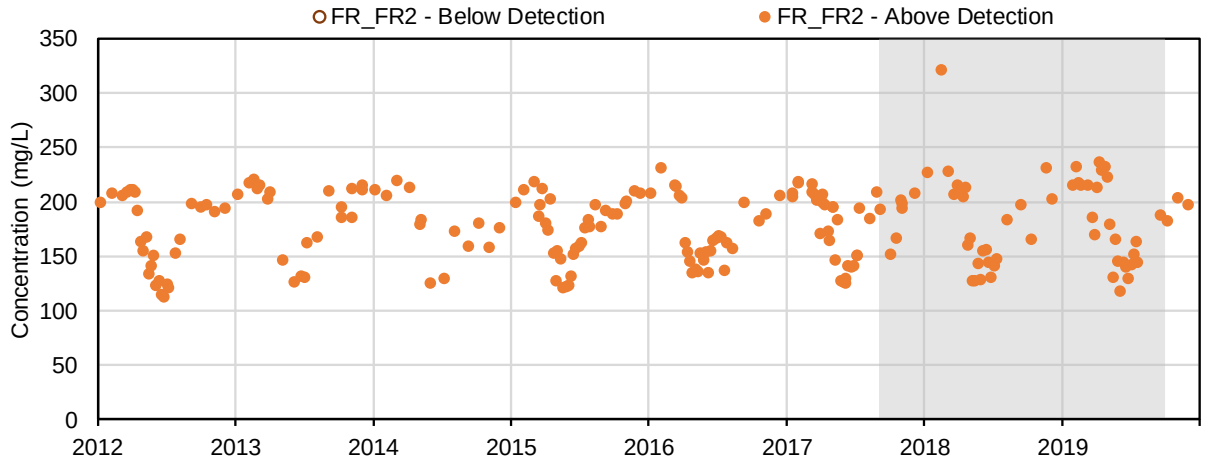
(12) Hardness, as CaCO3 (mg/L); Conventional Parameters



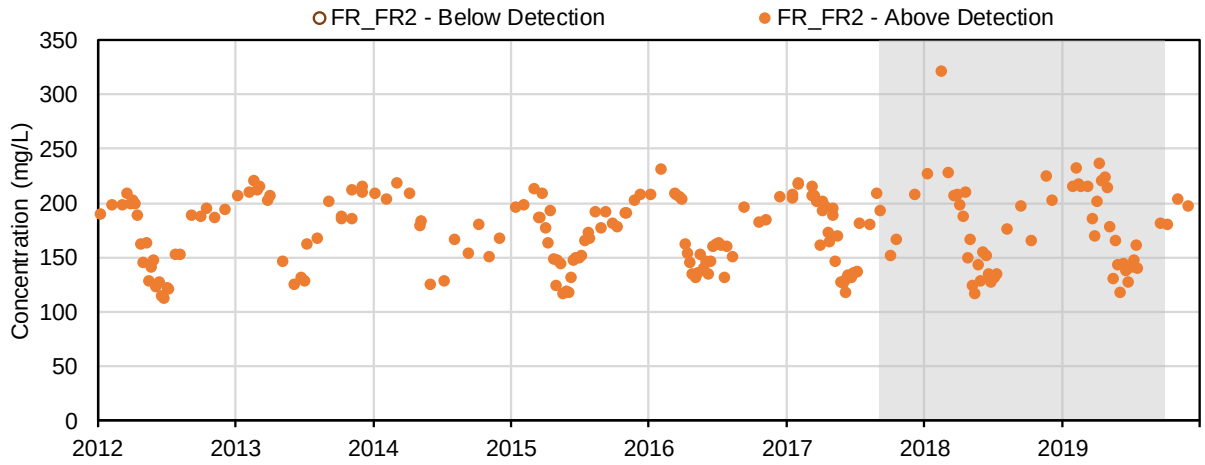
(13) Acidity, CaCO3 (mg/L); Conventional Parameters



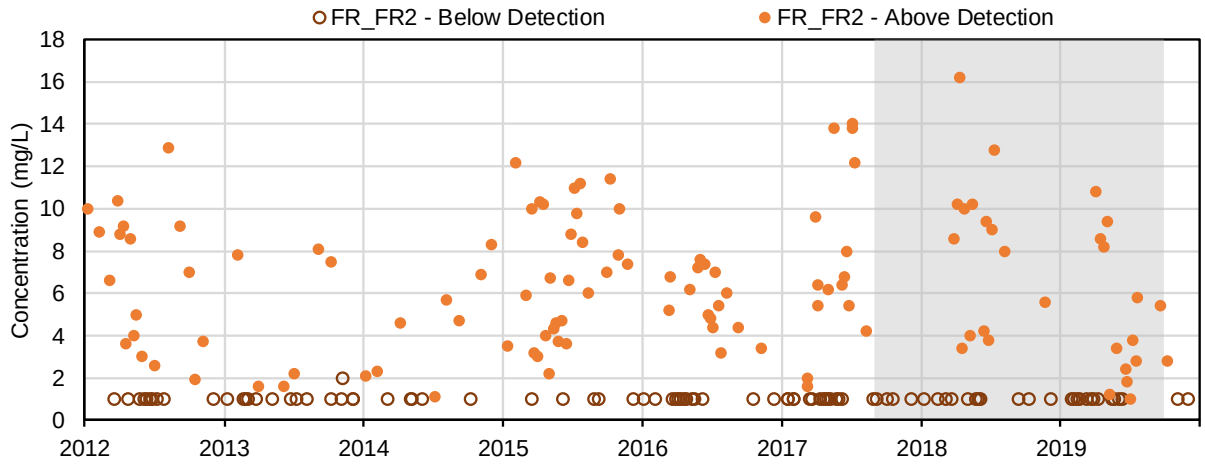
(14) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



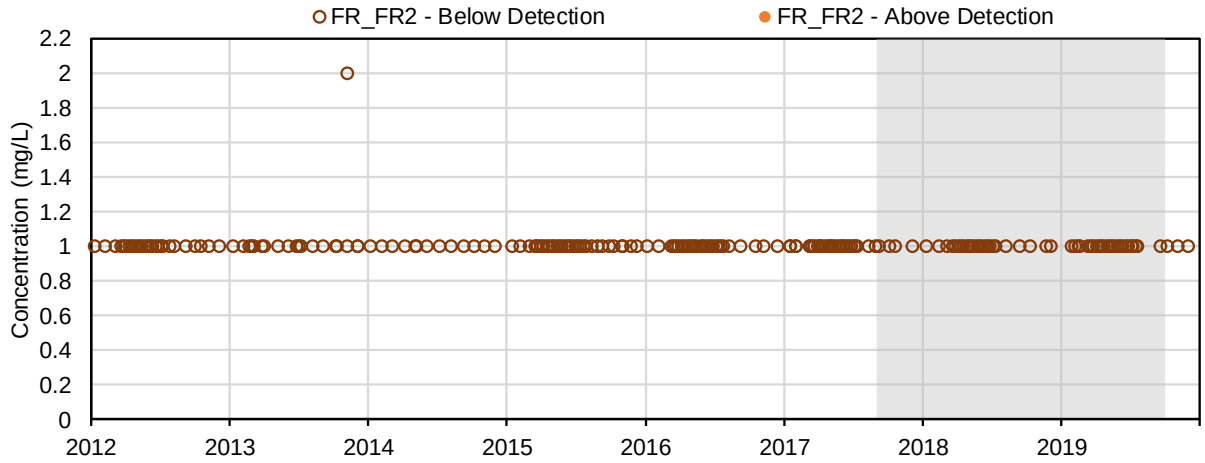
(15) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



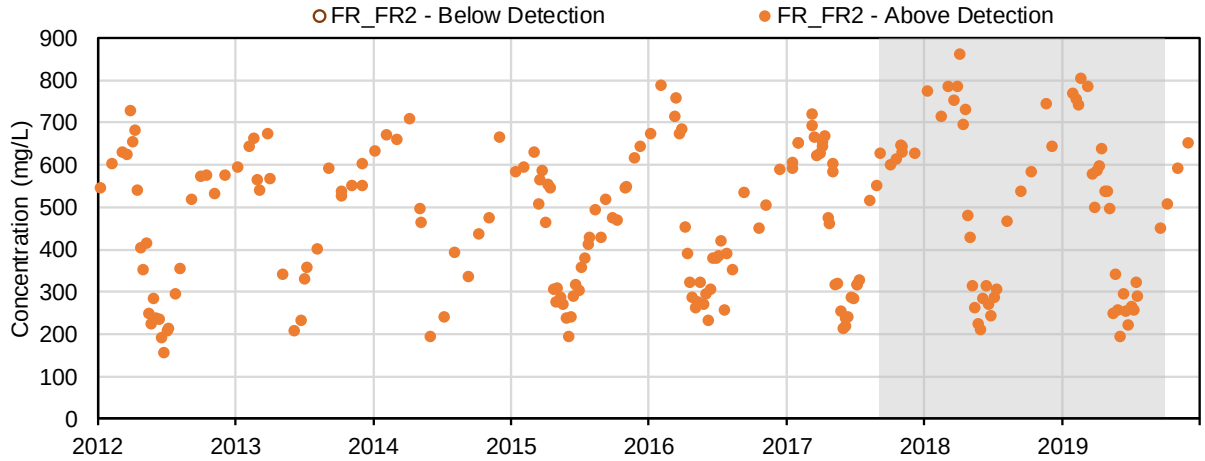
(16) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



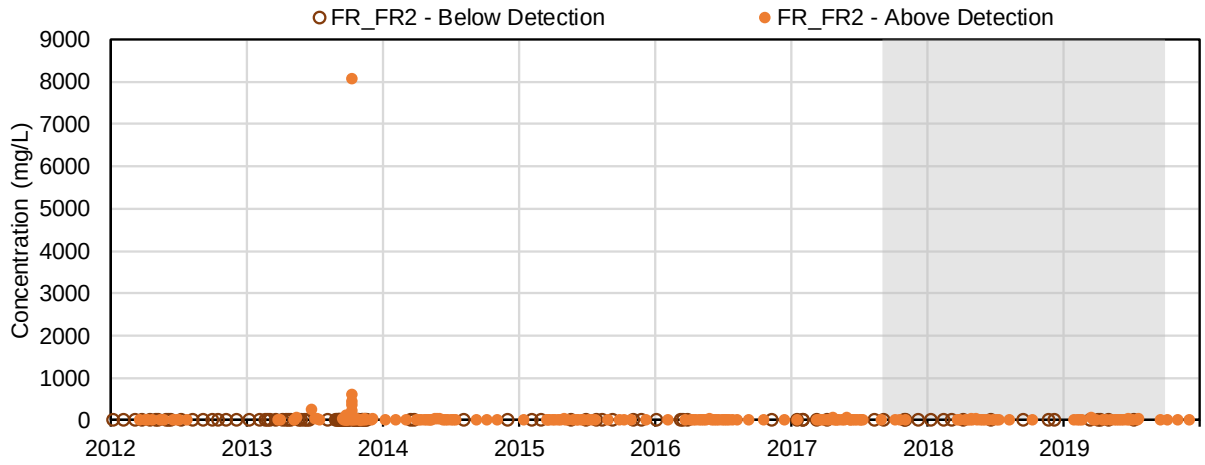
(17) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



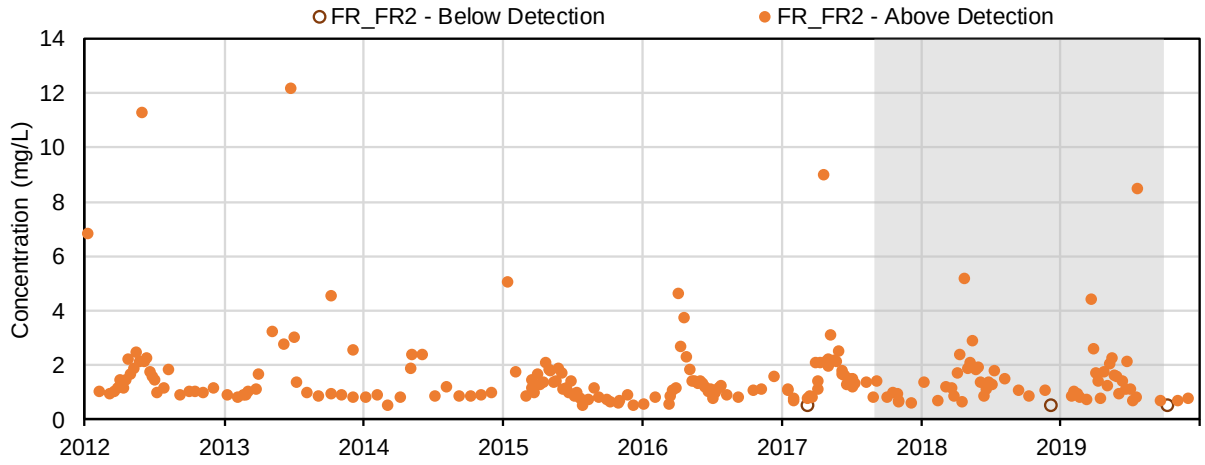
(18) Total dissolved solids (mg/L); Conventional Parameters



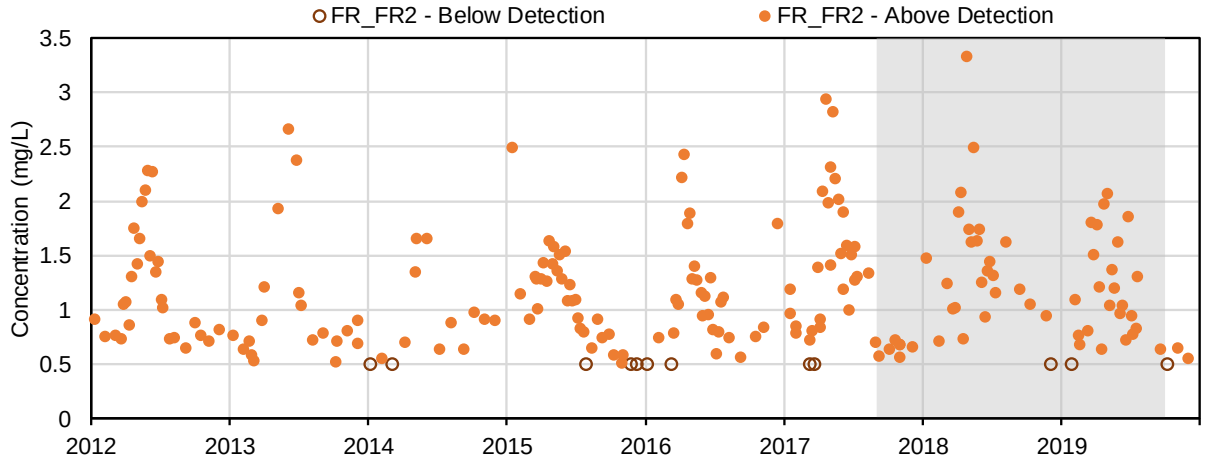
(19) Total suspended solids (mg/L); Conventional Parameters



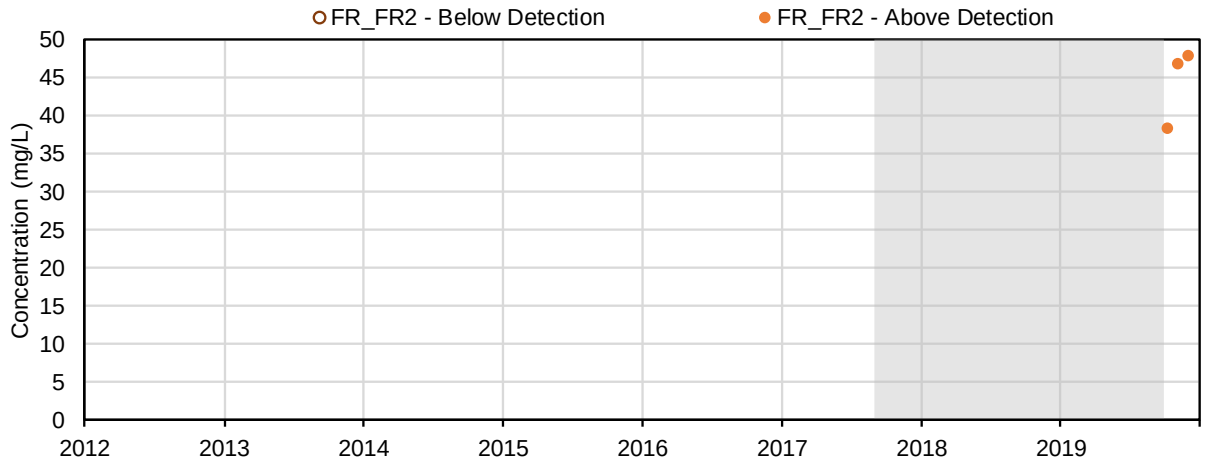
(20) Total organic carbon (mg/L); Conventional Parameters



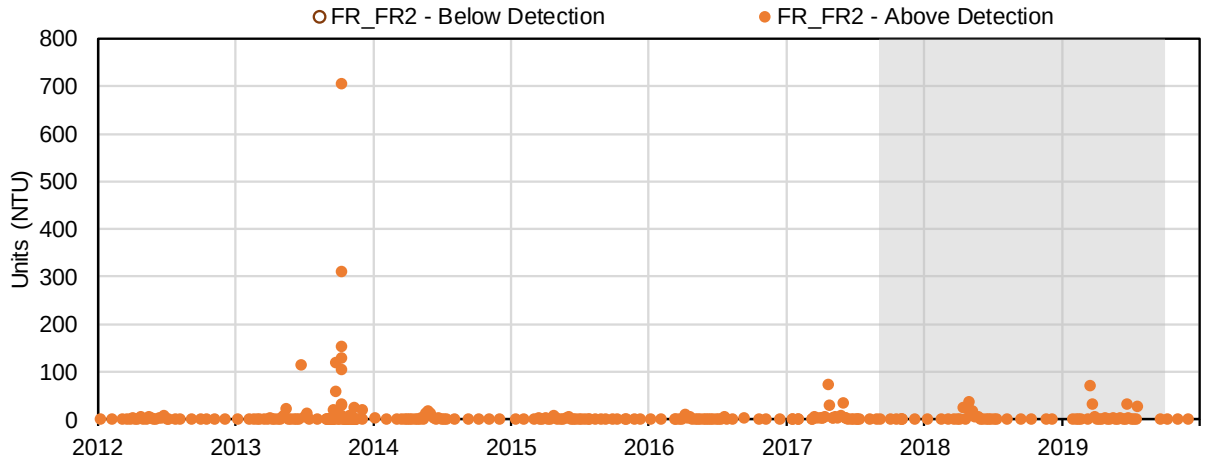
(21) Dissolved organic carbon (mg/L); Conventional Parameters



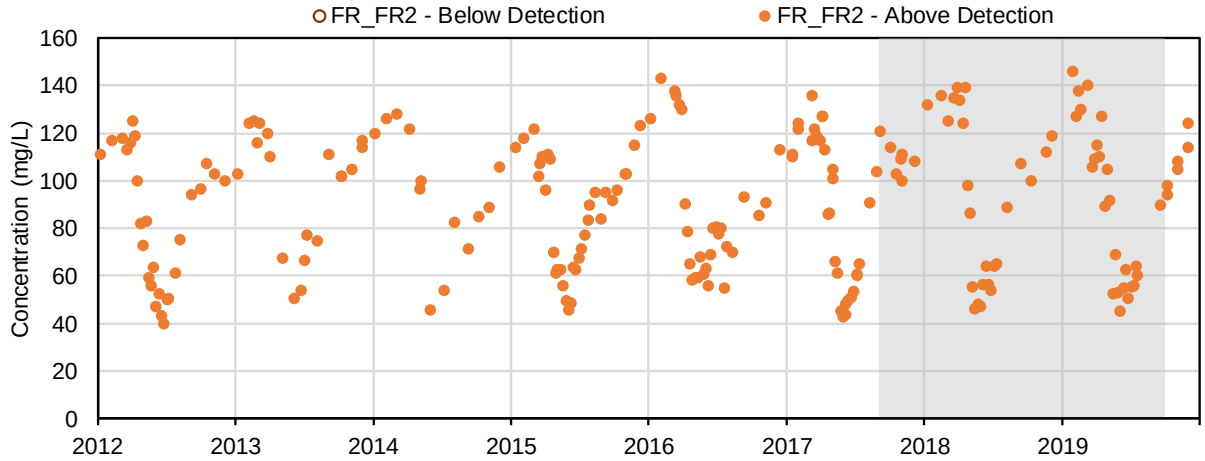
(22) Total Inorganic Carbon (mg/L); Conventional Parameters



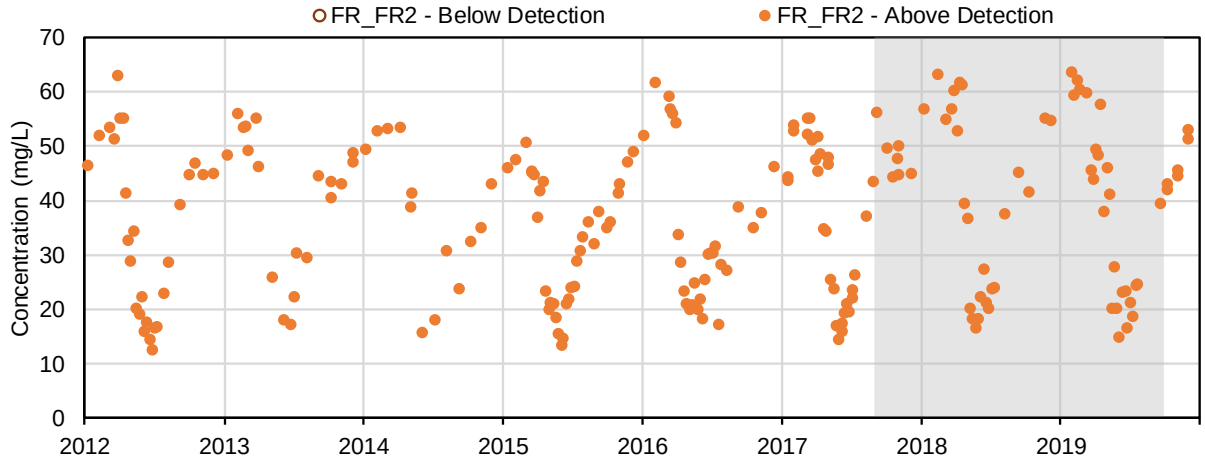
(23) Turbidity (NTU); Conventional Parameters



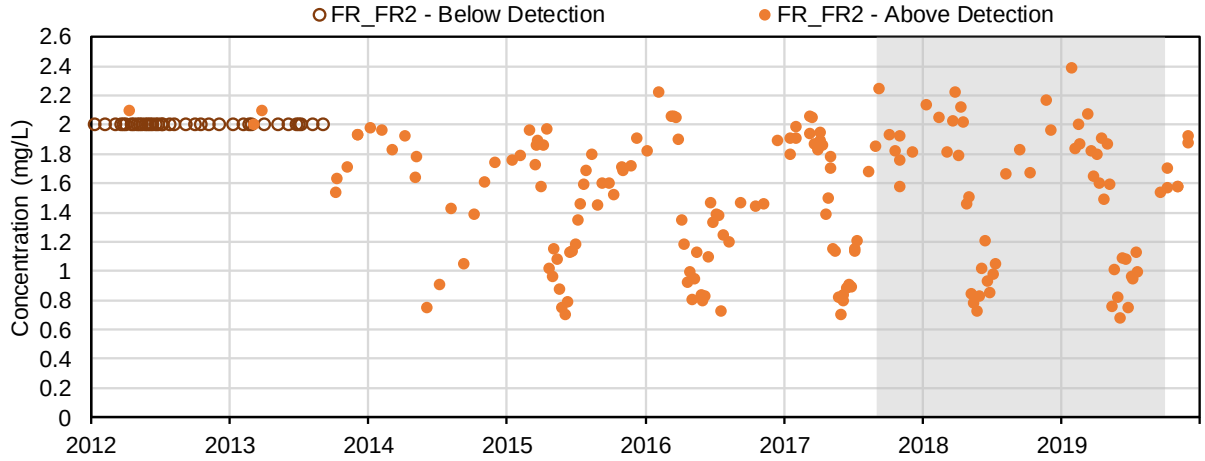
(24) Calcium (mg/L); Major Ions



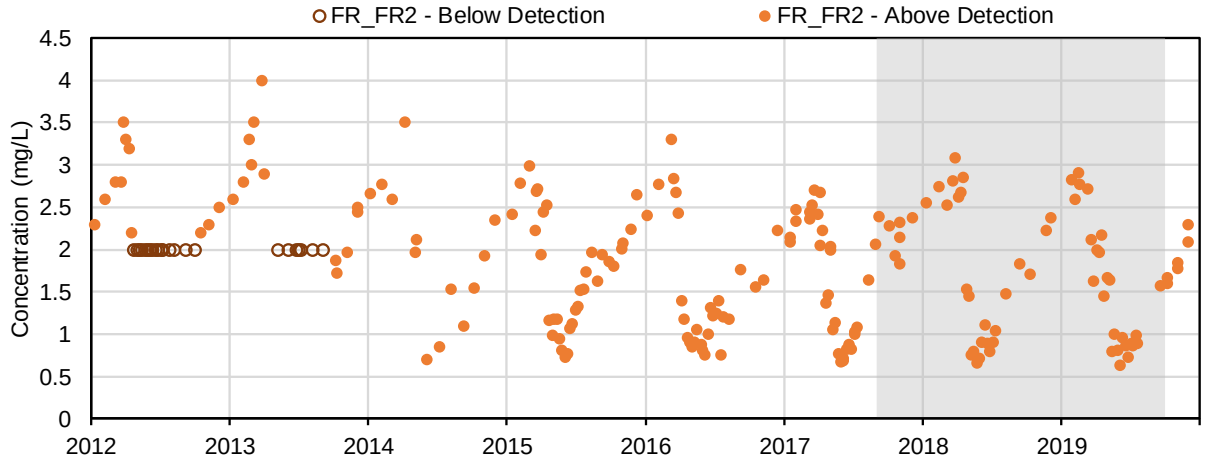
(25) Magnesium (mg/L); Major Ions



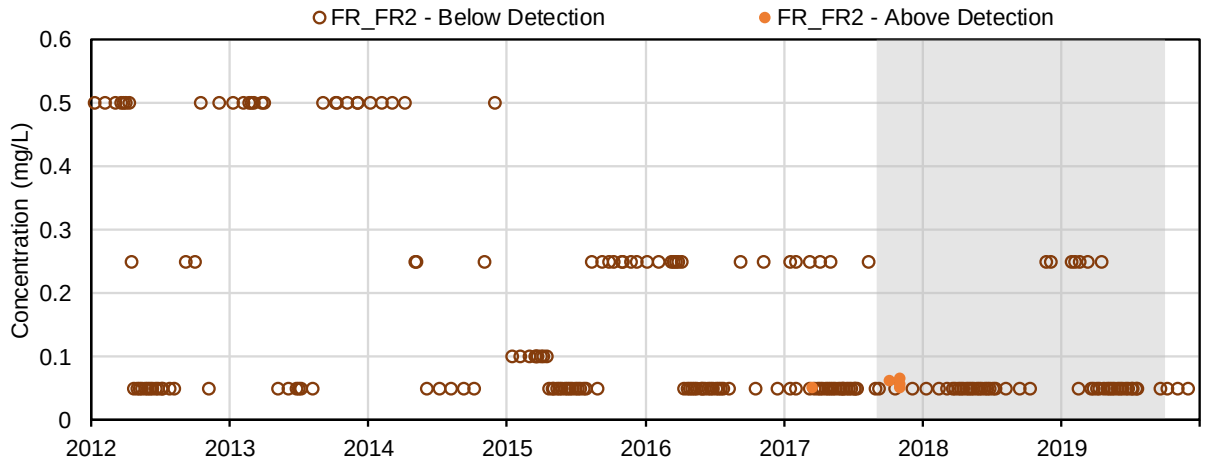
(26) Potassium (mg/L); Major Ions



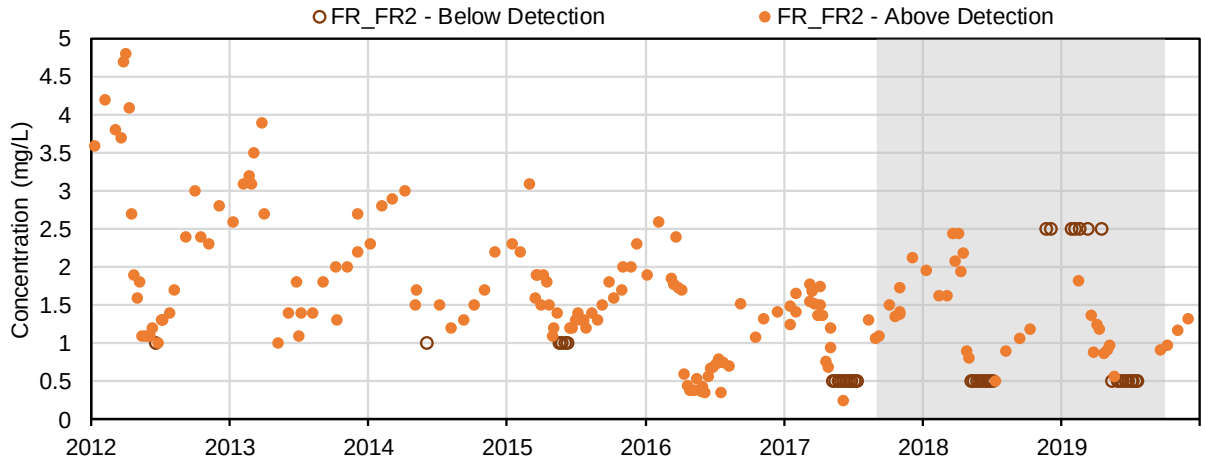
(27) Sodium (mg/L); Major Ions



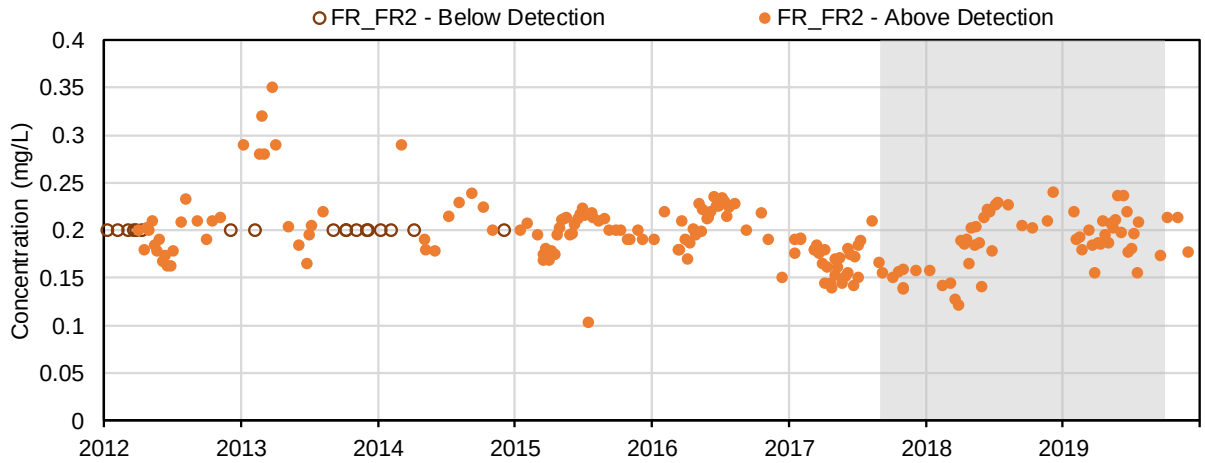
(28) Bromide (mg/L); Major Ions



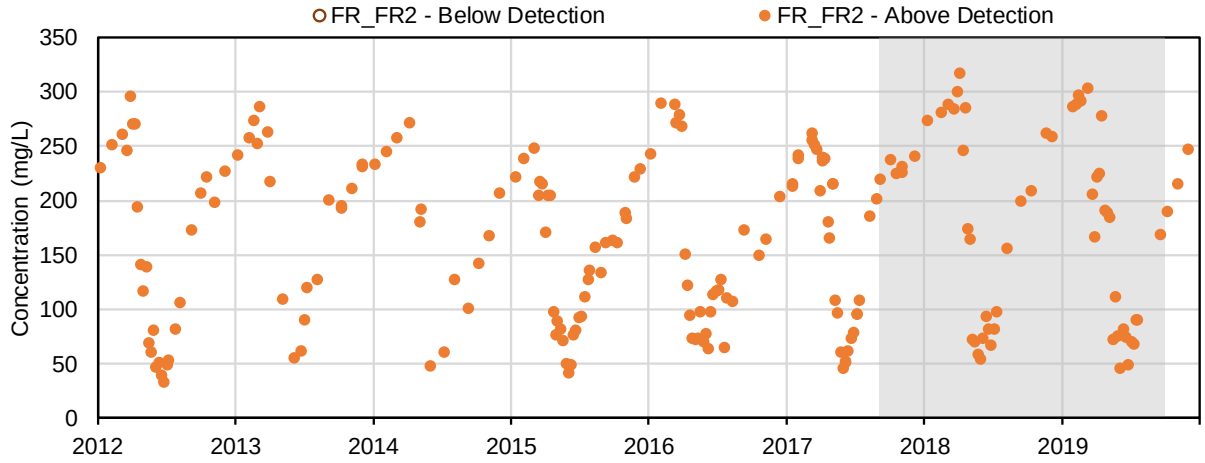
(29) Chloride (mg/L); Major Ions



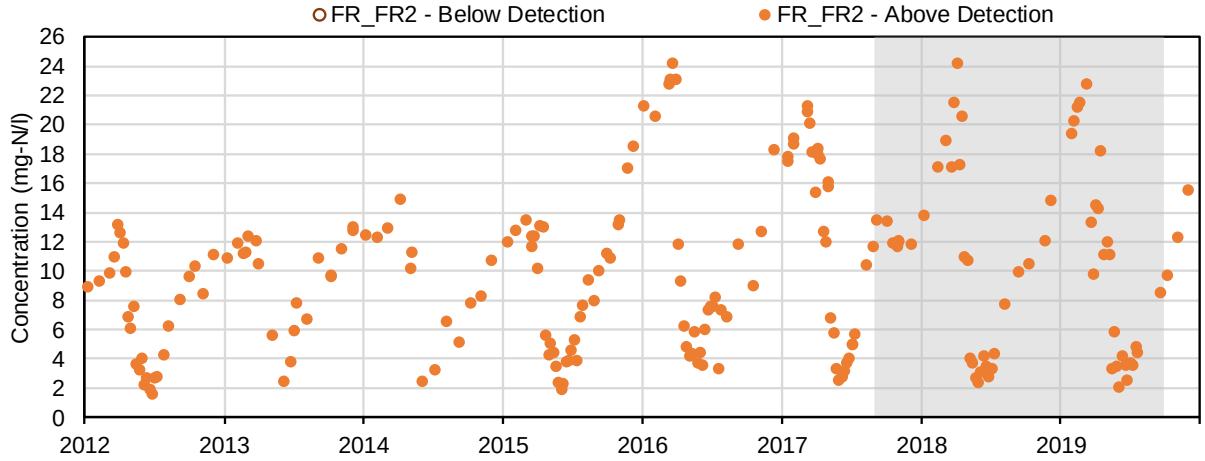
(30) Fluoride (mg/L); Major Ions



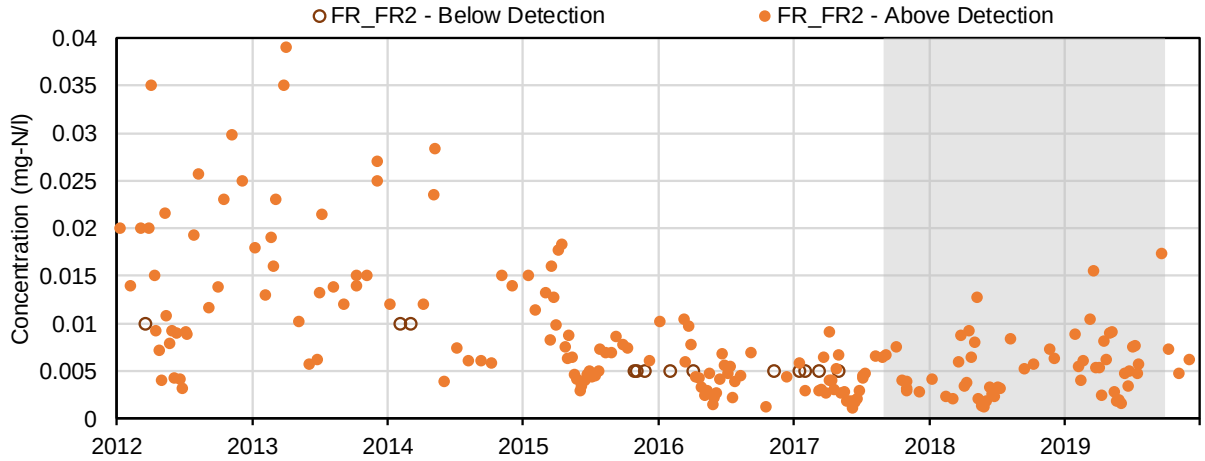
(31) Sulphate (mg/L); Major Ions



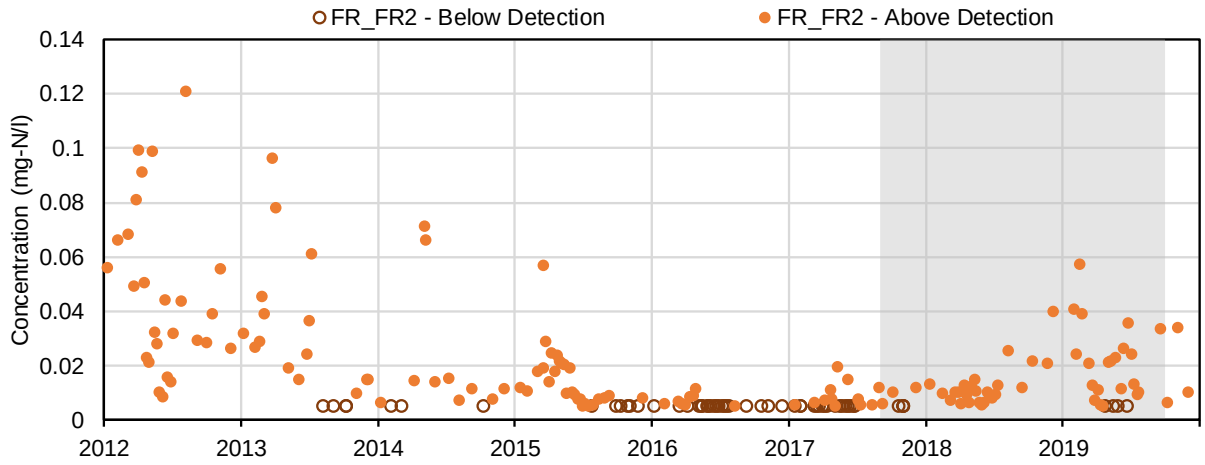
(32) Nitrate (mg-N/l); Nutrients and Biological Indicators



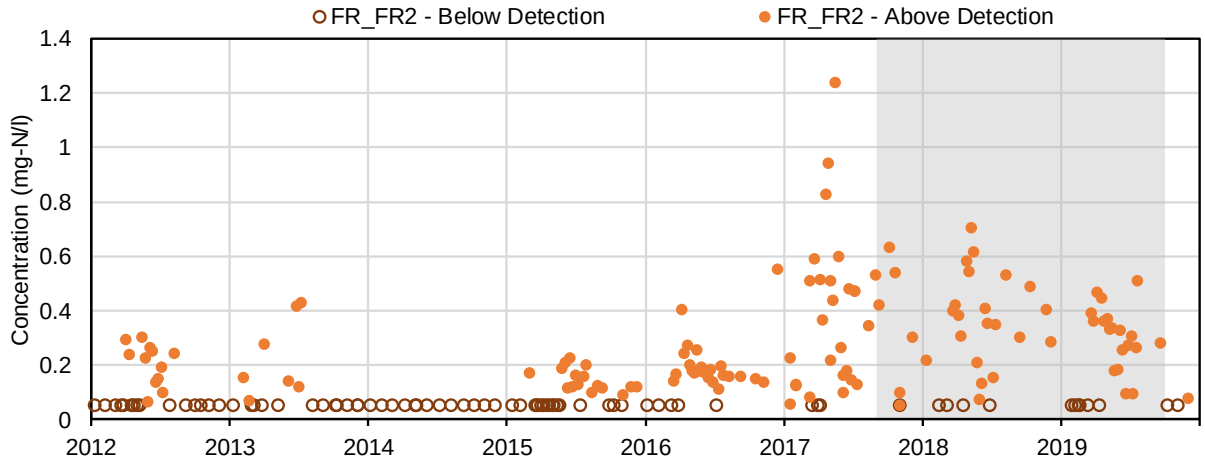
(33) Nitrite (mg-N/l); Nutrients and Biological Indicators



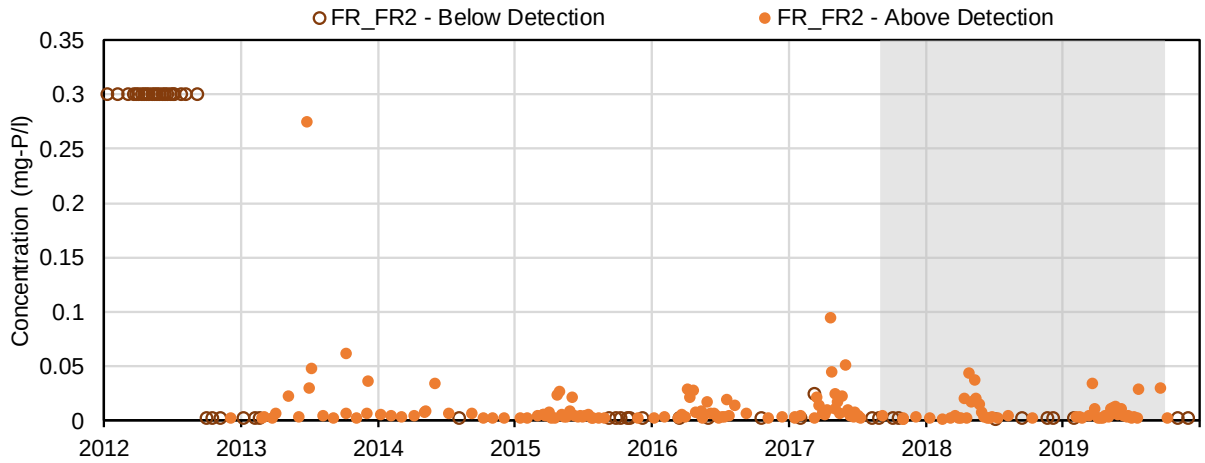
(34) Total ammonia (mg-N/l); Nutrients and Biological Indicators



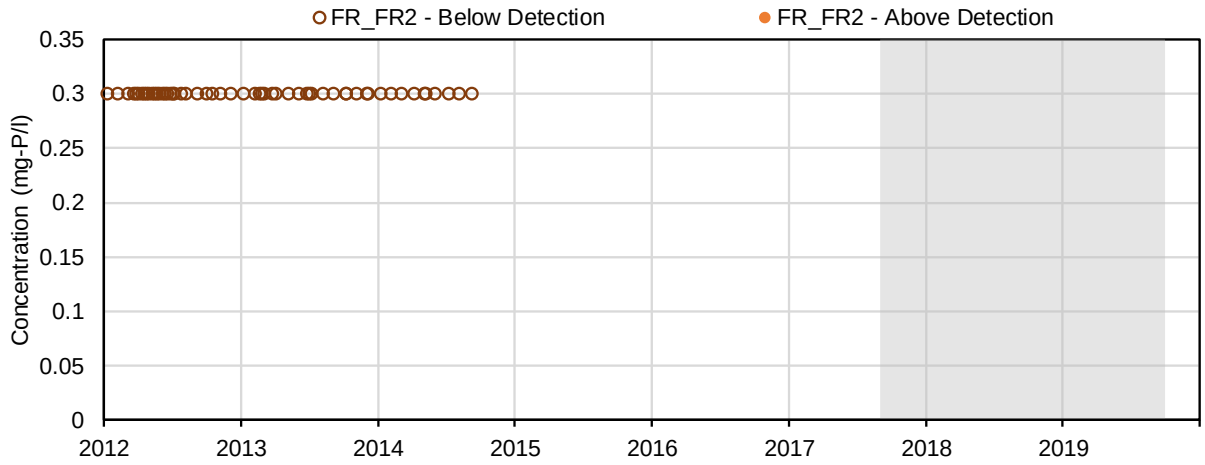
(35) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



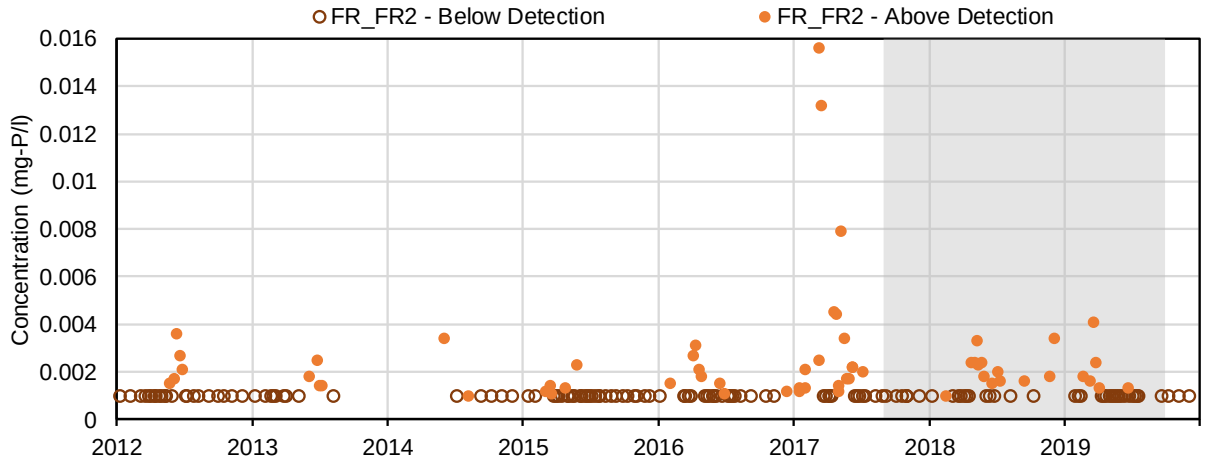
(36) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



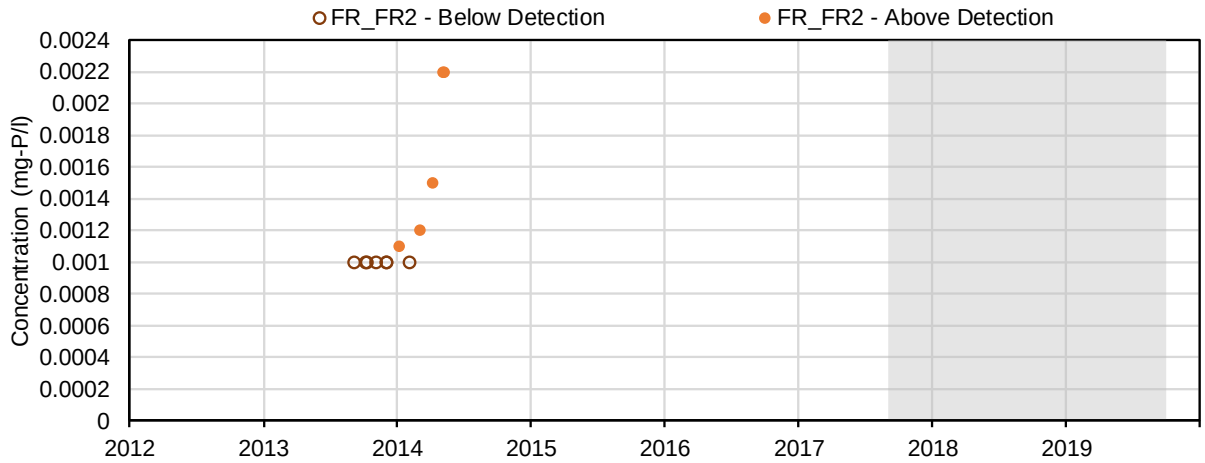
(37) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



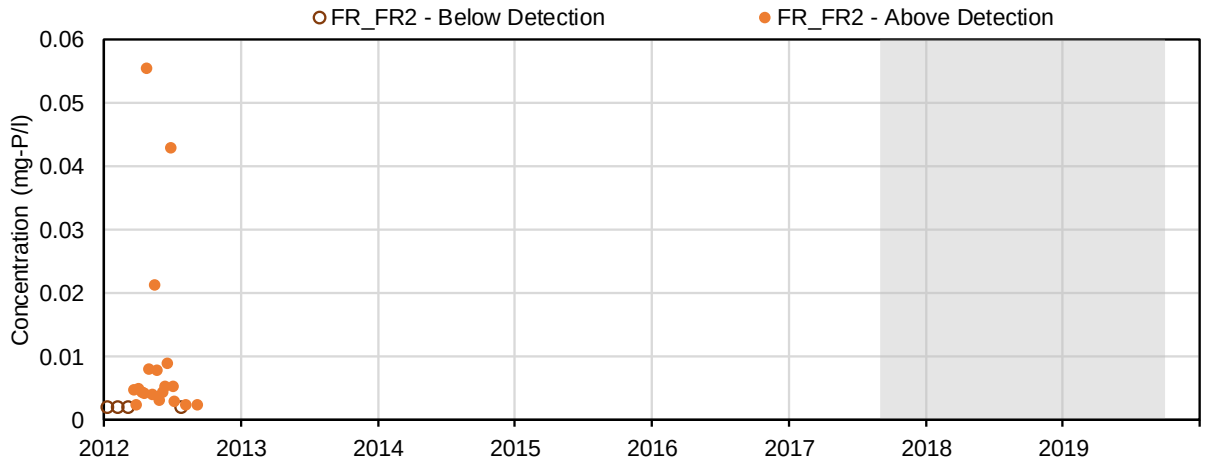
(38) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



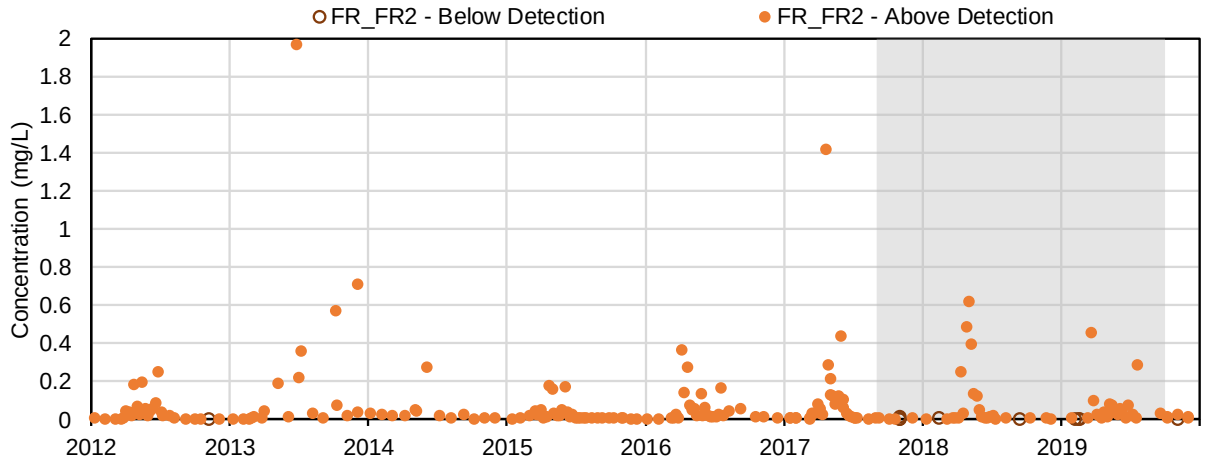
(39) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



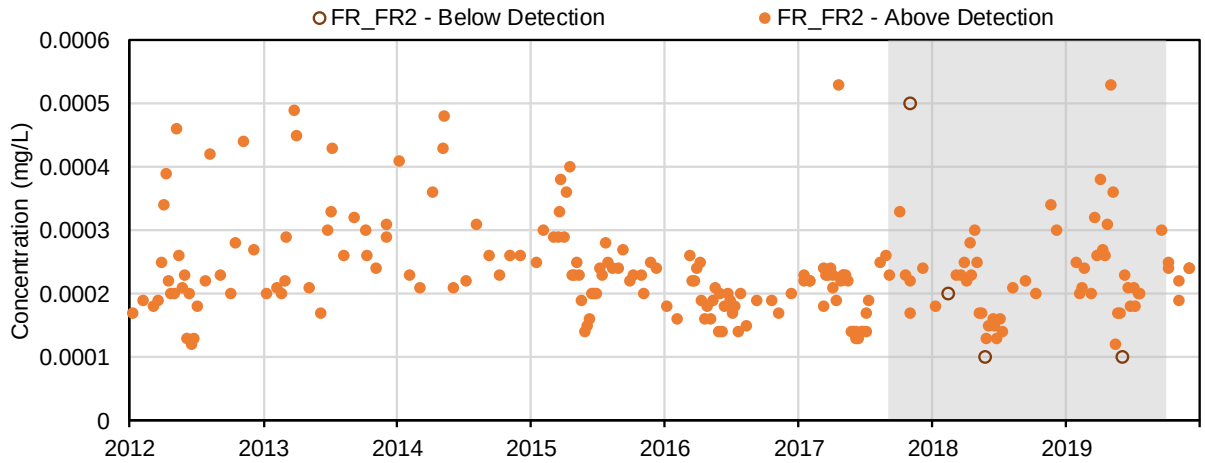
(40) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



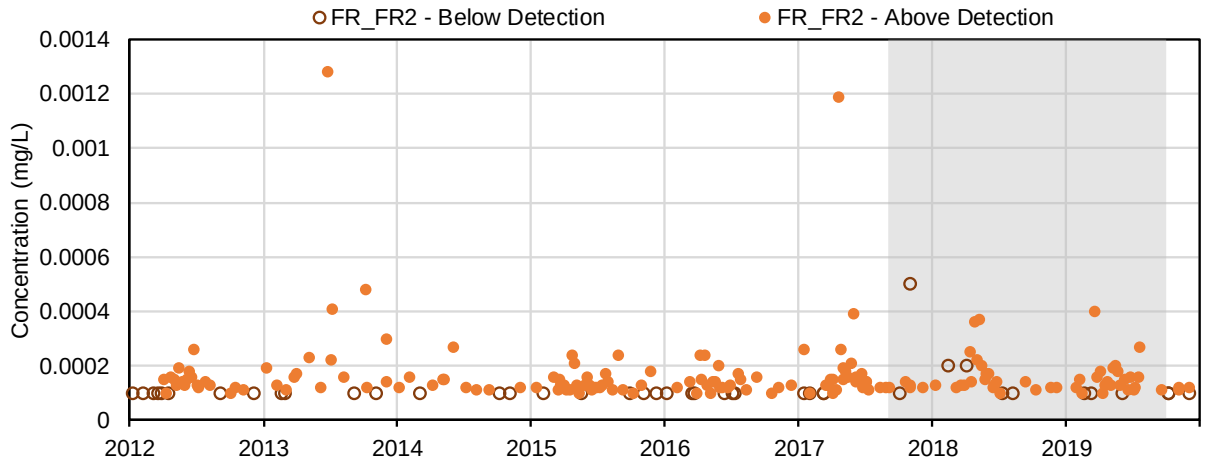
(41) Aluminum (mg/L); Total Metals



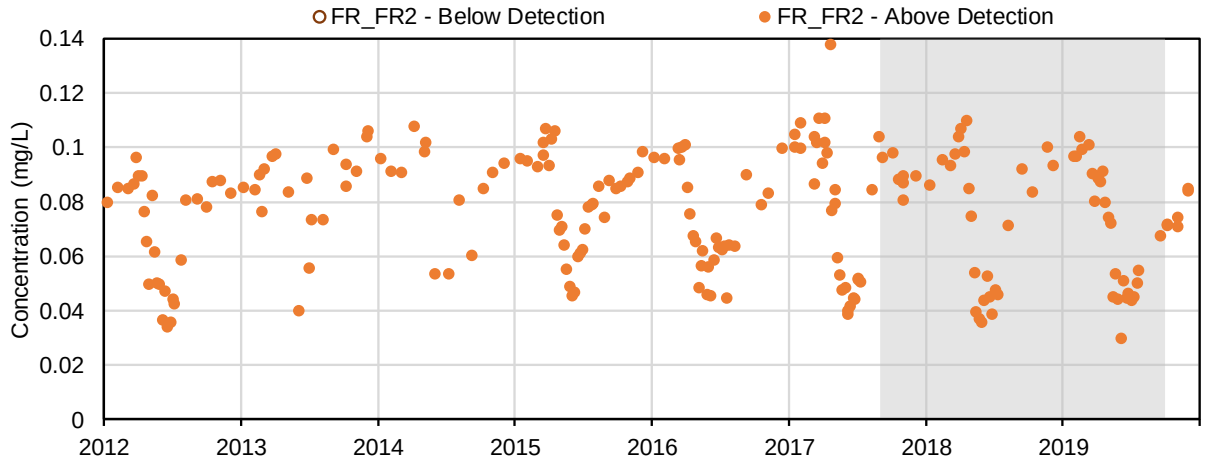
(42) Antimony (mg/L); Total Metals



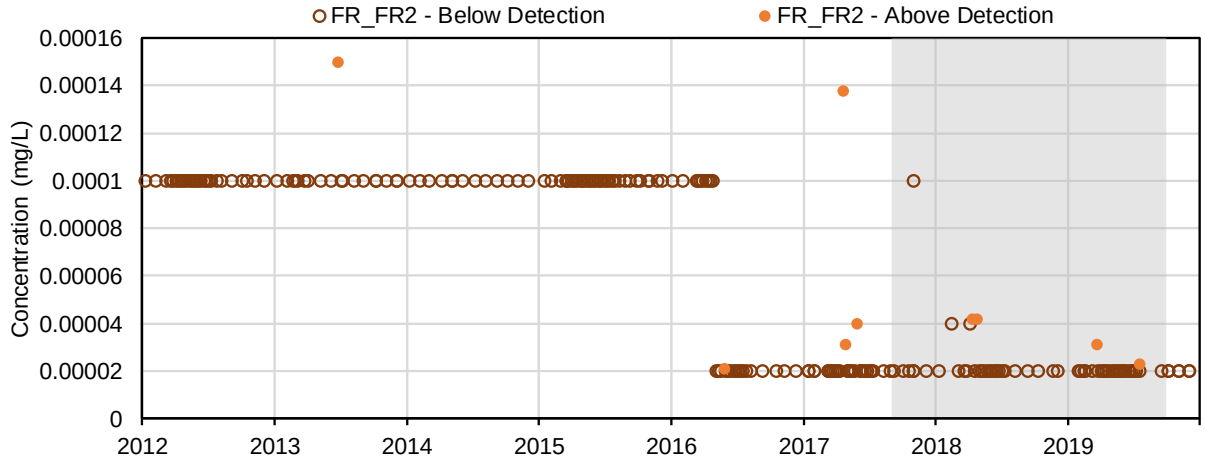
(43) Arsenic (mg/L); Total Metals



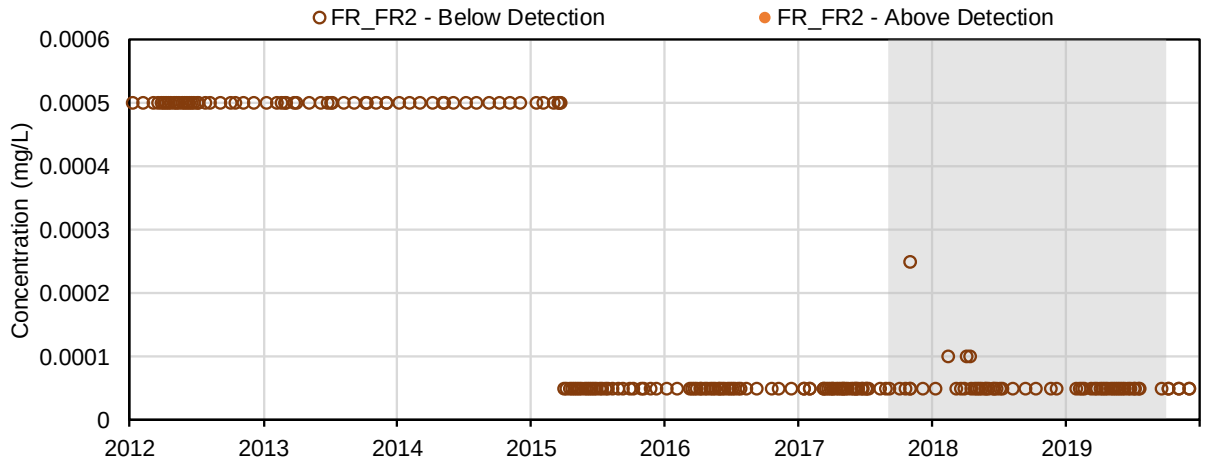
(44) Barium (mg/L); Total Metals



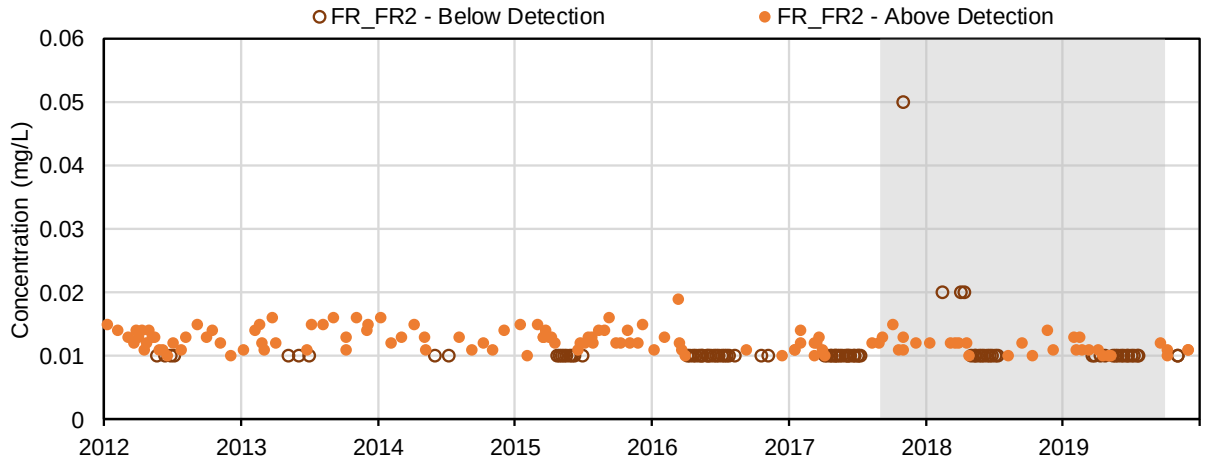
(45) Beryllium (mg/L); Total Metals



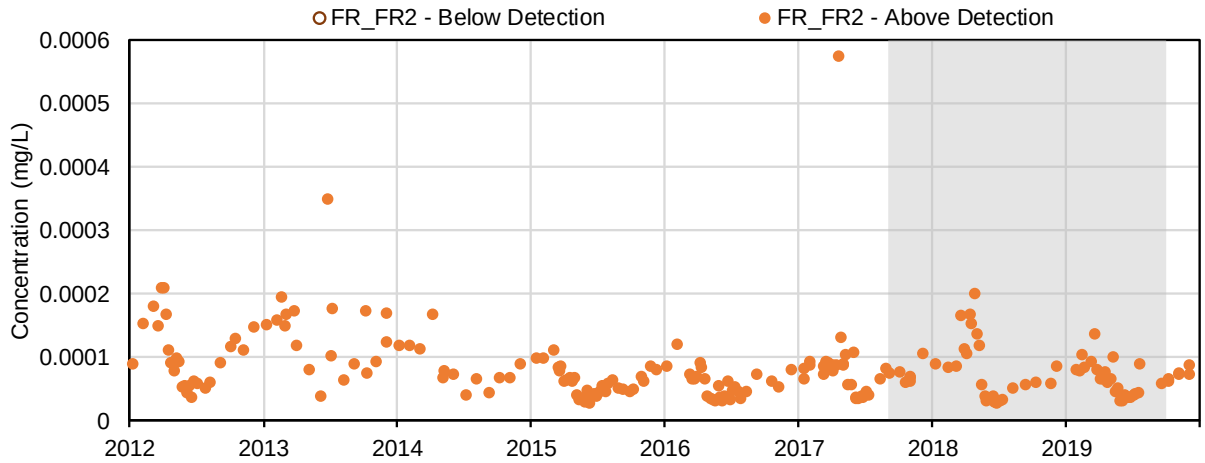
(46) Bismuth (mg/L); Total Metals



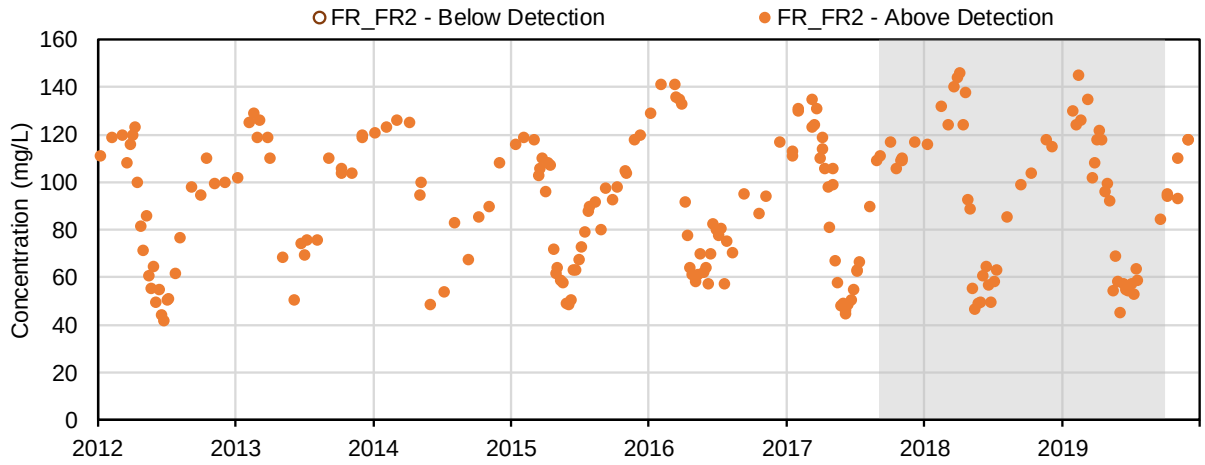
(47) Boron (mg/L); Total Metals



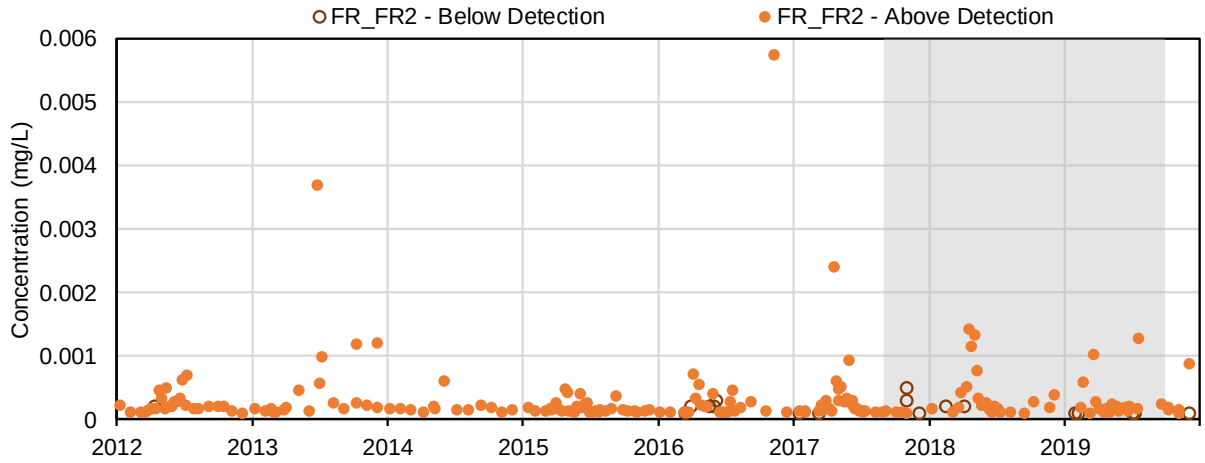
(48) Cadmium (mg/L); Total Metals



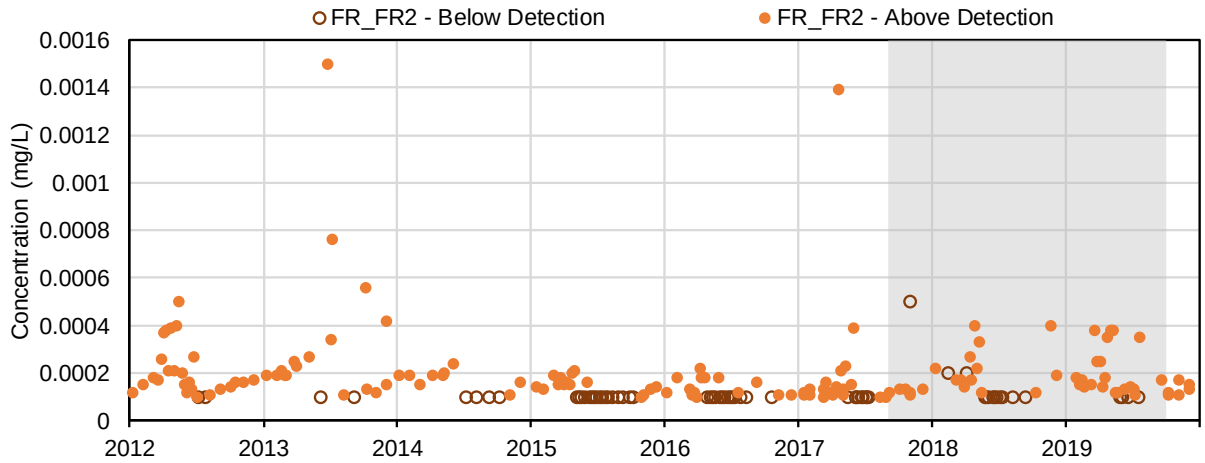
(49) Calcium (mg/L); Total Metals



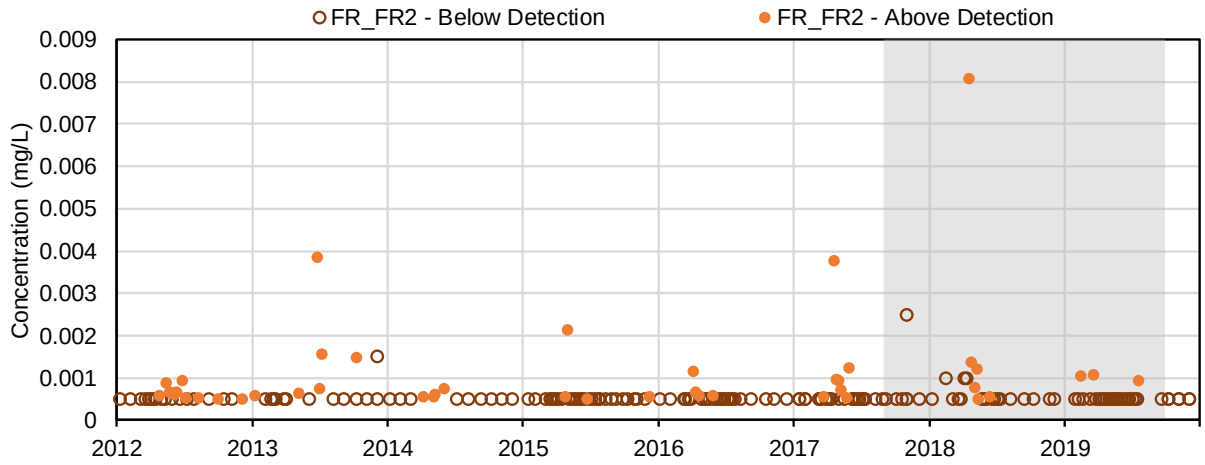
(50) Chromium (mg/L); Total Metals



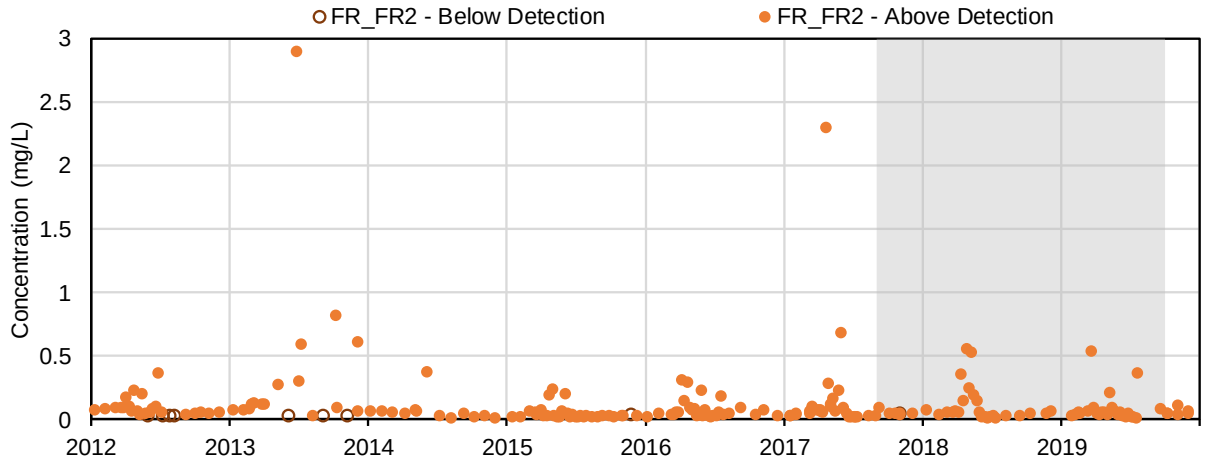
(51) Cobalt (mg/L); Total Metals



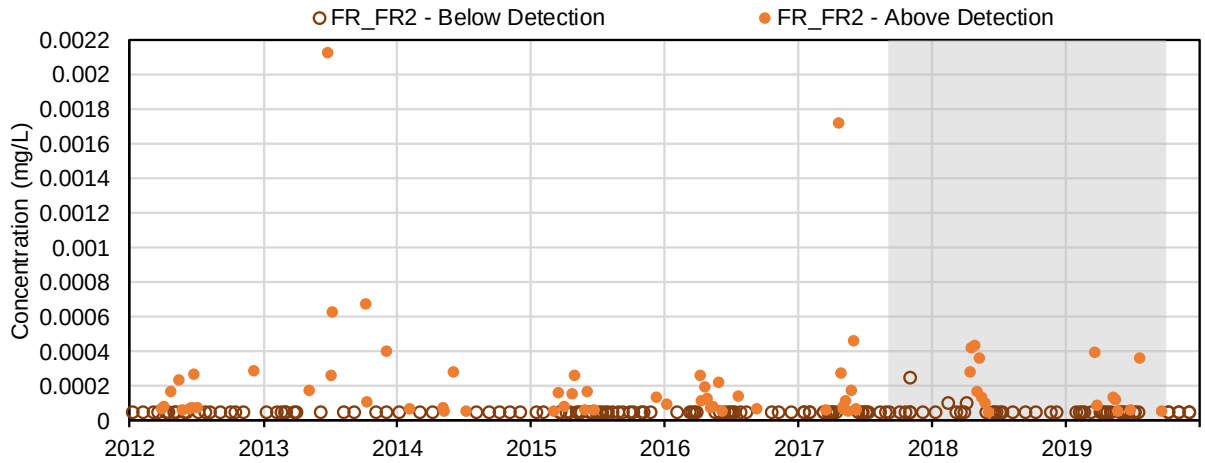
(52) Copper (mg/L); Total Metals



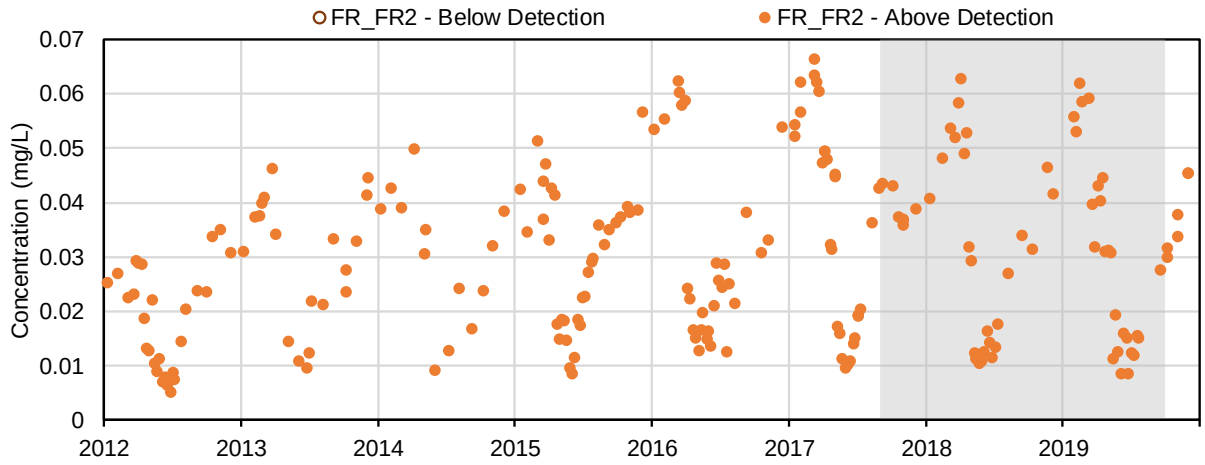
(53) Iron (mg/L); Total Metals



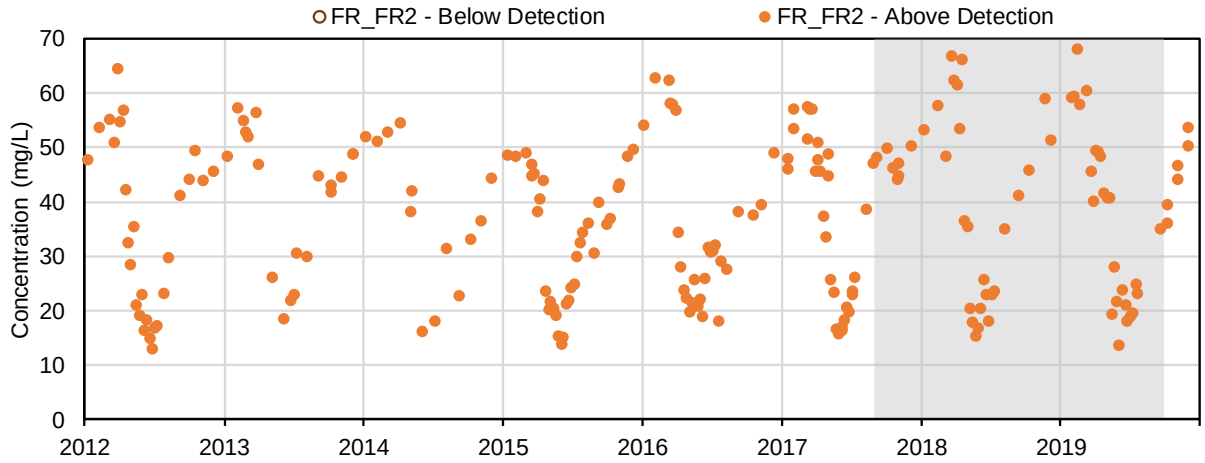
(54) Lead (mg/L); Total Metals



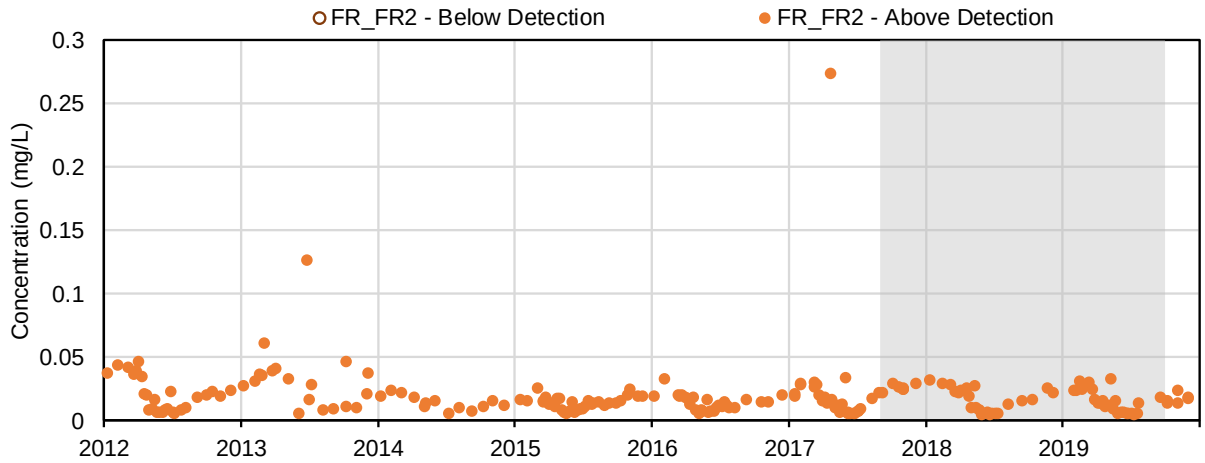
(55) Lithium (mg/L); Total Metals



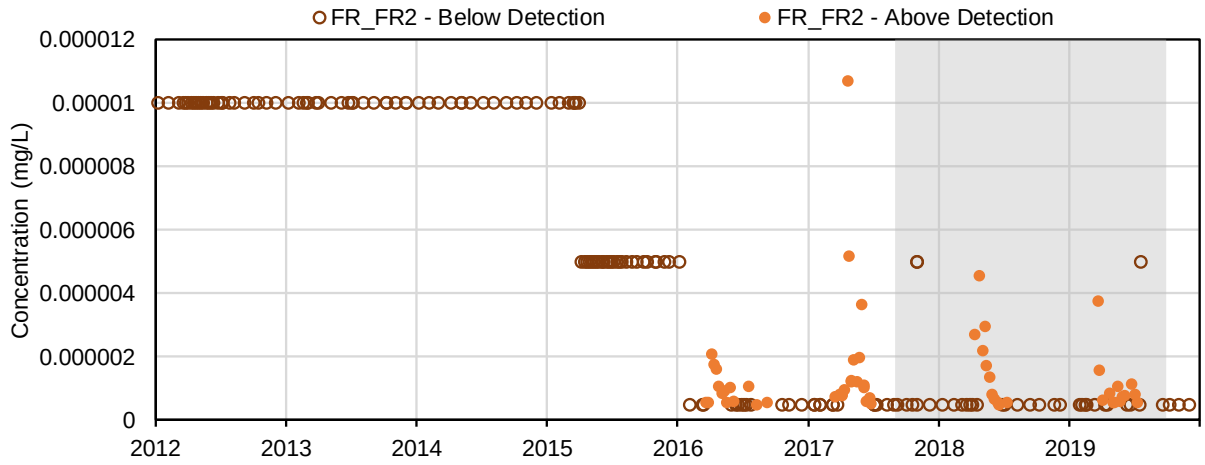
(56) Magnesium (mg/L); Total Metals



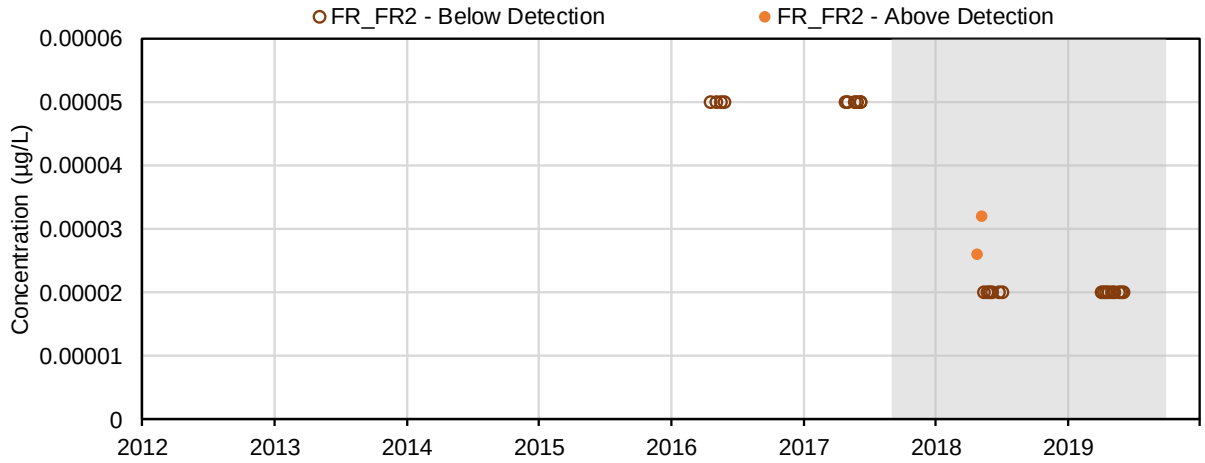
(57) Manganese (mg/L); Total Metals



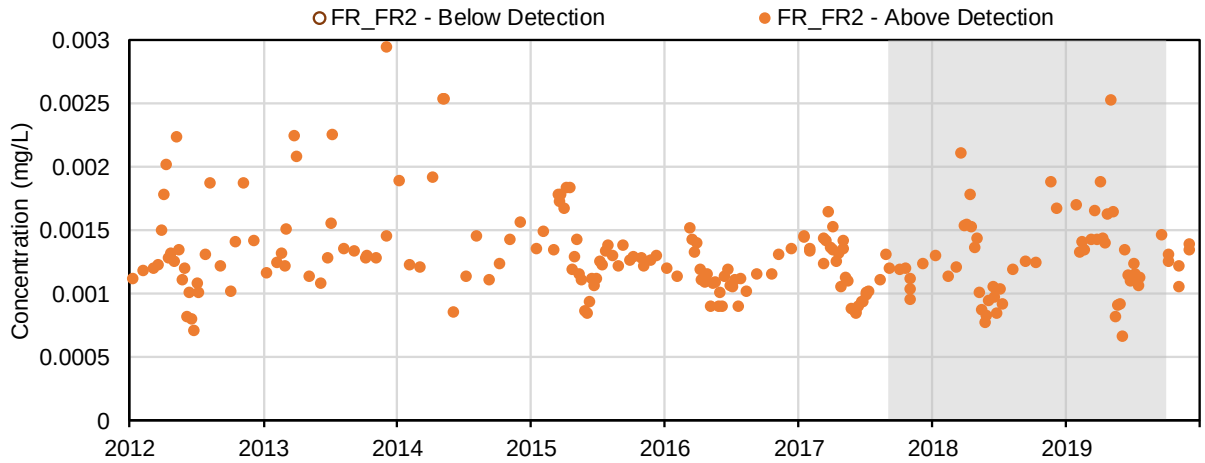
(58) Mercury (mg/L); Total Metals



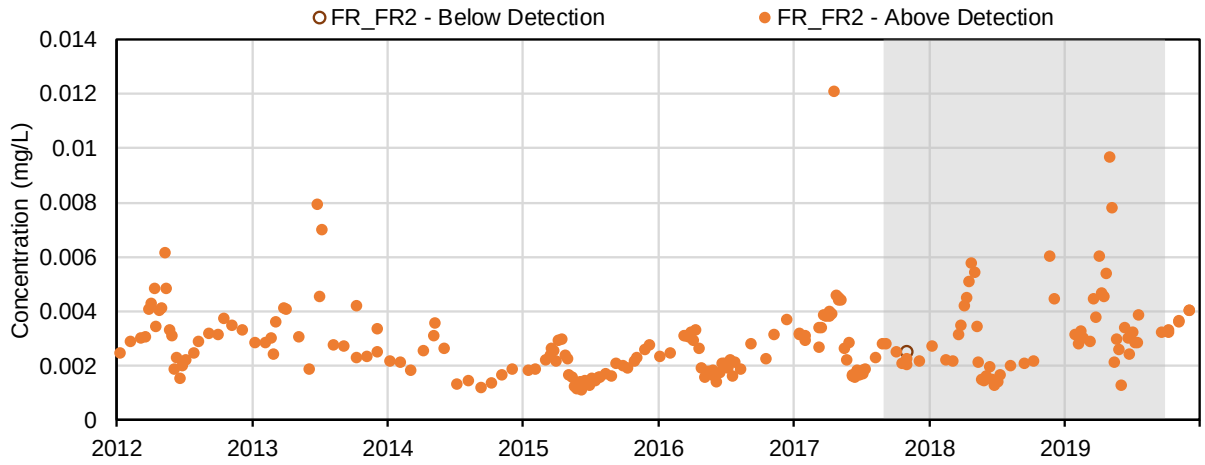
(59) Methyl mercury (µg/L); Total Metals



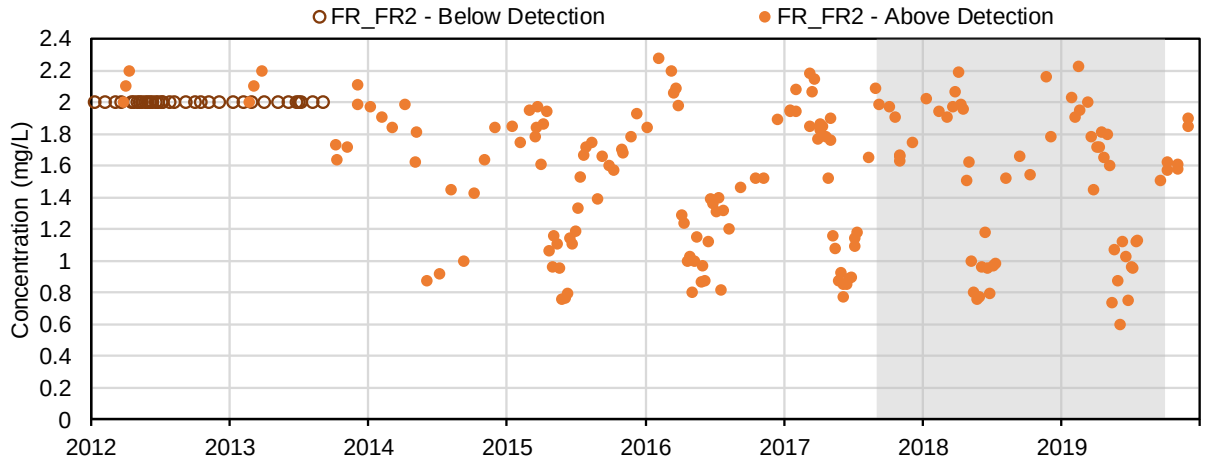
(60) Molybdenum (mg/L); Total Metals



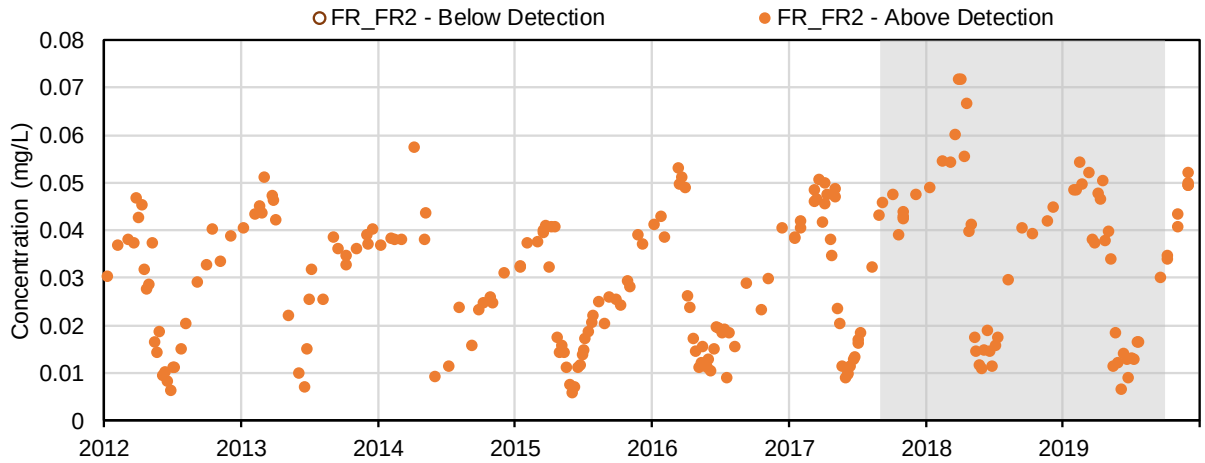
(61) Nickel (mg/L); Total Metals



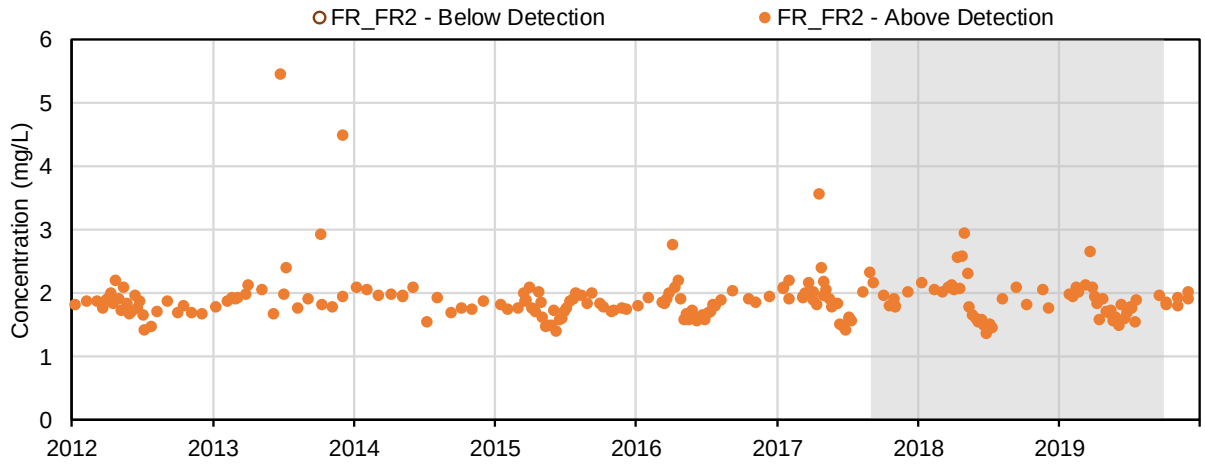
(62) Potassium (mg/L); Total Metals



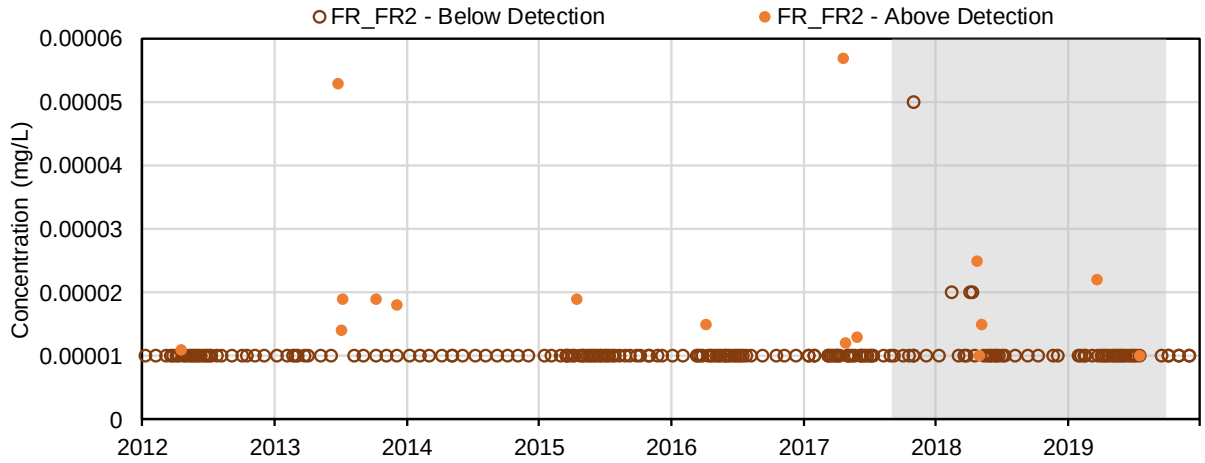
(63) Selenium (mg/L); Total Metals



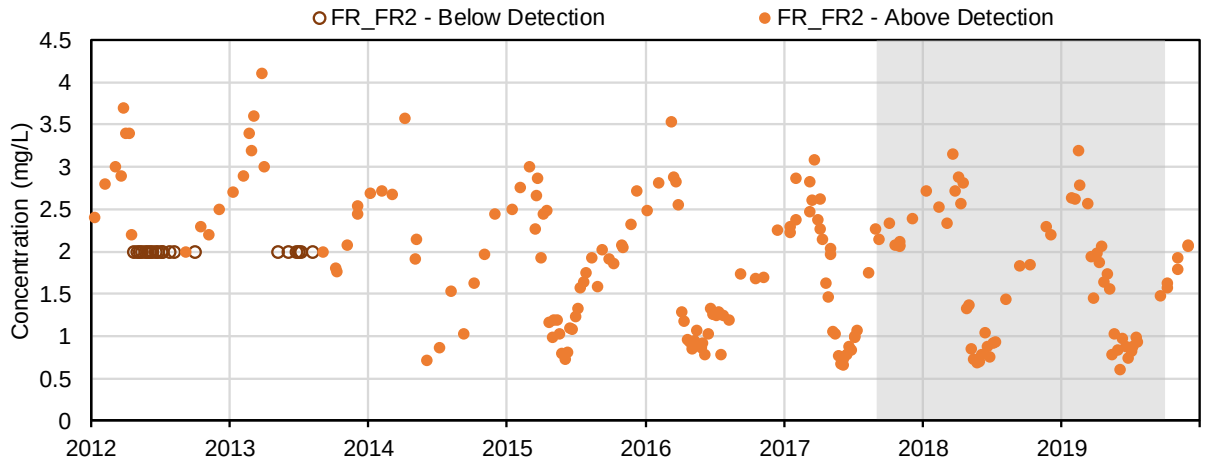
(64) Silicon (mg/L); Total Metals



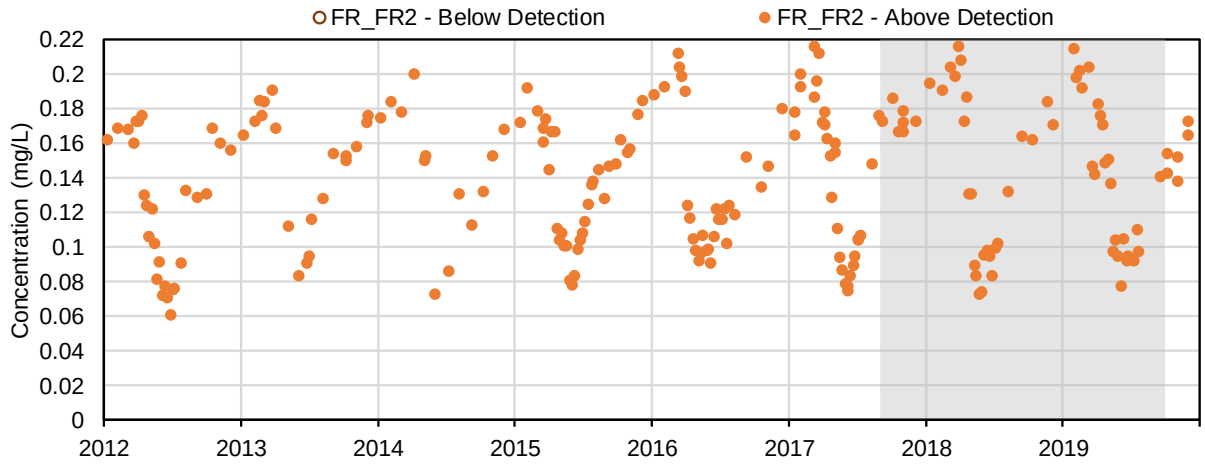
(65) Silver (mg/L); Total Metals



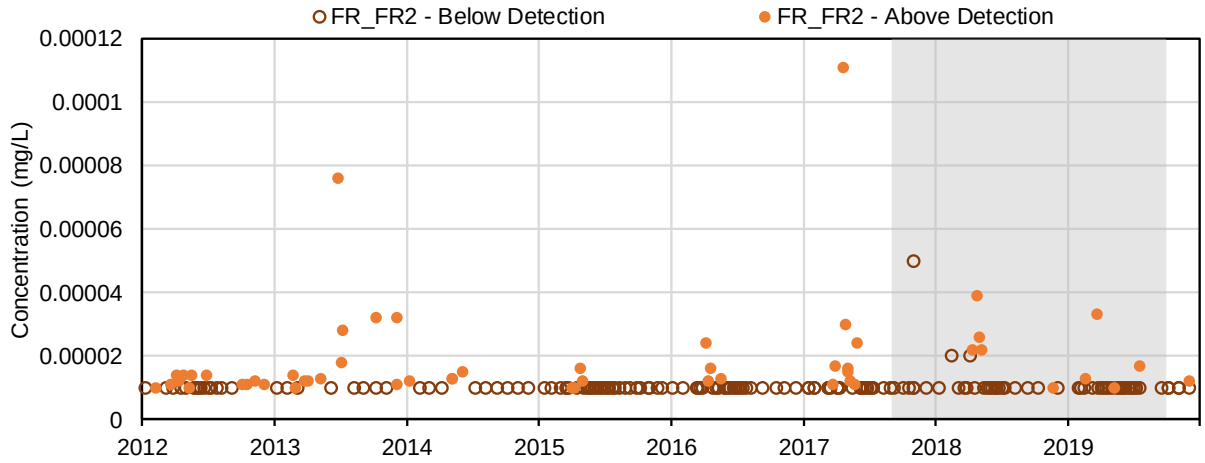
(66) Sodium (mg/L); Total Metals



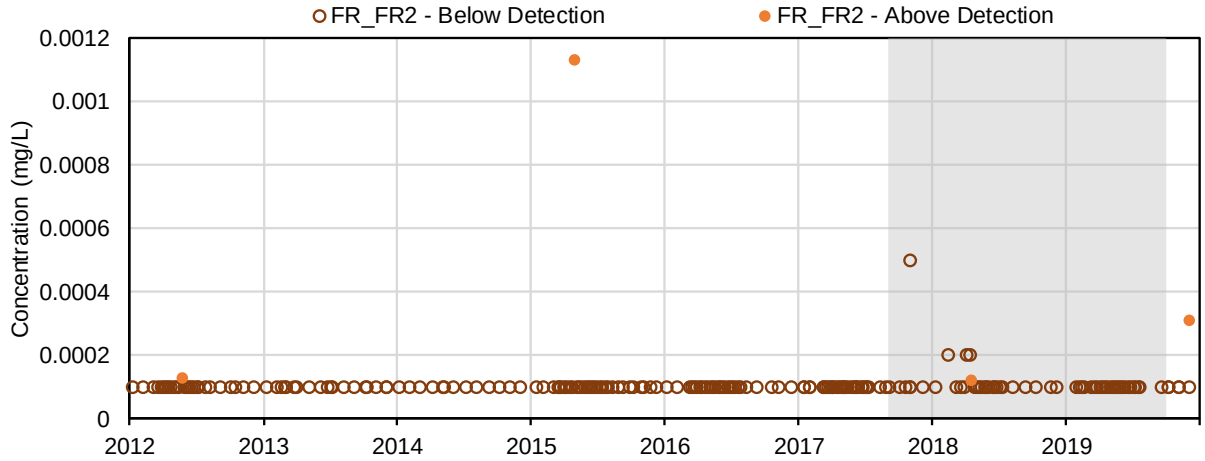
(67) Strontium (mg/L); Total Metals



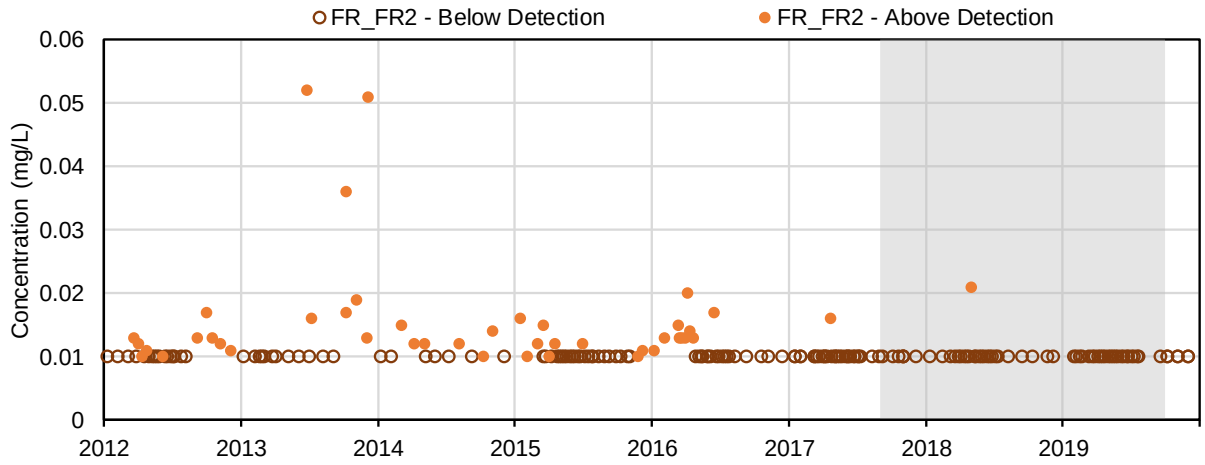
(68) Thallium (mg/L); Total Metals



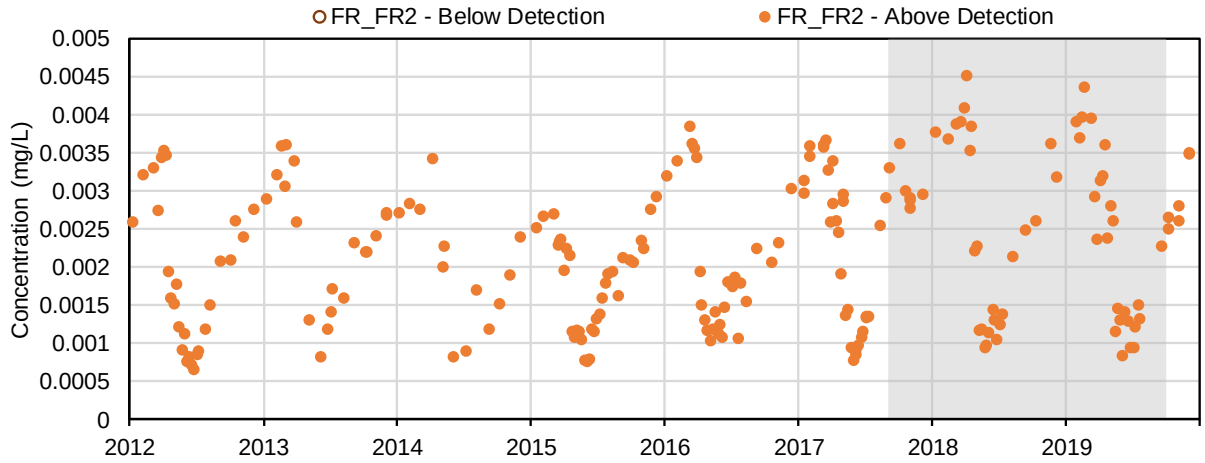
(69) Tin (mg/L); Total Metals



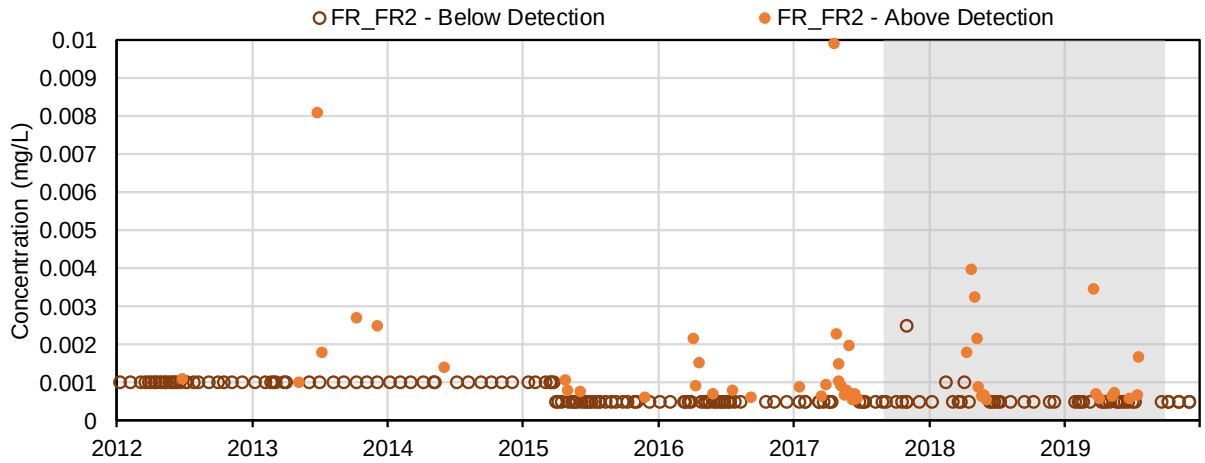
(70) Titanium (mg/L); Total Metals



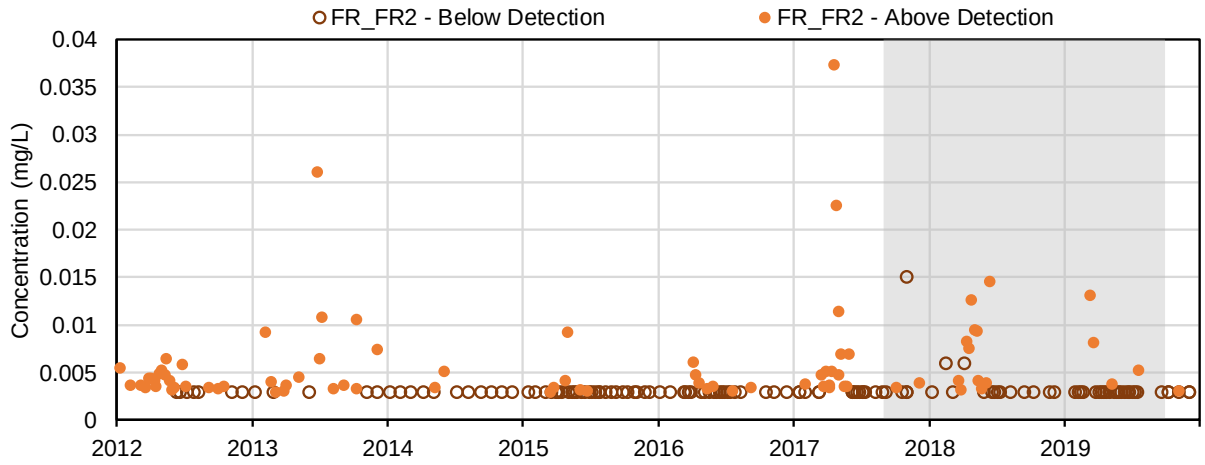
(71) Uranium (mg/L); Total Metals



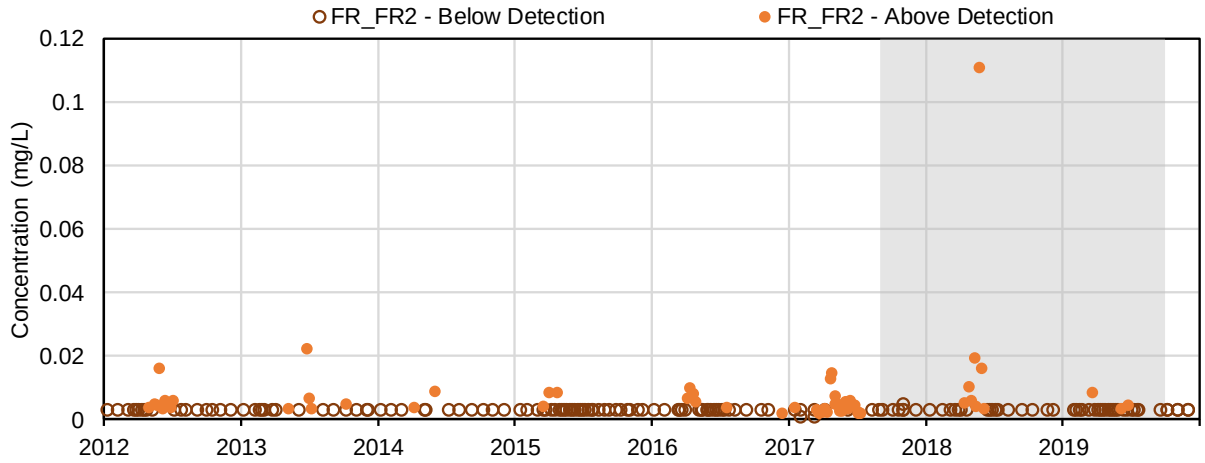
(72) Vanadium (mg/L); Total Metals



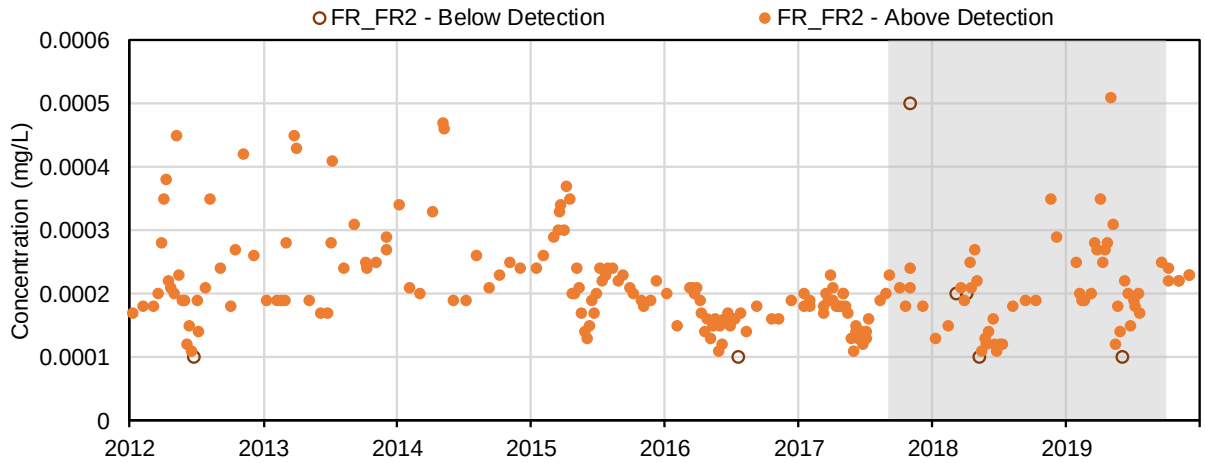
(73) Zinc (mg/L); Total Metals



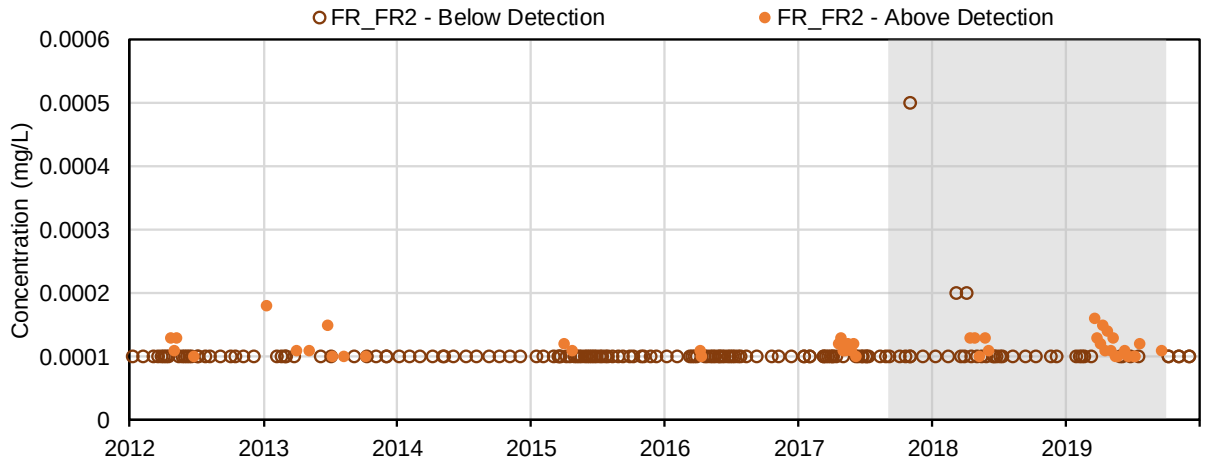
(74) Aluminum (mg/L); Dissolved Metals



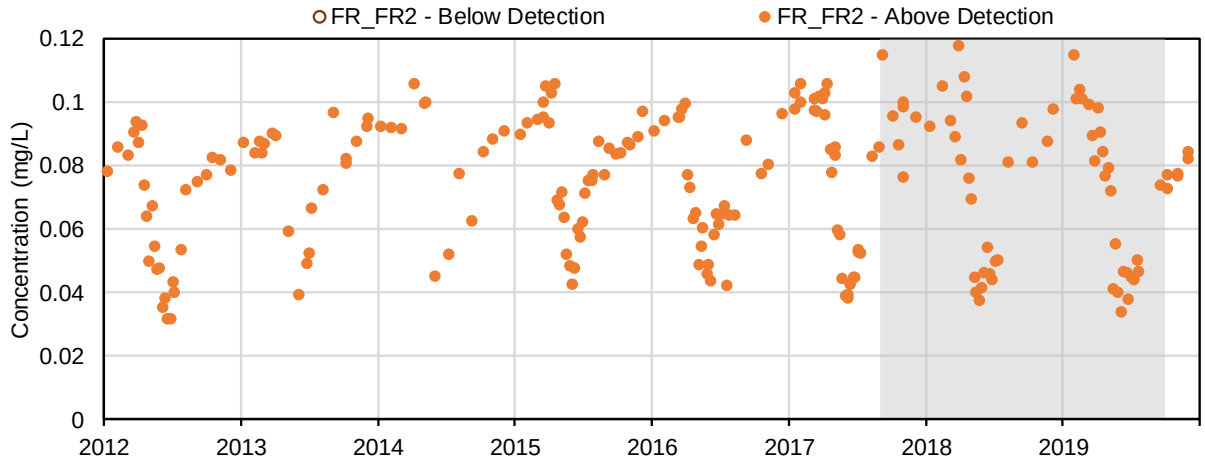
(75) Antimony (mg/L); Dissolved Metals



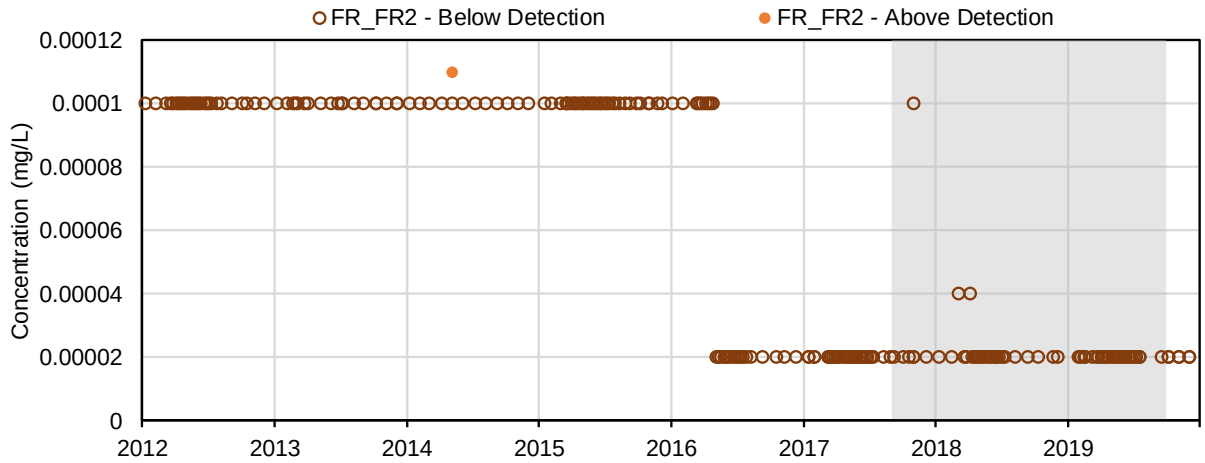
(76) Arsenic (mg/L); Dissolved Metals



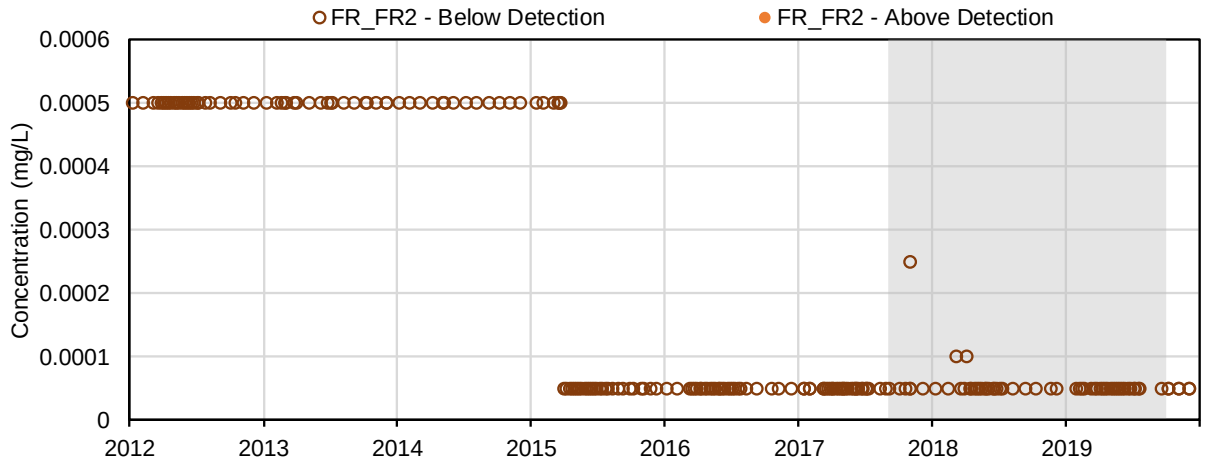
(77) Barium (mg/L); Dissolved Metals



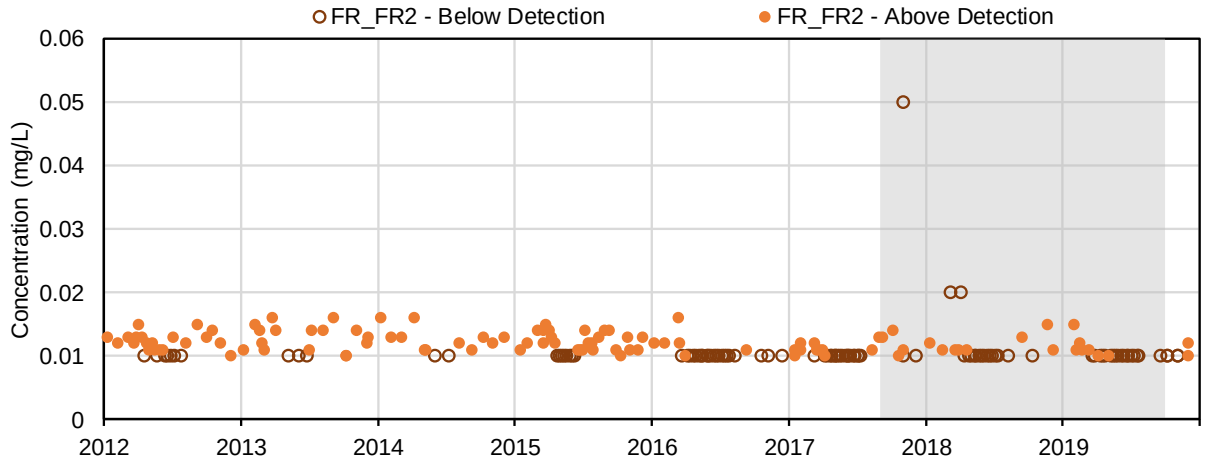
(78) Beryllium (mg/L); Dissolved Metals



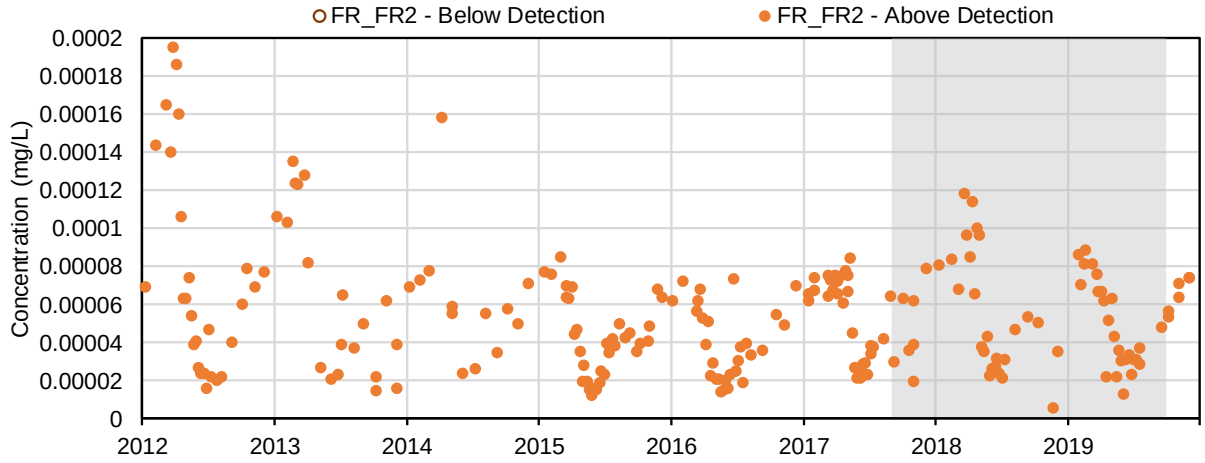
(79) Bismuth (mg/L); Dissolved Metals



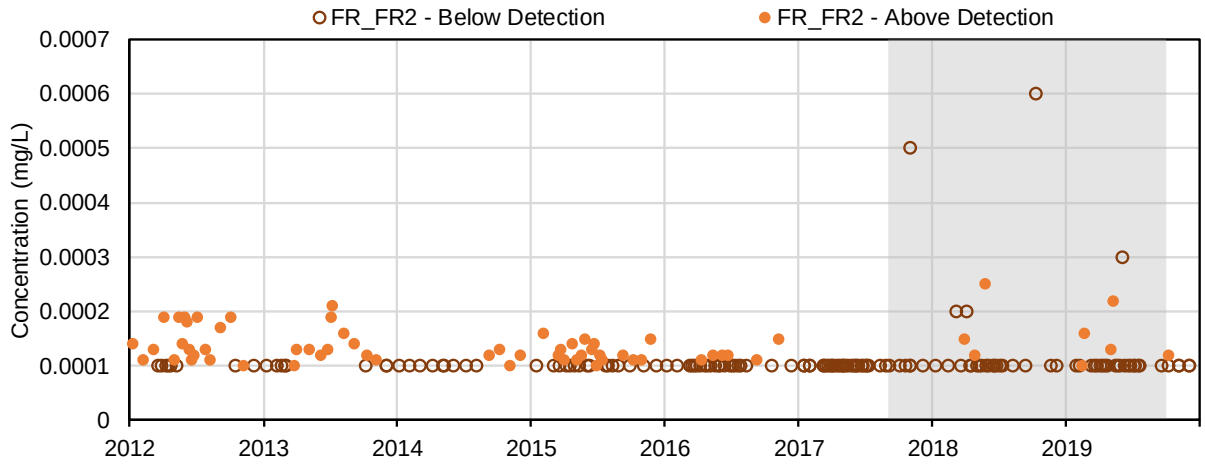
(80) Boron (mg/L); Dissolved Metals



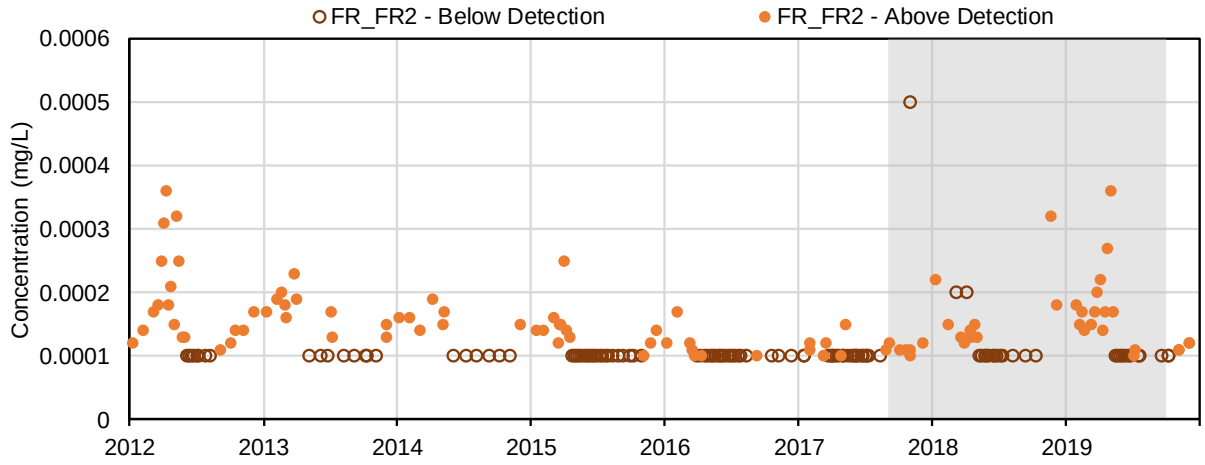
(81) Cadmium (mg/L); Dissolved Metals



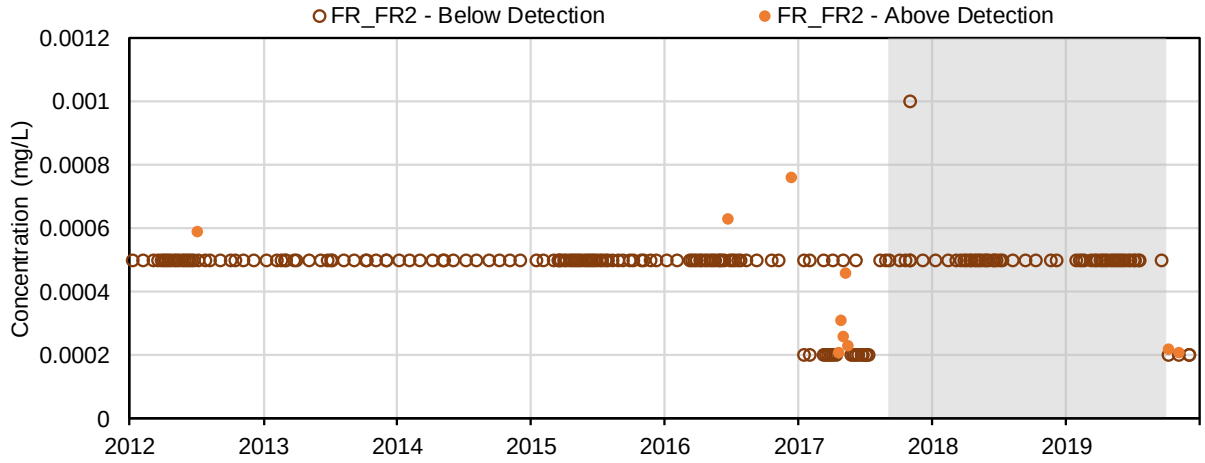
(82) Chromium (mg/L); Dissolved Metals



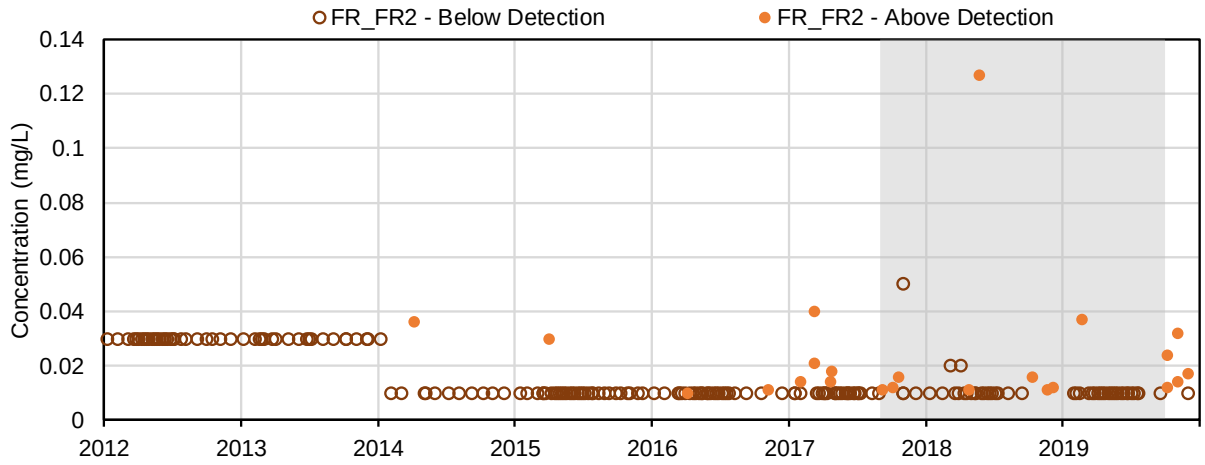
(83) Cobalt (mg/L); Dissolved Metals



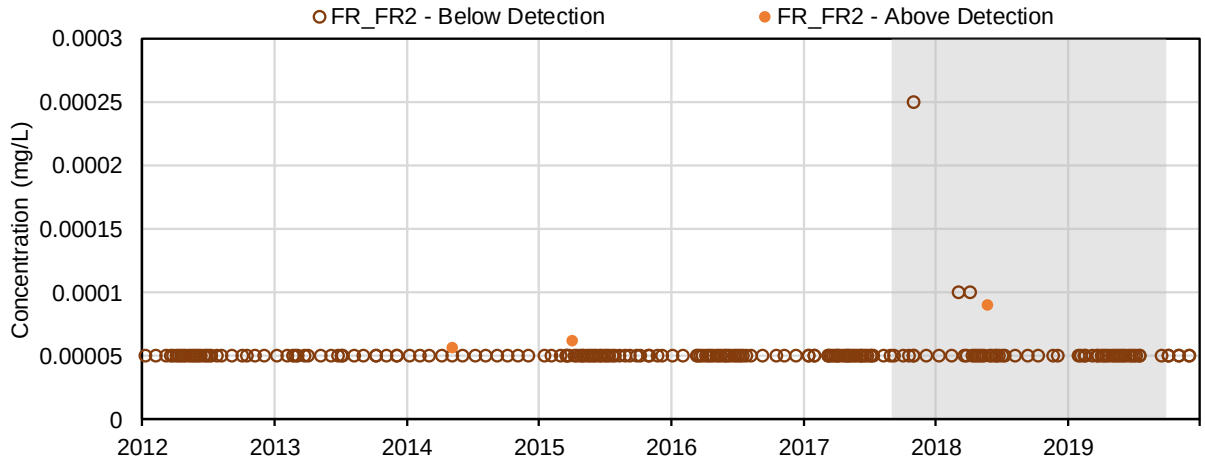
(84) Copper (mg/L); Dissolved Metals



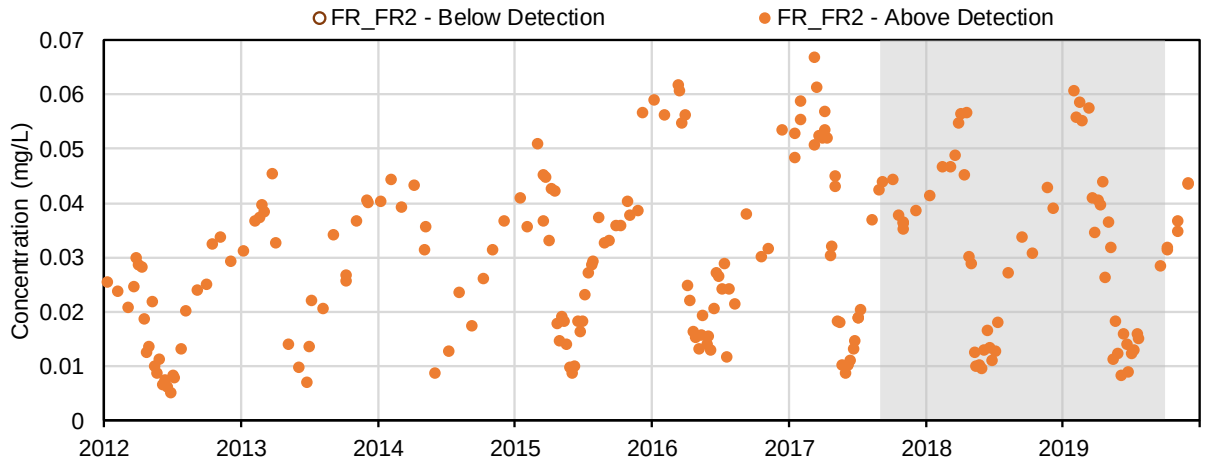
(85) Iron (mg/L); Dissolved Metals



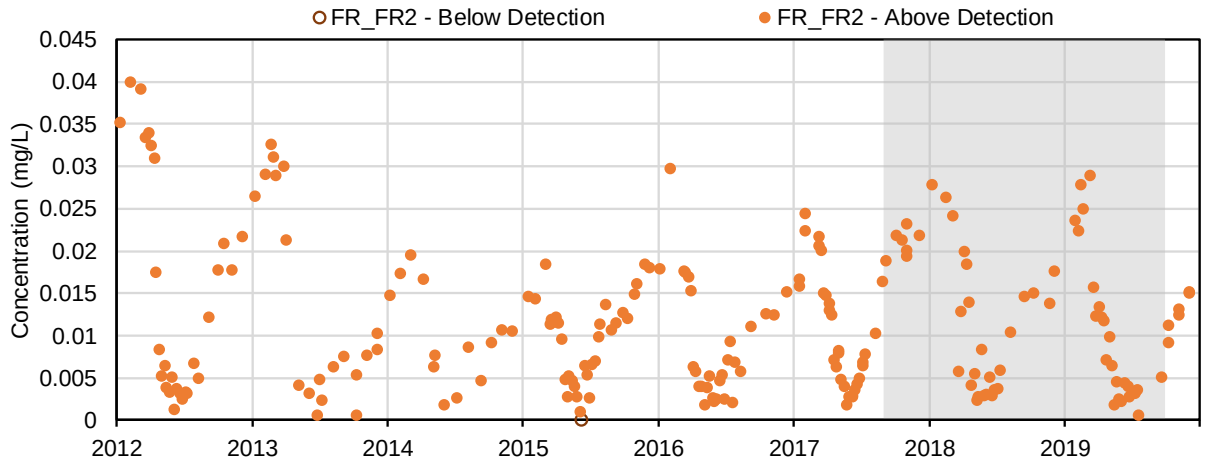
(86) Lead (mg/L); Dissolved Metals



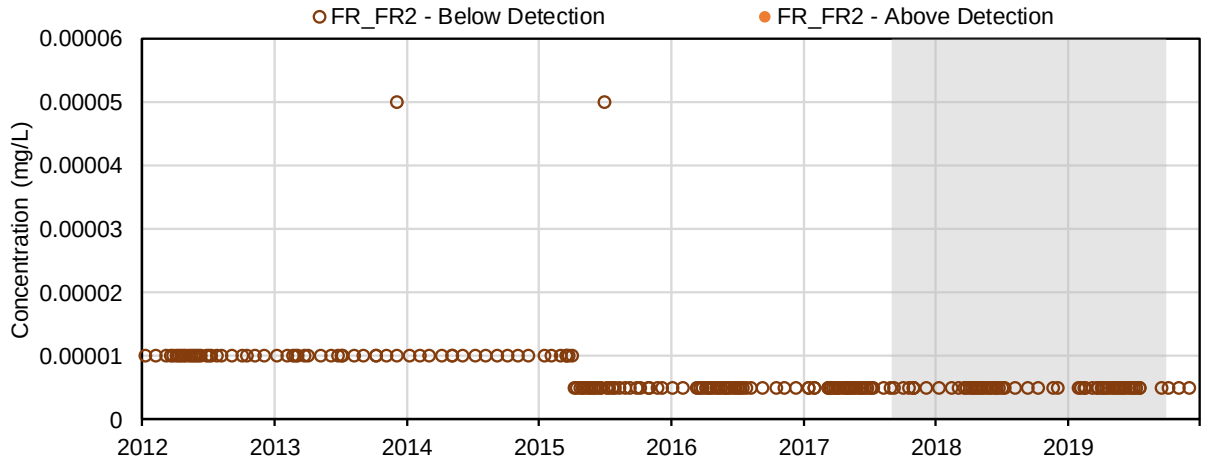
(87) Lithium (mg/L); Dissolved Metals



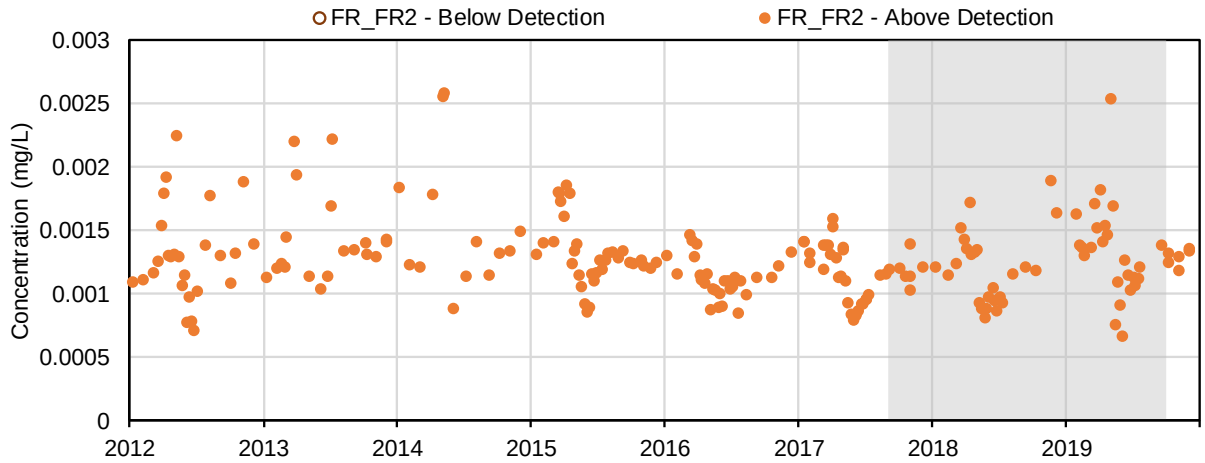
(88) Manganese (mg/L); Dissolved Metals



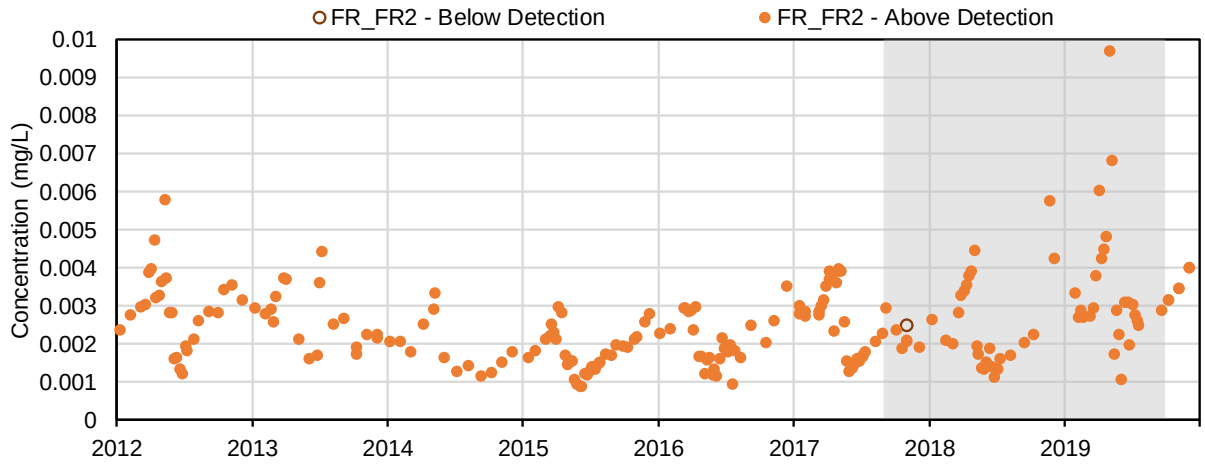
(89) Mercury (mg/L); Dissolved Metals



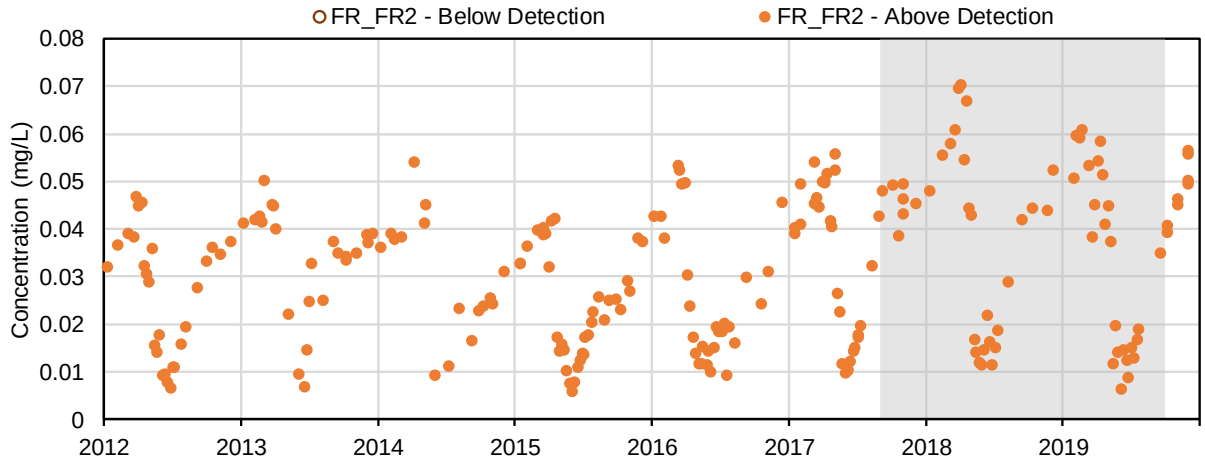
(90) Molybdenum (mg/L); Dissolved Metals



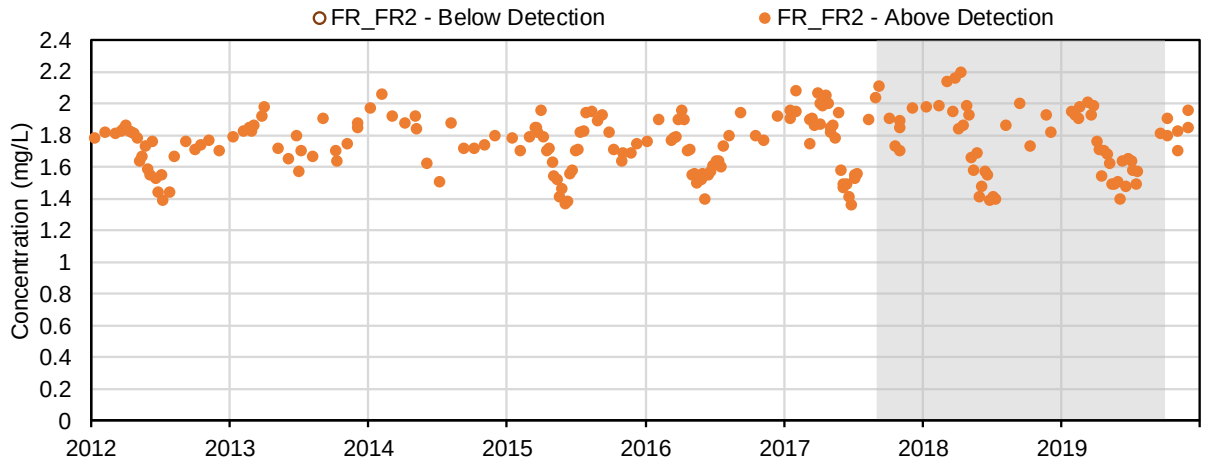
(91) Nickel (mg/L); Dissolved Metals



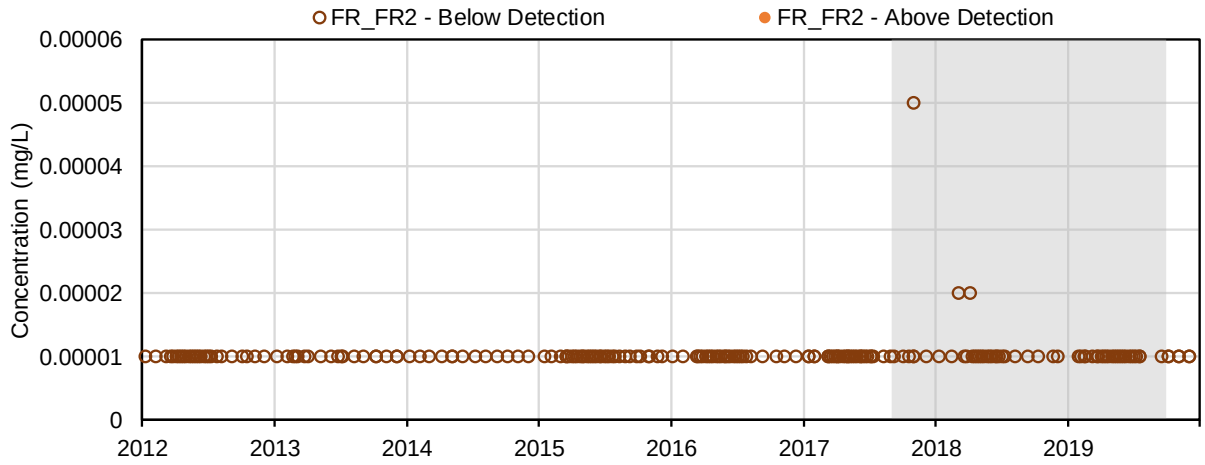
(92) Selenium (mg/L); Dissolved Metals



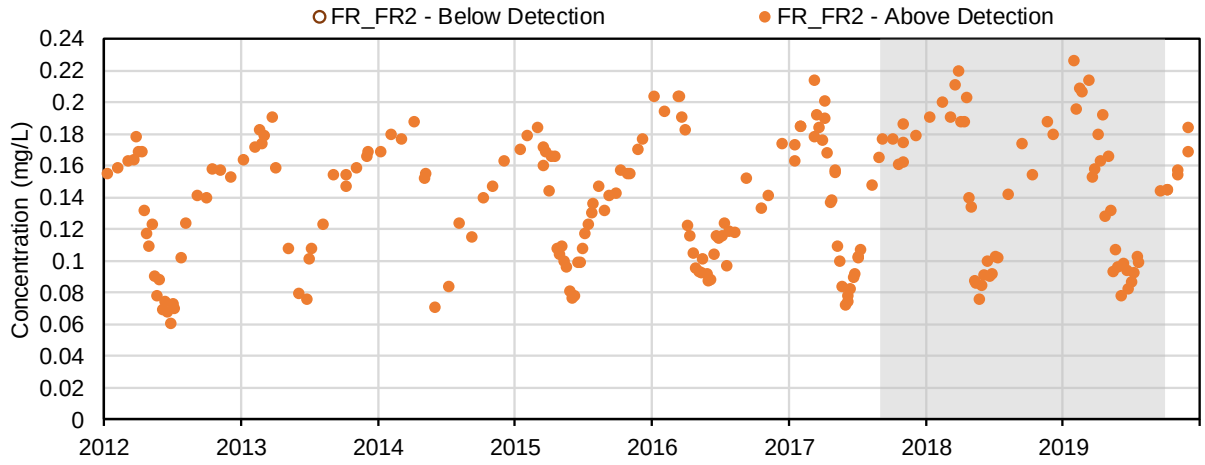
(93) Silicon (mg/L); Dissolved Metals



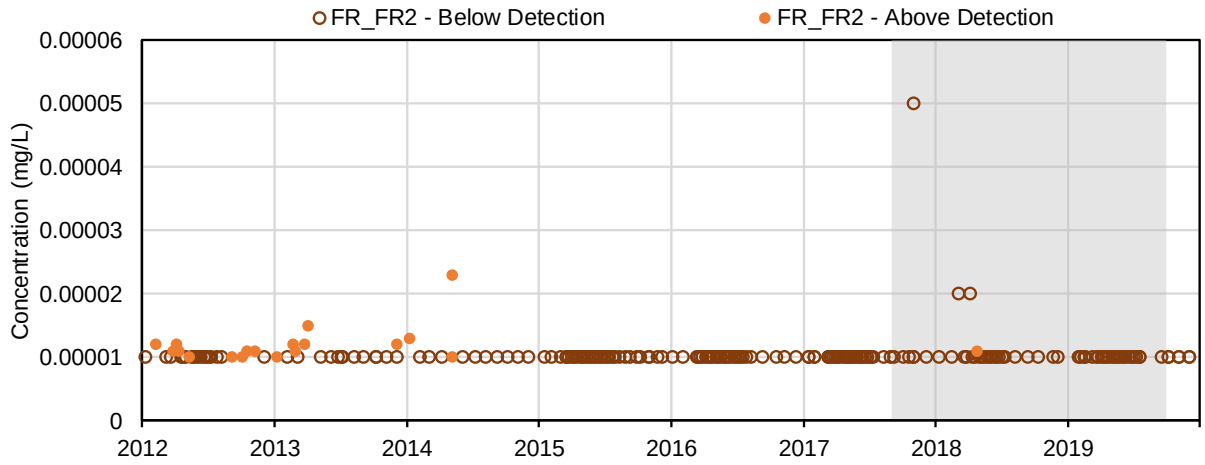
(94) Silver (mg/L); Dissolved Metals



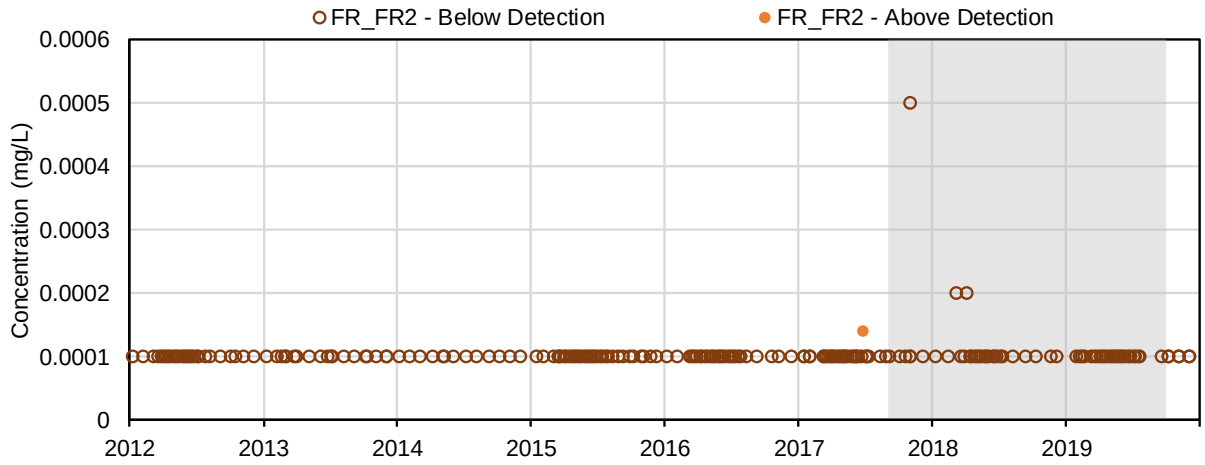
(95) Strontium (mg/L); Dissolved Metals



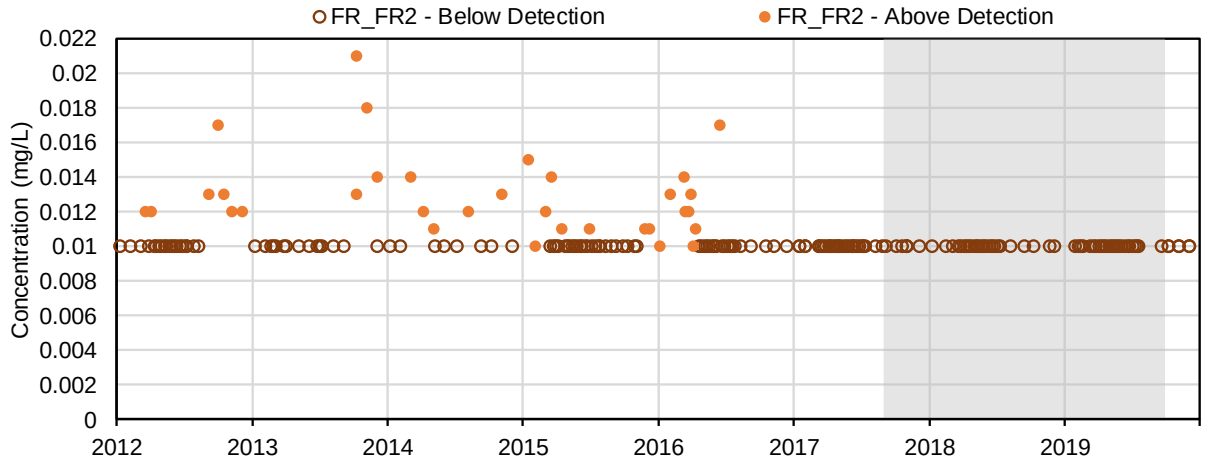
(96) Thallium (mg/L); Dissolved Metals



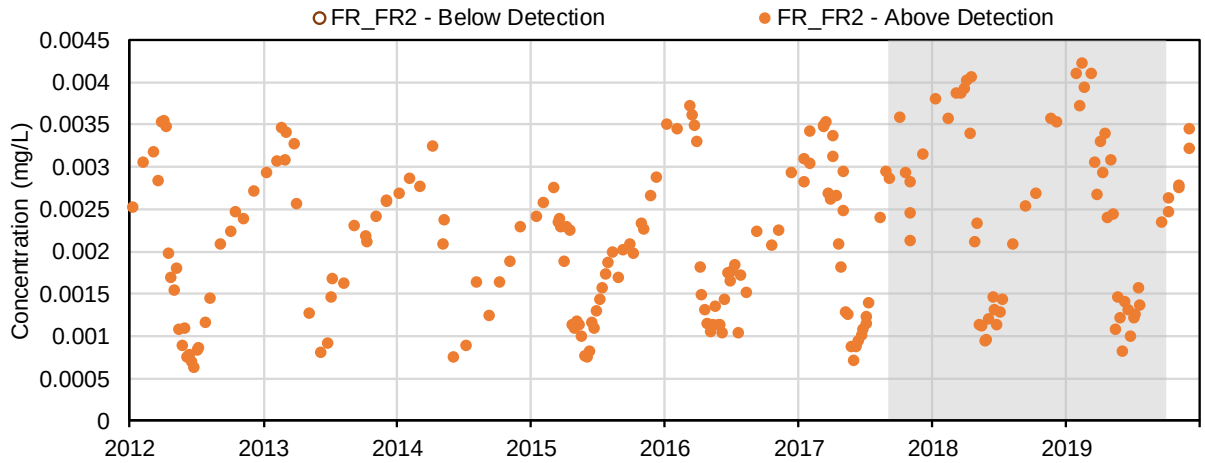
(97) Tin (mg/L); Dissolved Metals



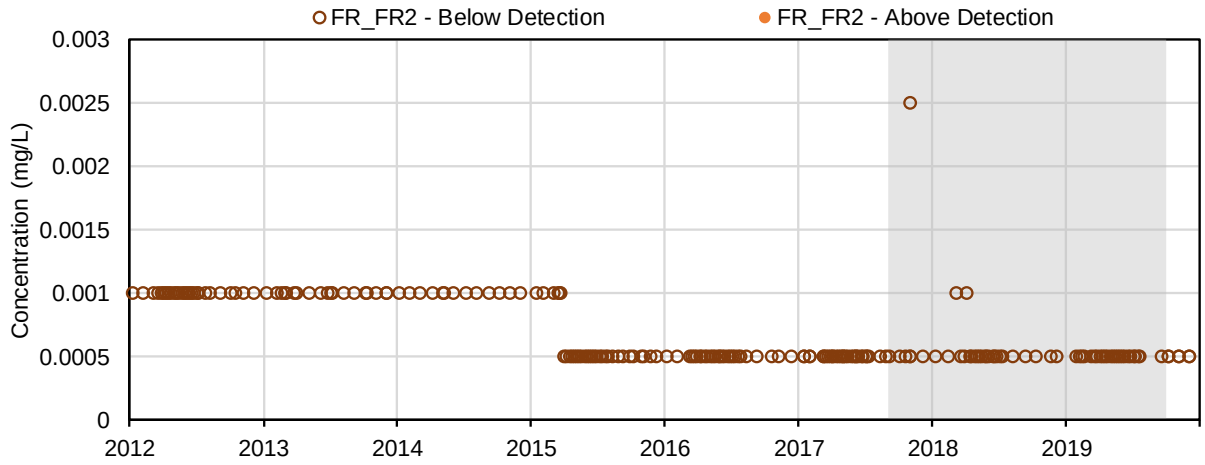
(98) Titanium (mg/L); Dissolved Metals



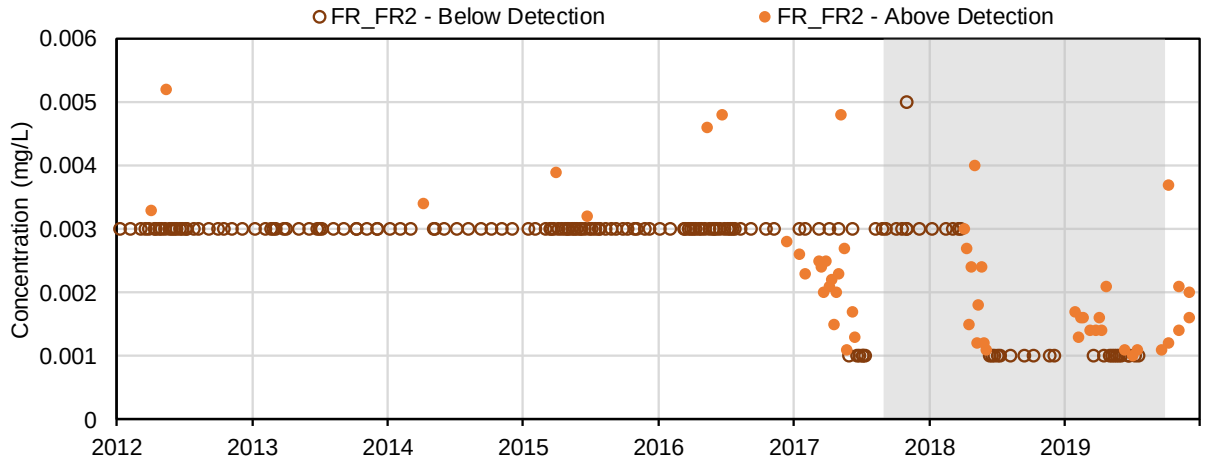
(99) Uranium (mg/L); Dissolved Metals



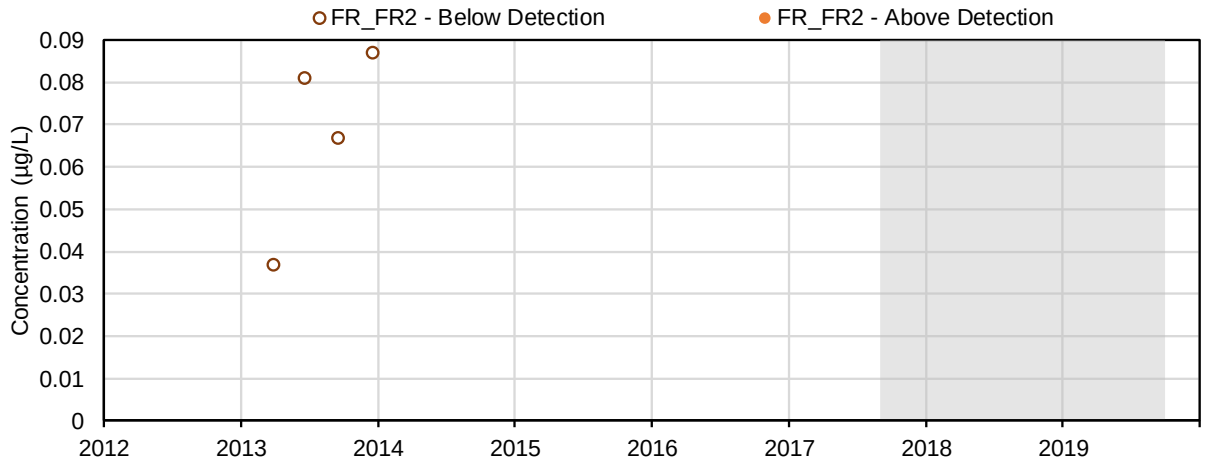
(100) Vanadium (mg/L); Dissolved Metals



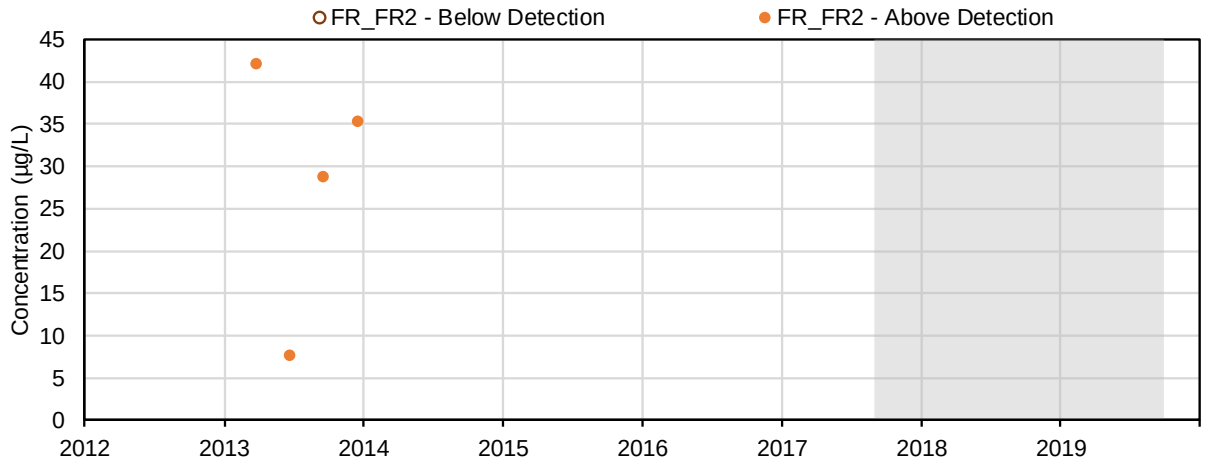
(101) Zinc (mg/L); Dissolved Metals



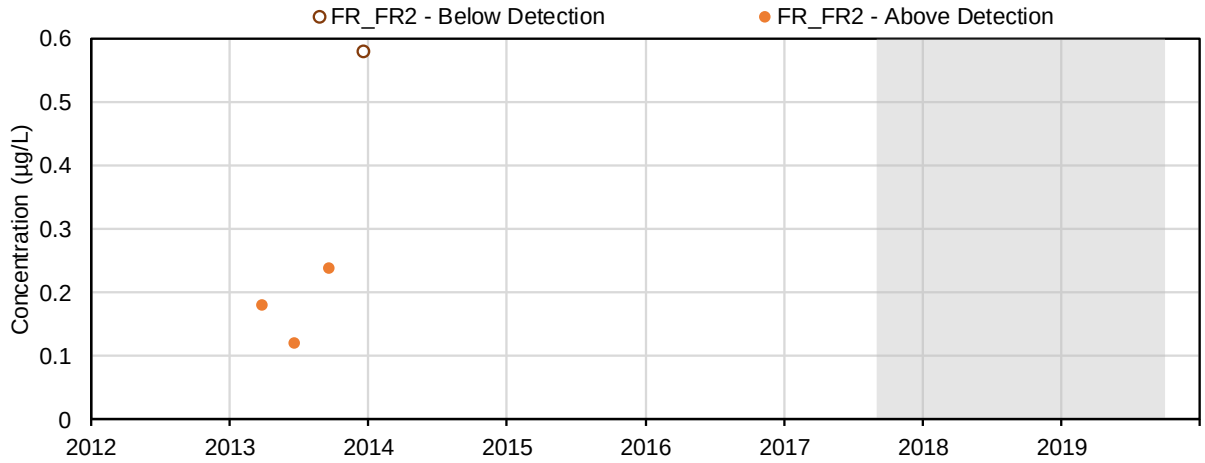
(102) Total Selenocyanate (µg/L); Speciation of Selenium



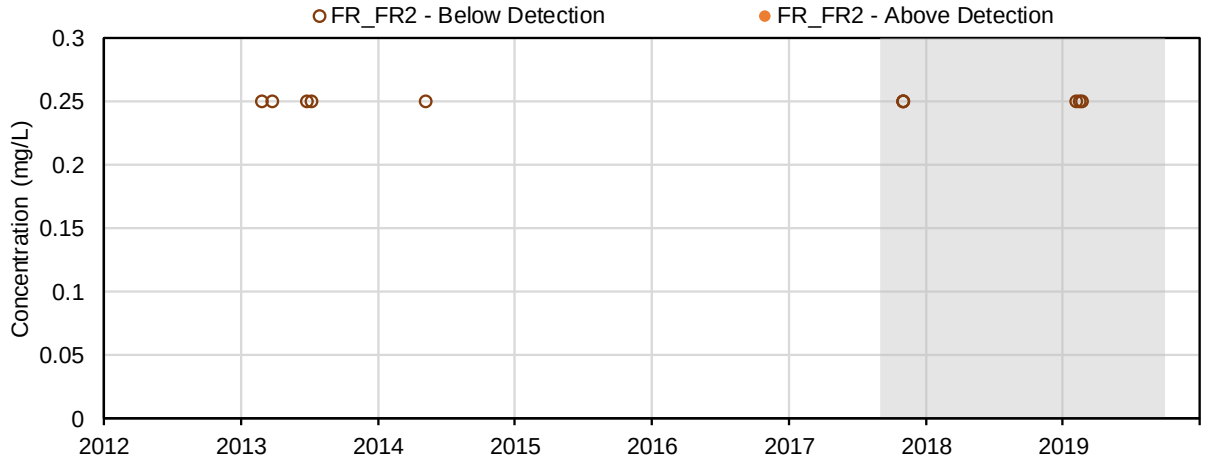
(103) Total Selenium 6+ (µg/L); Speciation of Selenium



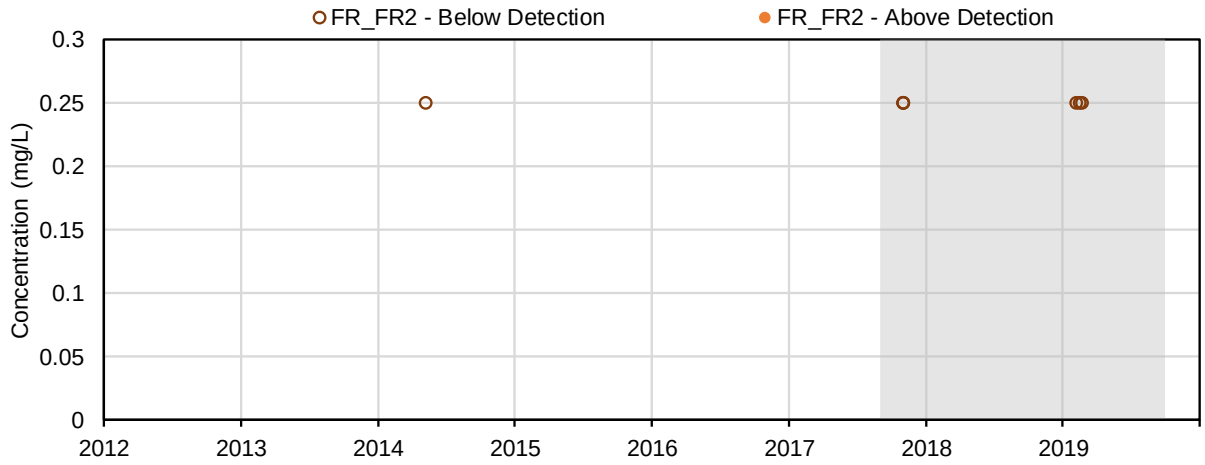
(104) Total Selenium 4+ (µg/L); Speciation of Selenium



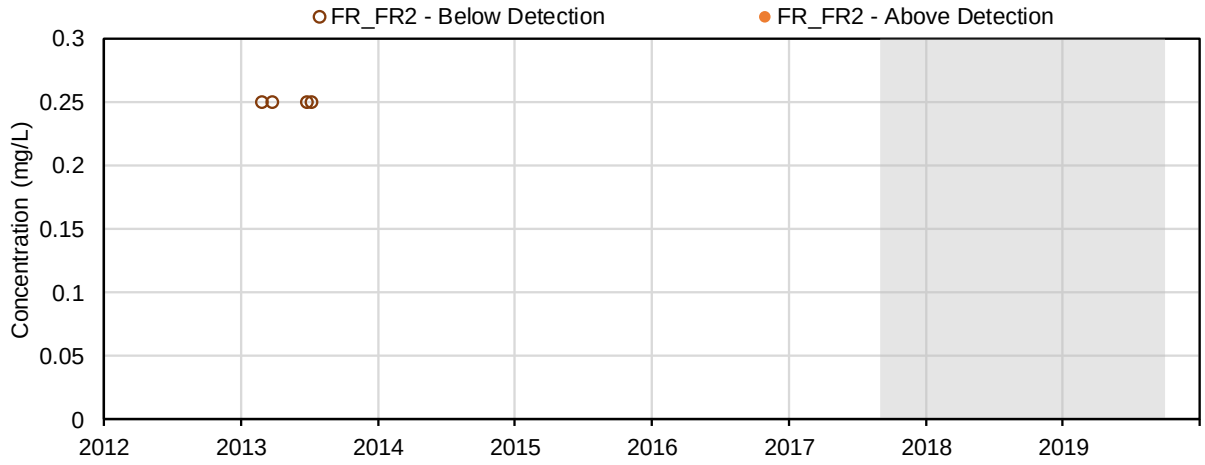
(105) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



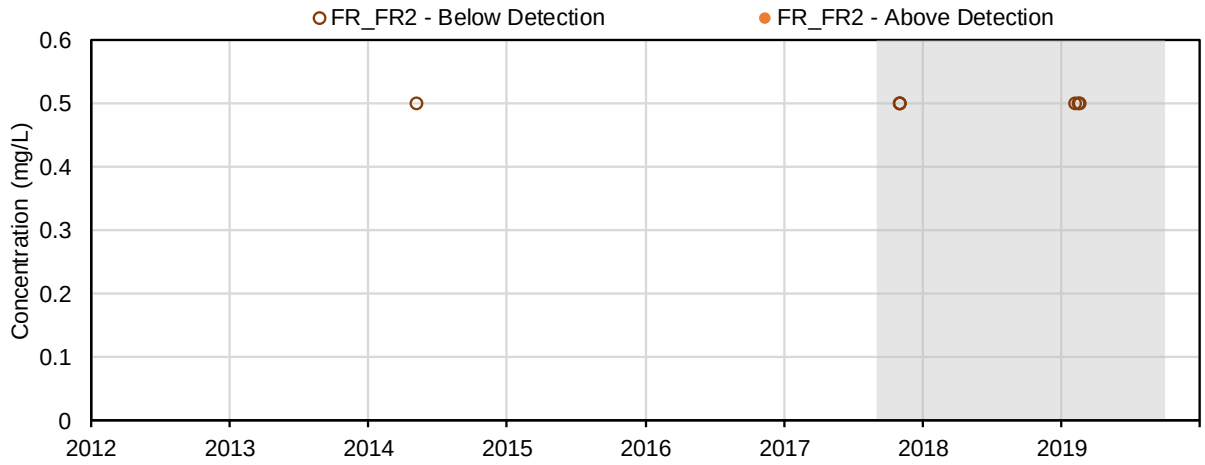
(106) Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



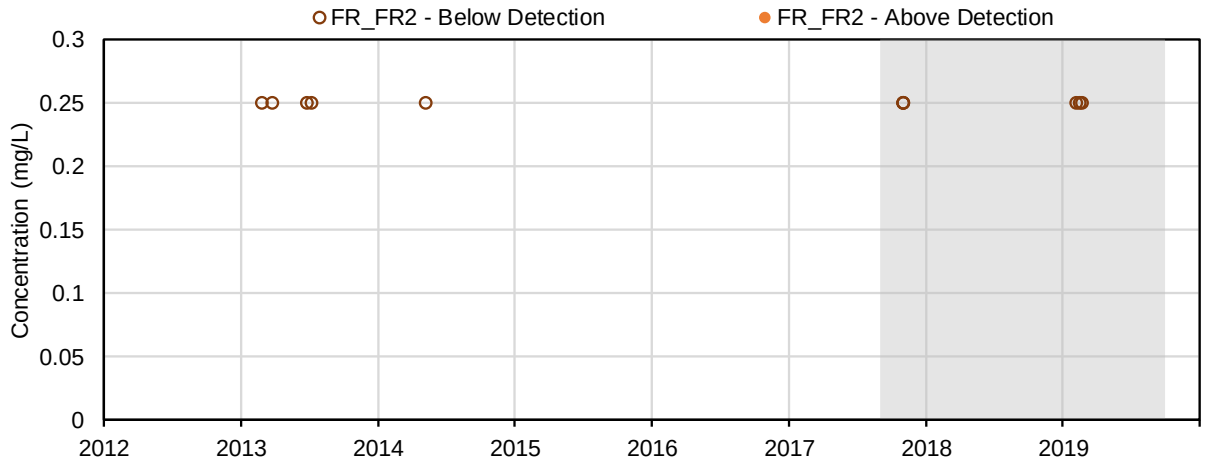
(107) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



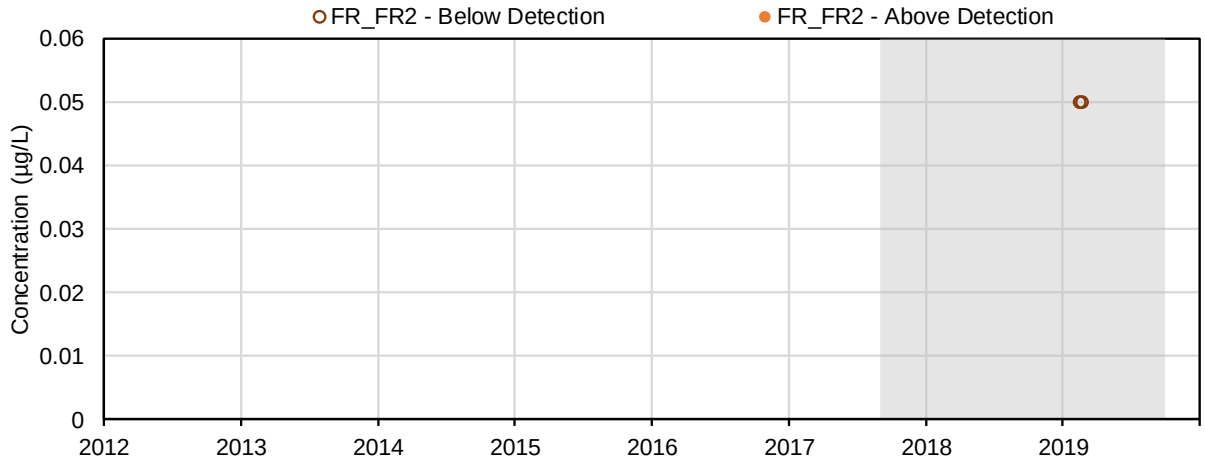
(108) Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L); Volatile Organics



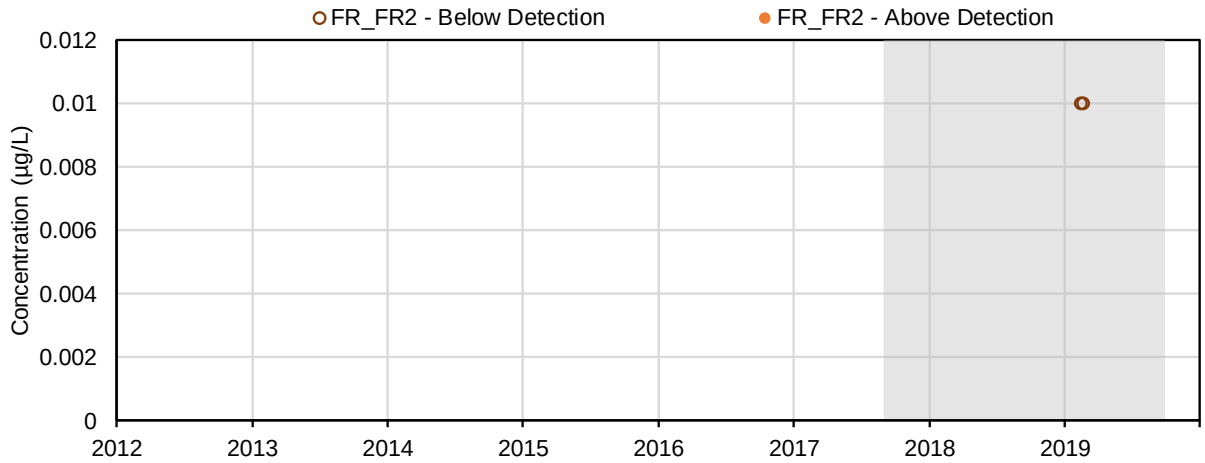
(109) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics



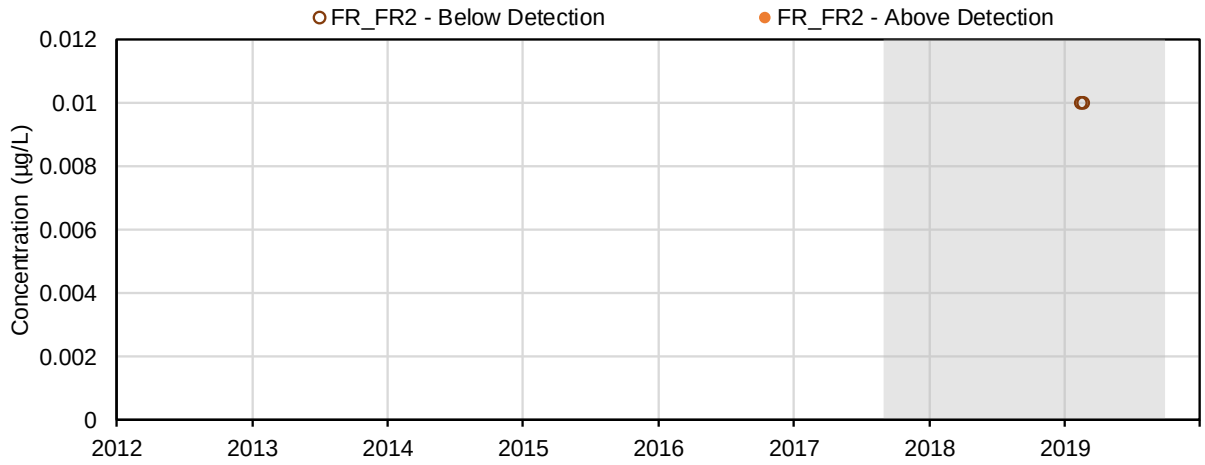
(110) Naphthalene (µg/L); Parent PAHs



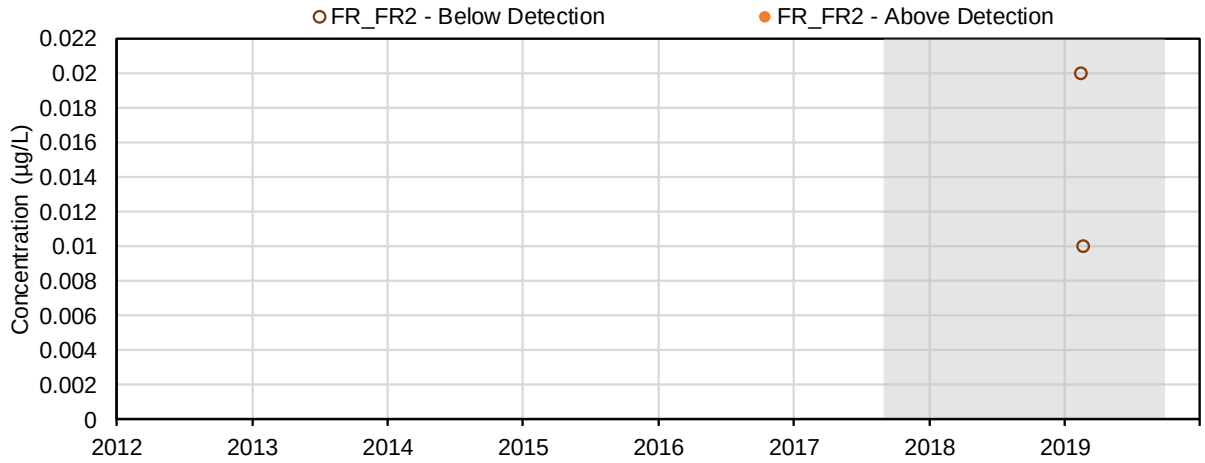
(111) Acenaphthylene (µg/L); Parent PAHs



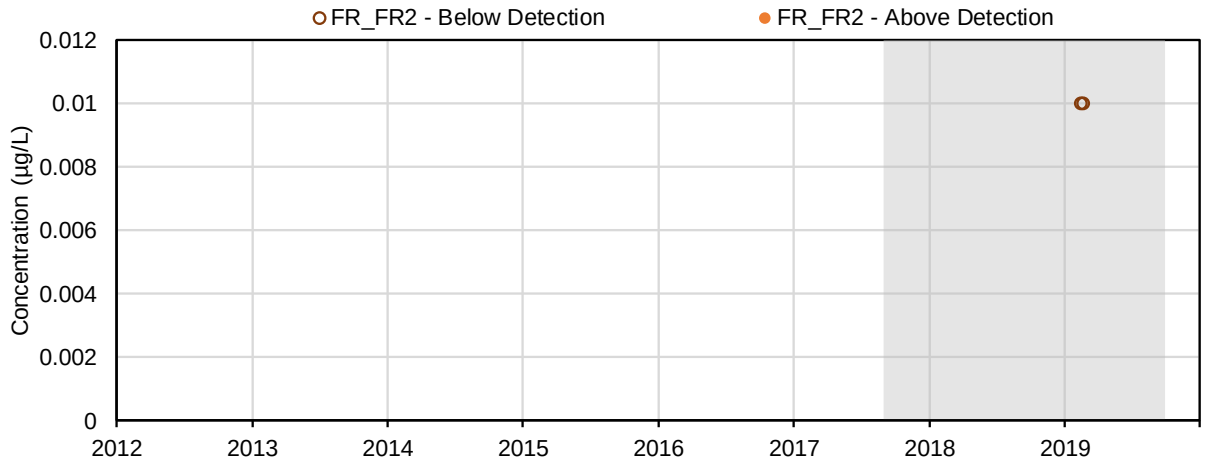
(112) Acenaphthene (µg/L); Parent PAHs



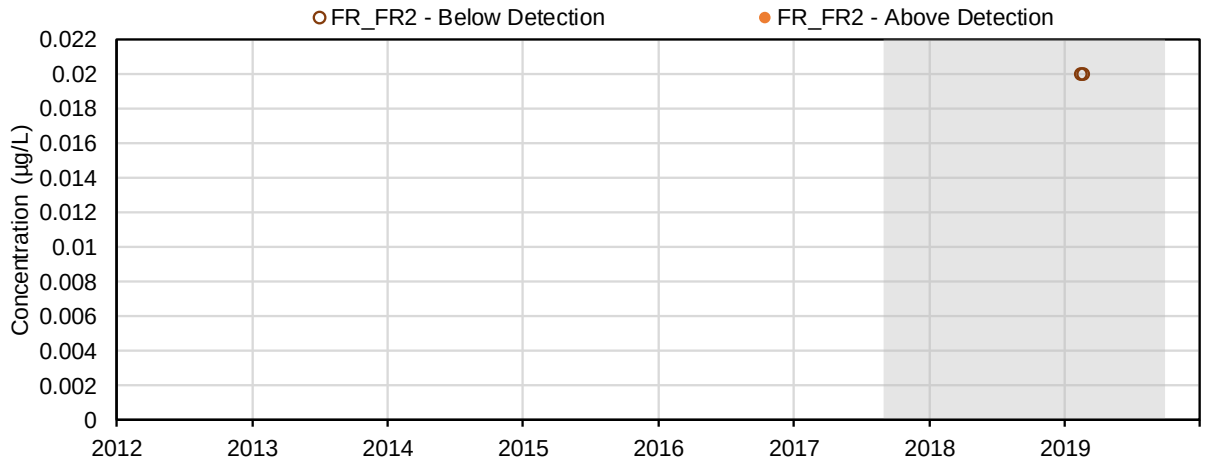
(113) Acridine (µg/L); Parent PAHs



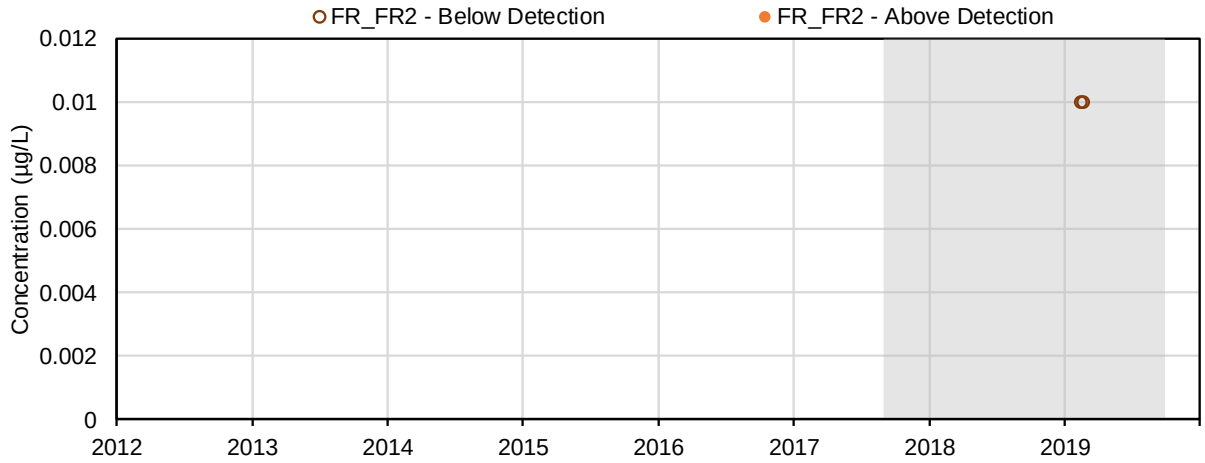
(114) Fluorene (µg/L); Parent PAHs



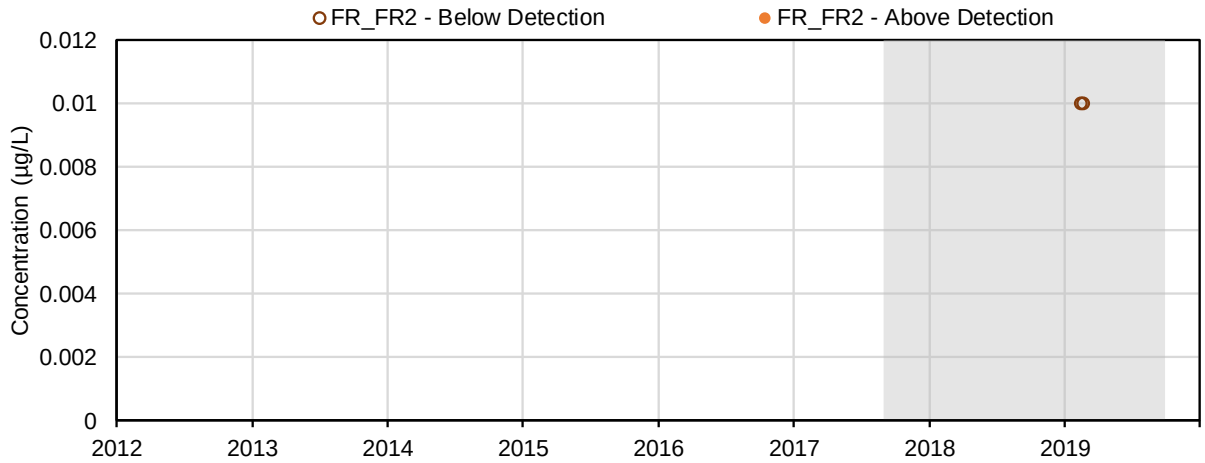
(115) Phenanthrene (µg/L); Parent PAHs



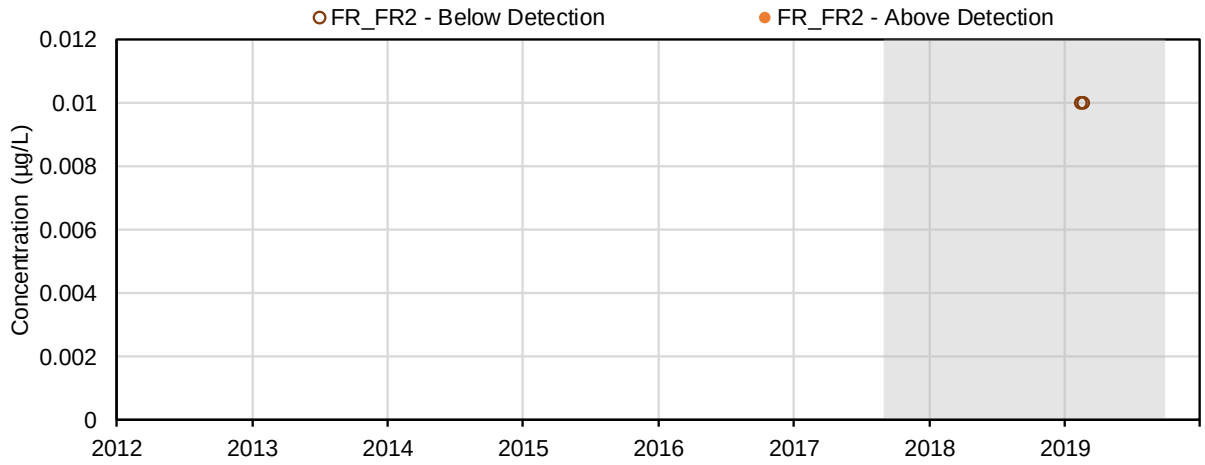
(116) Anthracene (µg/L); Parent PAHs



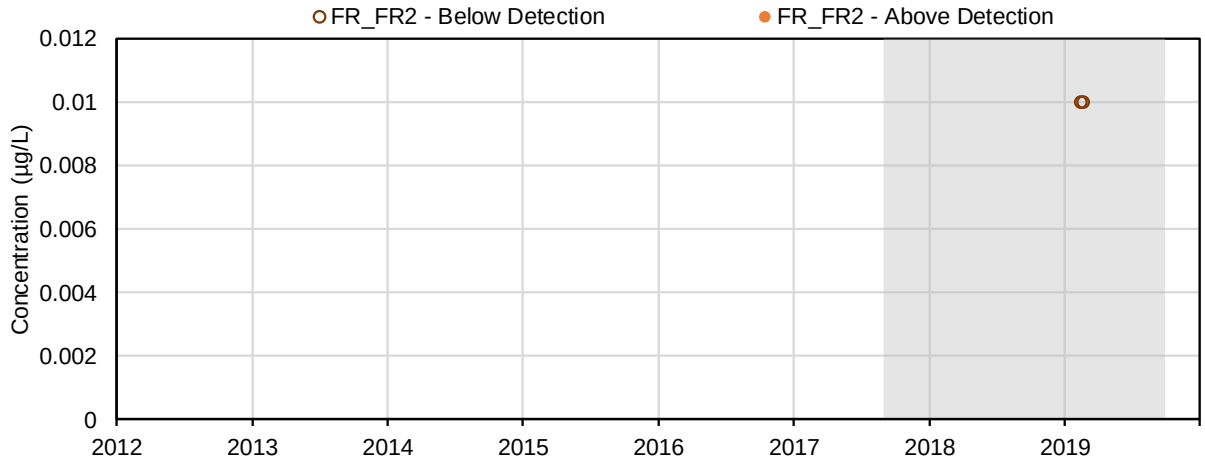
(117) Pyrene (µg/L); Parent PAHs



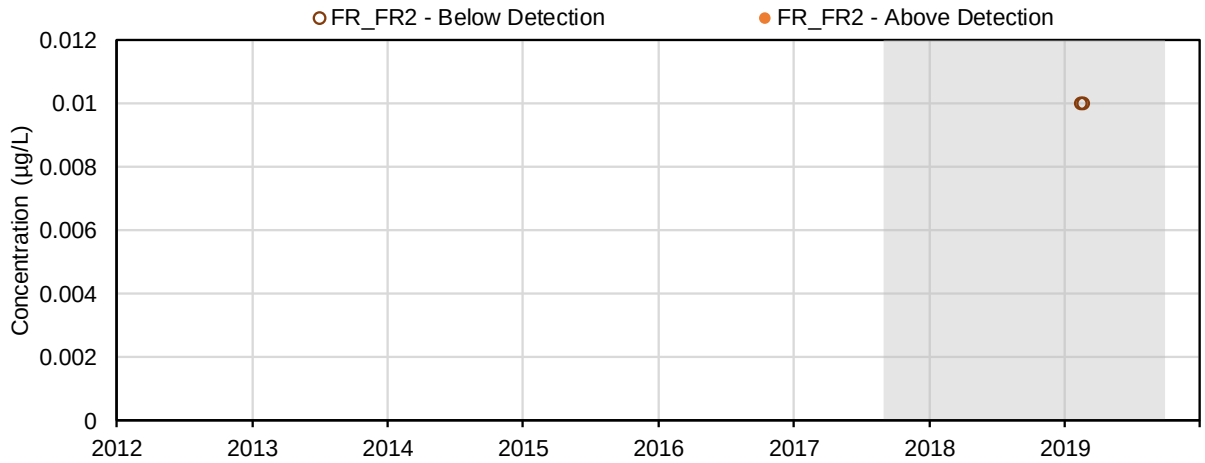
(118) Fluoranthene (µg/L); Parent PAHs



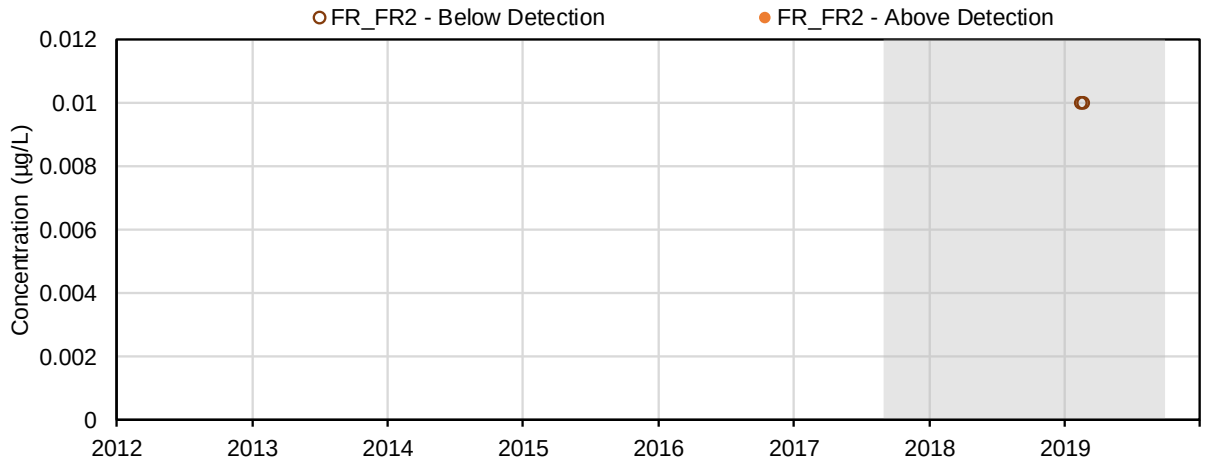
(119) Benzo(a)anthracene (µg/L); Parent PAHs



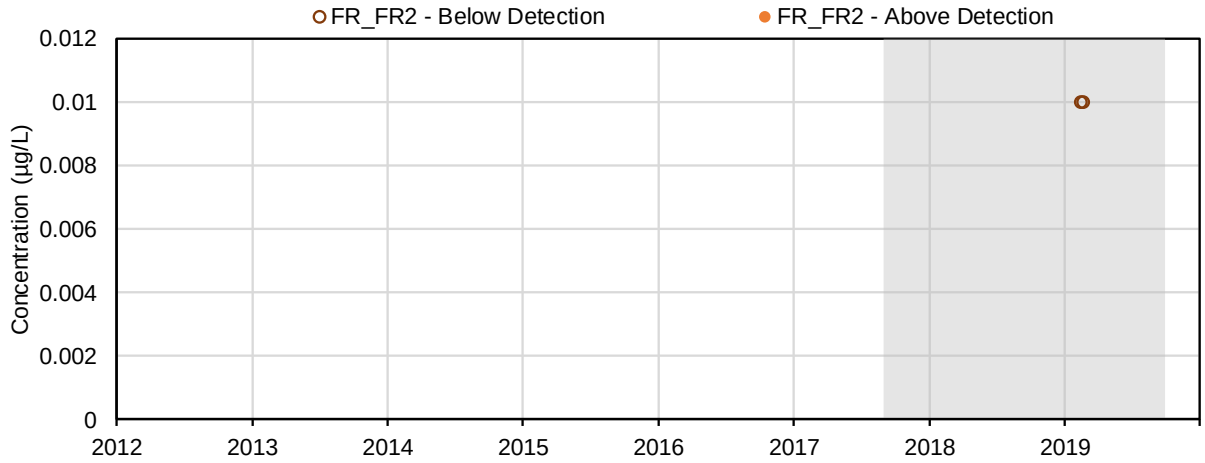
(120) Chrysene (µg/L); Parent PAHs



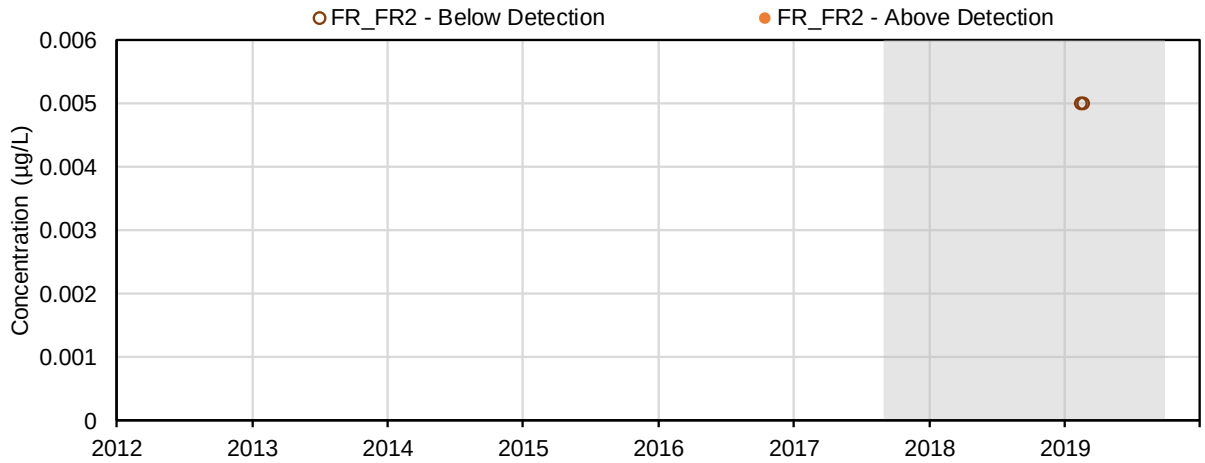
(121) Benzo(b,j)fluoranthene (µg/L); Parent PAHs



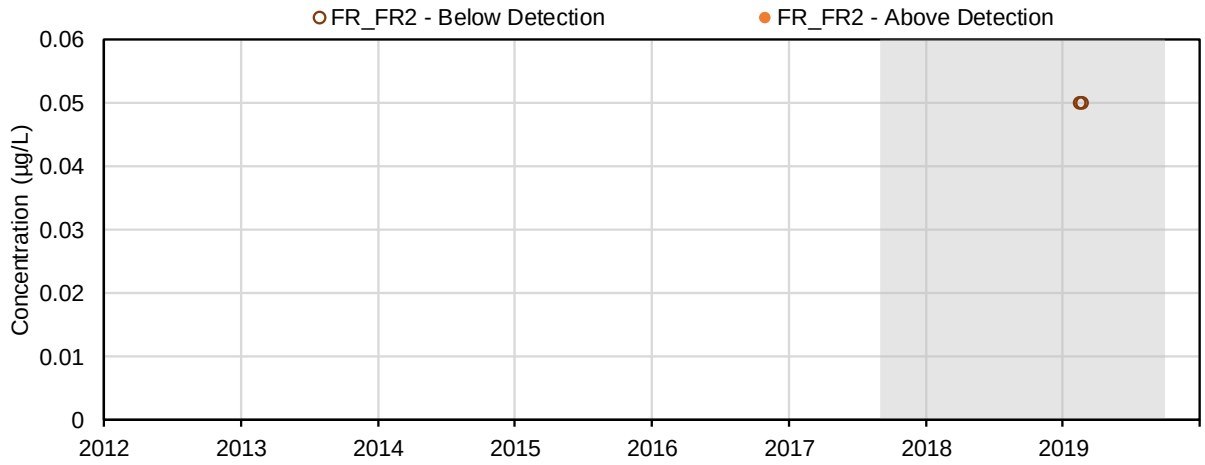
(122) Benzo(k)fluoranthene (µg/L); Parent PAHs



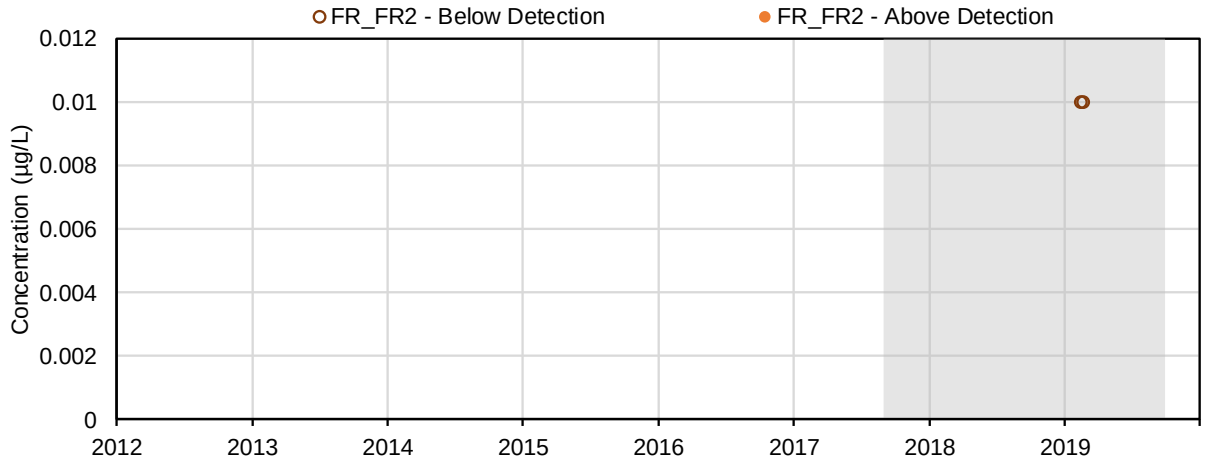
(123) Benzo(a)pyrene (µg/L); Parent PAHs



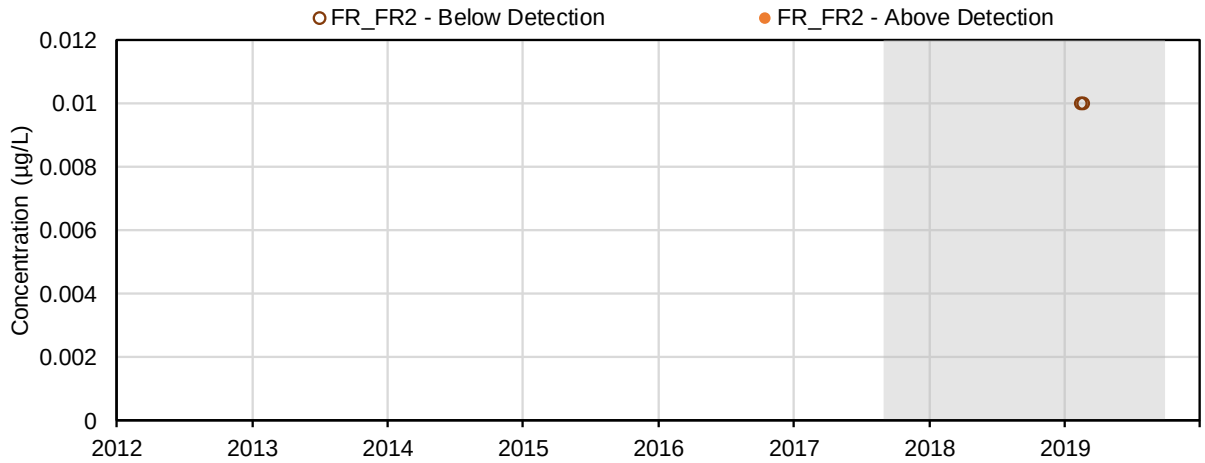
(124) Quinoline (µg/L); Parent PAHs



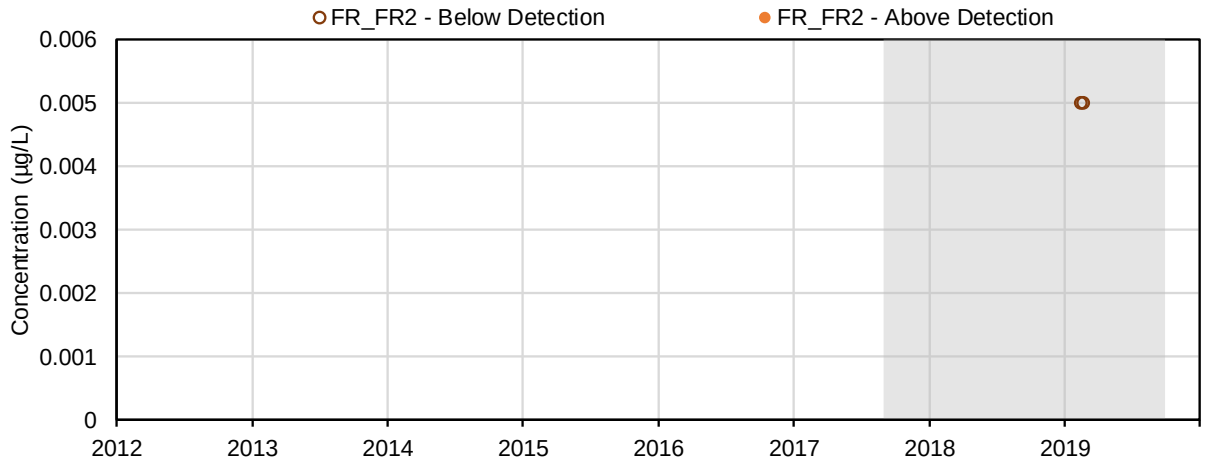
(125) Benzo(g,h,i)perylene (µg/L); Parent PAHs



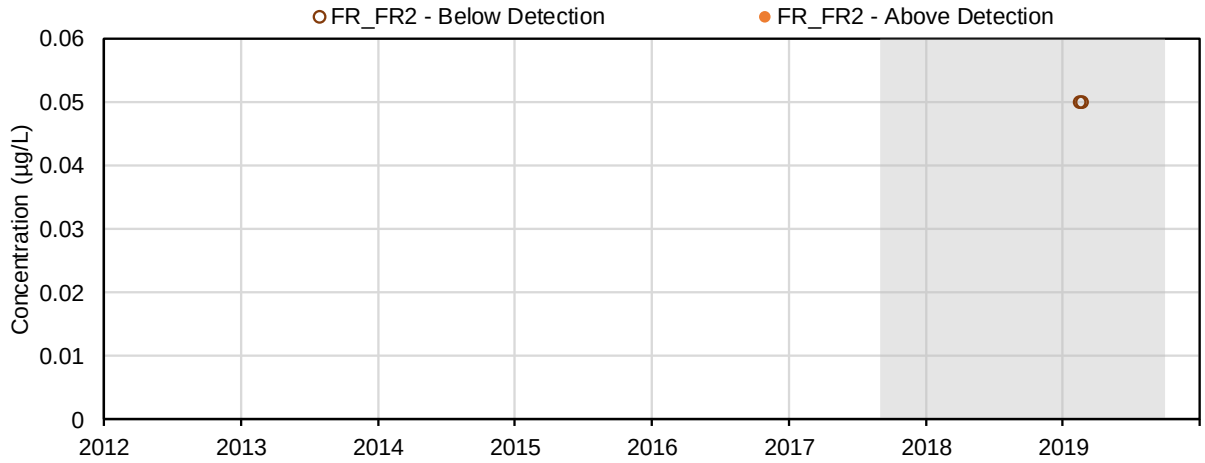
(126) Indeno(c,d-123)pyrene (µg/L); Parent PAHs



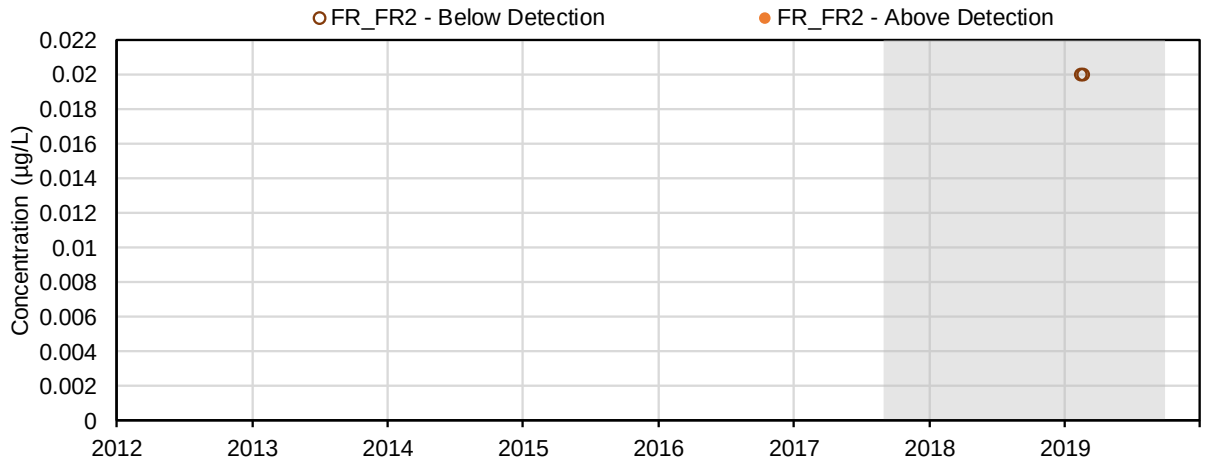
(127) Dibenzo(a,h)anthracene (µg/L); Parent PAHs



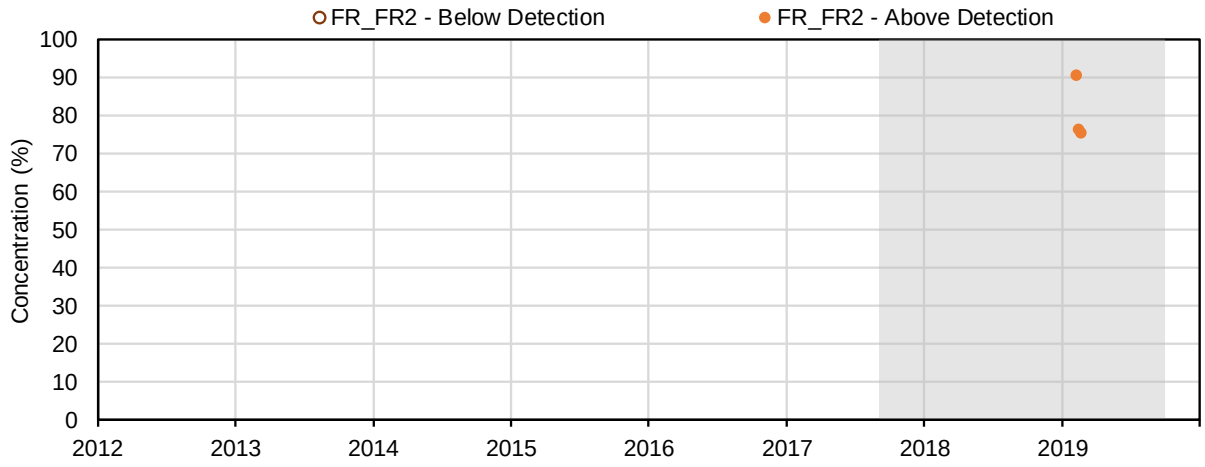
(128) 1-Methylnaphthalene (µg/L); Alkylated PAHs

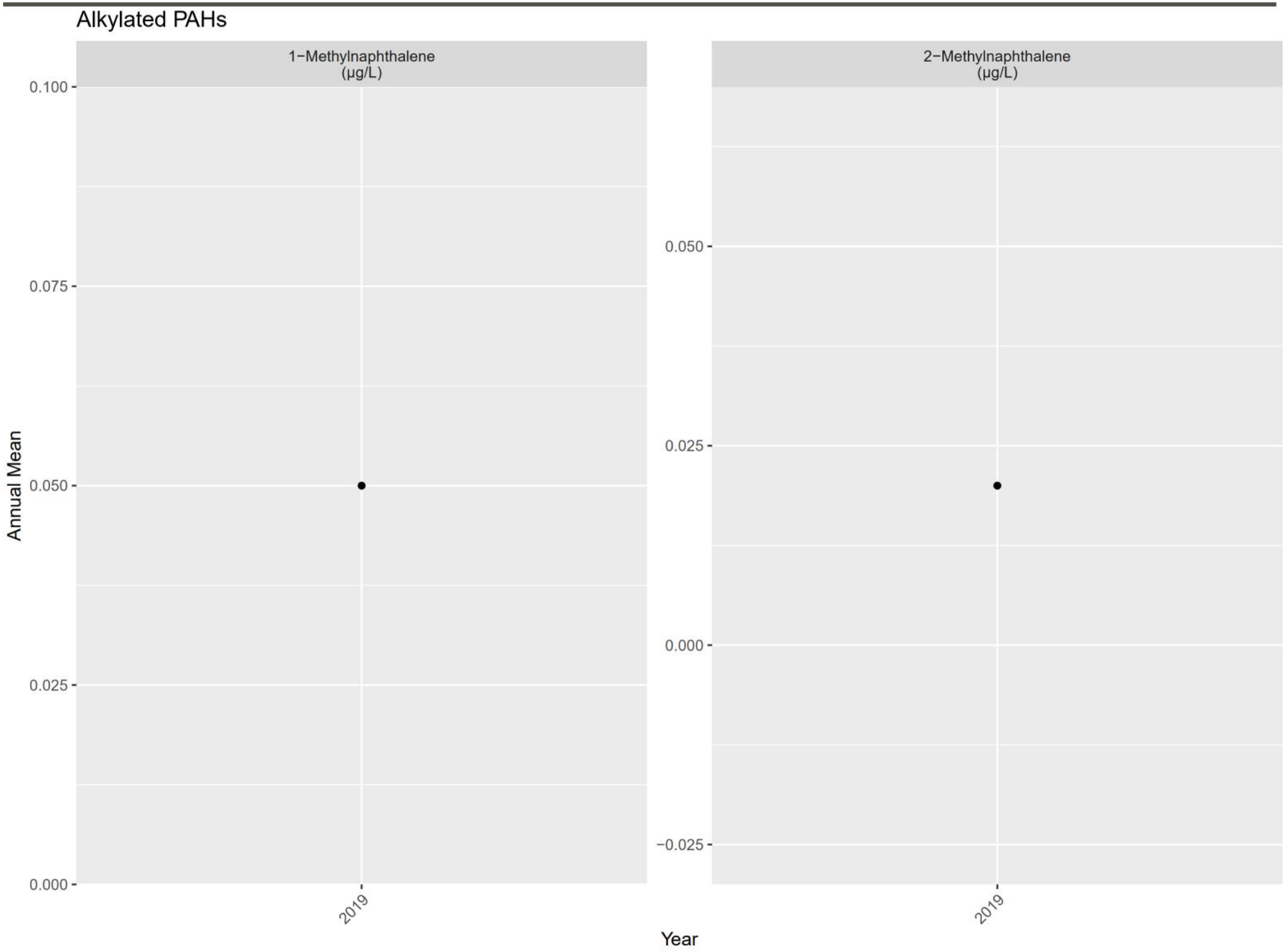


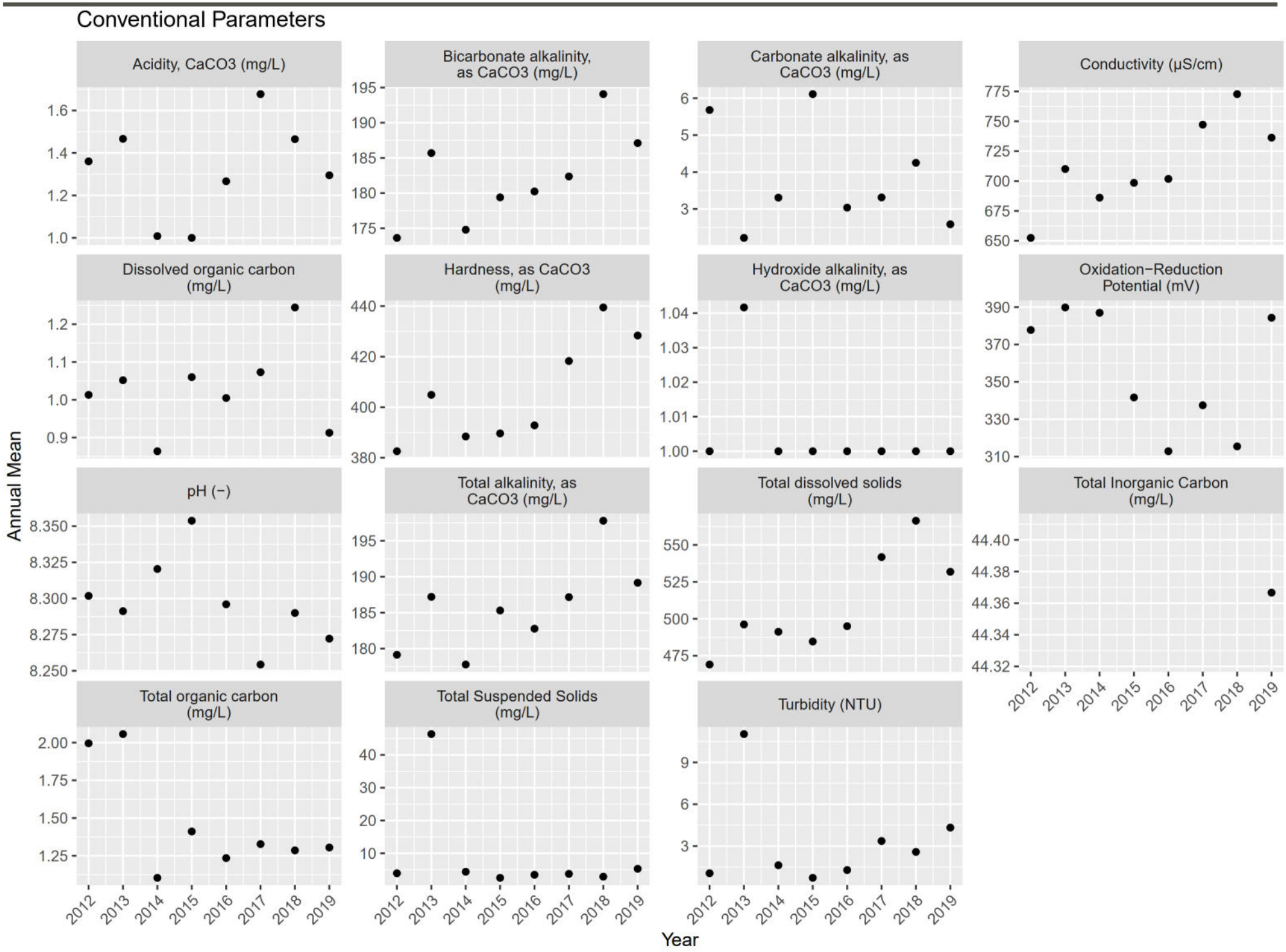
(129) 2-Methylnaphthalene (µg/L); Alkylated PAHs

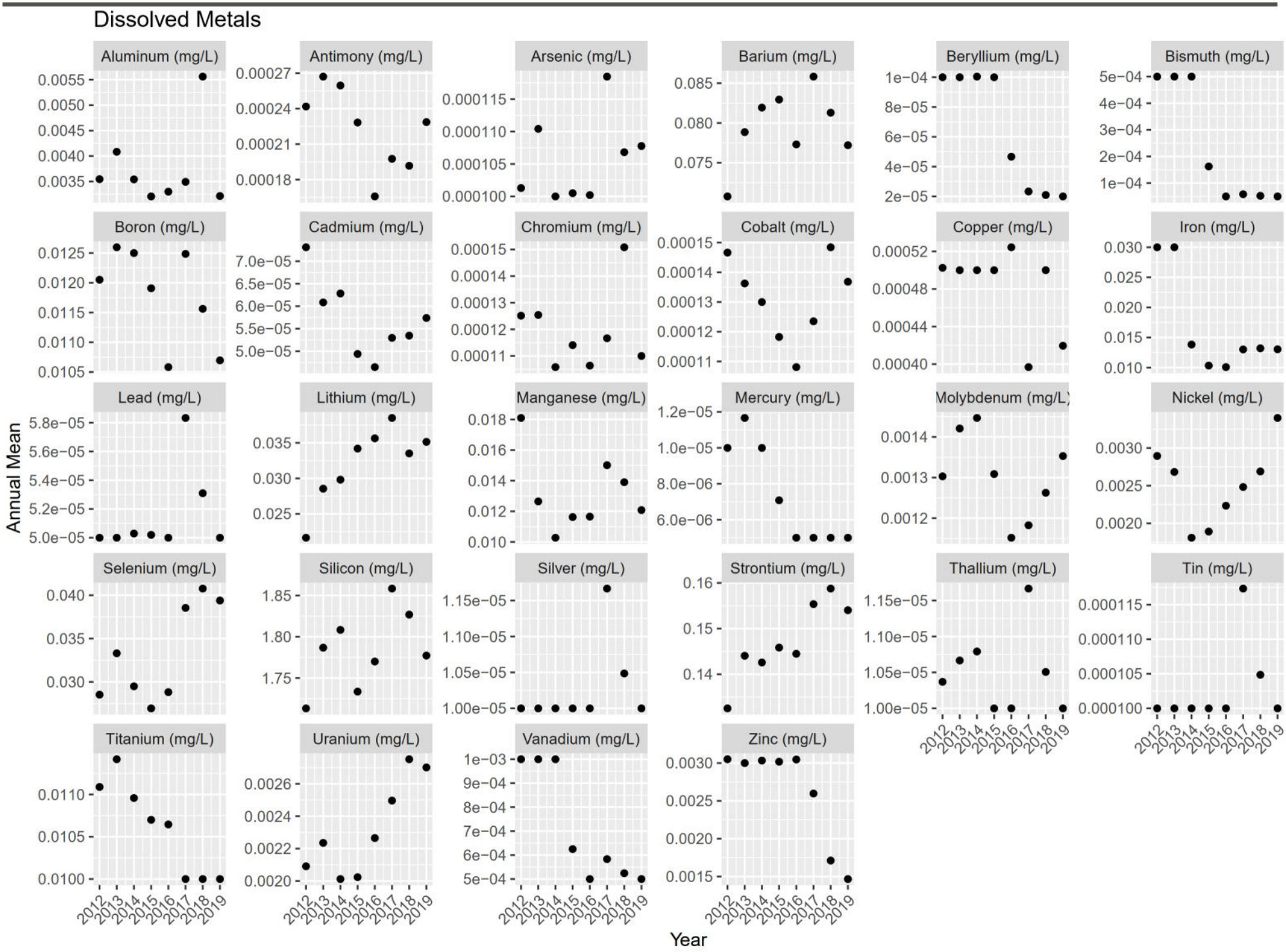


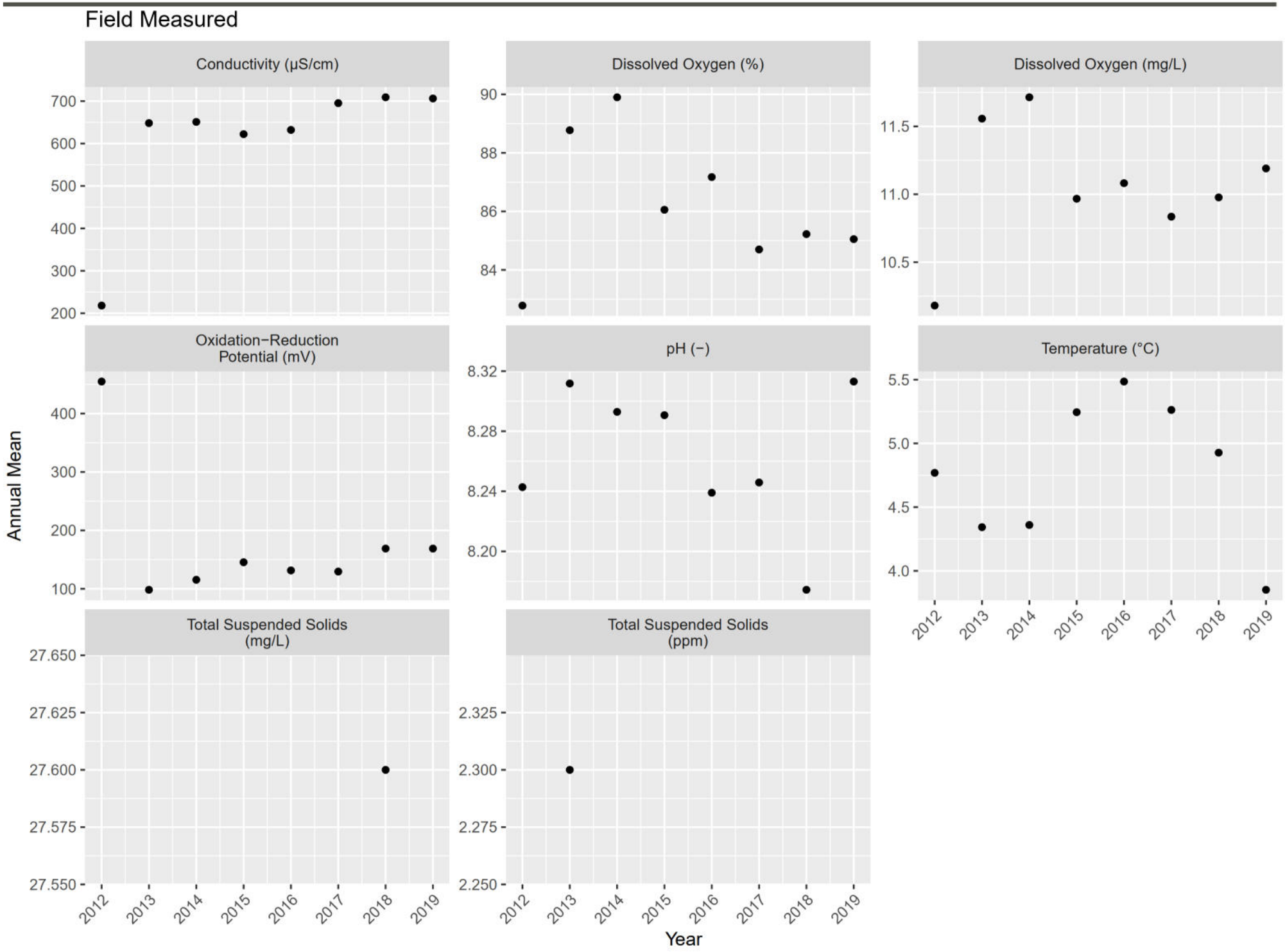
(130) 2-Bromobenzotrifluoride (%); Unknown

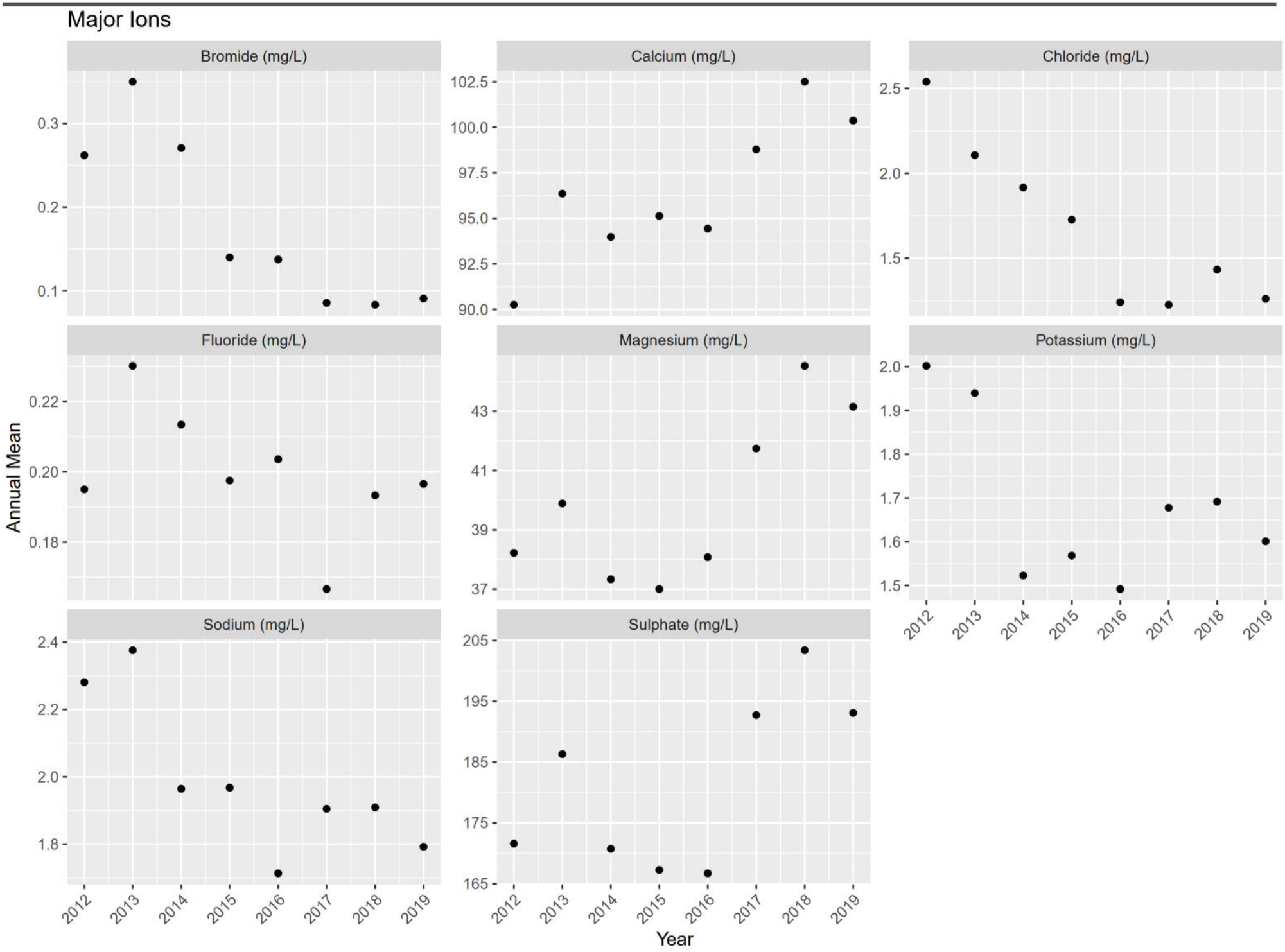


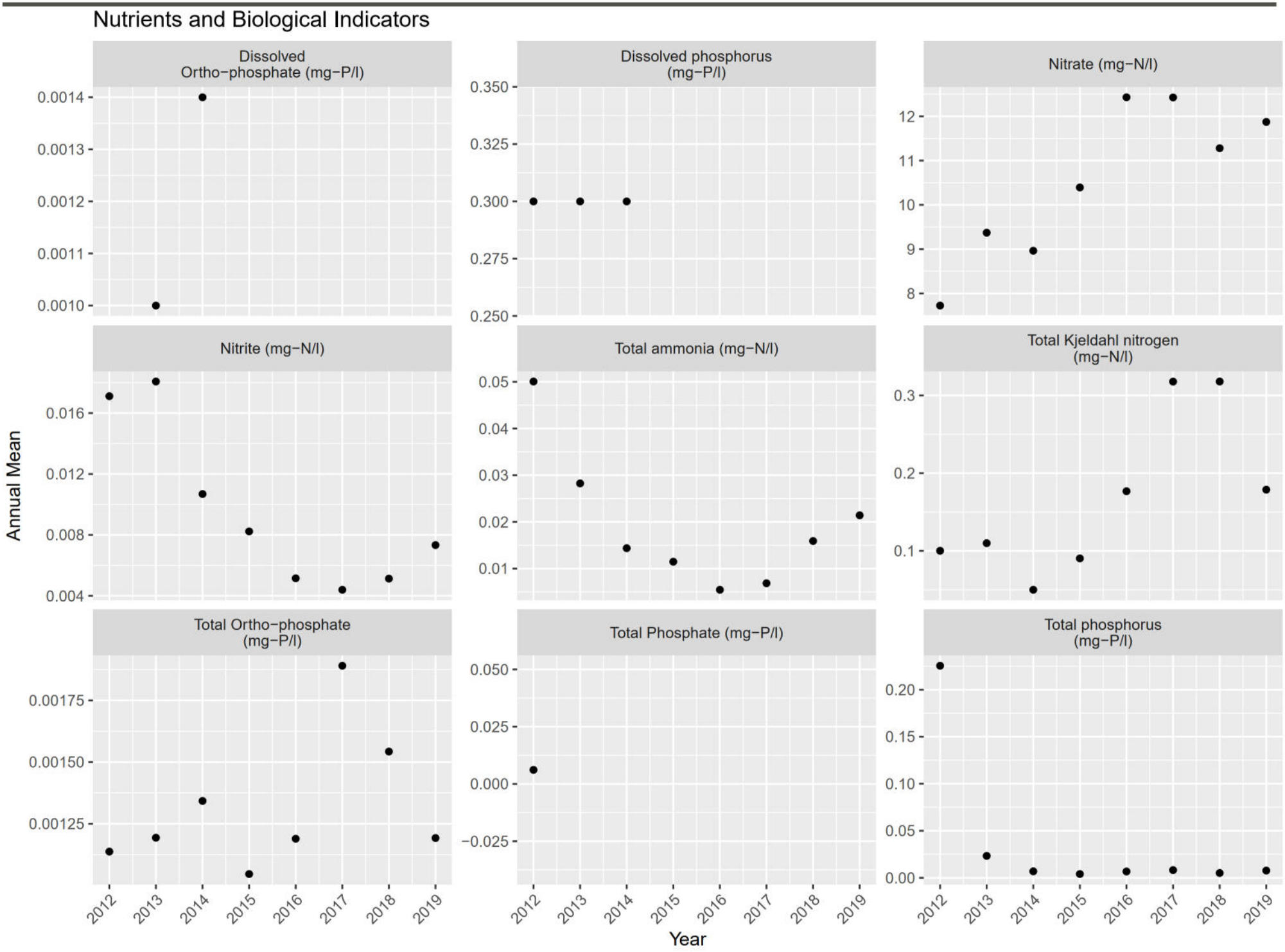

Alkylated PAHs
1−Methylnaphthalene (µg/L)
2−Methylnaphthalene (µg/L)
Annual Mean
0.100
0.075
0.050
0.025
0.000
−0.025
2019
Year

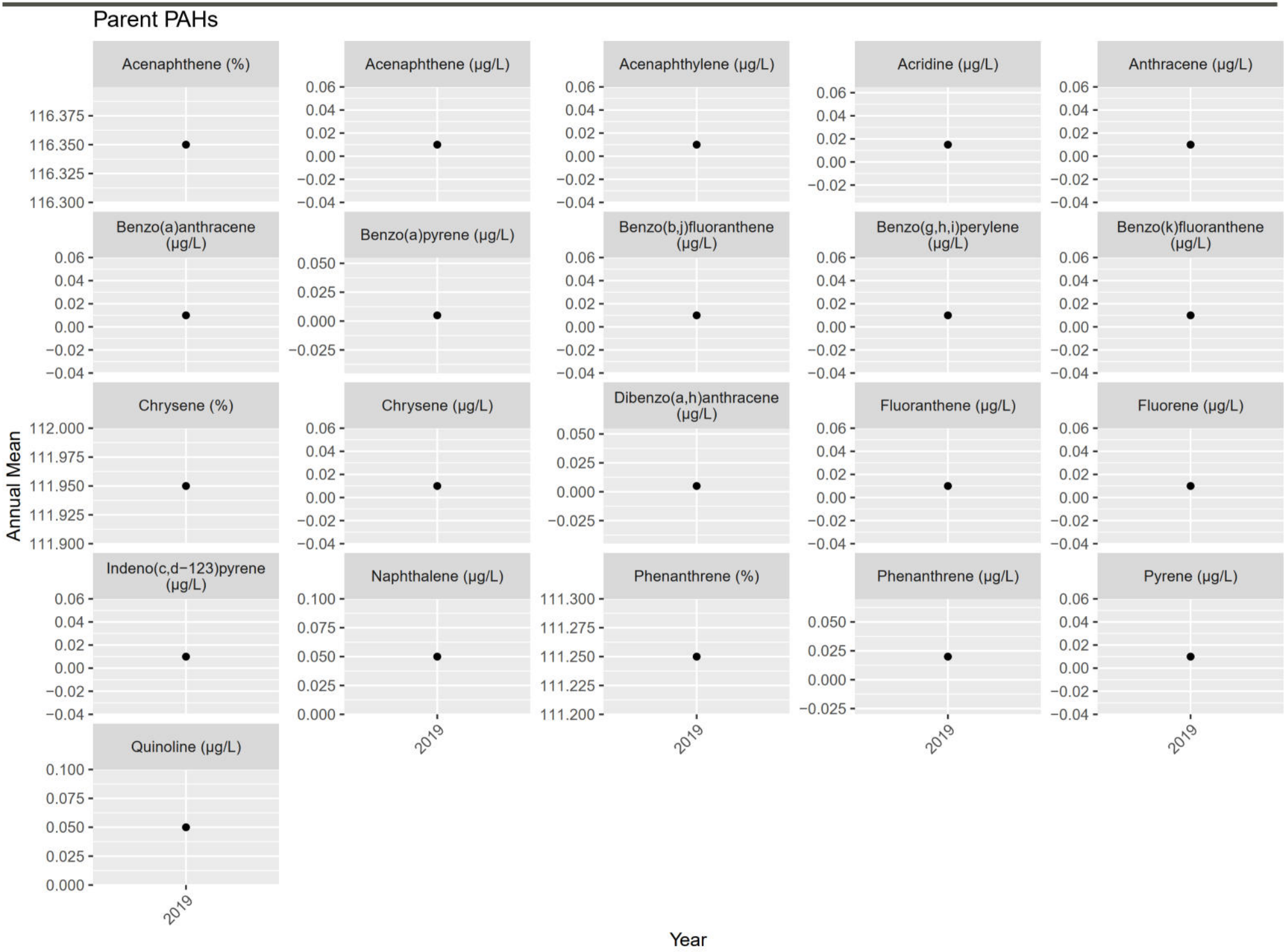

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total Inorganic Carbon (mg/L)
Total organic carbon (mg/L)
Total Suspended Solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

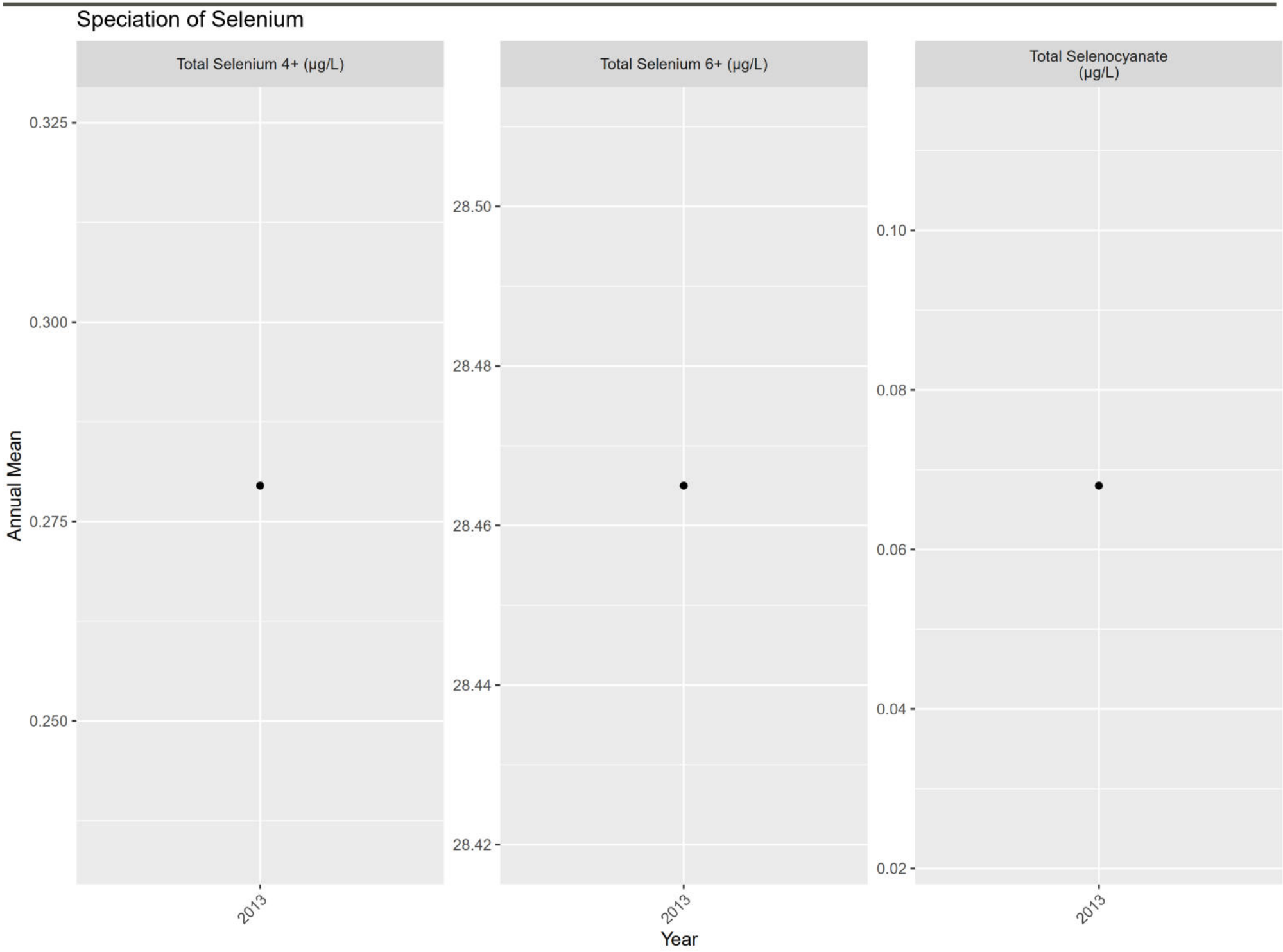

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

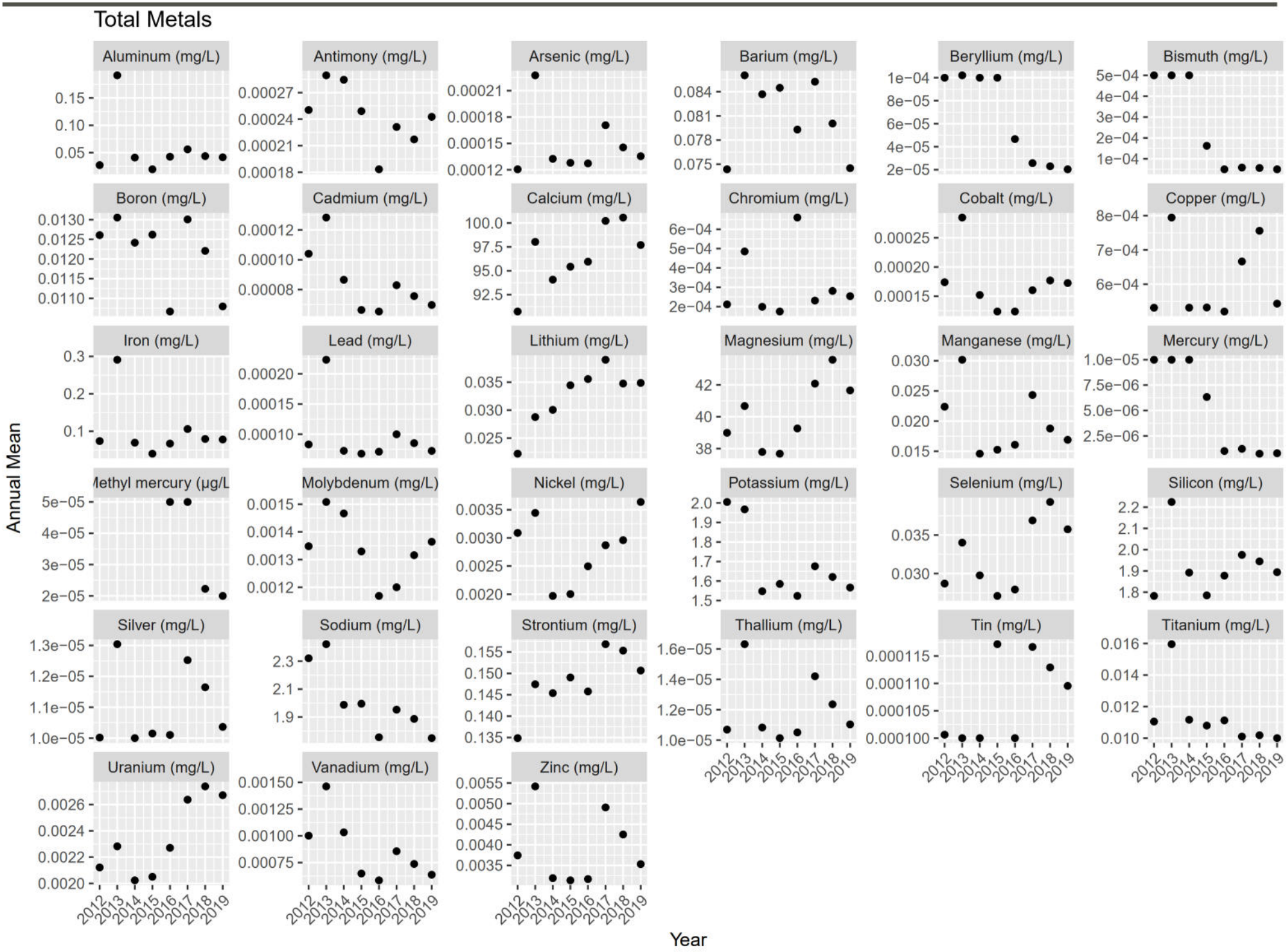

Field Measured
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Temperature (°C)
Total Suspended Solids (mg/L)
Total Suspended Solids (ppm)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

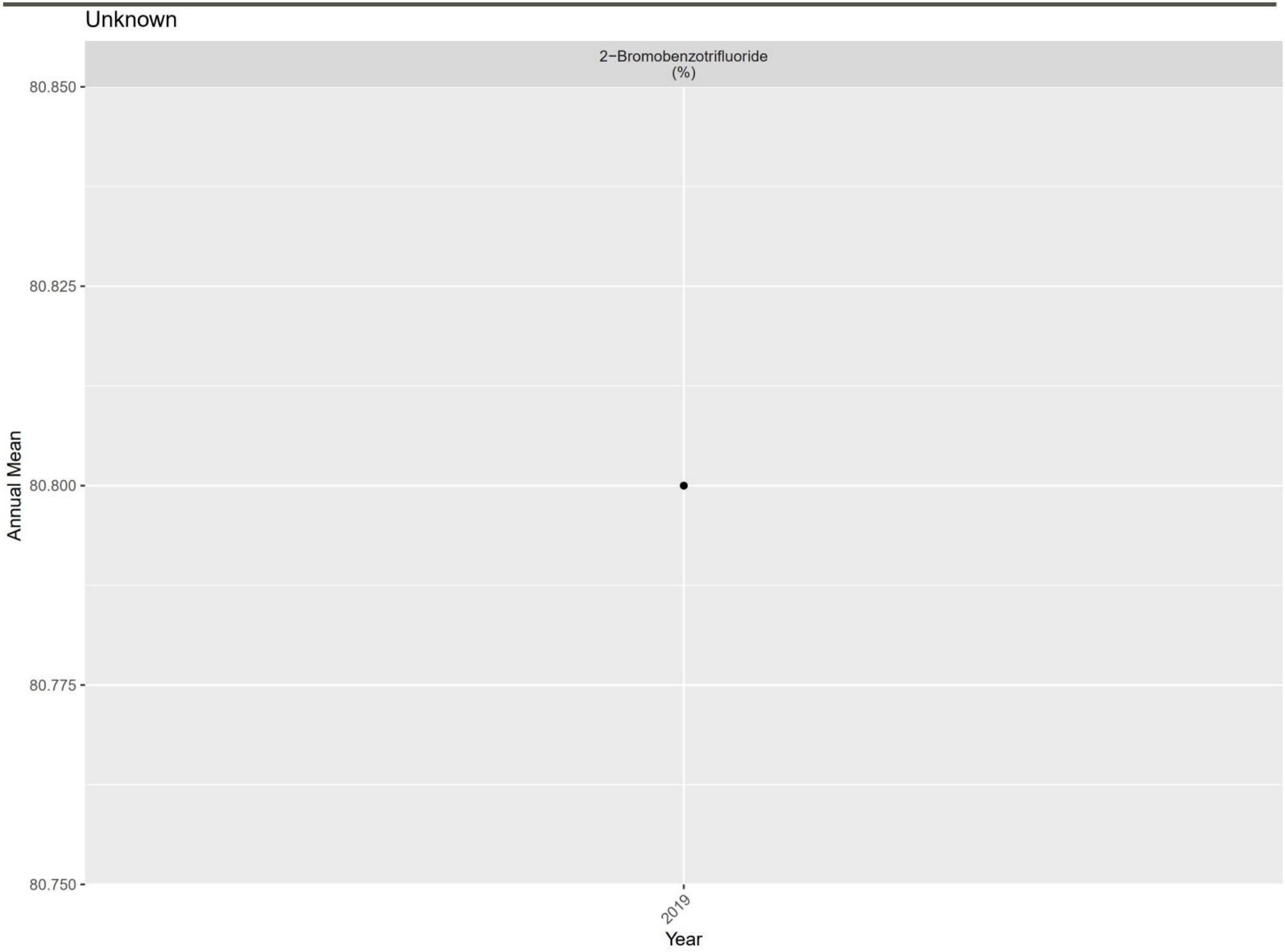

Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
0.1
0.2
0.3
90.0
92.5
95.0
97.5
100.0
102.5
1.5
2.0
2.5
0.18
0.20
0.22
37
39
41
43
1.5
1.6
1.7
1.8
1.9
2.0
1.8
2.0
2.2
2.4
165
175
185
195
205
2012
2013
2014
2015
2016
2017
2018
2019

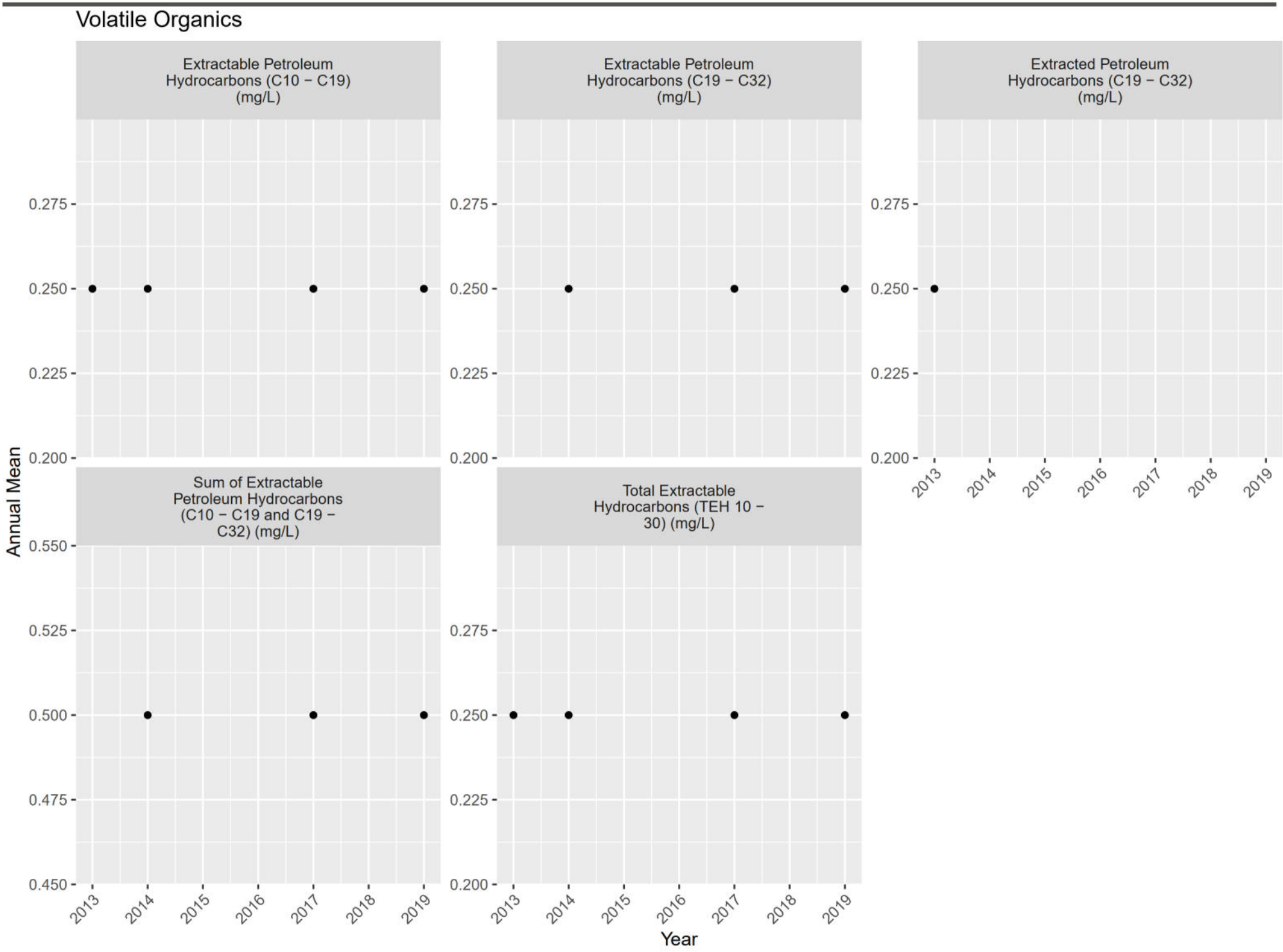

Nutrients and Biological Indicators
Dissolved Ortho−phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Parent PAHs
Acenaphthene (%)
Acenaphthene (µg/L)
Acenaphthylene (µg/L)
Acridine (µg/L)
Anthracene (µg/L)
Benzo(a)anthracene (µg/L)
Benzo(a)pyrene (µg/L)
Benzo(b,j)fluoranthene (µg/L)
Benzo(g,h,i)perylene (µg/L)
Benzo(k)fluoranthene (µg/L)
Chrysene (%)
Chrysene (µg/L)
Dibenzo(a,h)anthracene (µg/L)
Fluoranthene (µg/L)
Fluorene (µg/L)
Indeno(c,d−123)pyrene (µg/L)
Naphthalene (µg/L)
Phenanthrene (%)
Phenanthrene (µg/L)
Pyrene (µg/L)
Quinoline (µg/L)
Annual Mean
2019
Year


Speciation of Selenium
Total Selenium 4+ (µg/L)
Total Selenium 6+ (µg/L)
Total Selenocyanate (µg/L)
Annual Mean
0.325
0.300
0.275
0.250
28.50
28.48
28.46
28.44
28.42
0.10
0.08
0.06
0.04
0.02
2013
2013
2013
Year


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Methyl mercury (µg/L
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year

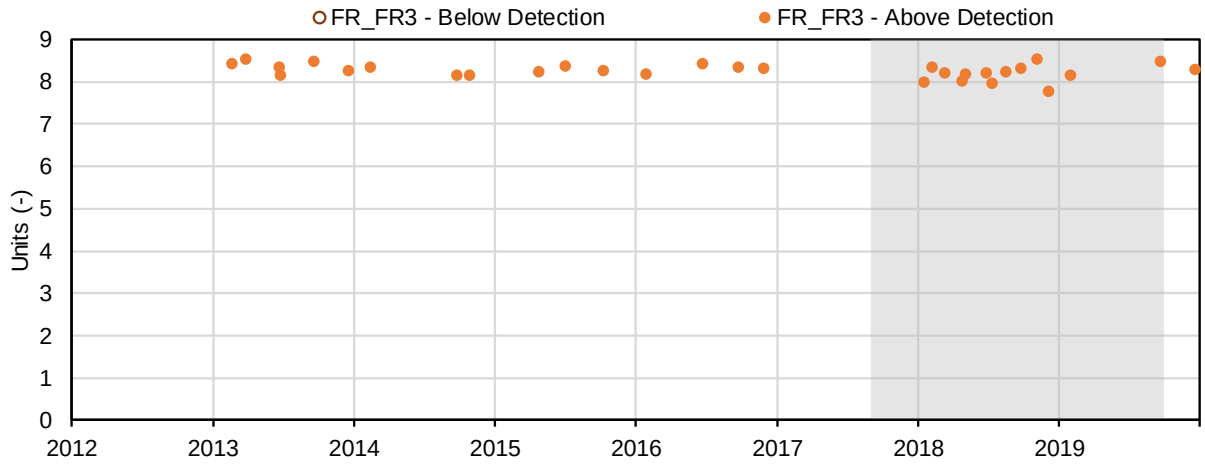

Unknown
2−Bromobenzotrifluoride
(%)
80.850
80.825
80.800
80.775
80.750
Annual Mean
2019
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extractable Petroleum Hydrocarbons (C19 − C32) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Sum of Extractable Petroleum Hydrocarbons (C10 − C19 and C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
Year
0.275
0.250
0.225
0.200
0.550
0.525
0.500
0.475
0.450
2013
2014
2015
2016
2017
2018
2019

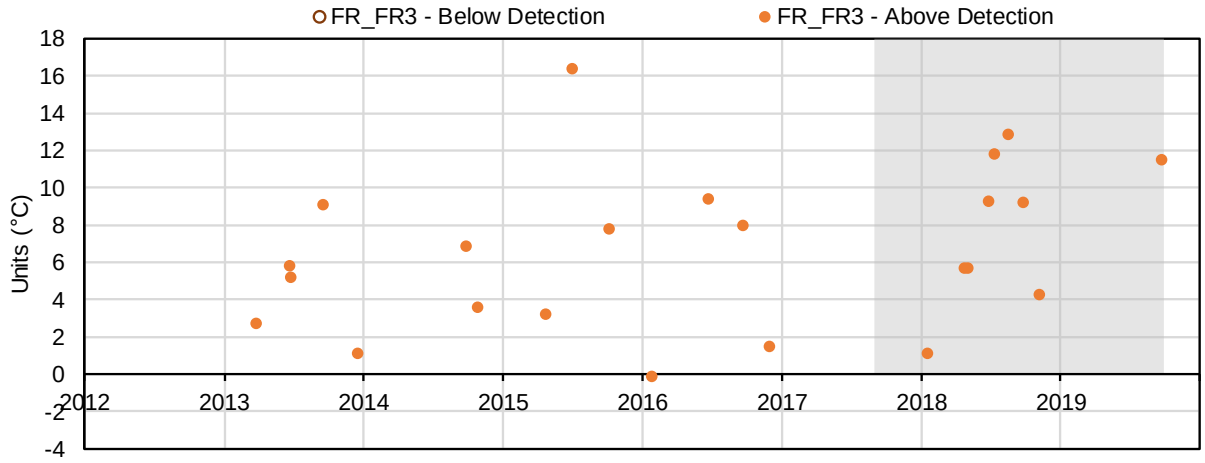
ATTACHMENT F7

FR_FR3 Plots

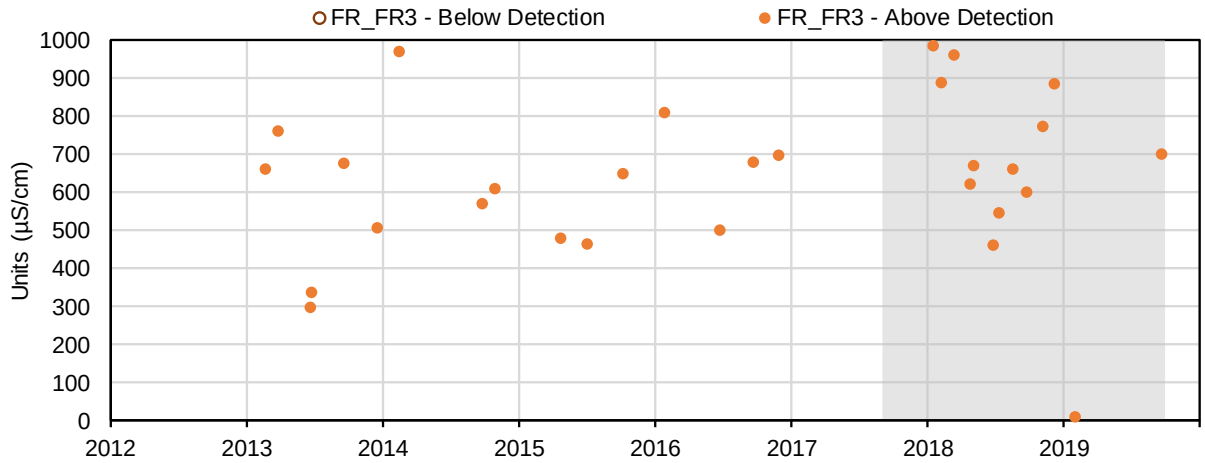
(1) pH (-); Field Measured



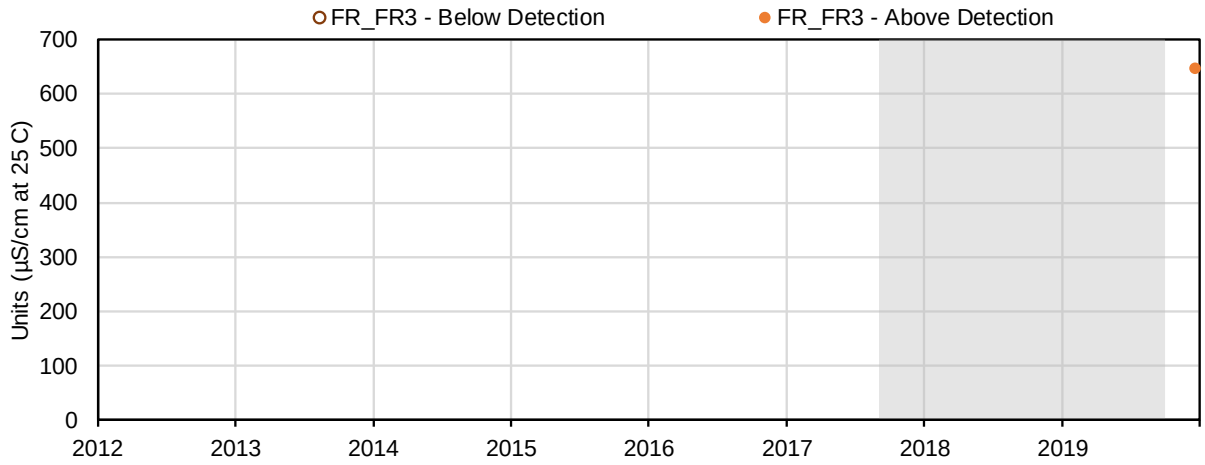
(2) Temperature (°C); Field Measured



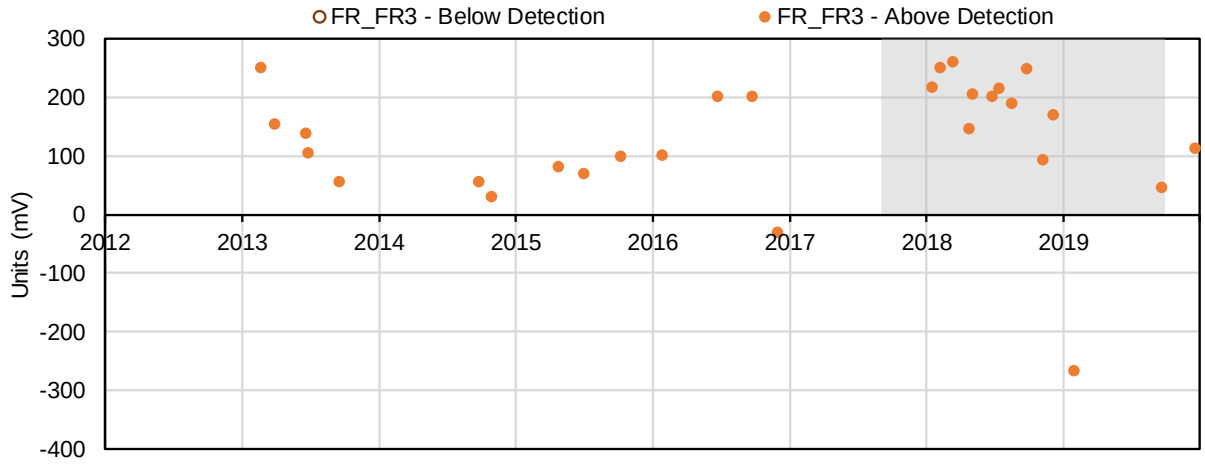
(3) Conductivity (µS/cm); Field Measured



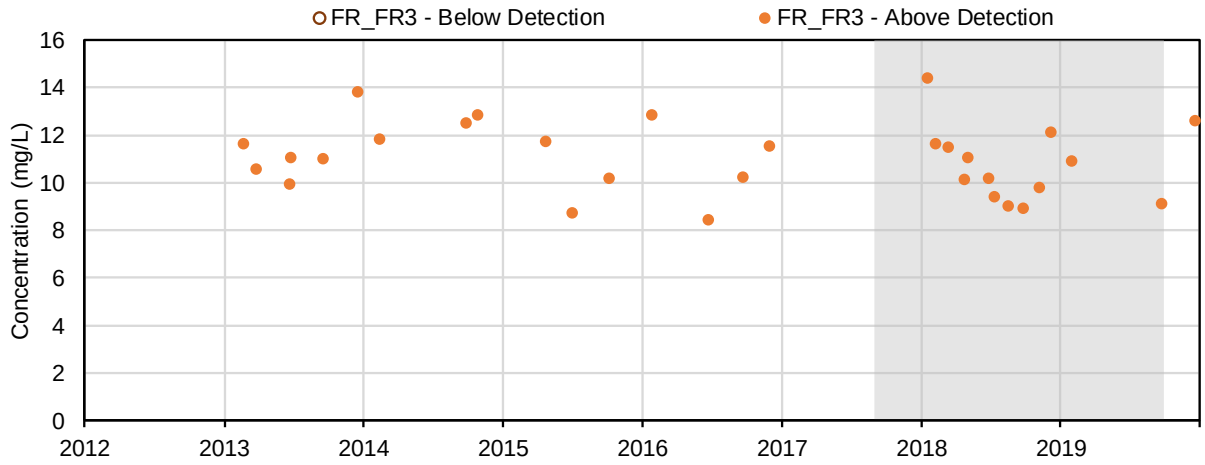
(4) Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C); Field Measured



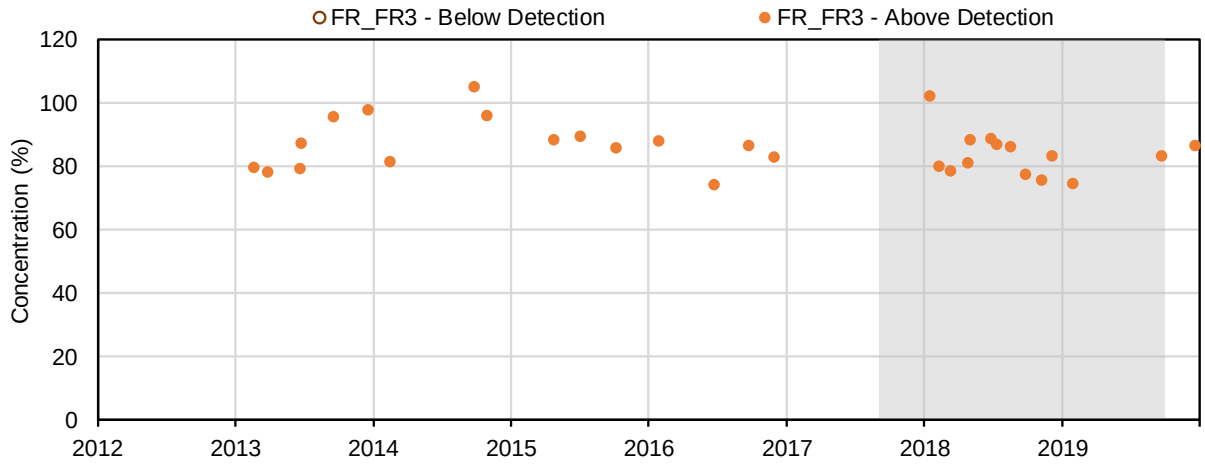
(5) Oxidation-Reduction Potential (mV); Field Measured



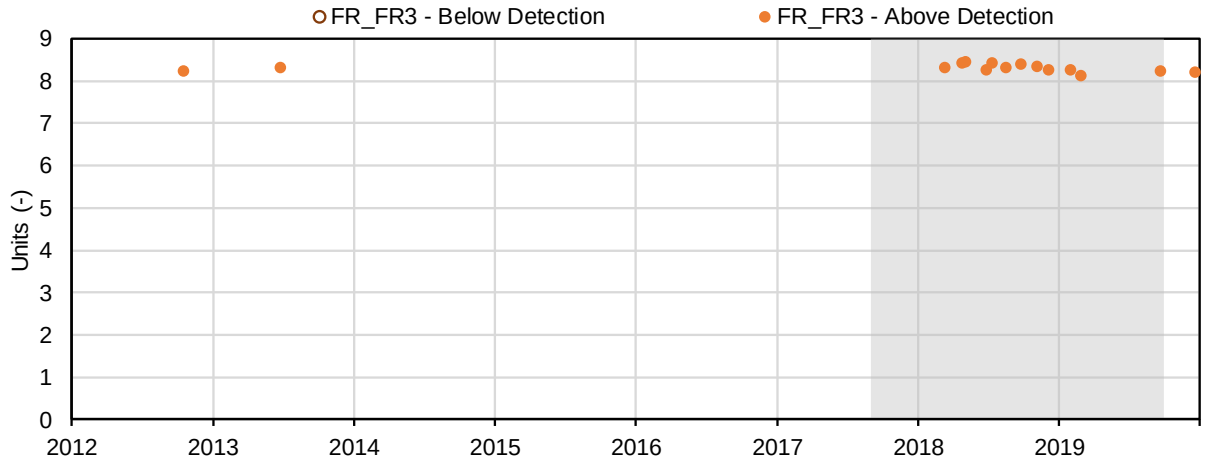
(6) Dissolved Oxygen (mg/L); Field Measured



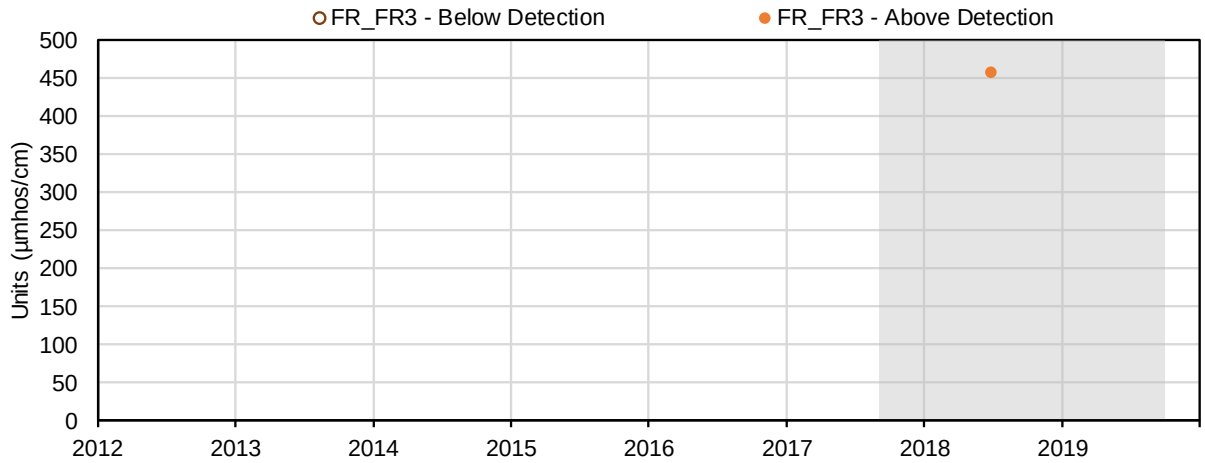
(7) Dissolved Oxygen (%); Field Measured



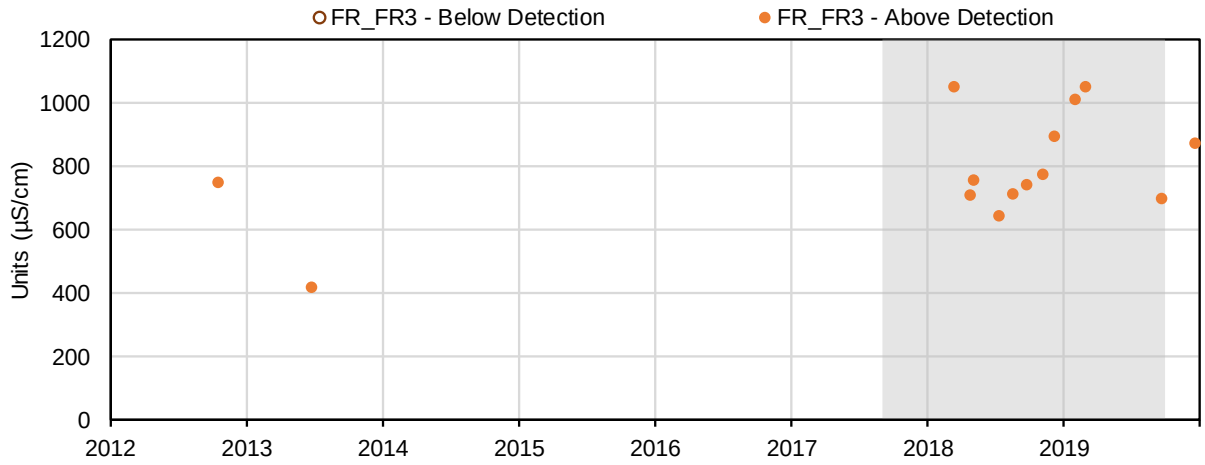
(8) pH (-); Conventional Parameters



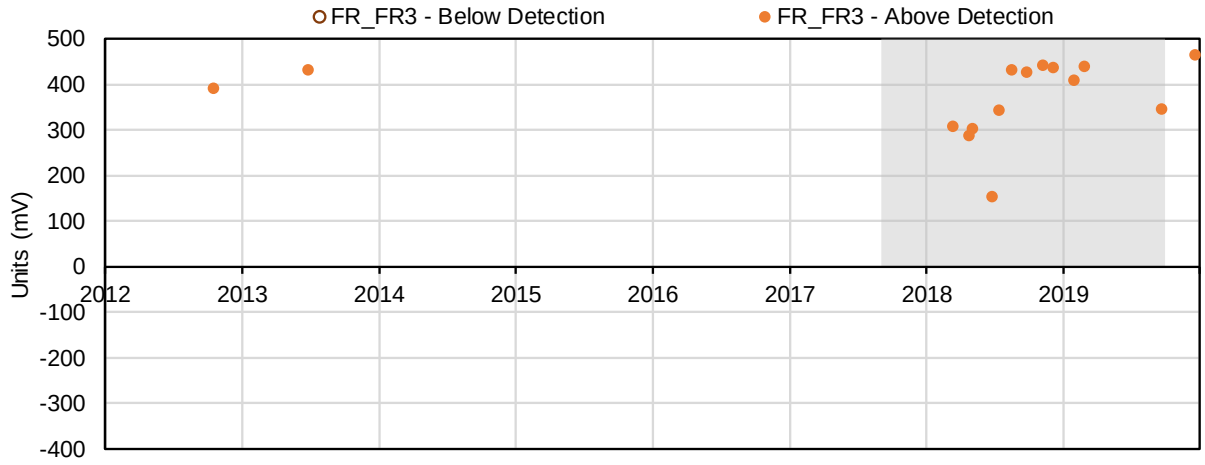
(9) Conductivity (µmhos/cm); Conventional Parameters



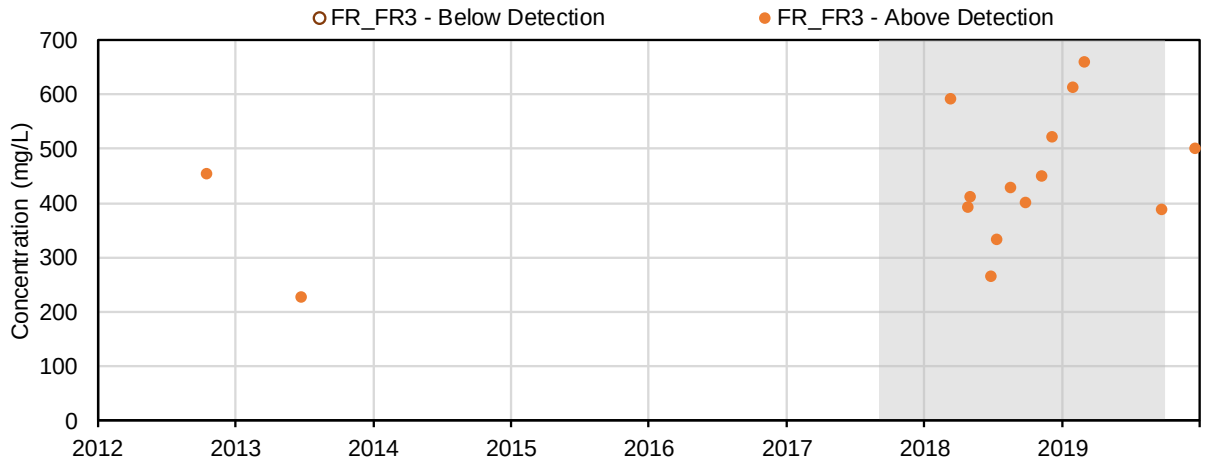
(10) Conductivity (µS/cm); Conventional Parameters



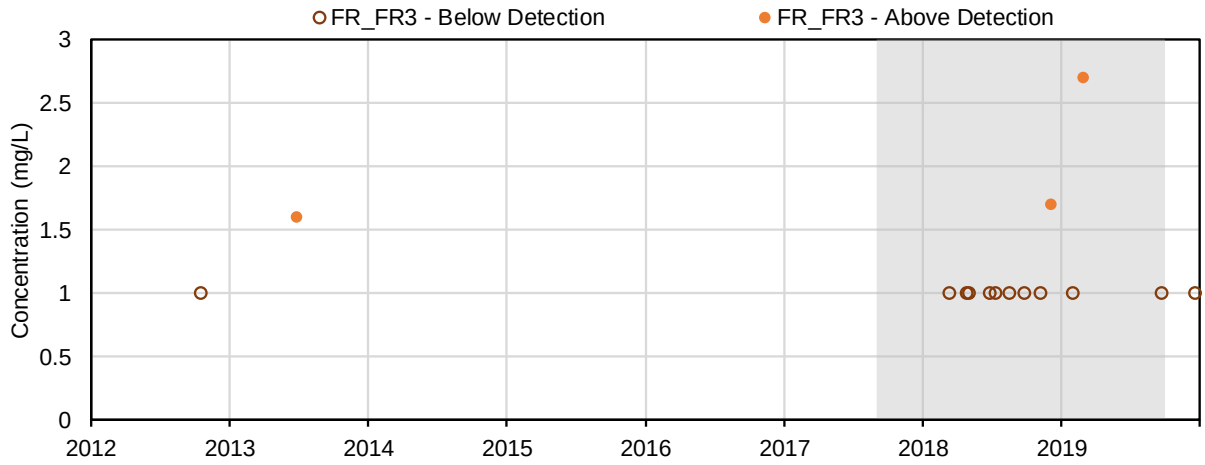
(11) Oxidation-Reduction Potential (mV); Conventional Parameters



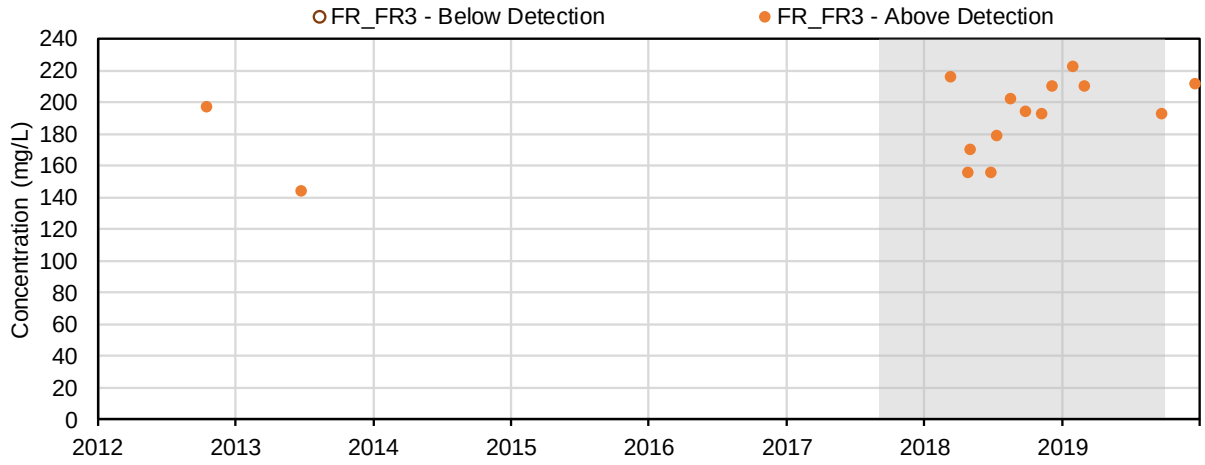
(12) Hardness, as CaCO3 (mg/L); Conventional Parameters



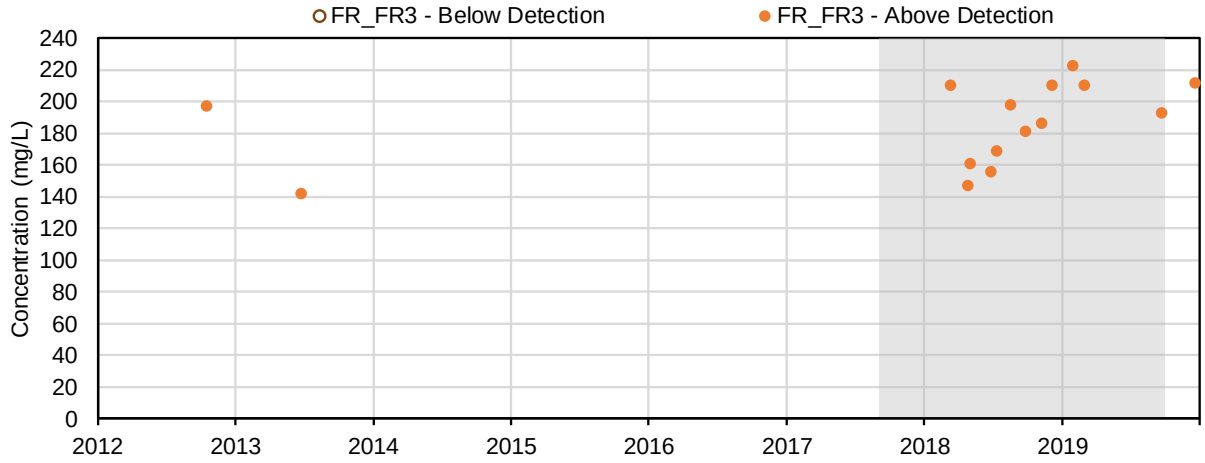
(13) Acidity, CaCO3 (mg/L); Conventional Parameters



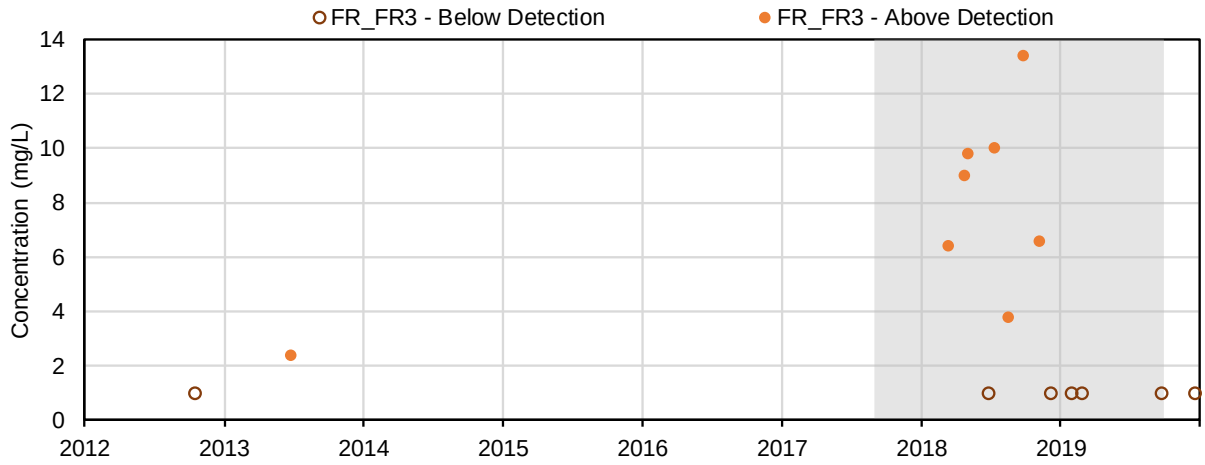
(14) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



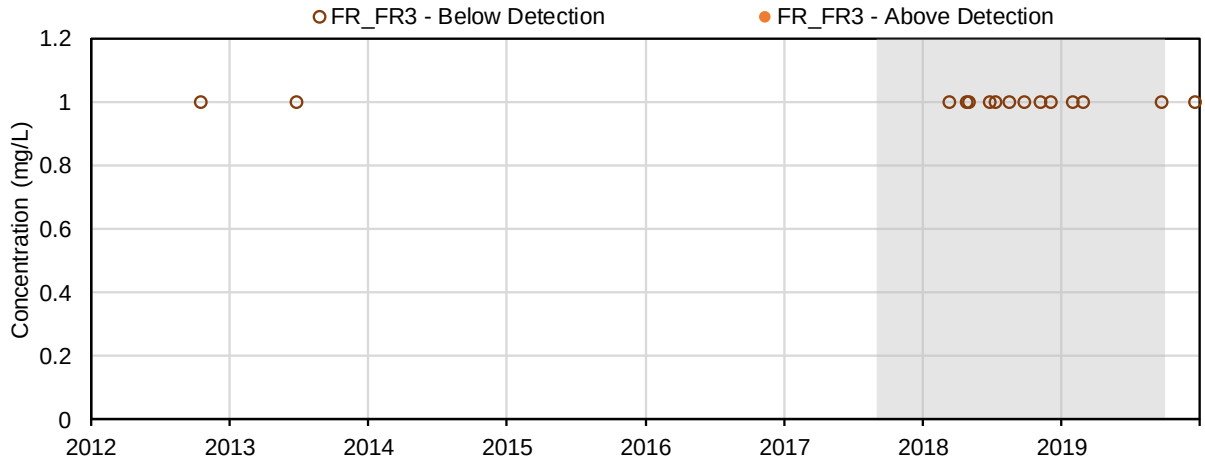
(15) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



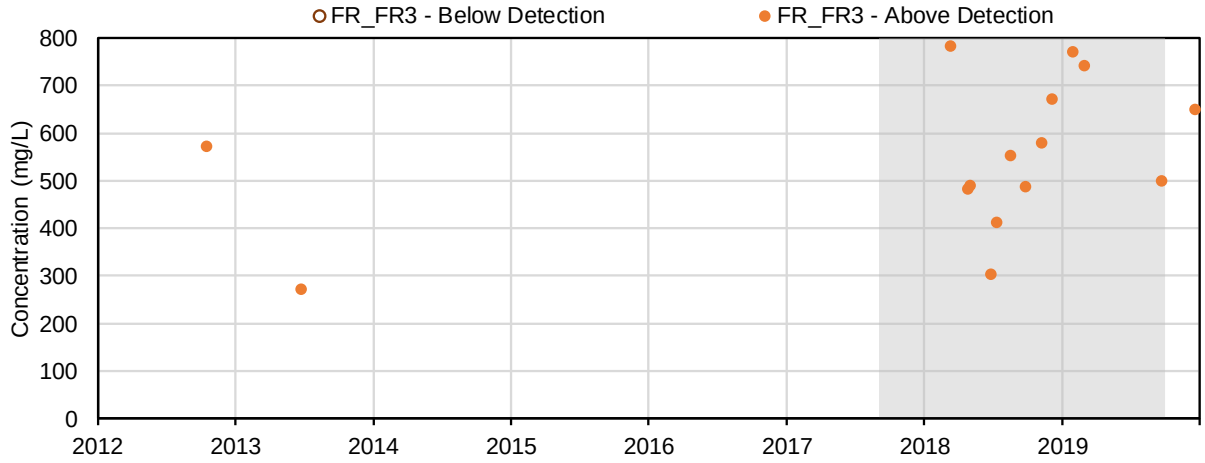
(16) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



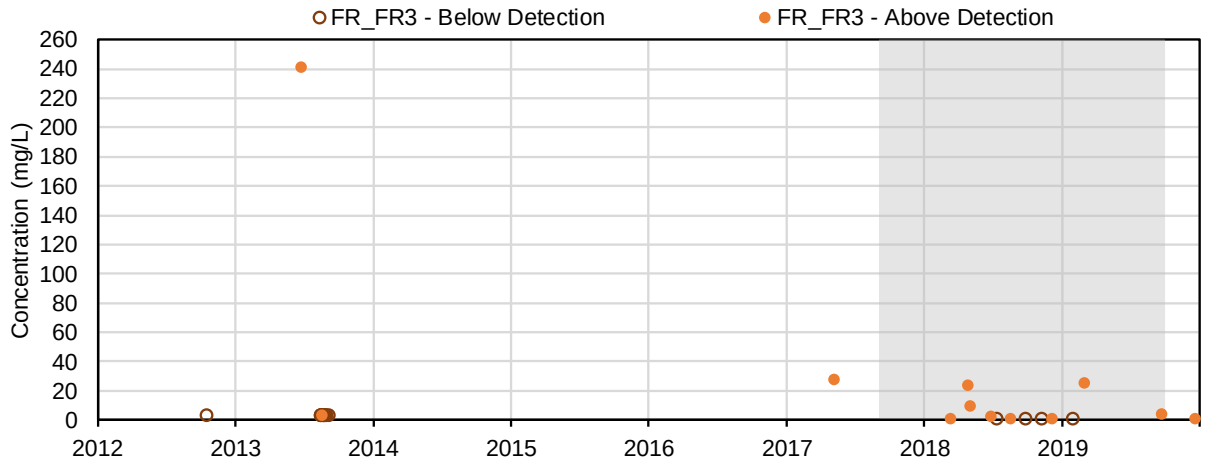
(17) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



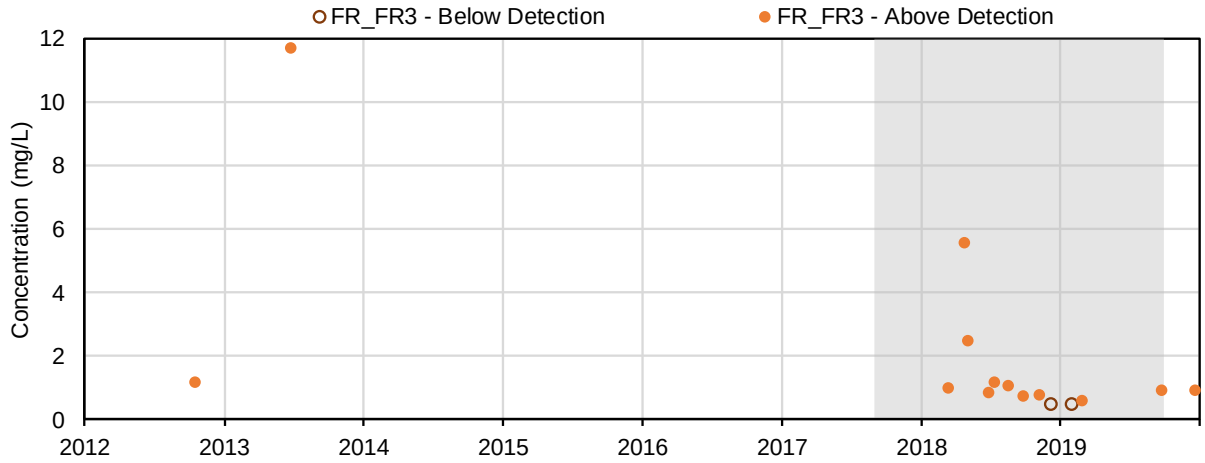
(18) Total dissolved solids (mg/L); Conventional Parameters



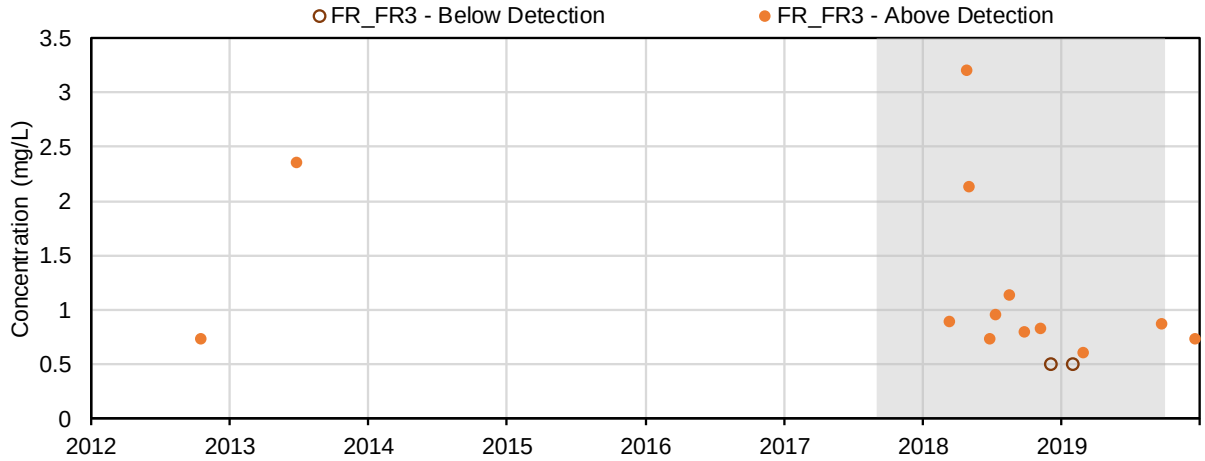
(19) Total suspended solids (mg/L); Conventional Parameters



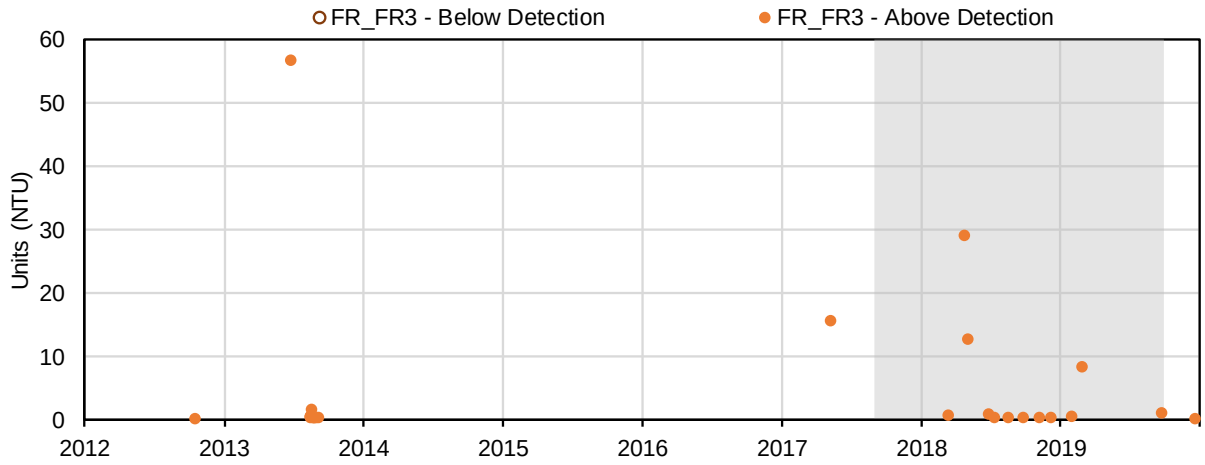
(20) Total organic carbon (mg/L); Conventional Parameters



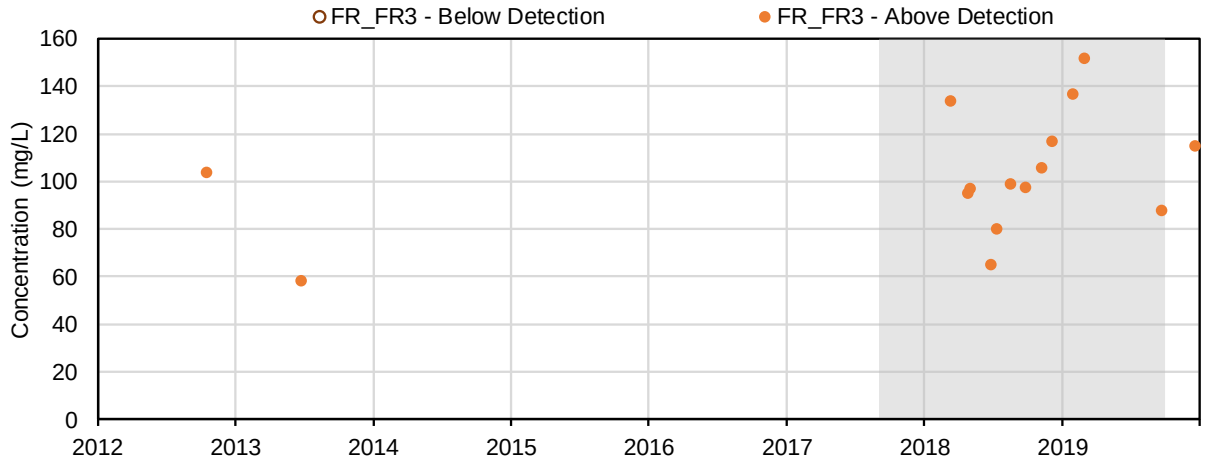
(21) Dissolved organic carbon (mg/L); Conventional Parameters



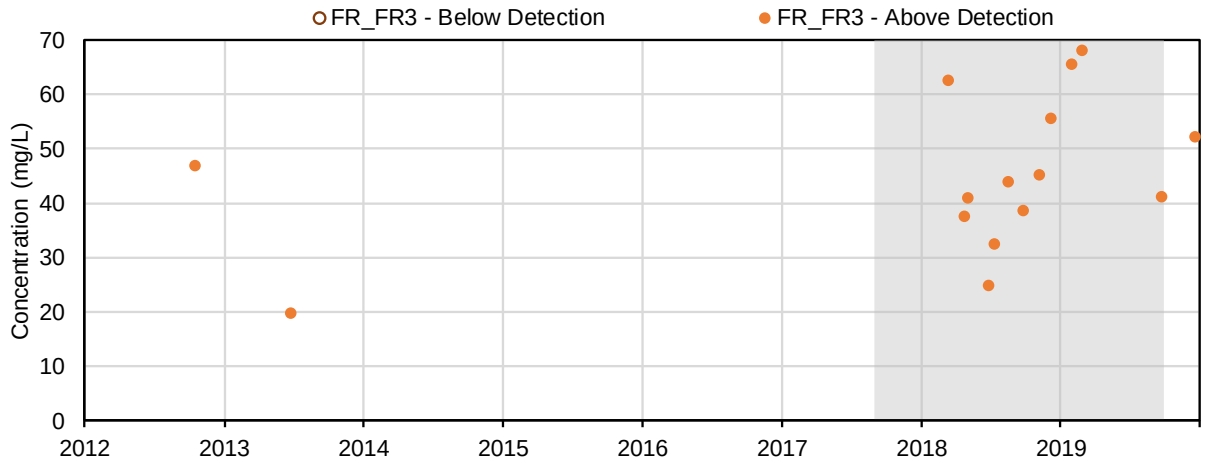
(22) Turbidity (NTU); Conventional Parameters



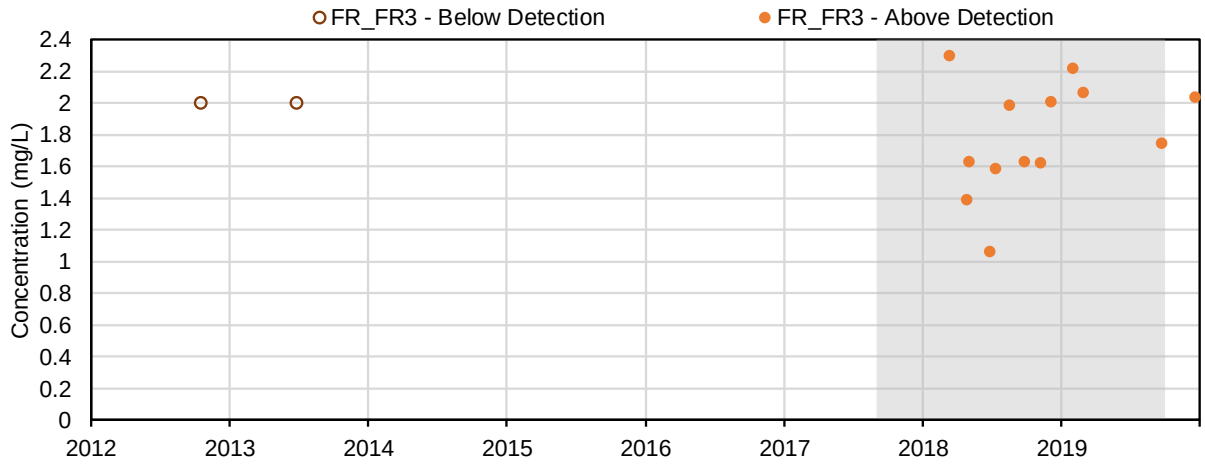
(23) Calcium (mg/L); Major Ions



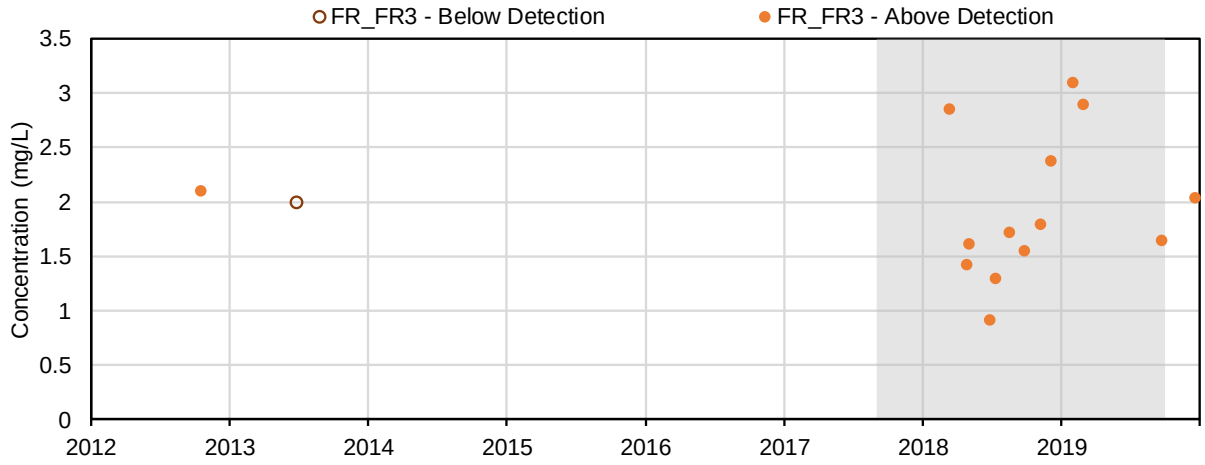
(24) Magnesium (mg/L); Major Ions



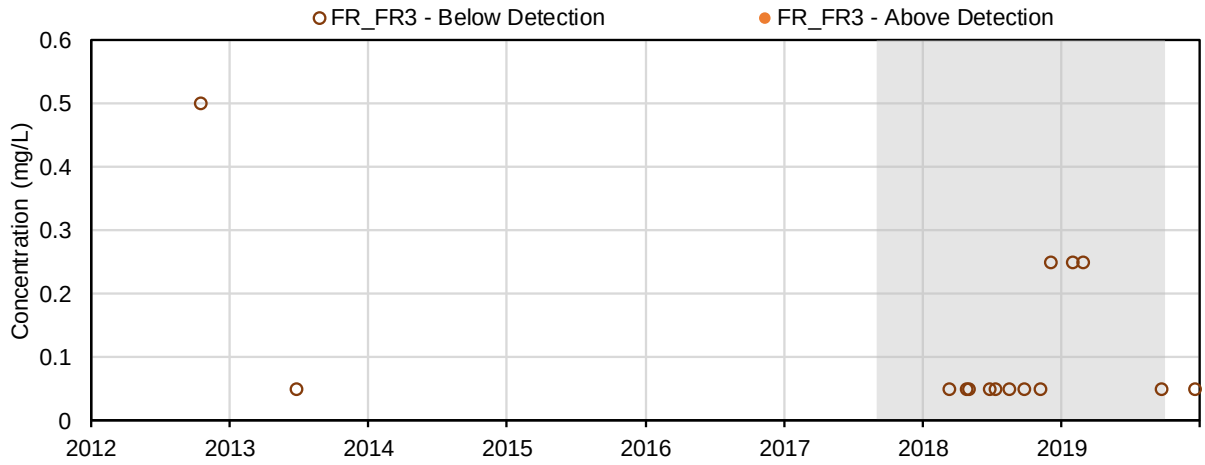
(25) Potassium (mg/L); Major Ions



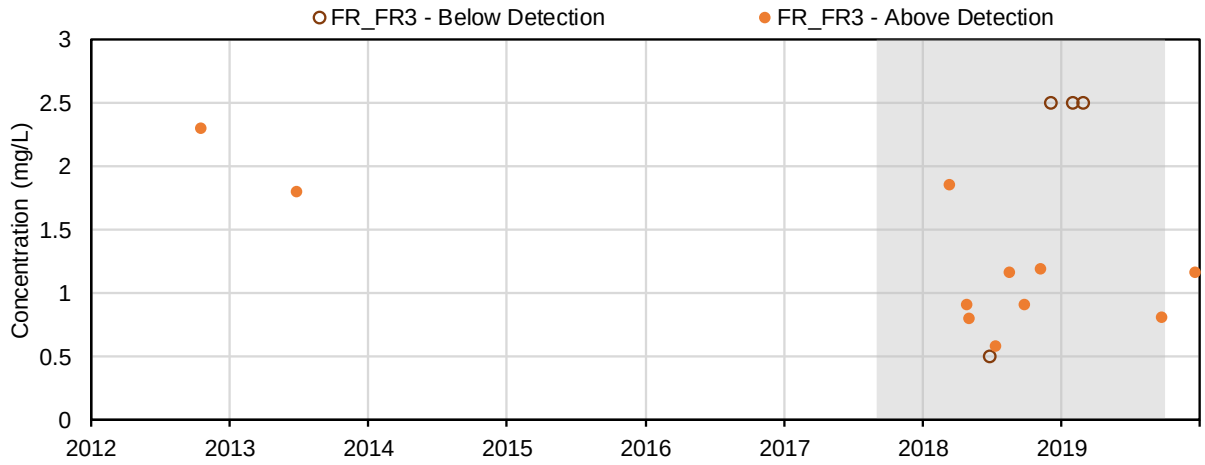
(26) Sodium (mg/L); Major Ions



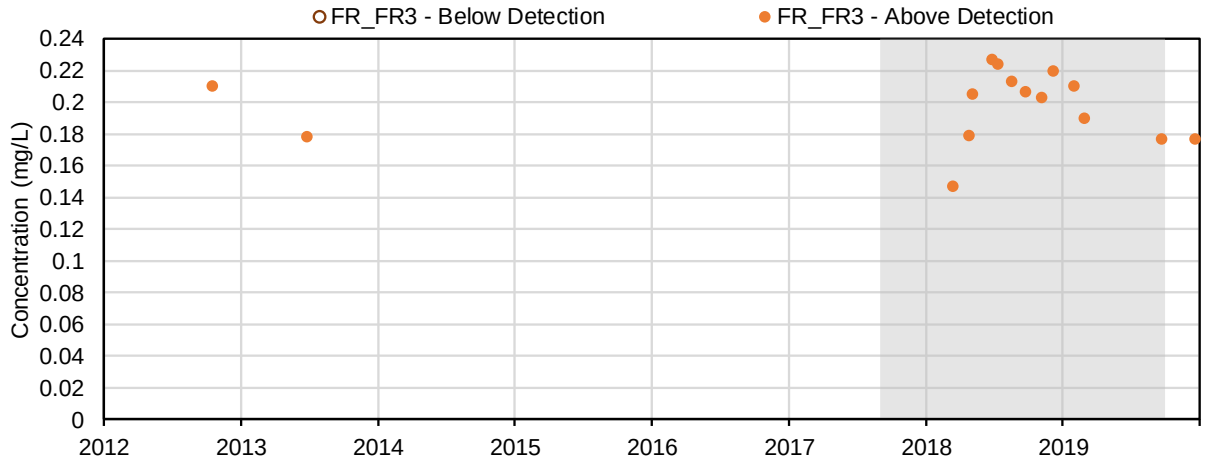
(27) Bromide (mg/L); Major Ions



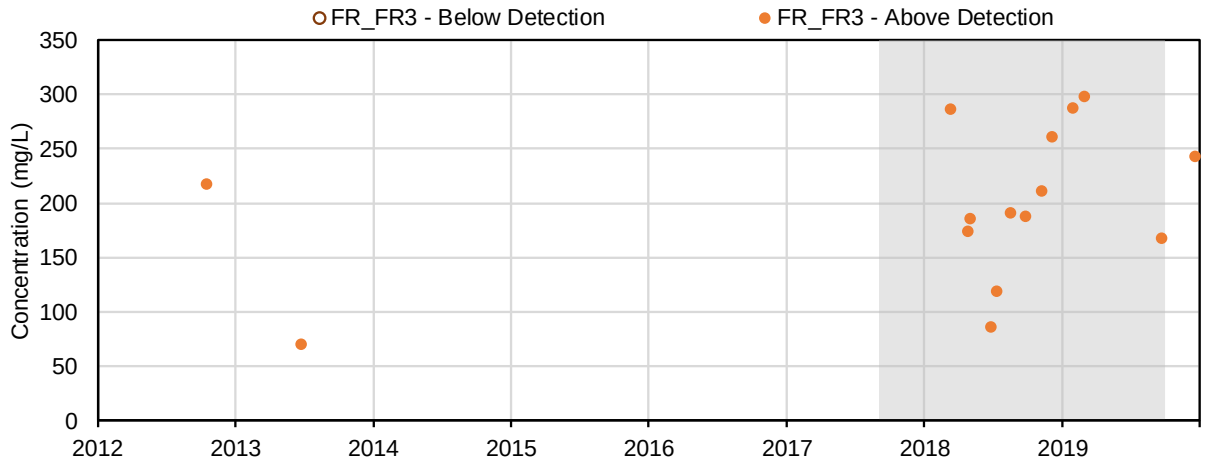
(28) Chloride (mg/L); Major Ions



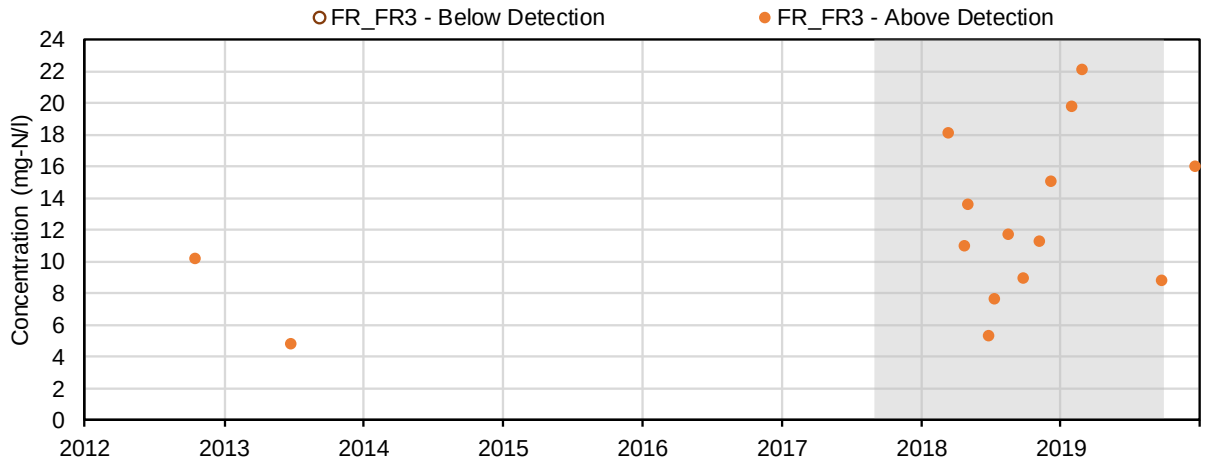
(29) Fluoride (mg/L); Major Ions



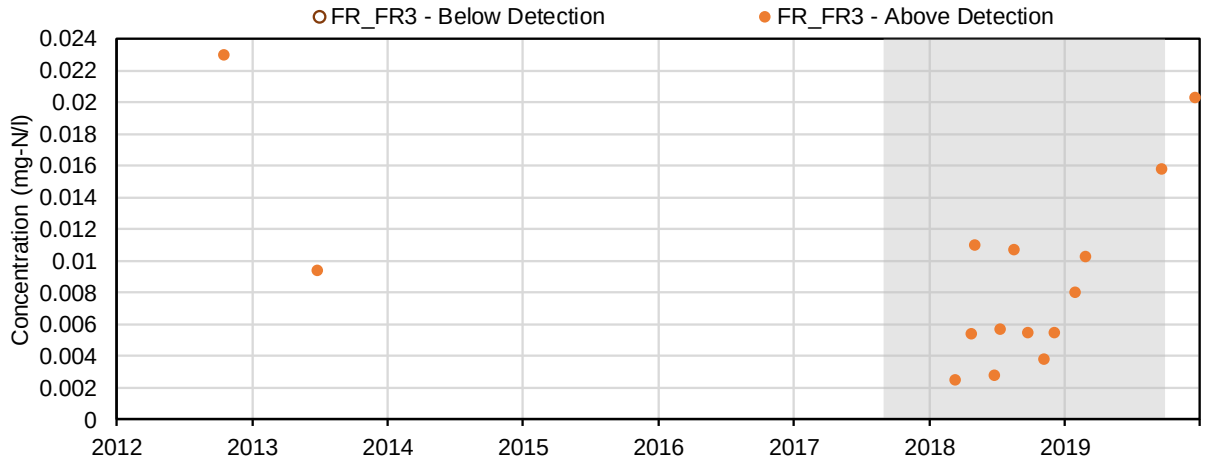
(30) Sulphate (mg/L); Major Ions



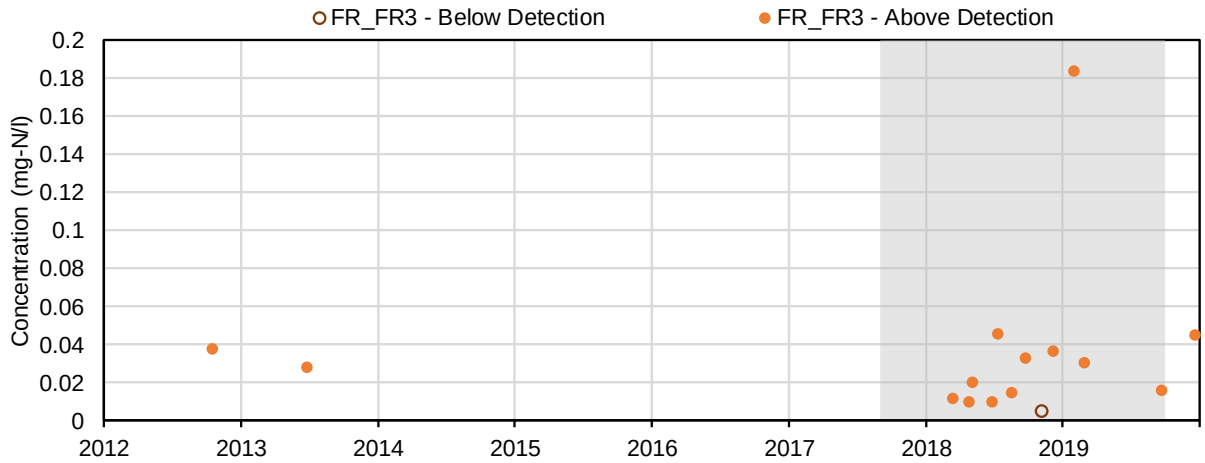
(31) Nitrate (mg-N/l); Nutrients and Biological Indicators



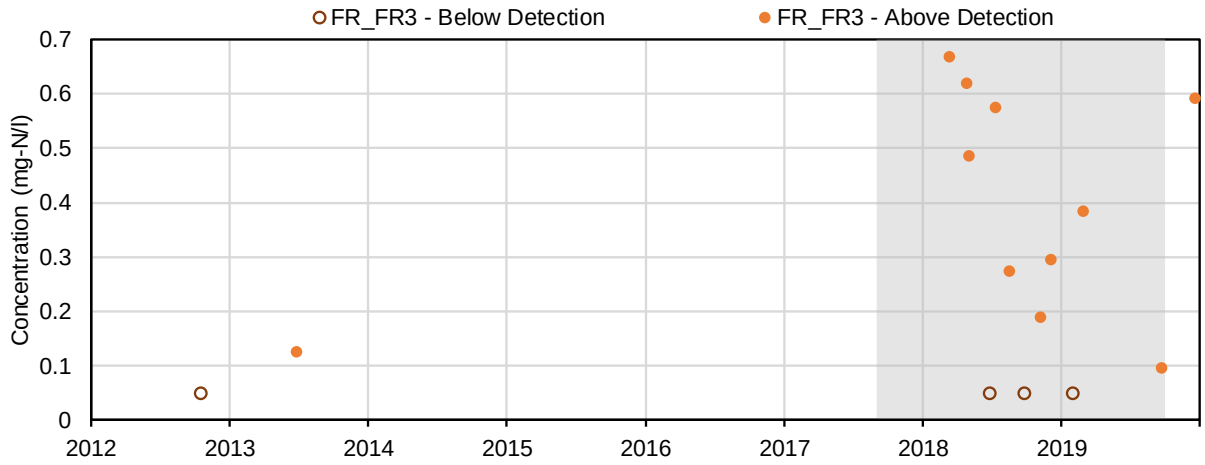
(32) Nitrite (mg-N/l); Nutrients and Biological Indicators



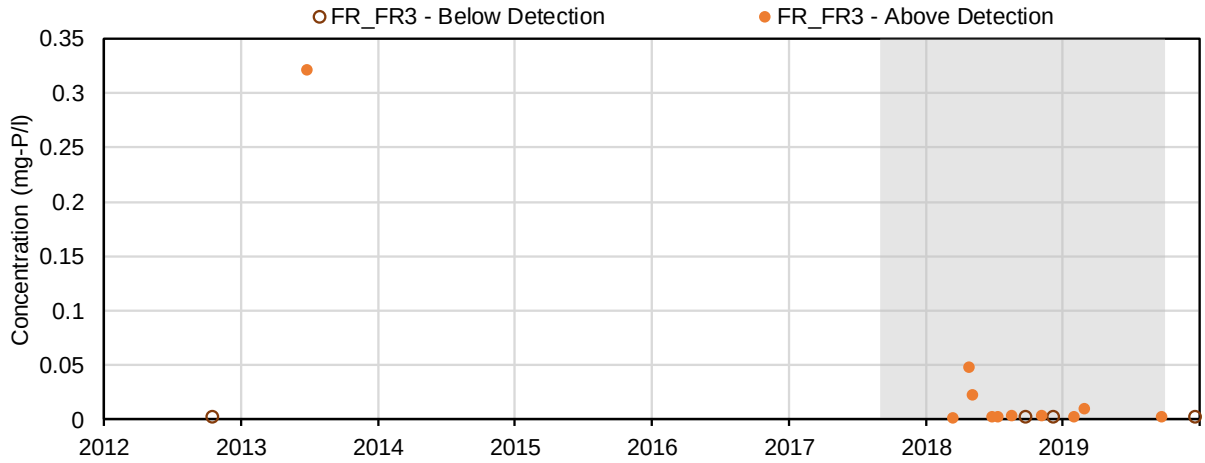
(33) Total ammonia (mg-N/l); Nutrients and Biological Indicators



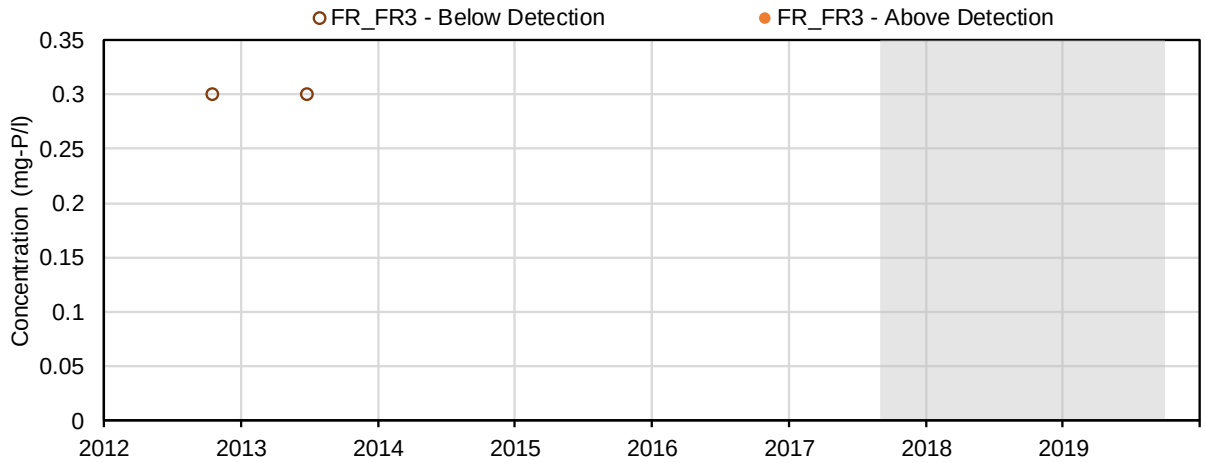
(34) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



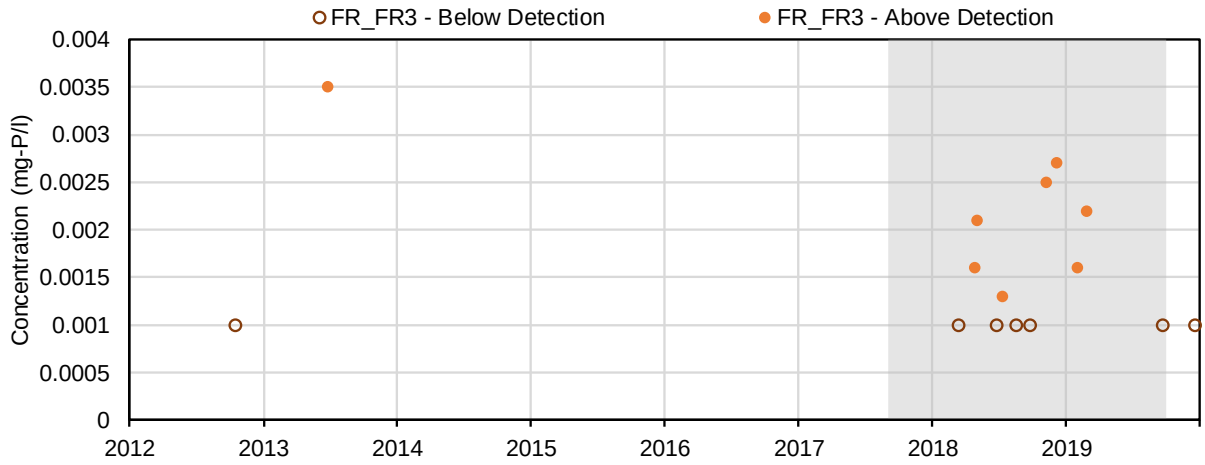
(35) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



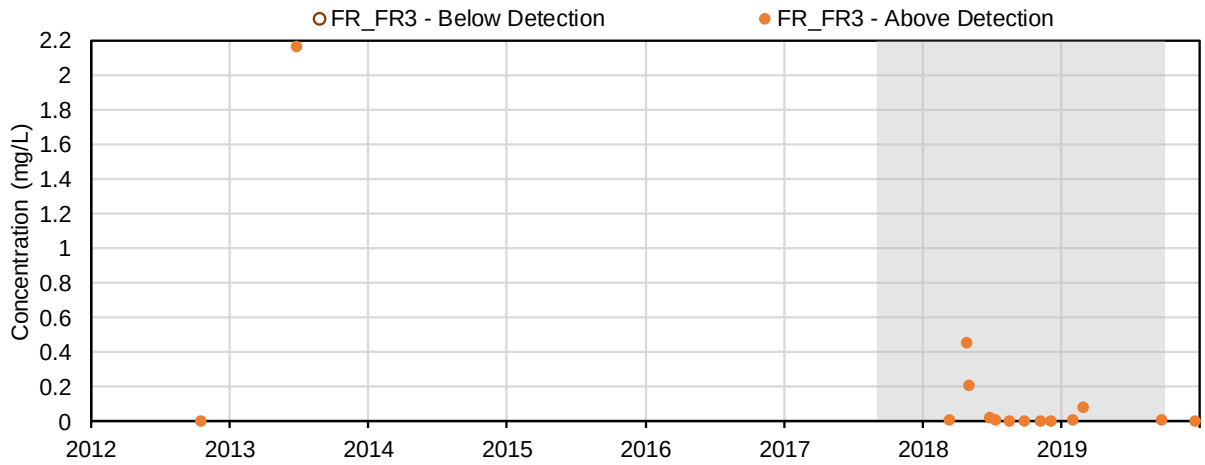
(36) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



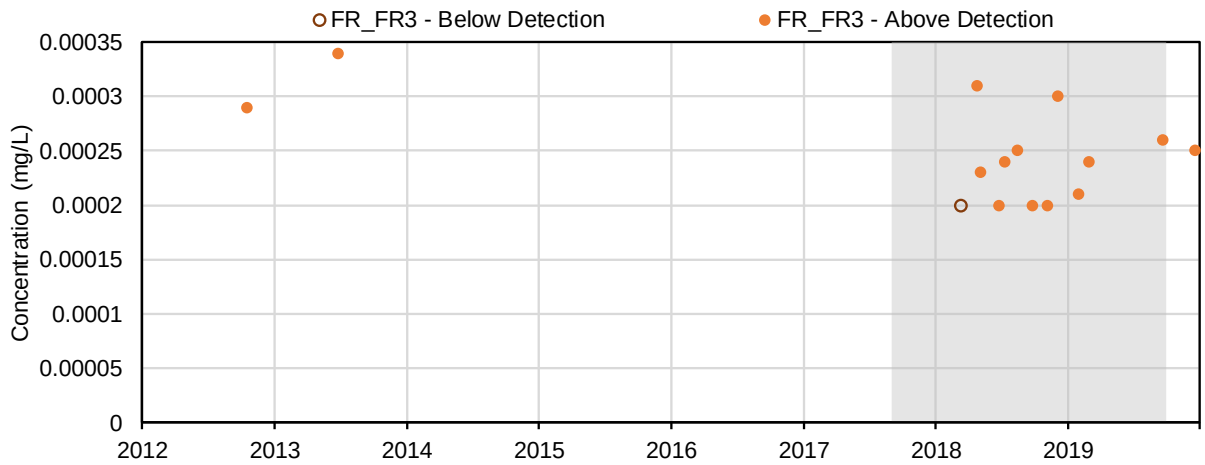
(37) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



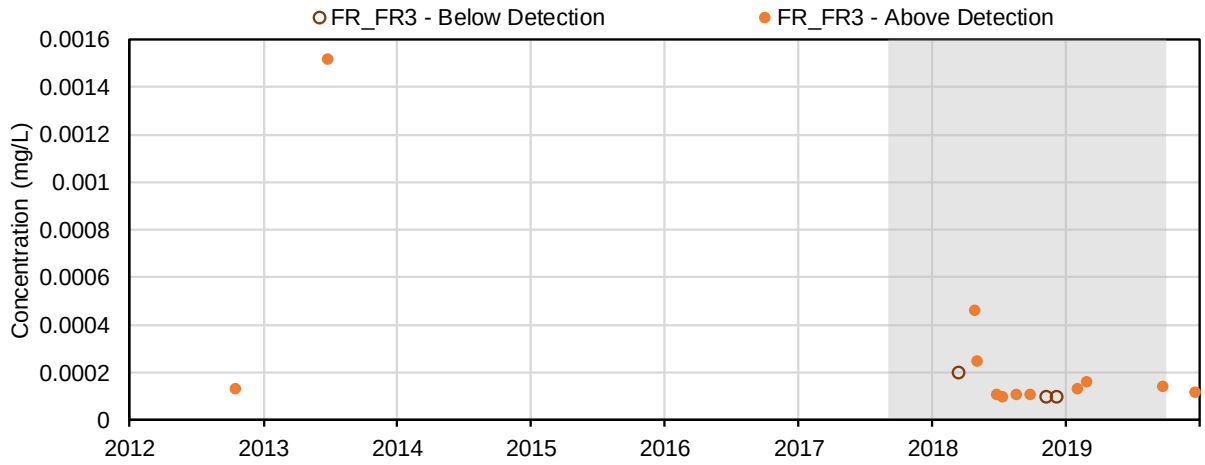
(38) Aluminum (mg/L); Total Metals



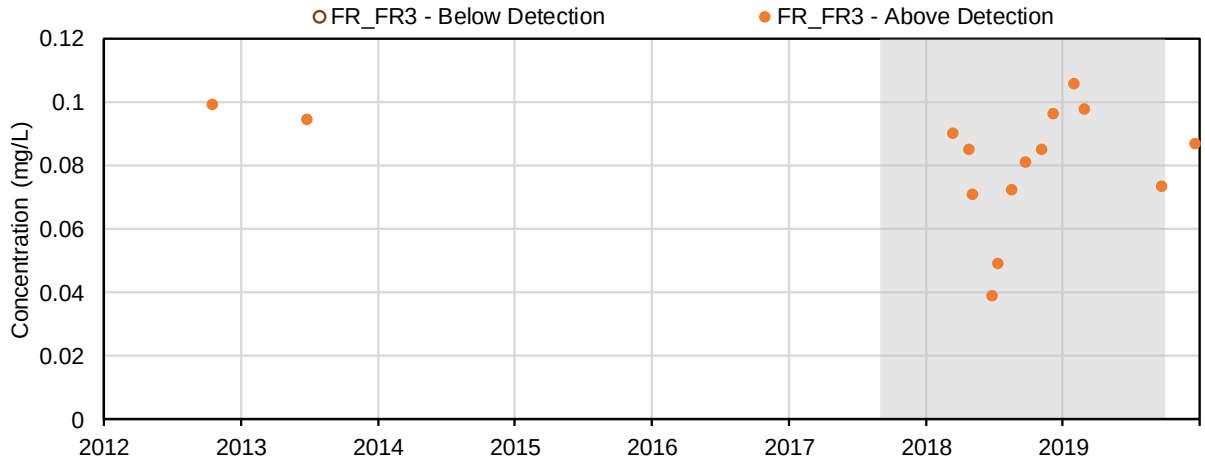
(39) Antimony (mg/L); Total Metals



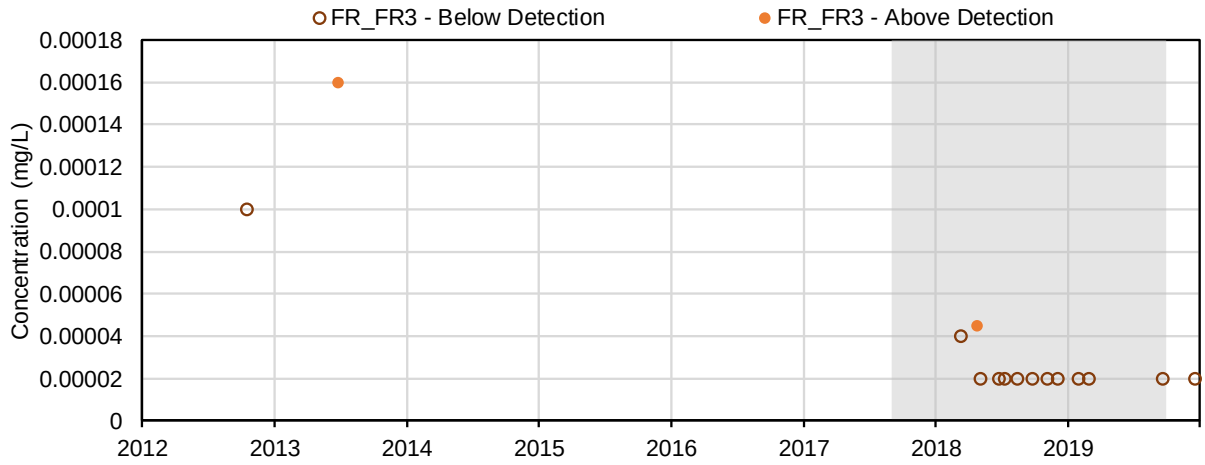
(40) Arsenic (mg/L); Total Metals



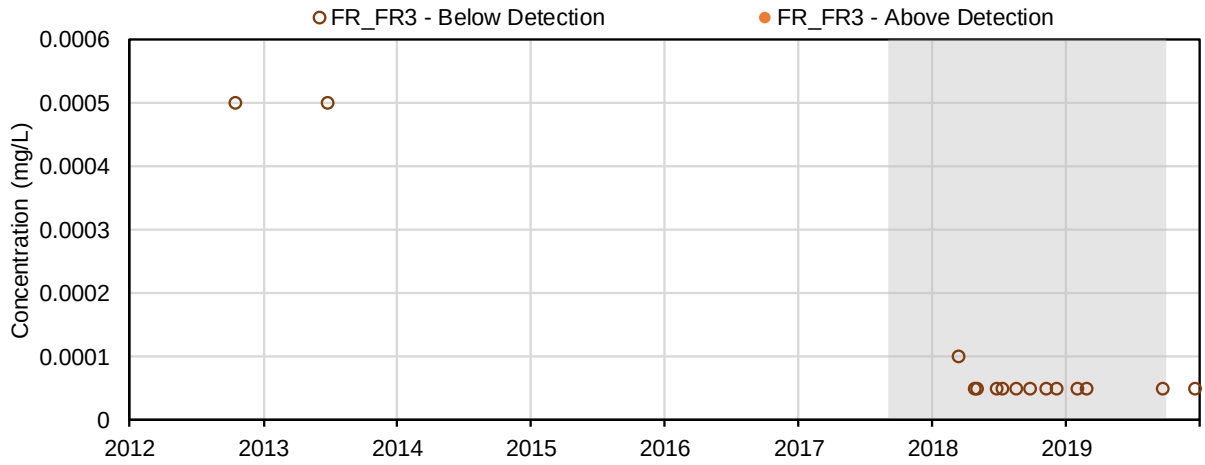
(41) Barium (mg/L); Total Metals



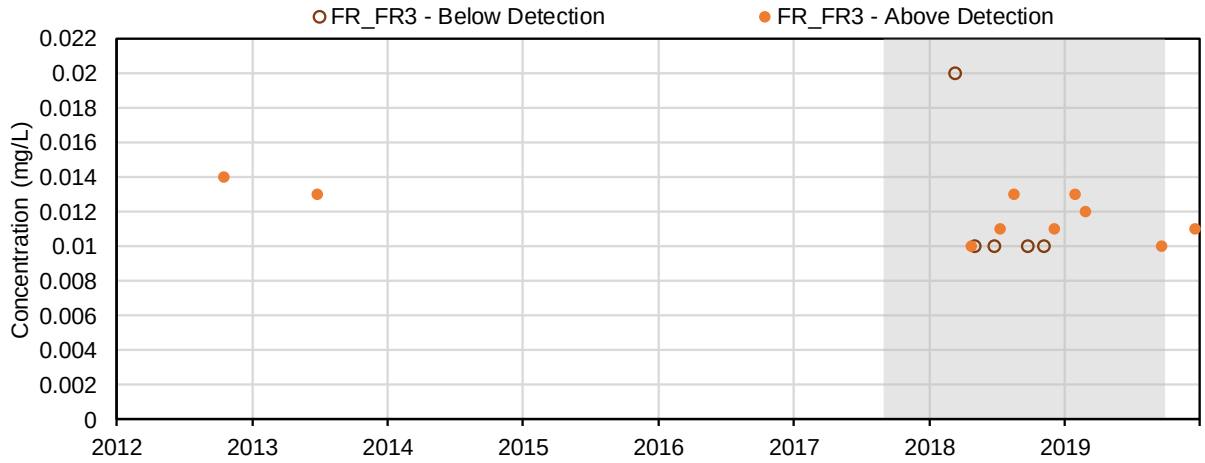
(42) Beryllium (mg/L); Total Metals



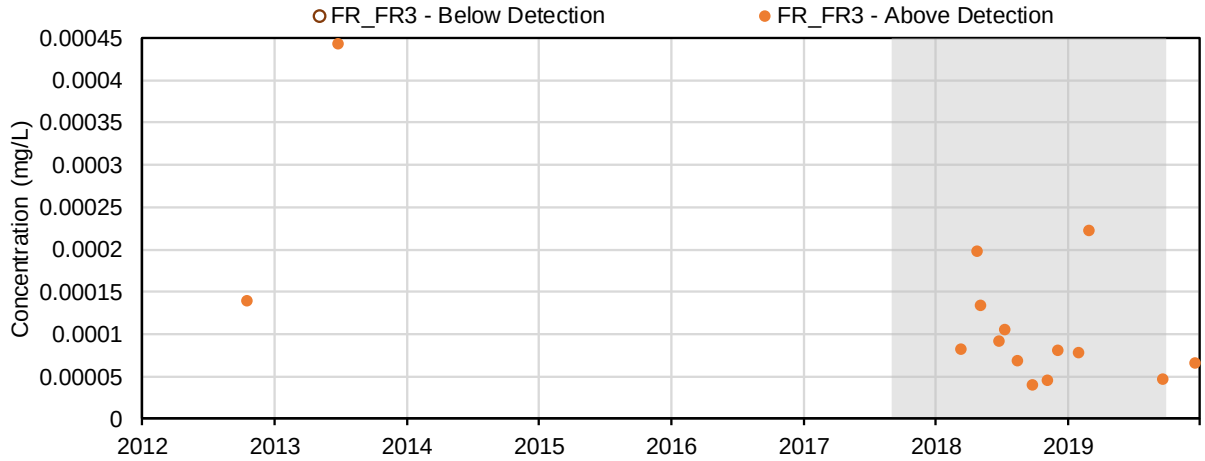
(43) Bismuth (mg/L); Total Metals



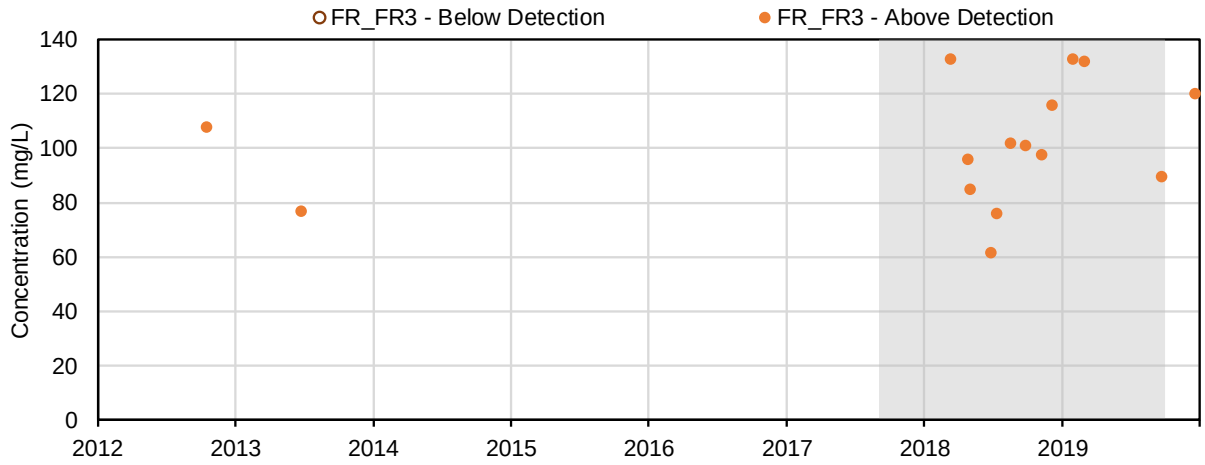
(44) Boron (mg/L); Total Metals



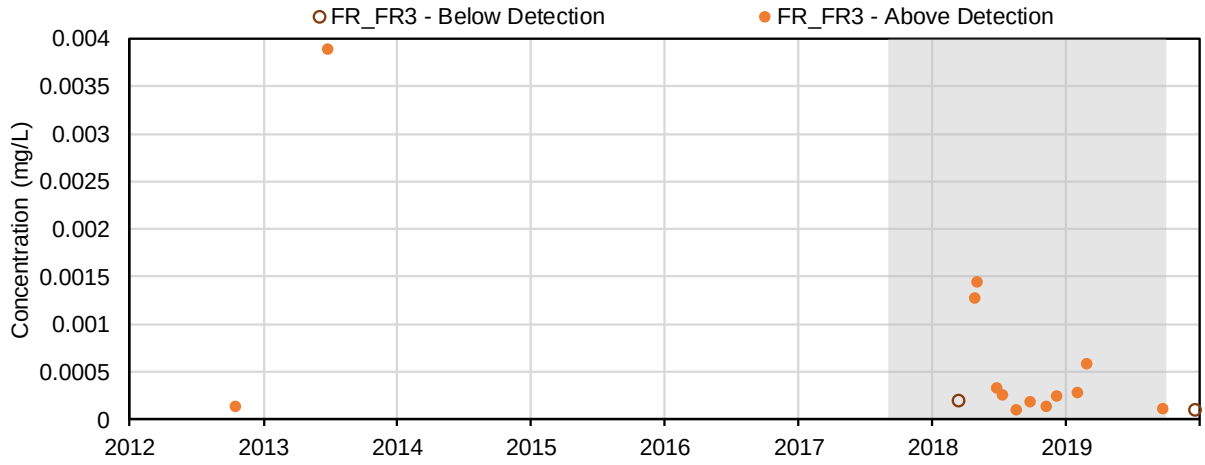
(45) Cadmium (mg/L); Total Metals



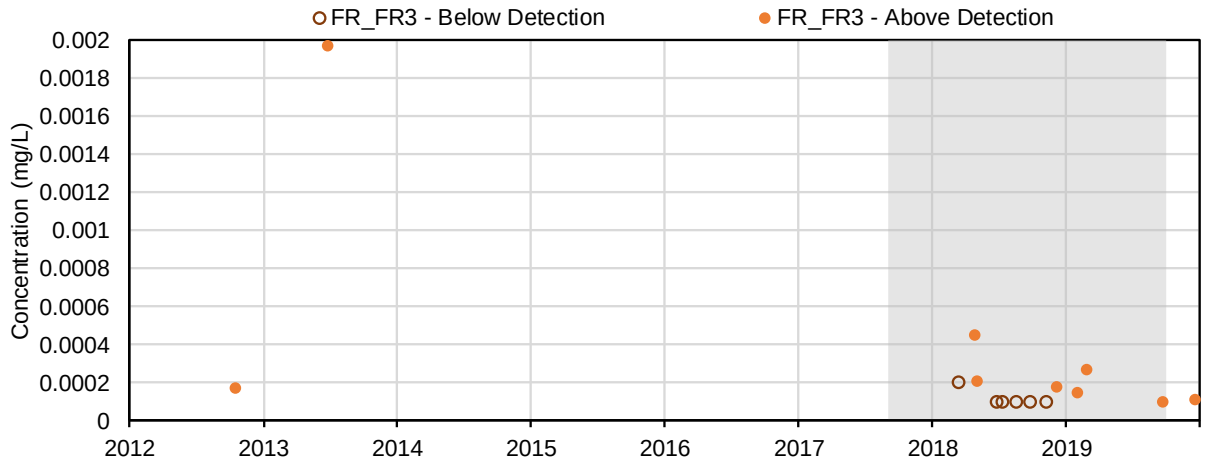
(46) Calcium (mg/L); Total Metals



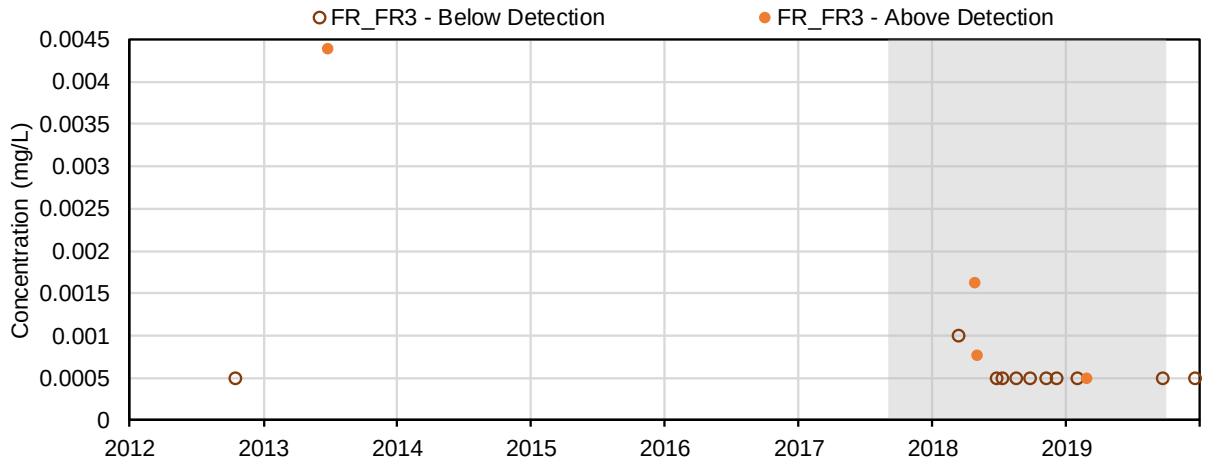
(47) Chromium (mg/L); Total Metals



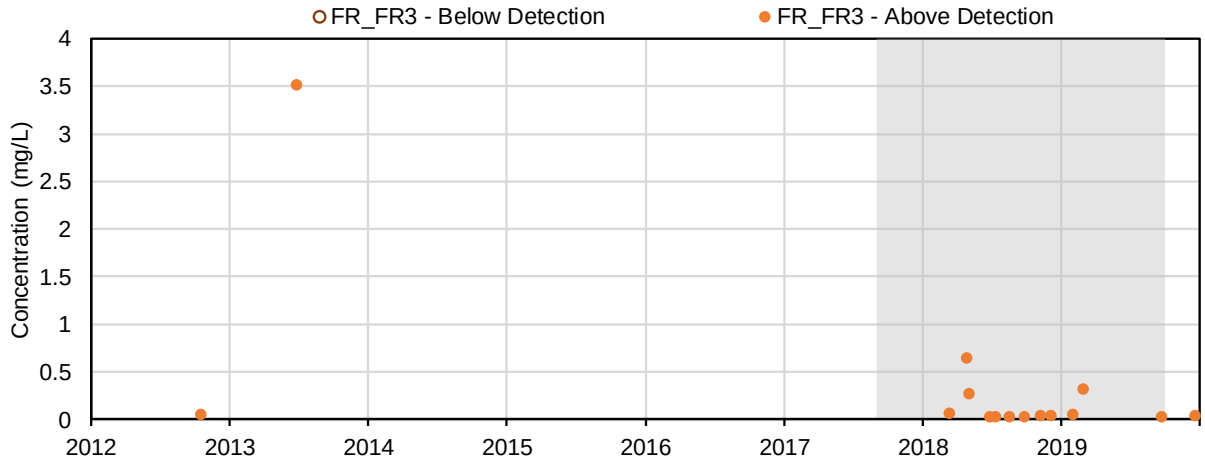
(48) Cobalt (mg/L); Total Metals



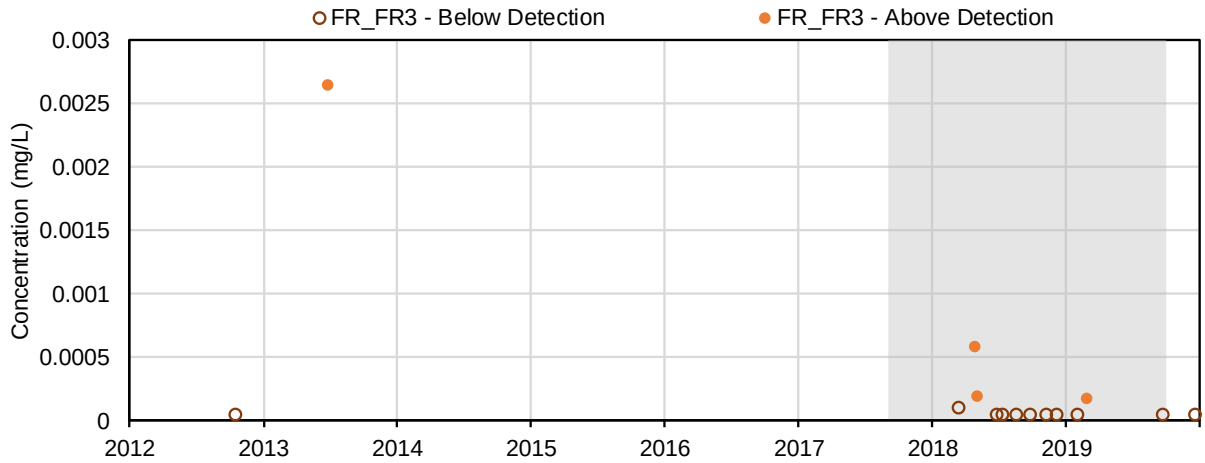
(49) Copper (mg/L); Total Metals



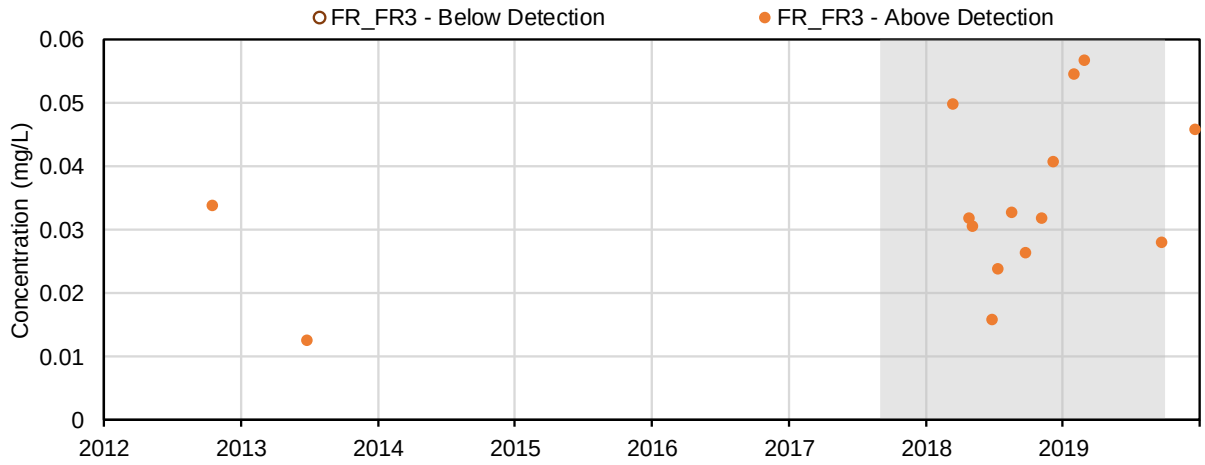
(50) Iron (mg/L); Total Metals



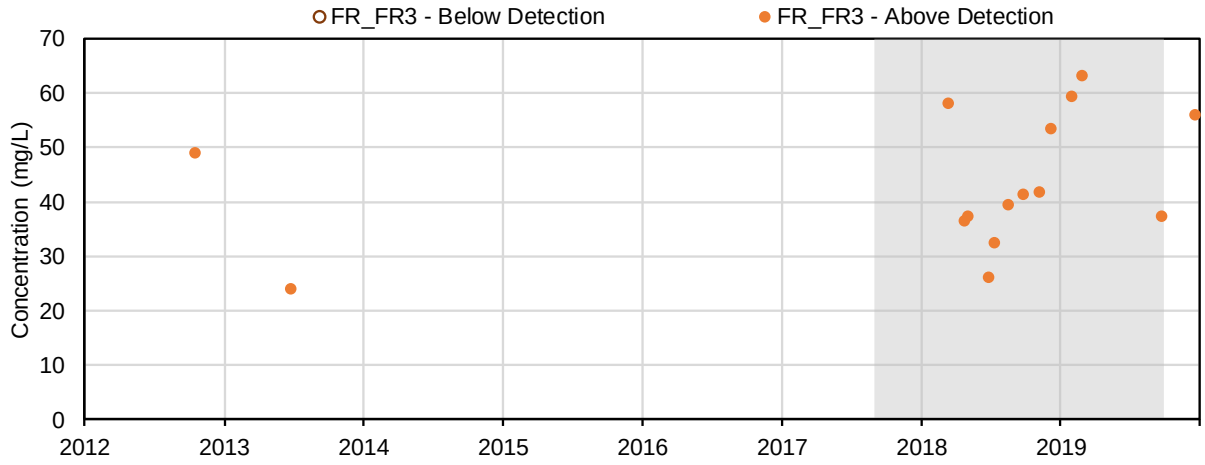
(51) Lead (mg/L); Total Metals



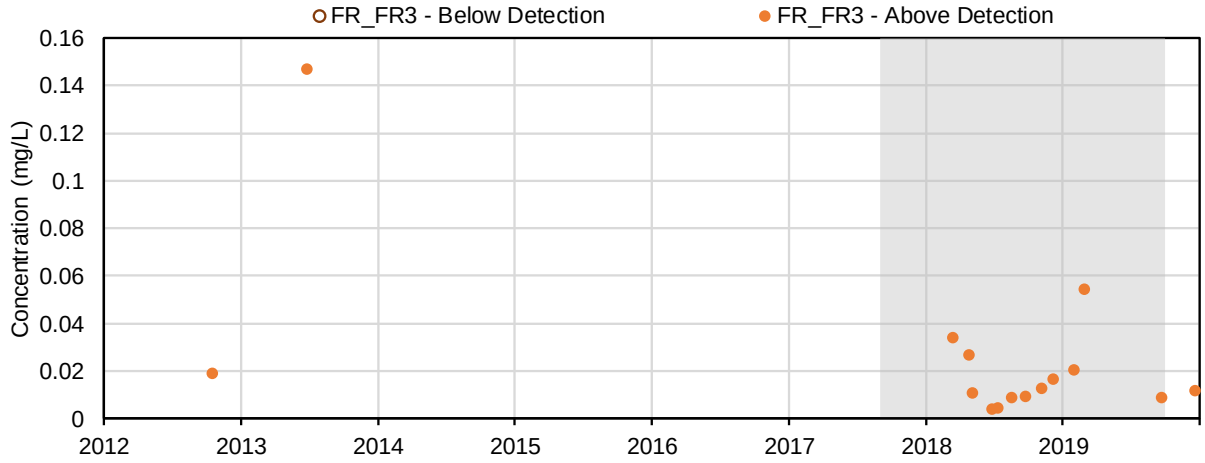
(52) Lithium (mg/L); Total Metals



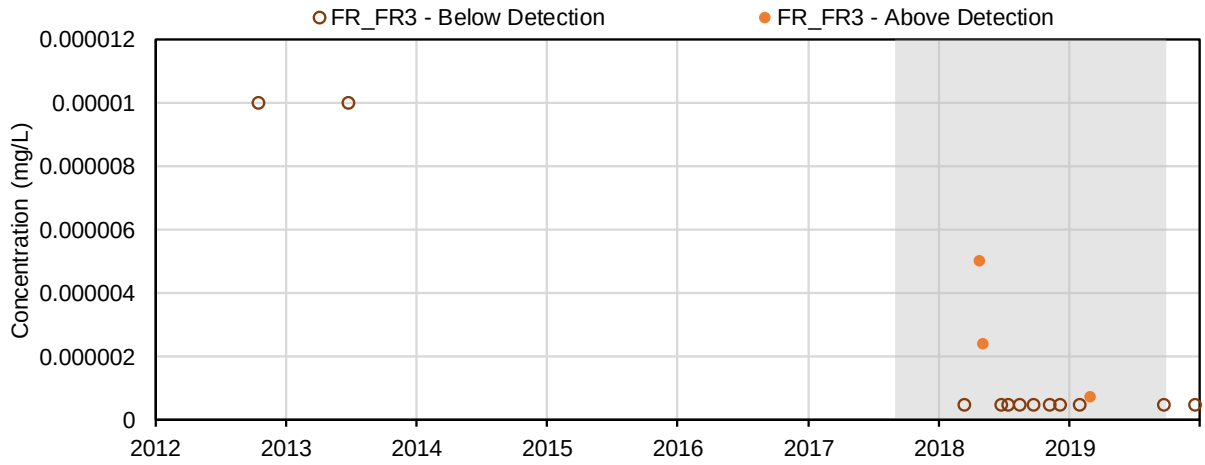
(53) Magnesium (mg/L); Total Metals



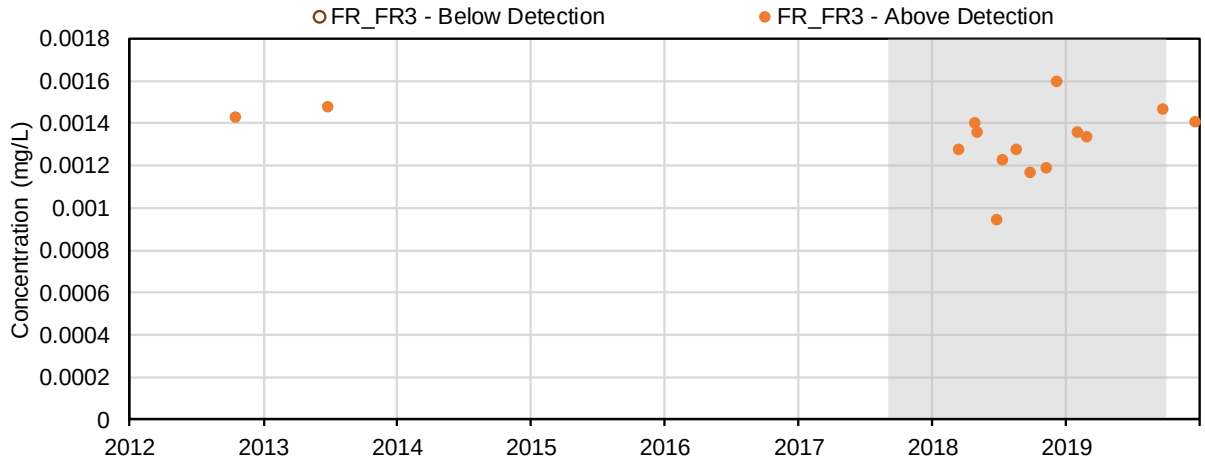
(54) Manganese (mg/L); Total Metals



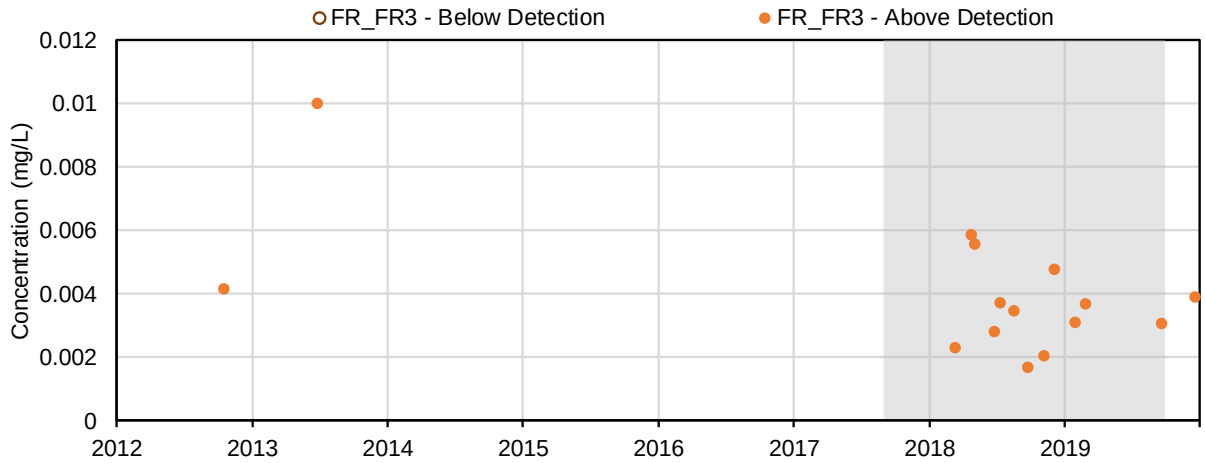
(55) Mercury (mg/L); Total Metals



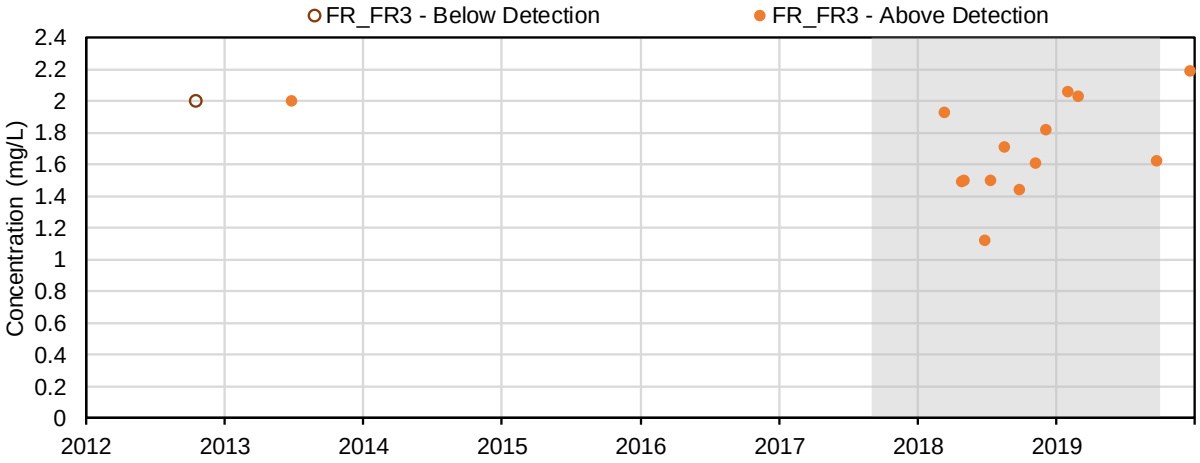
(56) Molybdenum (mg/L); Total Metals



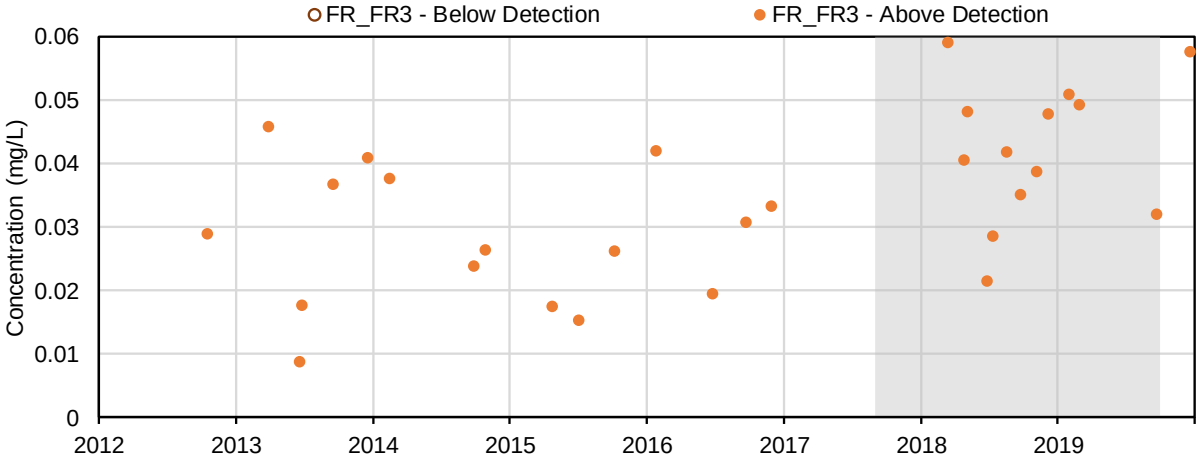
(57) Nickel (mg/L); Total Metals



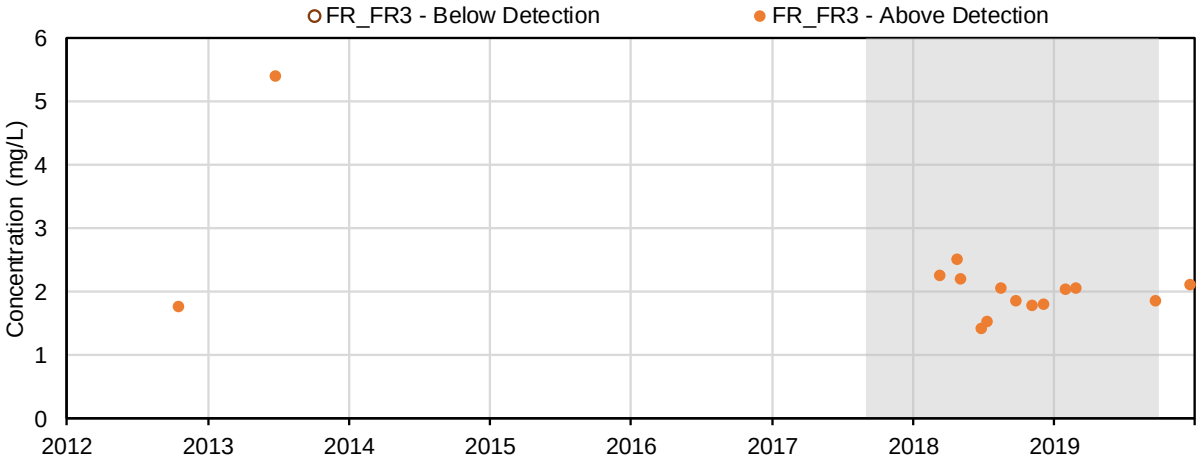
(58) Potassium (mg/L); Total Metals



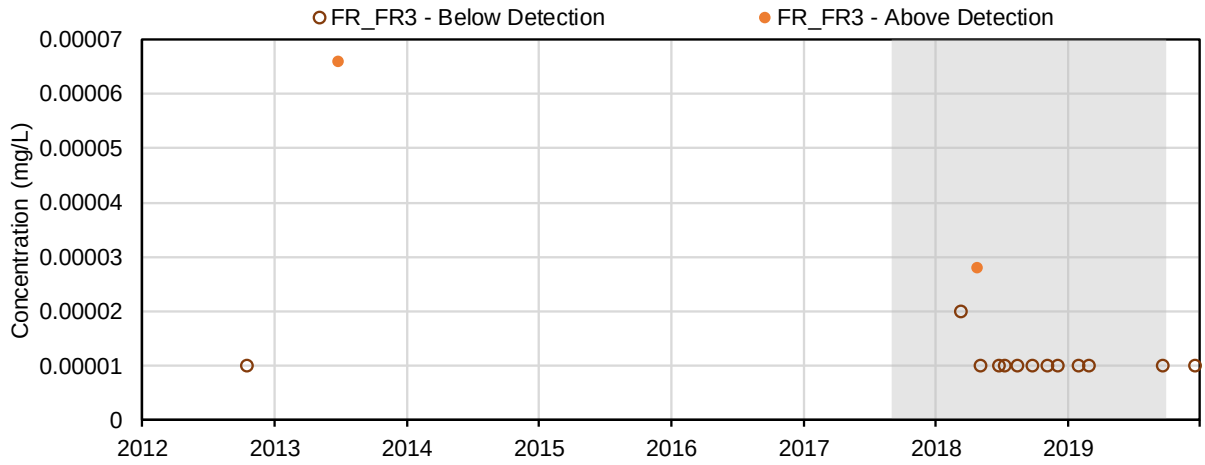
(59) Selenium (mg/L); Total Metals



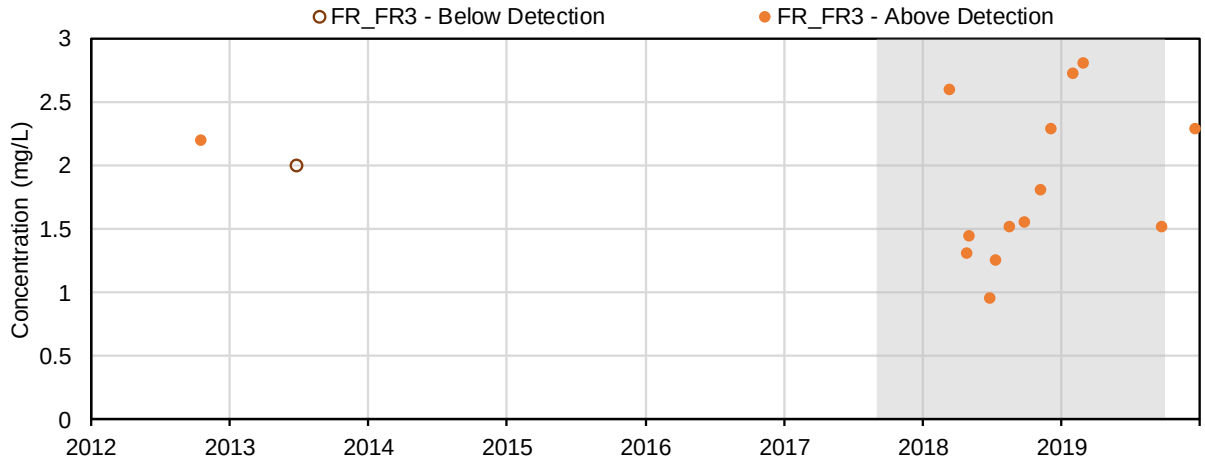
(60) Silicon (mg/L); Total Metals



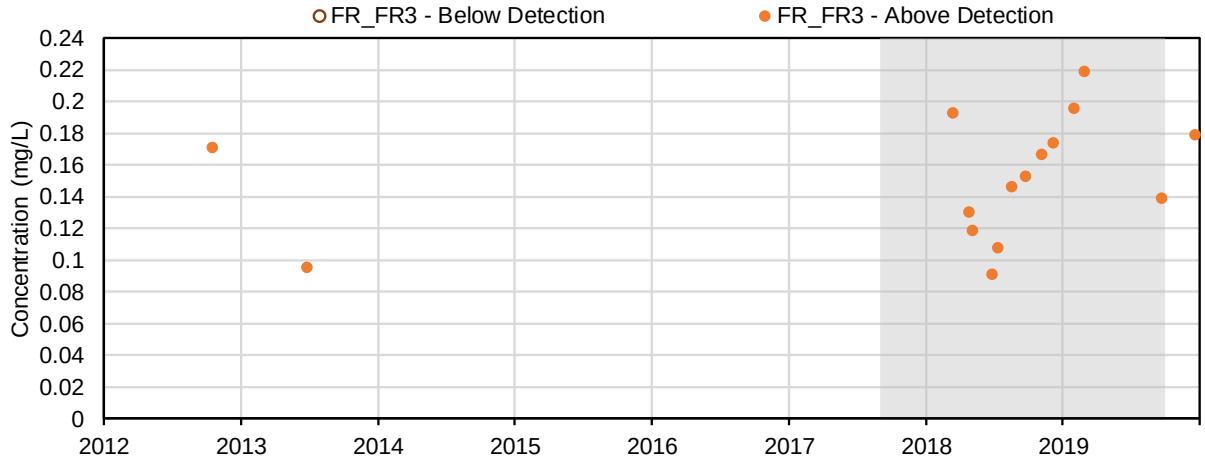
(61) Silver (mg/L); Total Metals



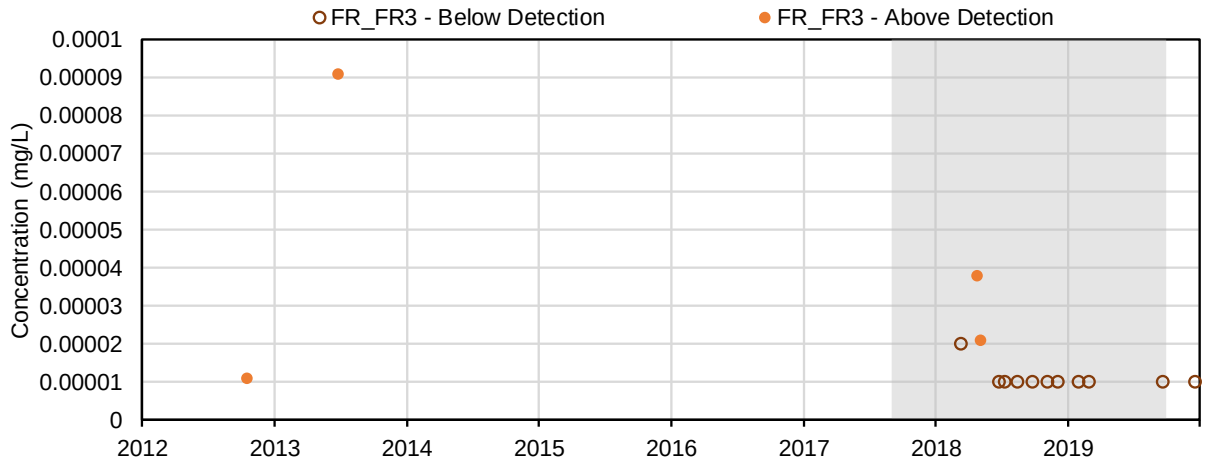
(62) Sodium (mg/L); Total Metals



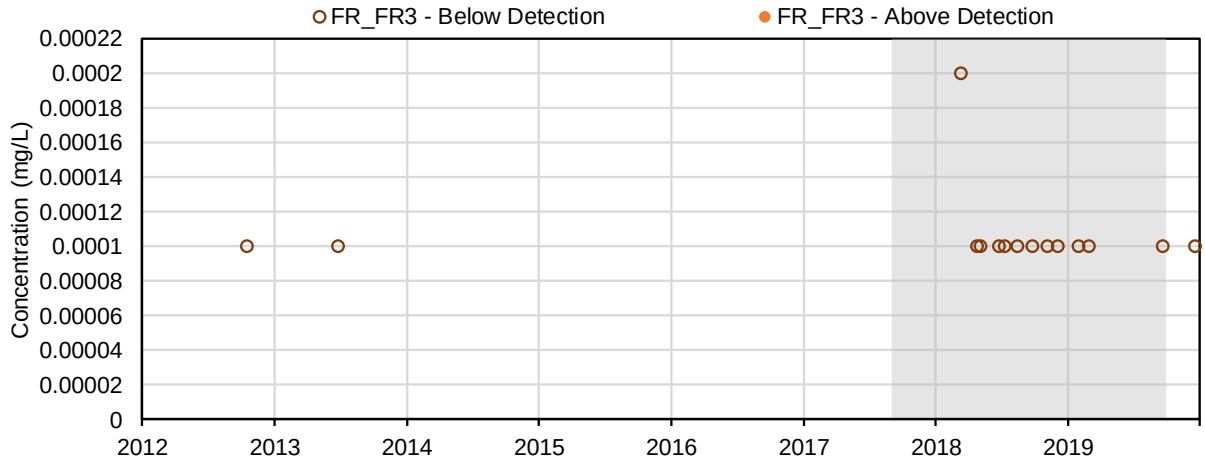
(63) Strontium (mg/L); Total Metals



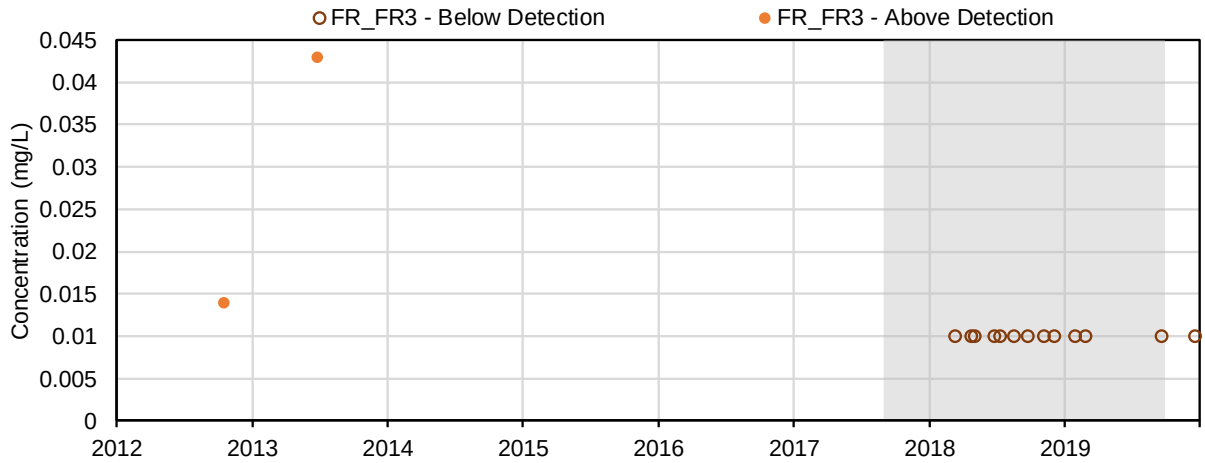
(64) Thallium (mg/L); Total Metals



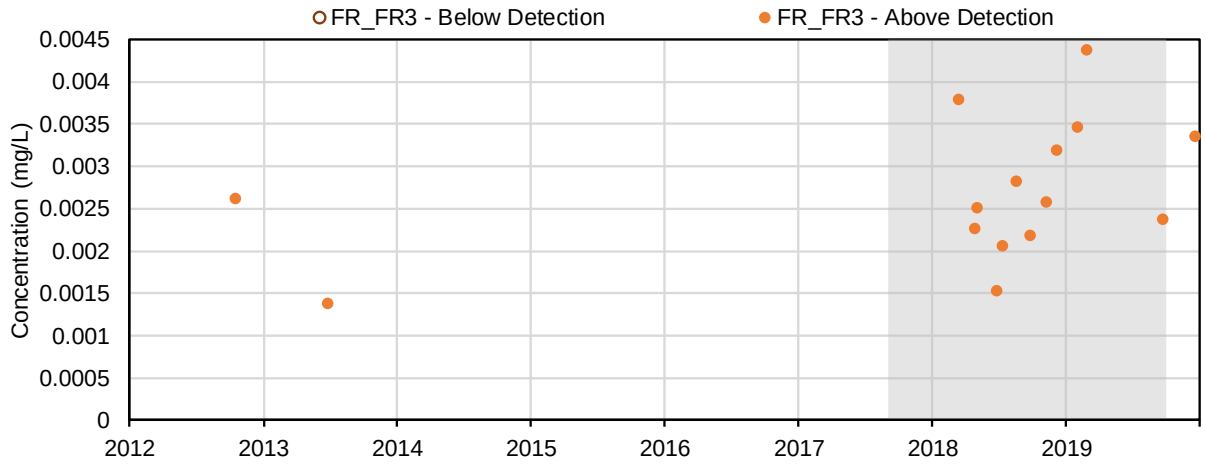
(65) Tin (mg/L); Total Metals



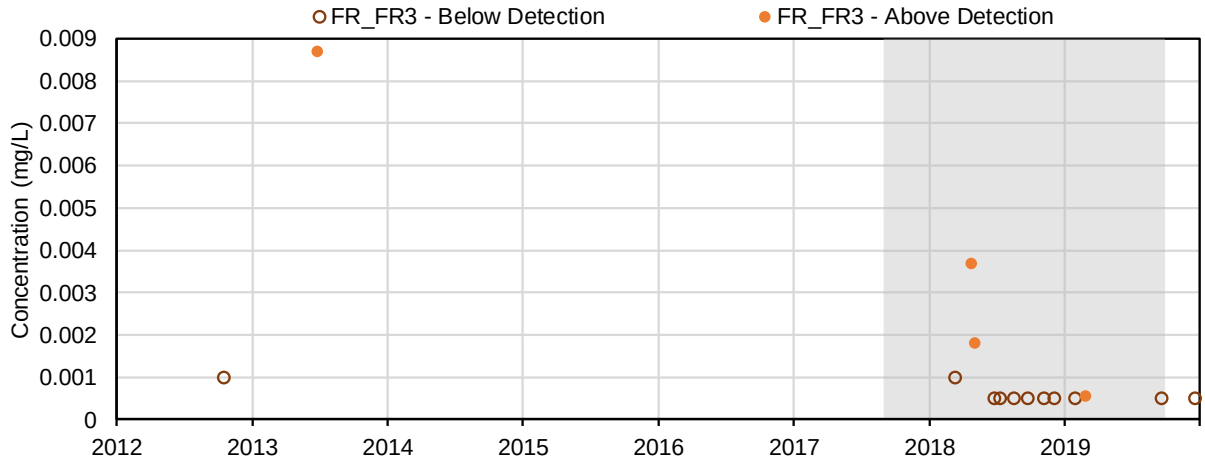
(66) Titanium (mg/L); Total Metals



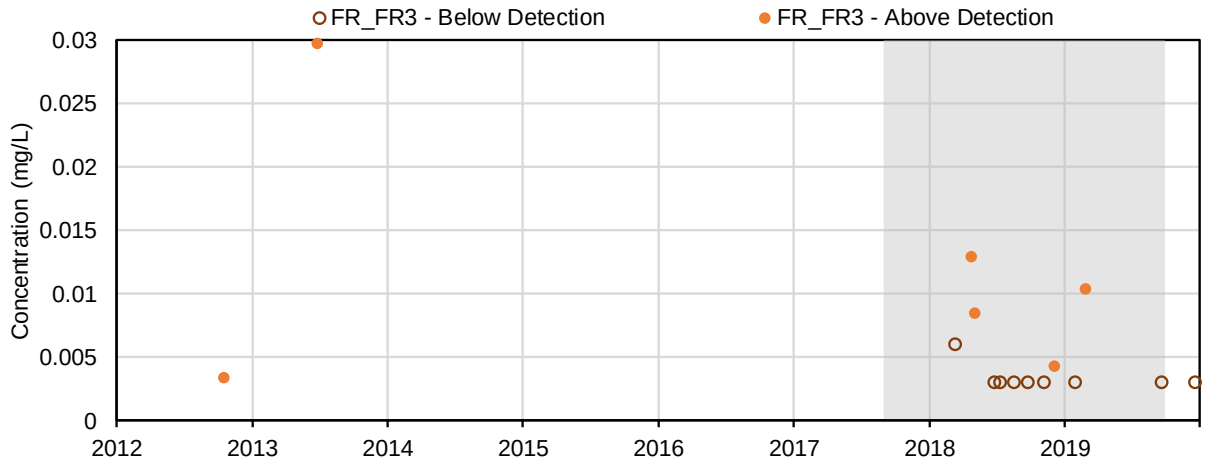
(67) Uranium (mg/L); Total Metals



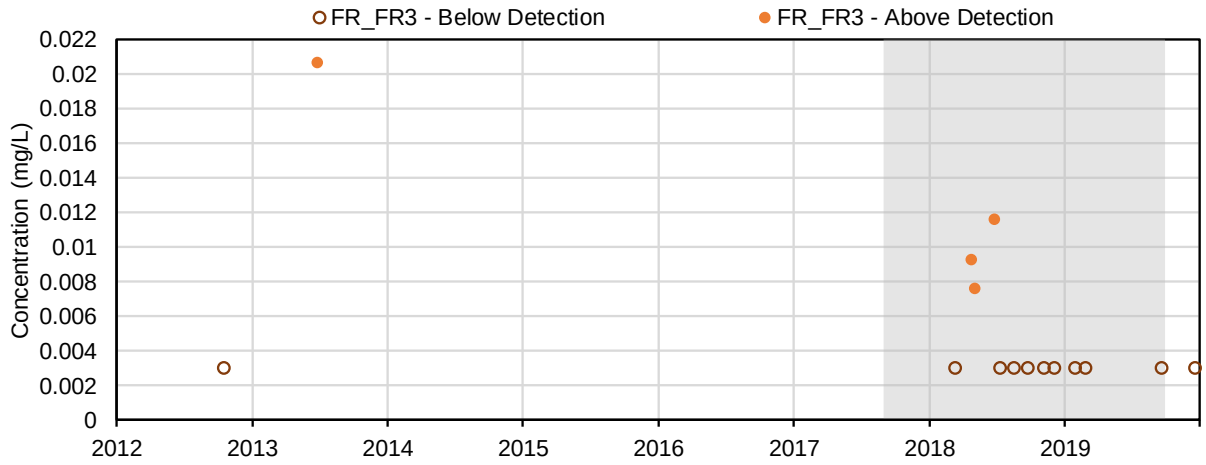
(68) Vanadium (mg/L); Total Metals



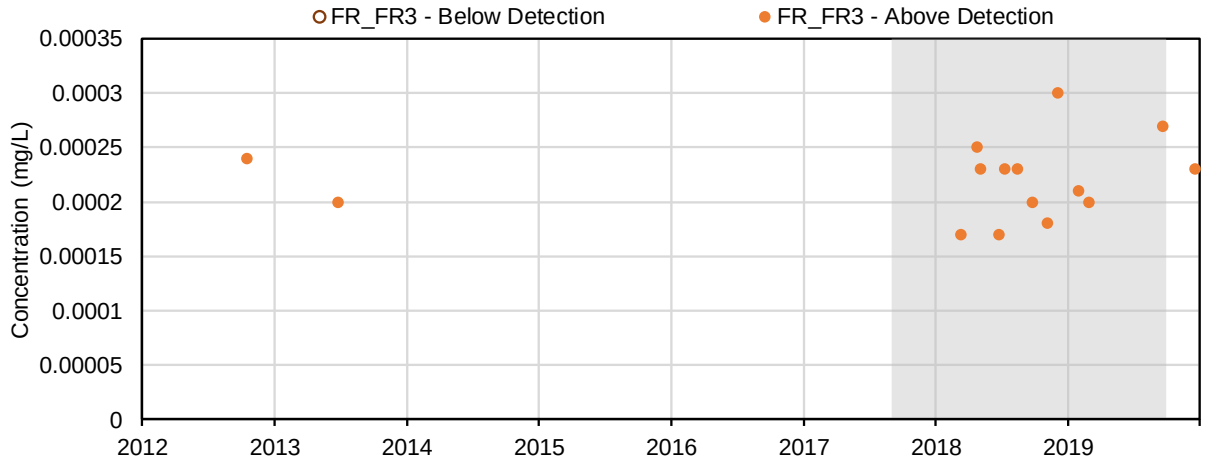
(69) Zinc (mg/L); Total Metals



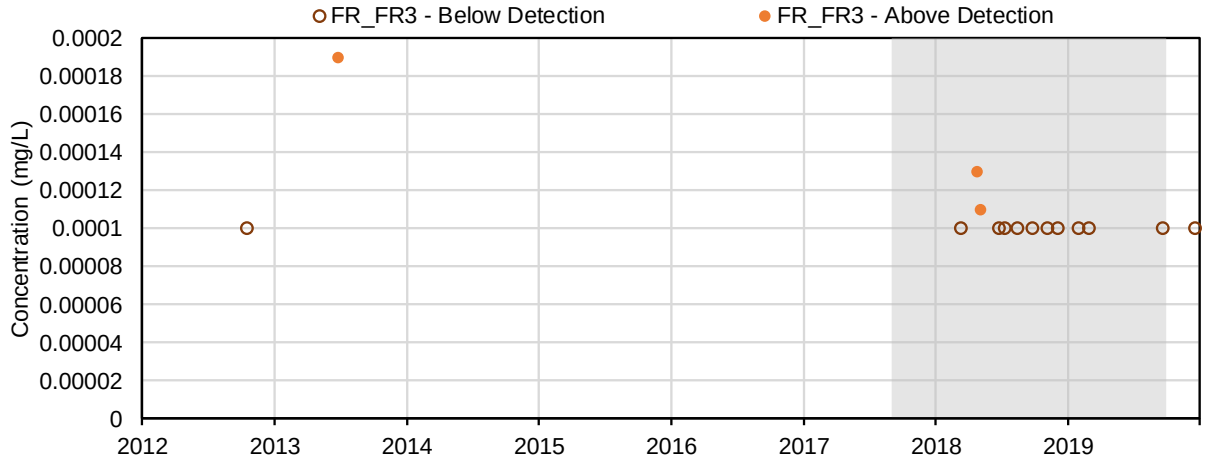
(70) Aluminum (mg/L); Dissolved Metals



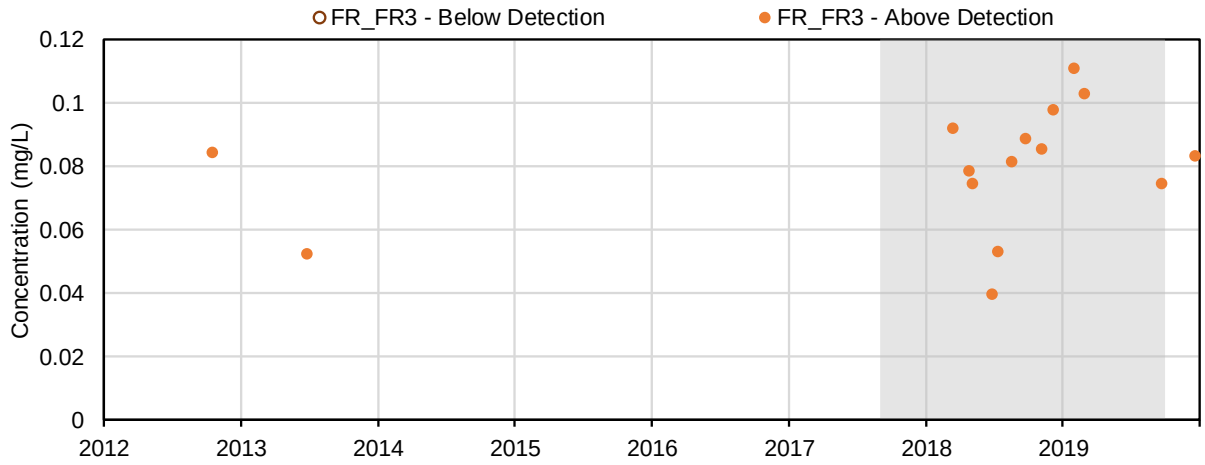
(71) Antimony (mg/L); Dissolved Metals



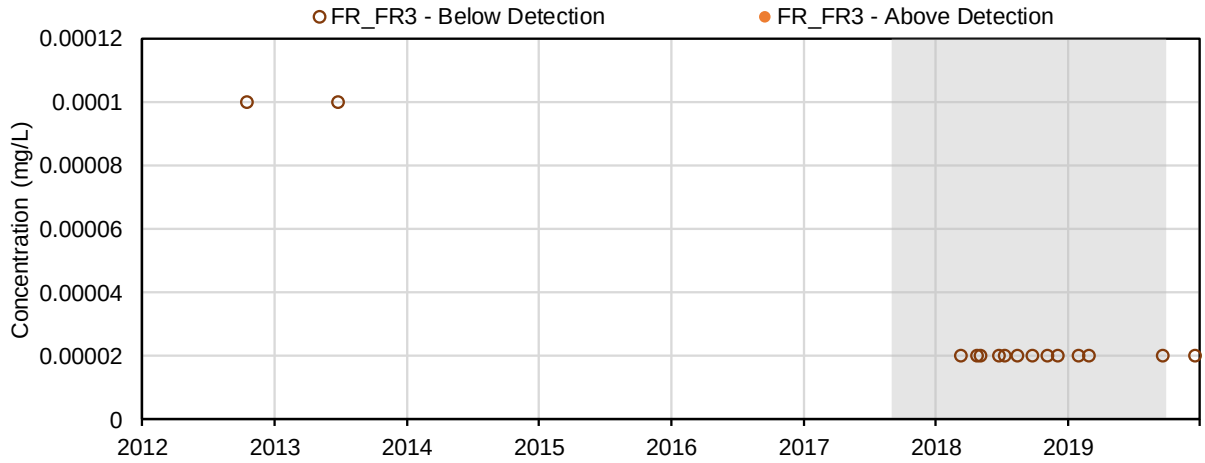
(72) Arsenic (mg/L); Dissolved Metals



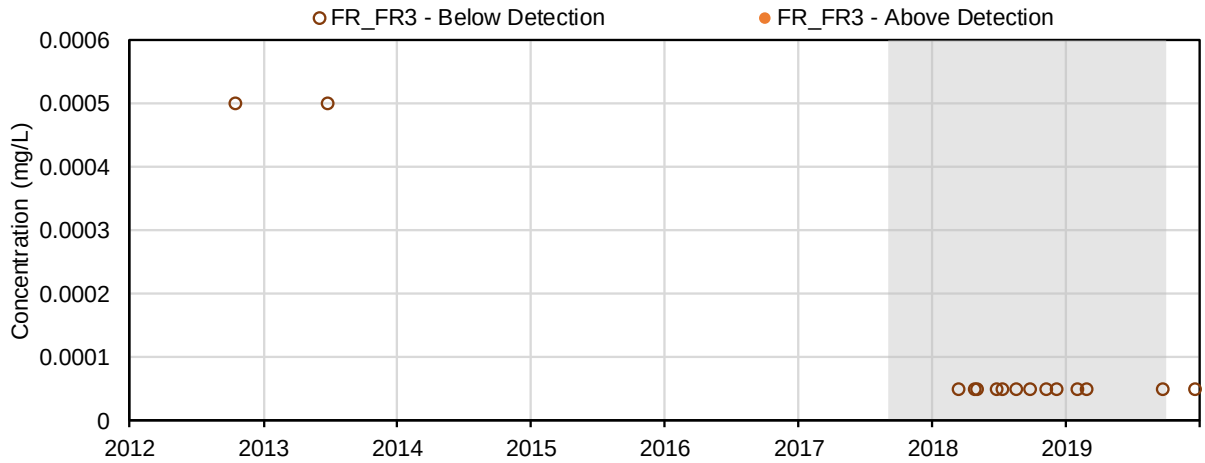
(73) Barium (mg/L); Dissolved Metals



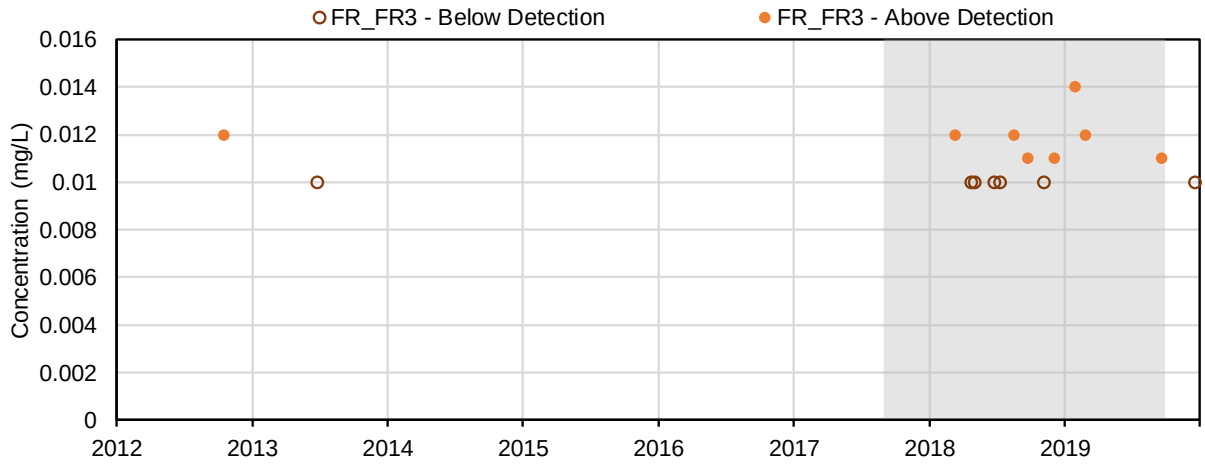
(74) Beryllium (mg/L); Dissolved Metals



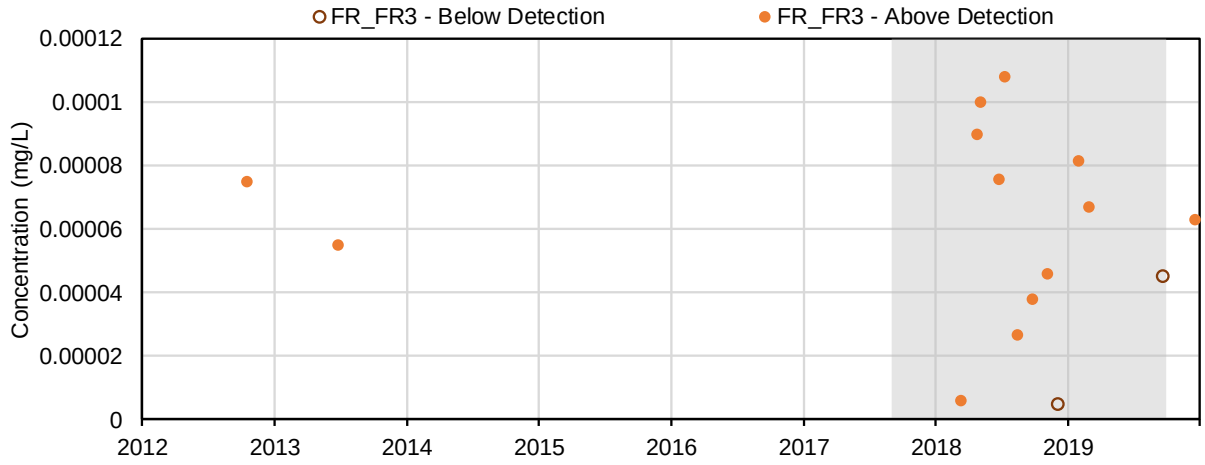
(75) Bismuth (mg/L); Dissolved Metals



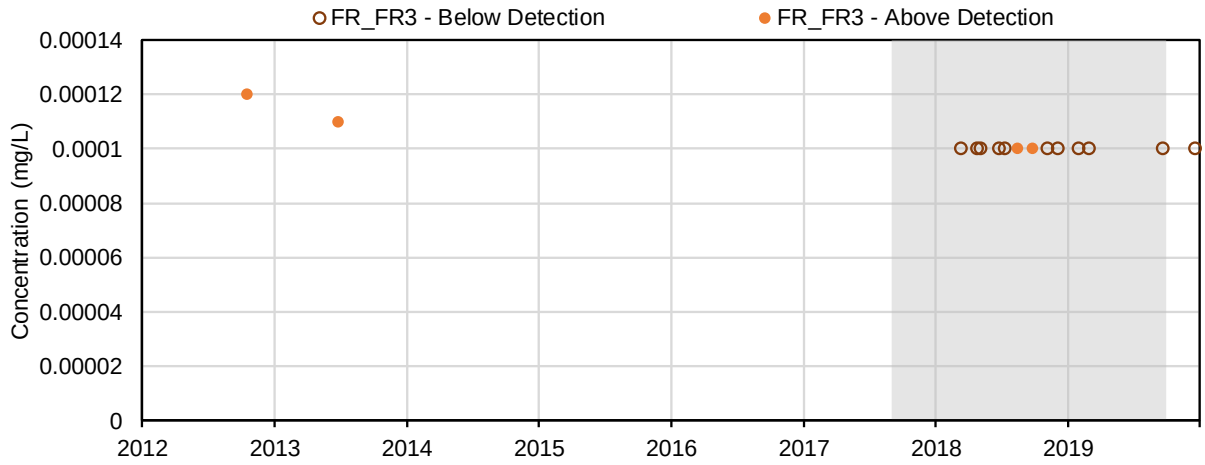
(76) Boron (mg/L); Dissolved Metals



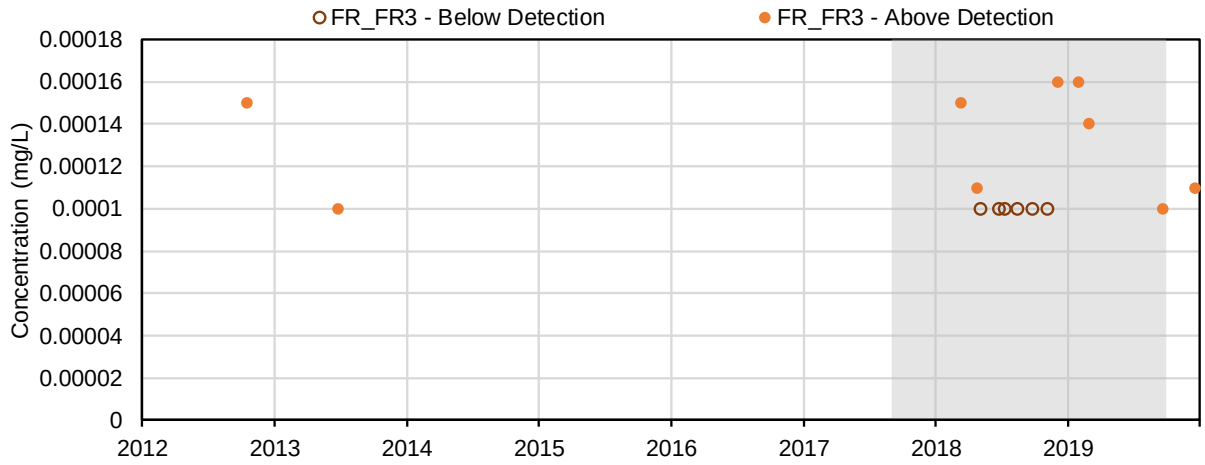
(77) Cadmium (mg/L); Dissolved Metals



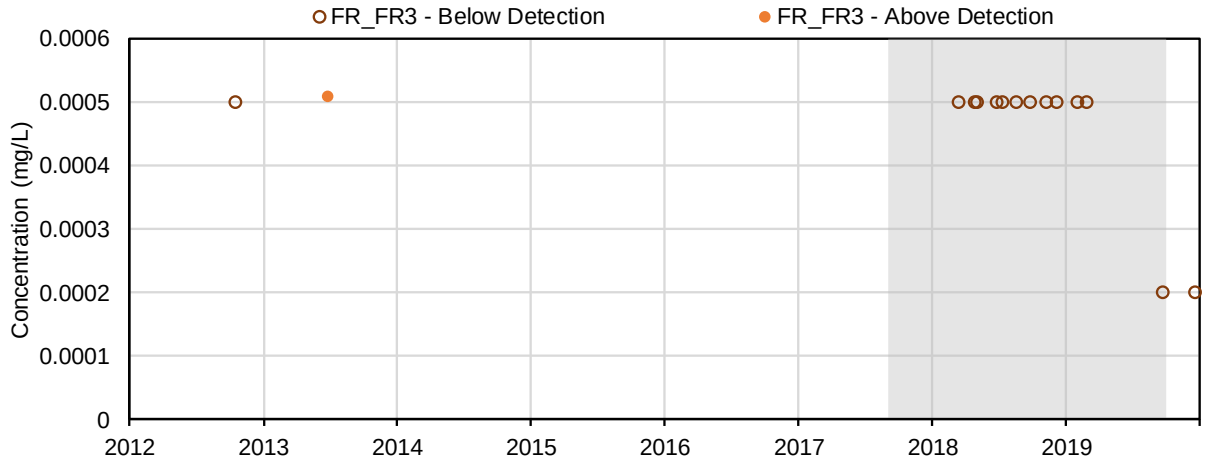
(78) Chromium (mg/L); Dissolved Metals



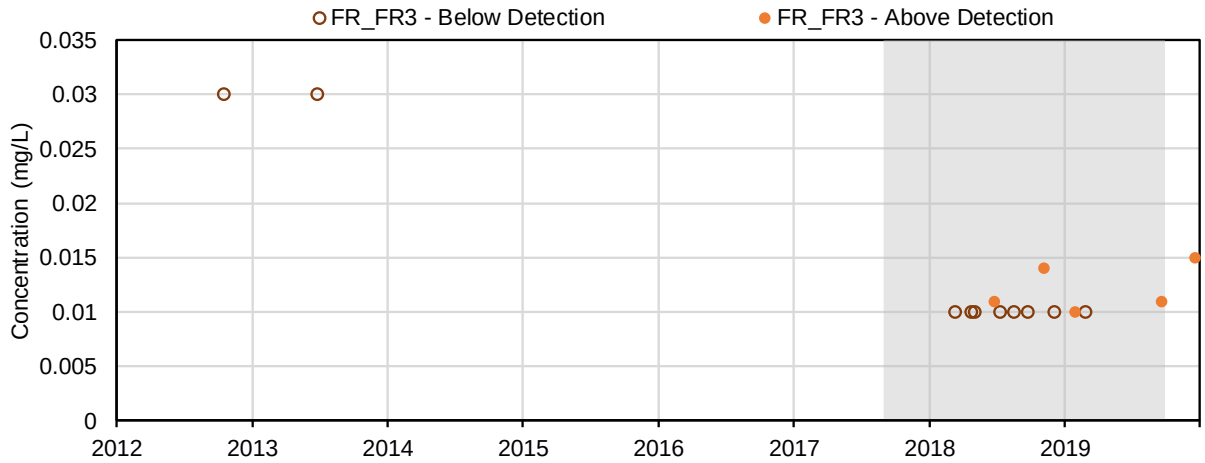
(79) Cobalt (mg/L); Dissolved Metals



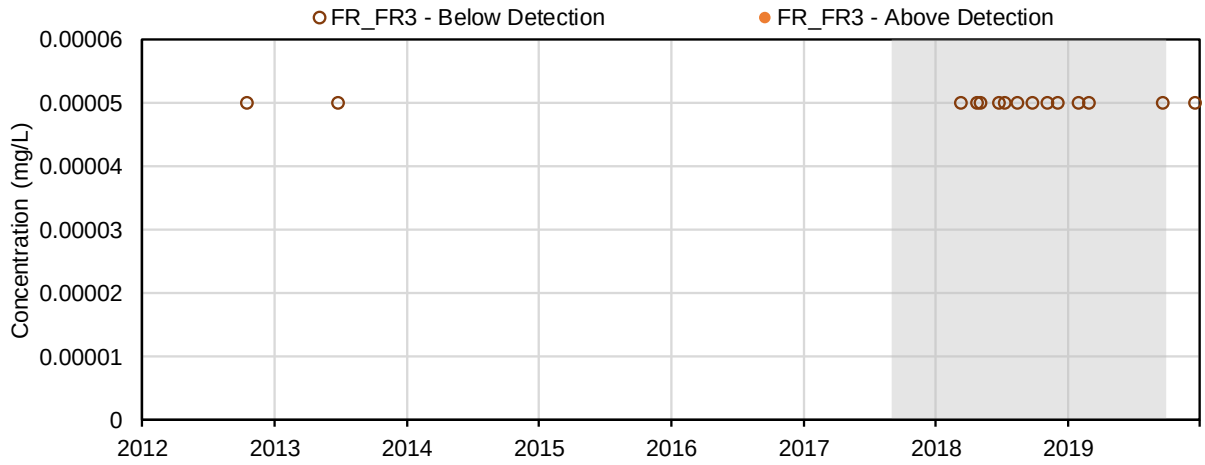
(80) Copper (mg/L); Dissolved Metals



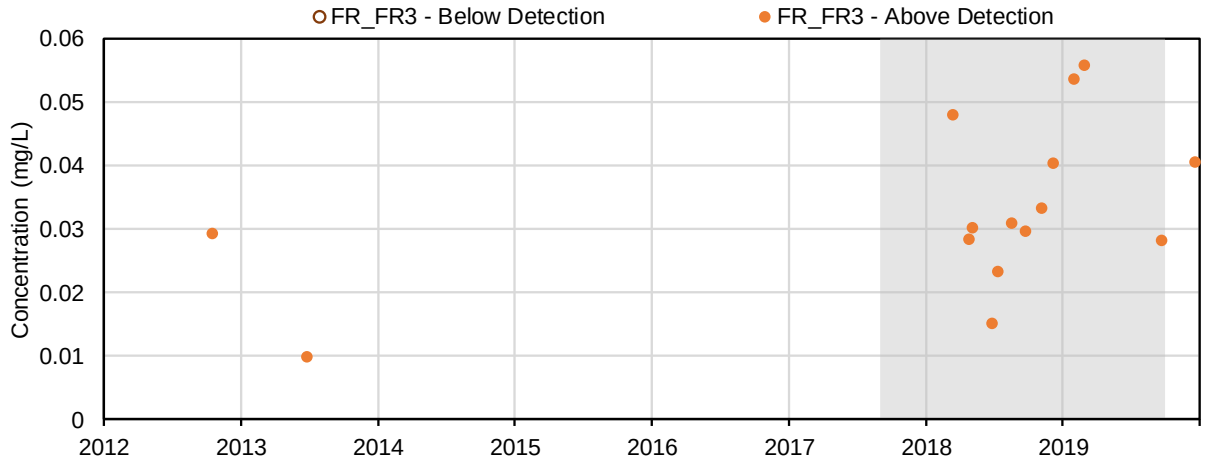
(81) Iron (mg/L); Dissolved Metals



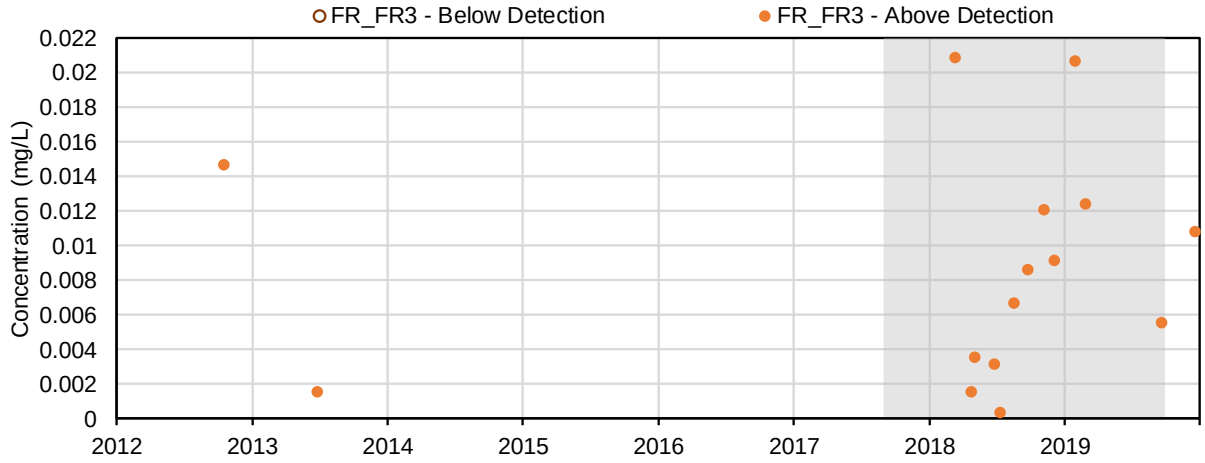
(82) Lead (mg/L); Dissolved Metals



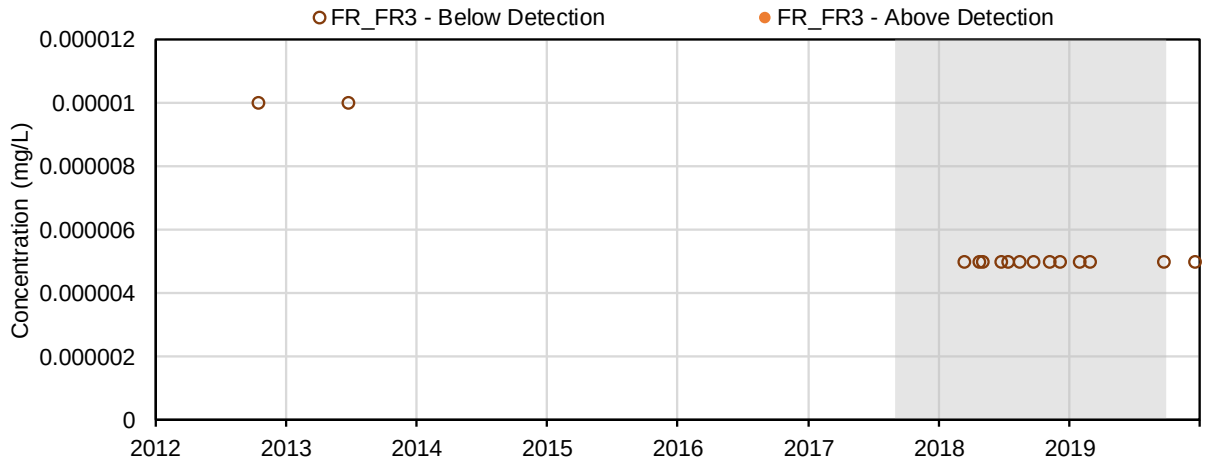
(83) Lithium (mg/L); Dissolved Metals



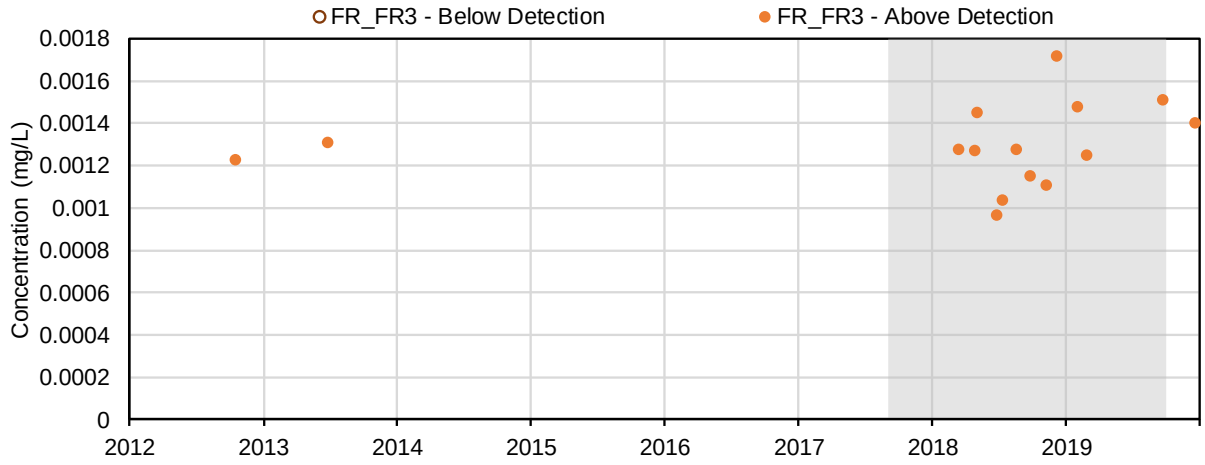
(84) Manganese (mg/L); Dissolved Metals



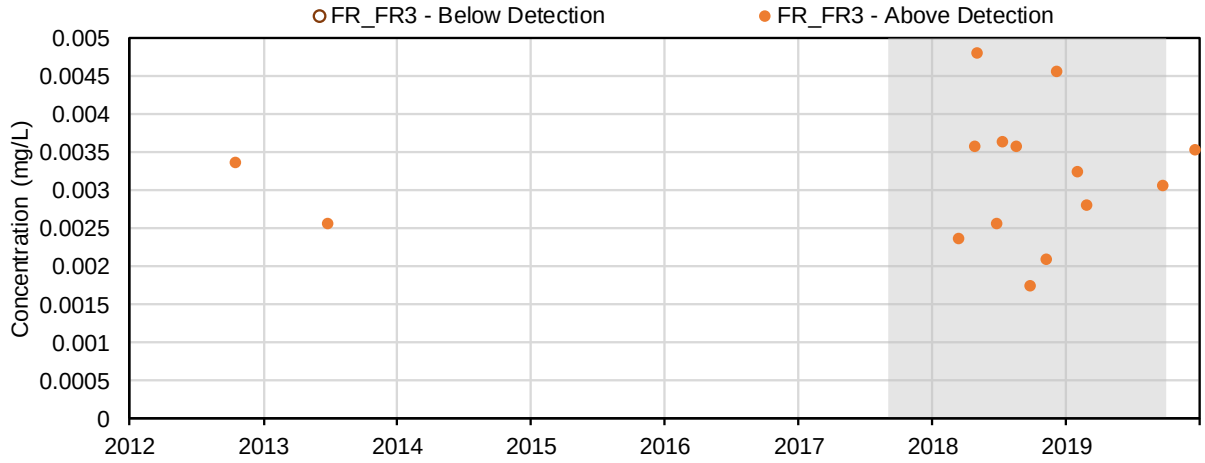
(85) Mercury (mg/L); Dissolved Metals



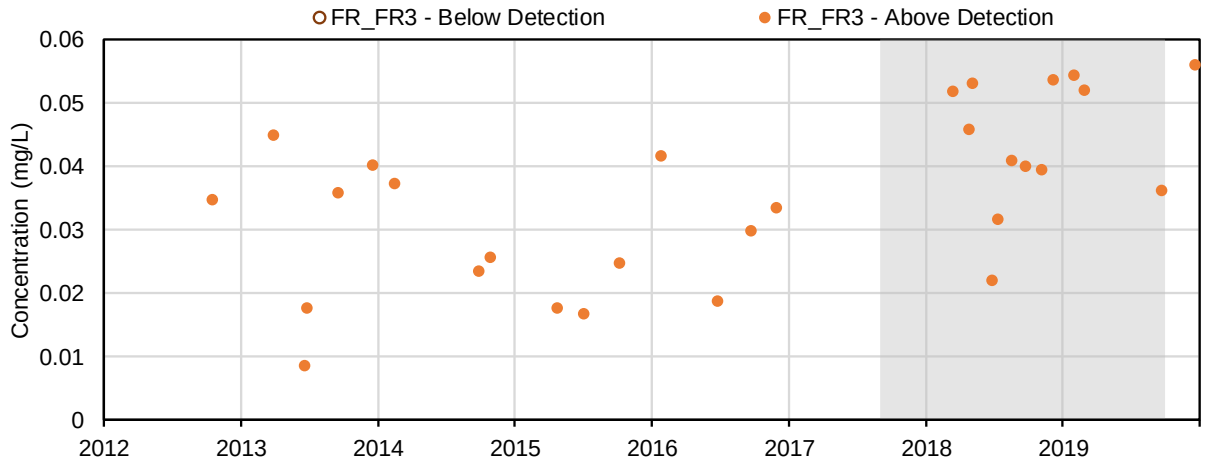
(86) Molybdenum (mg/L); Dissolved Metals



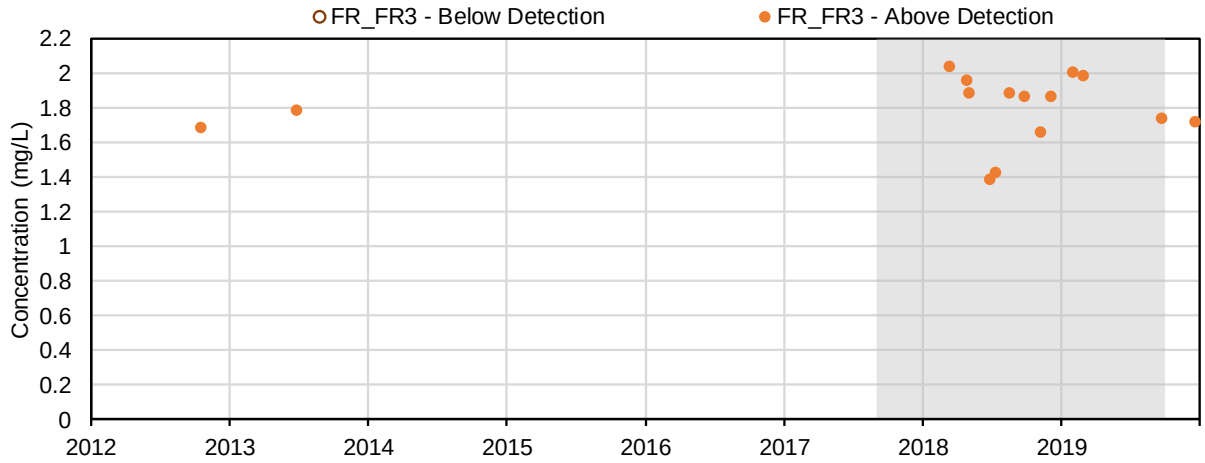
(87) Nickel (mg/L); Dissolved Metals



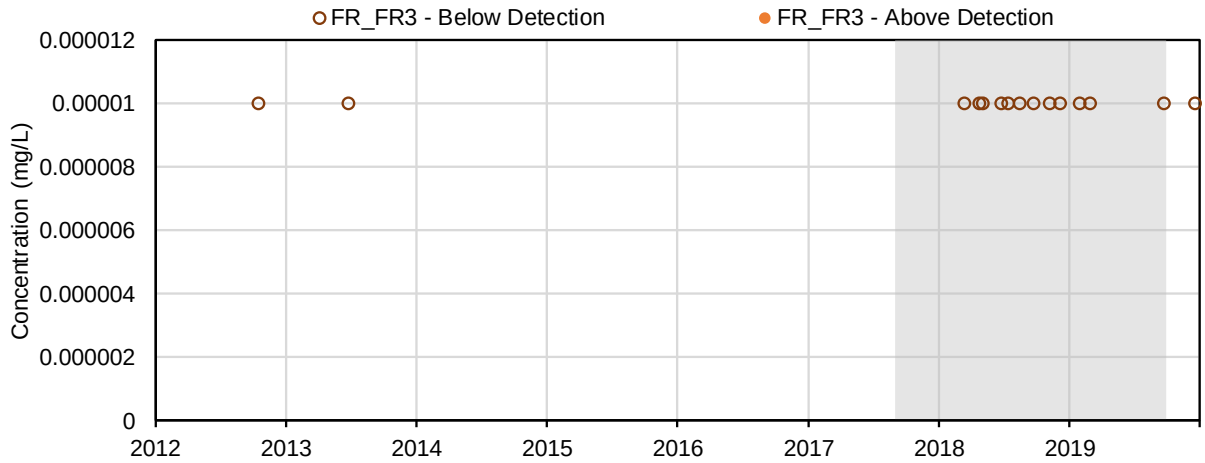
(88) Selenium (mg/L); Dissolved Metals



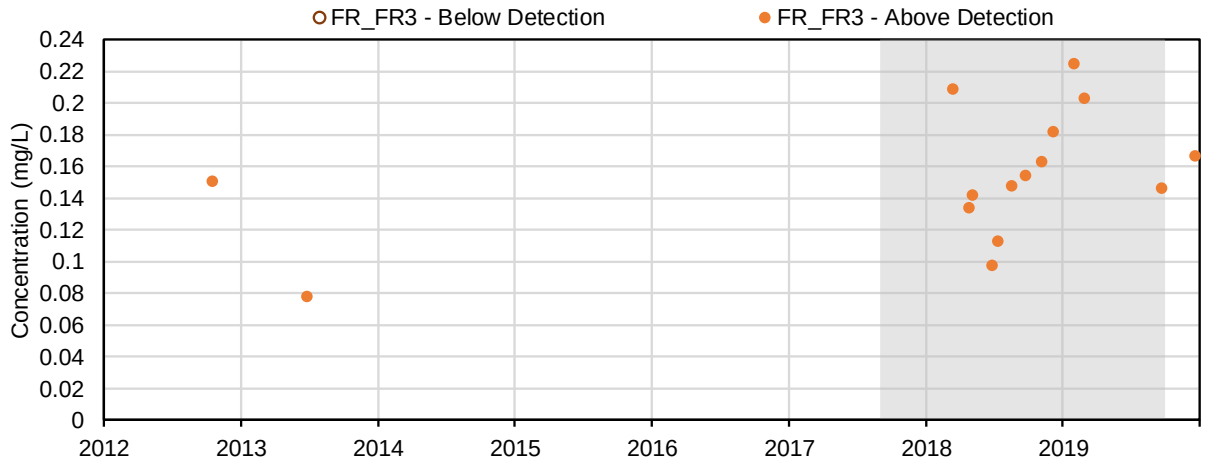
(89) Silicon (mg/L); Dissolved Metals



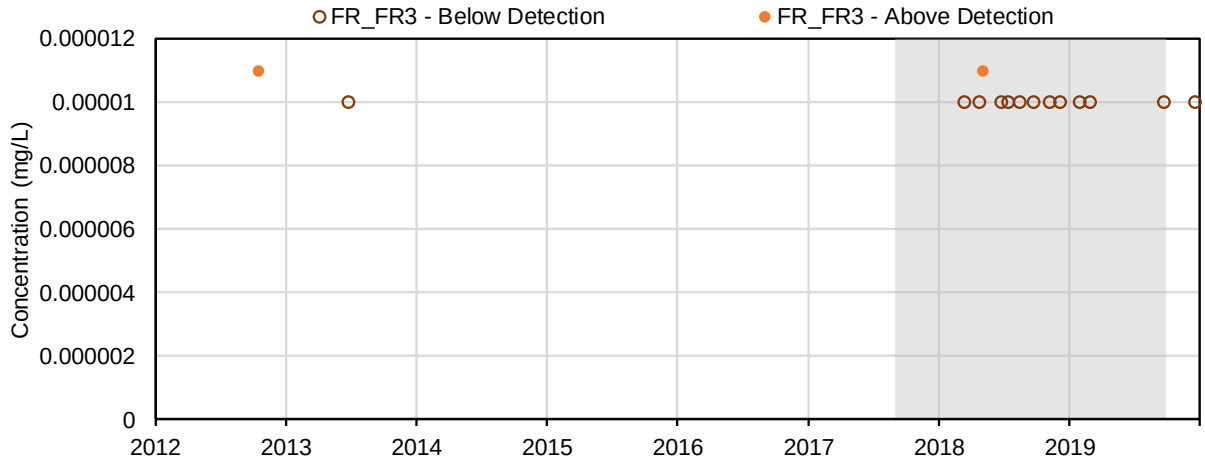
(90) Silver (mg/L); Dissolved Metals



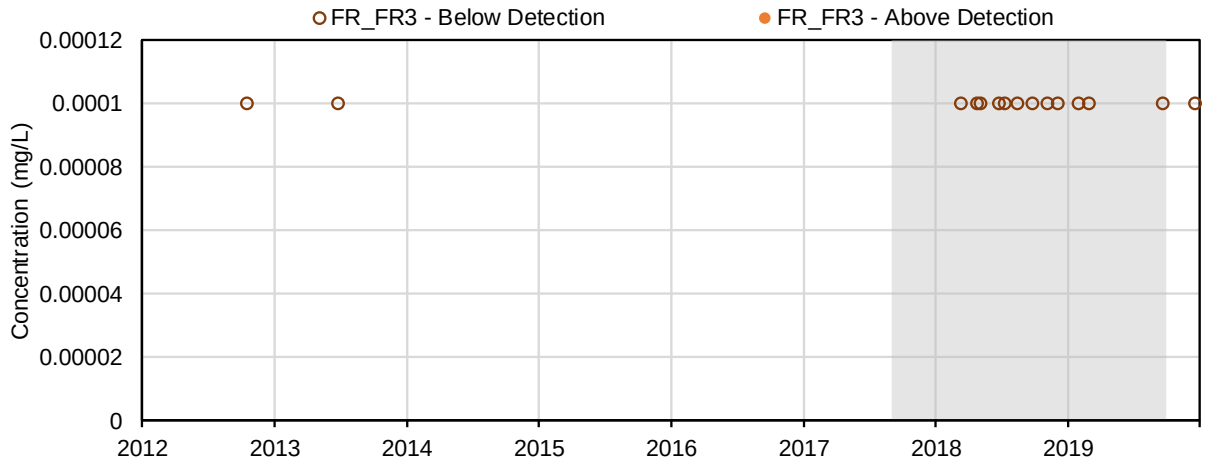
(91) Strontium (mg/L); Dissolved Metals



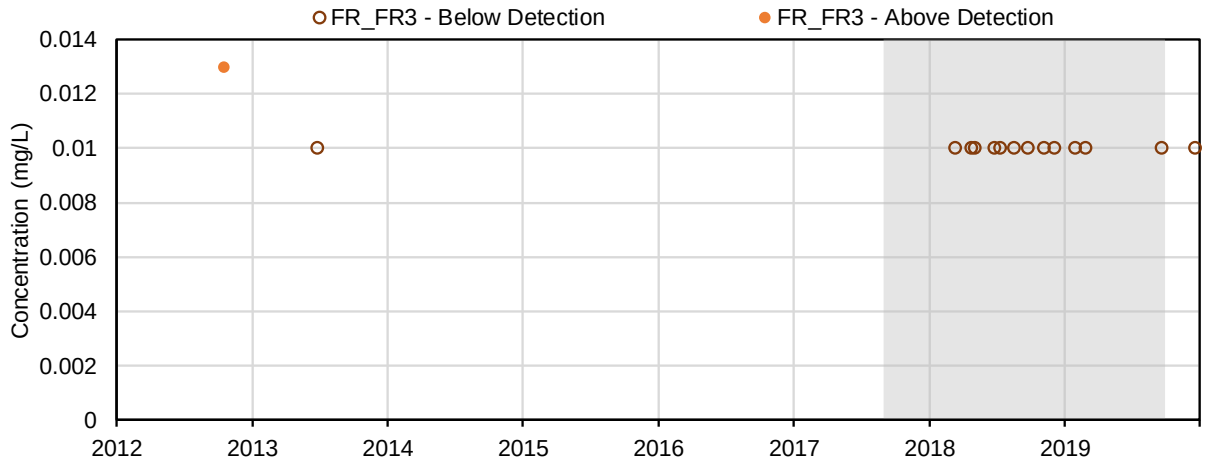
(92) Thallium (mg/L); Dissolved Metals



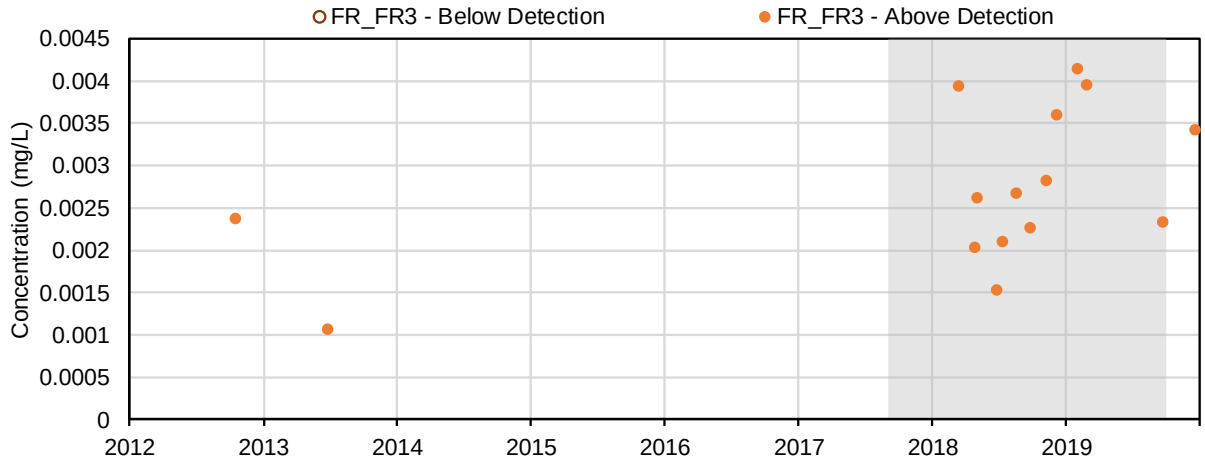
(93) Tin (mg/L); Dissolved Metals



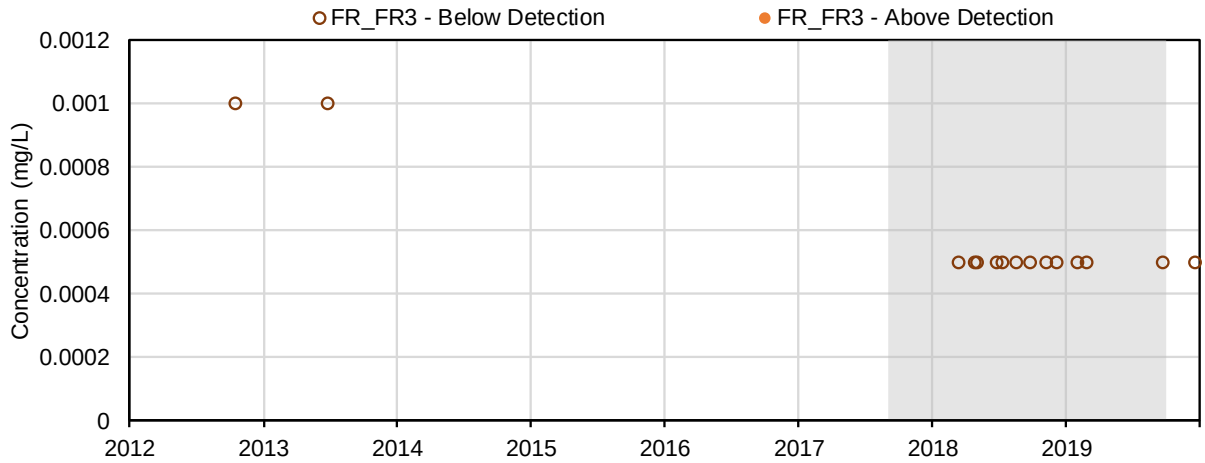
(94) Titanium (mg/L); Dissolved Metals



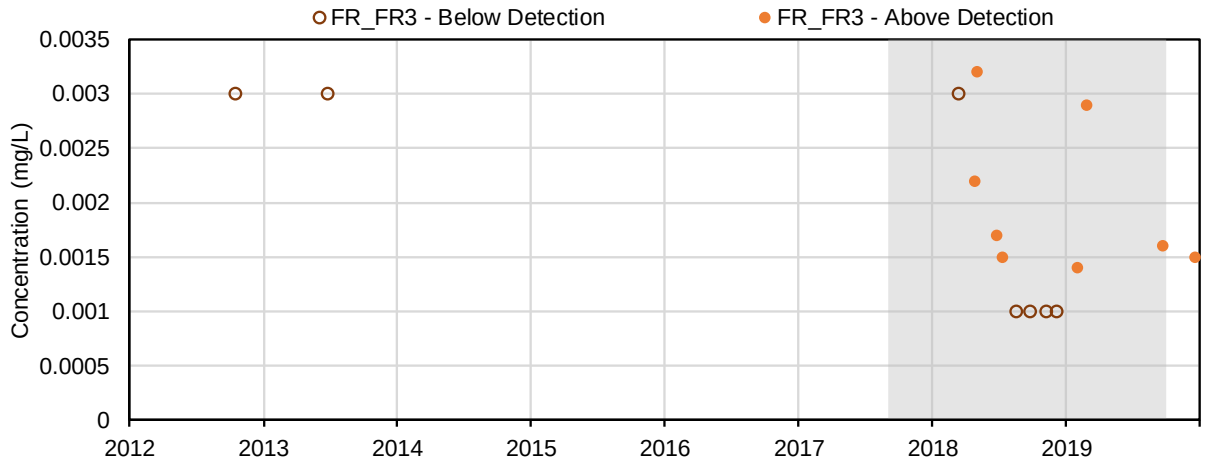
(95) Uranium (mg/L); Dissolved Metals



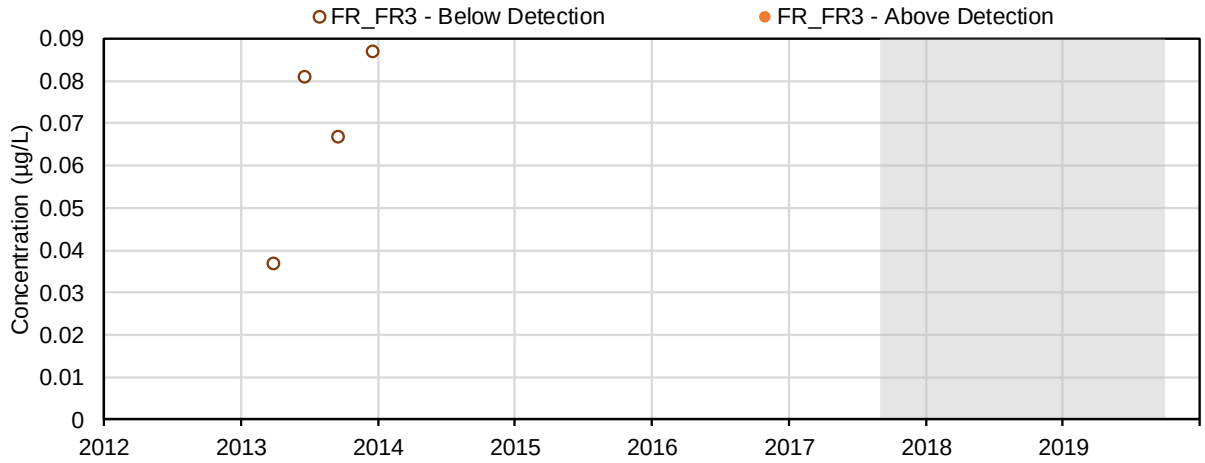
(96) Vanadium (mg/L); Dissolved Metals



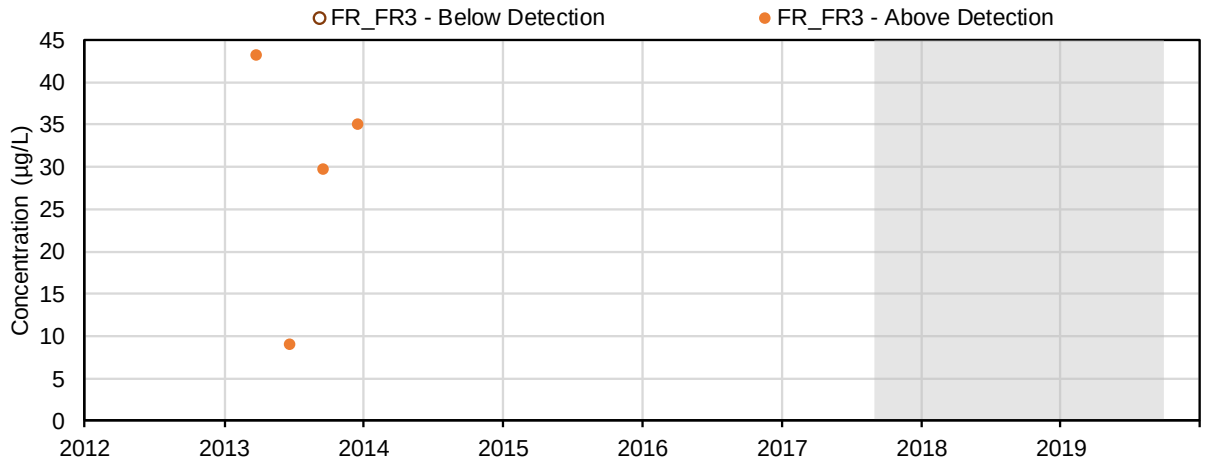
(97) Zinc (mg/L); Dissolved Metals



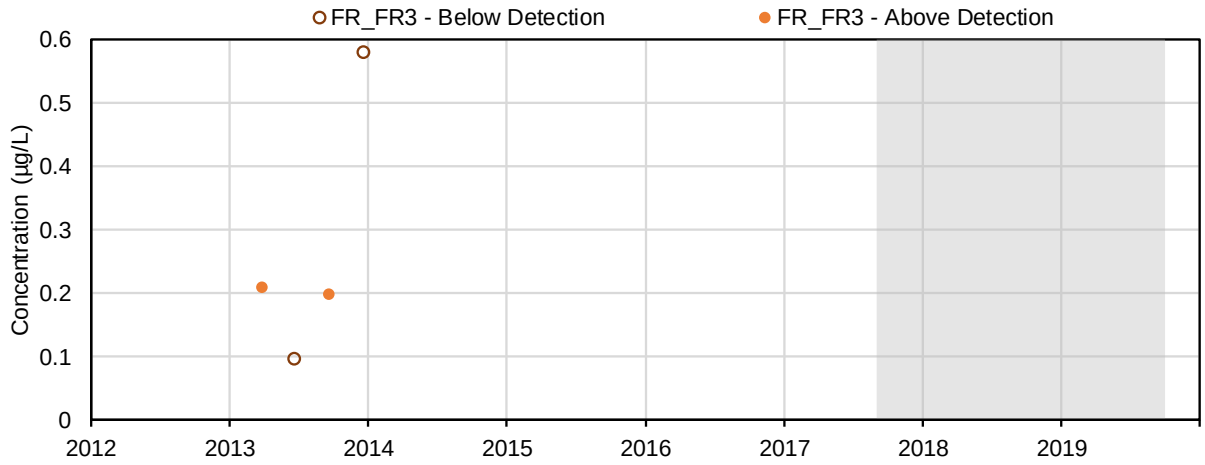
(98) Total Selenocyanate (µg/L); Speciation of Selenium



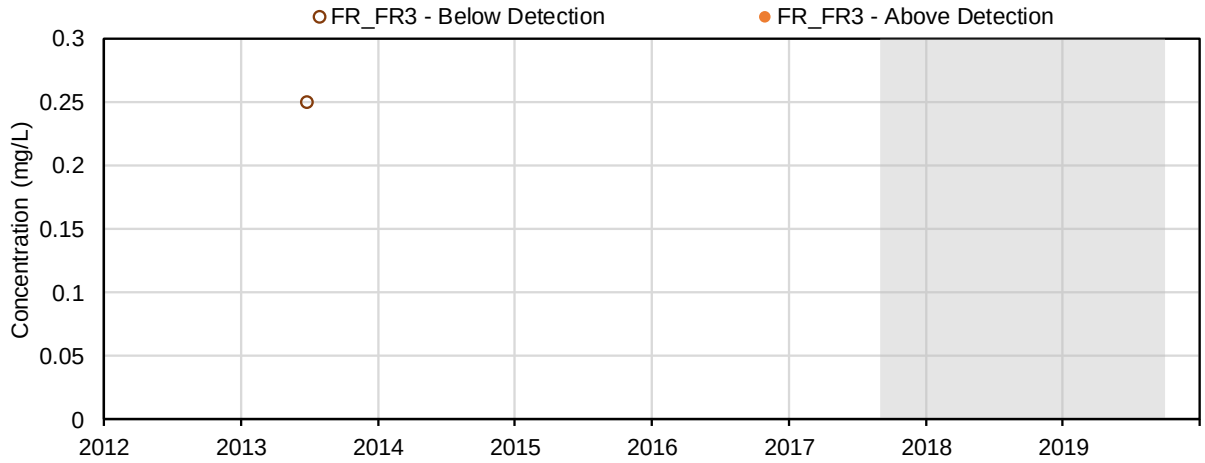
(99) Total Selenium 6+ (µg/L); Speciation of Selenium



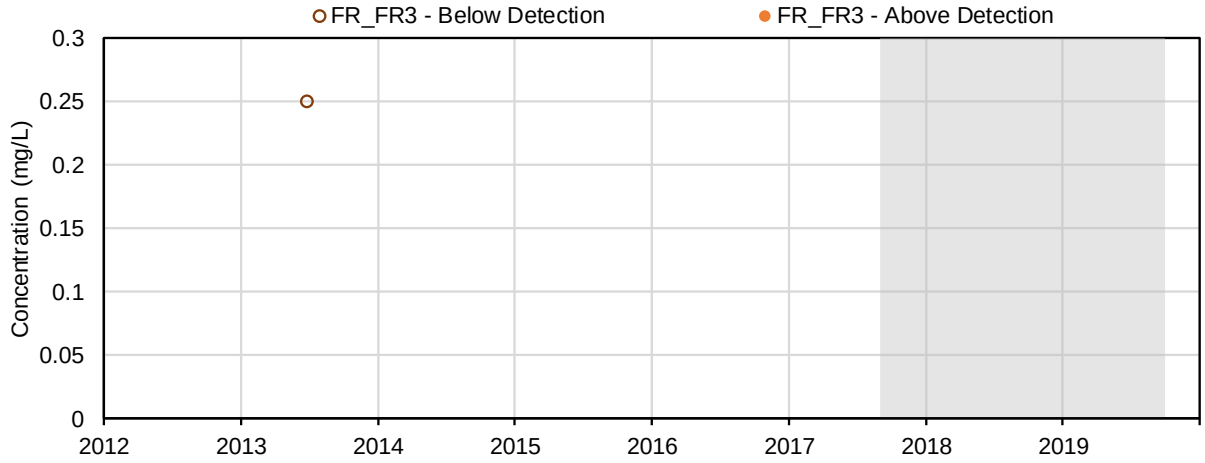
(100) Total Selenium 4+ (µg/L); Speciation of Selenium



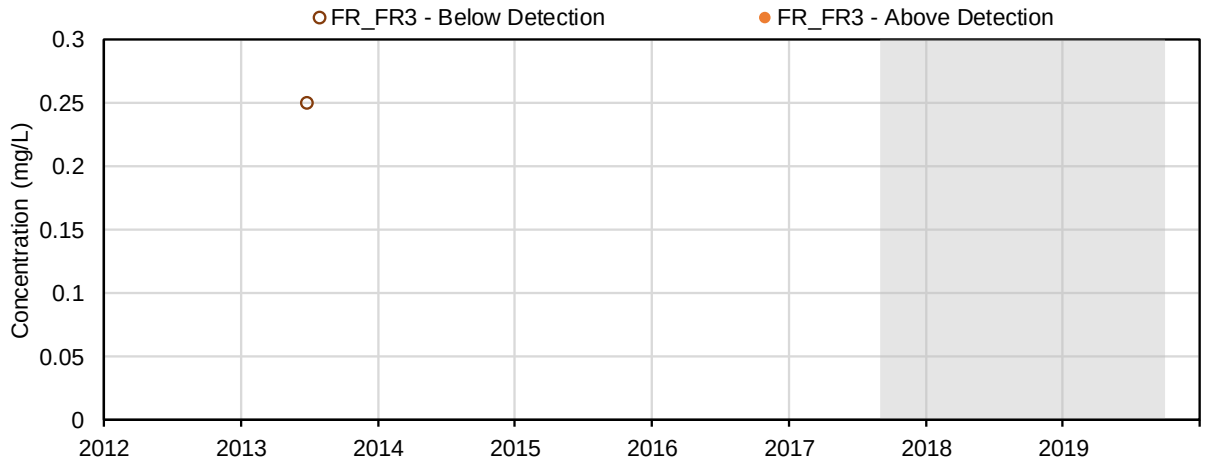
(101) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics

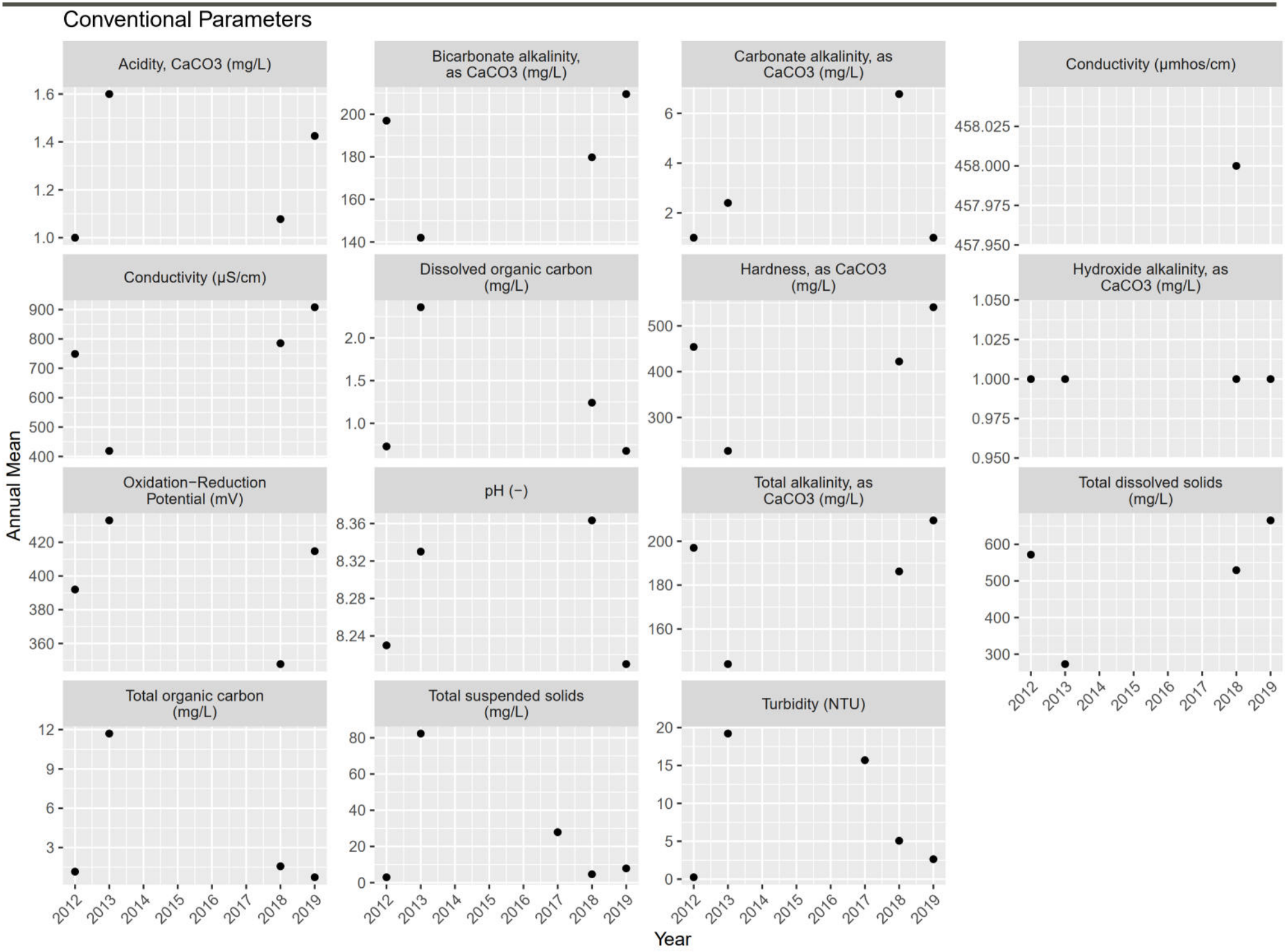


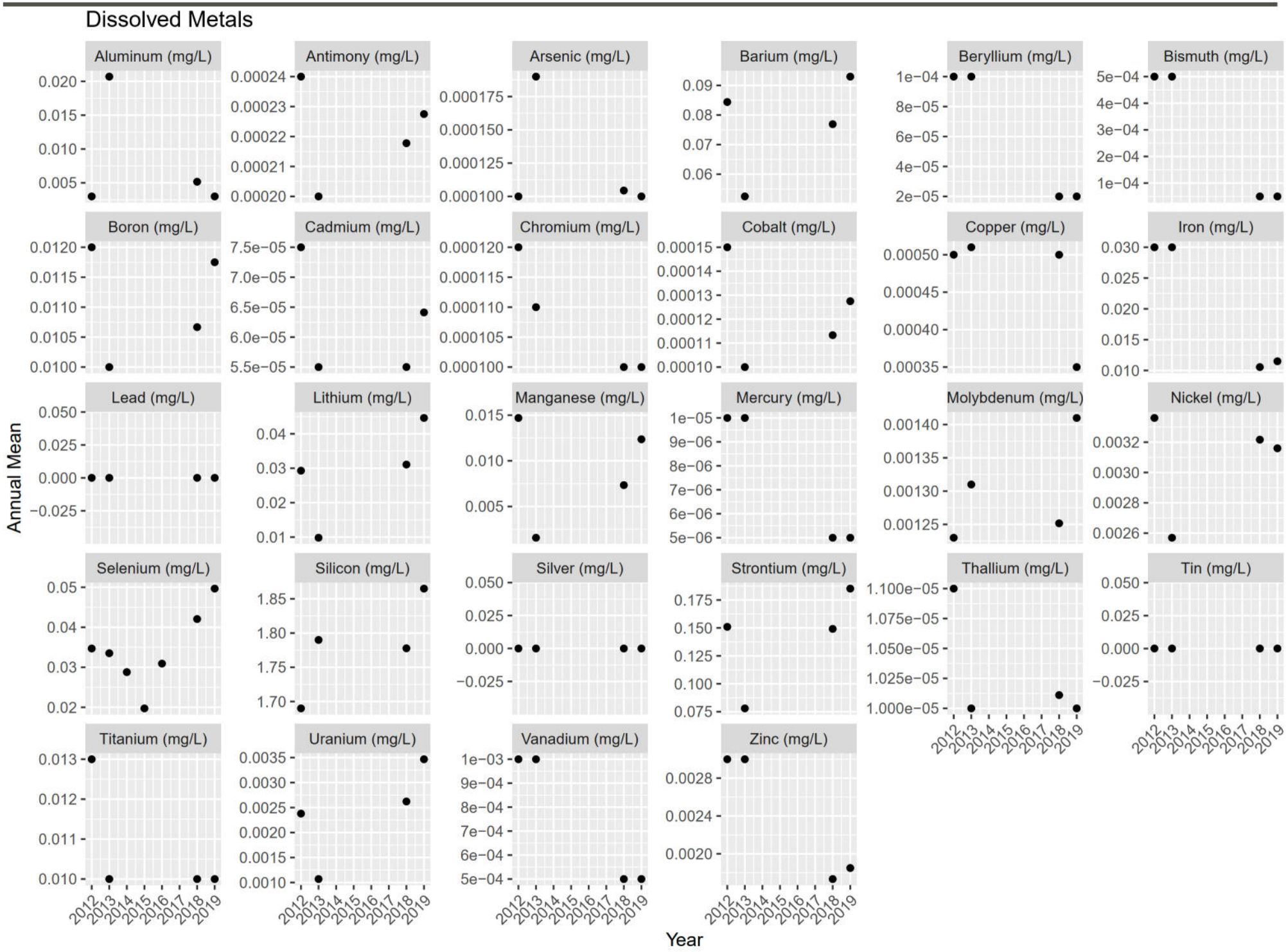
(102) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics

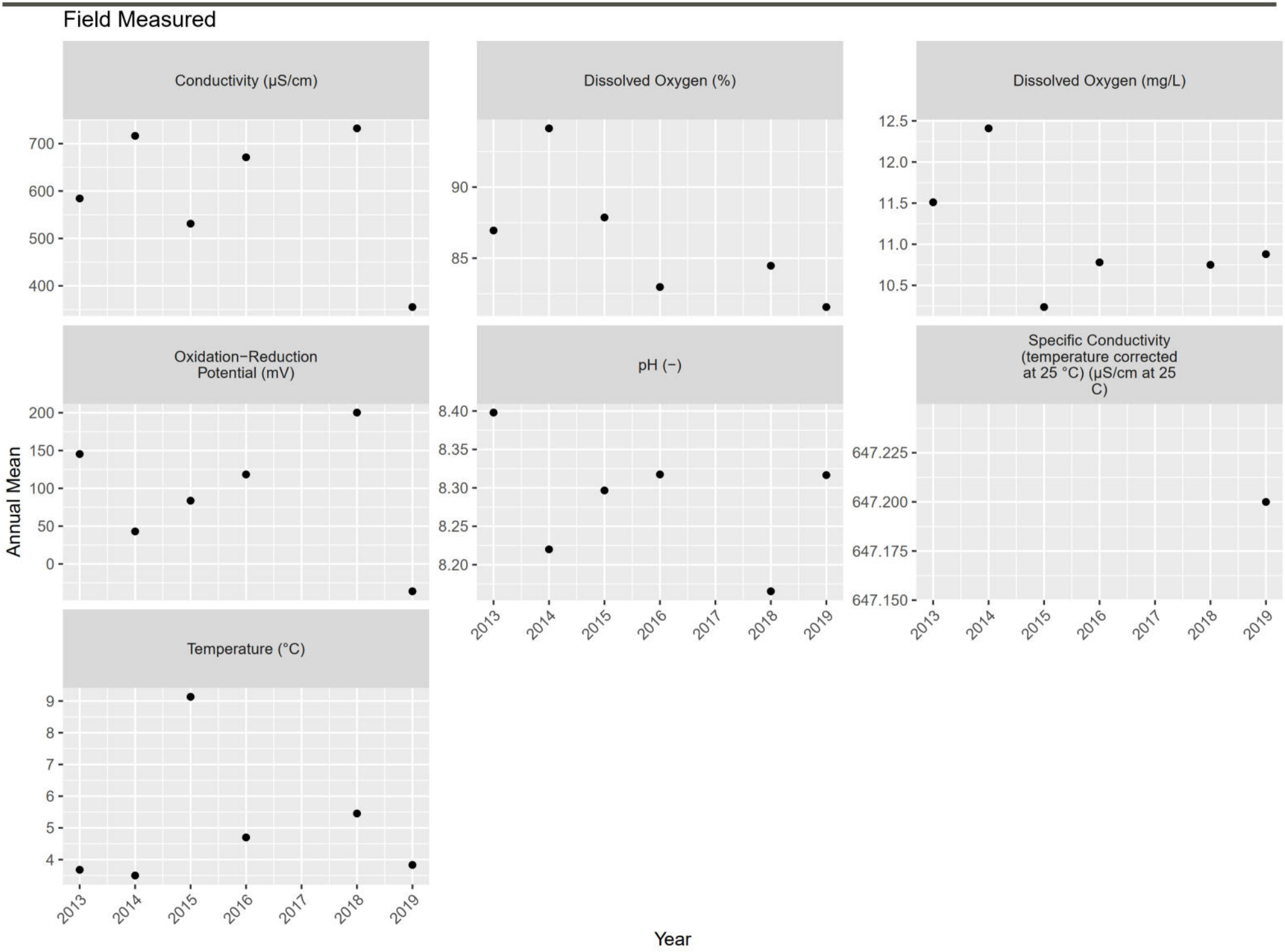


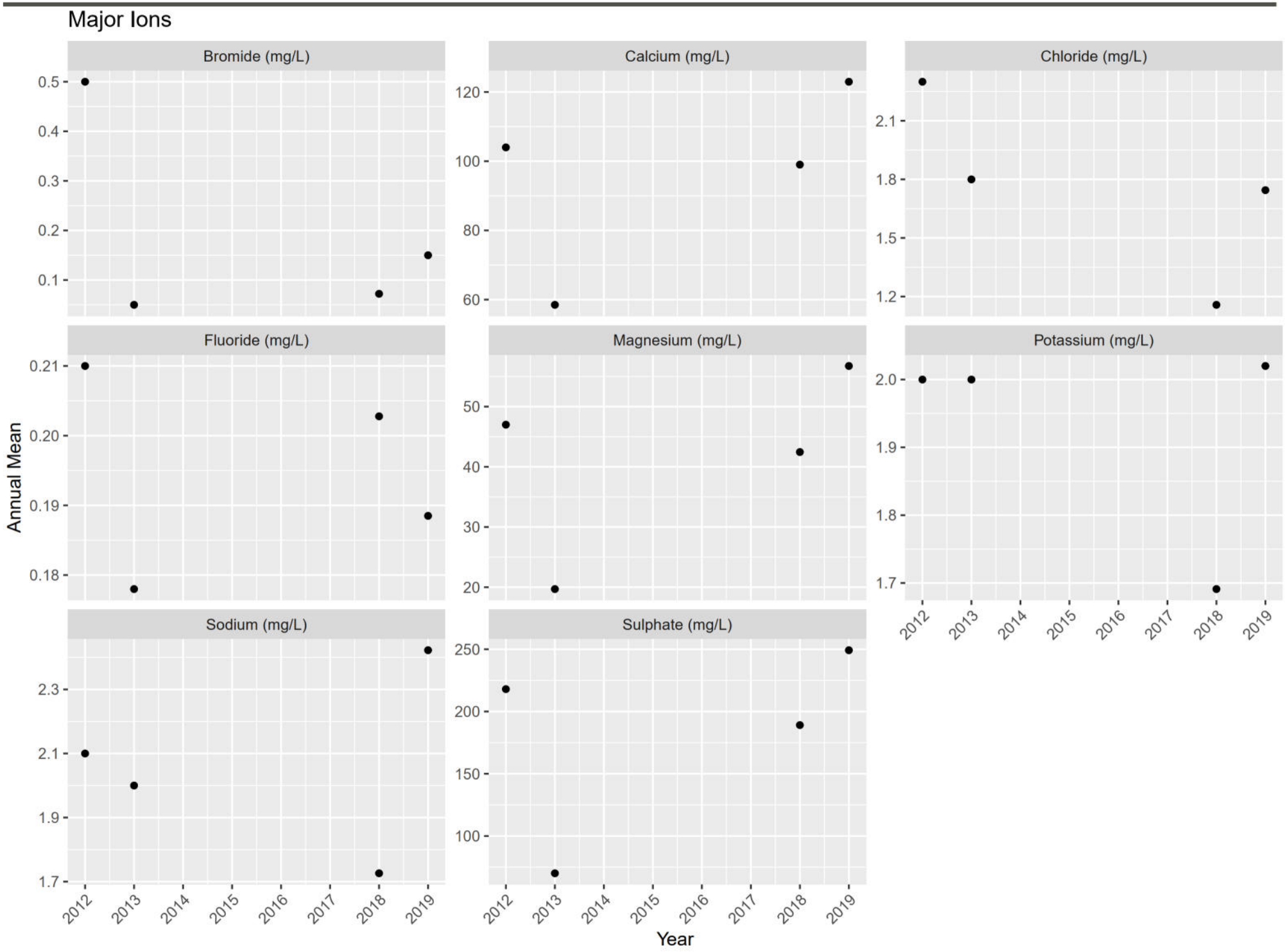
(103) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics

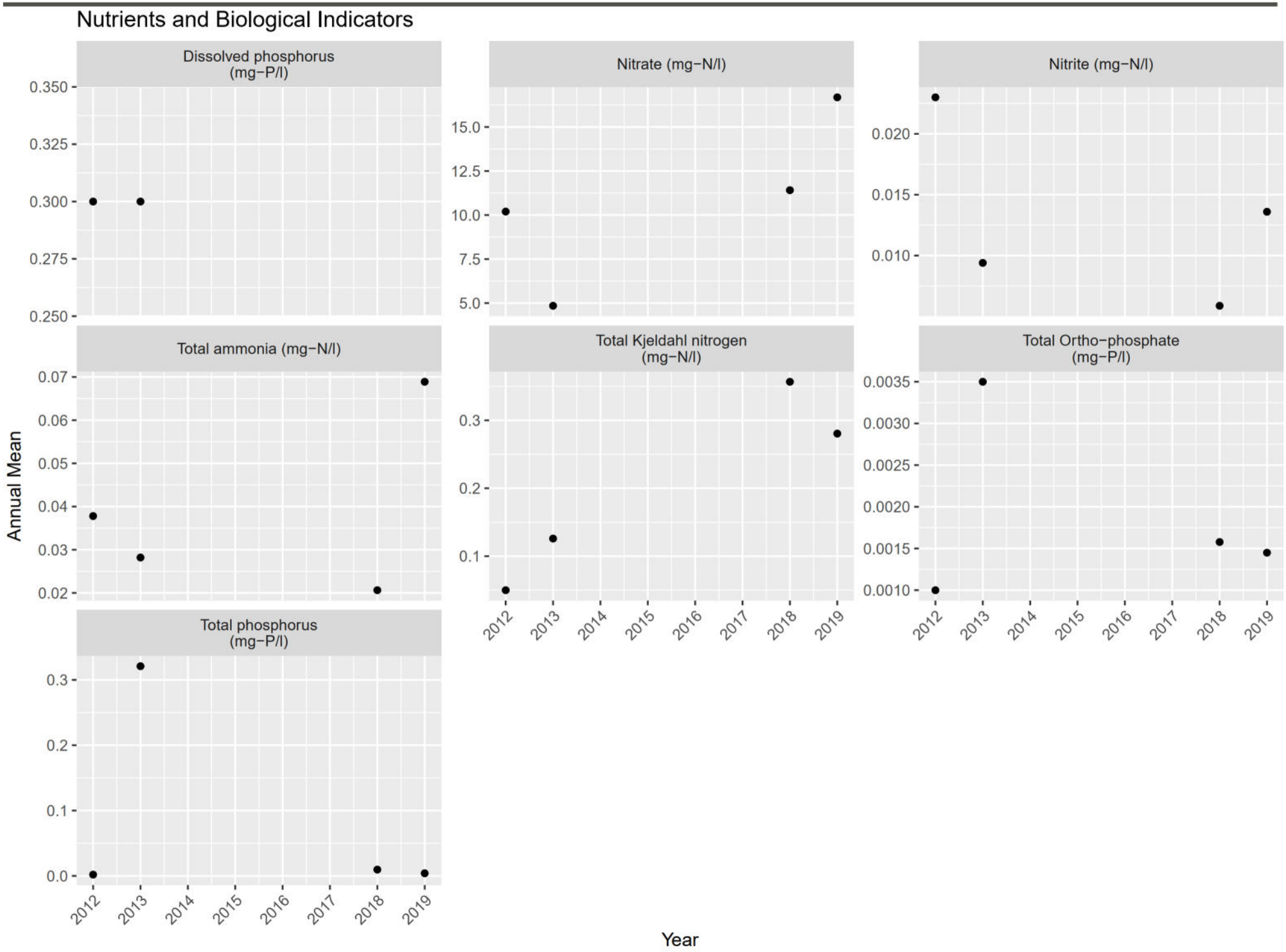


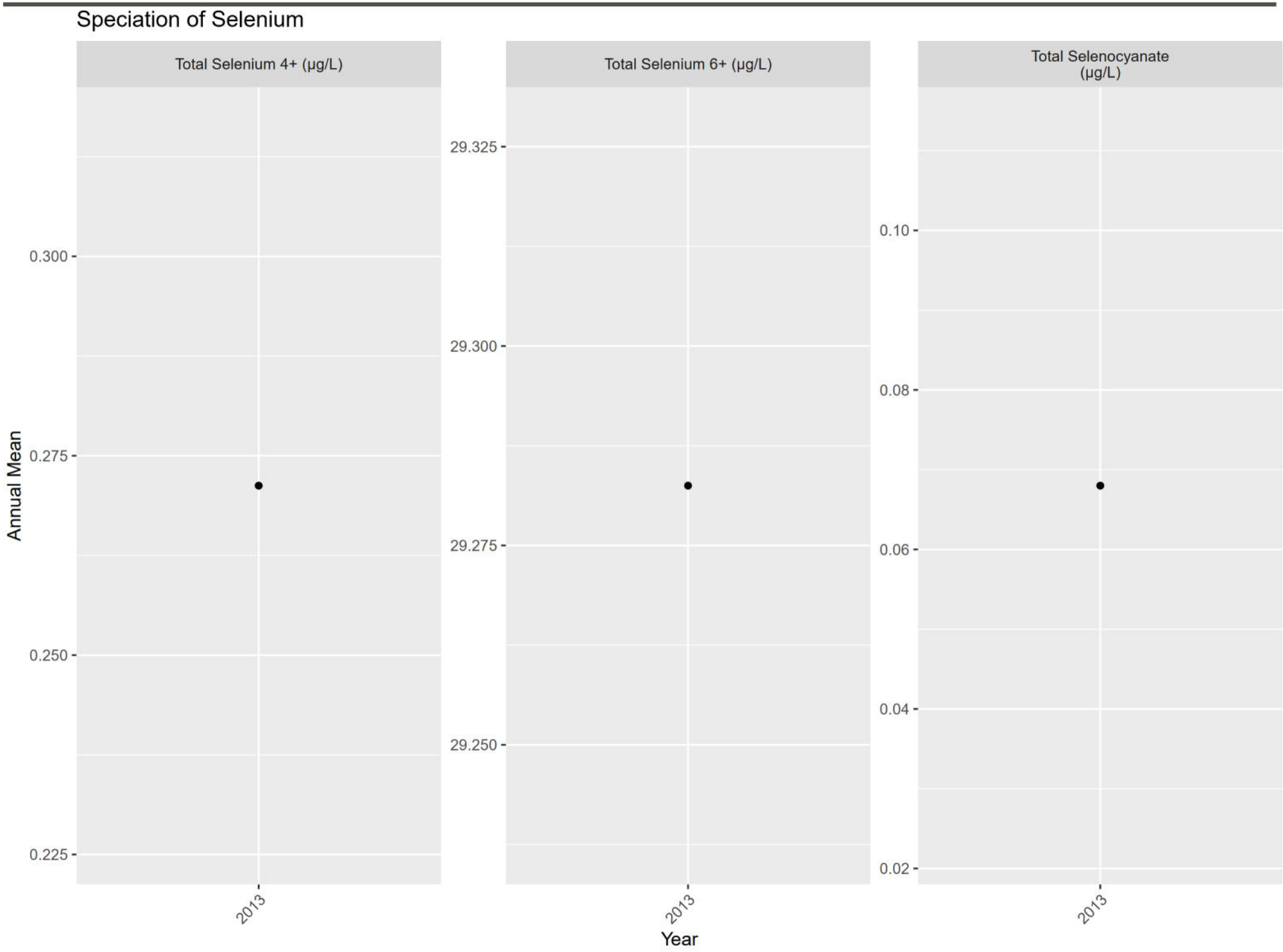

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Conductivity (µmhos/cm)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

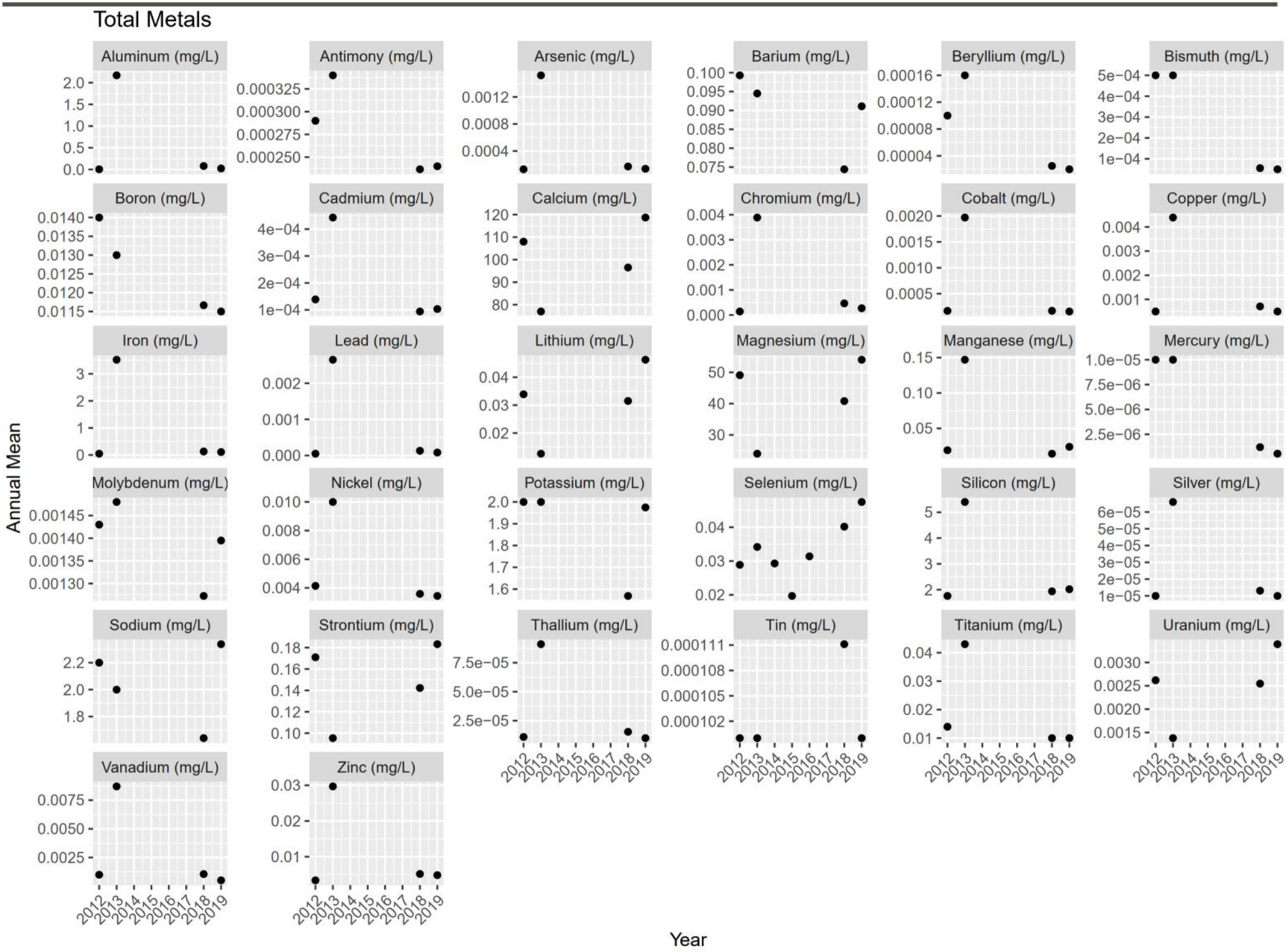

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

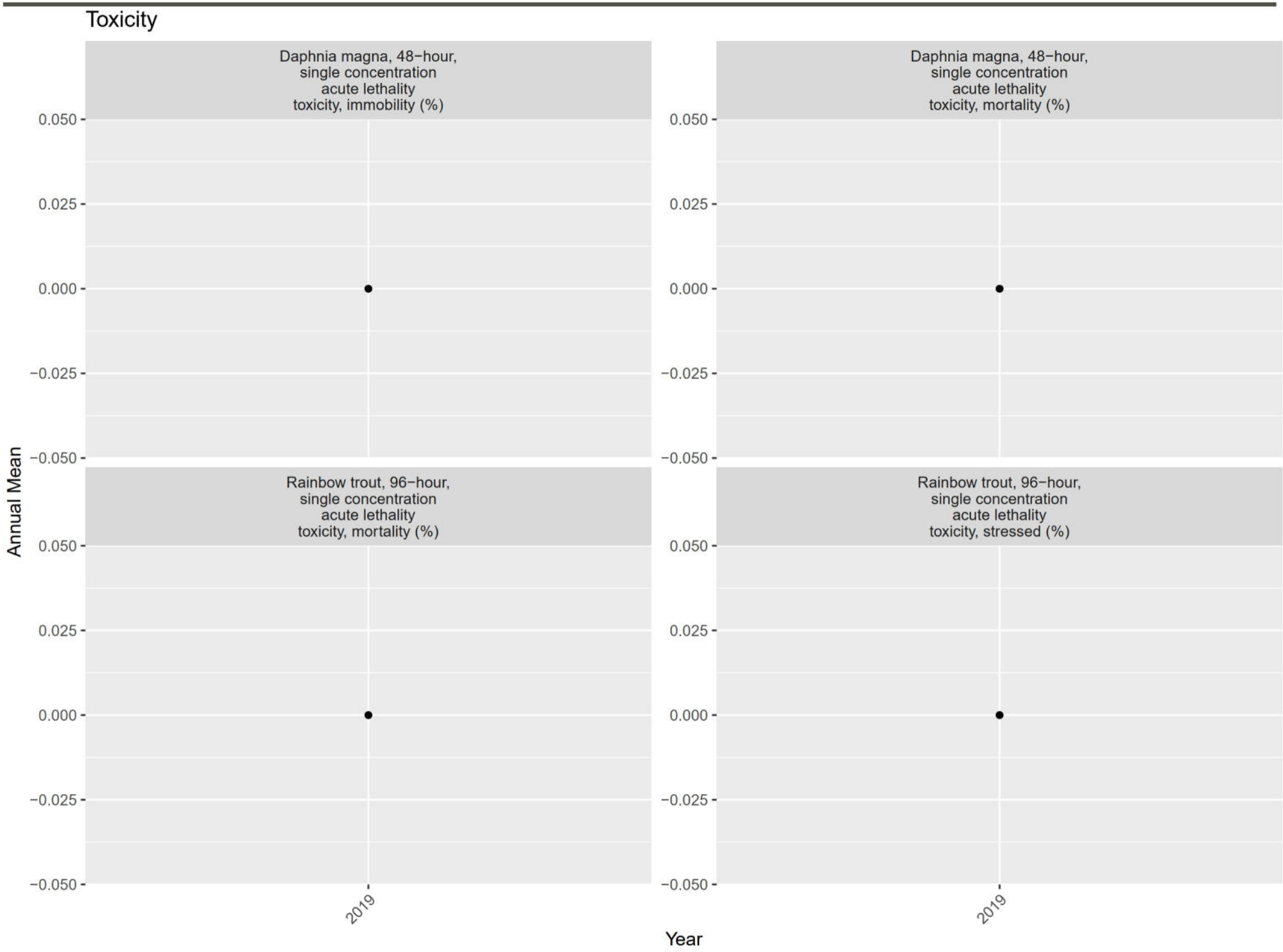

Field Measured
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)
Temperature (°C)
Annual Mean
Year
2013
2014
2015
2016
2017
2018
2019

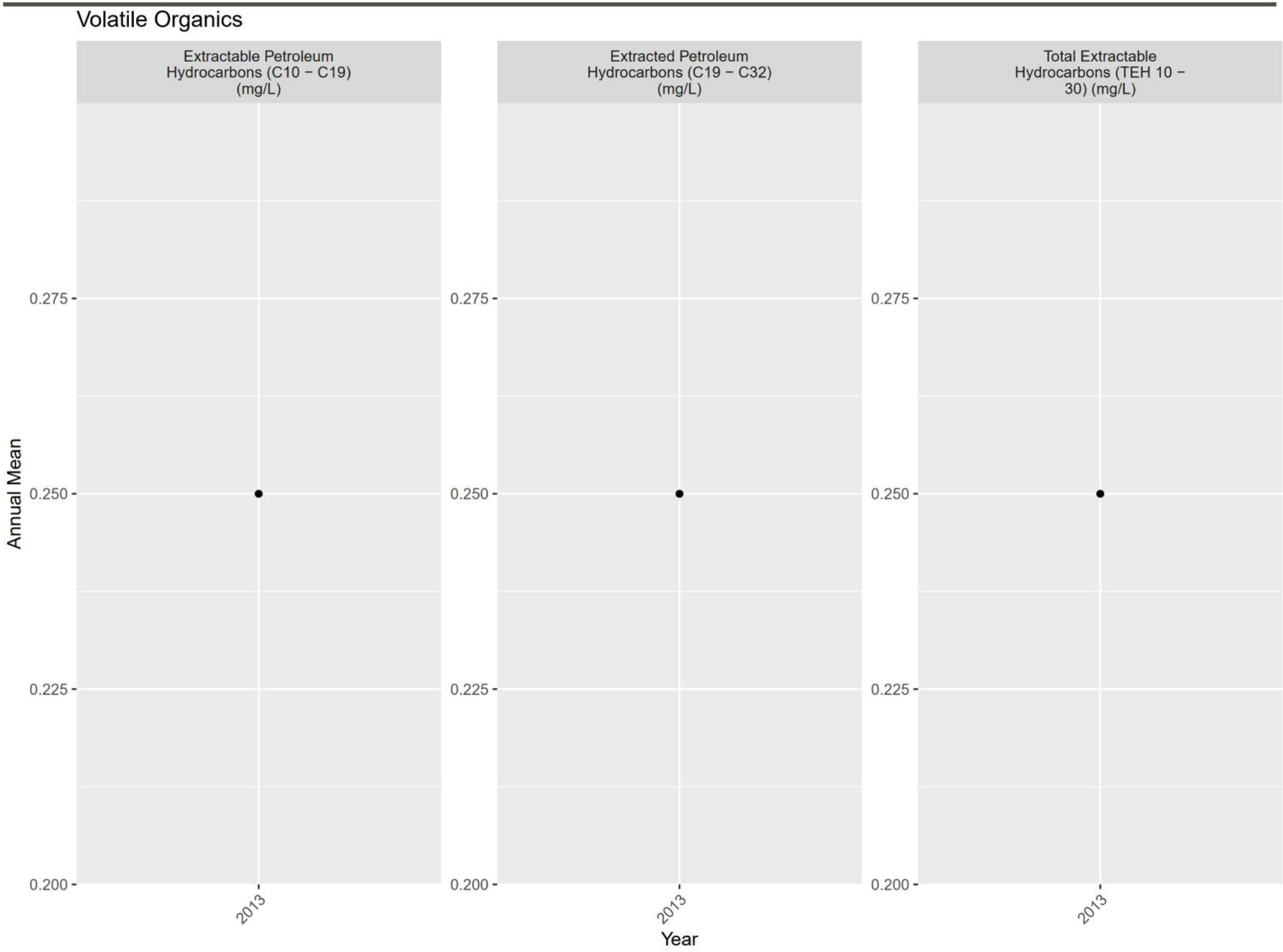

Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
0.5
0.4
0.3
0.2
0.1
120
100
80
60
2.1
1.8
1.5
1.2
0.21
0.20
0.19
0.18
50
40
30
20
2.0
1.9
1.8
1.7
2.3
2.1
1.9
1.7
250
200
150
100
2012
2013
2014
2015
2016
2017
2018
2019


Nutrients and Biological Indicators
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Speciation of Selenium
Total Selenium 4+ (µg/L)
Total Selenium 6+ (µg/L)
Total Selenocyanate (µg/L)
Annual Mean
0.300
0.275
0.250
0.225
29.325
29.300
29.275
29.250
0.10
0.08
0.06
0.04
0.02
2013
Year


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

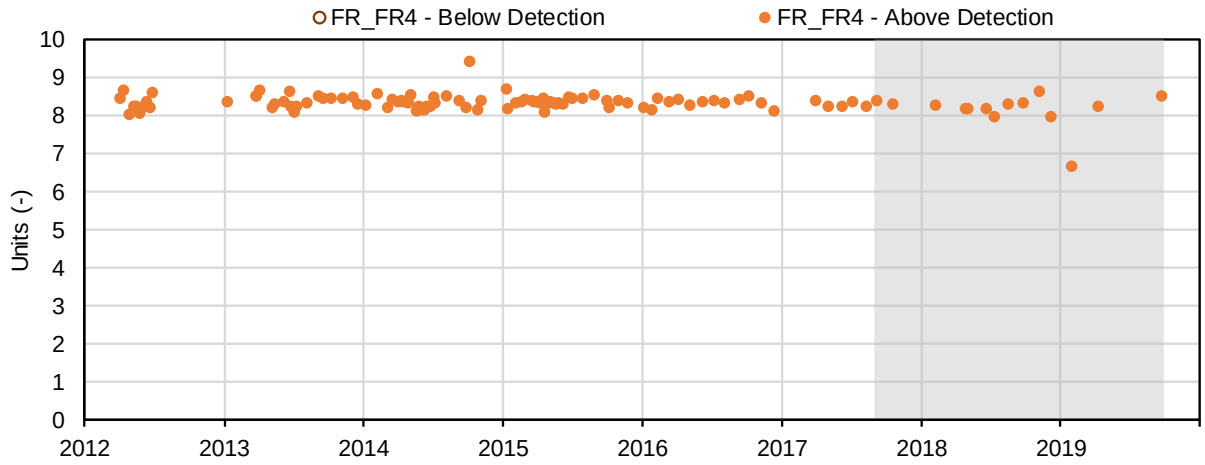

Toxicity
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, immobility (%)
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, stressed (%)
Annual Mean
0.050
0.025
0.000
−0.025
−0.050
2019
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
0.275
0.250
0.225
0.200
2013
Year

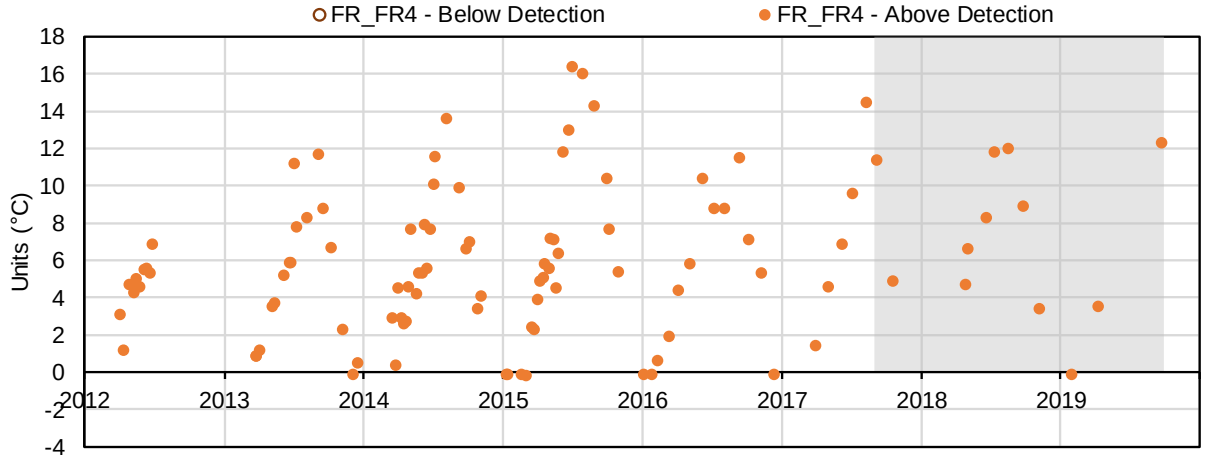
ATTACHMENT F8

FR_FR4 Plots

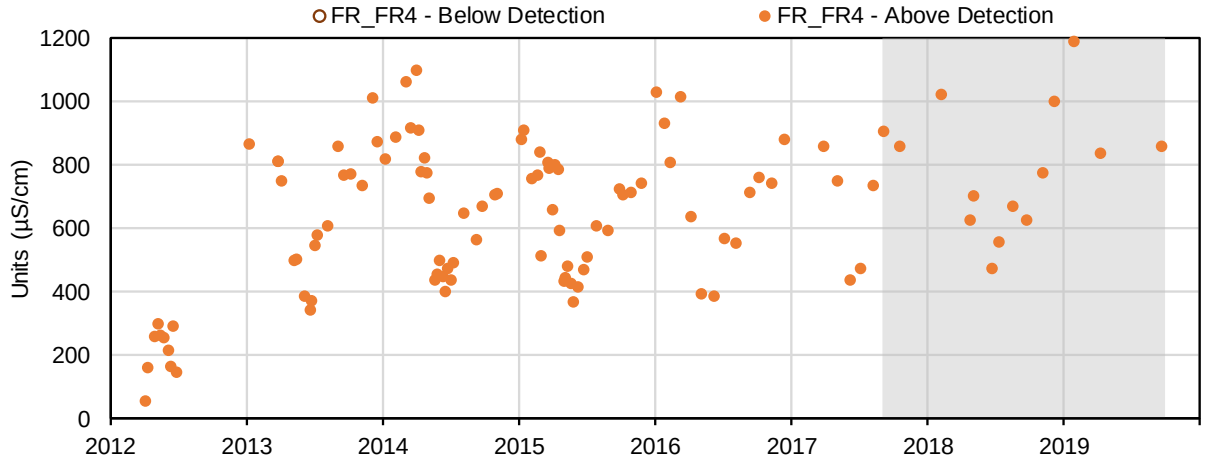
(1) pH (-); Field Measured



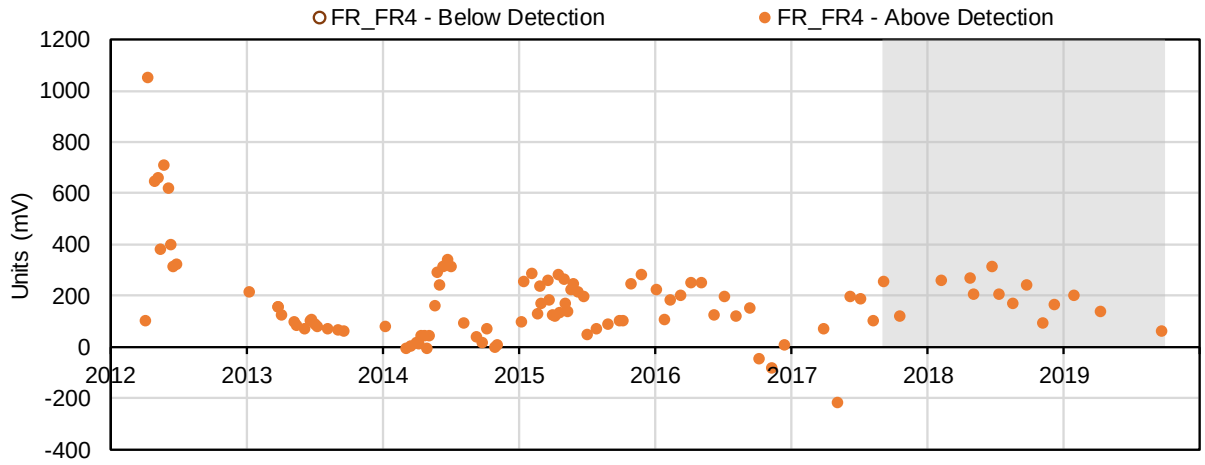
(2) Temperature (°C); Field Measured



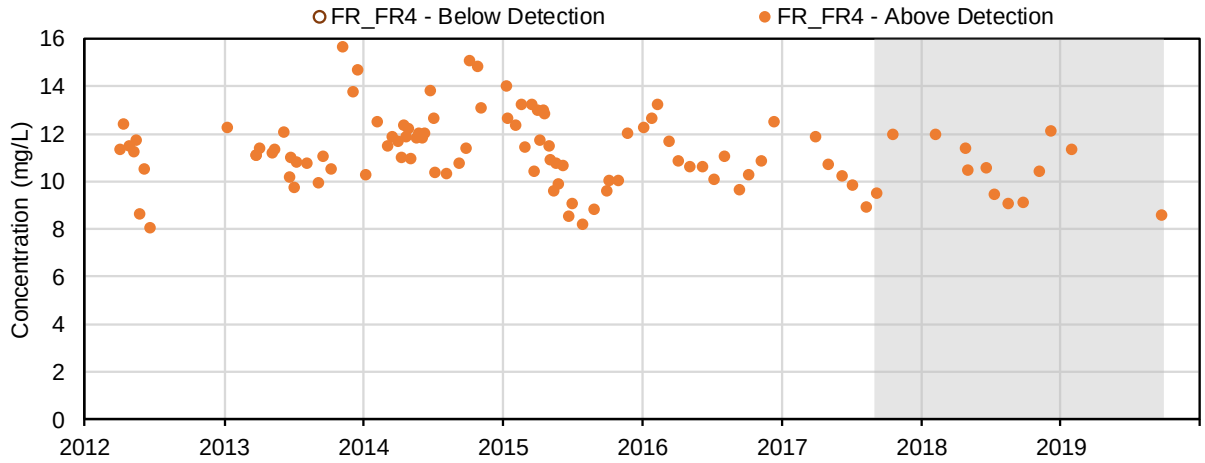
(3) Conductivity (µS/cm); Field Measured



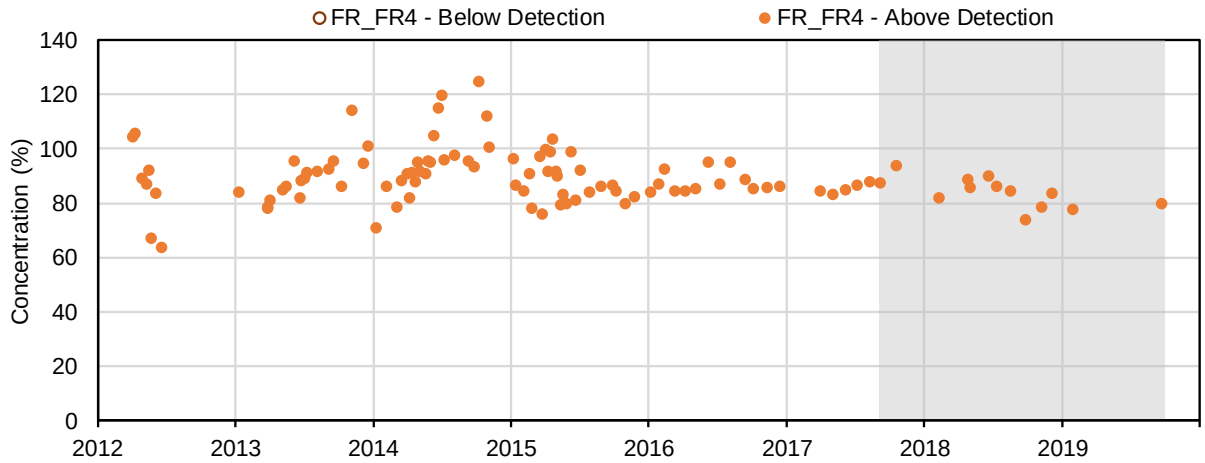
(4) Oxidation-Reduction Potential (mV); Field Measured



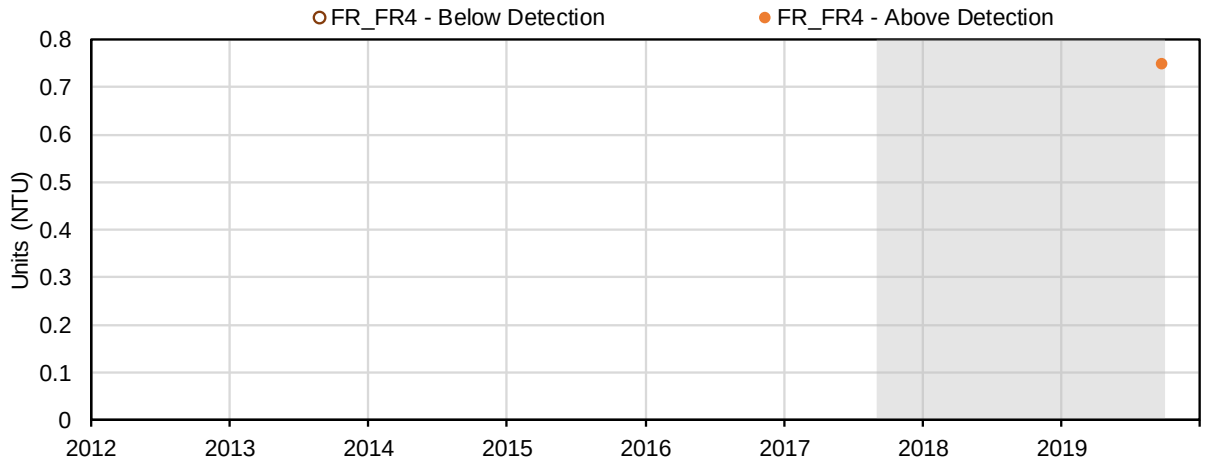
(5) Dissolved Oxygen (mg/L); Field Measured



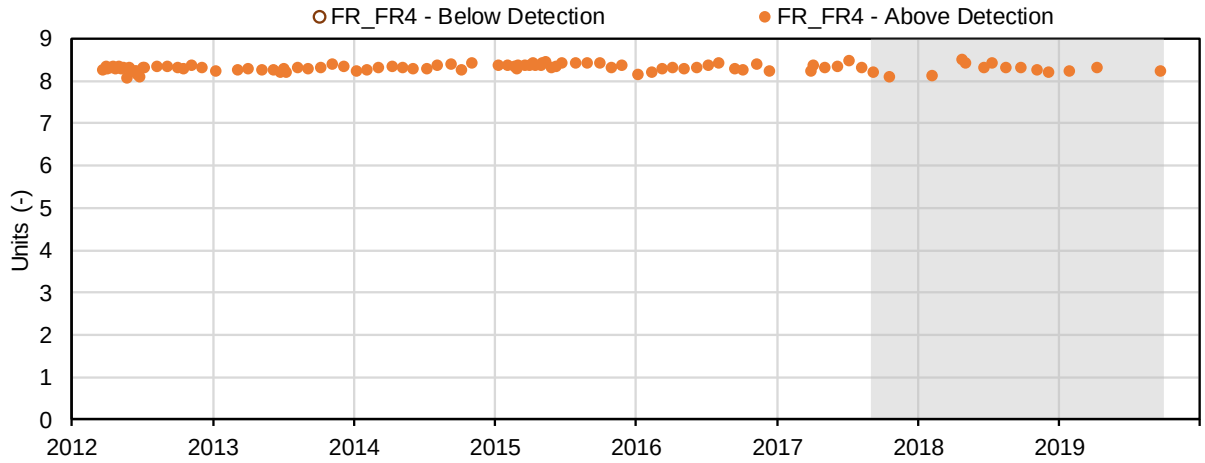
(6) Dissolved Oxygen (%); Field Measured



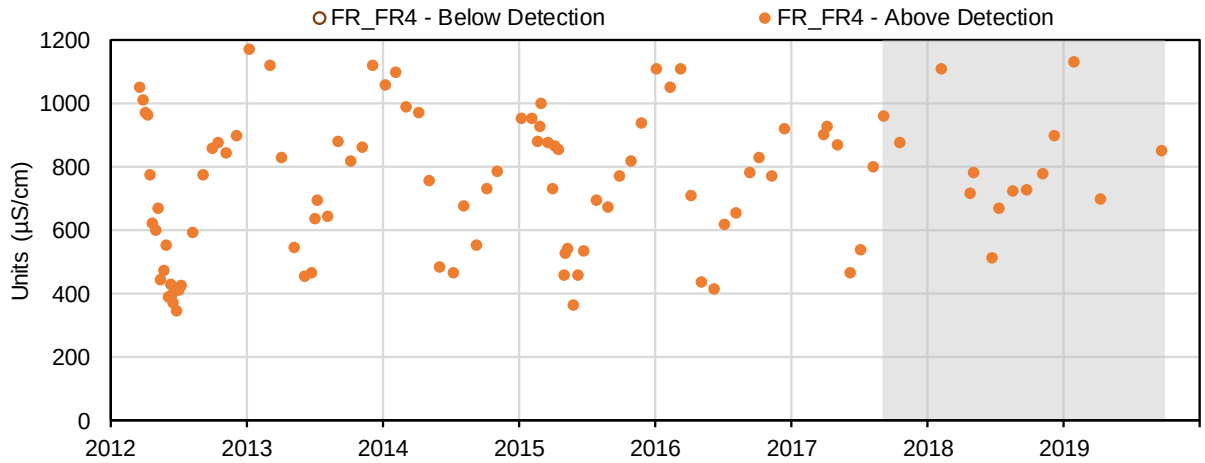
(7) Turbidity (NTU); Field Measured



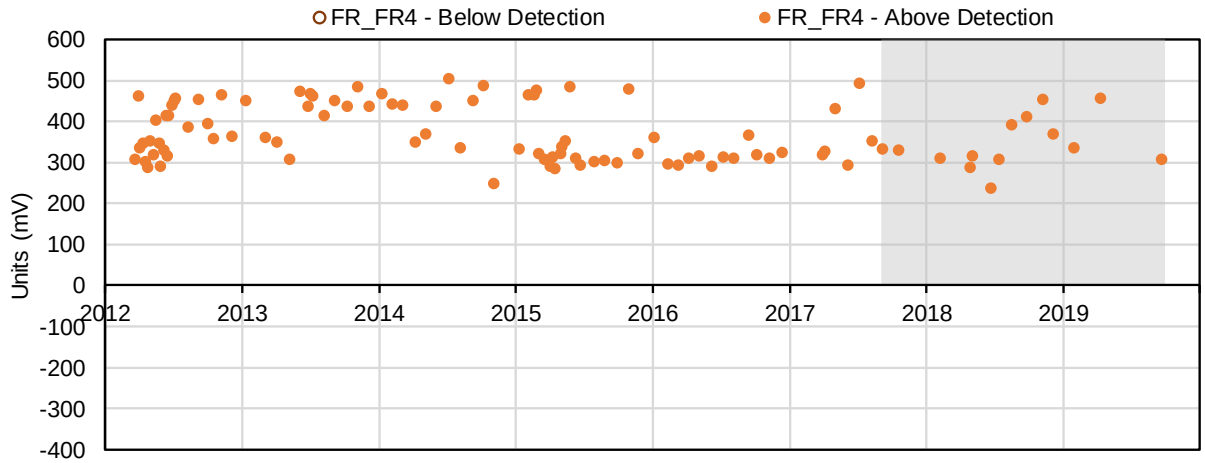
(8) pH (-); Conventional Parameters



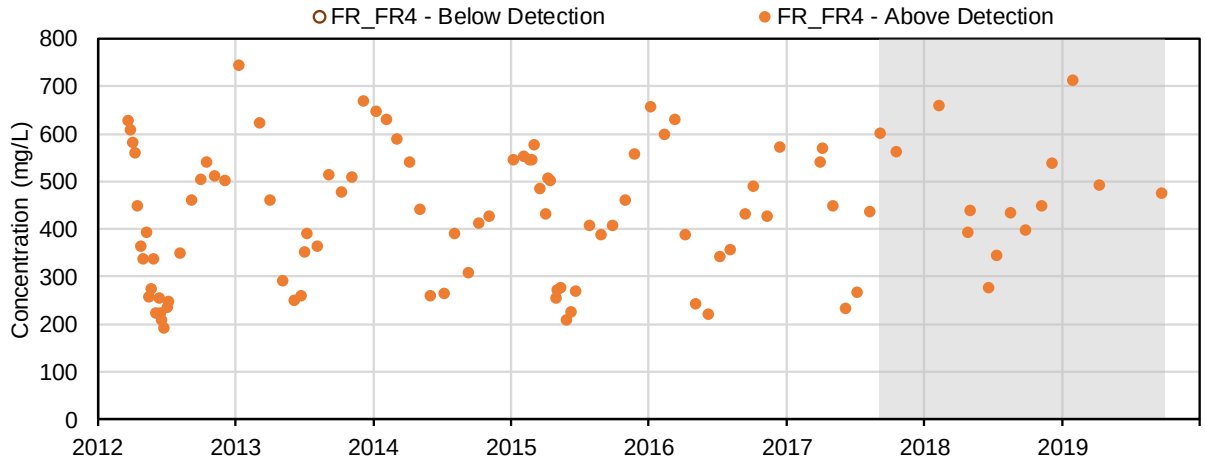
(9) Conductivity (µS/cm); Conventional Parameters



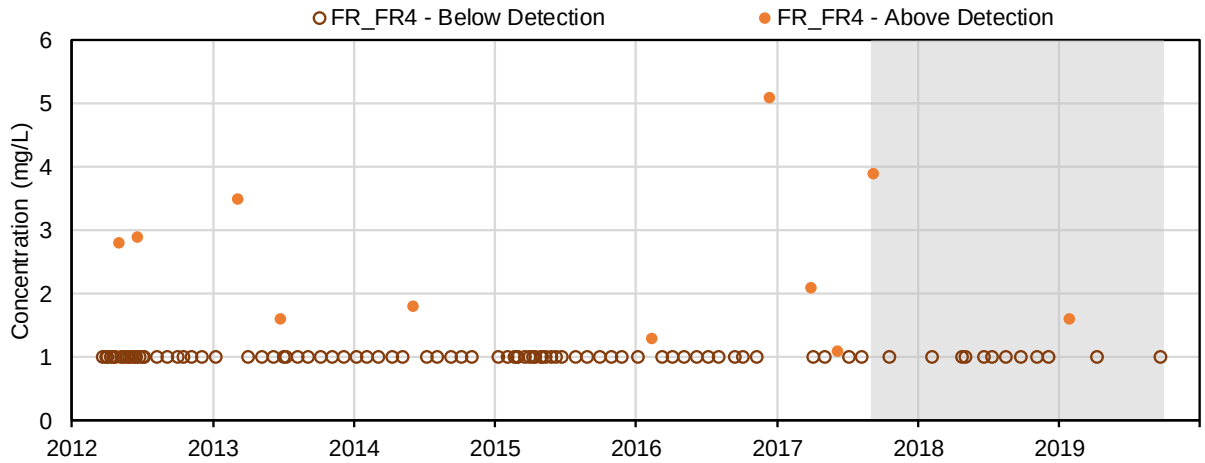
(10) Oxidation-Reduction Potential (mV); Conventional Parameters



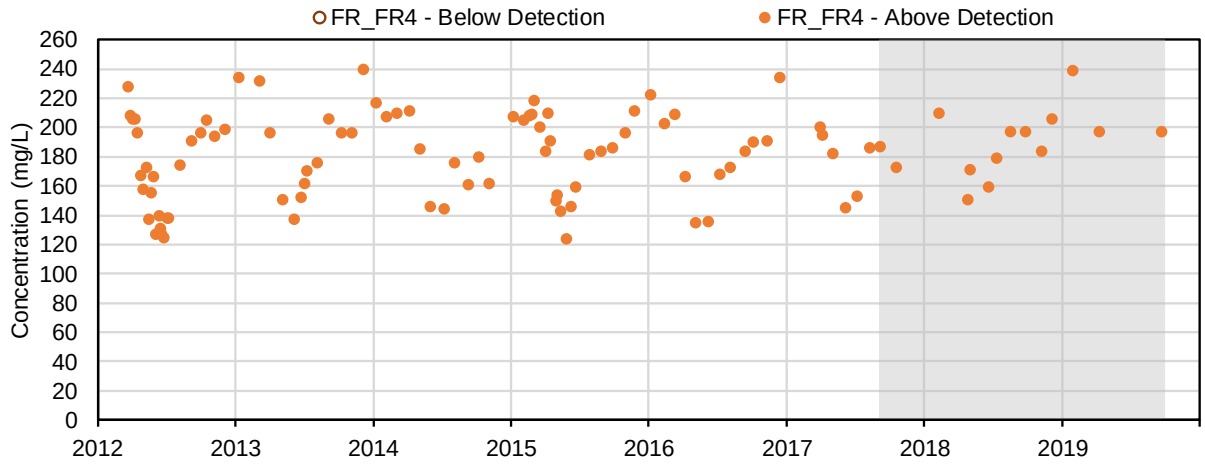
(11) Hardness, as CaCO3 (mg/L); Conventional Parameters



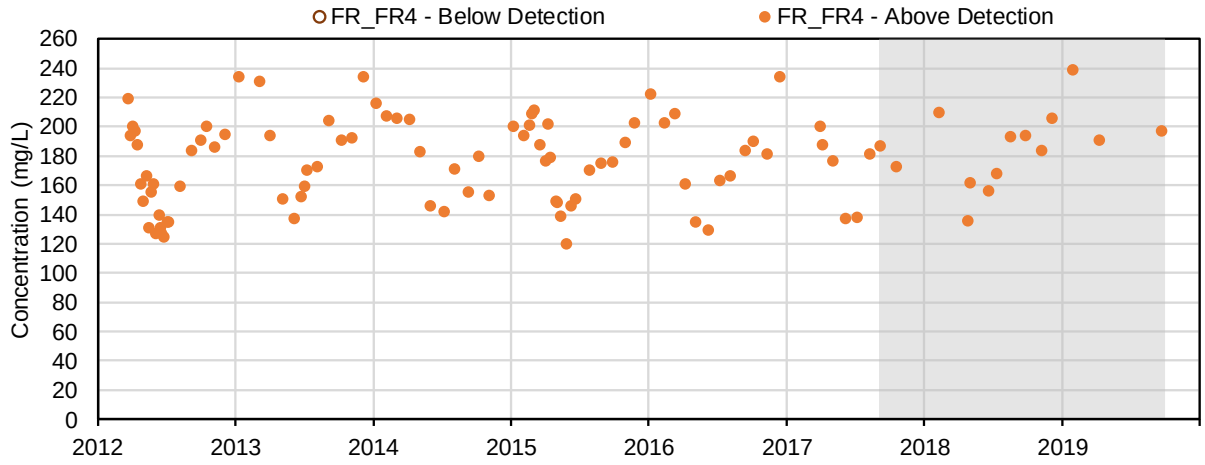
(12) Acidity, CaCO3 (mg/L); Conventional Parameters



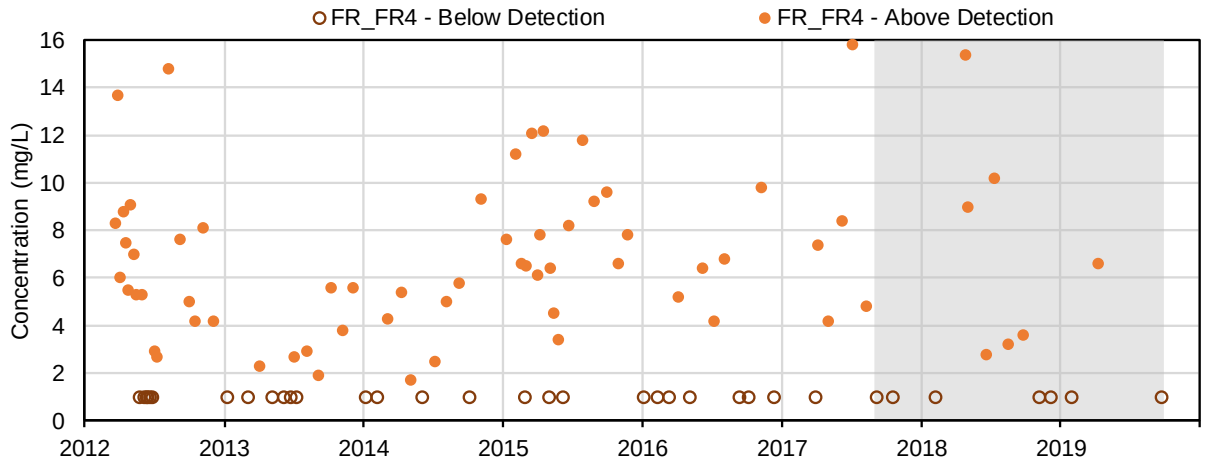
(13) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



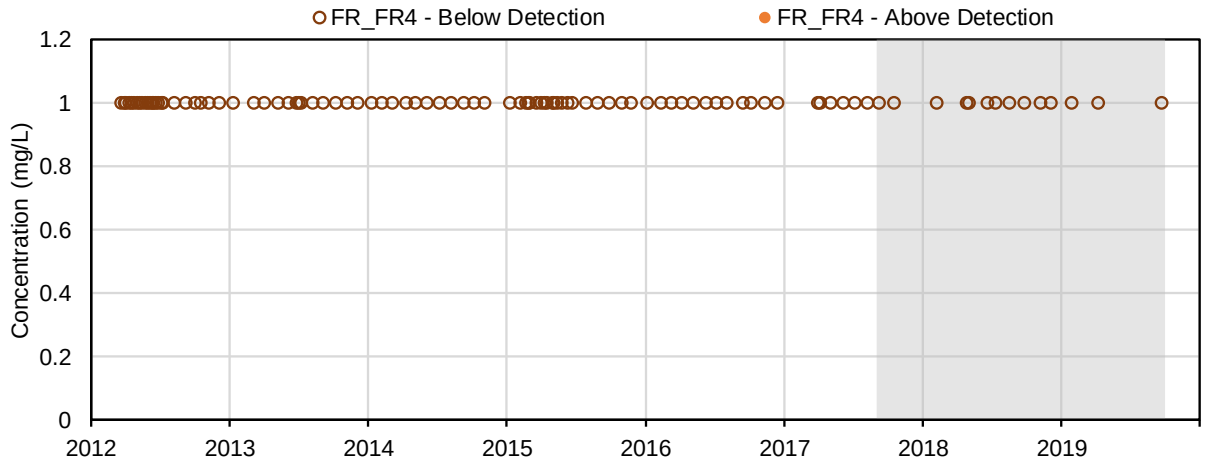
(14) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



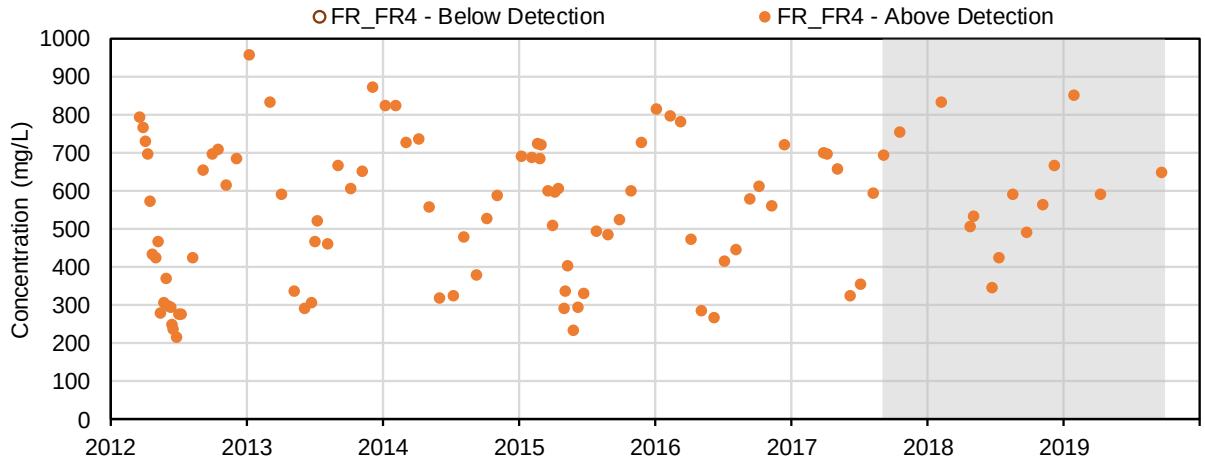
(15) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



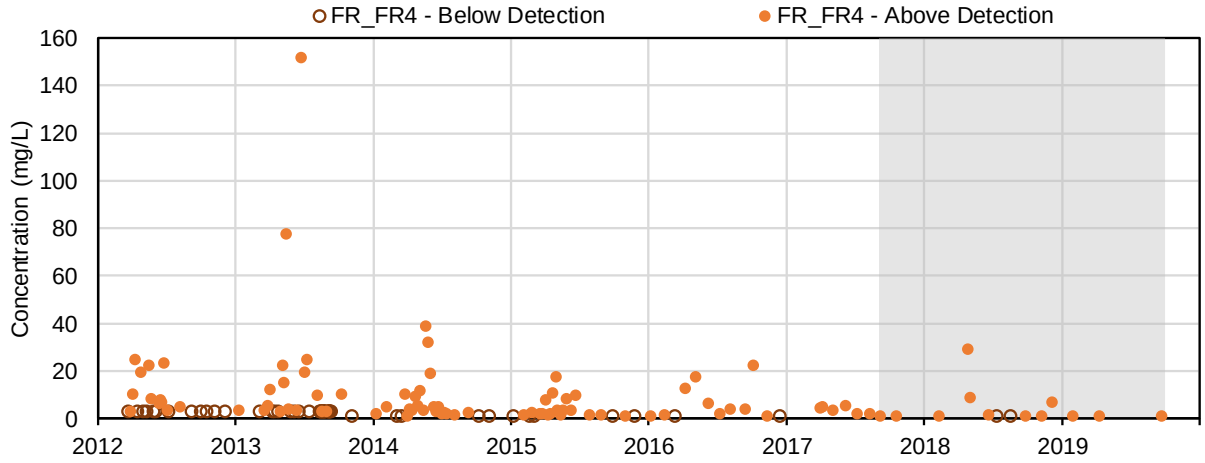
(16) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



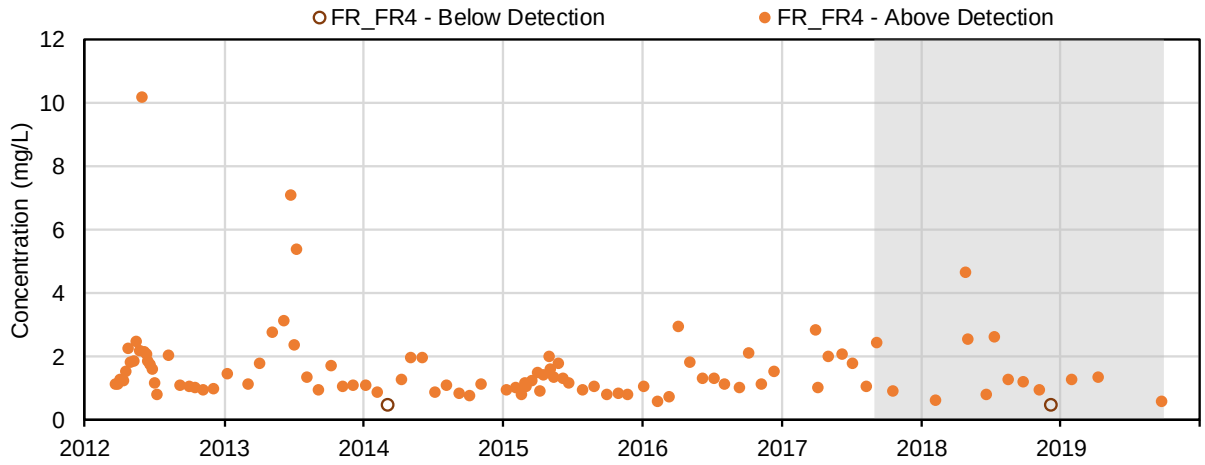
(17) Total dissolved solids (mg/L); Conventional Parameters



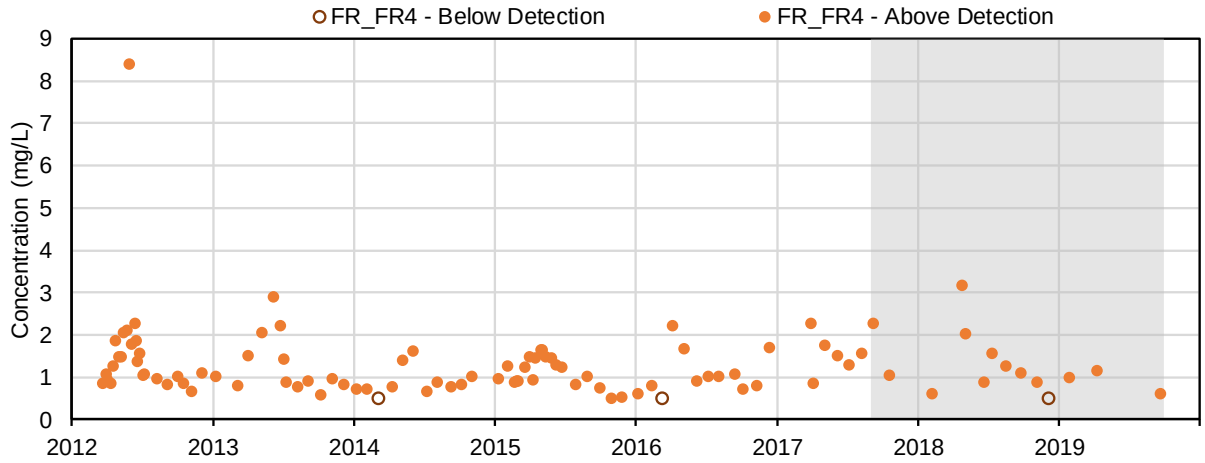
(18) Total suspended solids (mg/L); Conventional Parameters



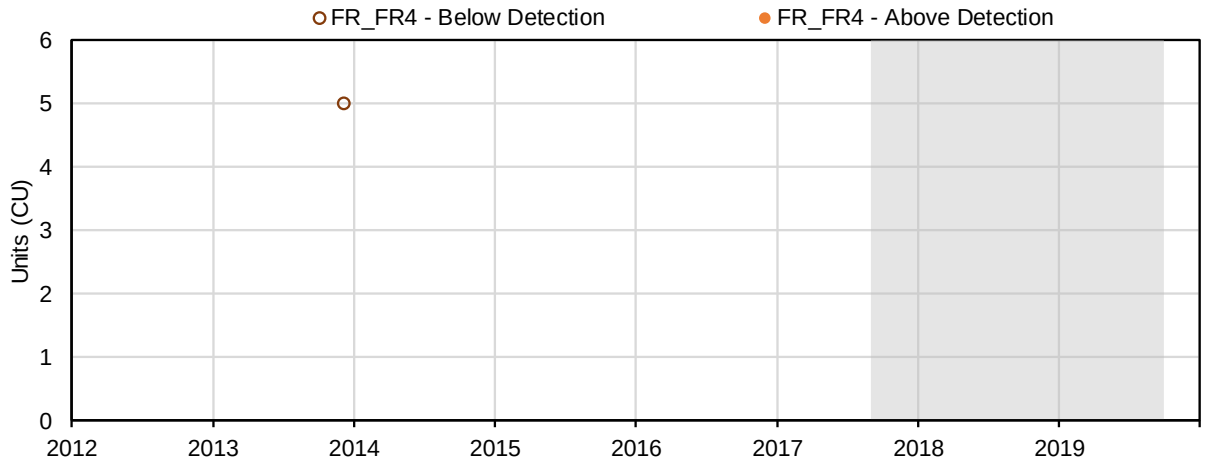
(19) Total organic carbon (mg/L); Conventional Parameters



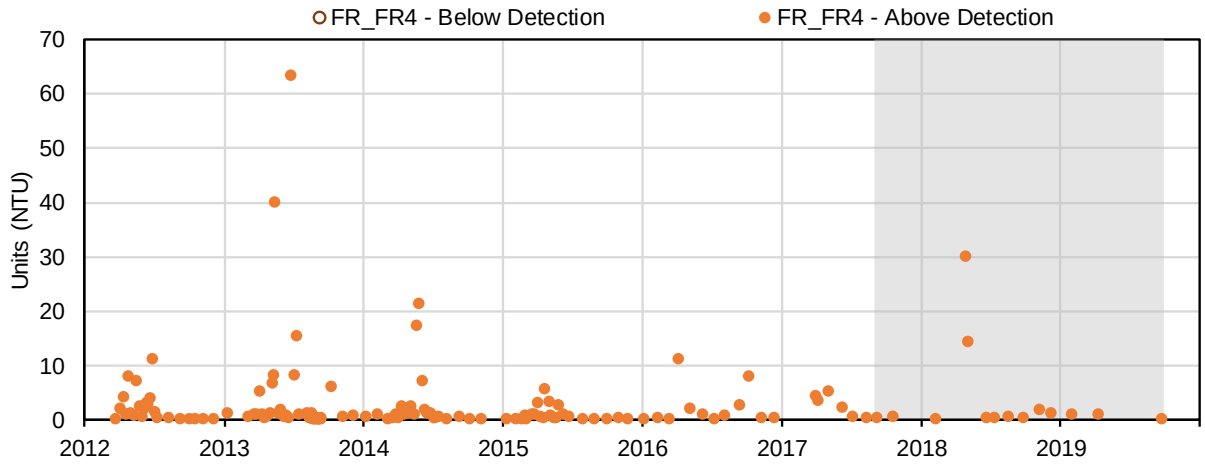
(20) Dissolved organic carbon (mg/L); Conventional Parameters



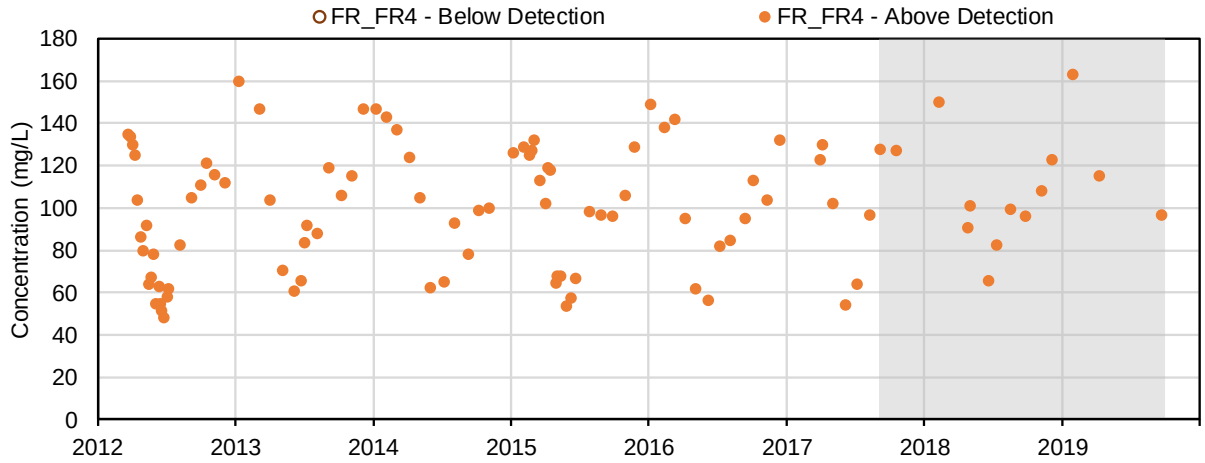
(21) Colour (CU); Conventional Parameters



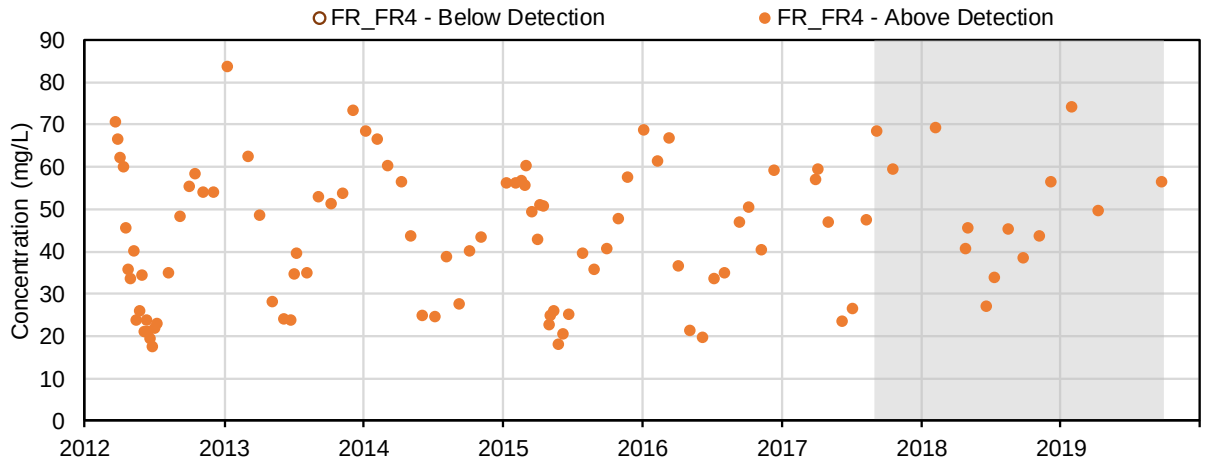
(22) Turbidity (NTU); Conventional Parameters



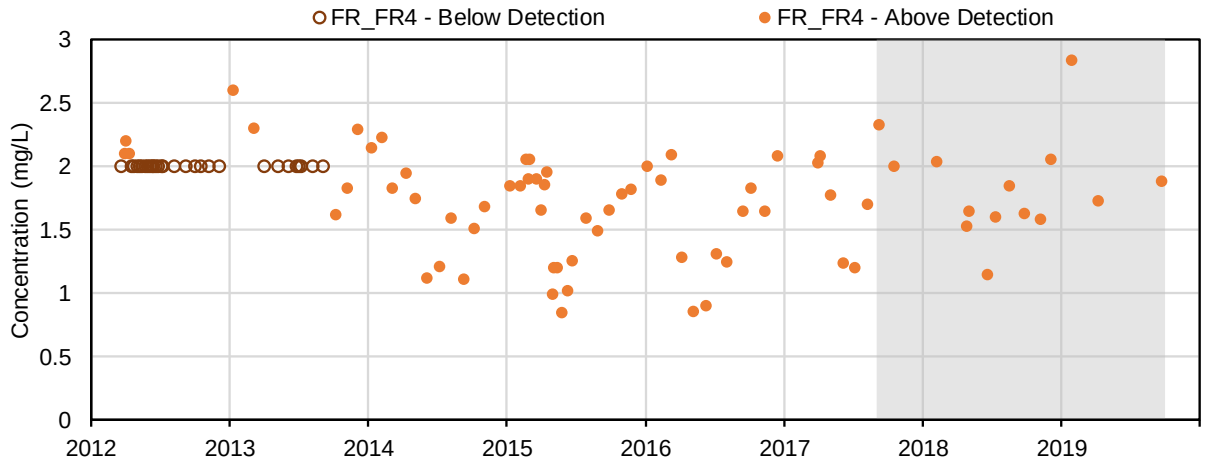
(23) Calcium (mg/L); Major Ions



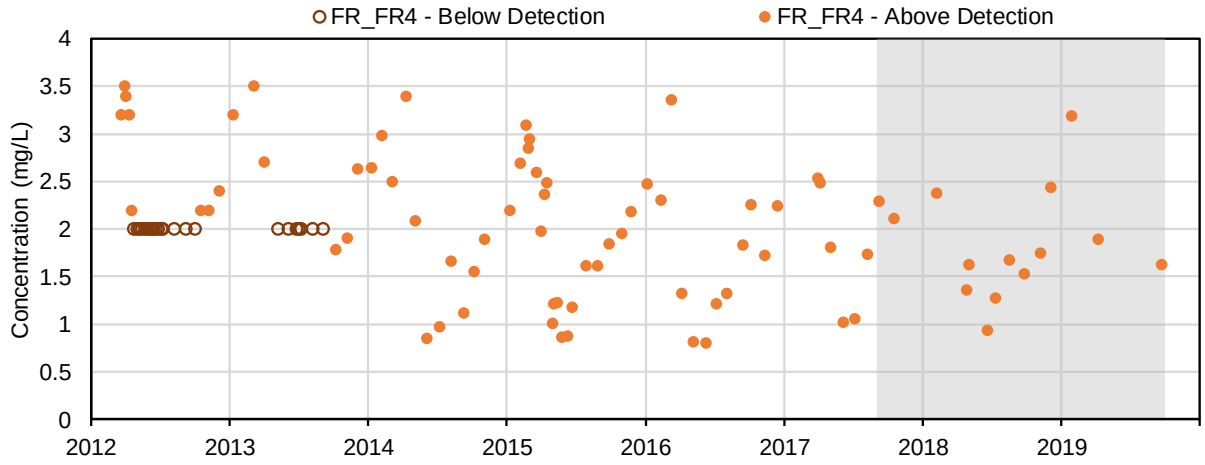
(24) Magnesium (mg/L); Major Ions



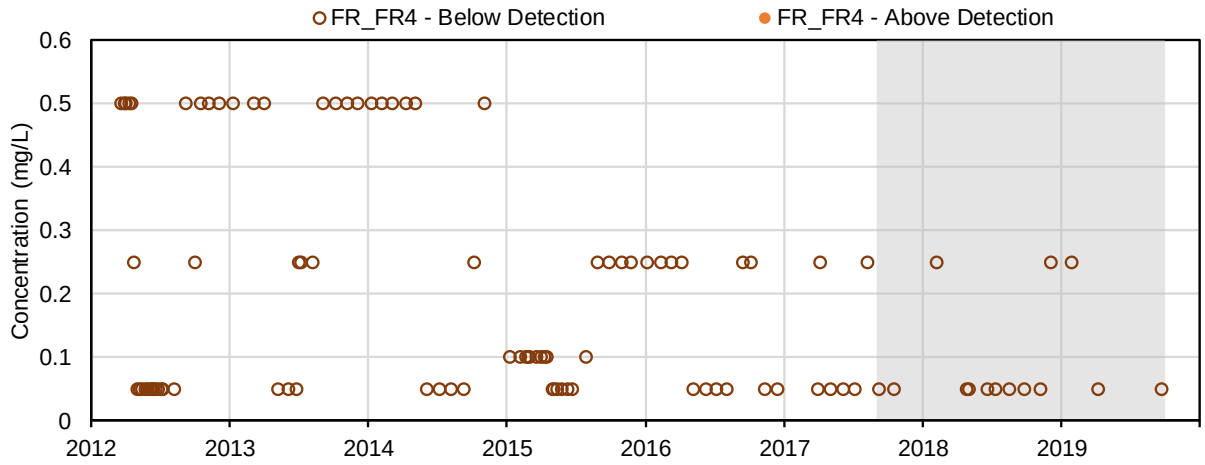
(25) Potassium (mg/L); Major Ions



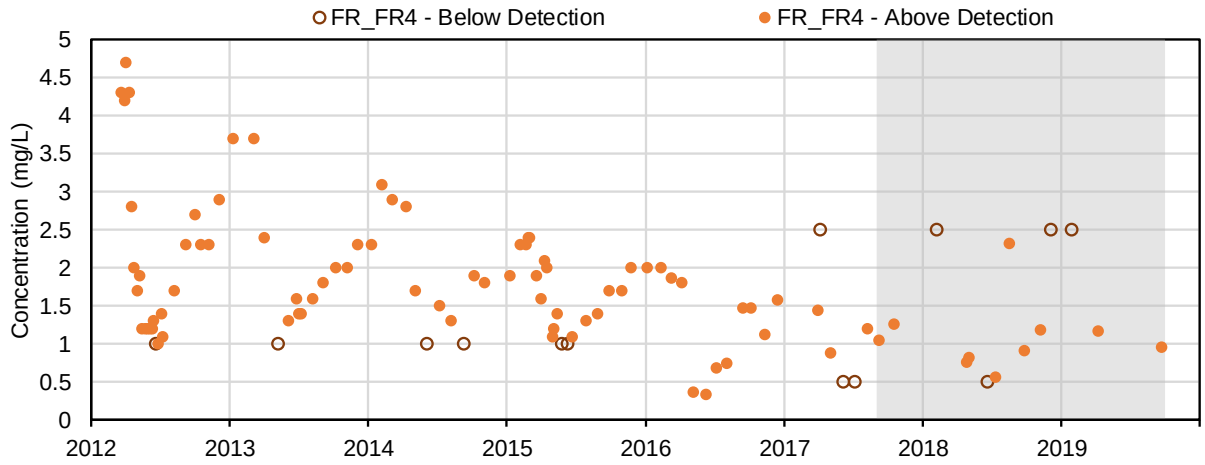
(26) Sodium (mg/L); Major Ions



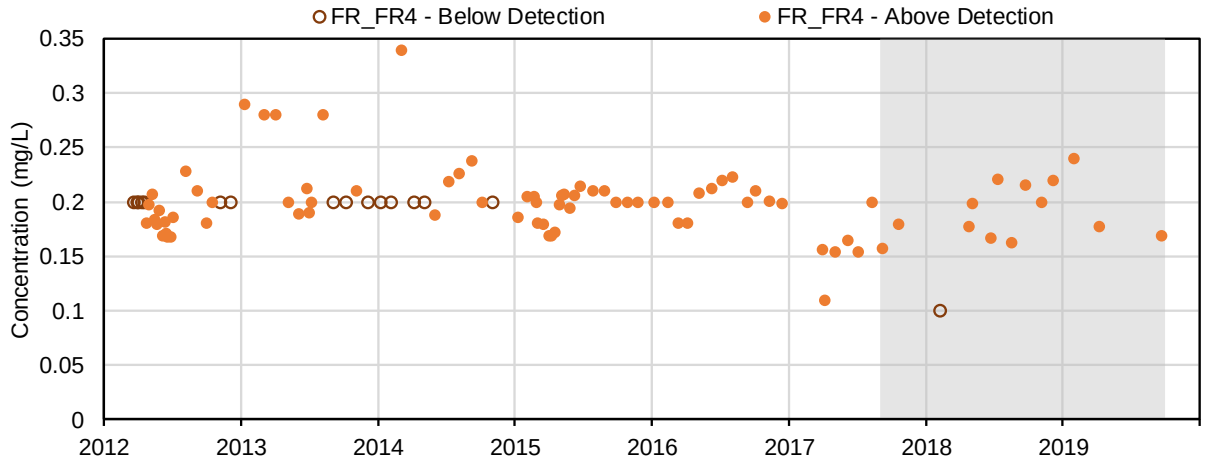
(27) Bromide (mg/L); Major Ions



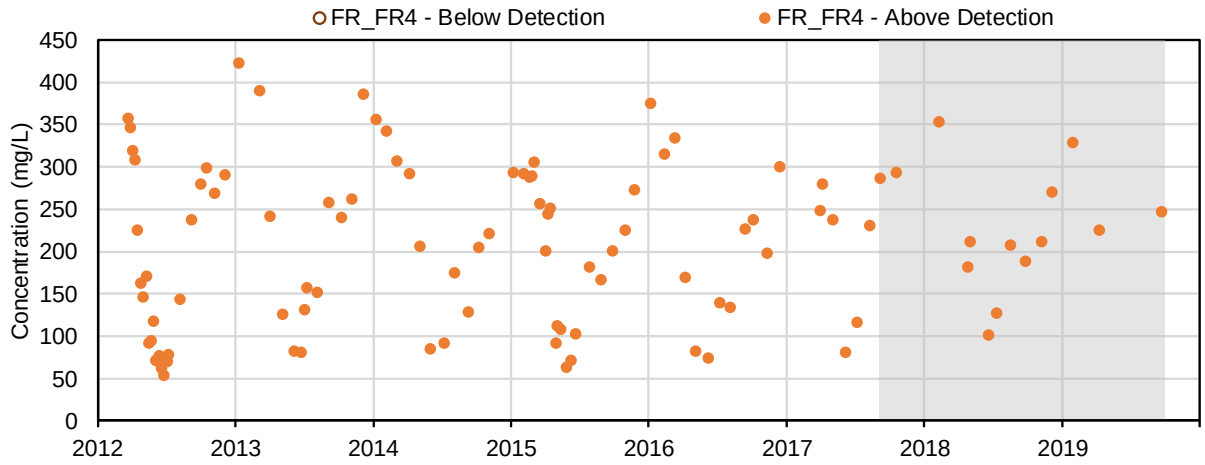
(28) Chloride (mg/L); Major Ions



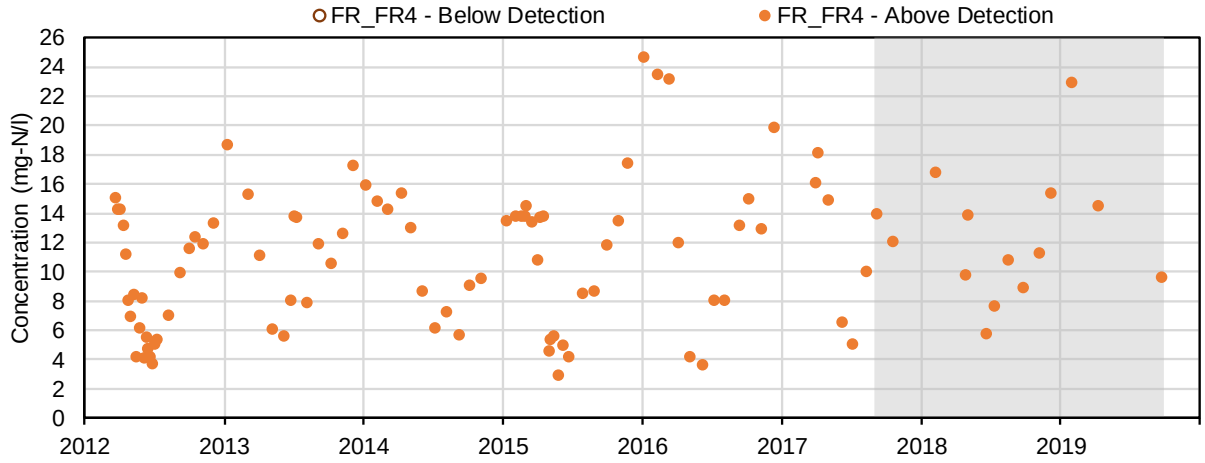
(29) Fluoride (mg/L); Major Ions



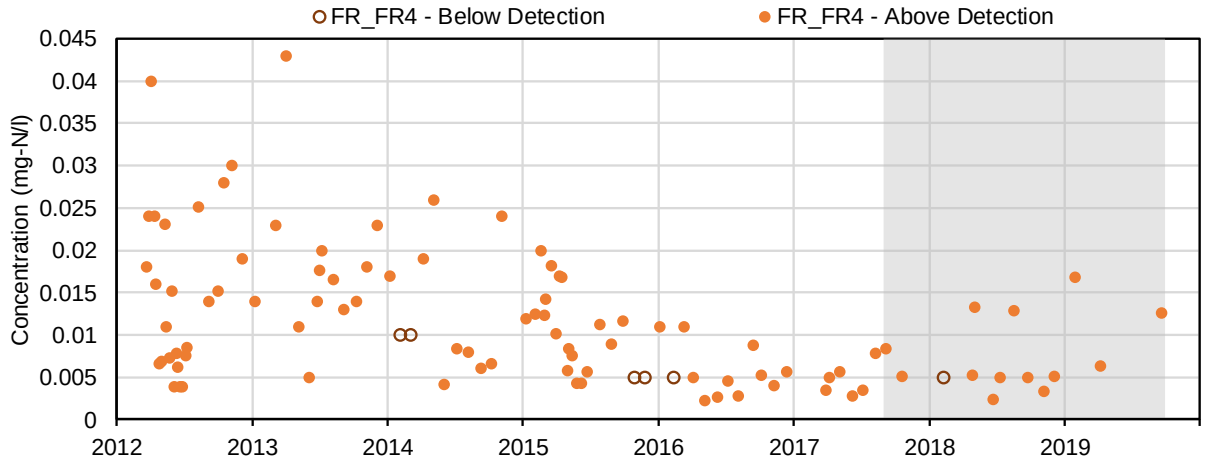
(30) Sulphate (mg/L); Major Ions



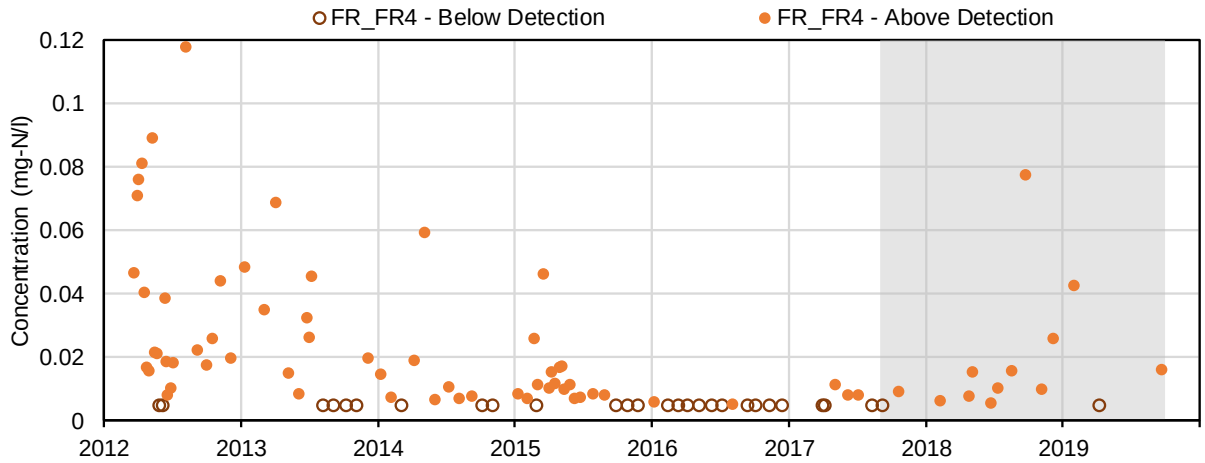
(31) Nitrate (mg-N/l); Nutrients and Biological Indicators



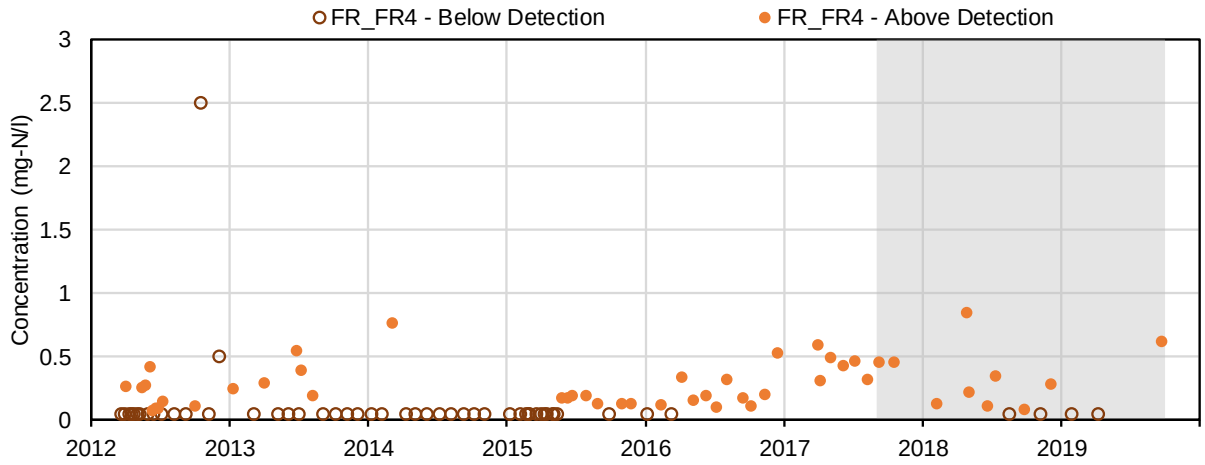
(32) Nitrite (mg-N/l); Nutrients and Biological Indicators



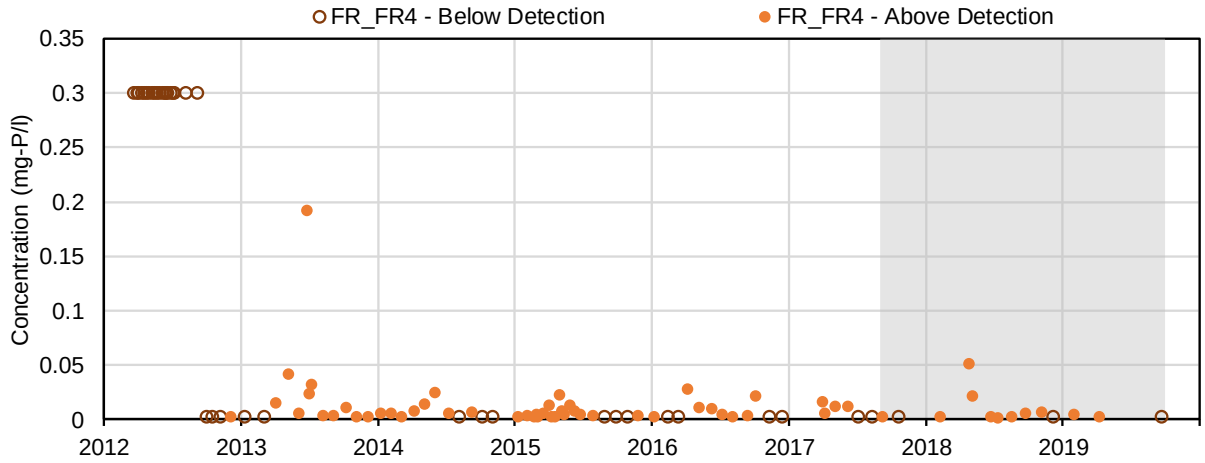
(33) Total ammonia (mg-N/l); Nutrients and Biological Indicators



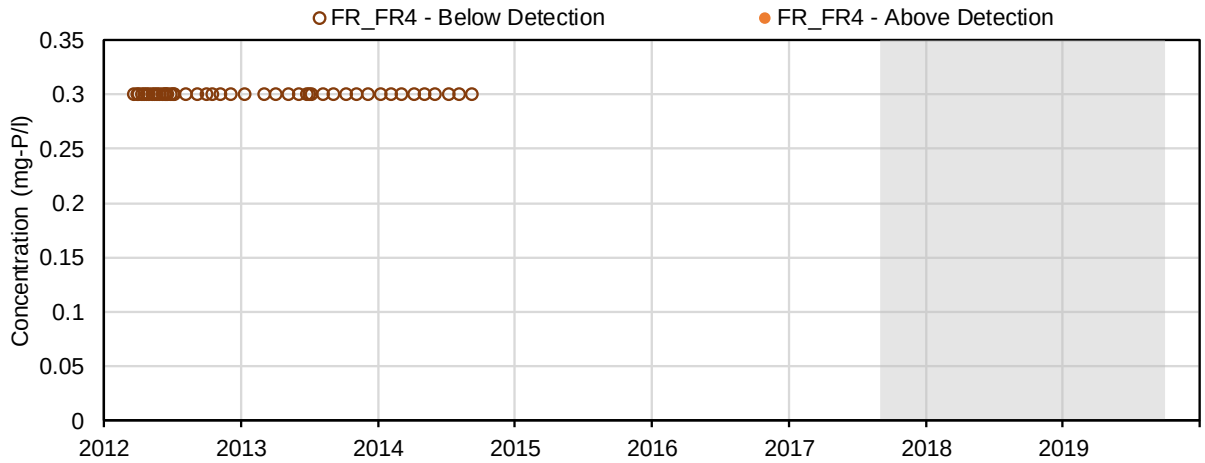
(34) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



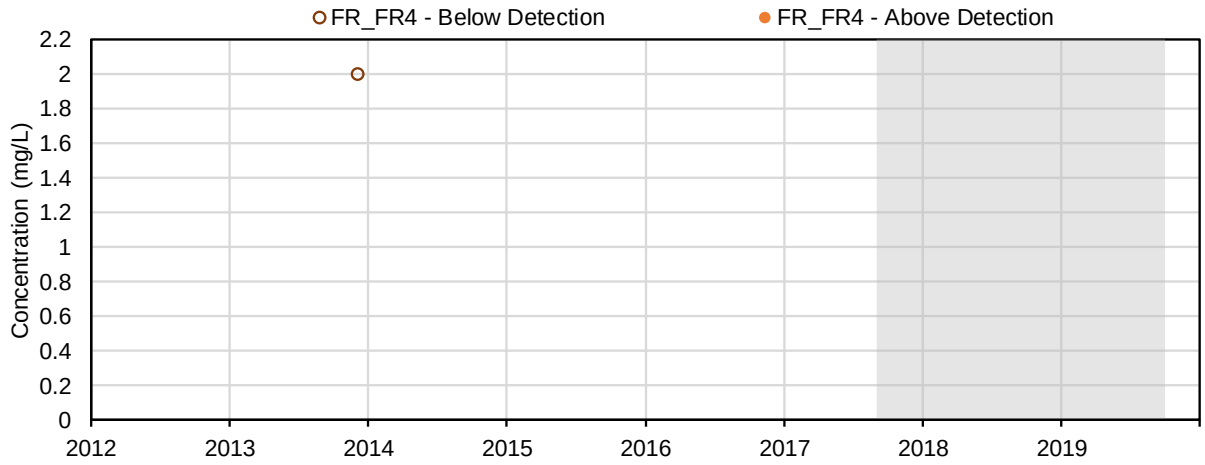
(35) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



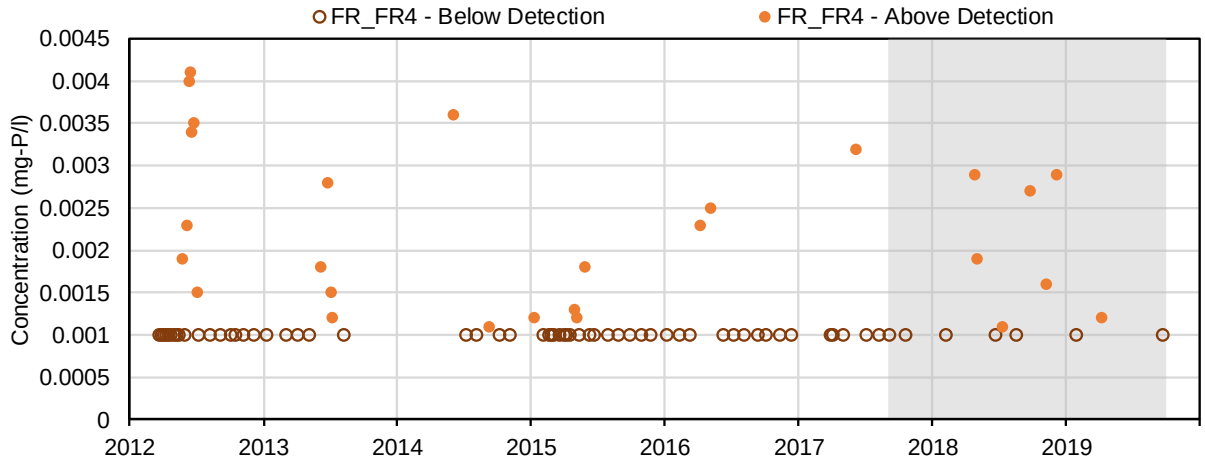
(36) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



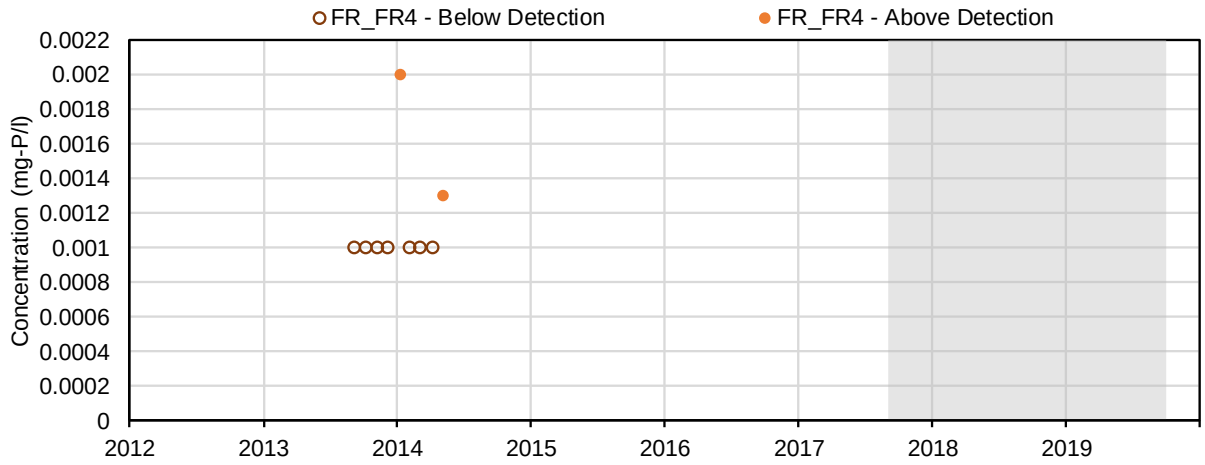
(37) Biochemical oxygen demand (mg/L); Nutrients and Biological Indicators



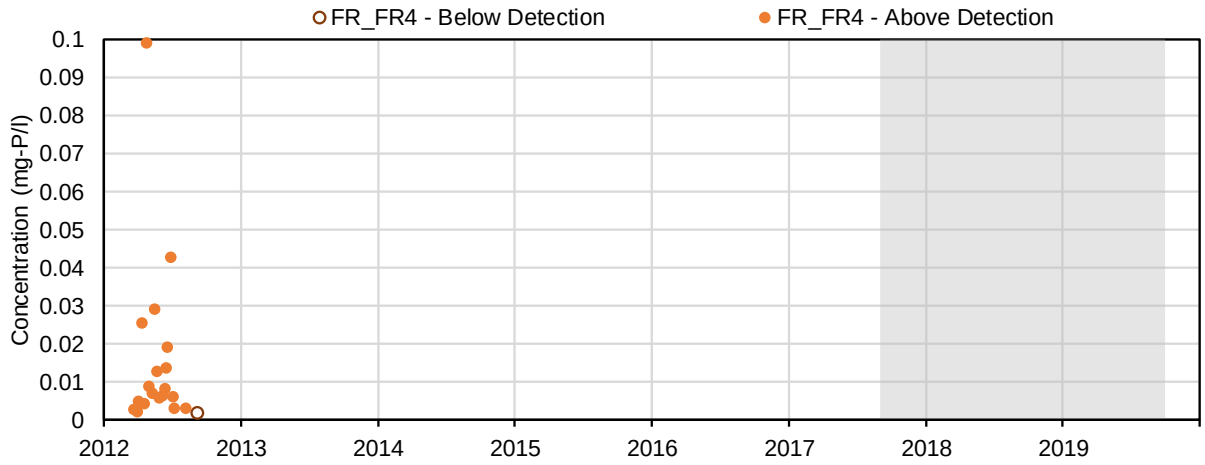
(38) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



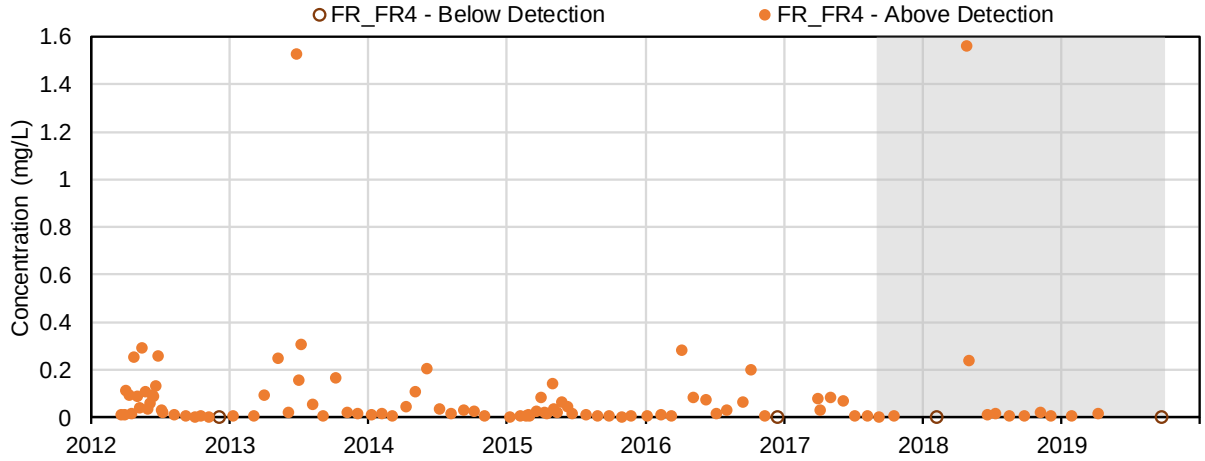
(39) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



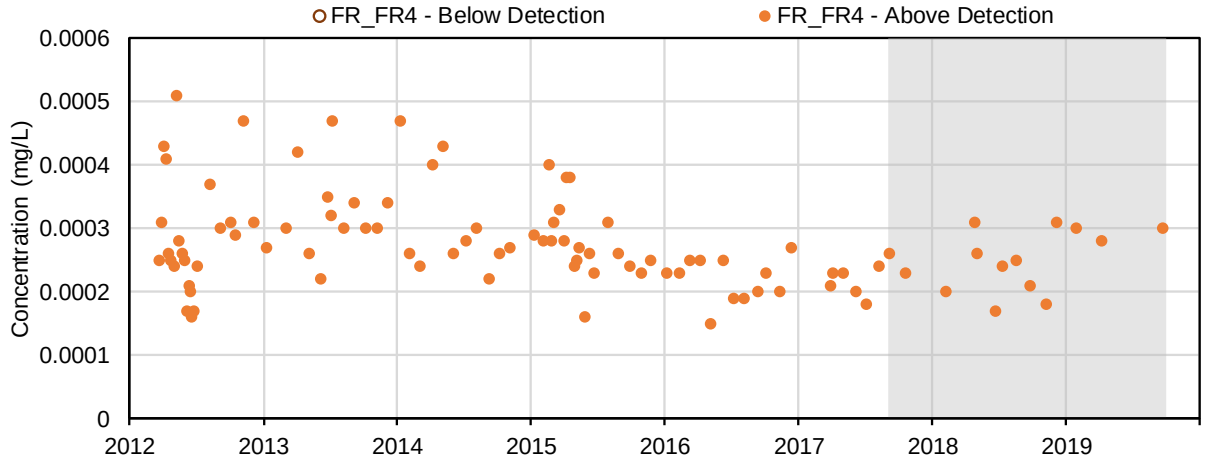
(40) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



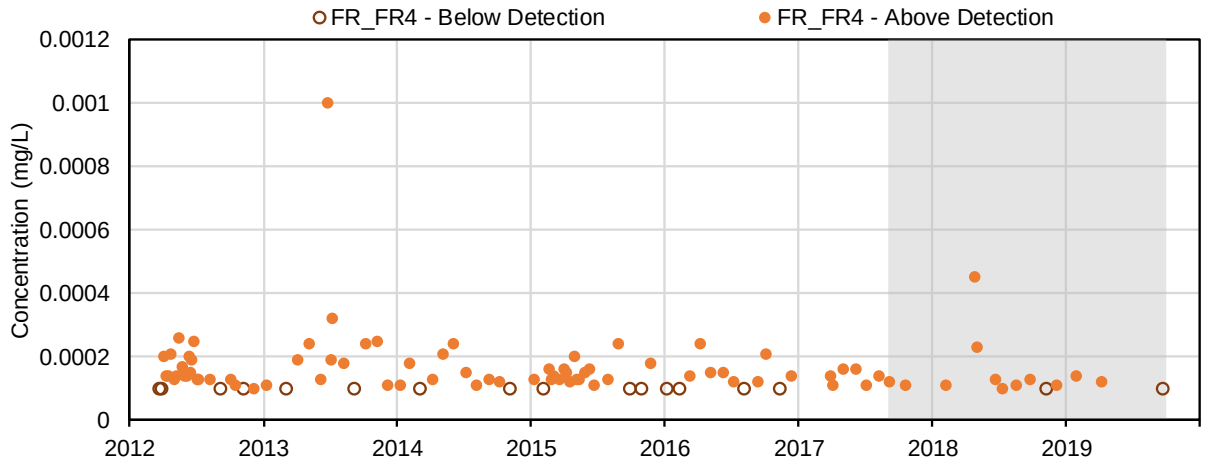
(41) Aluminum (mg/L); Total Metals



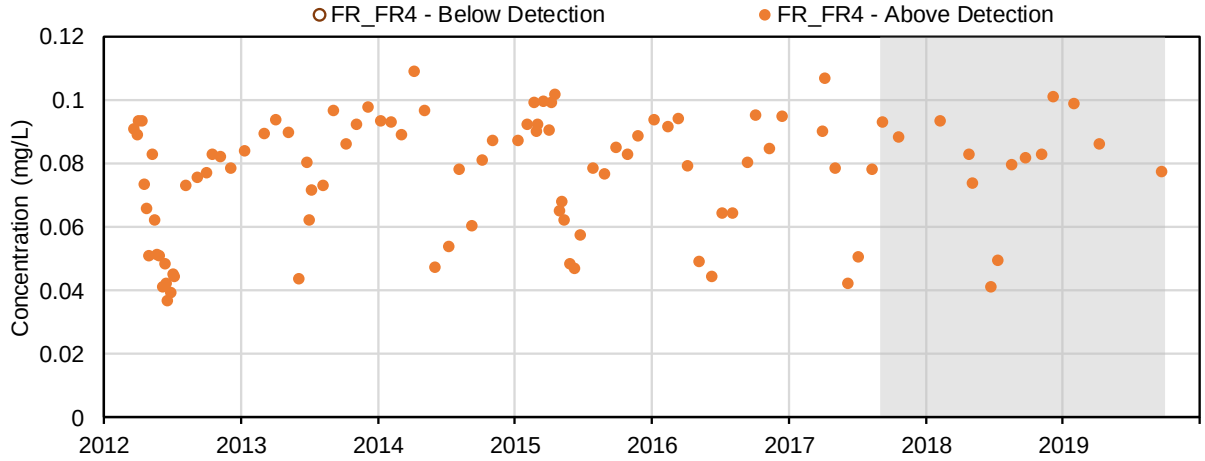
(42) Antimony (mg/L); Total Metals



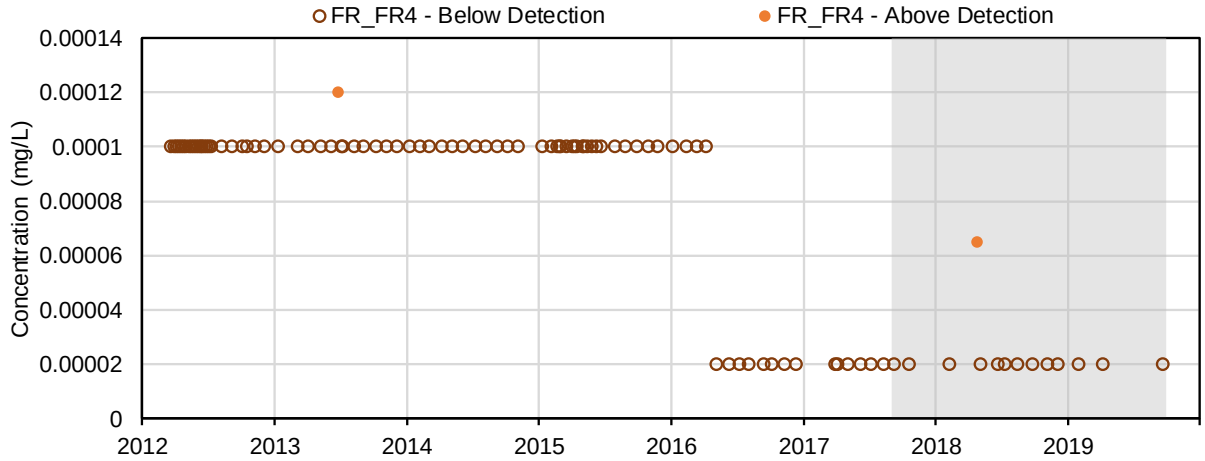
(43) Arsenic (mg/L); Total Metals



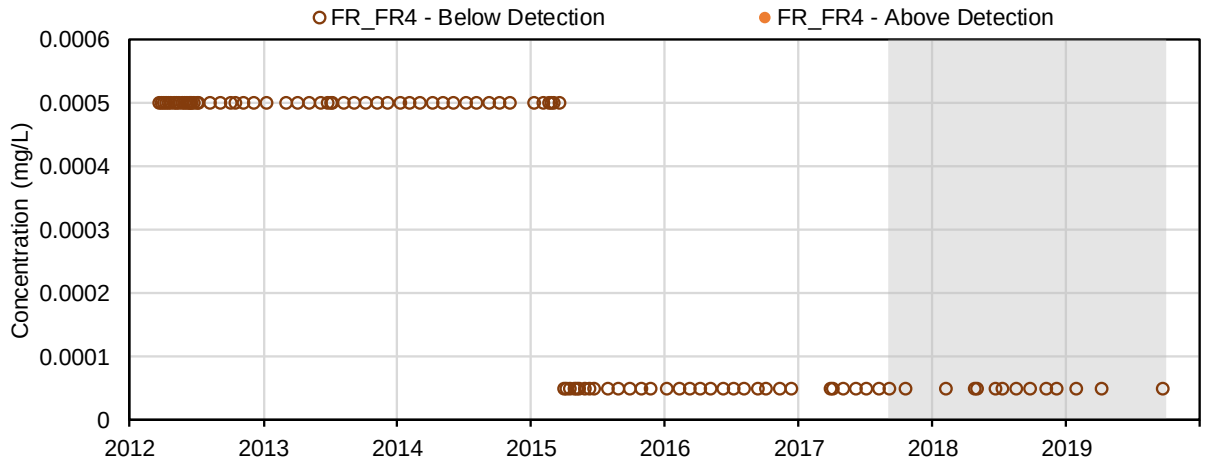
(44) Barium (mg/L); Total Metals



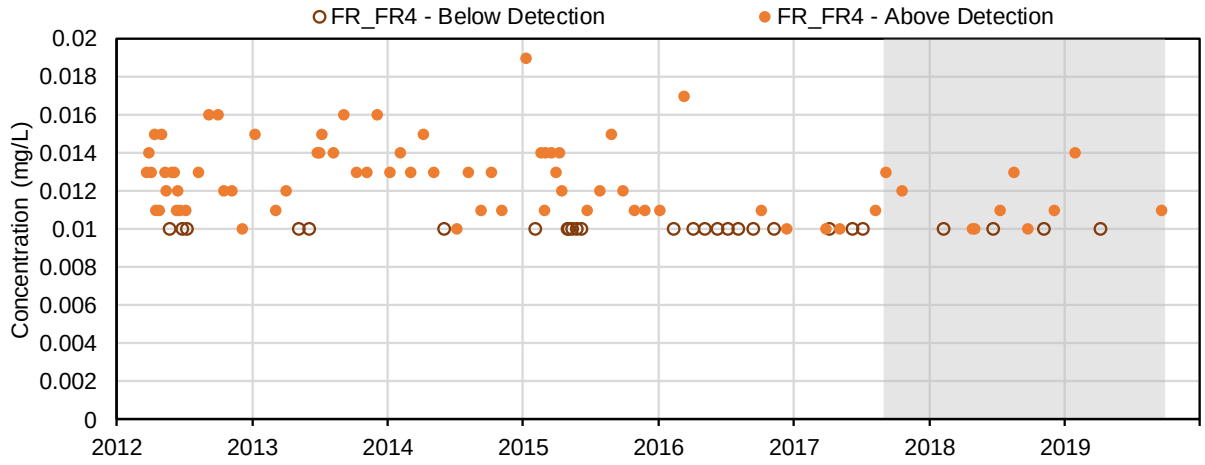
(45) Beryllium (mg/L); Total Metals



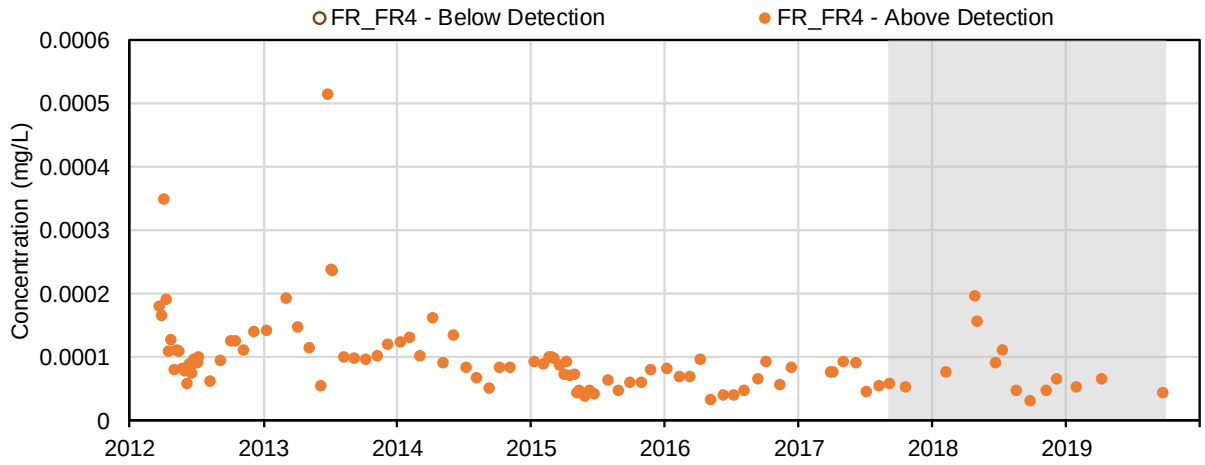
(46) Bismuth (mg/L); Total Metals



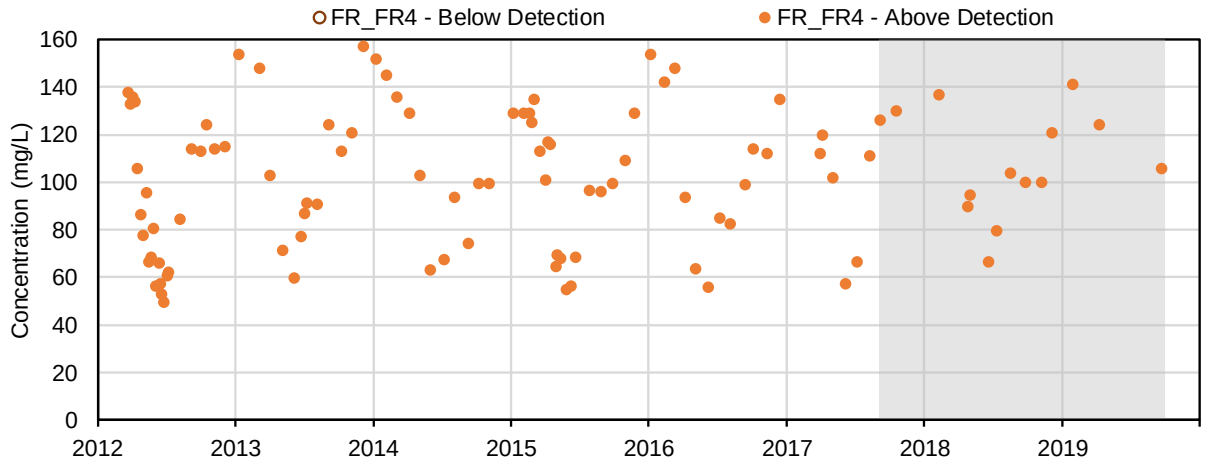
(47) Boron (mg/L); Total Metals



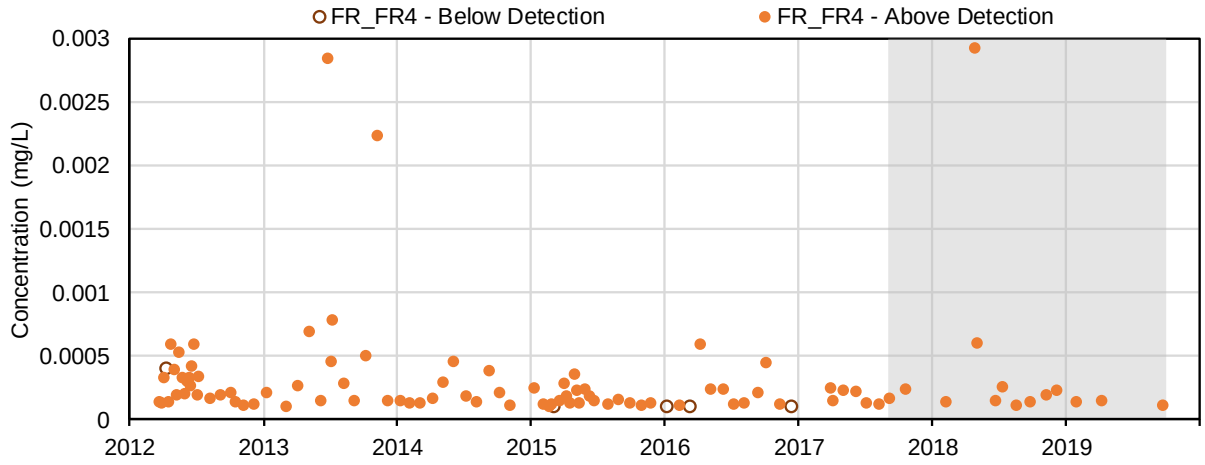
(48) Cadmium (mg/L); Total Metals



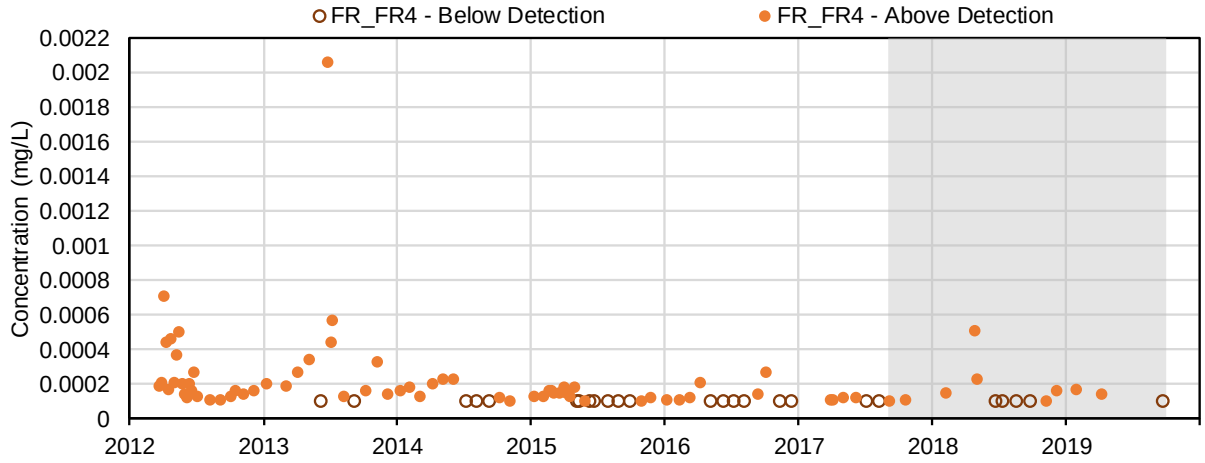
(49) Calcium (mg/L); Total Metals



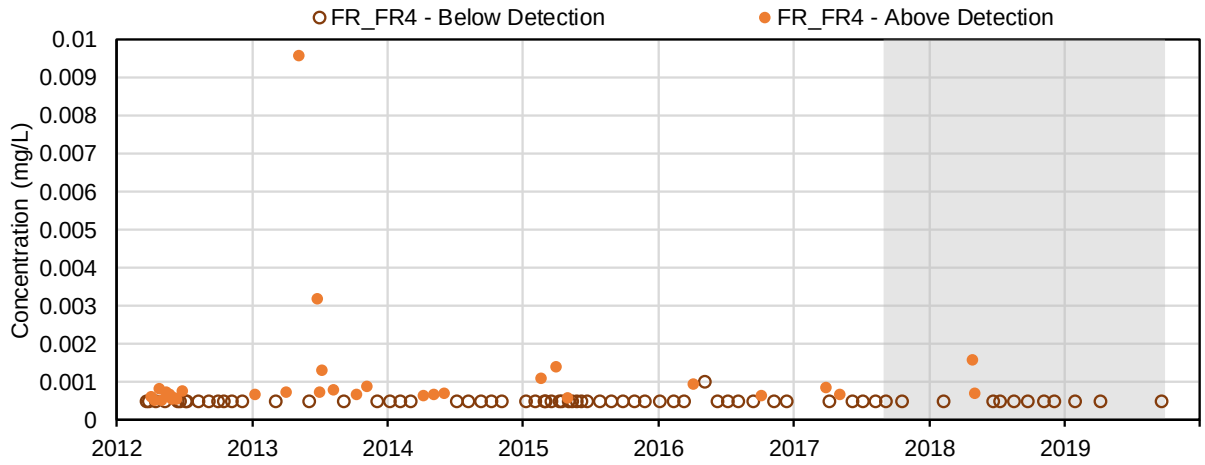
(50) Chromium (mg/L); Total Metals



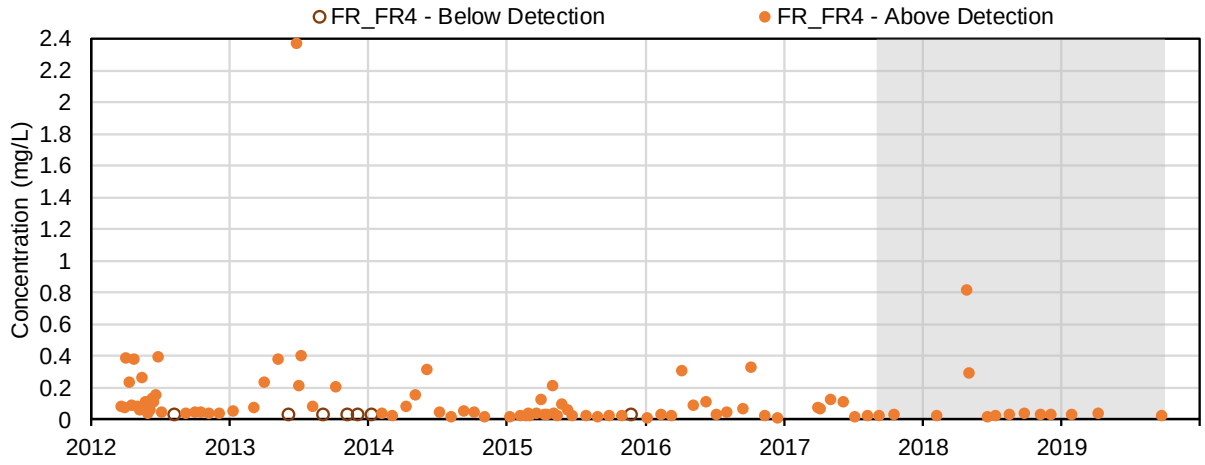
(51) Cobalt (mg/L); Total Metals



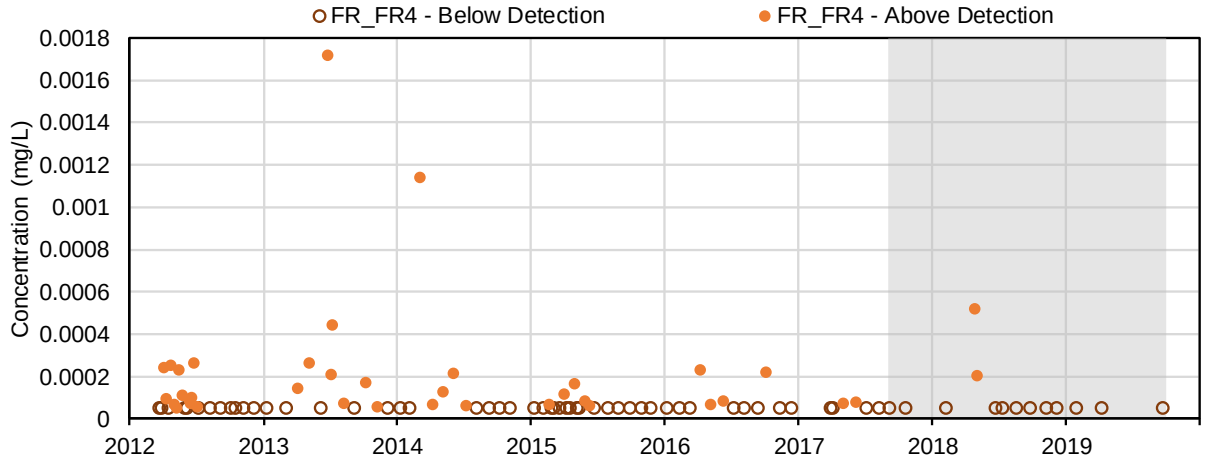
(52) Copper (mg/L); Total Metals



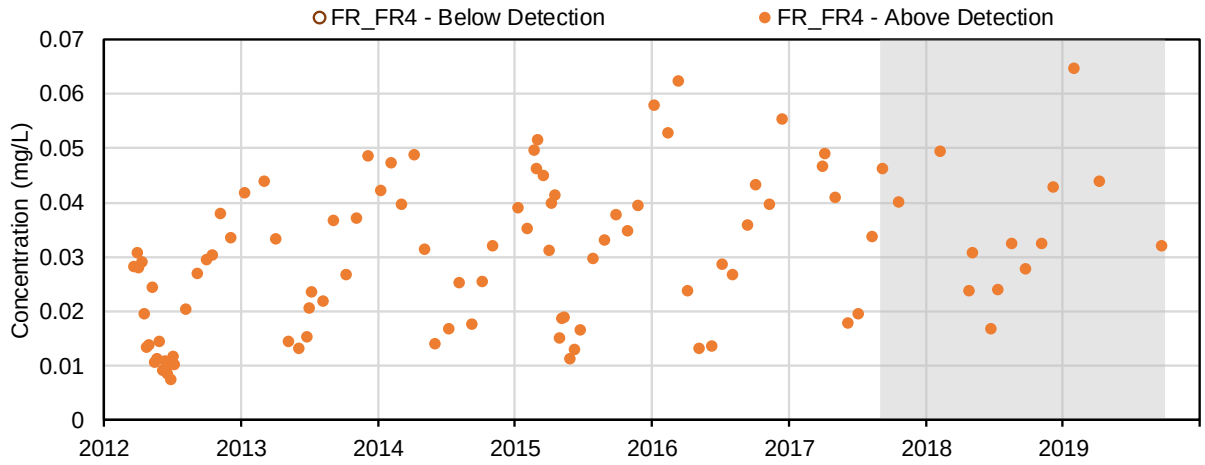
(53) Iron (mg/L); Total Metals



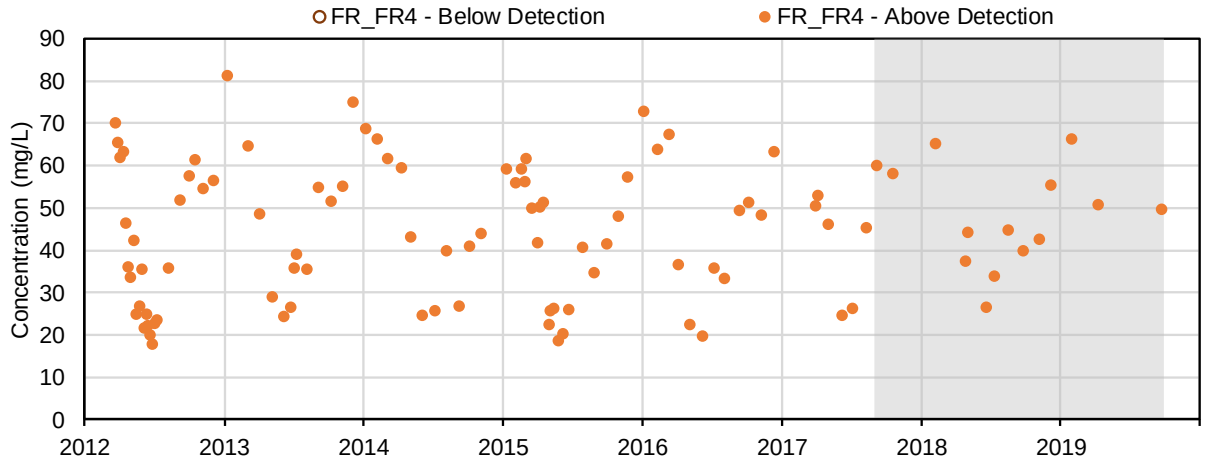
(54) Lead (mg/L); Total Metals



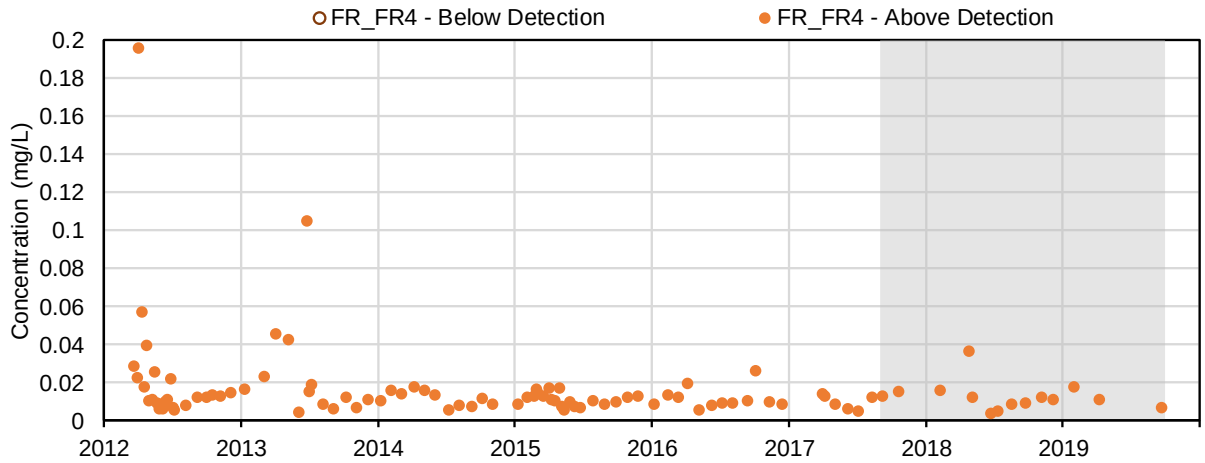
(55) Lithium (mg/L); Total Metals



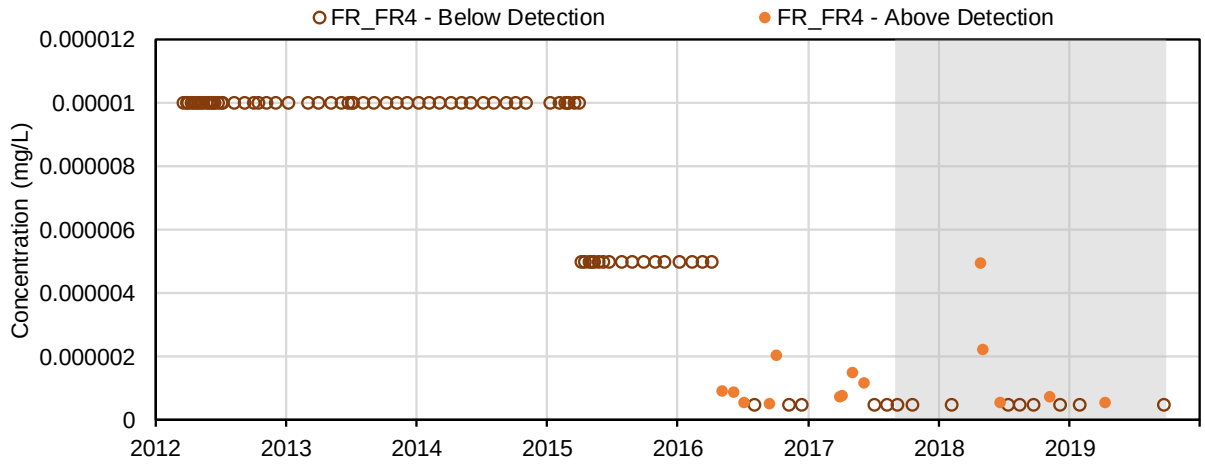
(56) Magnesium (mg/L); Total Metals



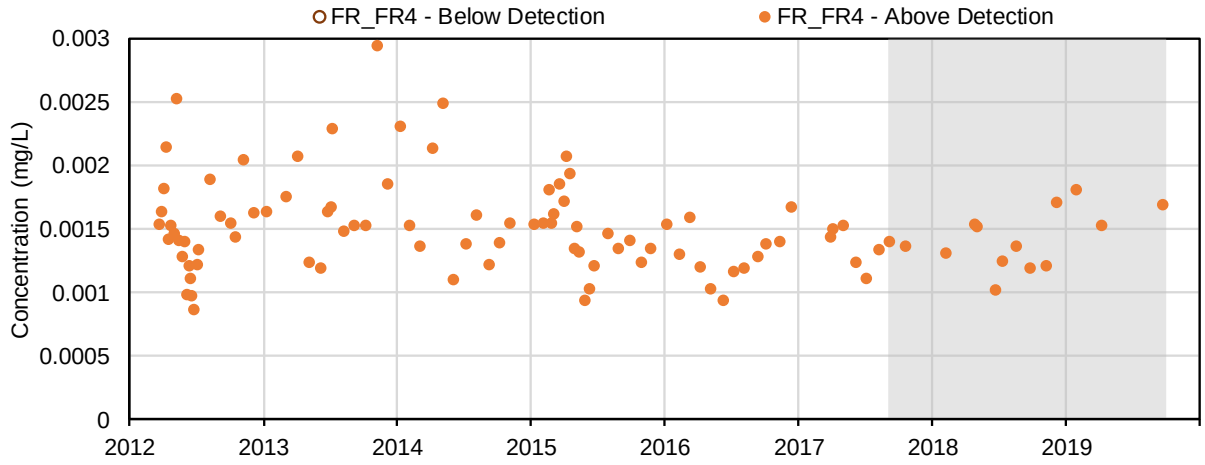
(57) Manganese (mg/L); Total Metals



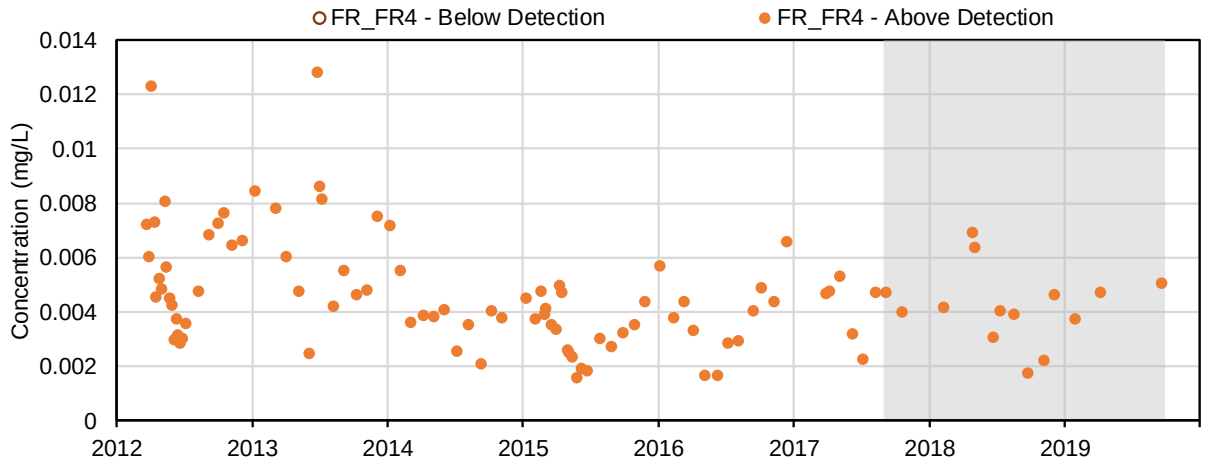
(58) Mercury (mg/L); Total Metals



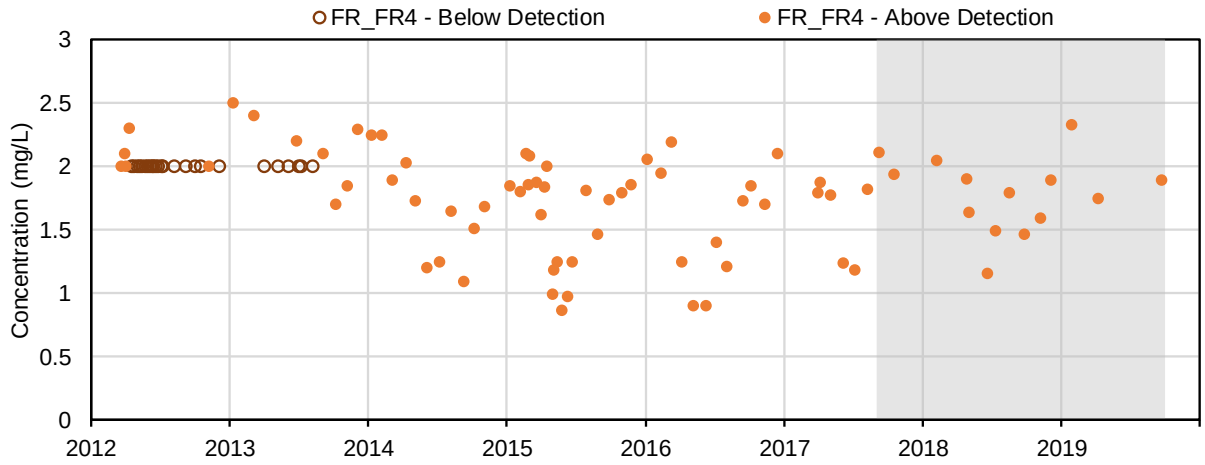
(59) Molybdenum (mg/L); Total Metals



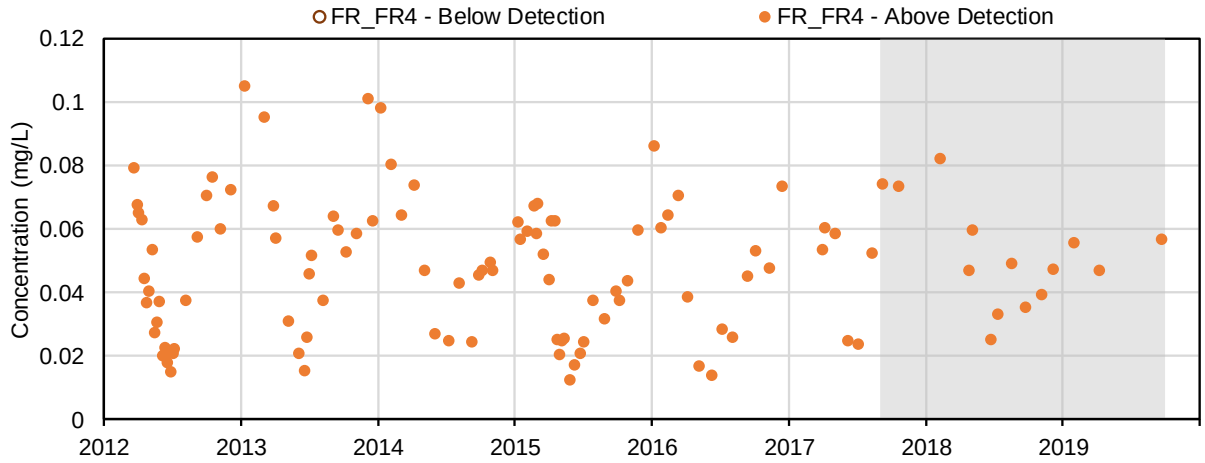
(60) Nickel (mg/L); Total Metals



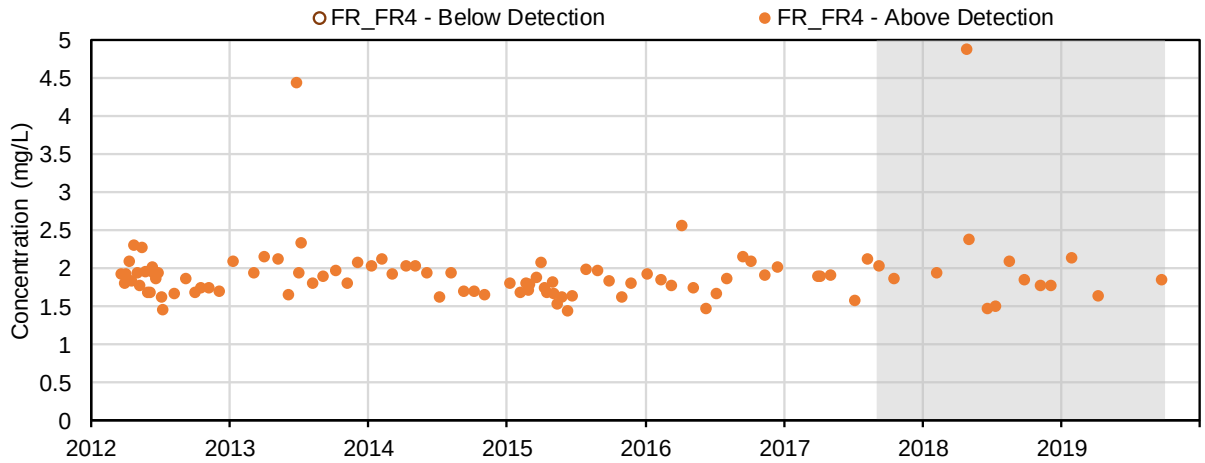
(61) Potassium (mg/L); Total Metals



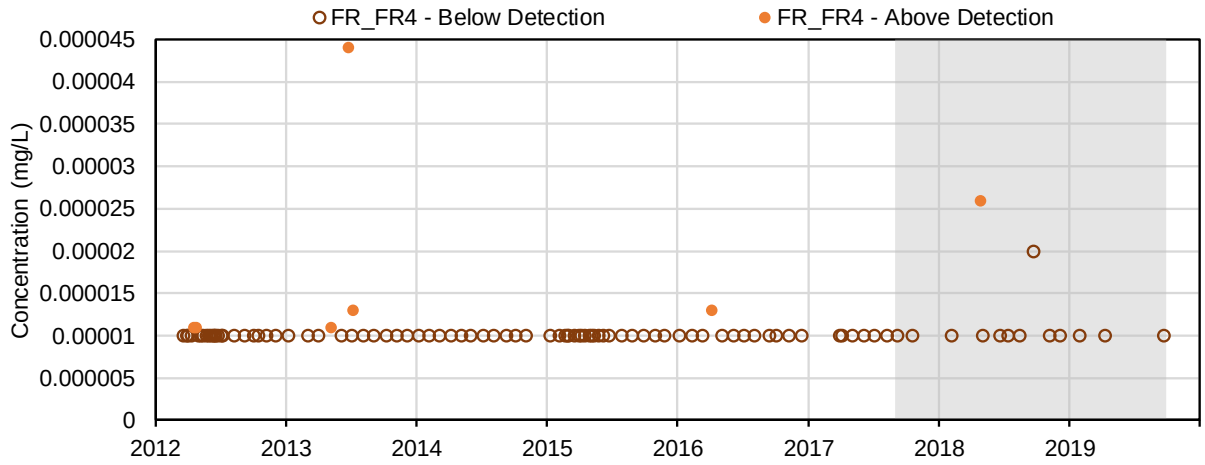
(62) Selenium (mg/L); Total Metals



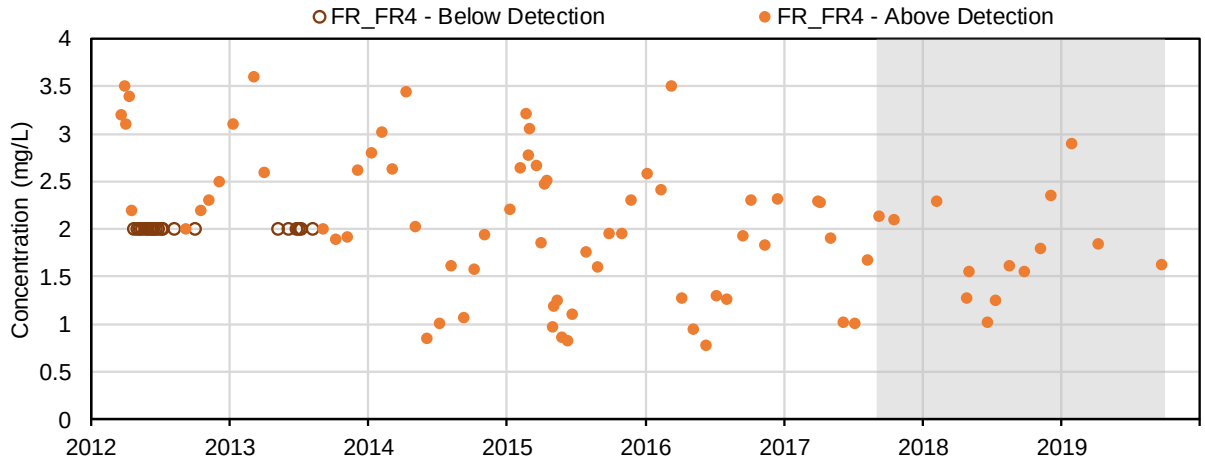
(63) Silicon (mg/L); Total Metals



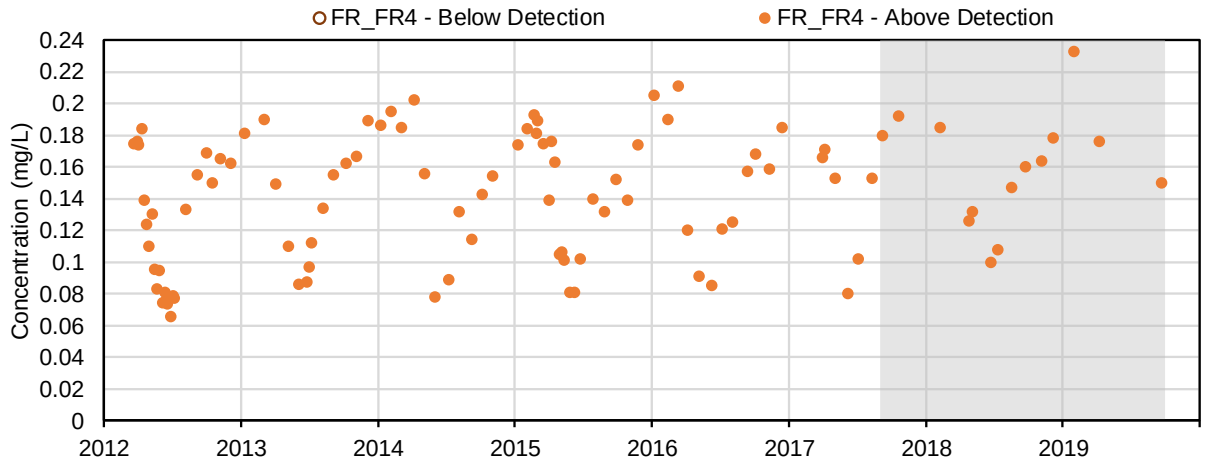
(64) Silver (mg/L); Total Metals



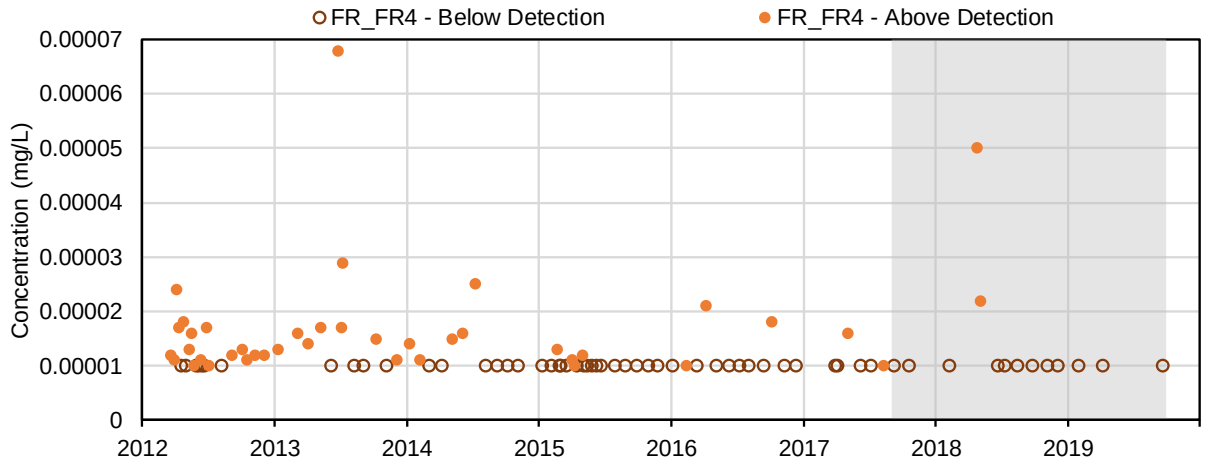
(65) Sodium (mg/L); Total Metals



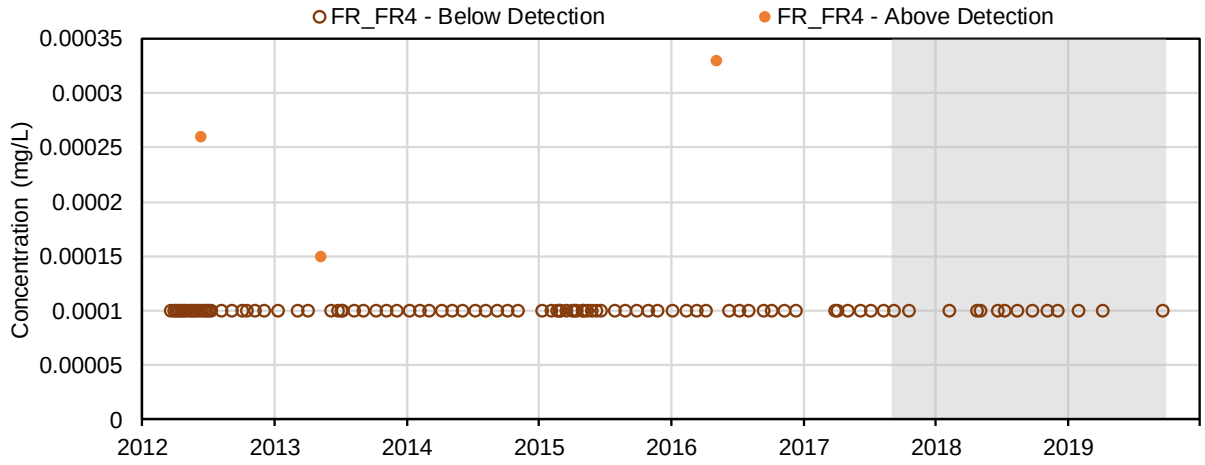
(66) Strontium (mg/L); Total Metals



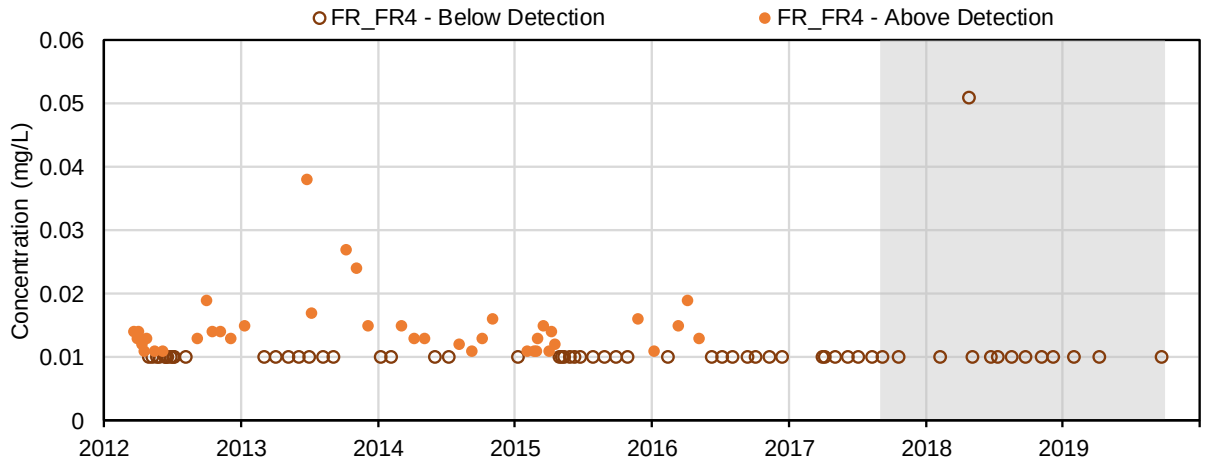
(67) Thallium (mg/L); Total Metals



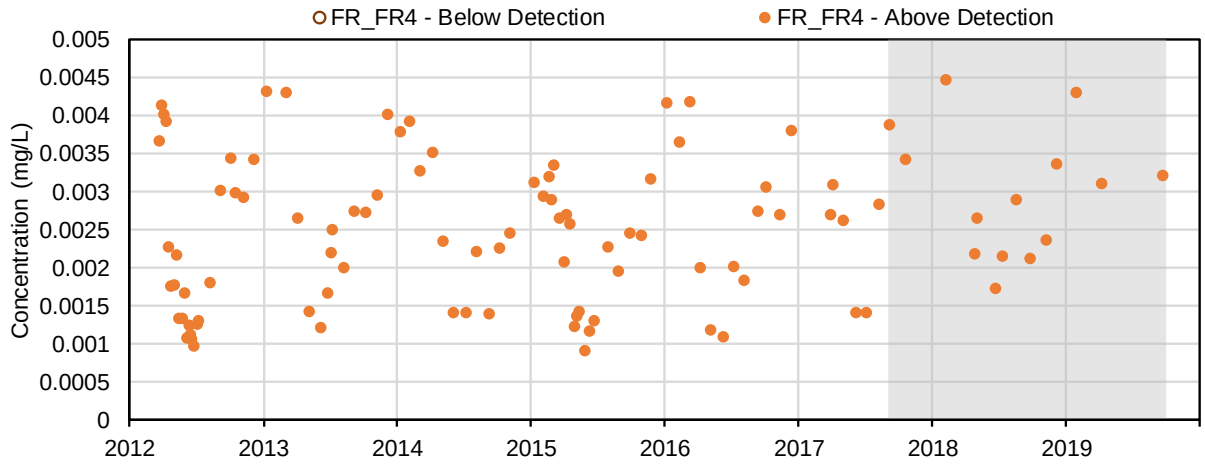
(68) Tin (mg/L); Total Metals



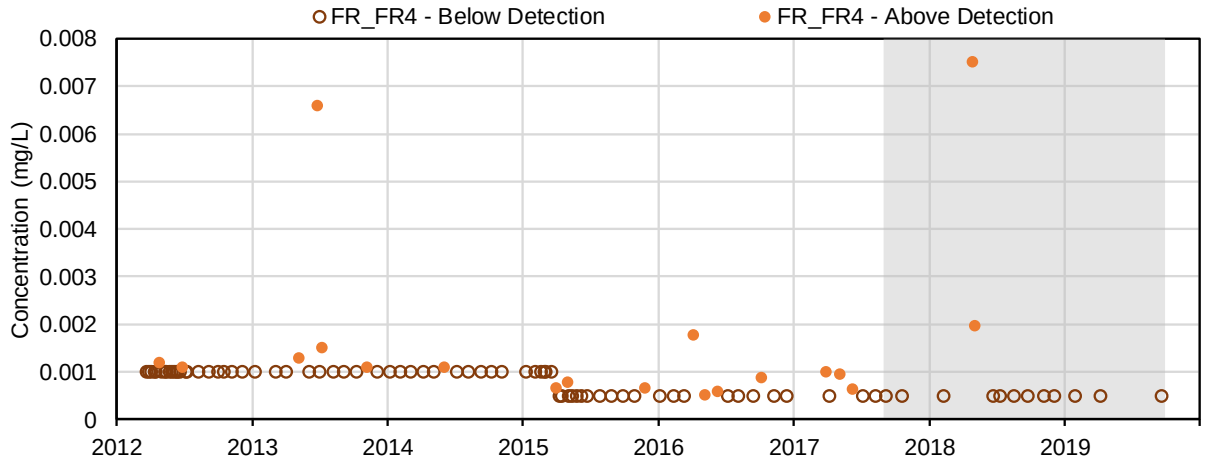
(69) Titanium (mg/L); Total Metals



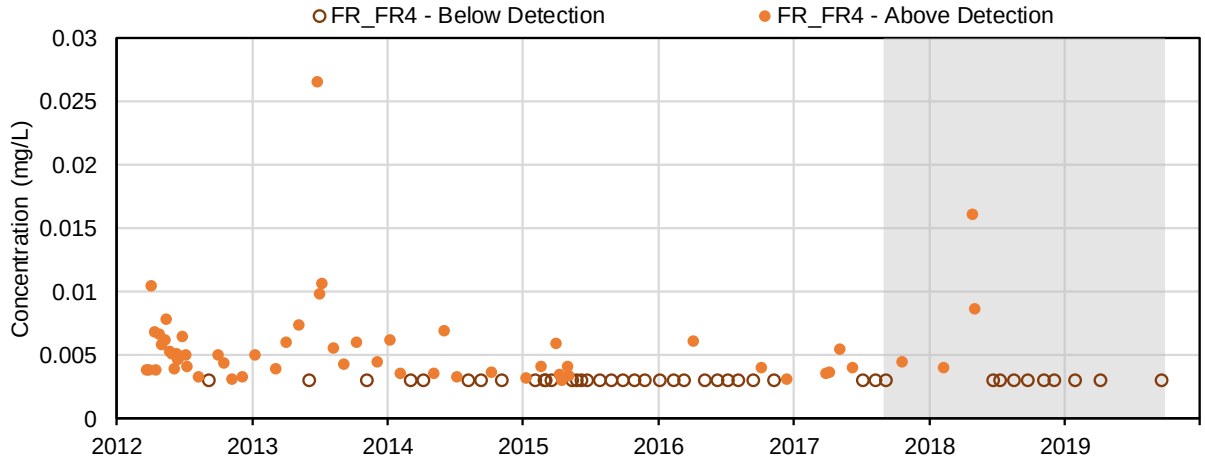
(70) Uranium (mg/L); Total Metals



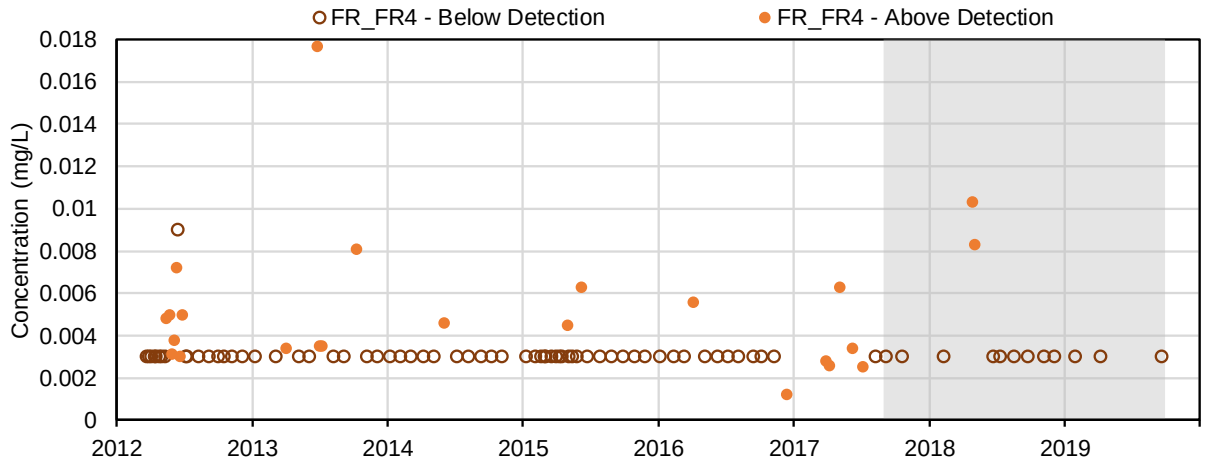
(71) Vanadium (mg/L); Total Metals



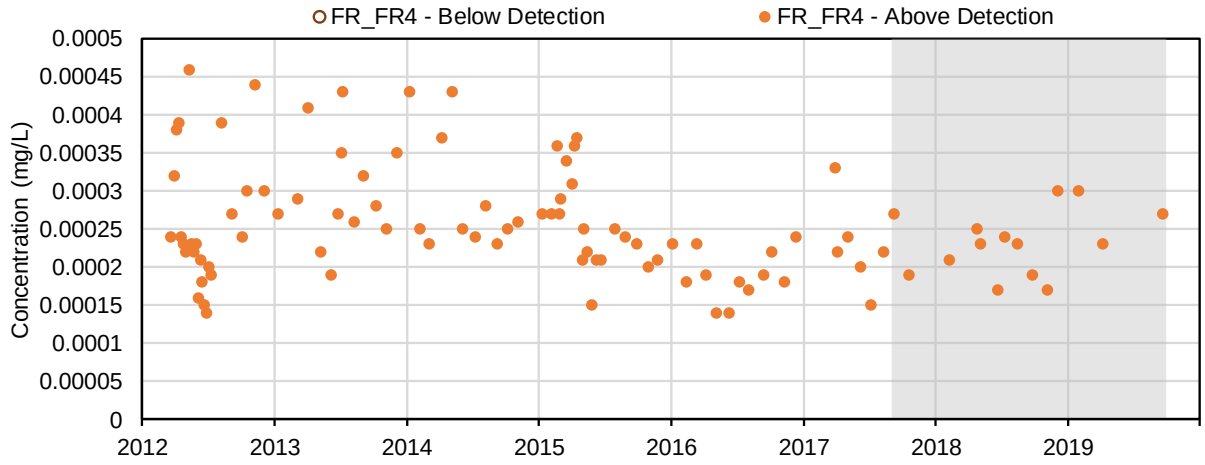
(72) Zinc (mg/L); Total Metals



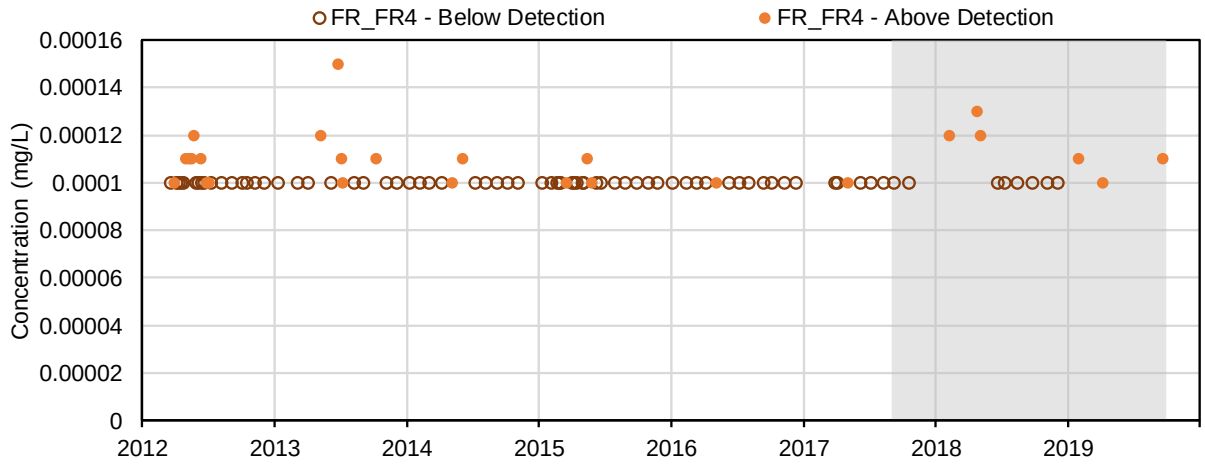
(73) Aluminum (mg/L); Dissolved Metals



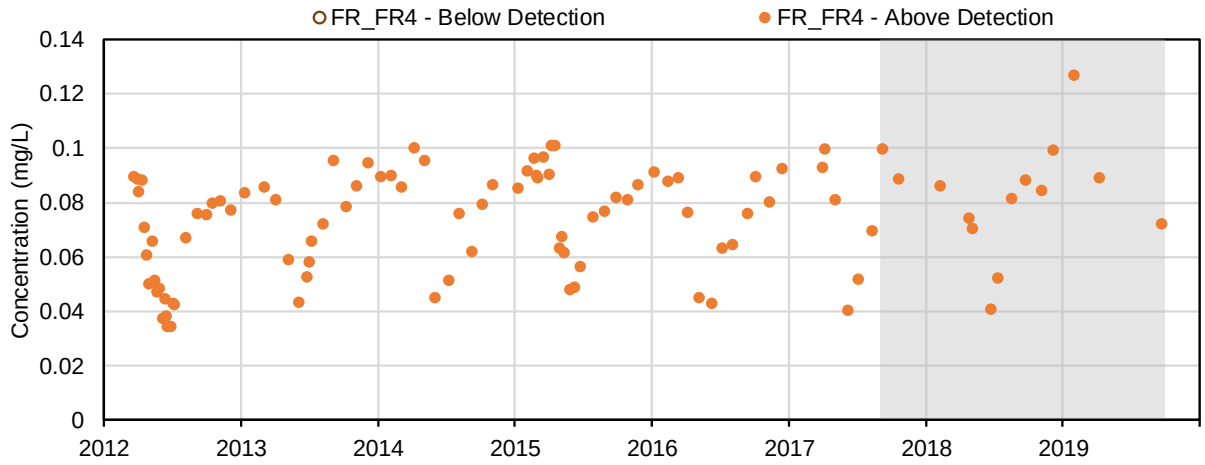
(74) Antimony (mg/L); Dissolved Metals



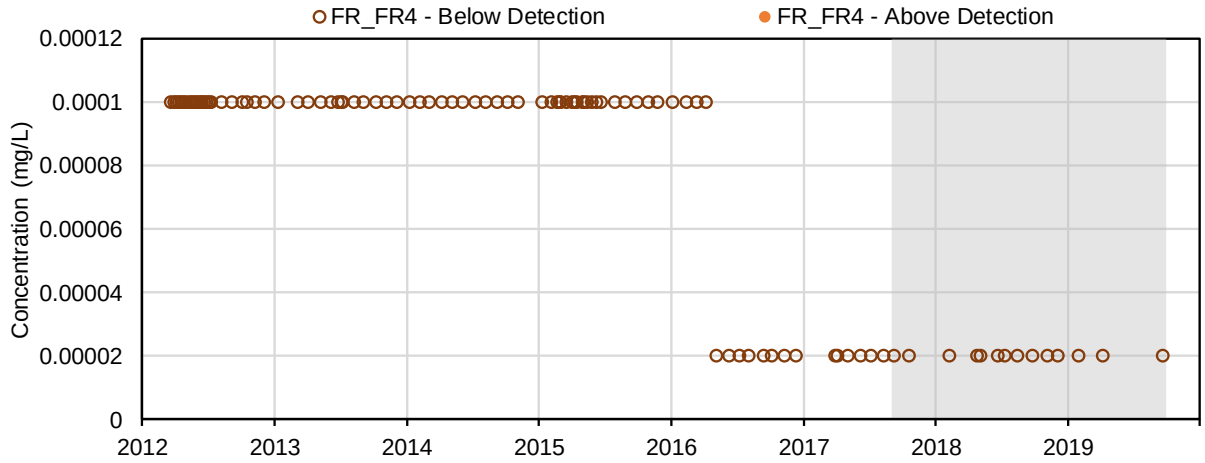
(75) Arsenic (mg/L); Dissolved Metals



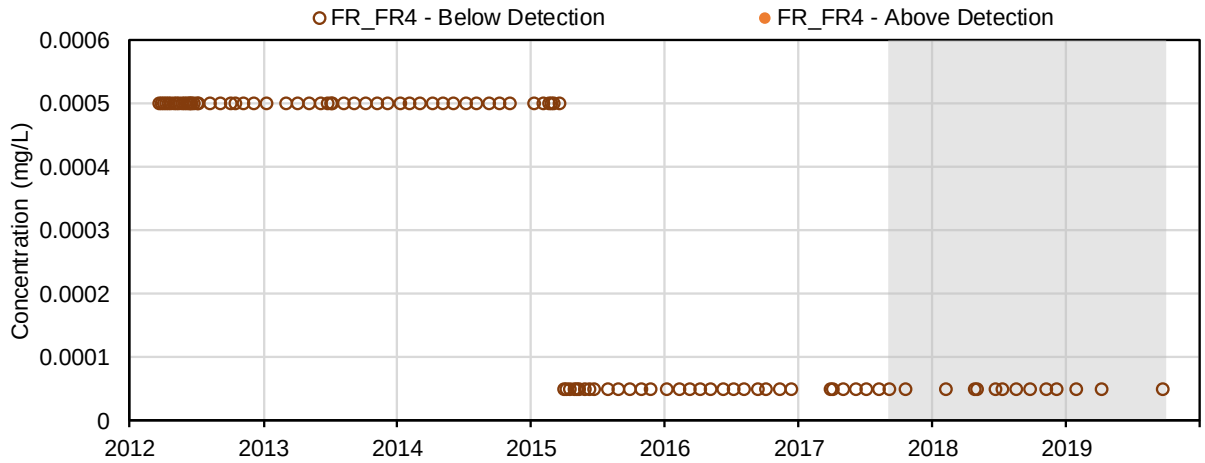
(76) Barium (mg/L); Dissolved Metals



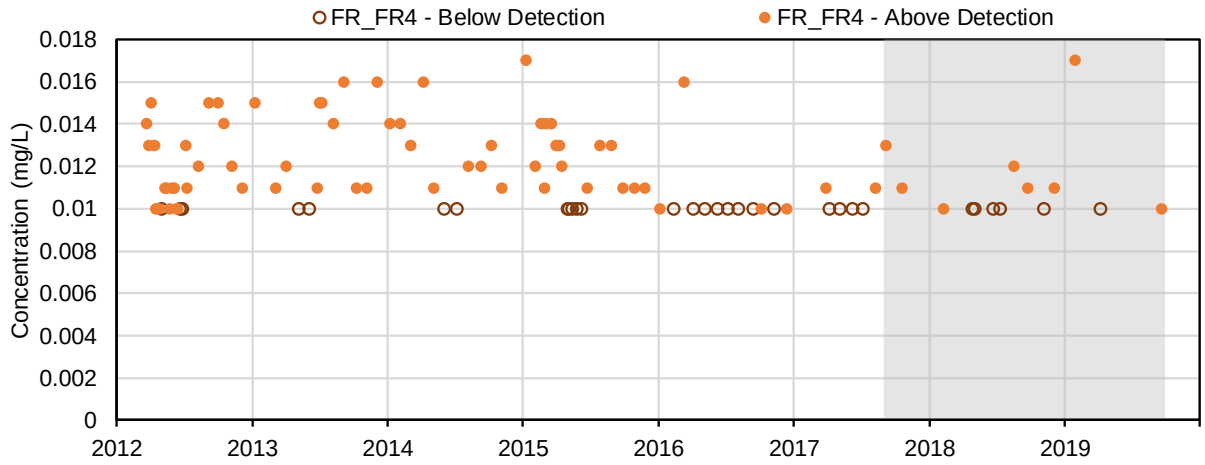
(77) Beryllium (mg/L); Dissolved Metals



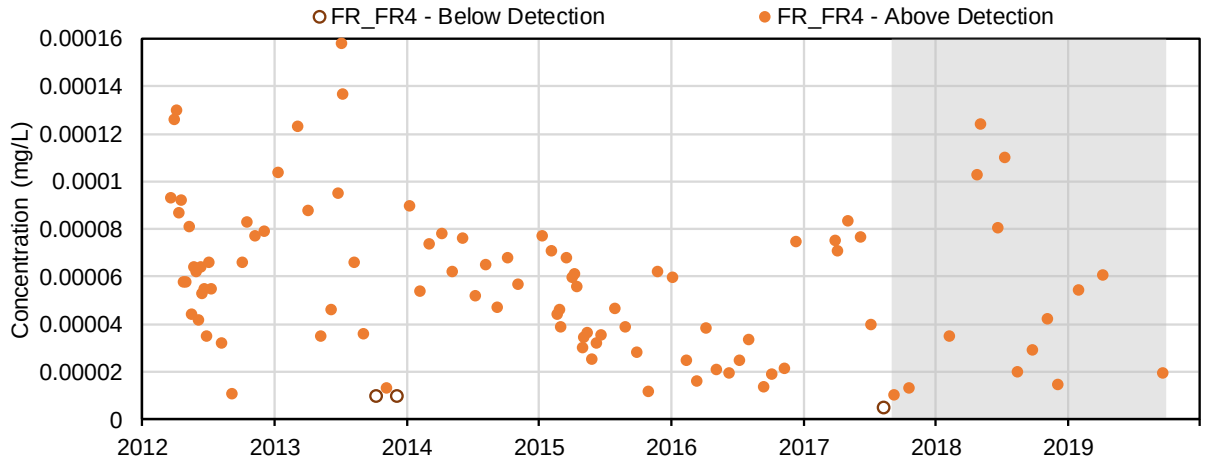
(78) Bismuth (mg/L); Dissolved Metals



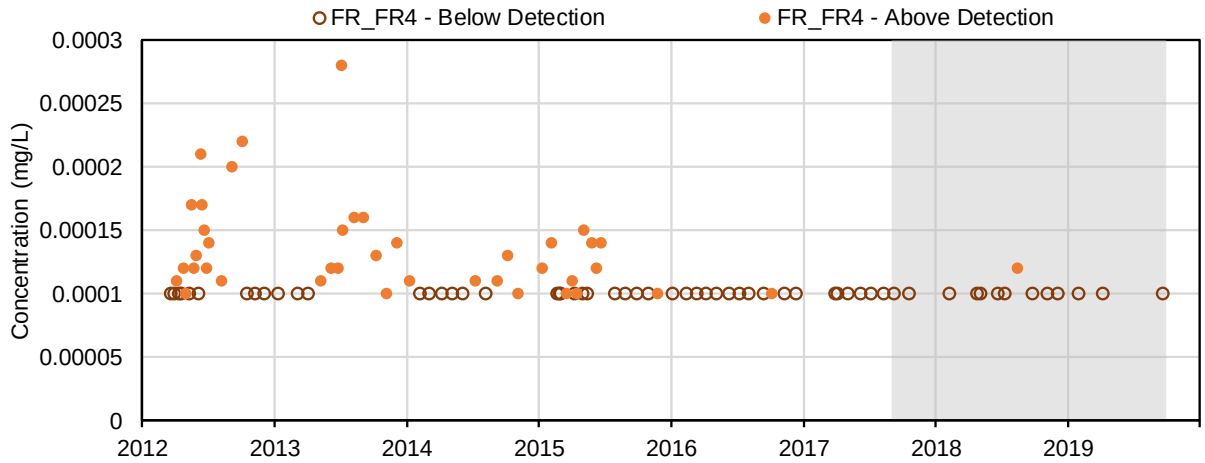
(79) Boron (mg/L); Dissolved Metals



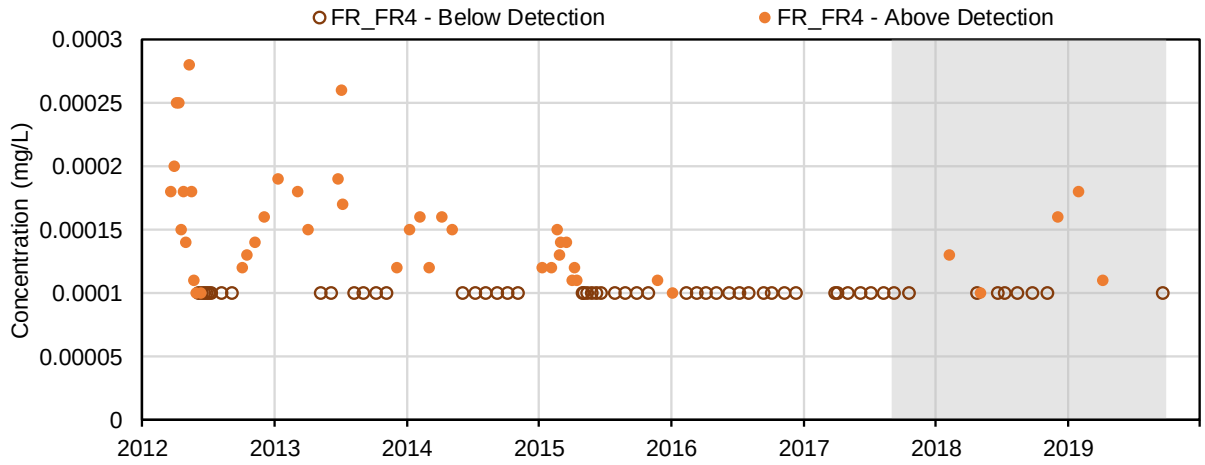
(80) Cadmium (mg/L); Dissolved Metals



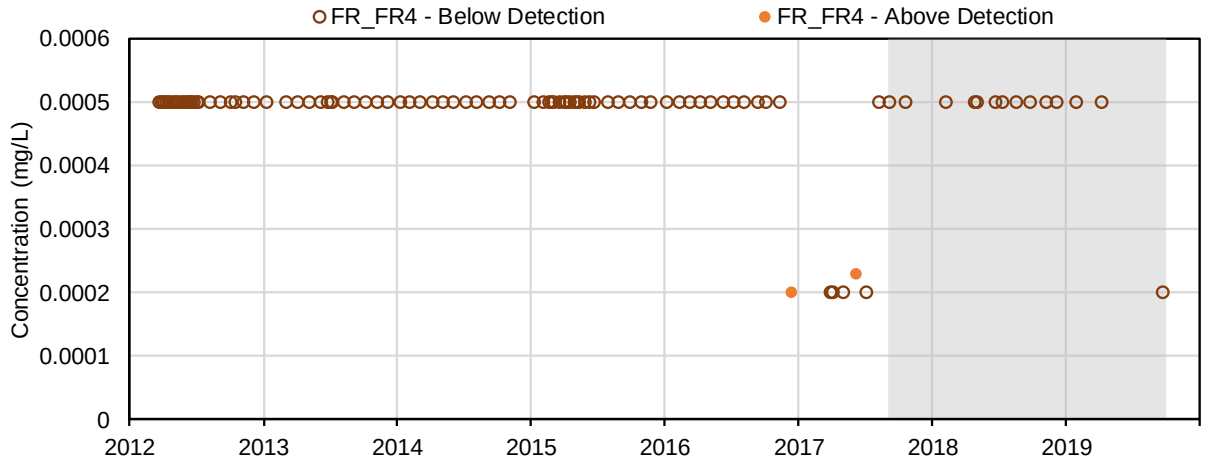
(81) Chromium (mg/L); Dissolved Metals



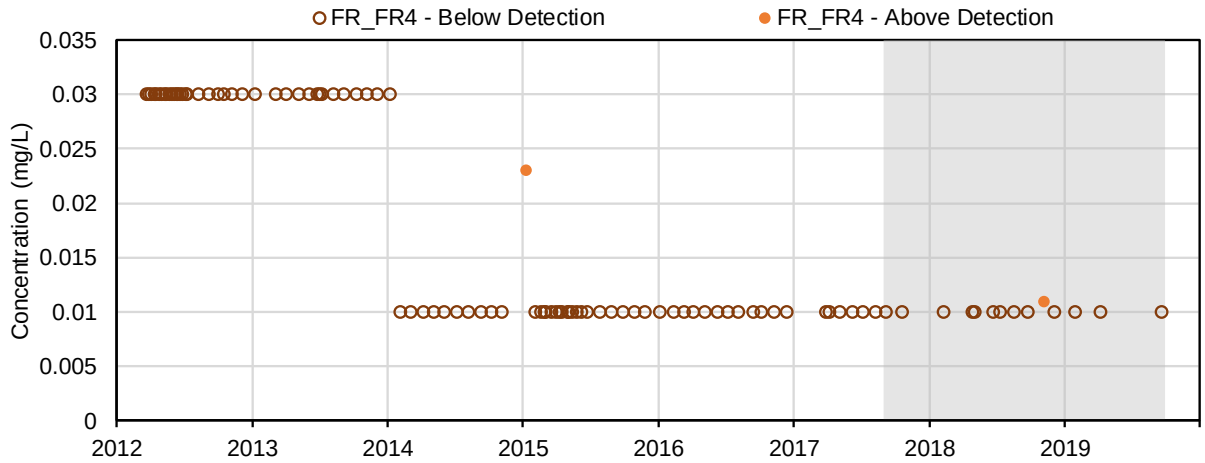
(82) Cobalt (mg/L); Dissolved Metals



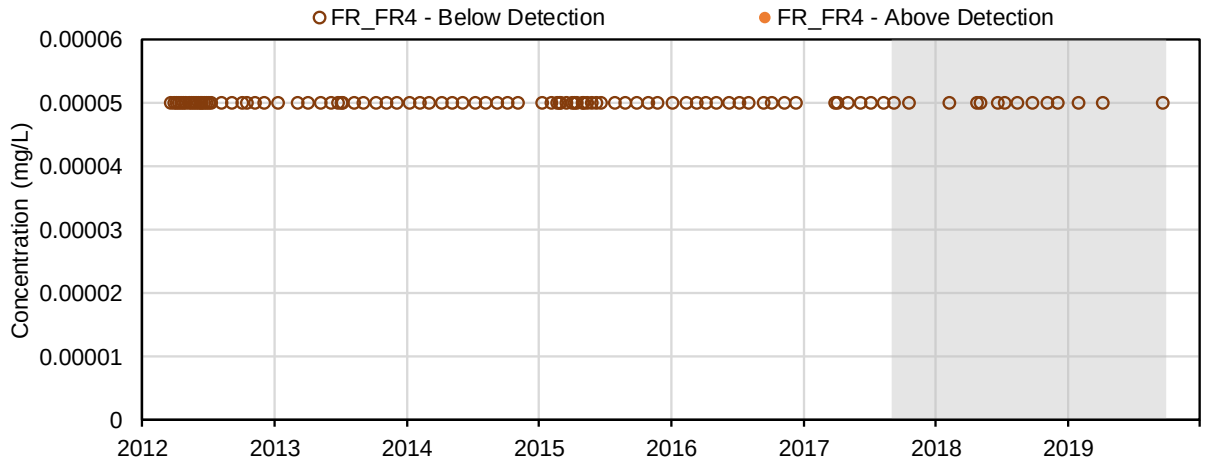
(83) Copper (mg/L); Dissolved Metals



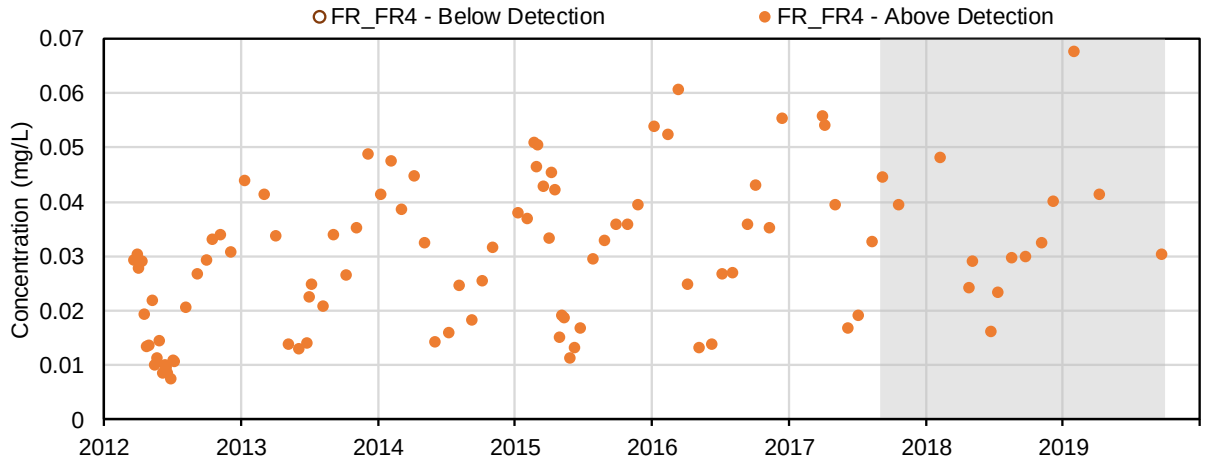
(84) Iron (mg/L); Dissolved Metals



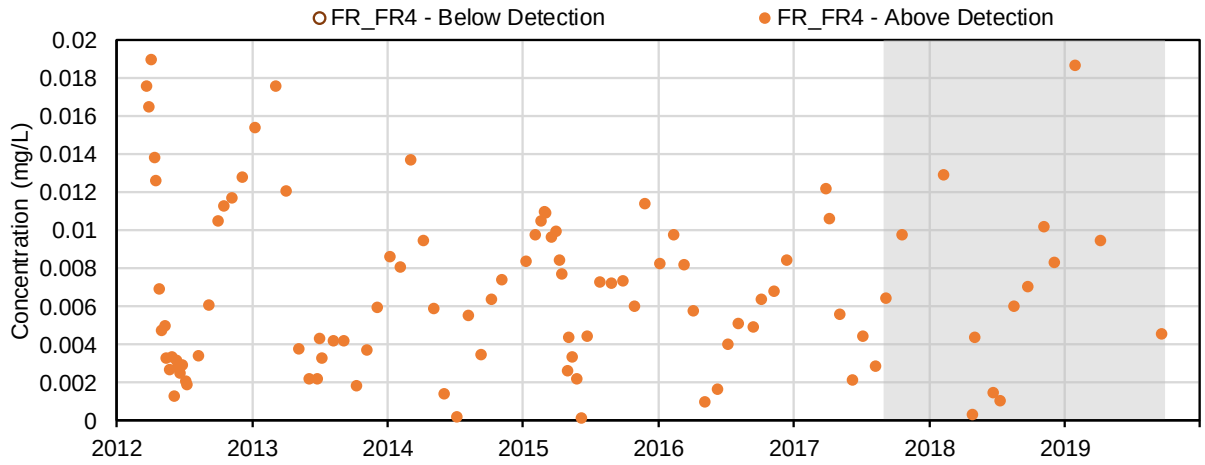
(85) Lead (mg/L); Dissolved Metals



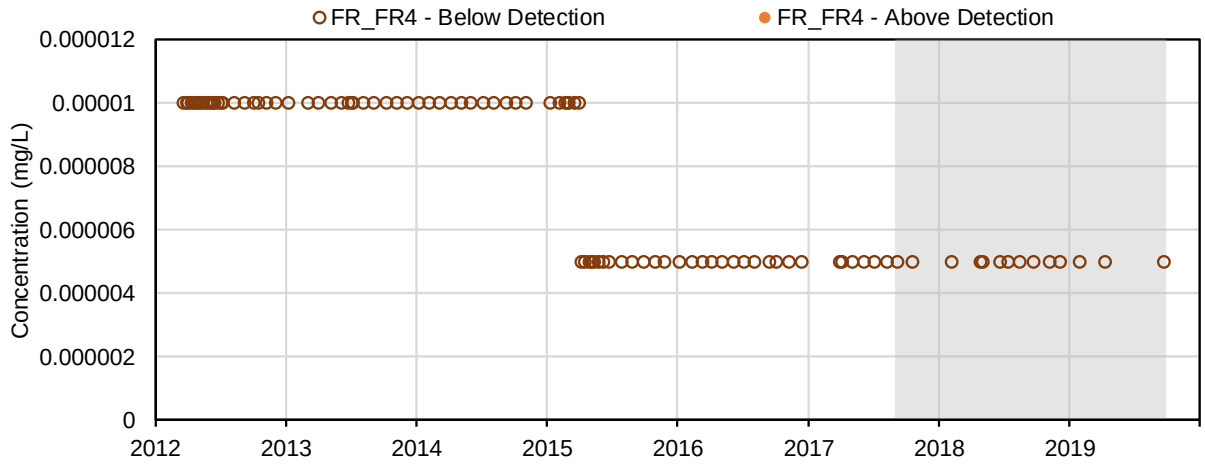
(86) Lithium (mg/L); Dissolved Metals



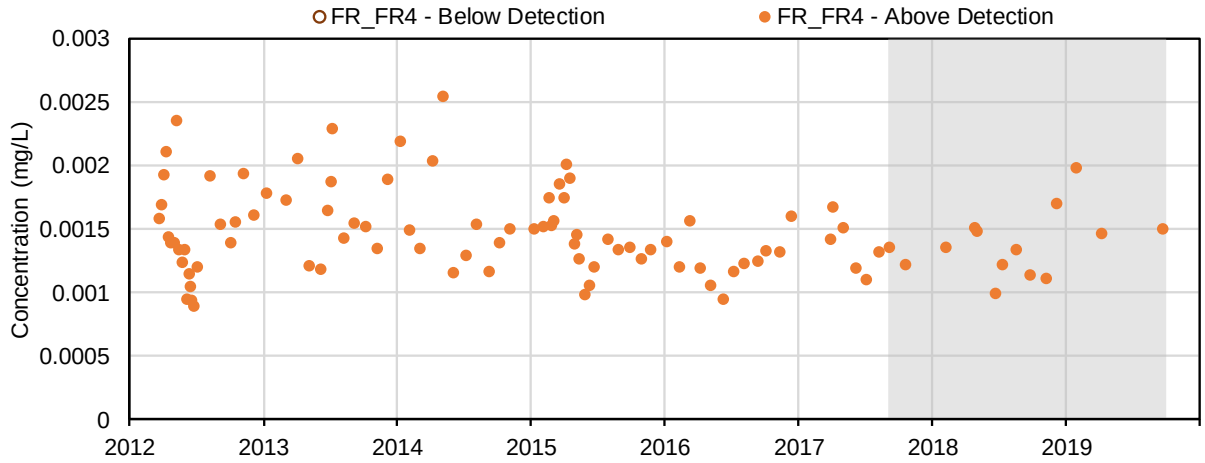
(87) Manganese (mg/L); Dissolved Metals



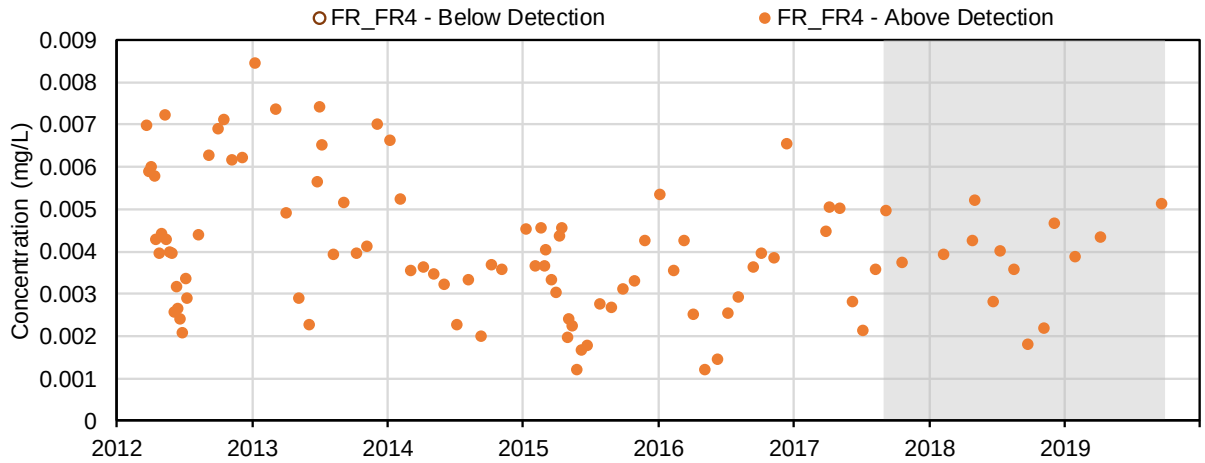
(88) Mercury (mg/L); Dissolved Metals



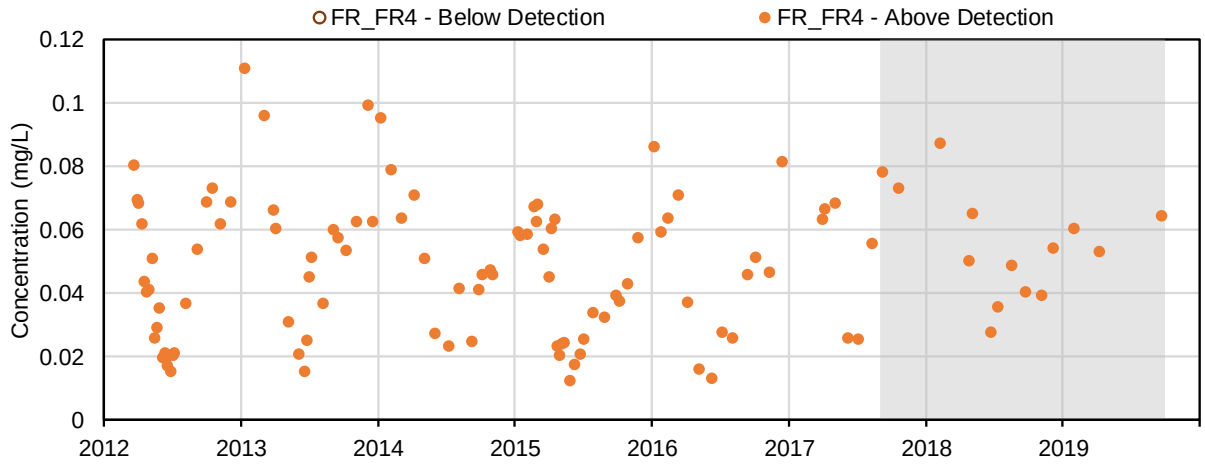
(89) Molybdenum (mg/L); Dissolved Metals



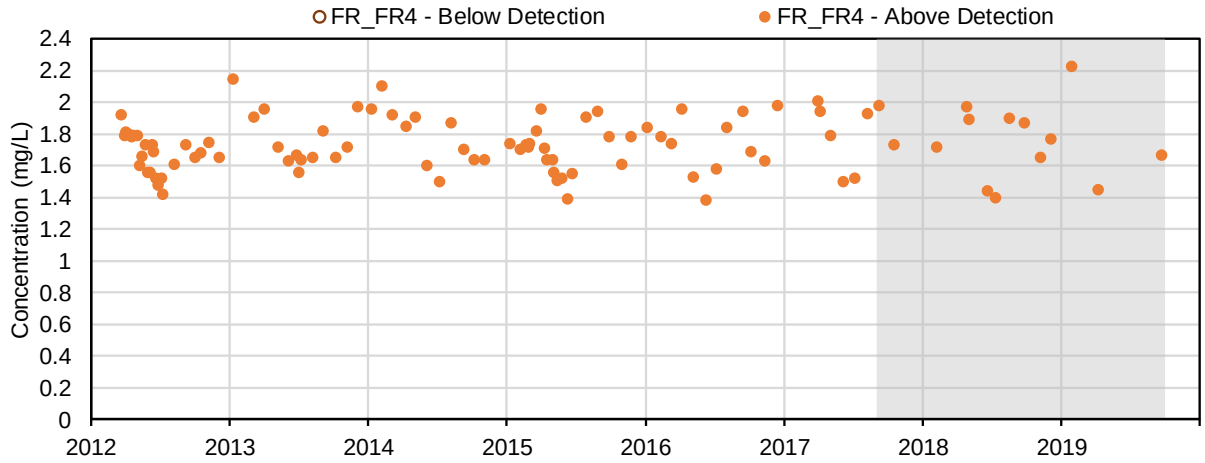
(90) Nickel (mg/L); Dissolved Metals



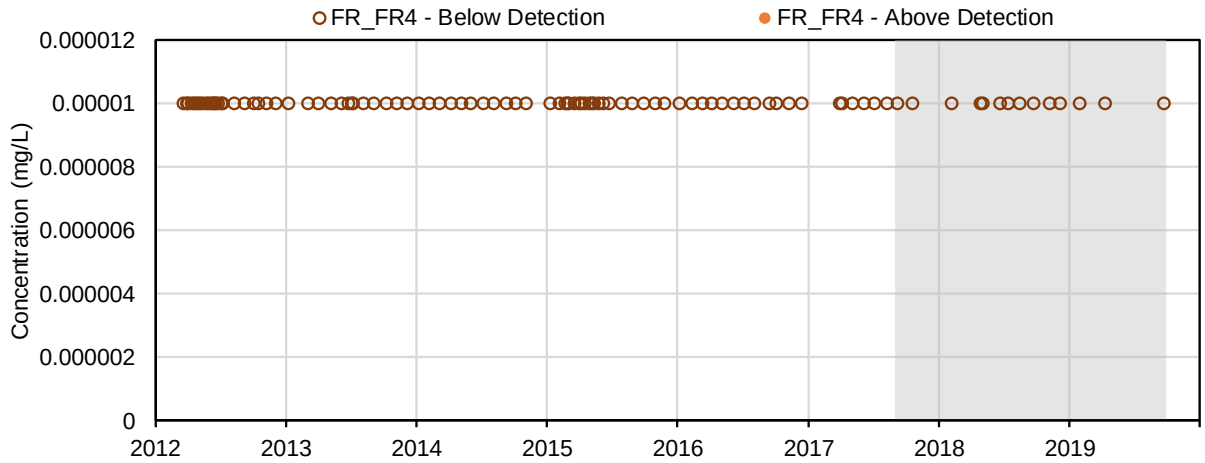
(91) Selenium (mg/L); Dissolved Metals



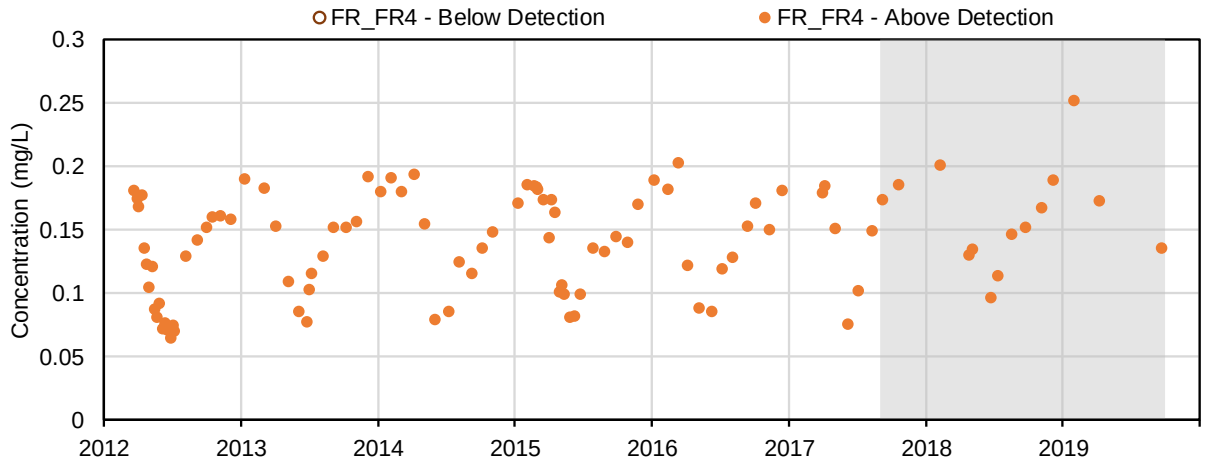
(92) Silicon (mg/L); Dissolved Metals



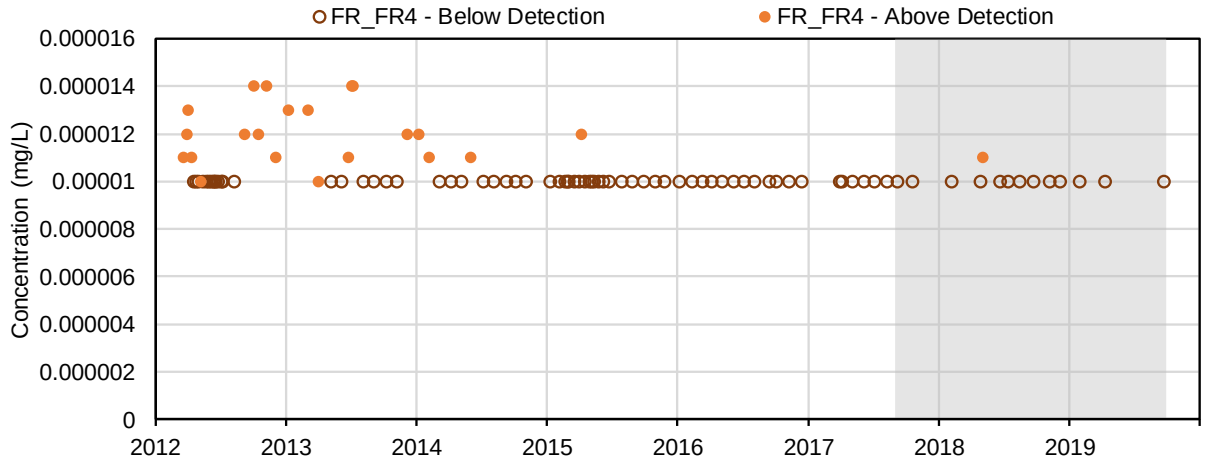
(93) Silver (mg/L); Dissolved Metals



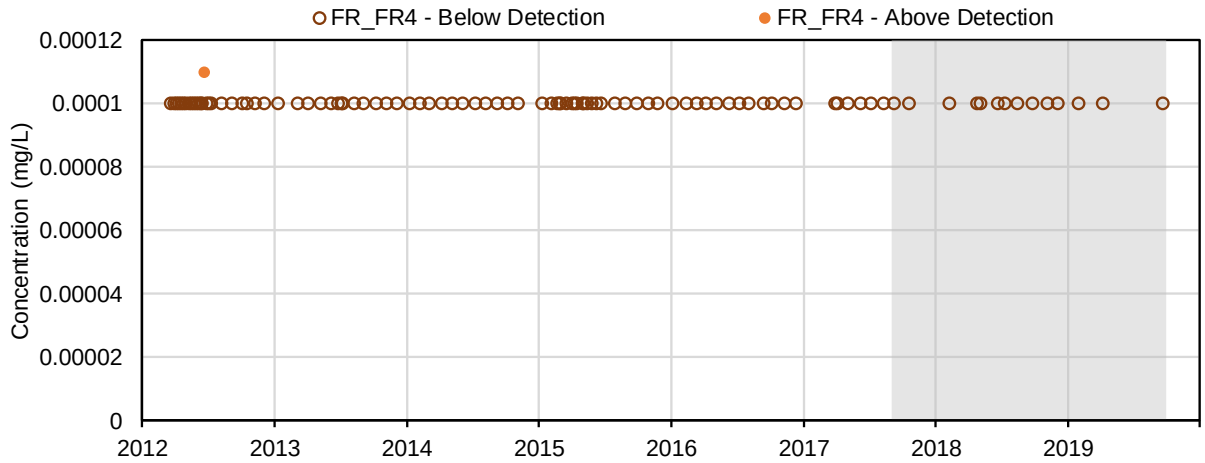
(94) Strontium (mg/L); Dissolved Metals



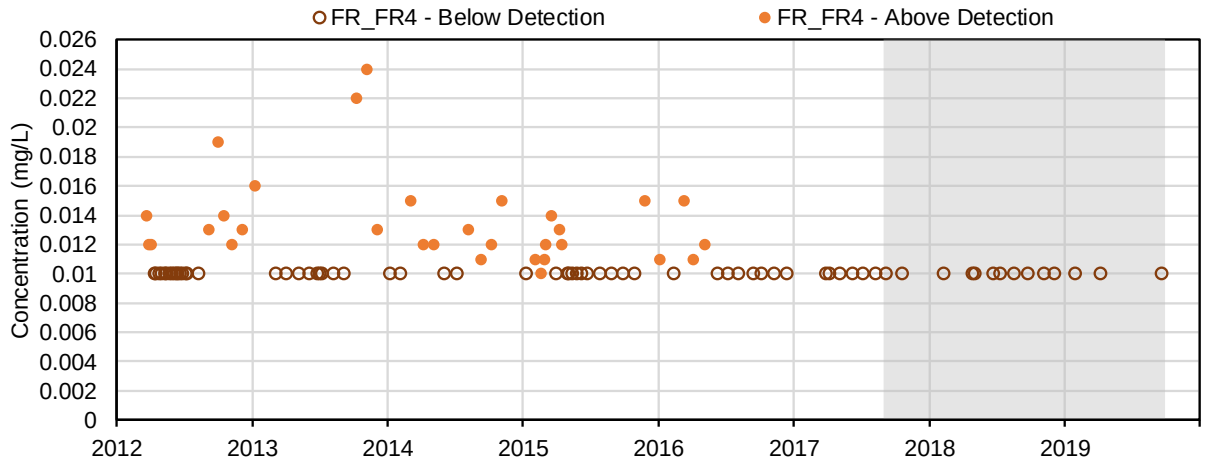
(95) Thallium (mg/L); Dissolved Metals



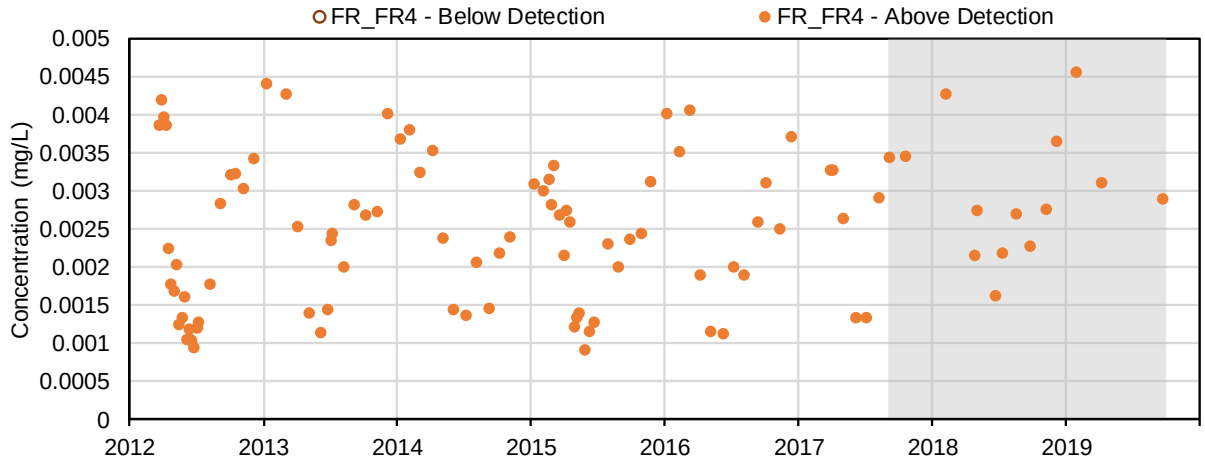
(96) Tin (mg/L); Dissolved Metals



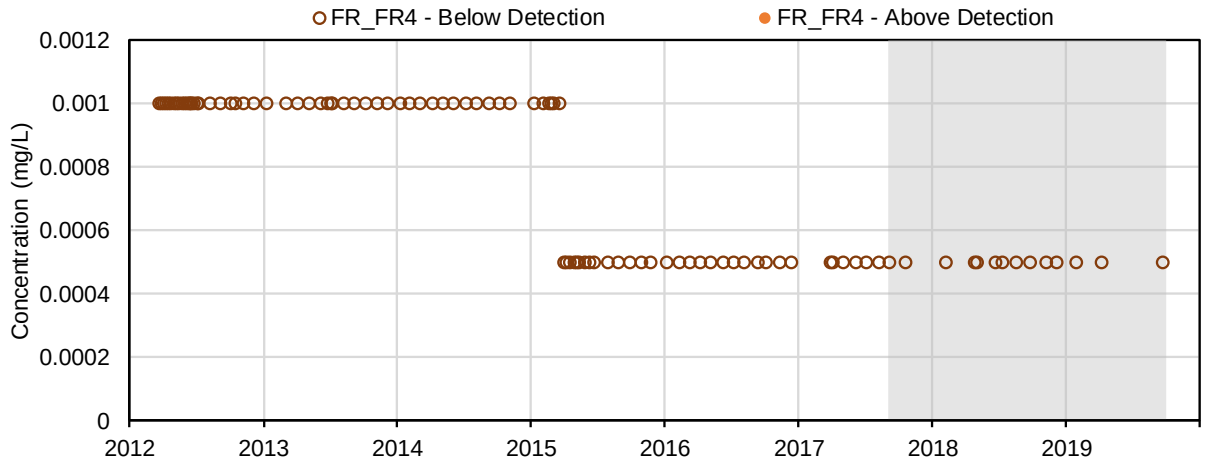
(97) Titanium (mg/L); Dissolved Metals



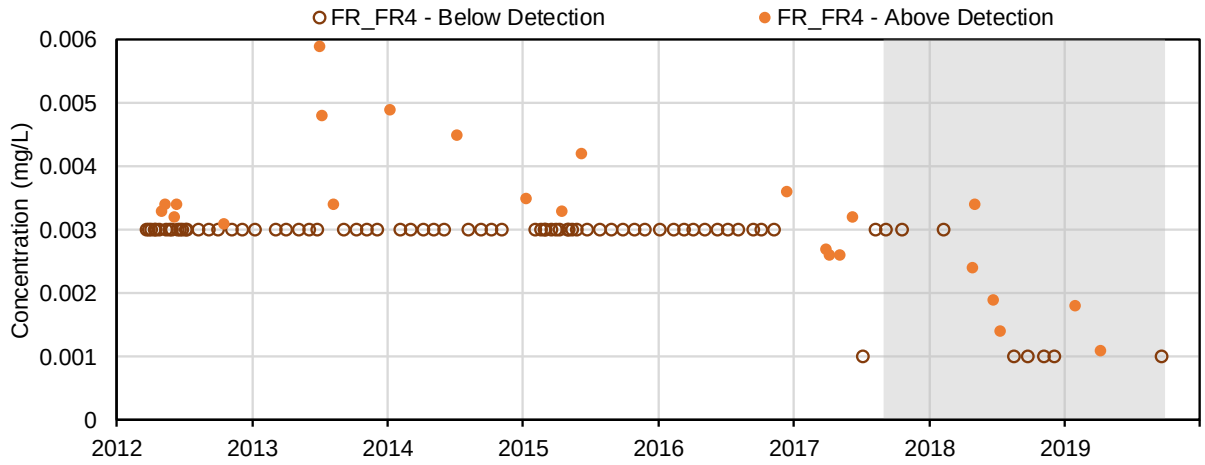
(98) Uranium (mg/L); Dissolved Metals



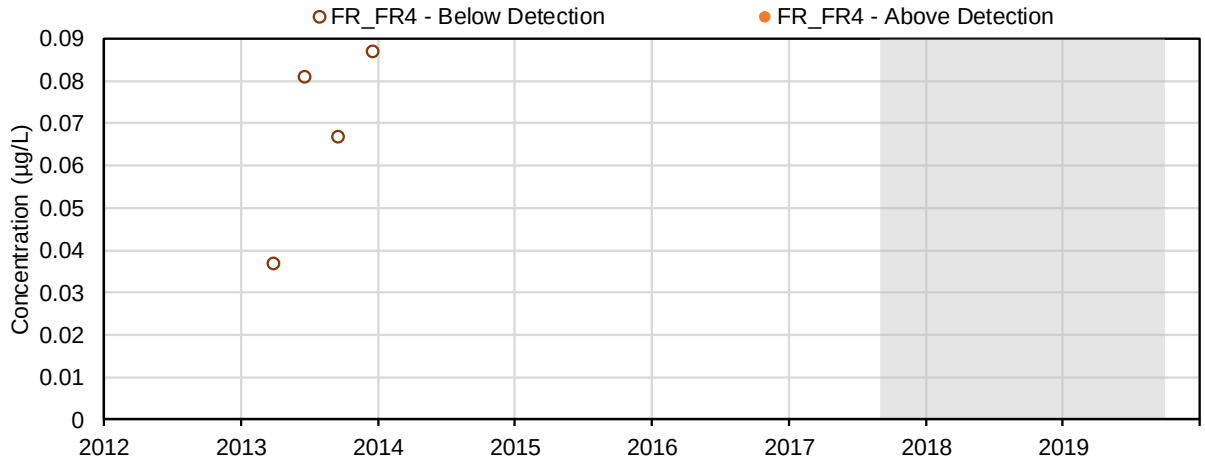
(99) Vanadium (mg/L); Dissolved Metals



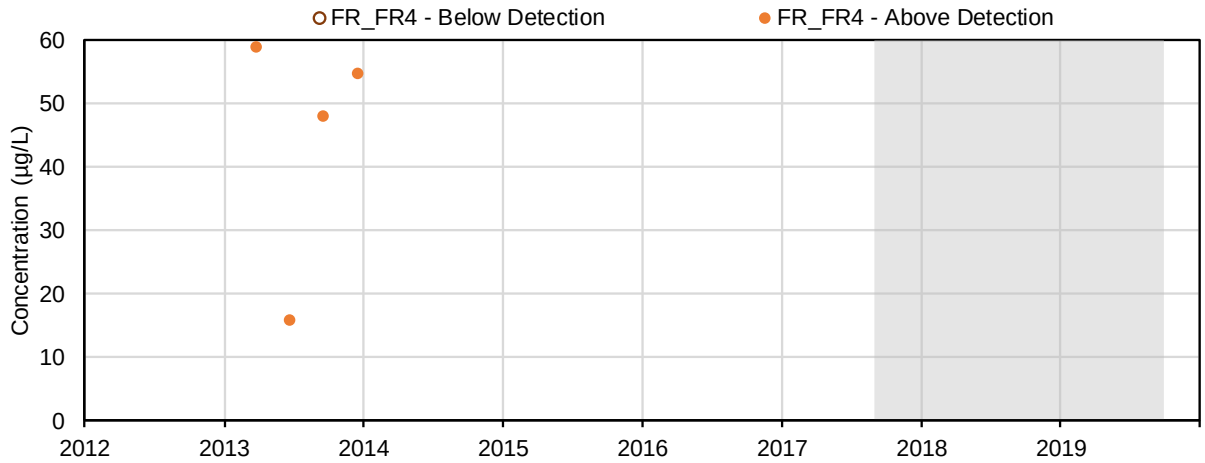
(100) Zinc (mg/L); Dissolved Metals



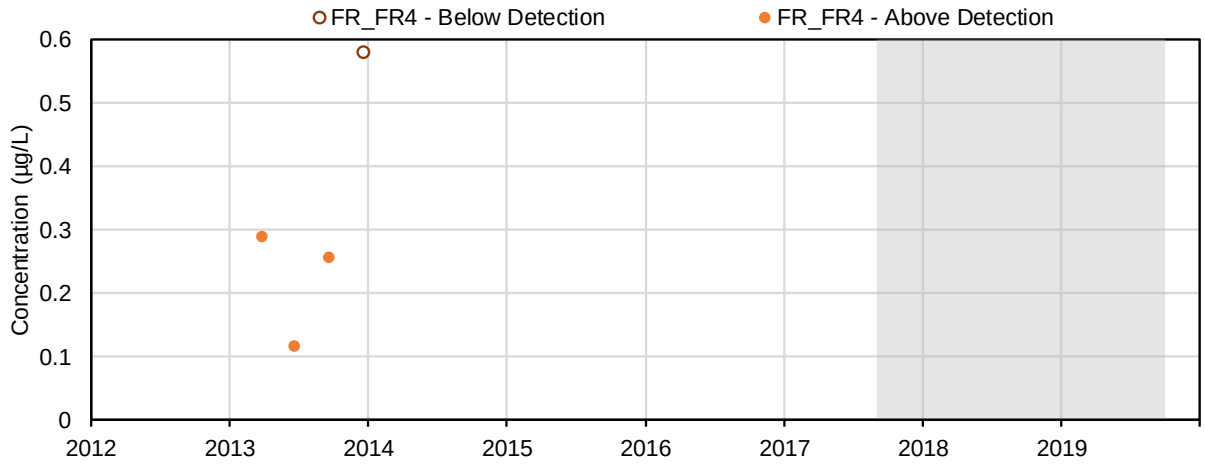
(101) Total Selenocyanate (µg/L); Speciation of Selenium



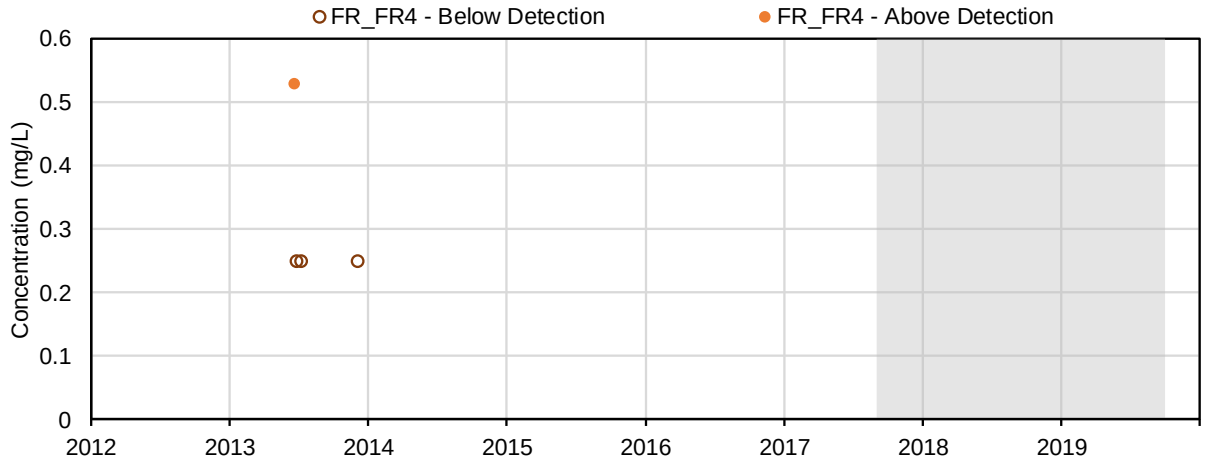
(102) Total Selenium 6+ (µg/L); Speciation of Selenium



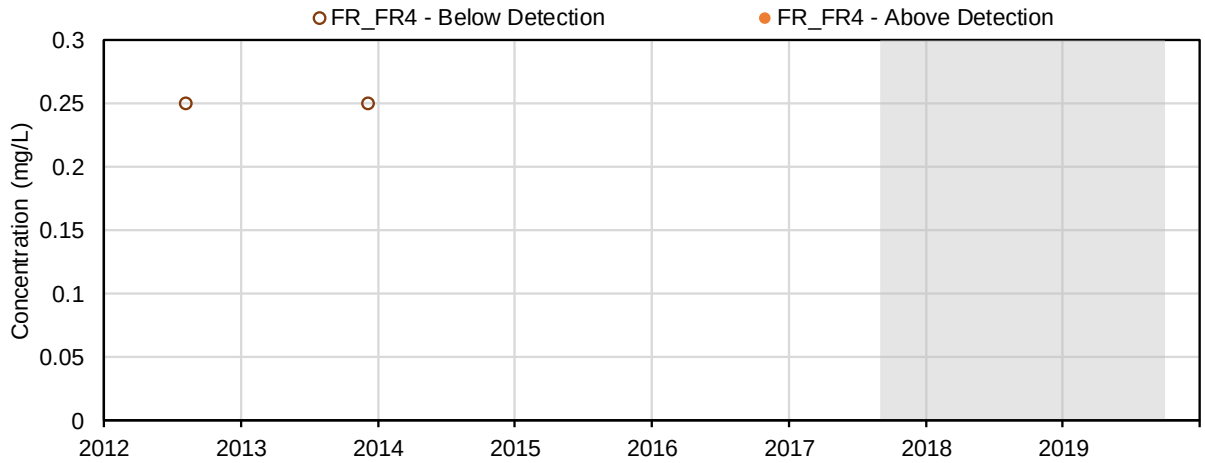
(103) Total Selenium 4+ (µg/L); Speciation of Selenium



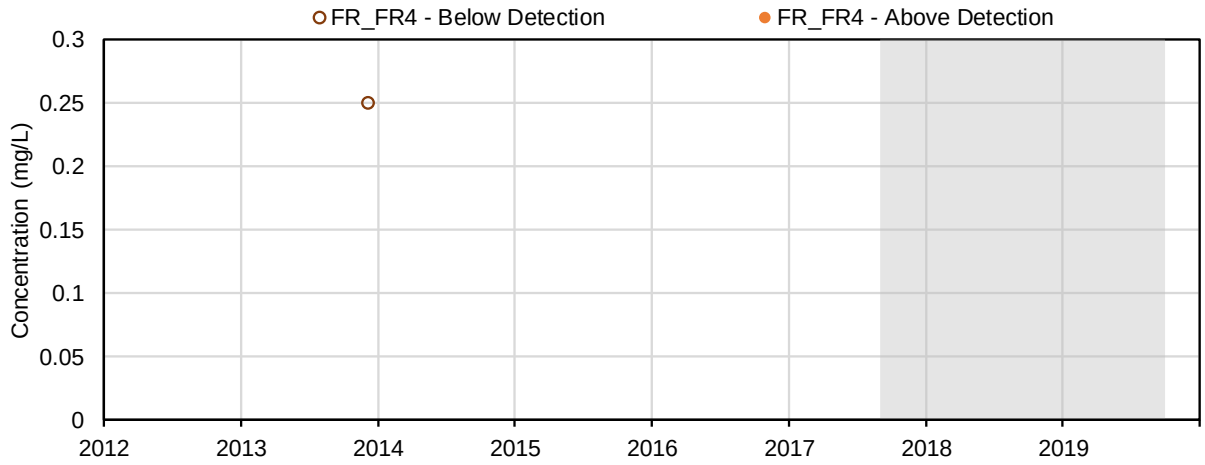
(104) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



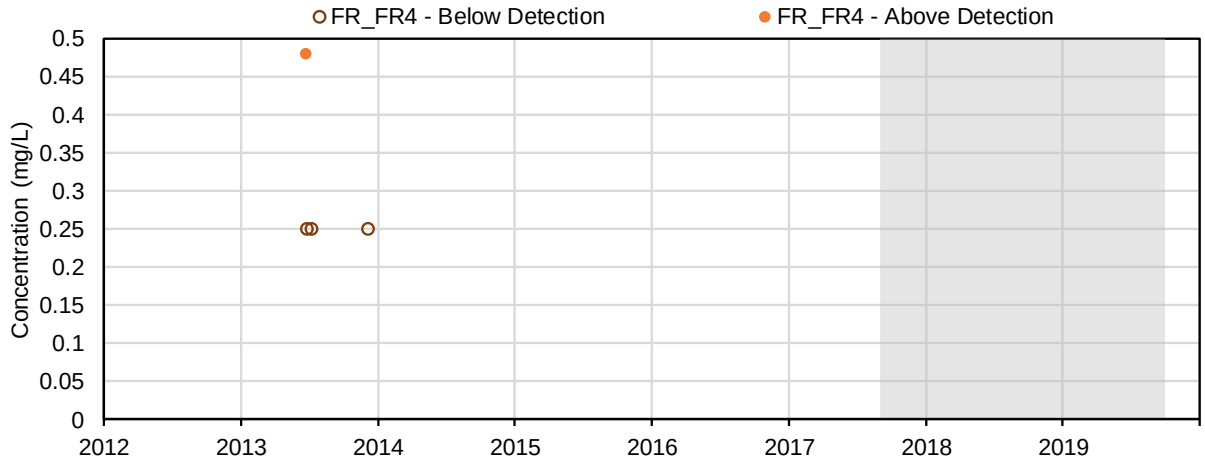
(105) Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



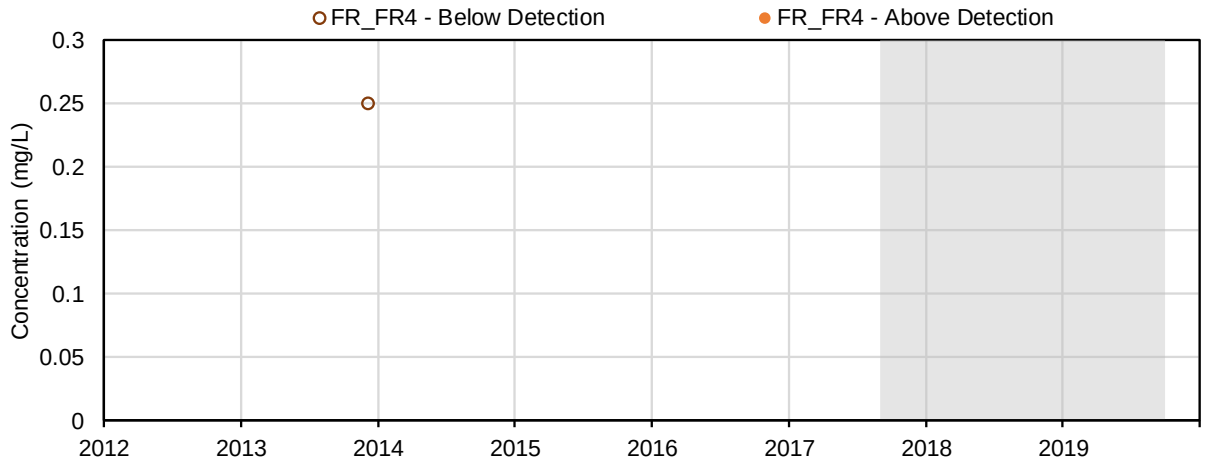
(106) Extracted Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



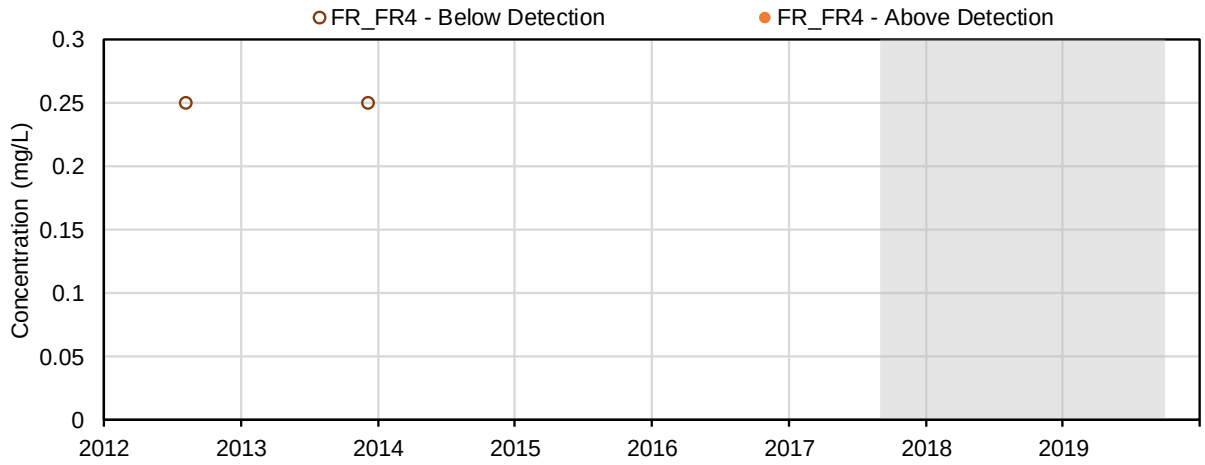
(107) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



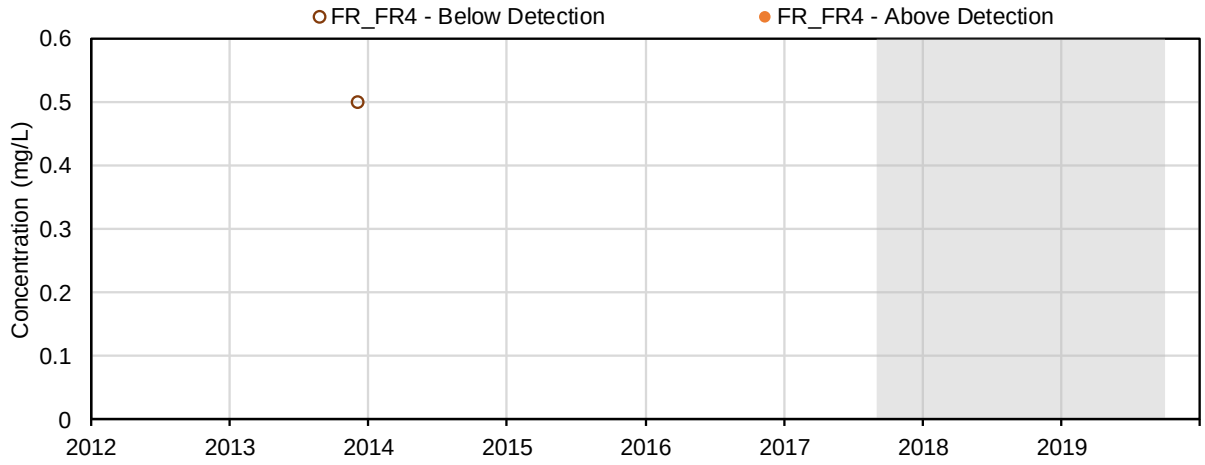
(108) Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L); Volatile Organics



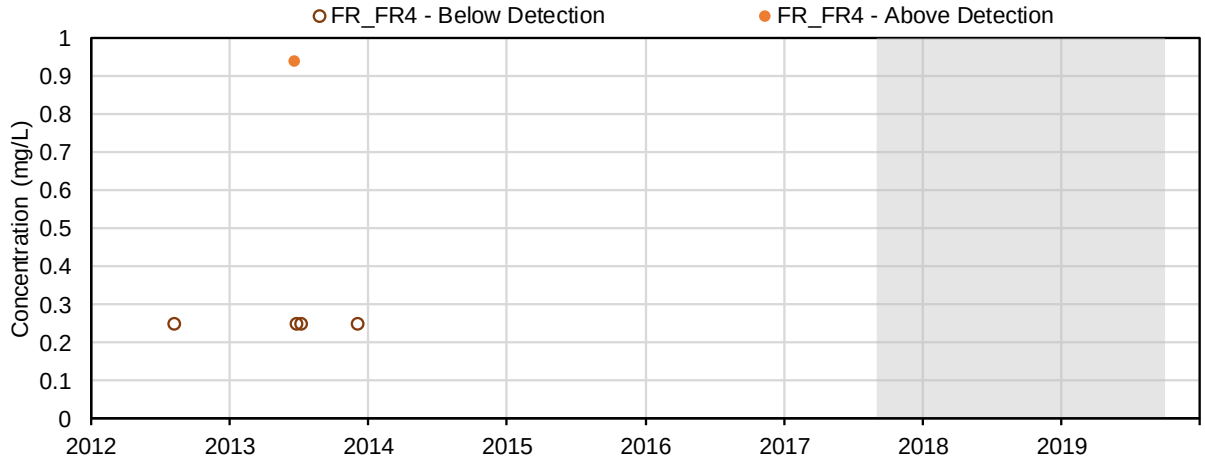
(109) Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L); Volatile Organics



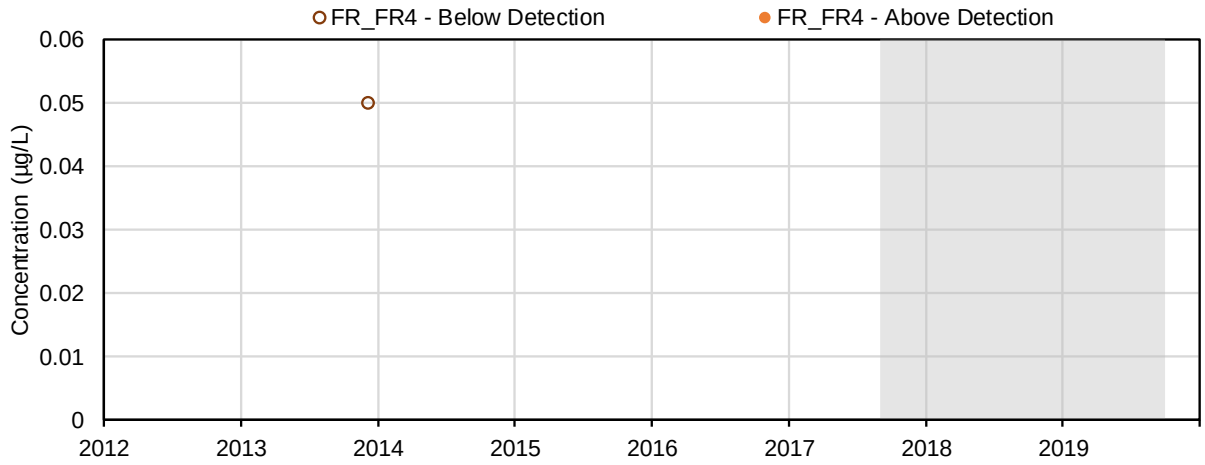
(110) Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L); Volatile Organics



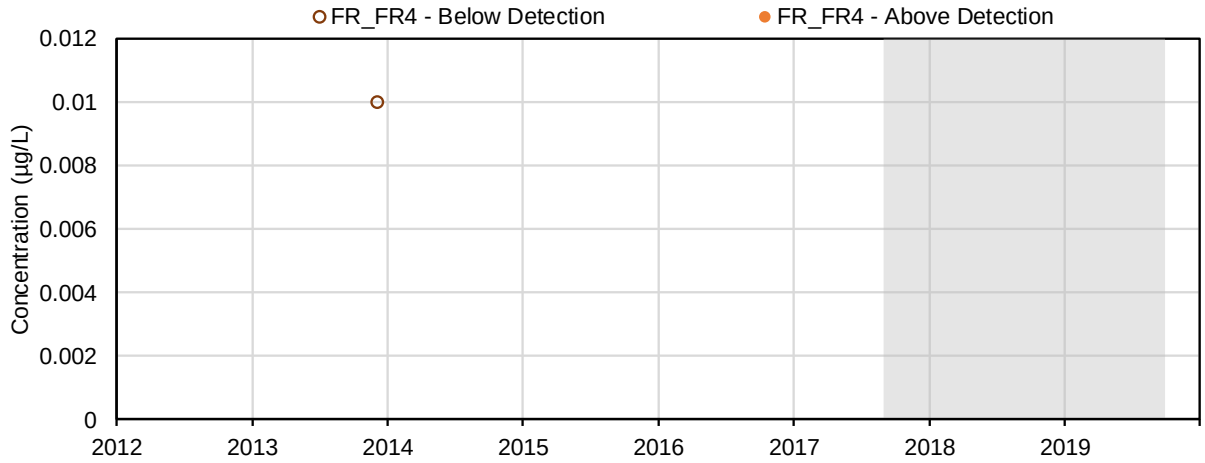
(111) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics



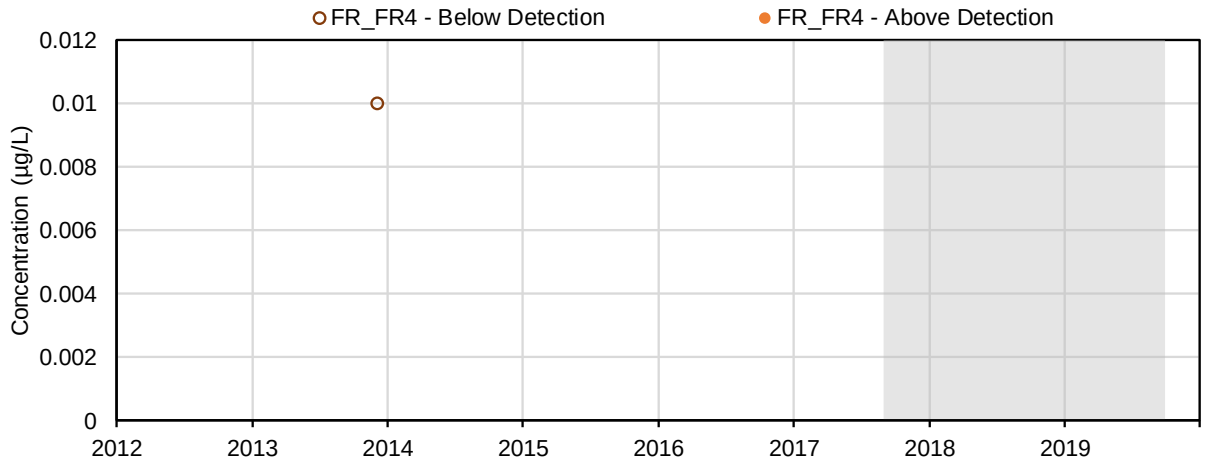
(112) Naphthalene (µg/L); Parent PAHs



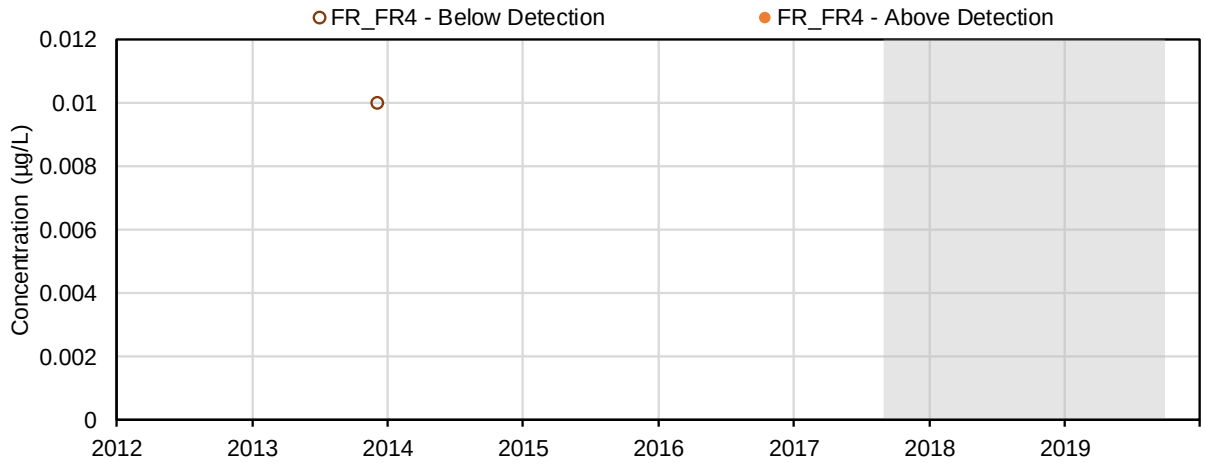
(113) Acenaphthylene (µg/L); Parent PAHs



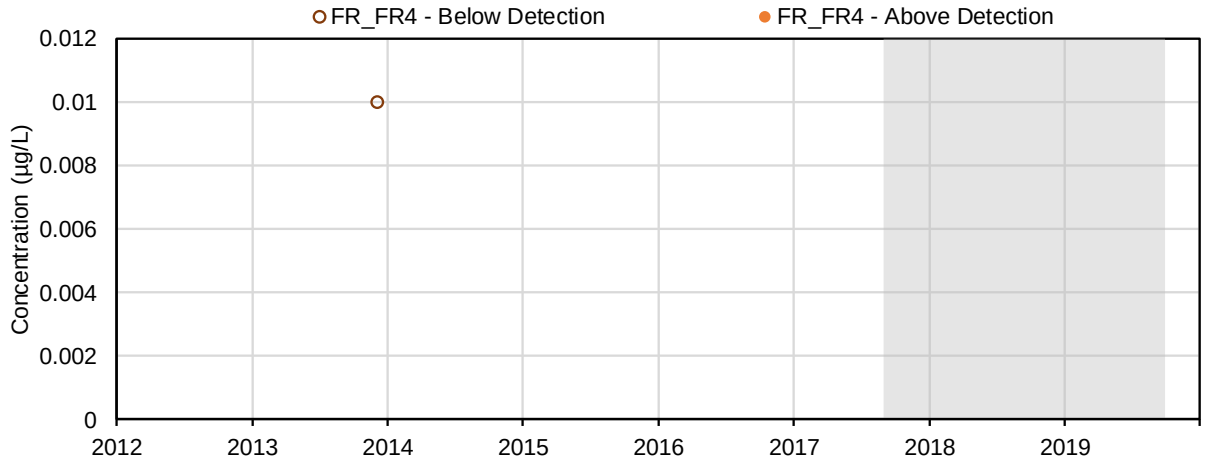
(114) Acenaphthene (µg/L); Parent PAHs



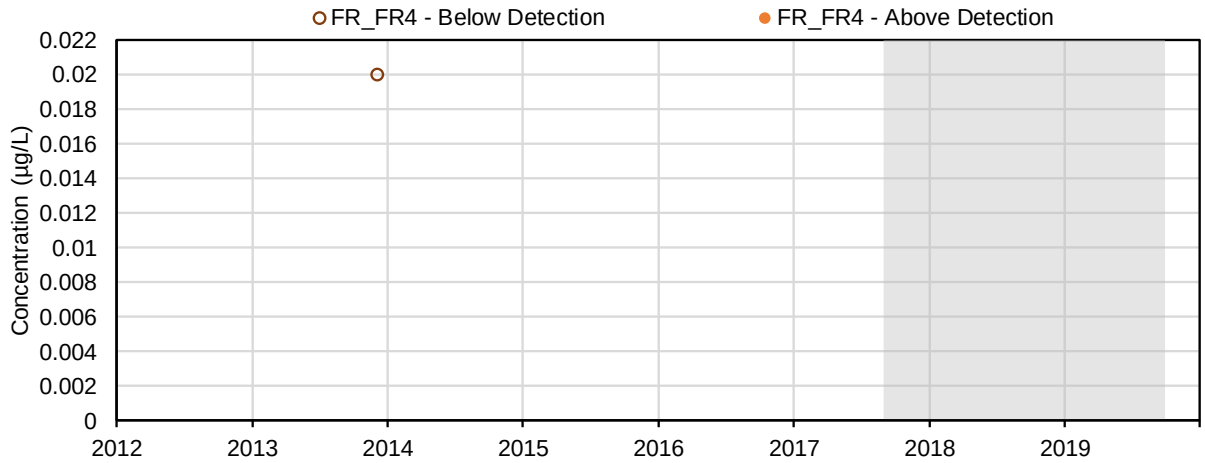
(115) Acridine (µg/L); Parent PAHs



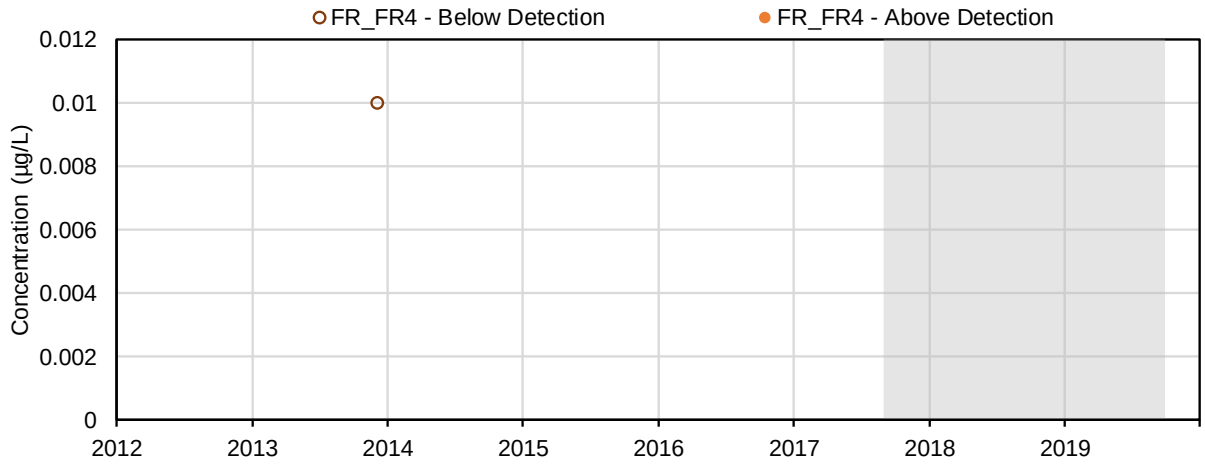
(116) Fluorene (µg/L); Parent PAHs



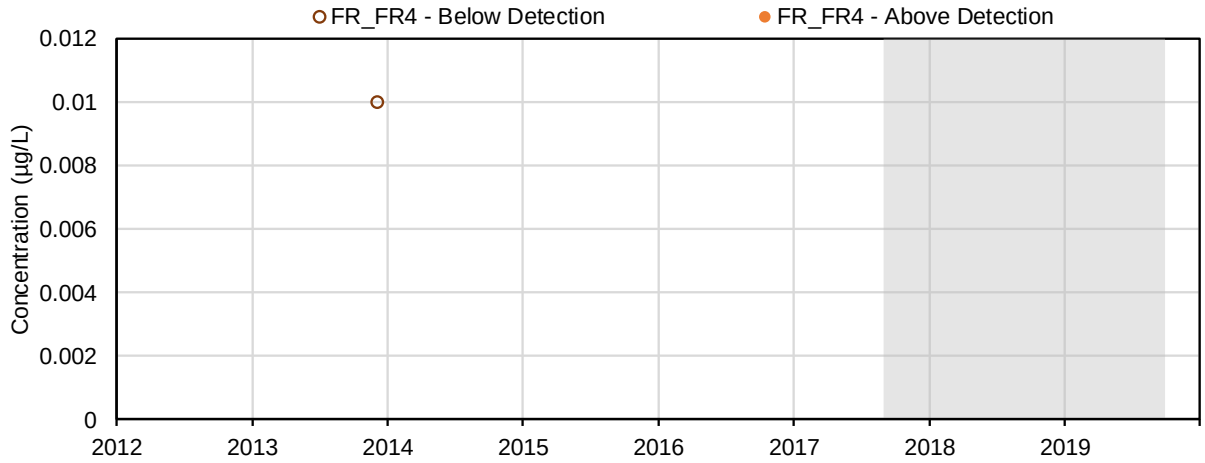
(117) Phenanthrene (µg/L); Parent PAHs



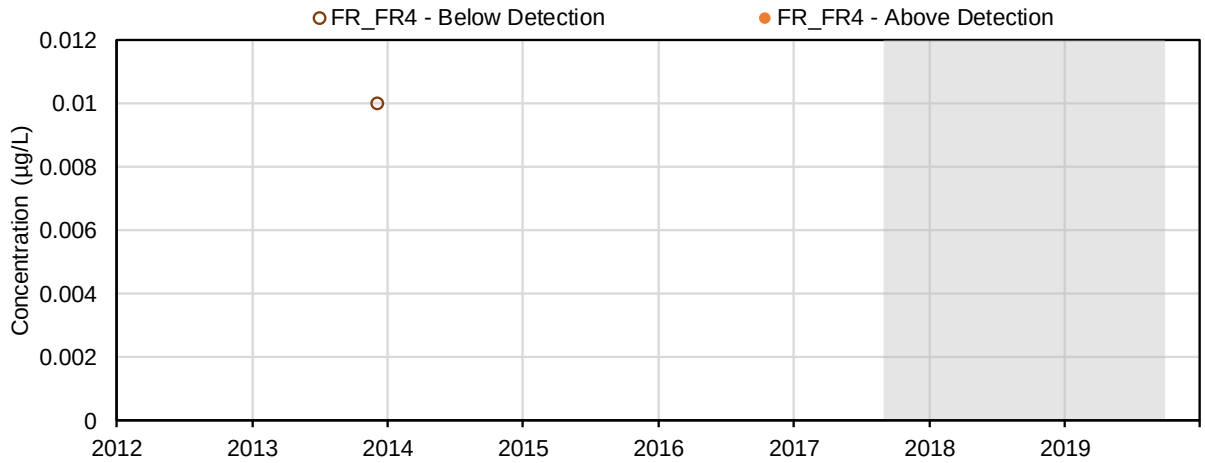
(118) Anthracene (µg/L); Parent PAHs



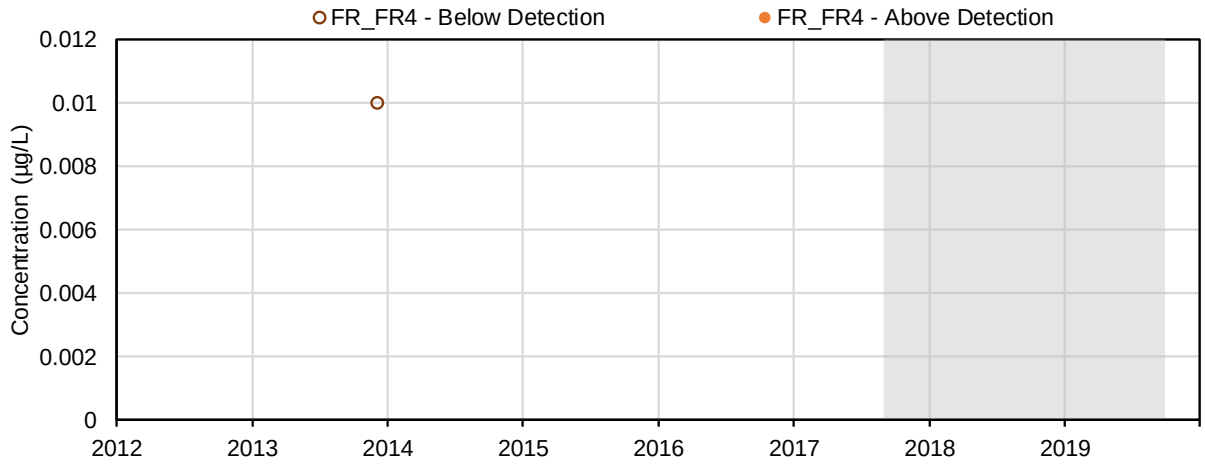
(119) Pyrene (µg/L); Parent PAHs



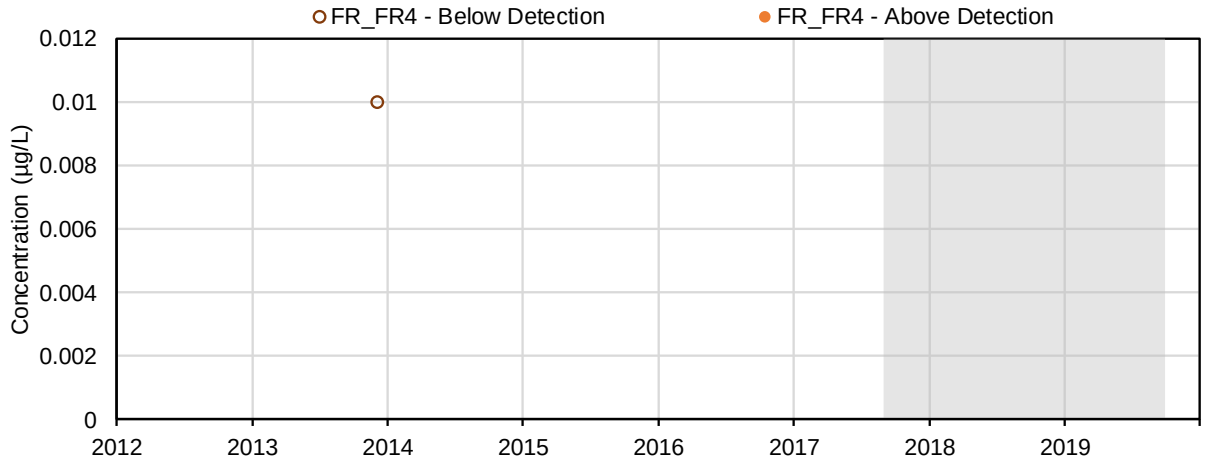
(120) Fluoranthene (µg/L); Parent PAHs



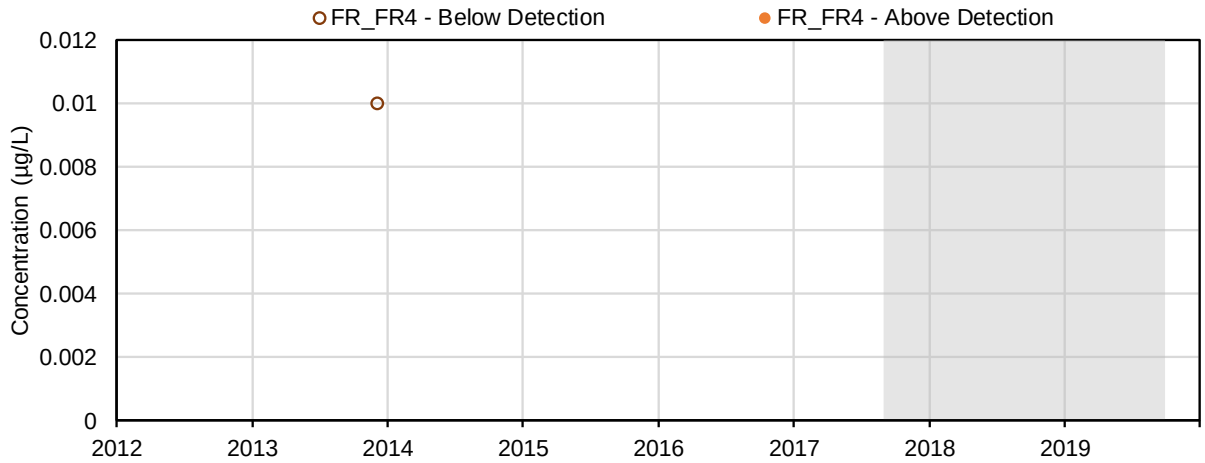
(121) Benzo(a)anthracene (µg/L); Parent PAHs



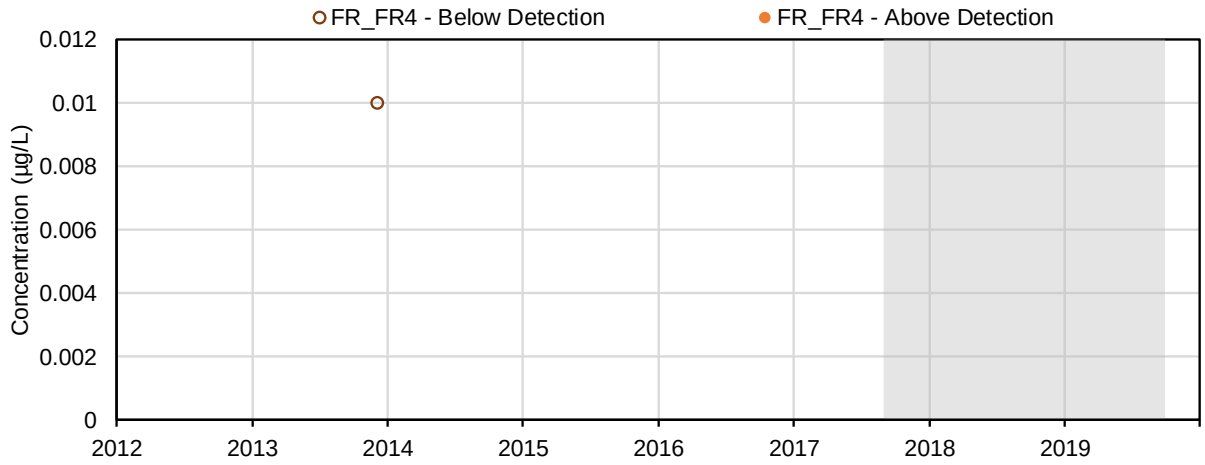
(122) Chrysene (µg/L); Parent PAHs



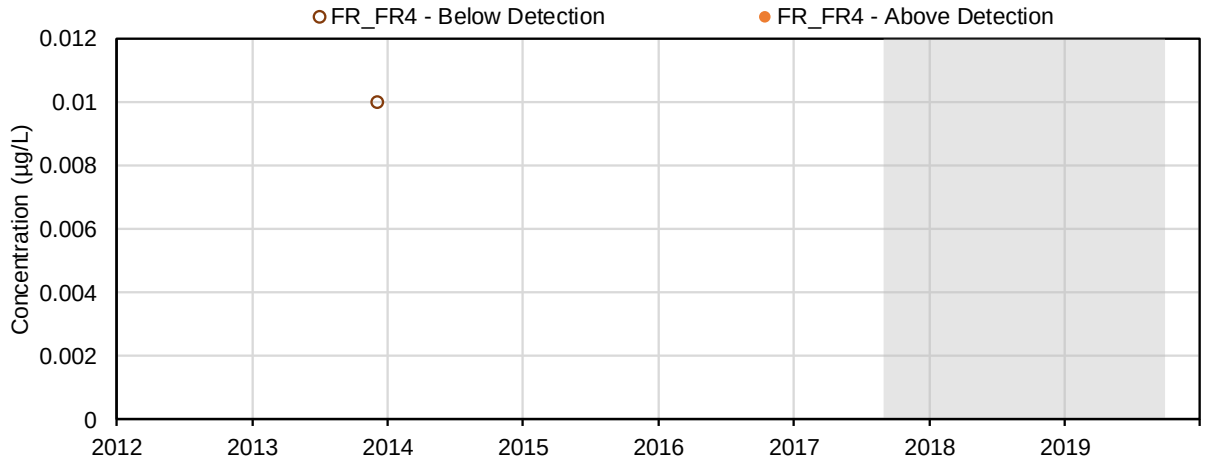
(123) Benzo(b)fluoranthene (µg/L); Parent PAHs



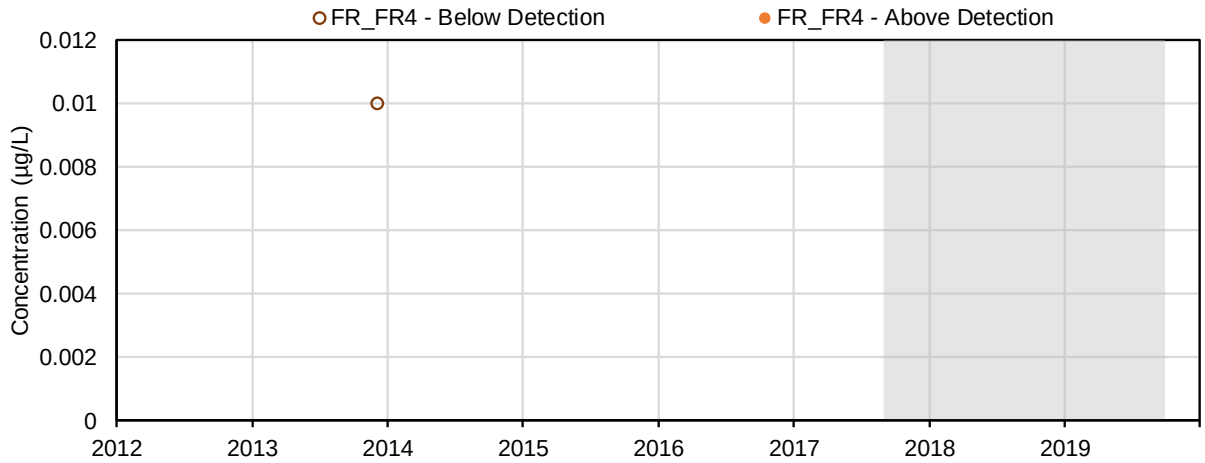
(124) Benzo(k)fluoranthene (µg/L); Parent PAHs



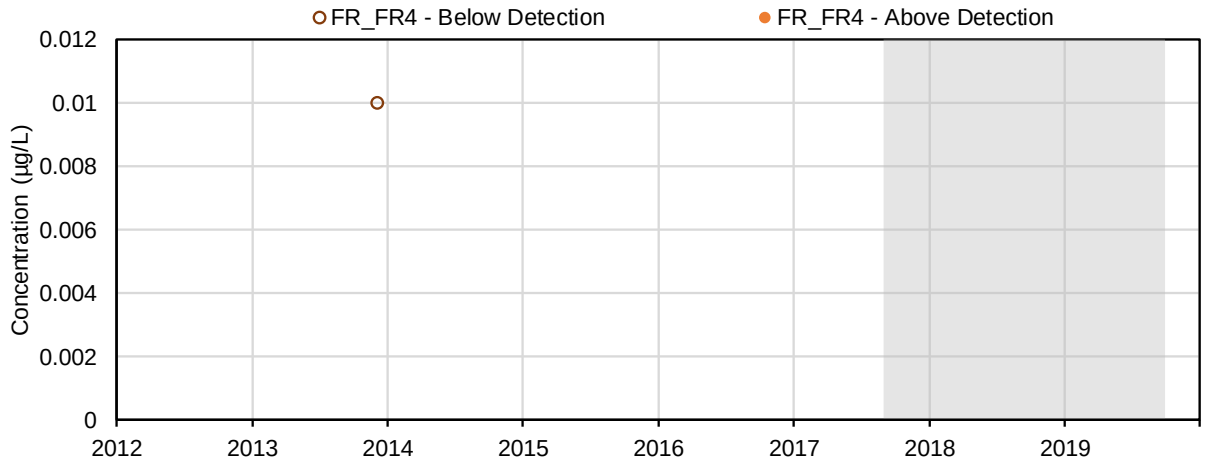
(125) Benzo(a)pyrene (µg/L); Parent PAHs



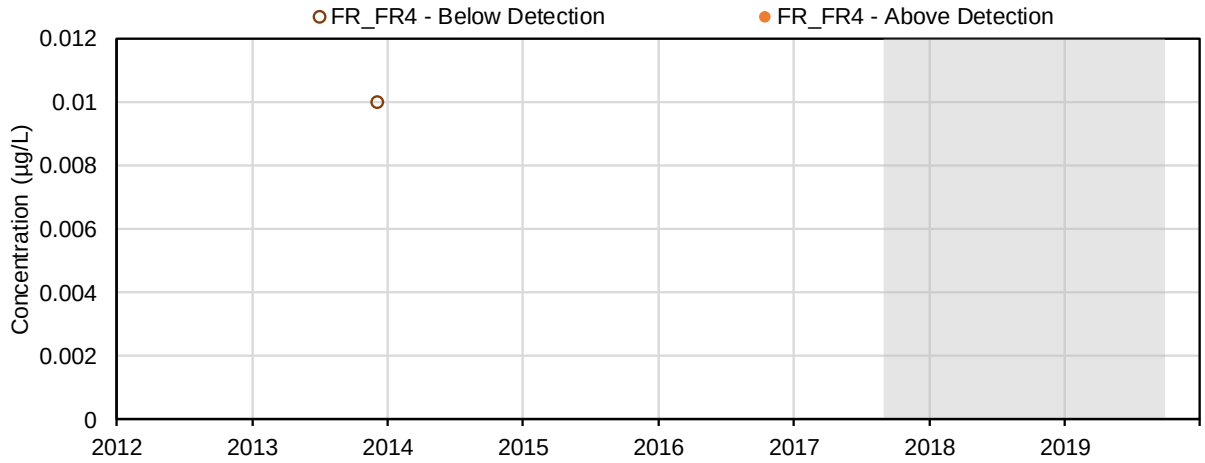
(126) Quinoline (µg/L); Parent PAHs



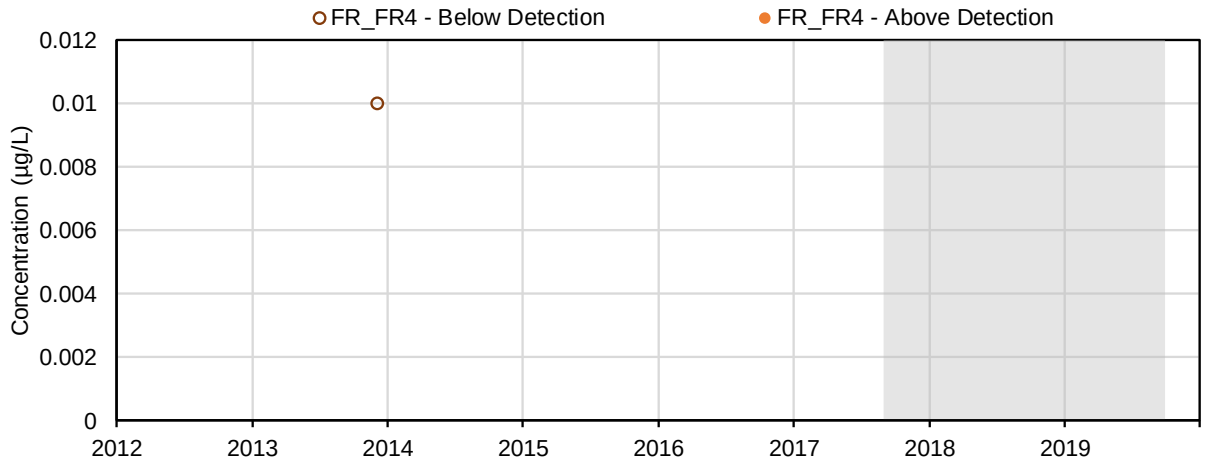
(127) Benzo(g,h,i)perylene (µg/L); Parent PAHs

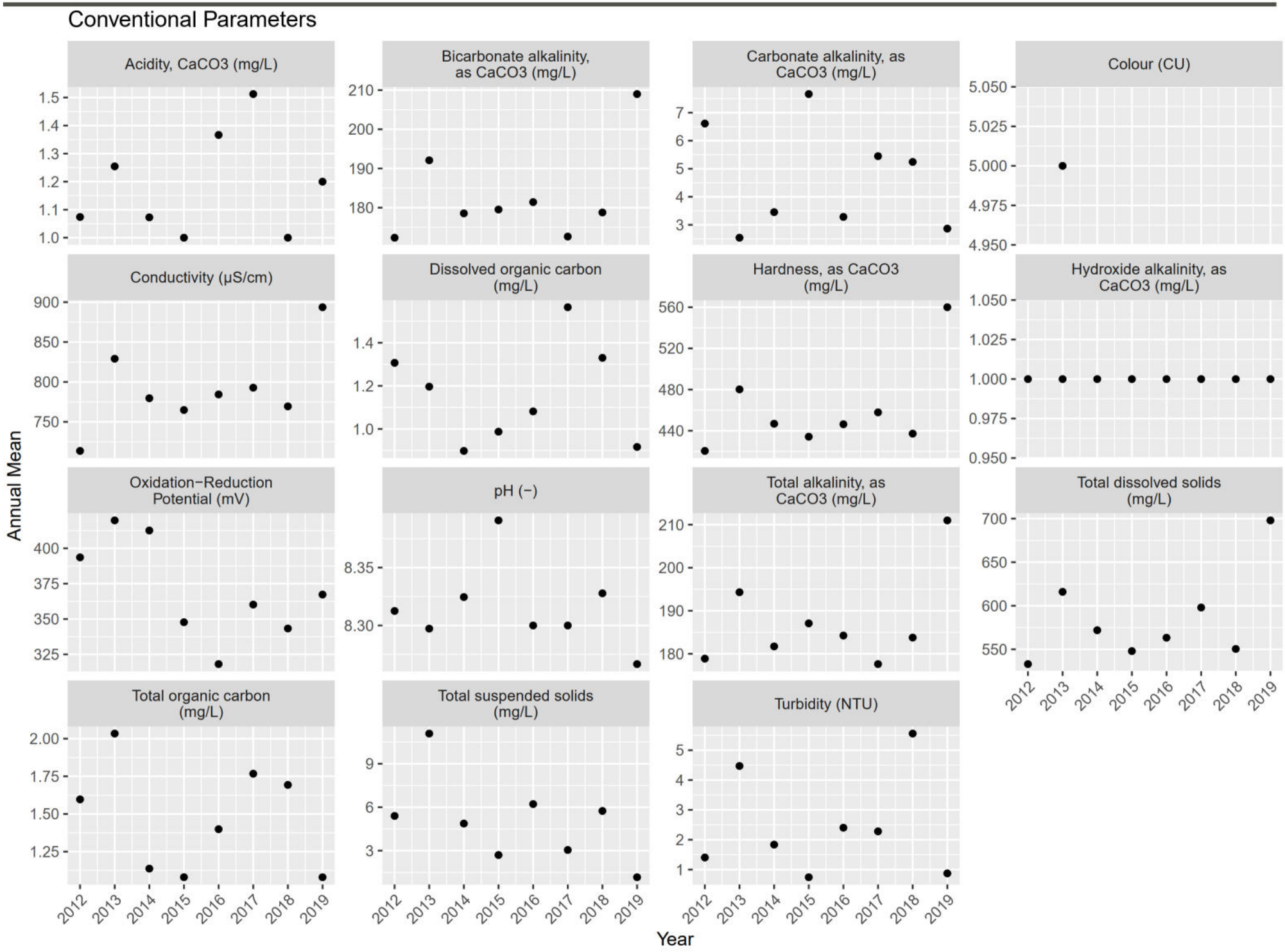


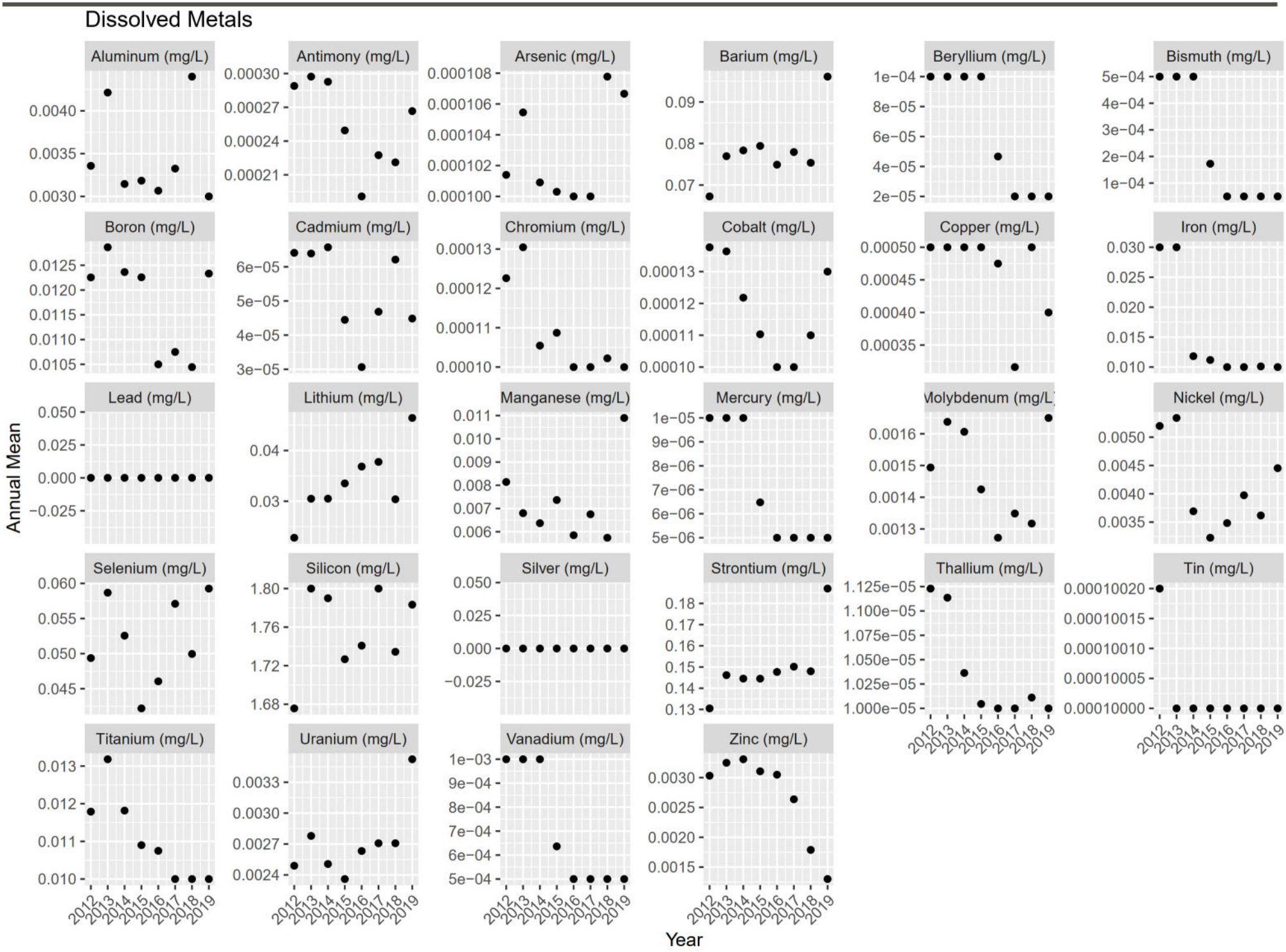
(128) Indeno(c,d-123)pyrene (µg/L); Parent PAHs

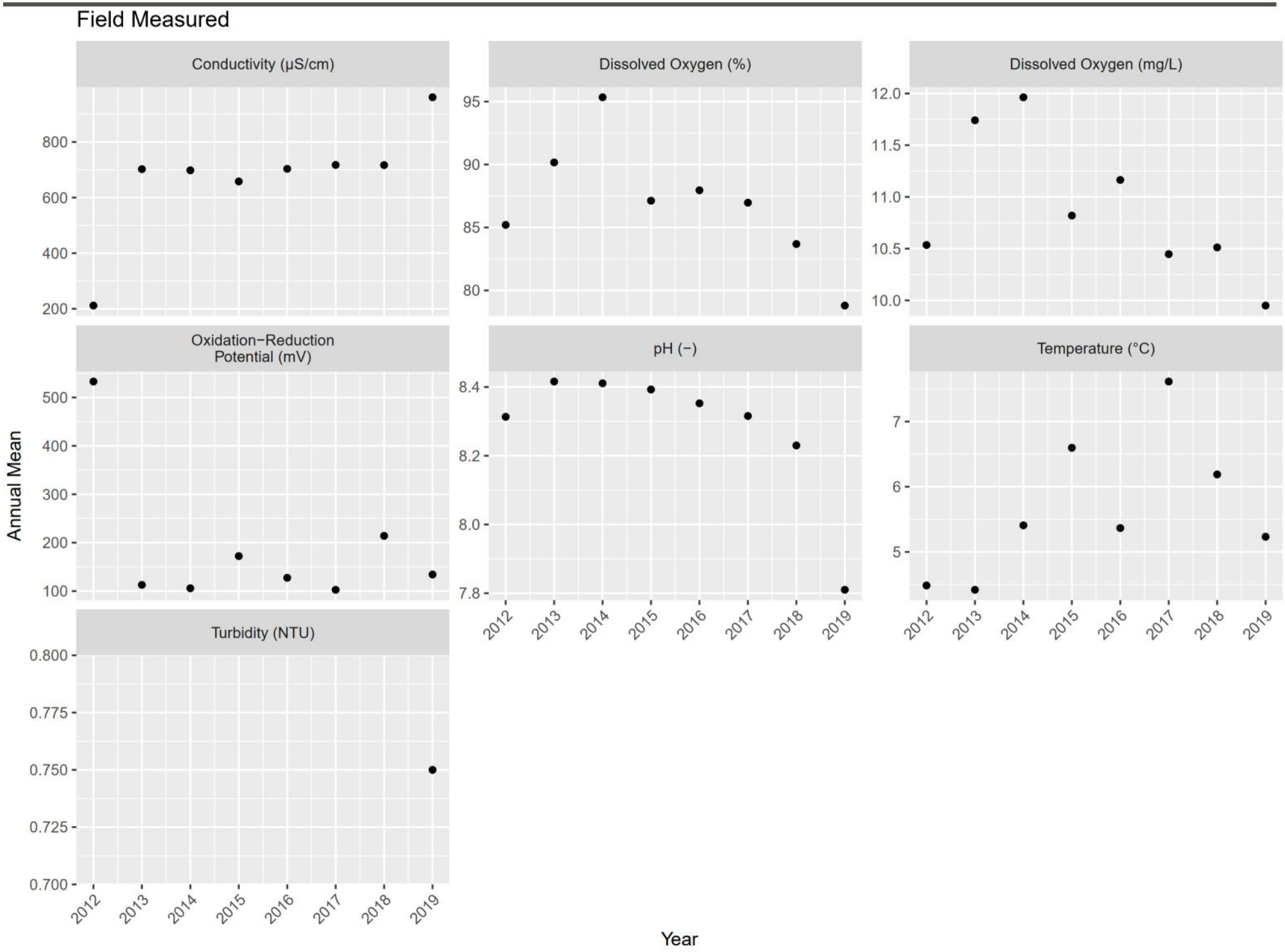


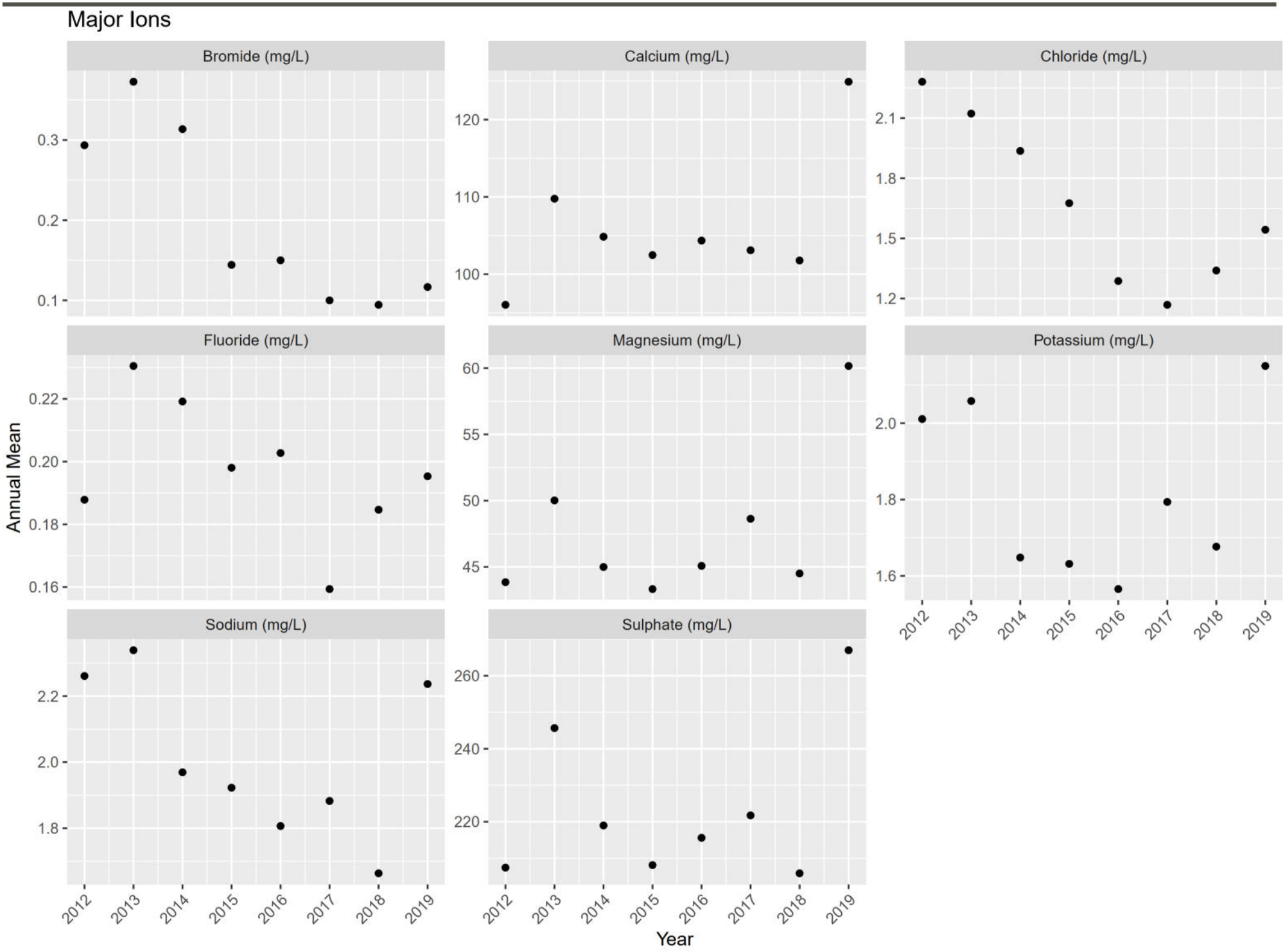
(129) Dibenzo(a,h)anthracene (µg/L); Parent PAHs

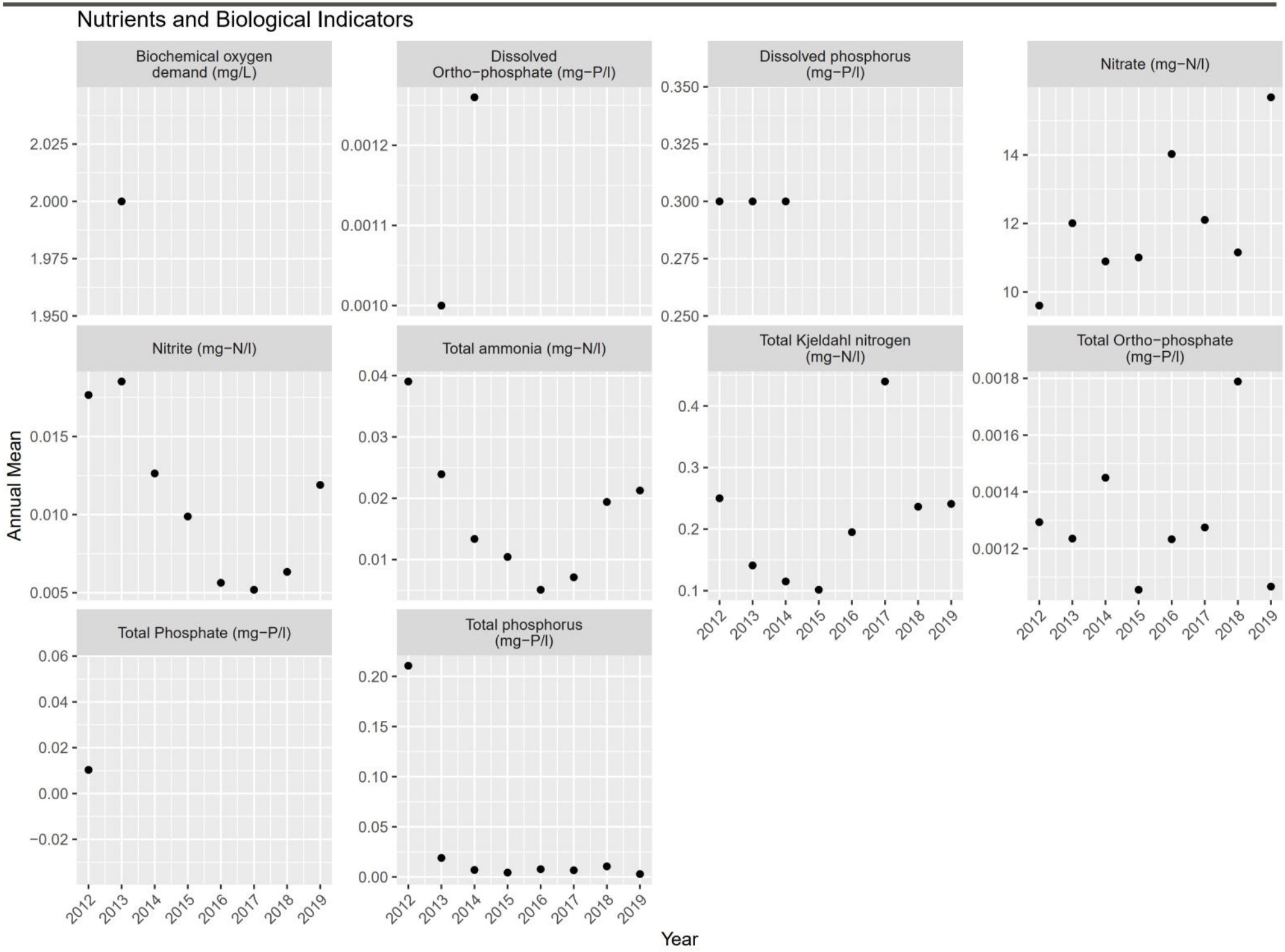


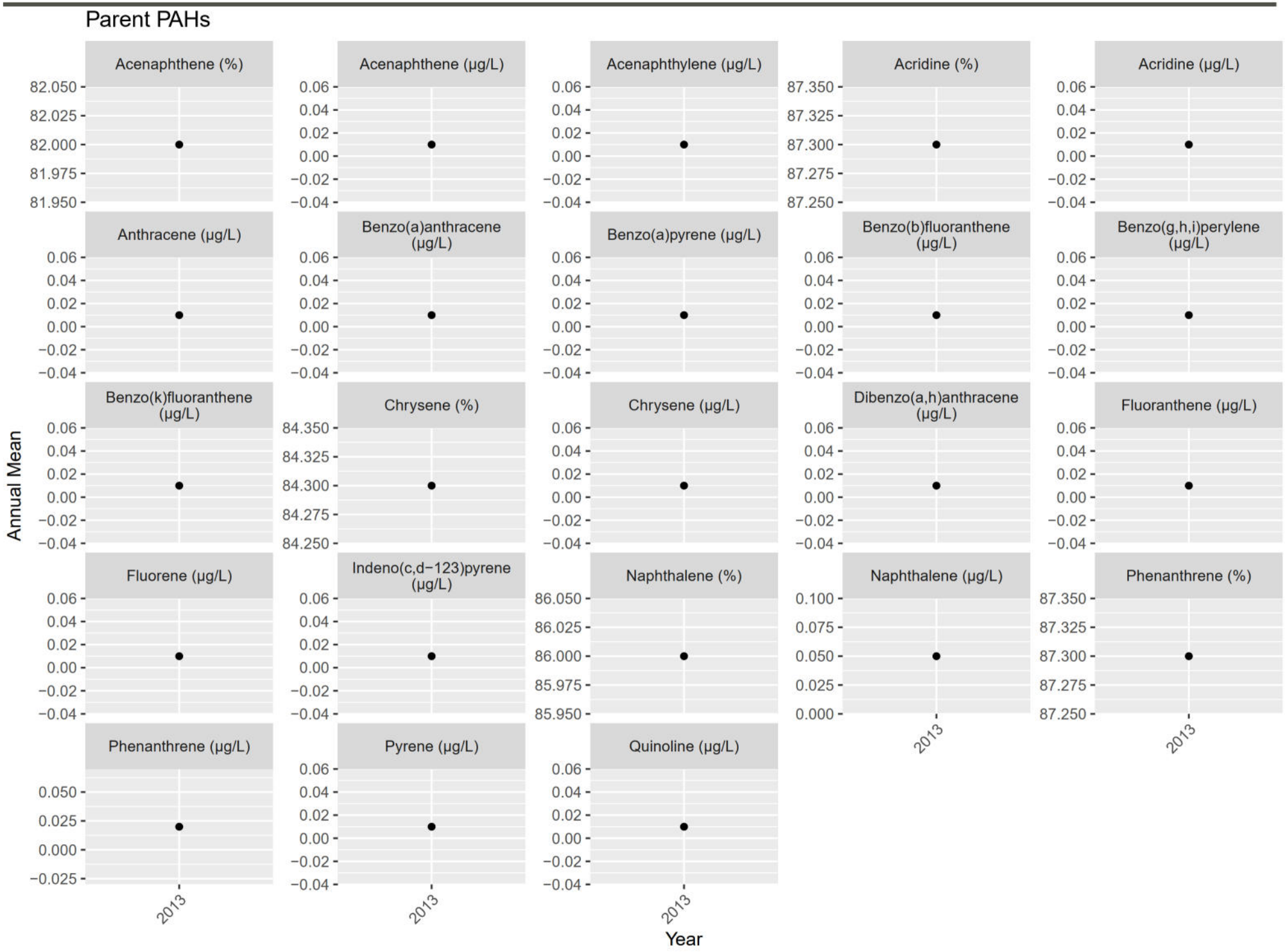

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Colour (CU)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

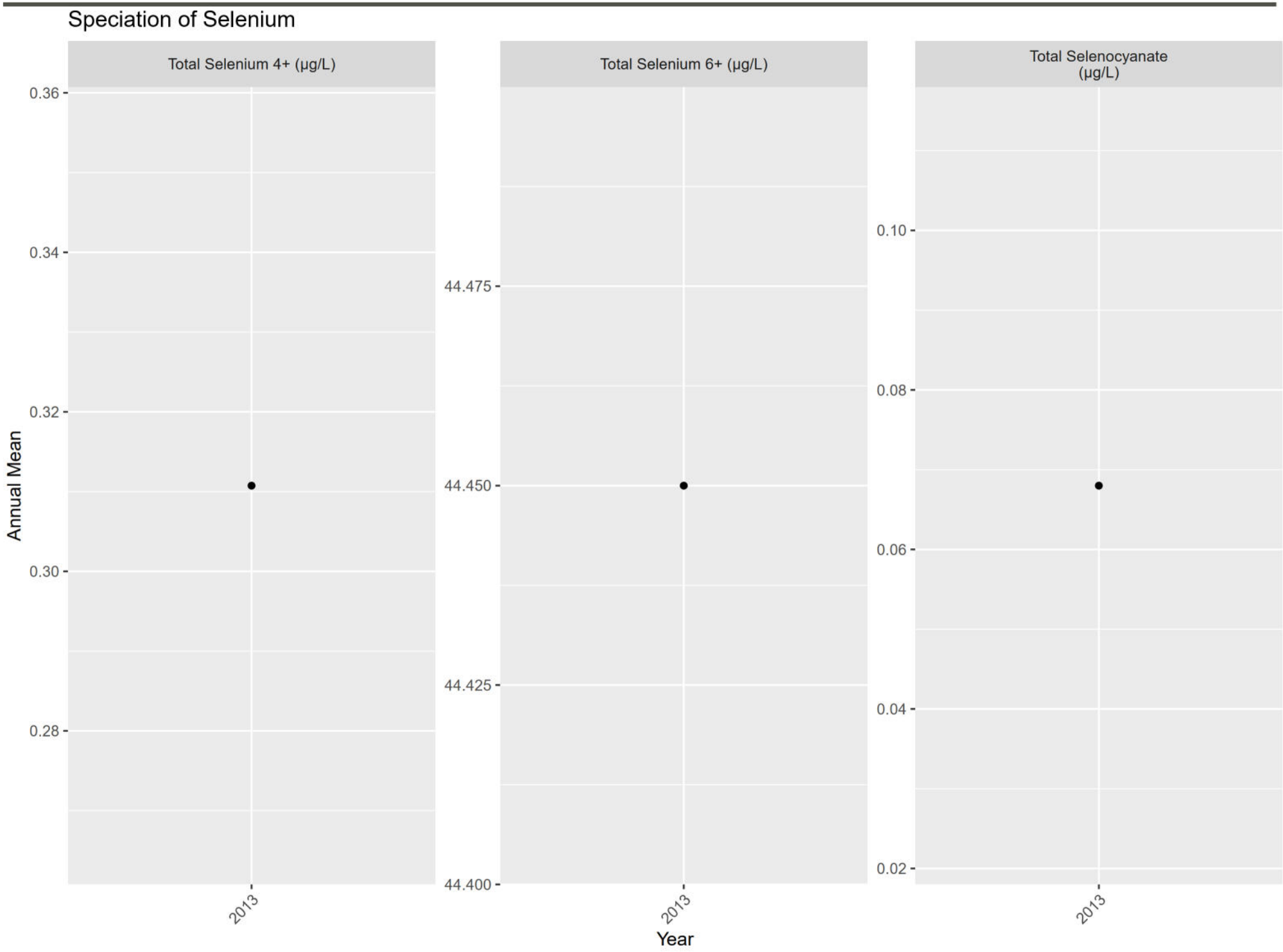

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

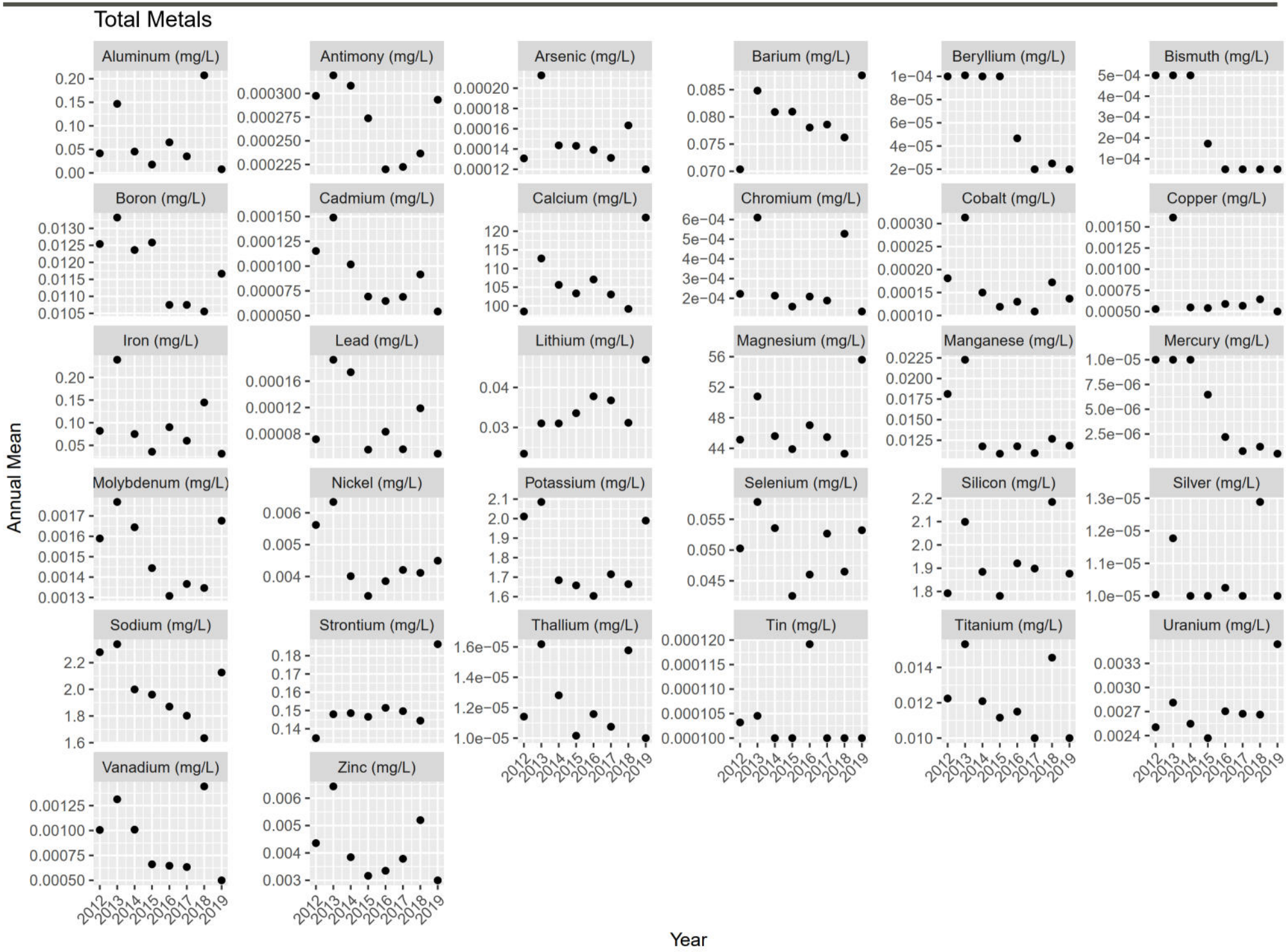

Field Measured
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Temperature (°C)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

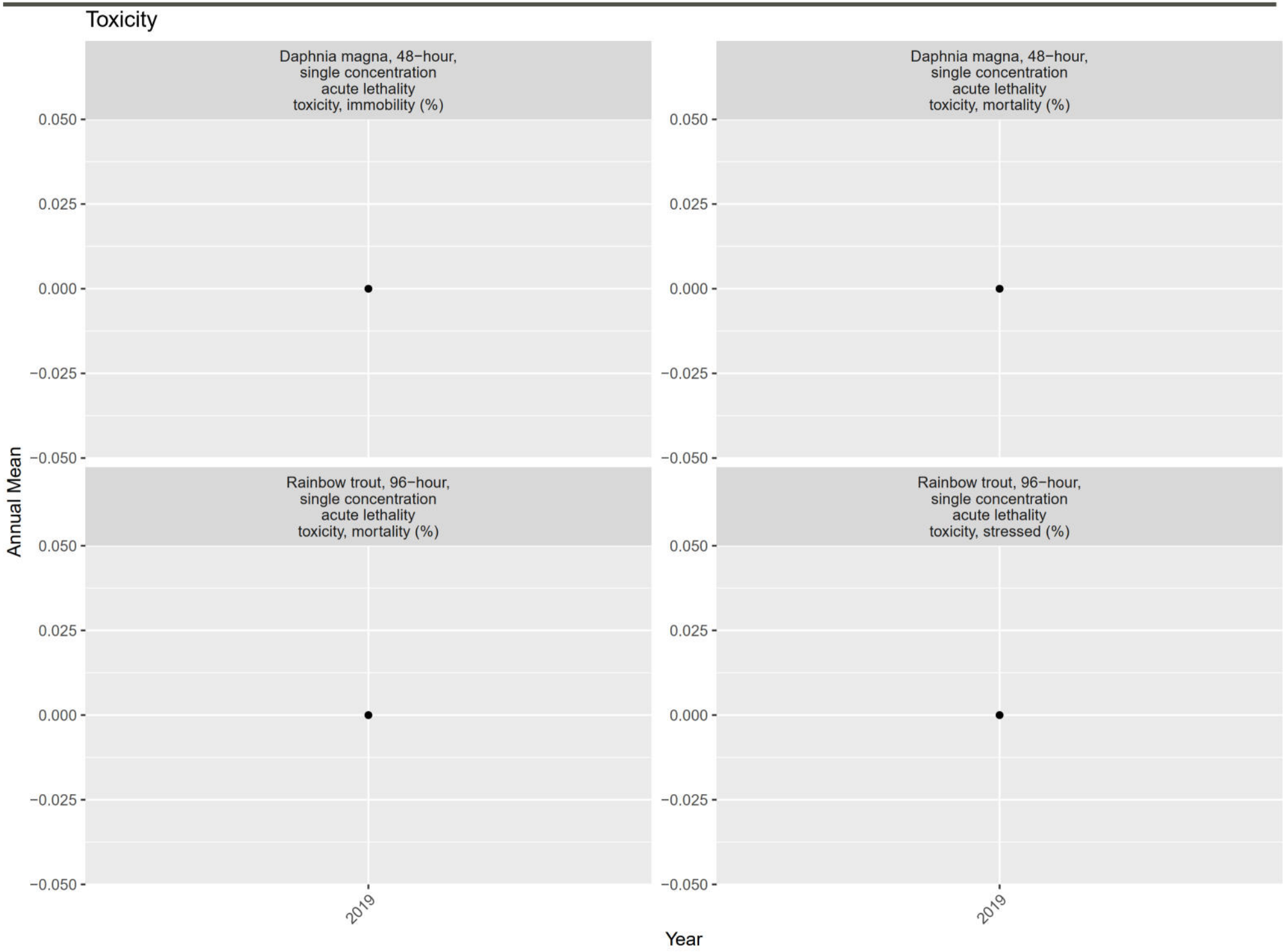

Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
0.1
0.2
0.3
100
110
120
1.2
1.5
1.8
2.1
0.16
0.18
0.20
0.22
45
50
55
60
1.6
1.8
2.0
1.8
2.0
2.2
220
240
260
2012
2013
2014
2015
2016
2017
2018
2019

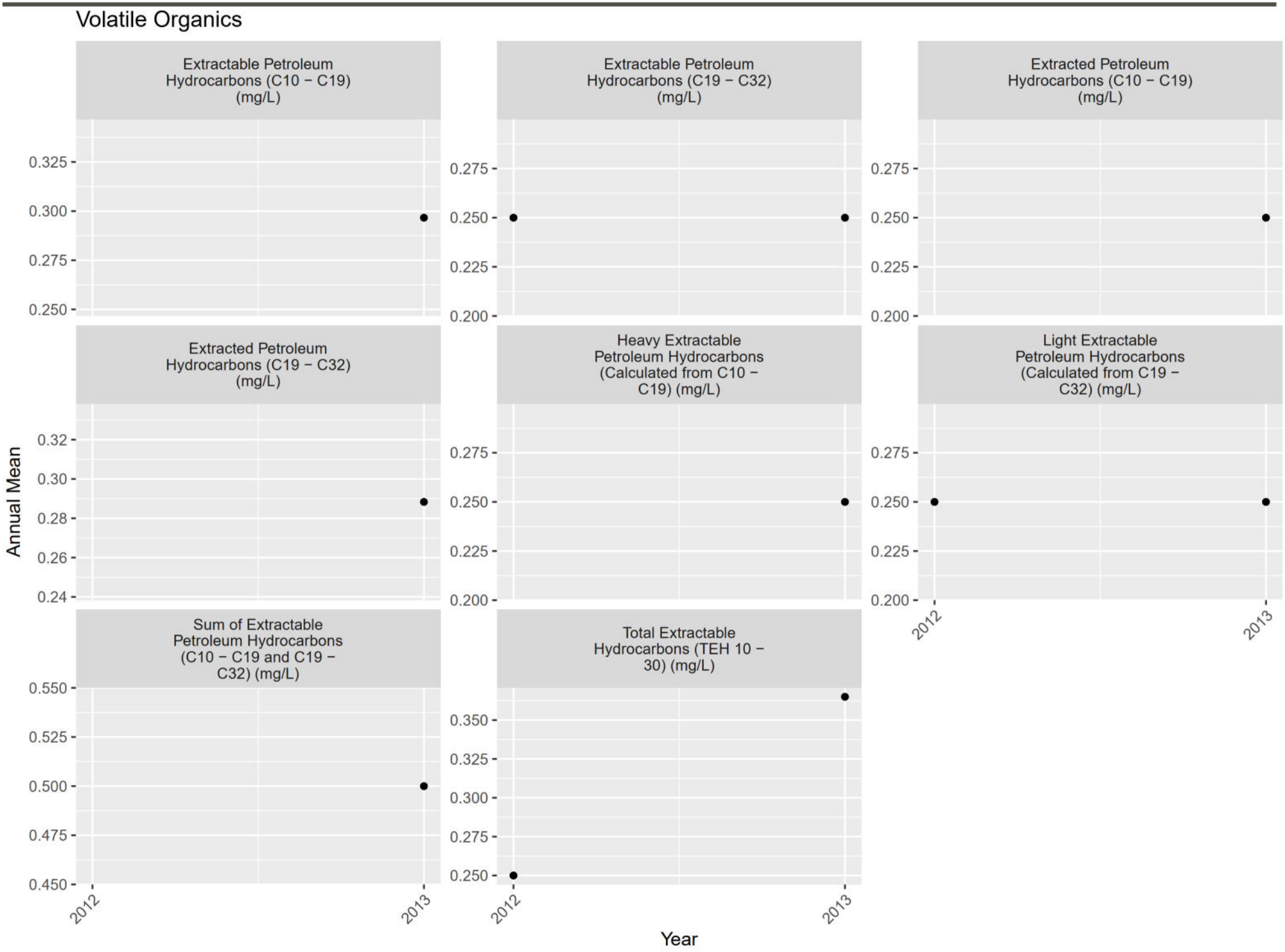

Nutrients and Biological Indicators
Biochemical oxygen demand (mg/L)
Dissolved Ortho−phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Parent PAHs
Acenaphthene (%)
Acenaphthene (µg/L)
Acenaphthylene (µg/L)
Acridine (%)
Acridine (µg/L)
Anthracene (µg/L)
Benzo(a)anthracene (µg/L)
Benzo(a)pyrene (µg/L)
Benzo(b)fluoranthene (µg/L)
Benzo(g,h,i)perylene (µg/L)
Benzo(k)fluoranthene (µg/L)
Chrysene (%)
Chrysene (µg/L)
Dibenzo(a,h)anthracene (µg/L)
Fluoranthene (µg/L)
Fluorene (µg/L)
Indeno(c,d−123)pyrene (µg/L)
Naphthalene (%)
Naphthalene (µg/L)
Phenanthrene (%)
Phenanthrene (µg/L)
Pyrene (µg/L)
Quinoline (µg/L)
Annual Mean
2013
Year


Speciation of Selenium
Total Selenium 4+ (µg/L)
Total Selenium 6+ (µg/L)
Total Selenocyanate (µg/L)
Annual Mean
0.36
0.34
0.32
0.30
0.28
44.475
44.450
44.425
44.400
0.10
0.08
0.06
0.04
0.02
2013
Year


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year

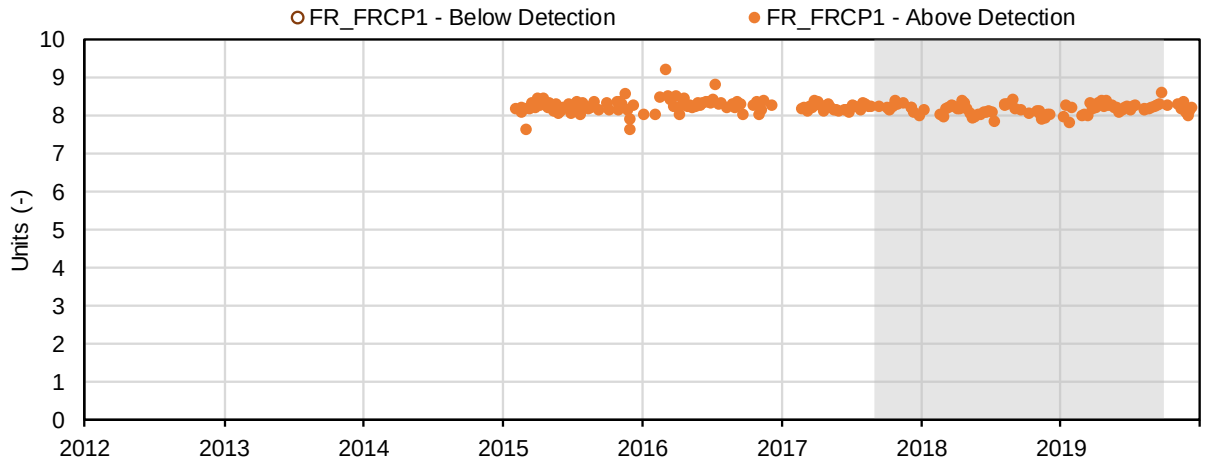

Toxicity
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, immobility (%)
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, stressed (%)
Annual Mean
0.050
0.025
0.000
−0.025
−0.050
2019
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extractable Petroleum Hydrocarbons (C19 − C32) (mg/L)
Extracted Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 − C19) (mg/L)
Light Extractable Petroleum Hydrocarbons (Calculated from C19 − C32) (mg/L)
Sum of Extractable Petroleum Hydrocarbons (C10 − C19 and C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
Year
2012
2013

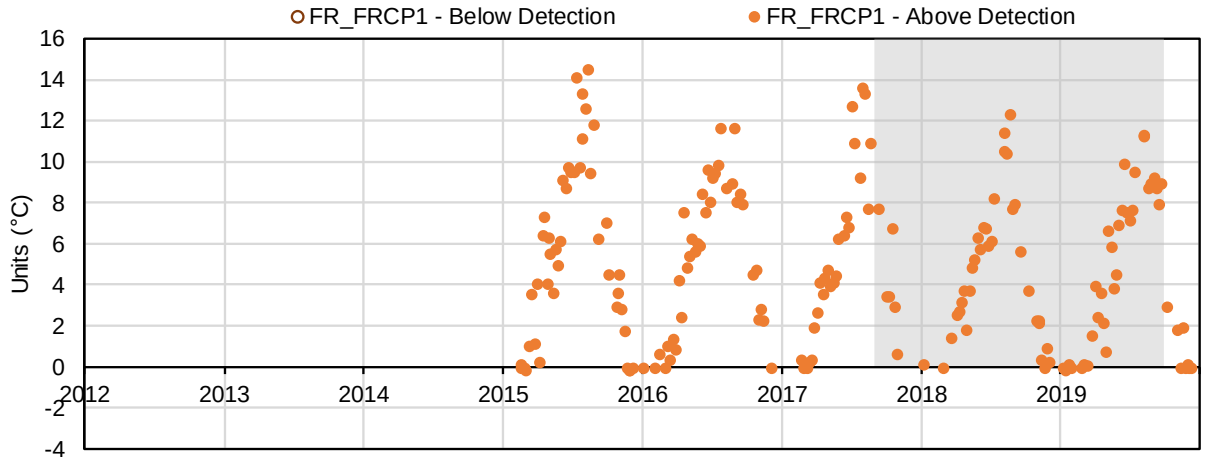
ATTACHMENT F9

FR_FRCP1 Plots

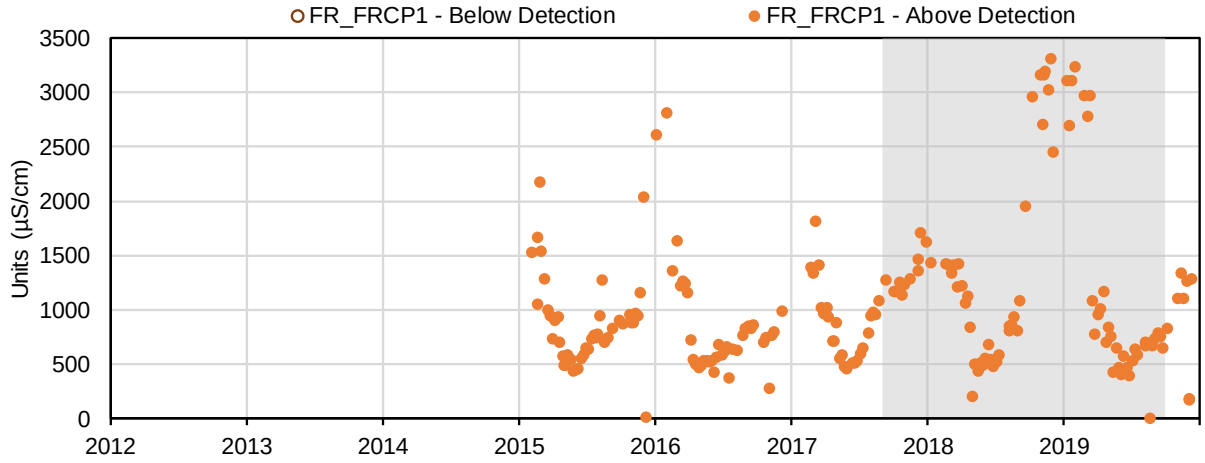
(1) pH (-); Field Measured



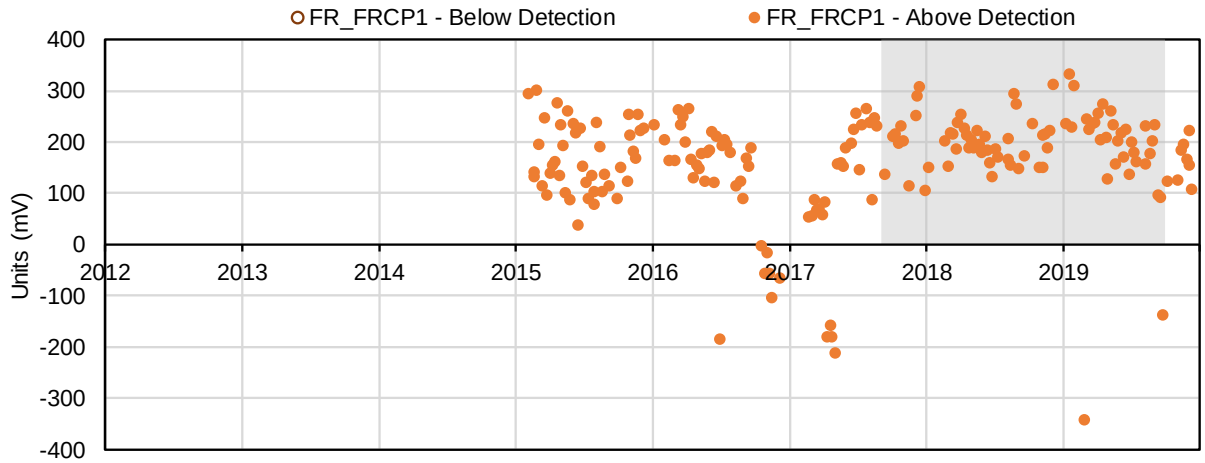
(2) Temperature (°C); Field Measured



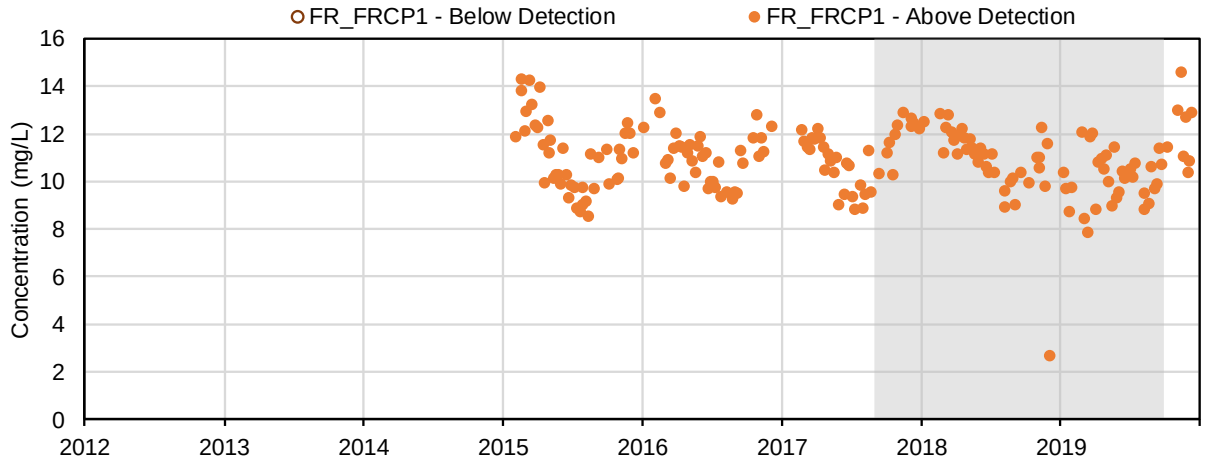
(3) Conductivity (µS/cm); Field Measured



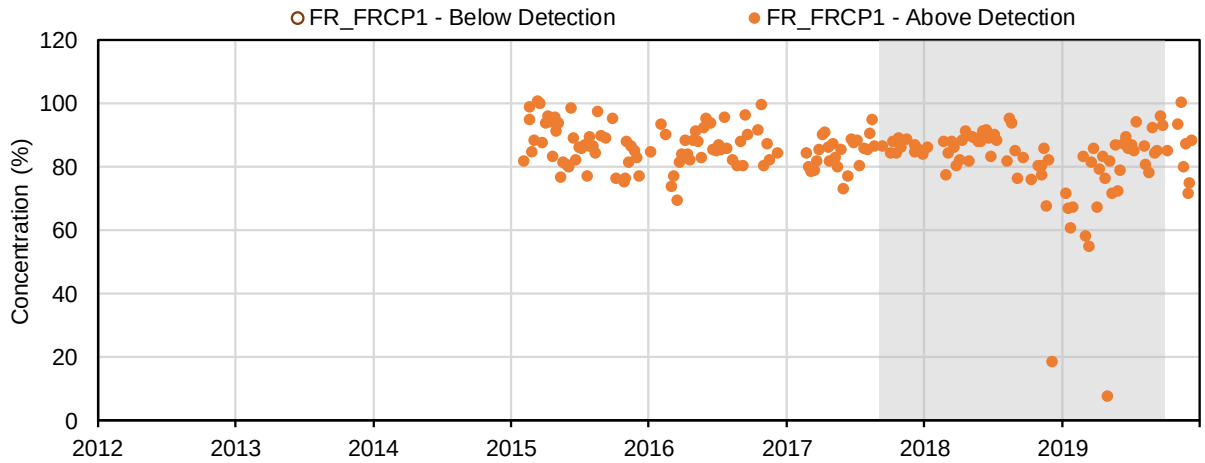
(4) Oxidation-Reduction Potential (mV); Field Measured



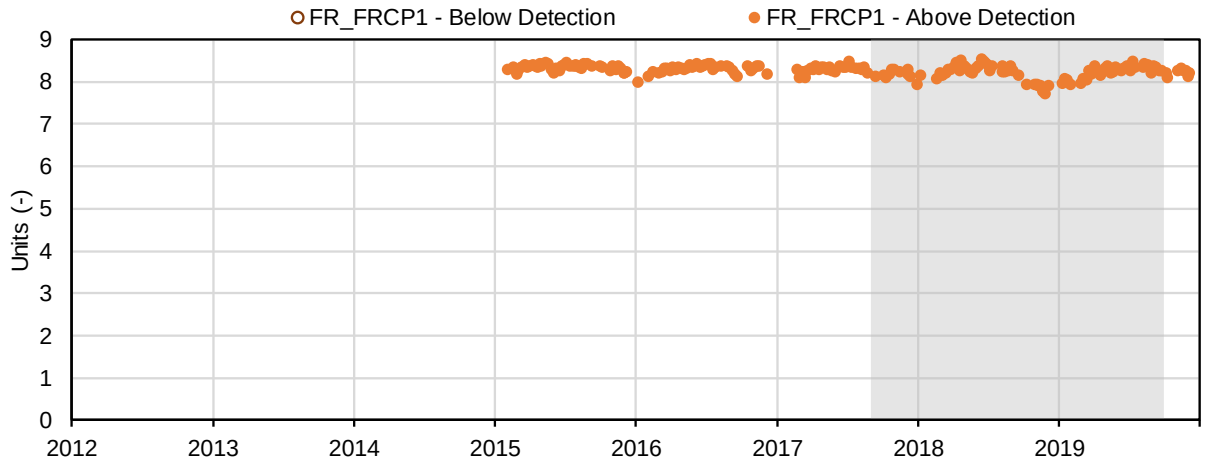
(5) Dissolved Oxygen (mg/L); Field Measured



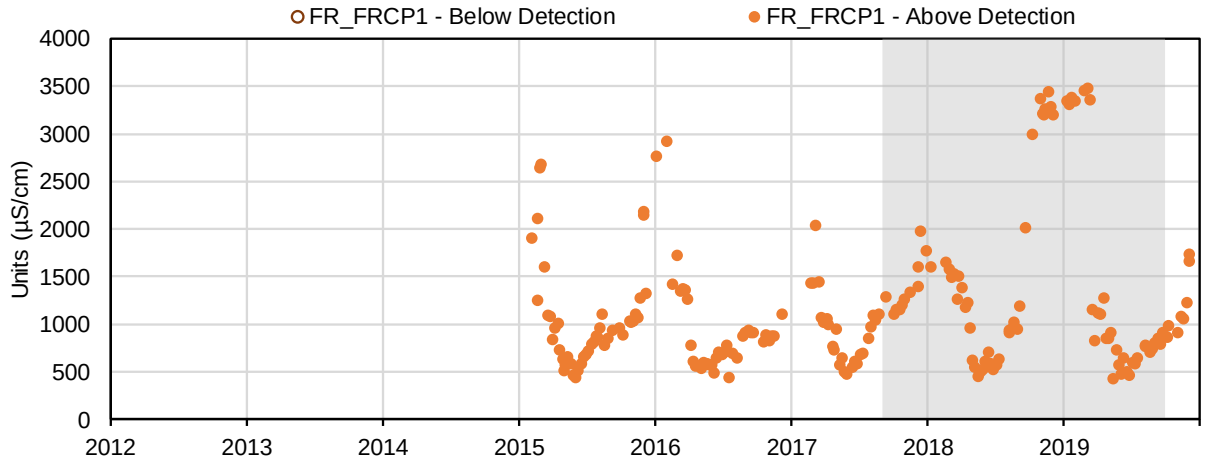
(6) Dissolved Oxygen (%); Field Measured



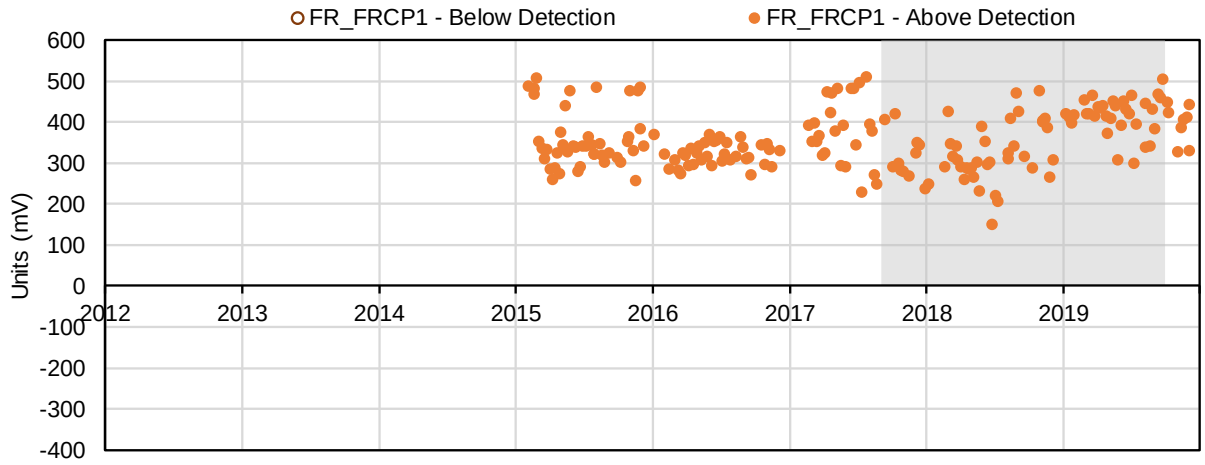
(7) pH (-); Conventional Parameters



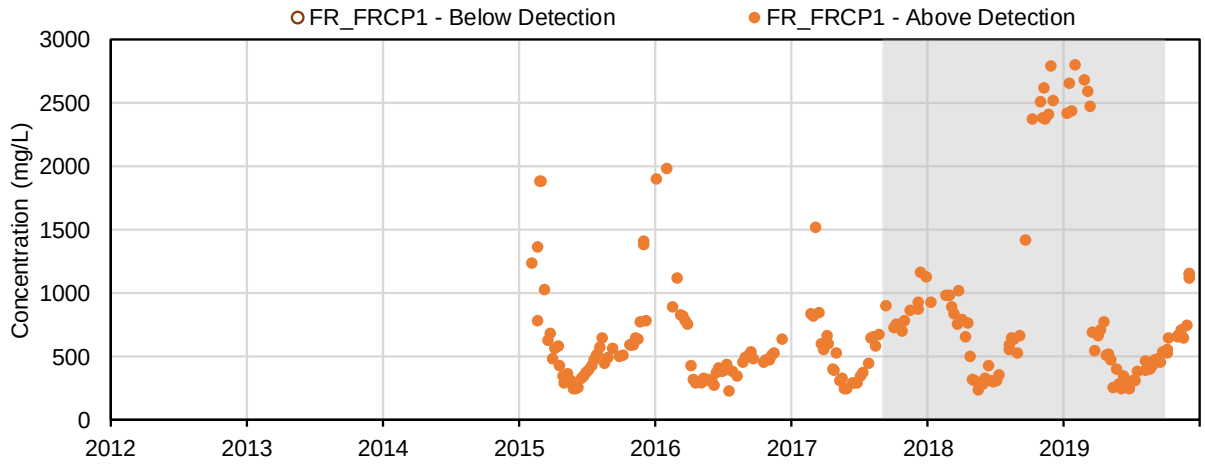
(8) Conductivity (µS/cm); Conventional Parameters



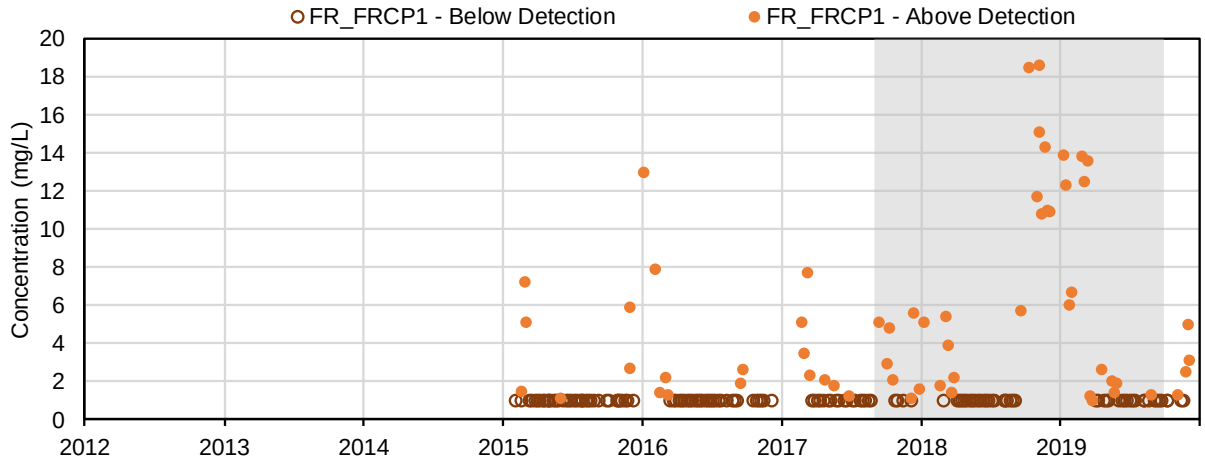
(9) Oxidation-Reduction Potential (mV); Conventional Parameters



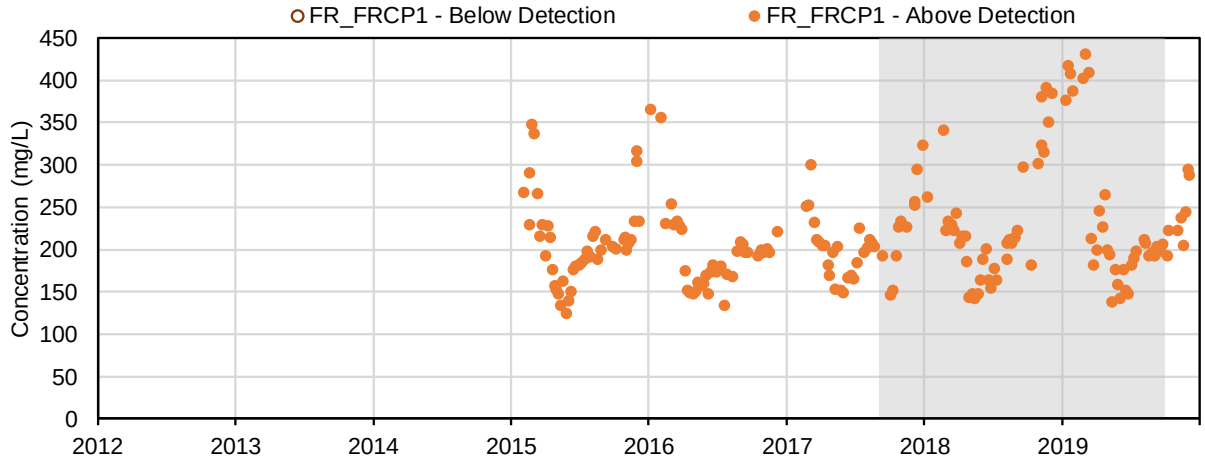
(10) Hardness, as CaCO3 (mg/L); Conventional Parameters



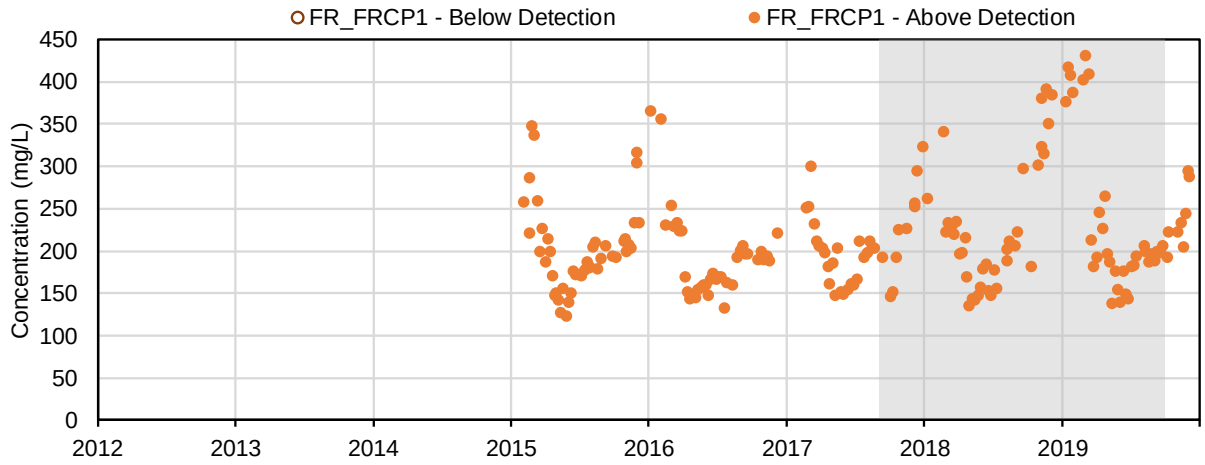
(11) Acidity, CaCO3 (mg/L); Conventional Parameters



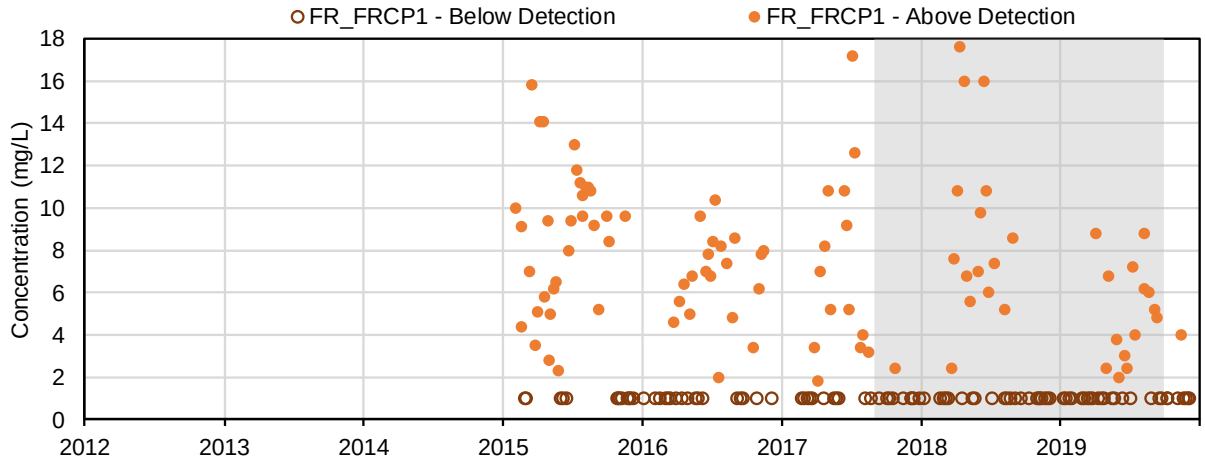
(12) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



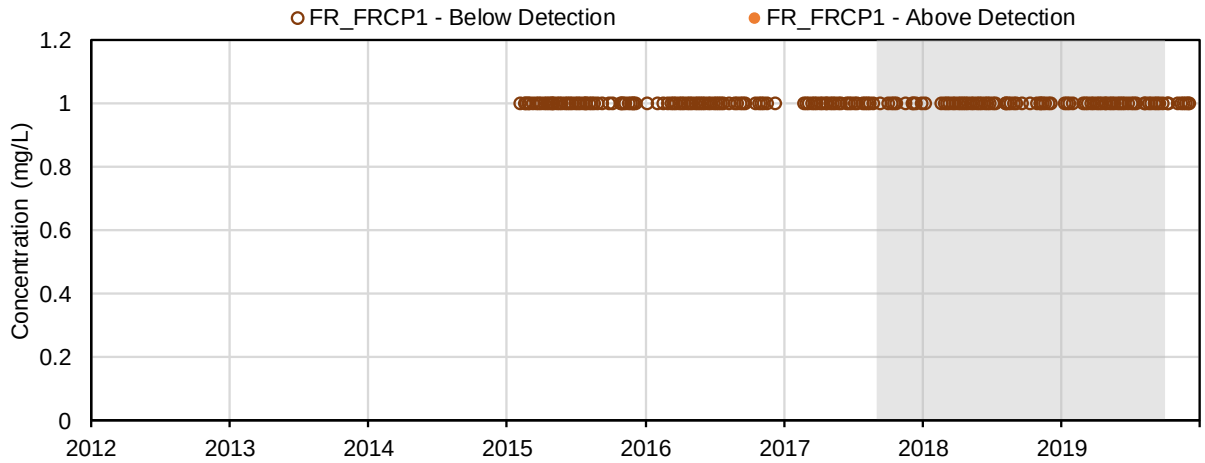
(13) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



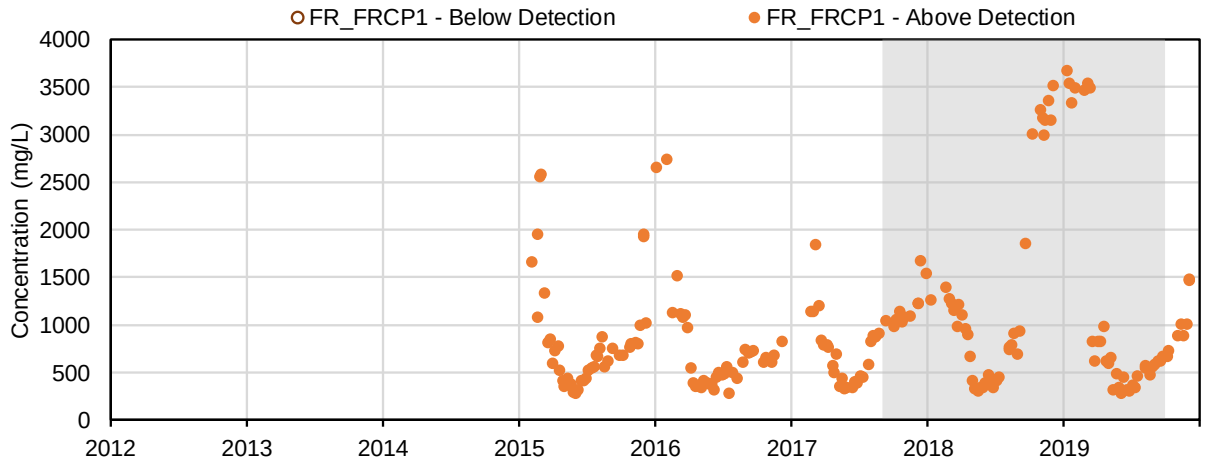
(14) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



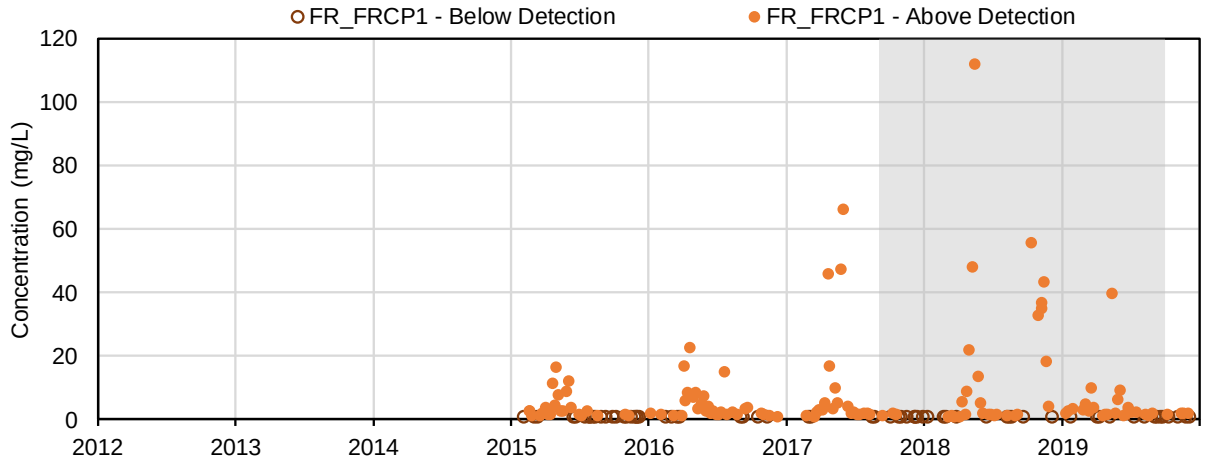
(15) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



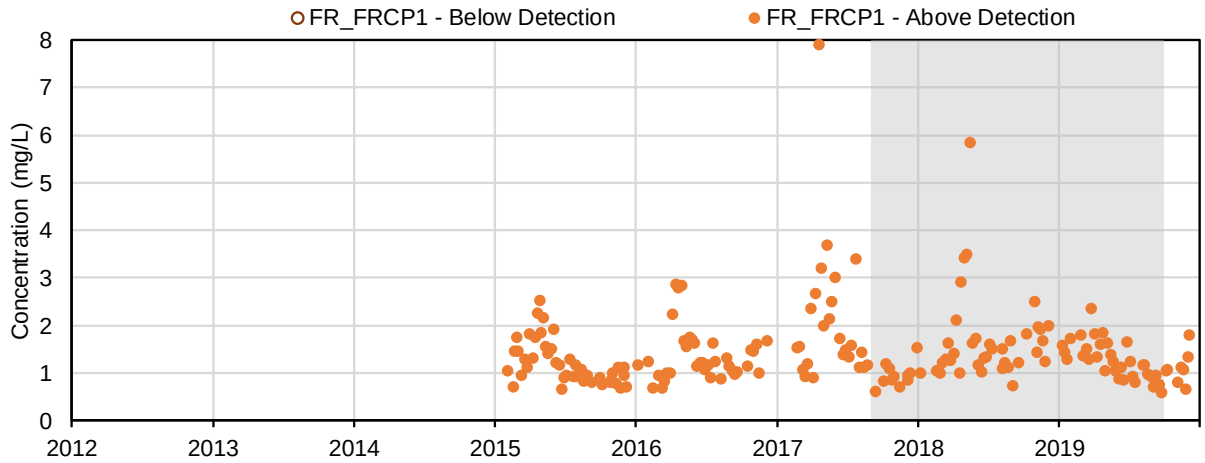
(16) Total dissolved solids (mg/L); Conventional Parameters



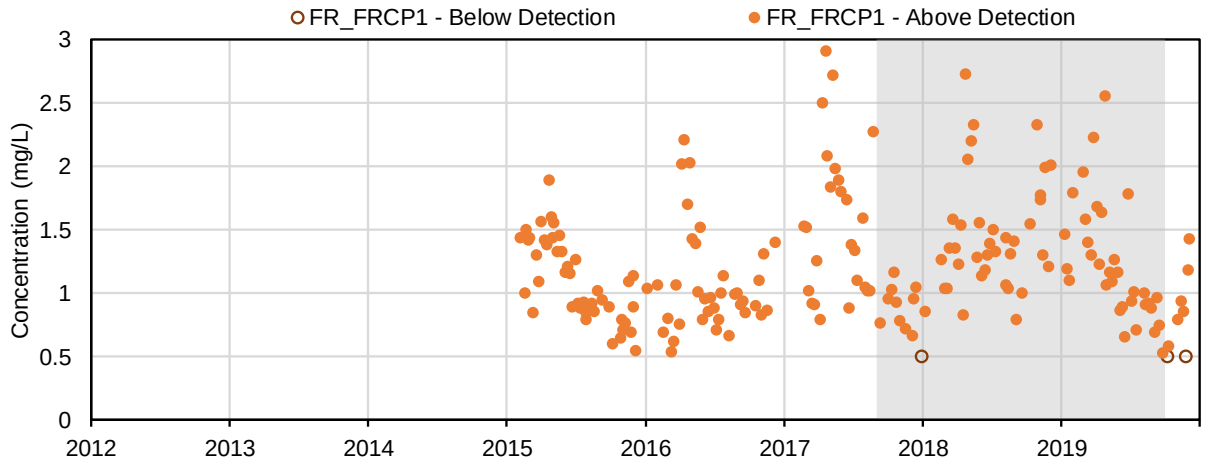
(17) Total suspended solids (mg/L); Conventional Parameters



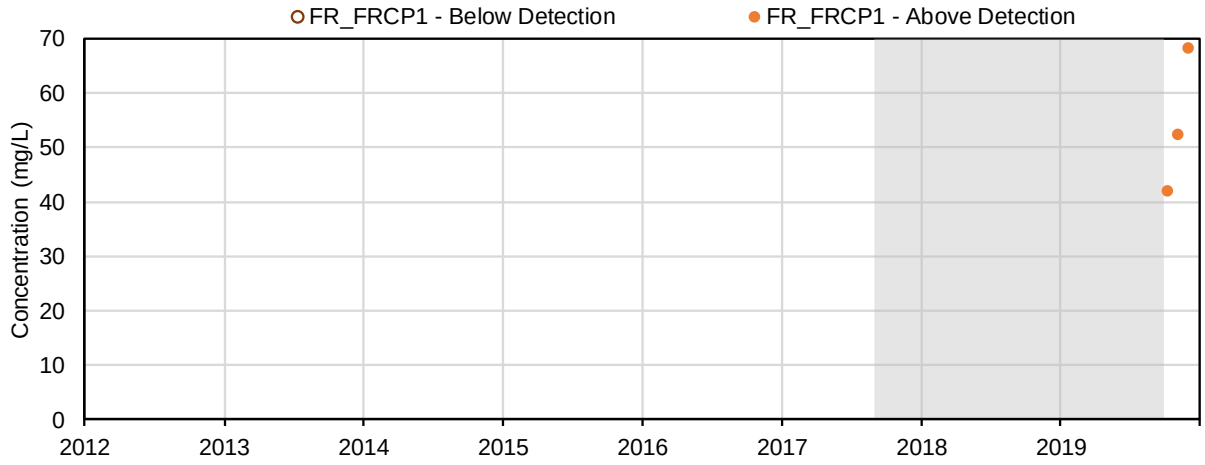
(18) Total organic carbon (mg/L); Conventional Parameters



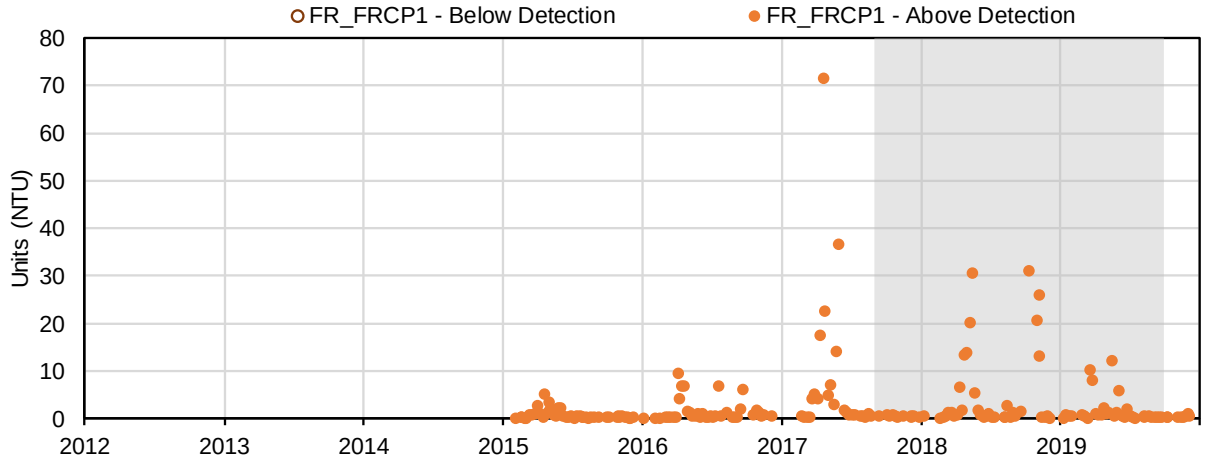
(19) Dissolved organic carbon (mg/L); Conventional Parameters



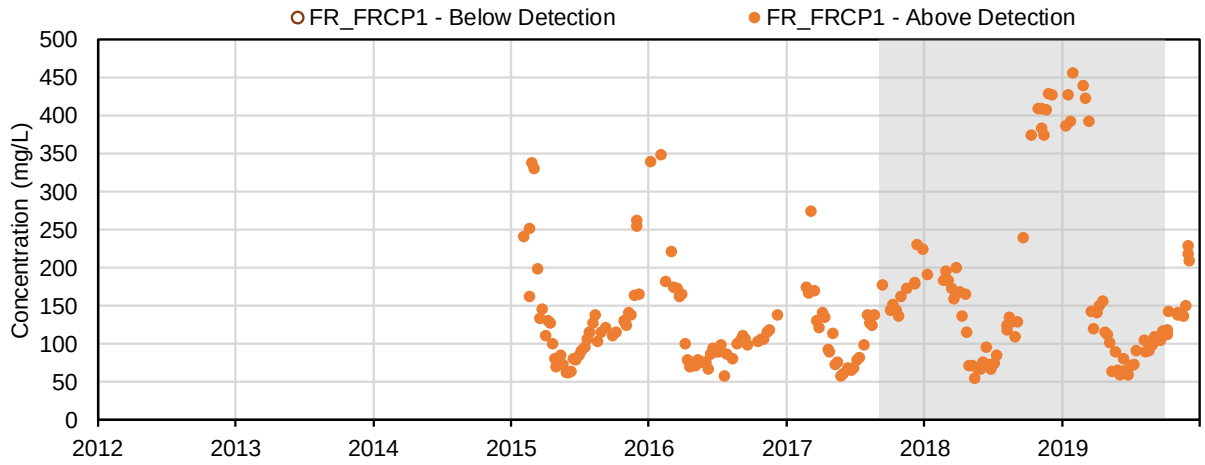
(20) Total Inorganic Carbon (mg/L); Conventional Parameters



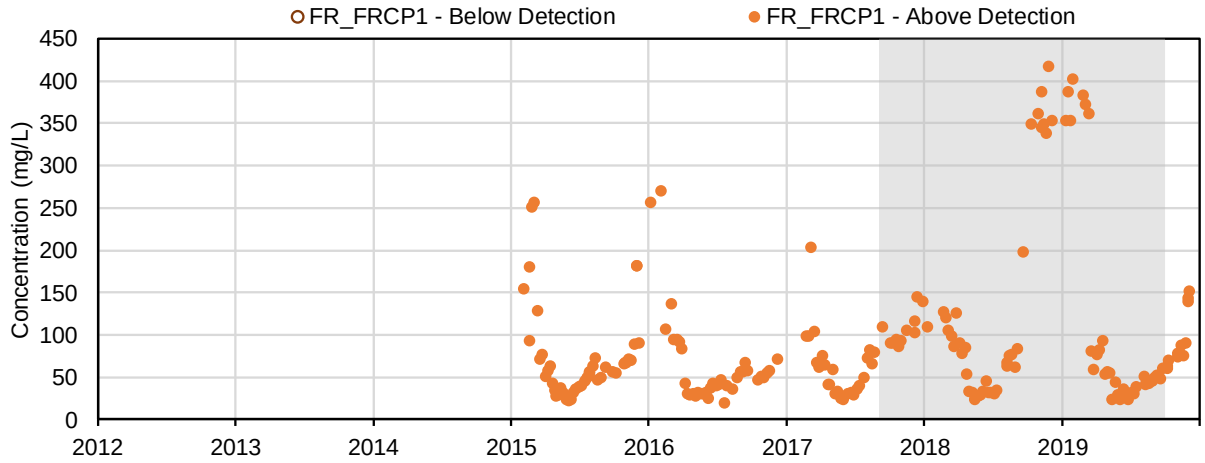
(21) Turbidity (NTU); Conventional Parameters



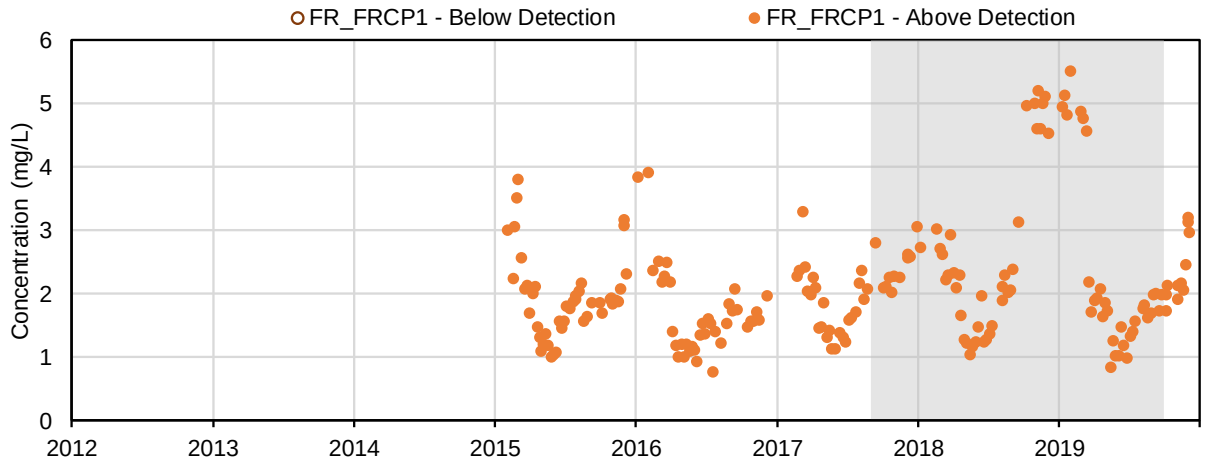
(22) Calcium (mg/L); Major Ions



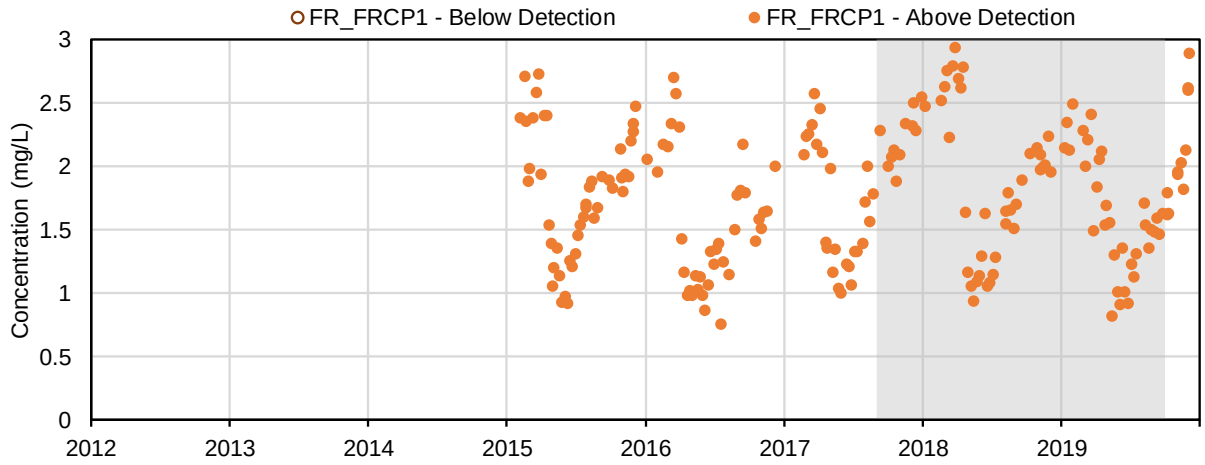
(23) Magnesium (mg/L); Major Ions



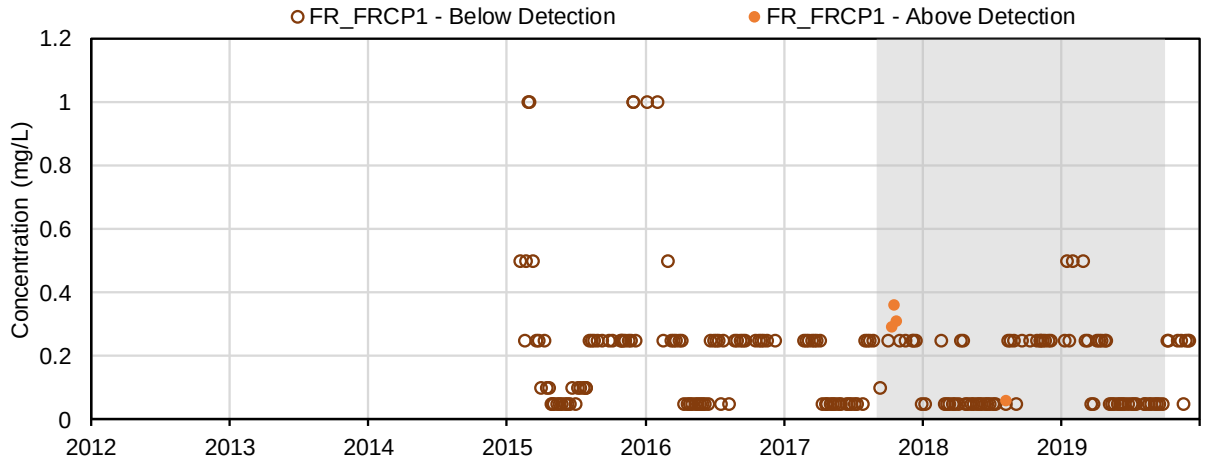
(24) Potassium (mg/L); Major Ions



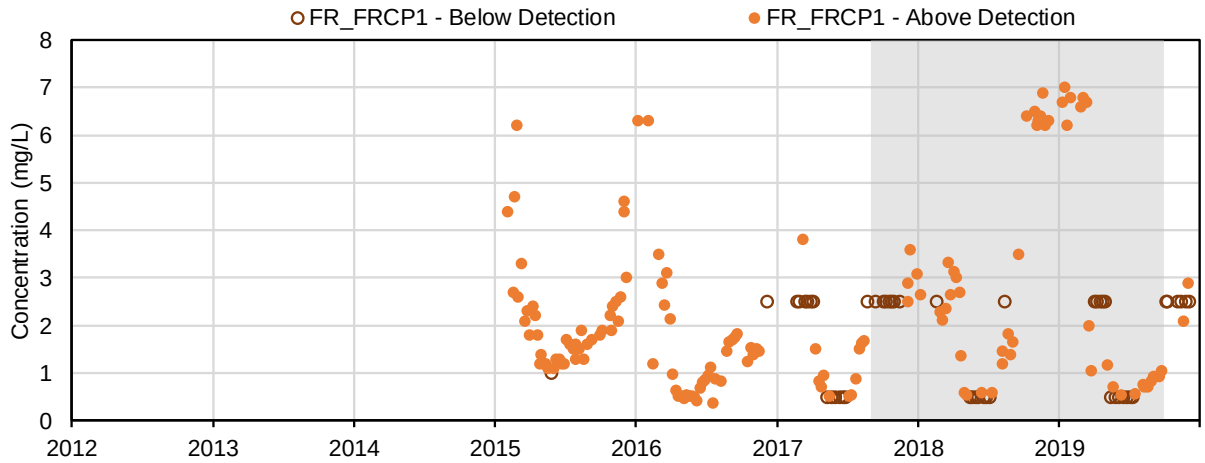
(25) Sodium (mg/L); Major Ions



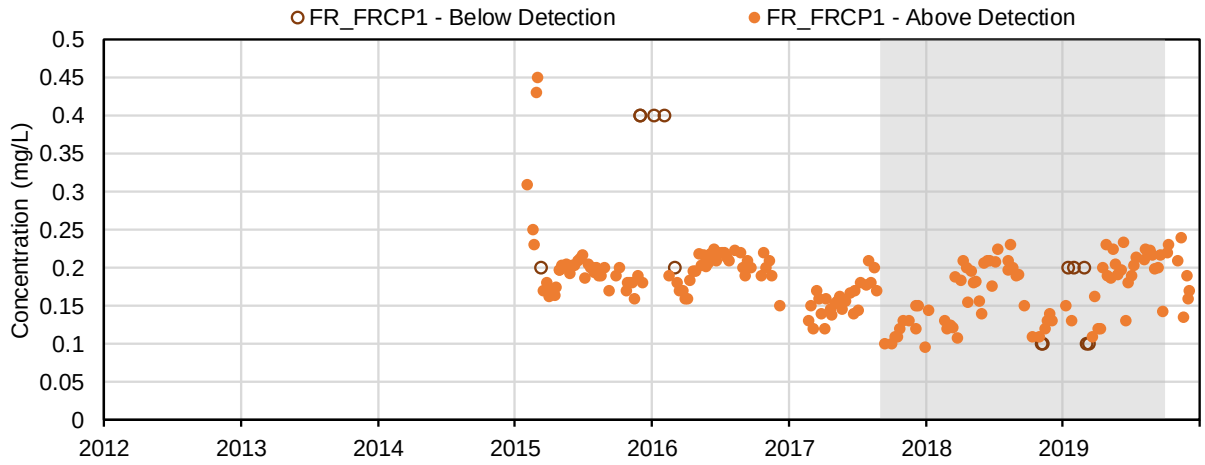
(26) Bromide (mg/L); Major Ions



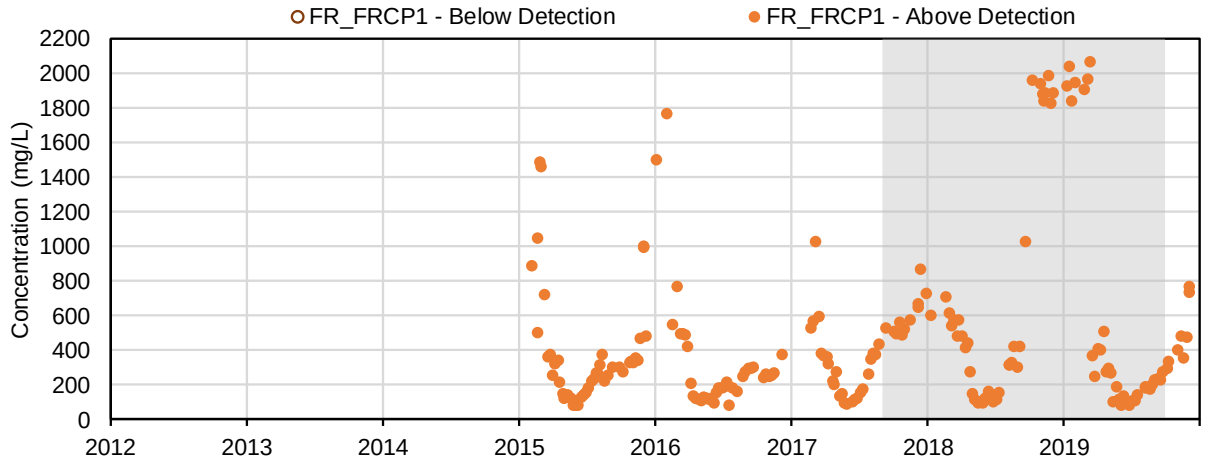
(27) Chloride (mg/L); Major Ions



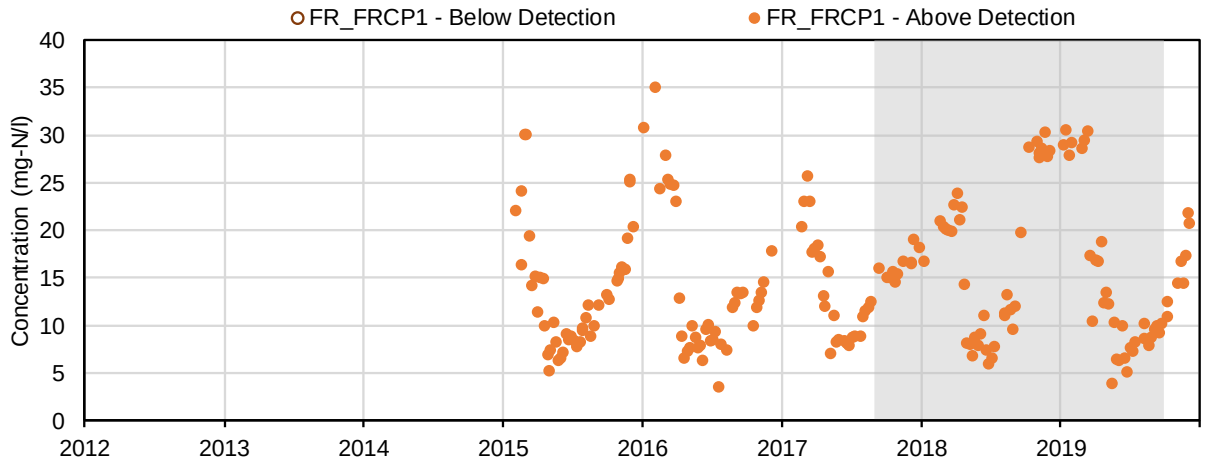
(28) Fluoride (mg/L); Major Ions



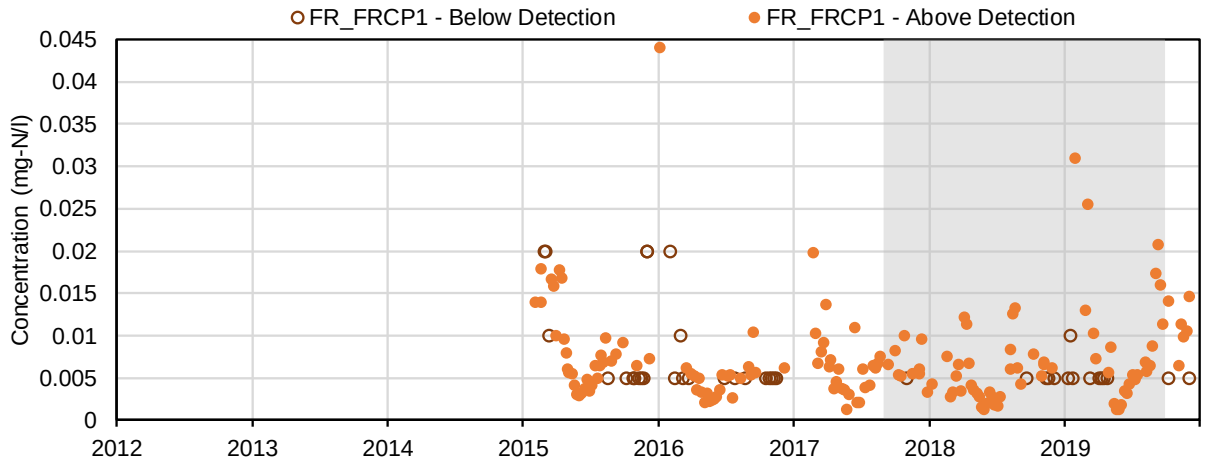
(29) Sulphate (mg/L); Major Ions



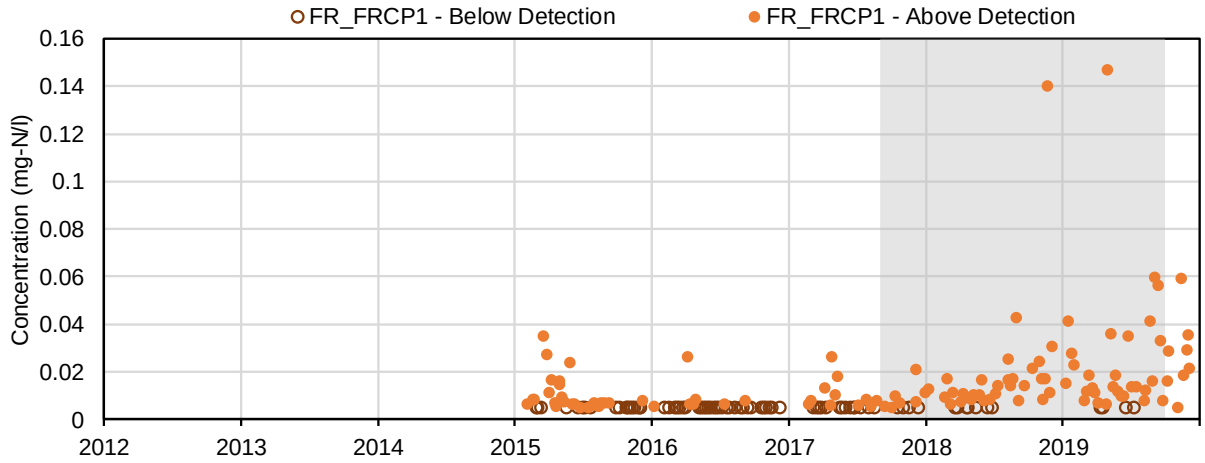
(30) Nitrate (mg-N/l); Nutrients and Biological Indicators



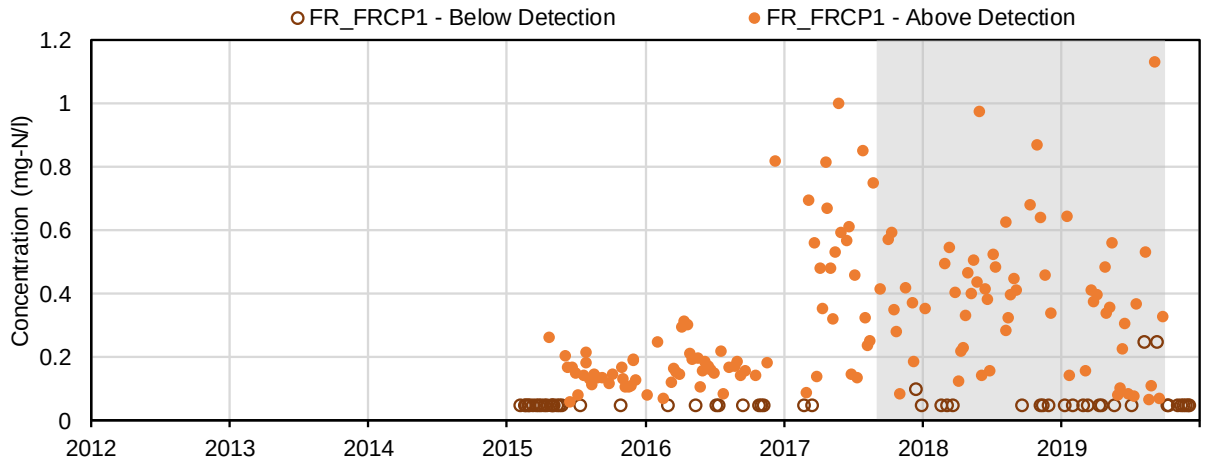
(31) Nitrite (mg-N/l); Nutrients and Biological Indicators



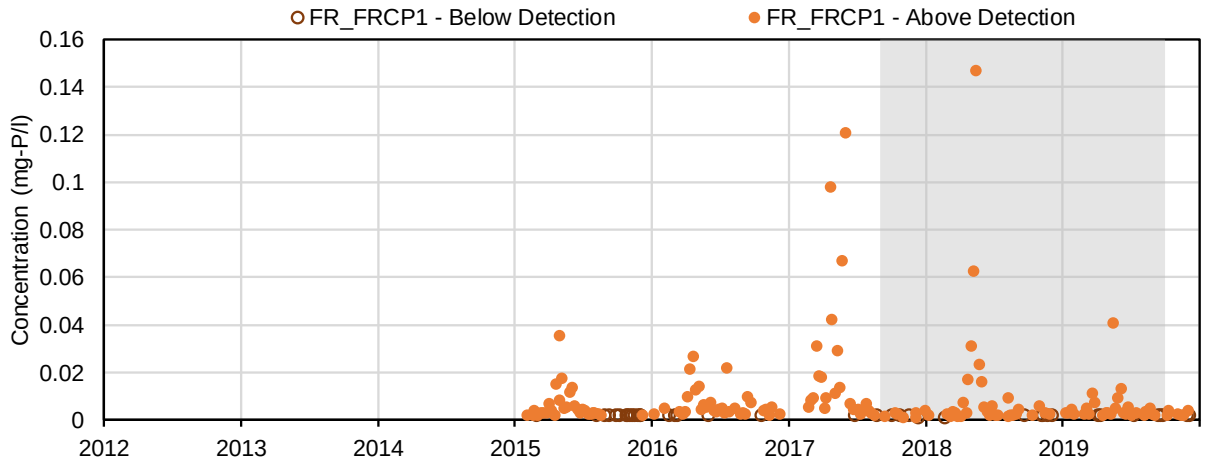
(32) Total ammonia (mg-N/l); Nutrients and Biological Indicators



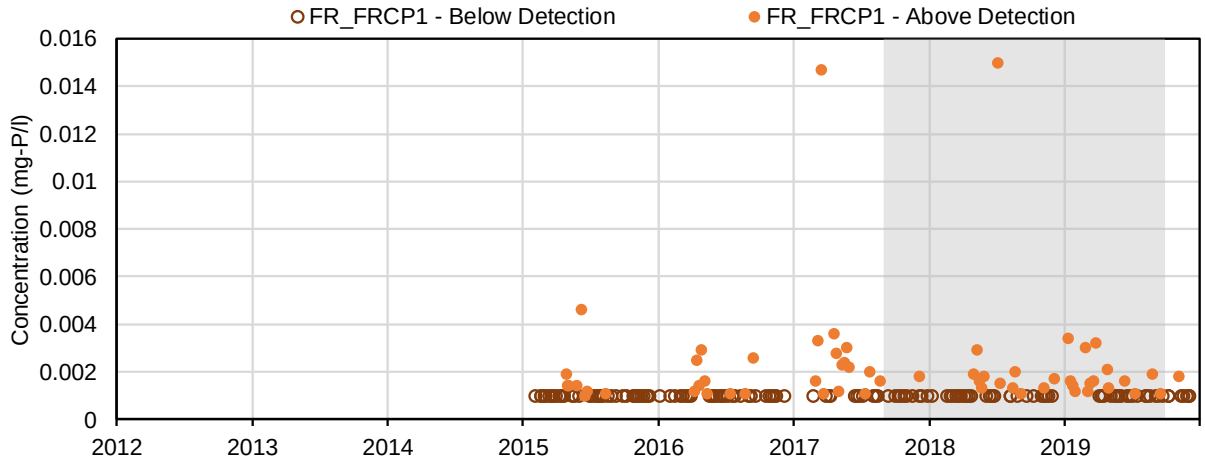
(33) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



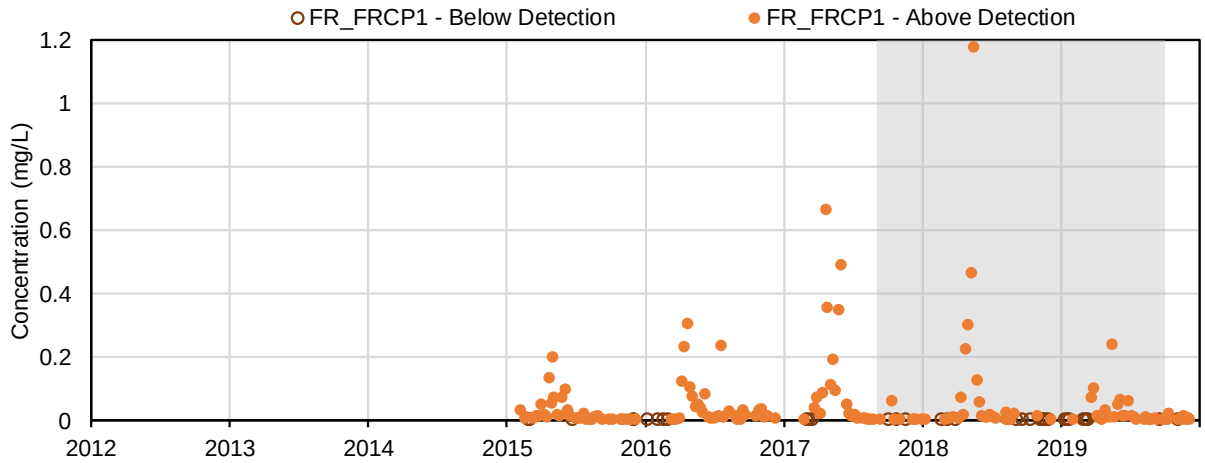
(34) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



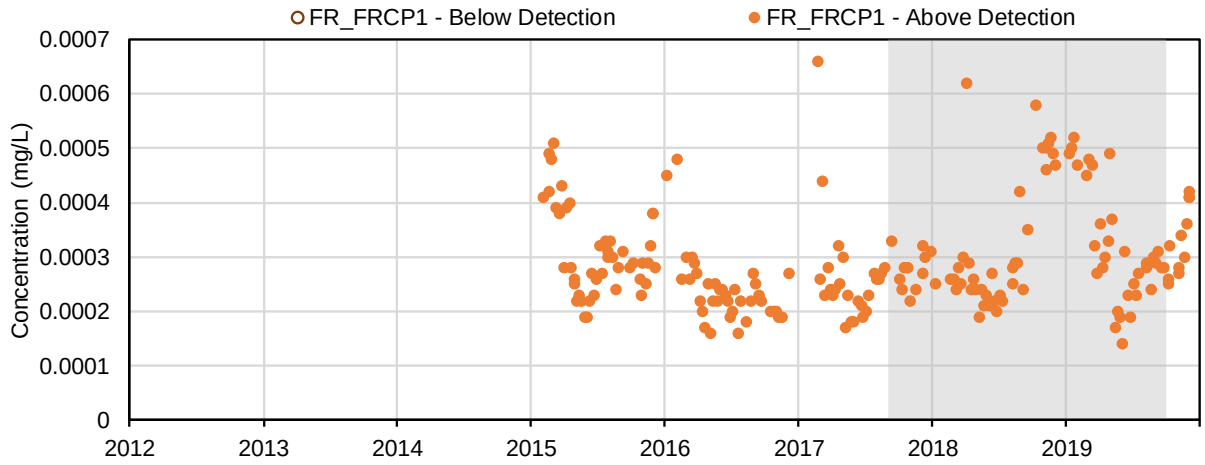
(35) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



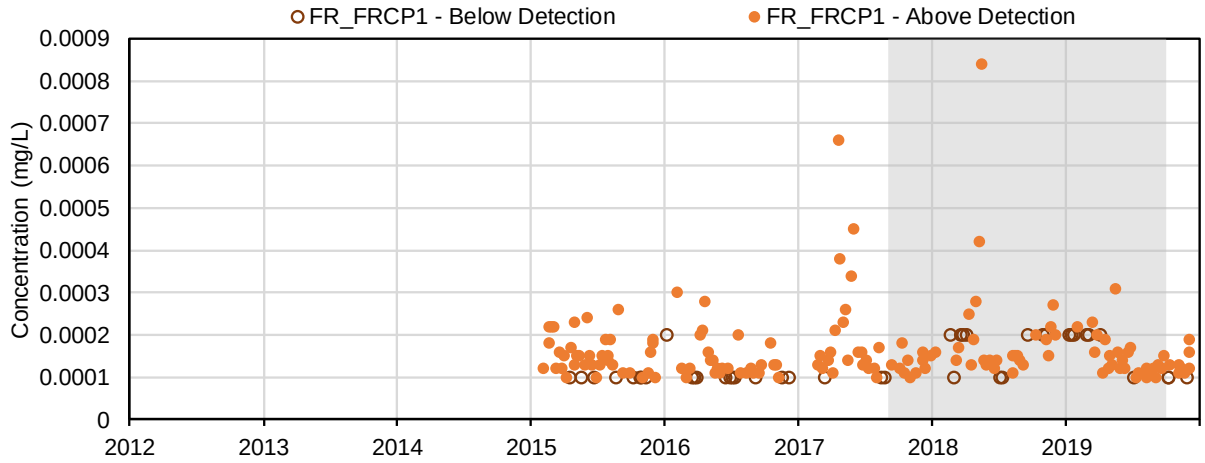
(36) Aluminum (mg/L); Total Metals



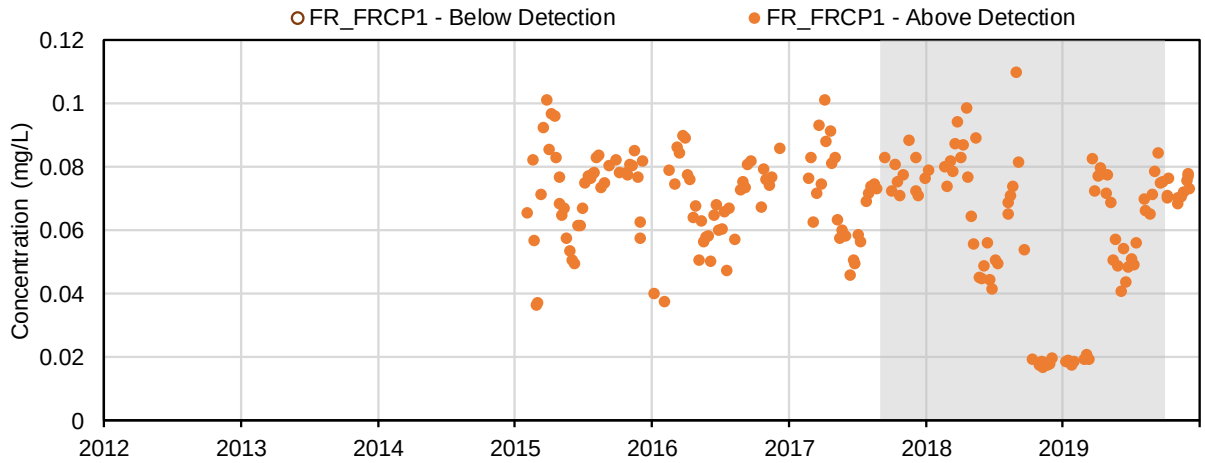
(37) Antimony (mg/L); Total Metals



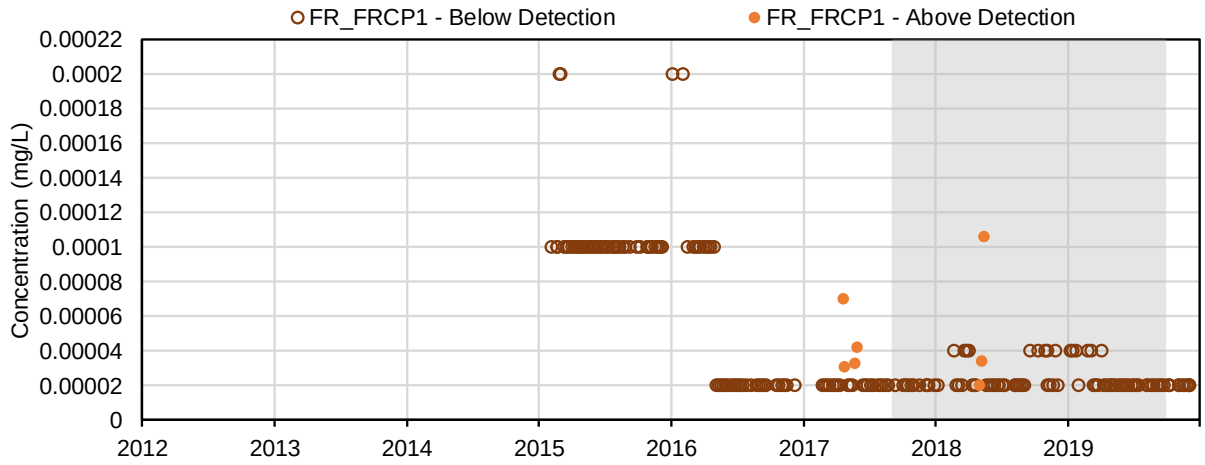
(38) Arsenic (mg/L); Total Metals



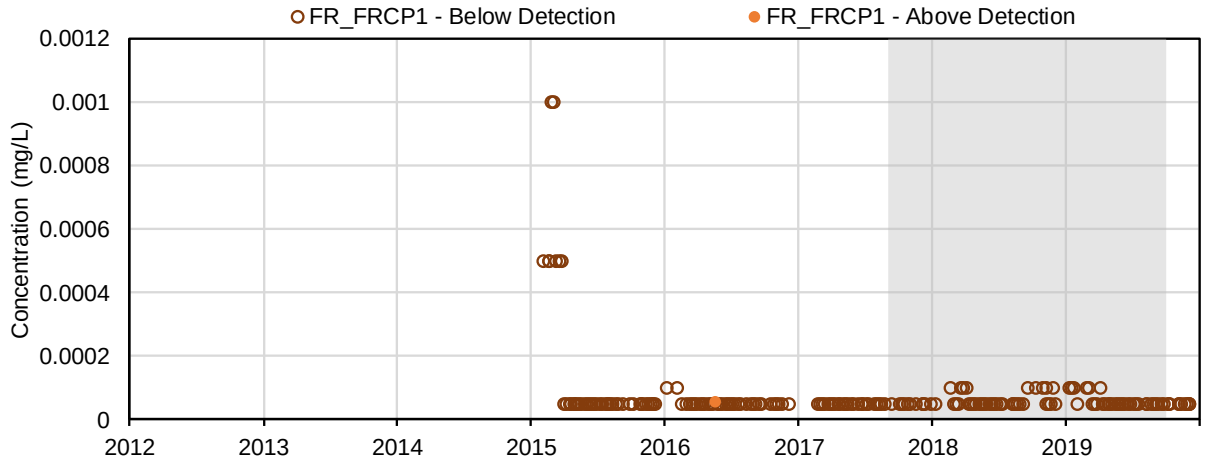
(39) Barium (mg/L); Total Metals



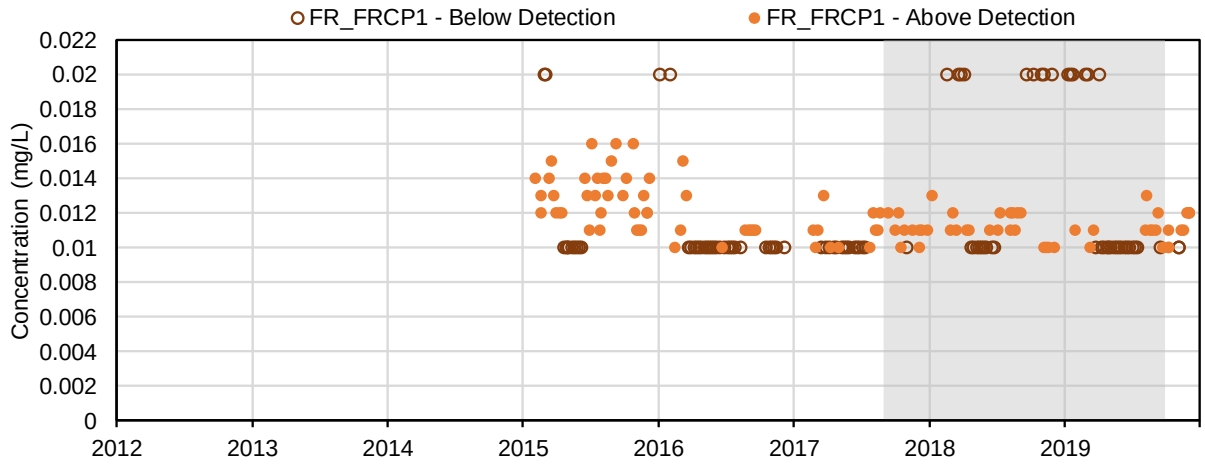
(40) Beryllium (mg/L); Total Metals



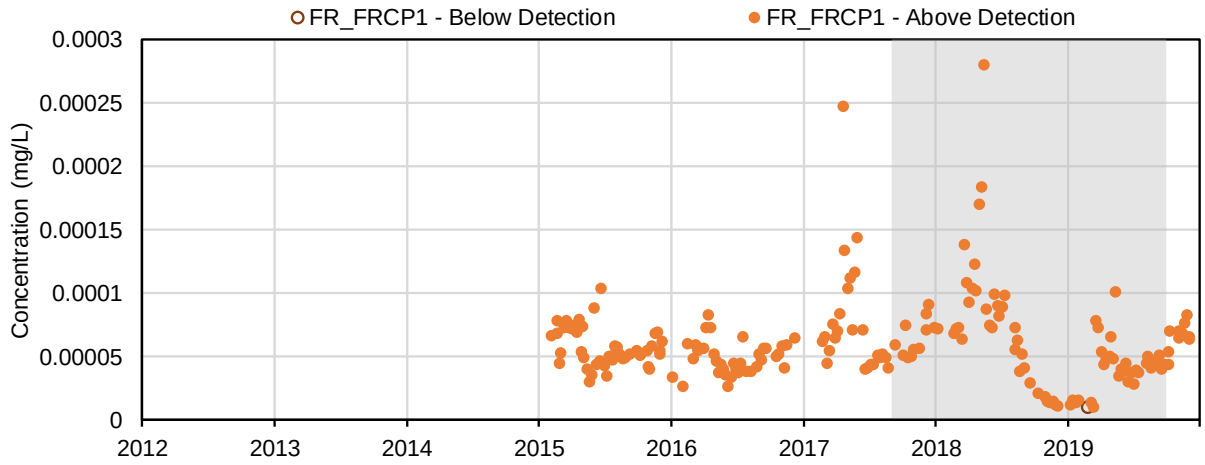
(41) Bismuth (mg/L); Total Metals



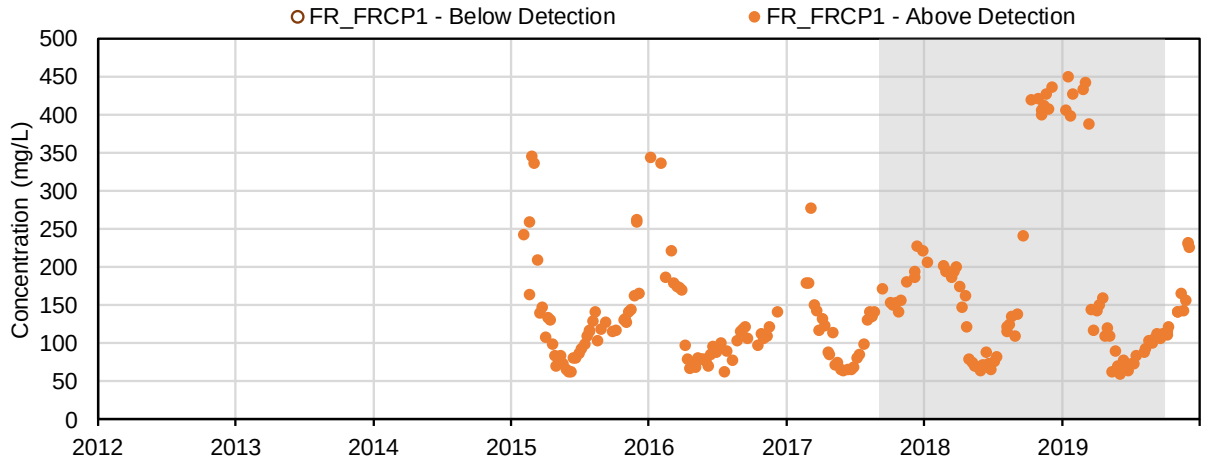
(42) Boron (mg/L); Total Metals



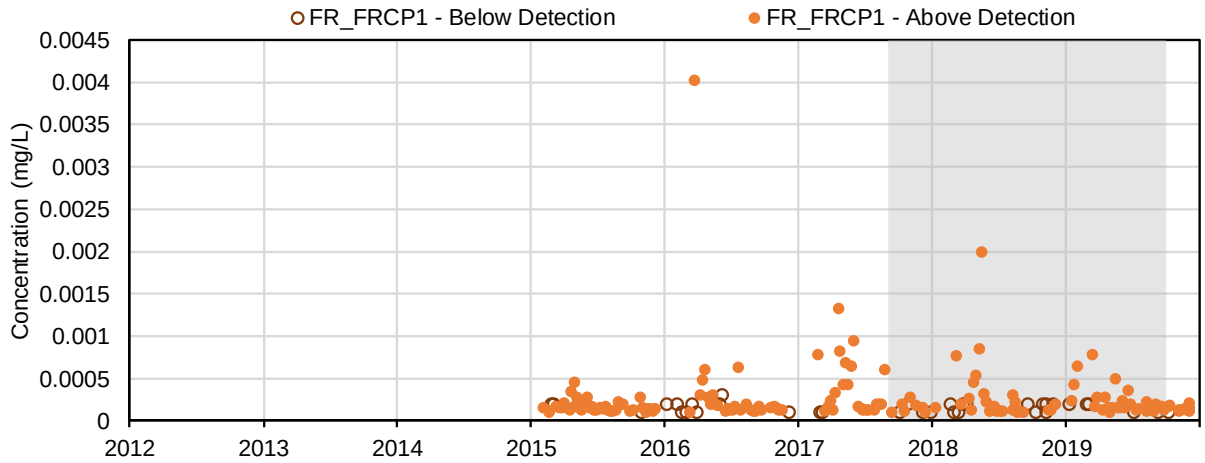
(43) Cadmium (mg/L); Total Metals



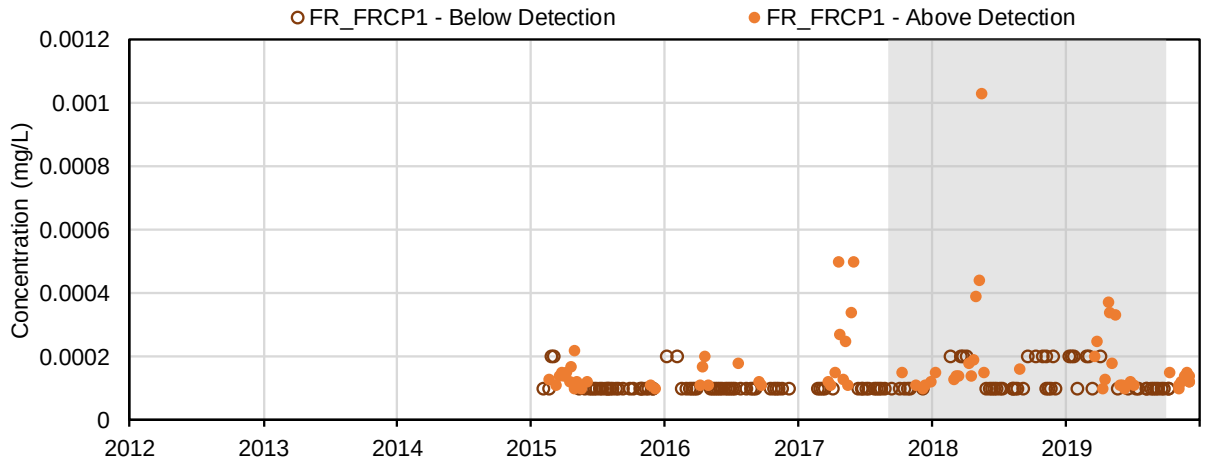
(44) Calcium (mg/L); Total Metals



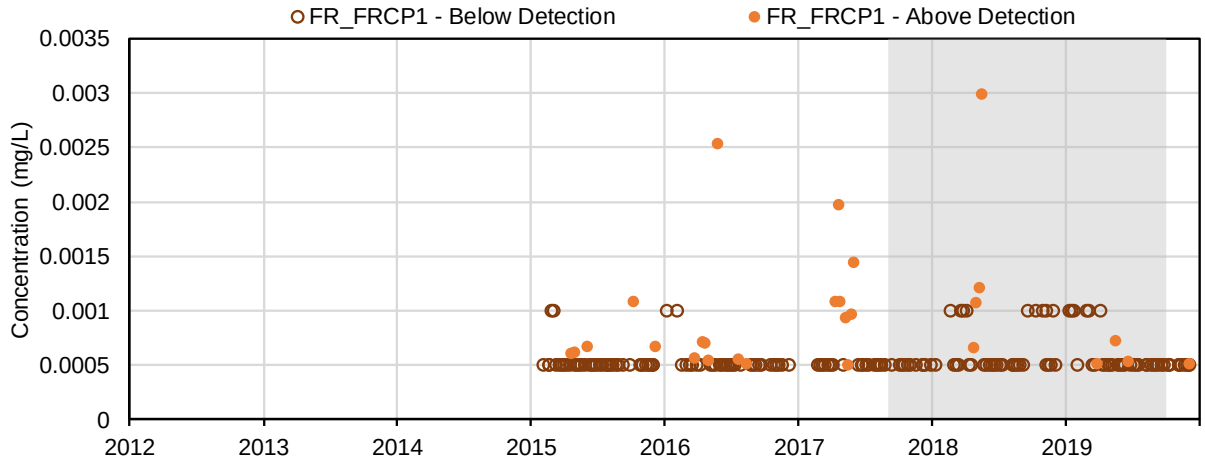
(45) Chromium (mg/L); Total Metals



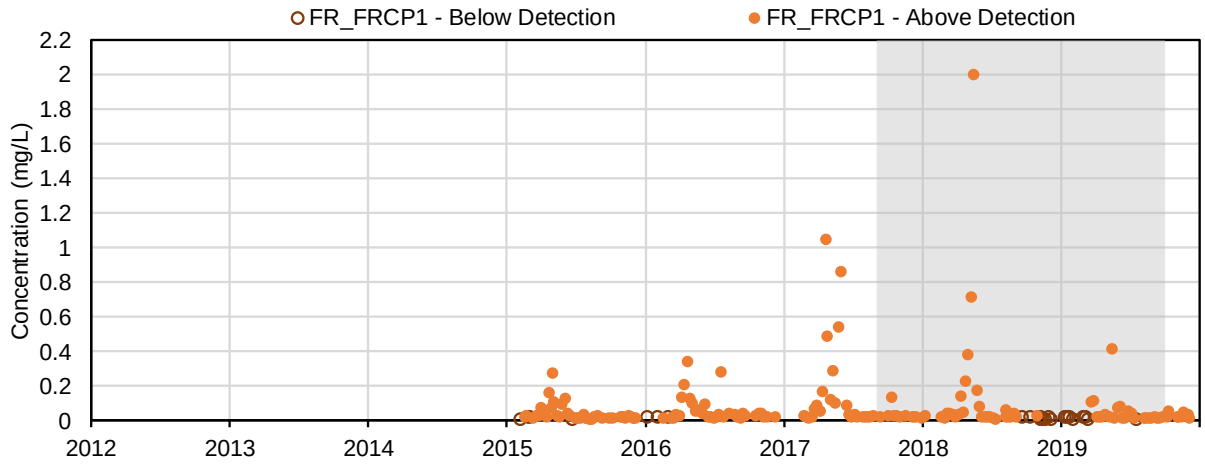
(46) Cobalt (mg/L); Total Metals



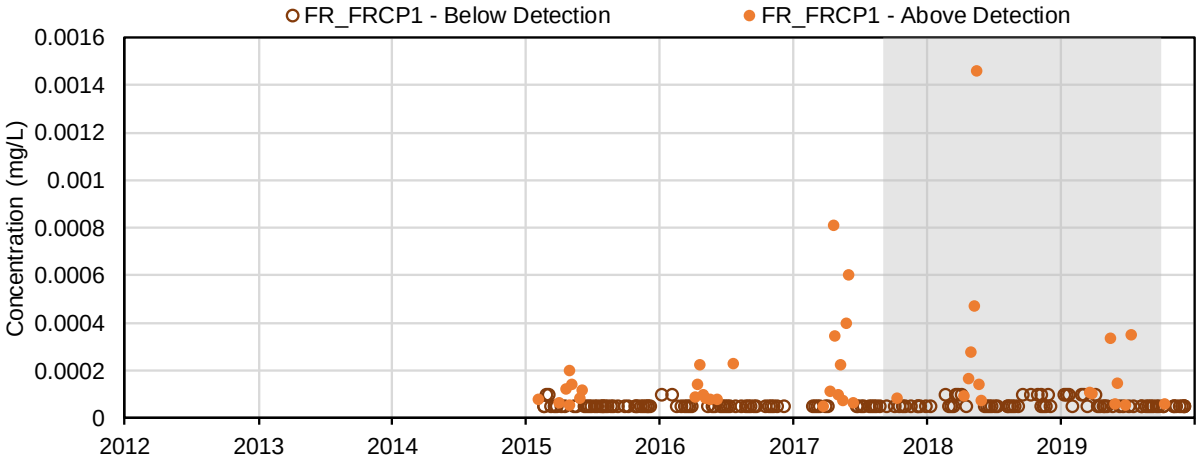
(47) Copper (mg/L); Total Metals



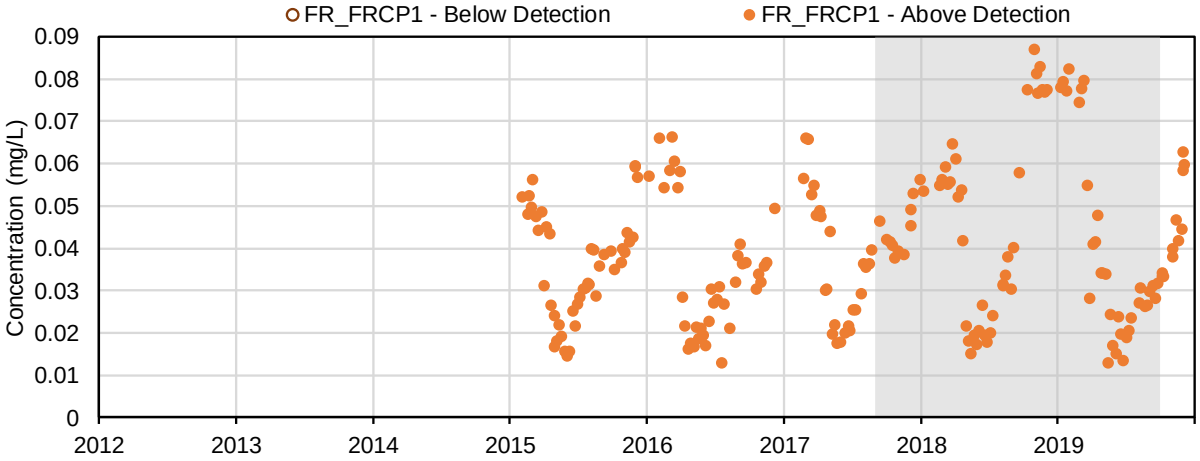
(48) Iron (mg/L); Total Metals



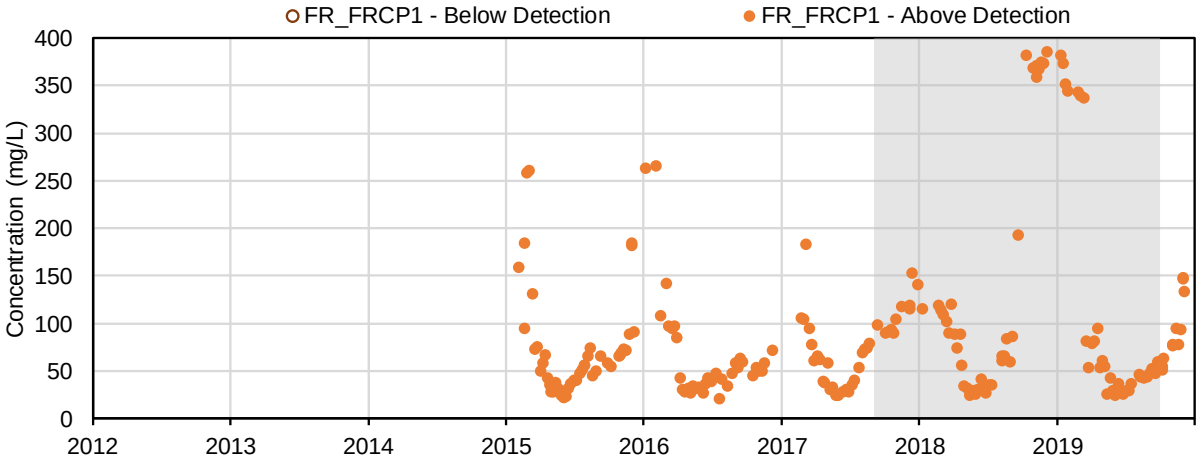
(49) Lead (mg/L); Total Metals



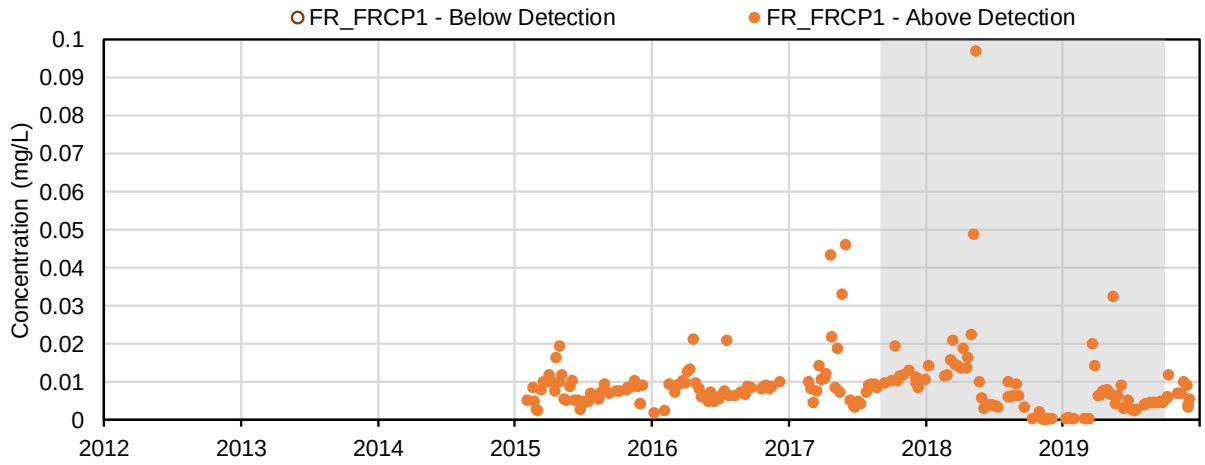
(50) Lithium (mg/L); Total Metals



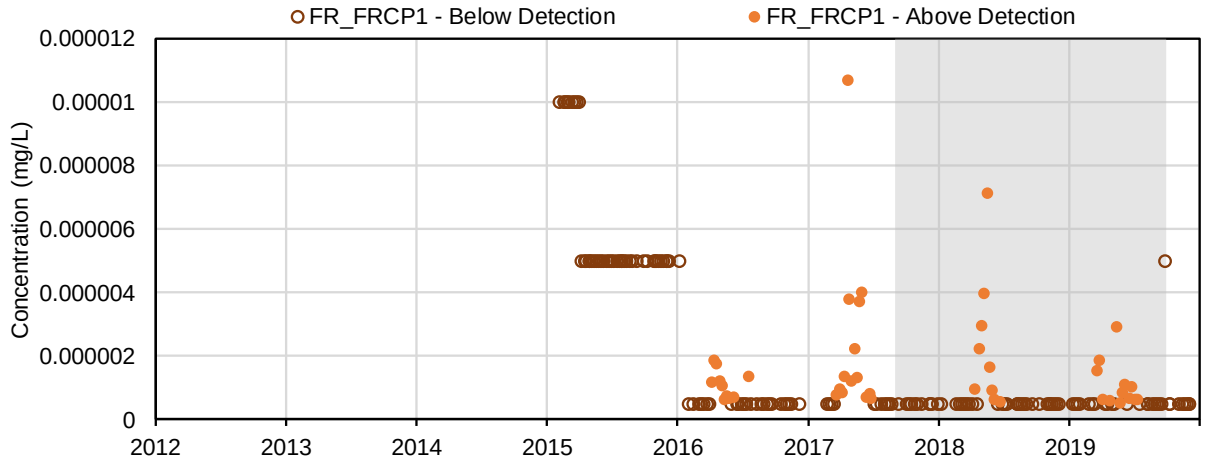
(51) Magnesium (mg/L); Total Metals



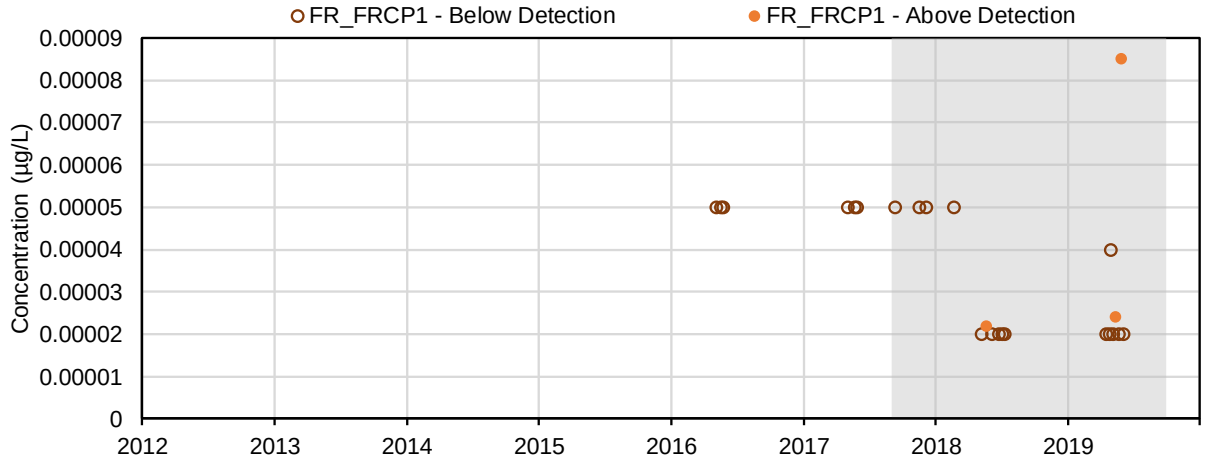
(52) Manganese (mg/L); Total Metals



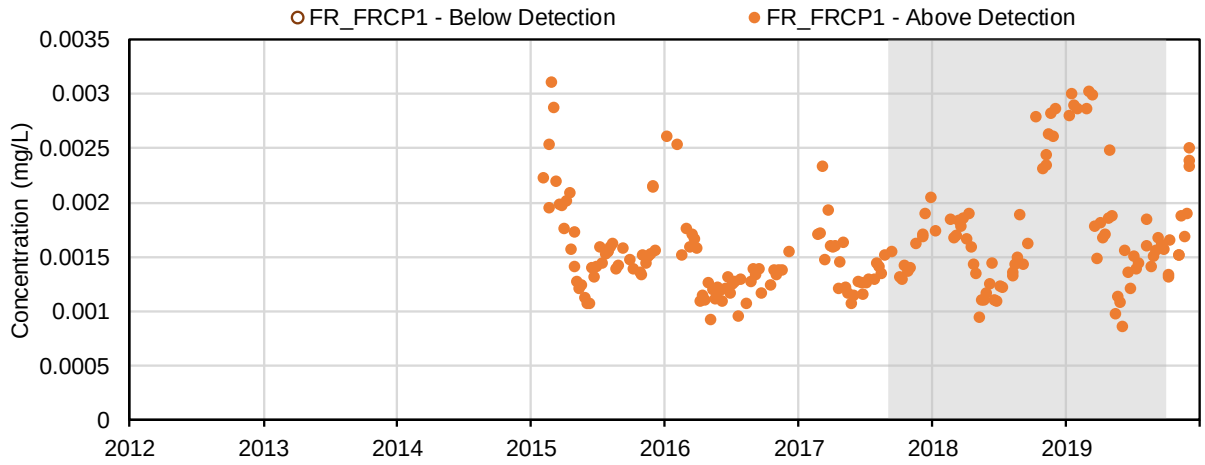
(53) Mercury (mg/L); Total Metals



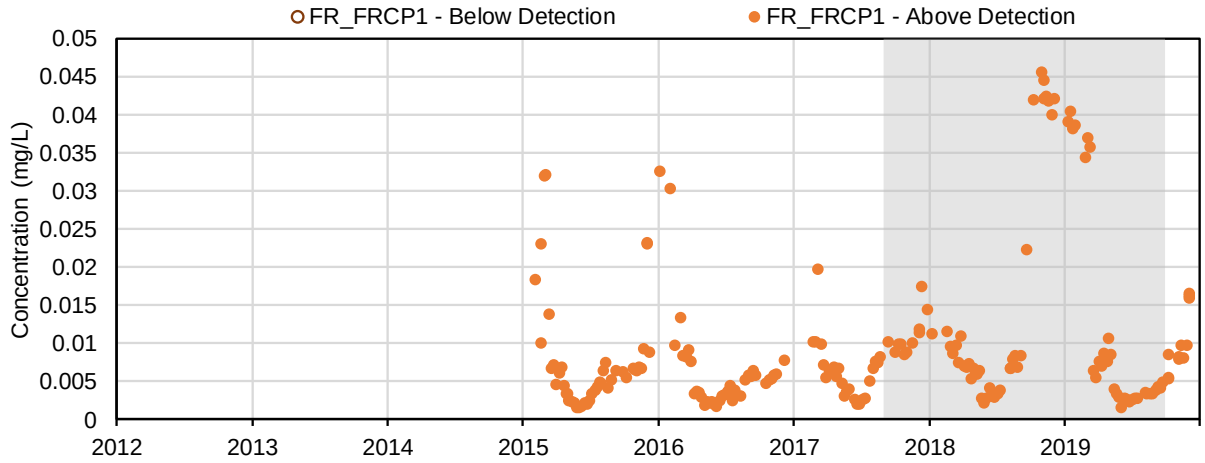
(54) Methyl mercury (µg/L); Total Metals



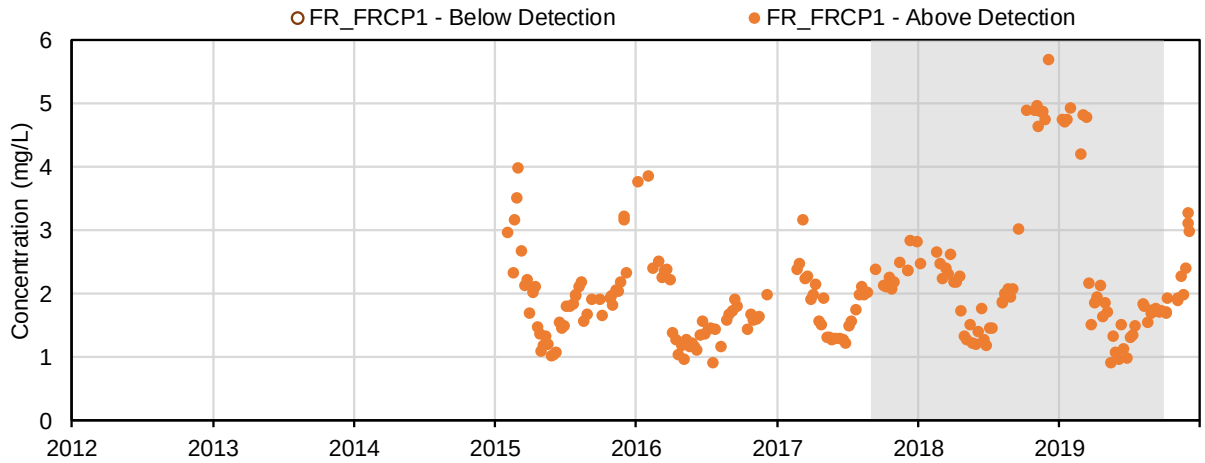
(55) Molybdenum (mg/L); Total Metals



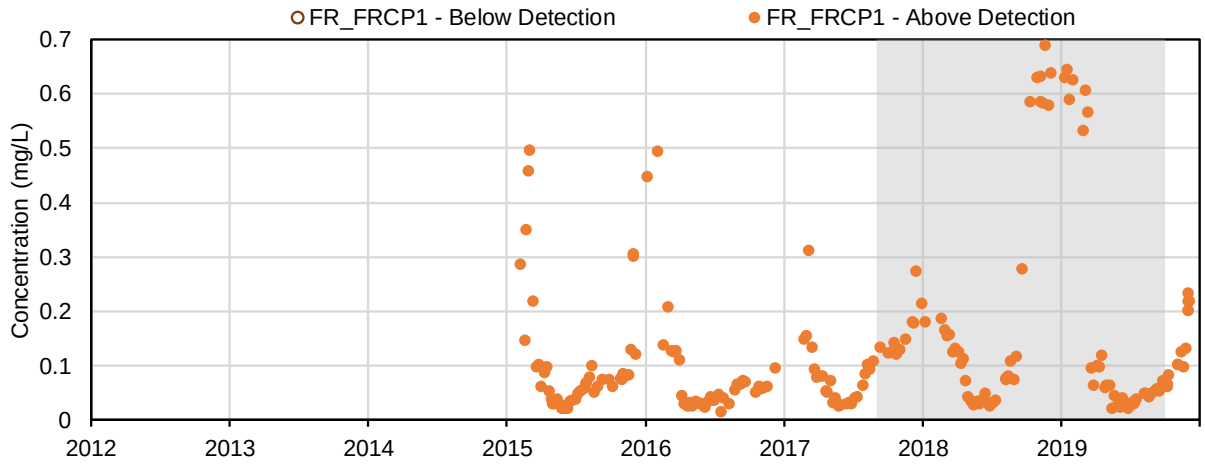
(56) Nickel (mg/L); Total Metals



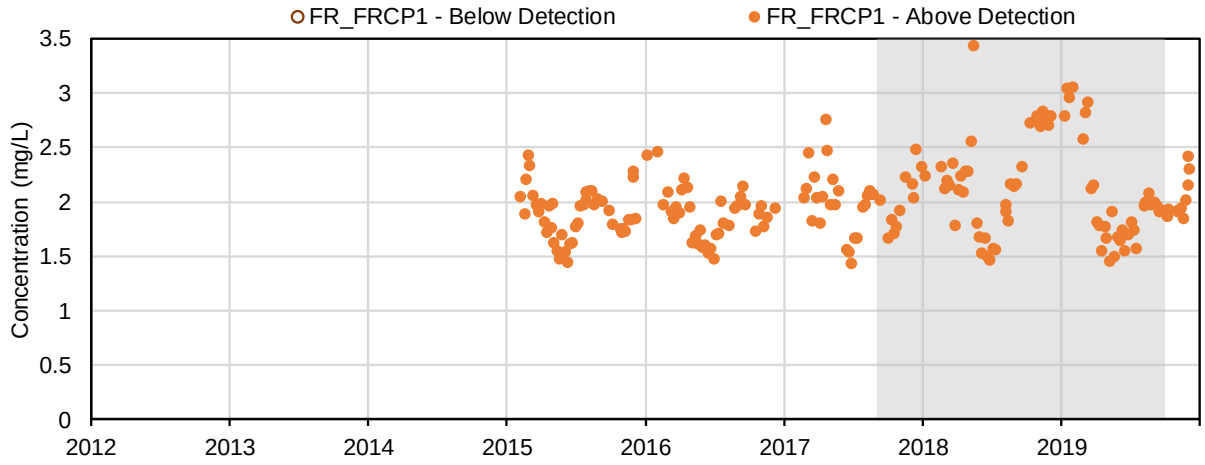
(57) Potassium (mg/L); Total Metals



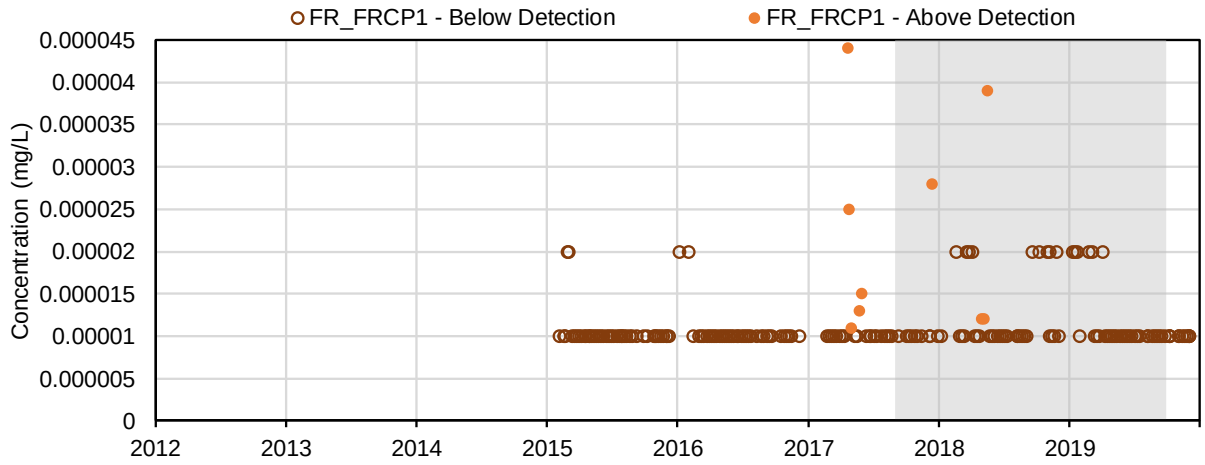
(58) Selenium (mg/L); Total Metals



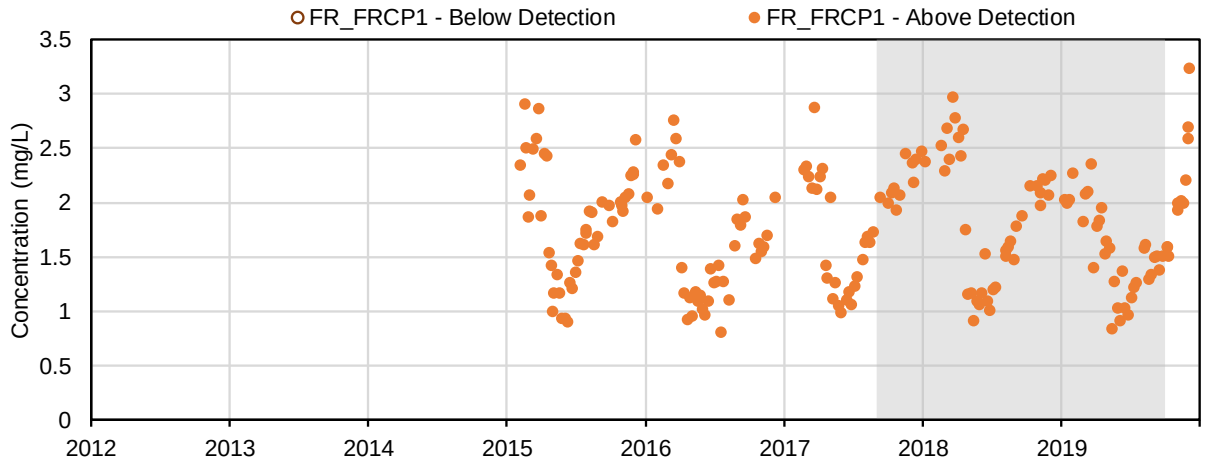
(59) Silicon (mg/L); Total Metals



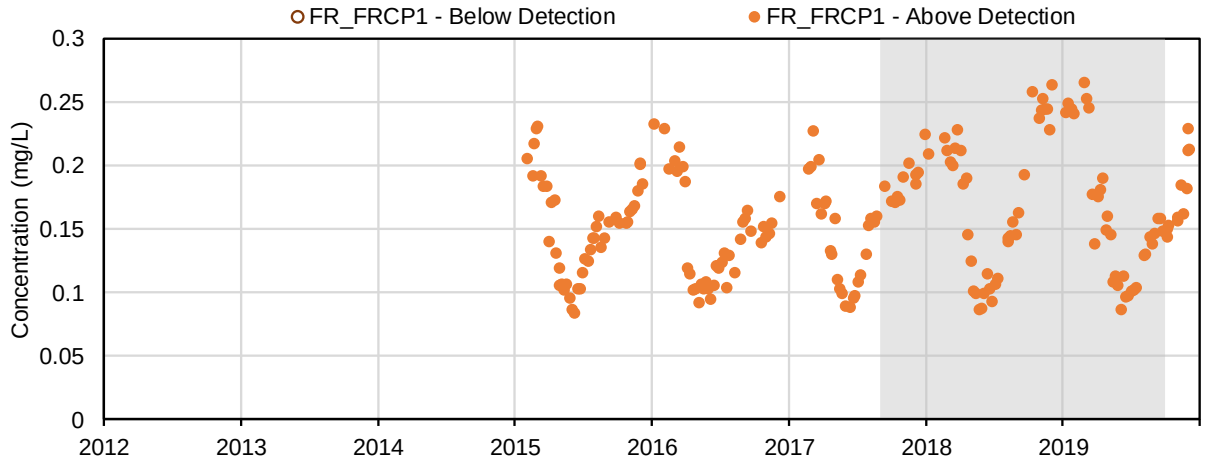
(60) Silver (mg/L); Total Metals



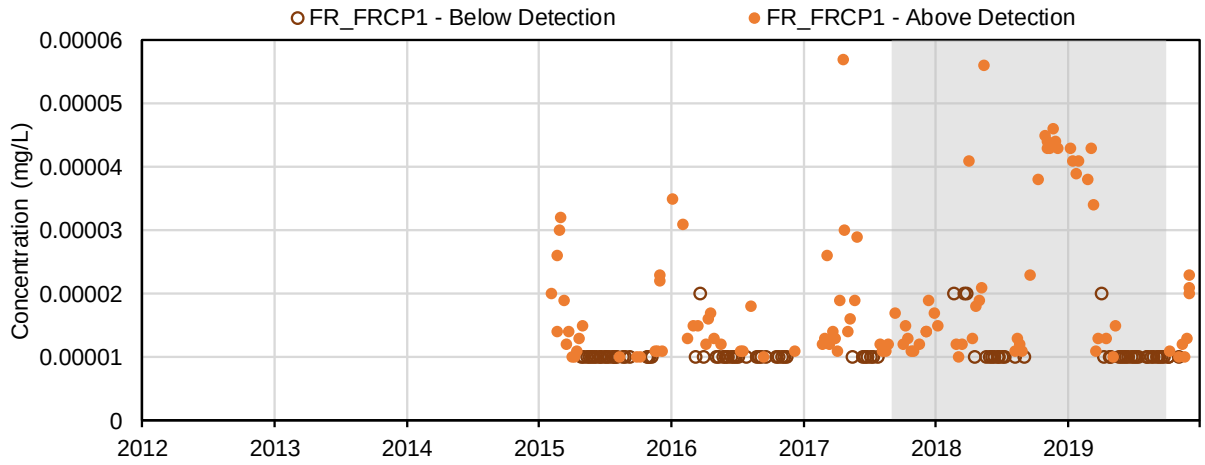
(61) Sodium (mg/L); Total Metals



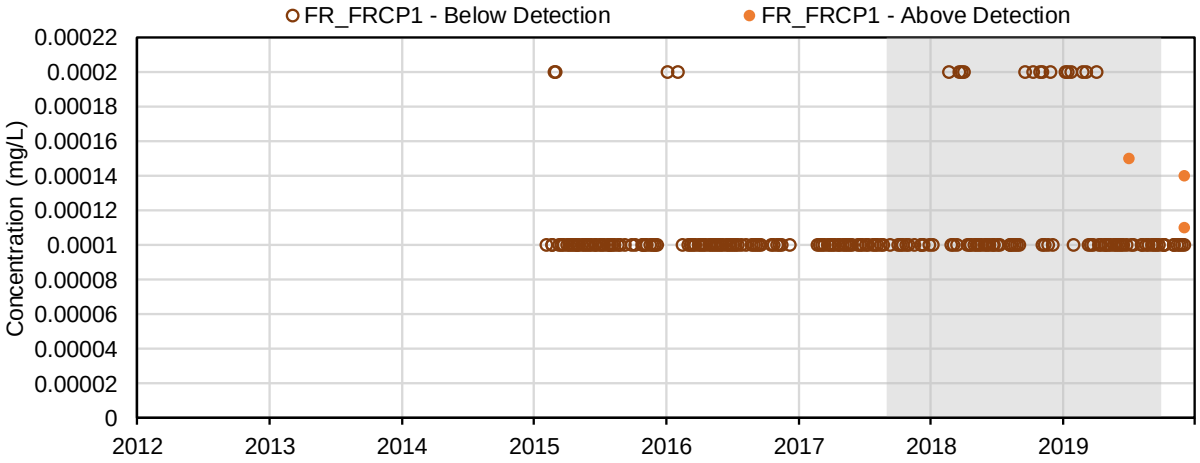
(62) Strontium (mg/L); Total Metals



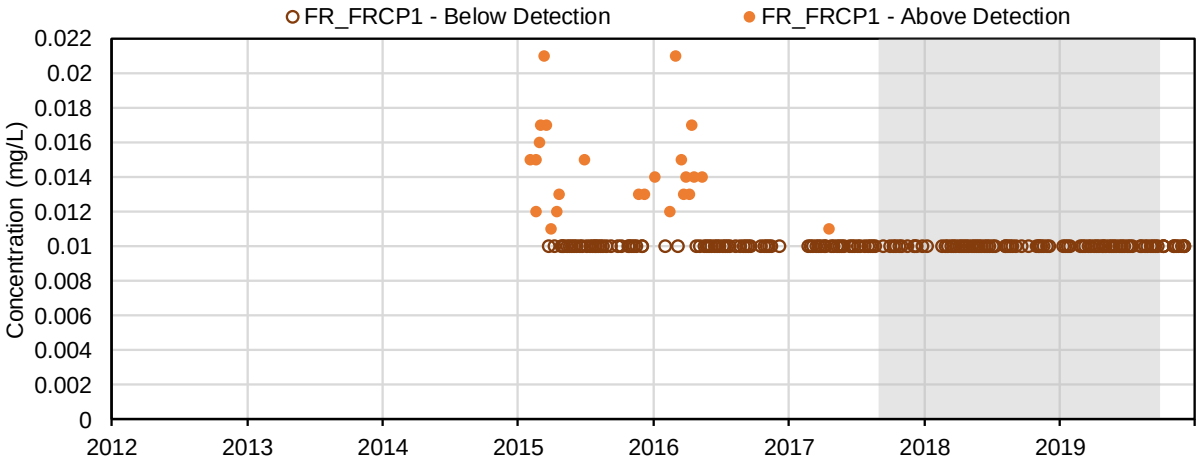
(63) Thallium (mg/L); Total Metals



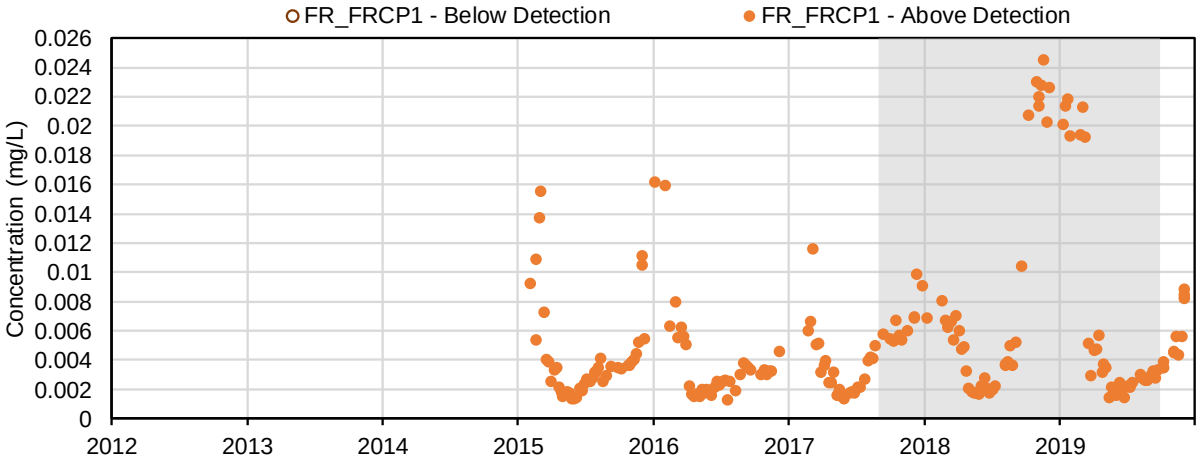
(64) Tin (mg/L); Total Metals



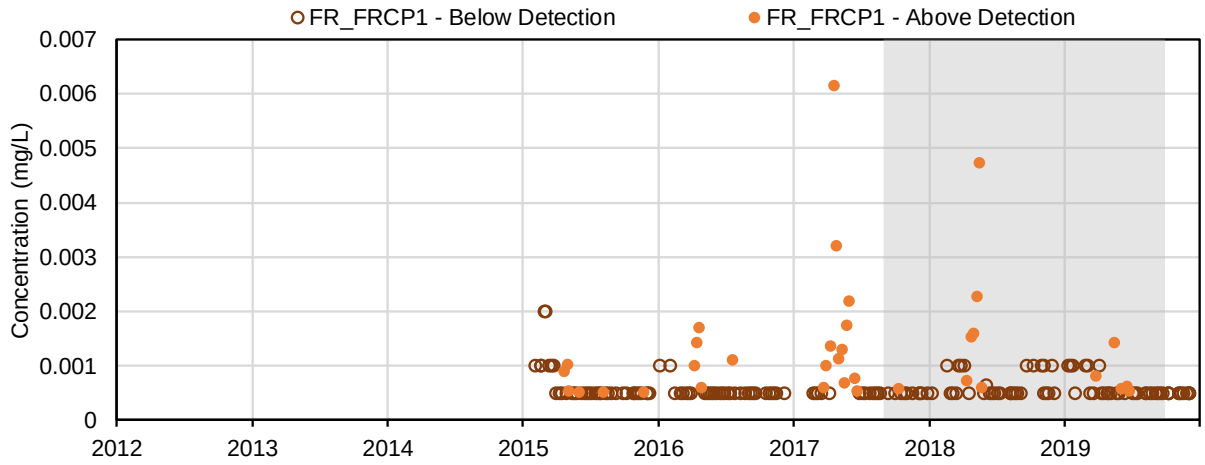
(65) Titanium (mg/L); Total Metals



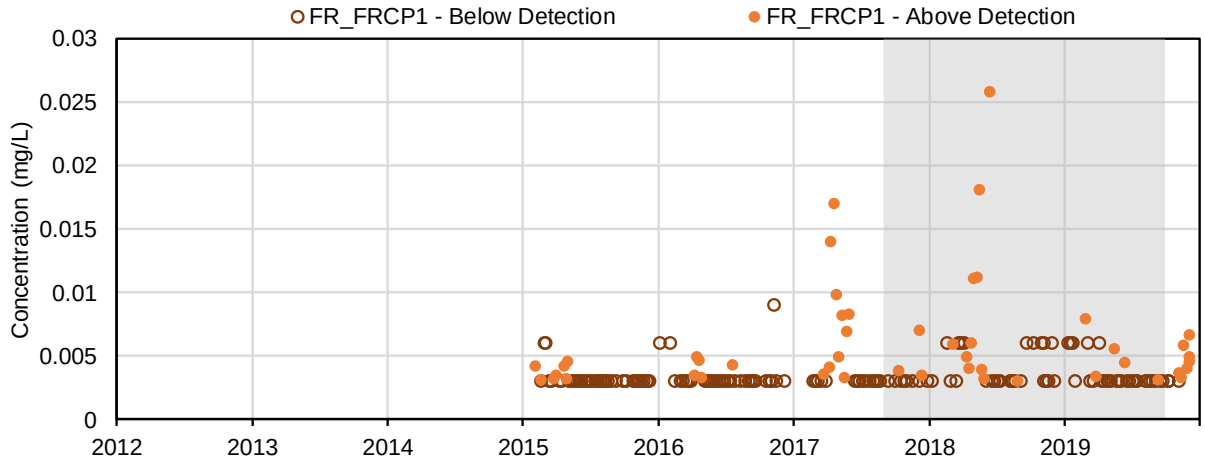
(66) Uranium (mg/L); Total Metals



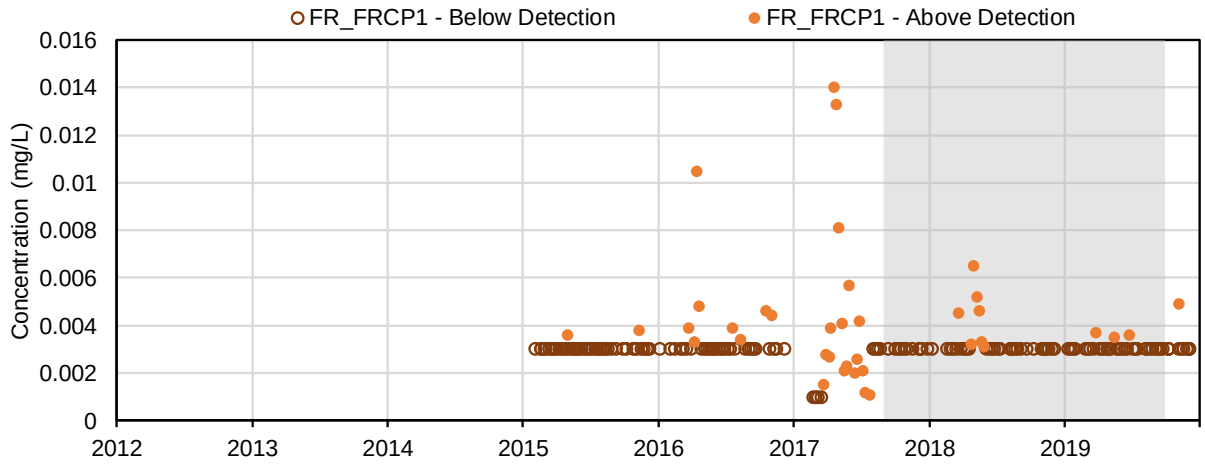
(67) Vanadium (mg/L); Total Metals



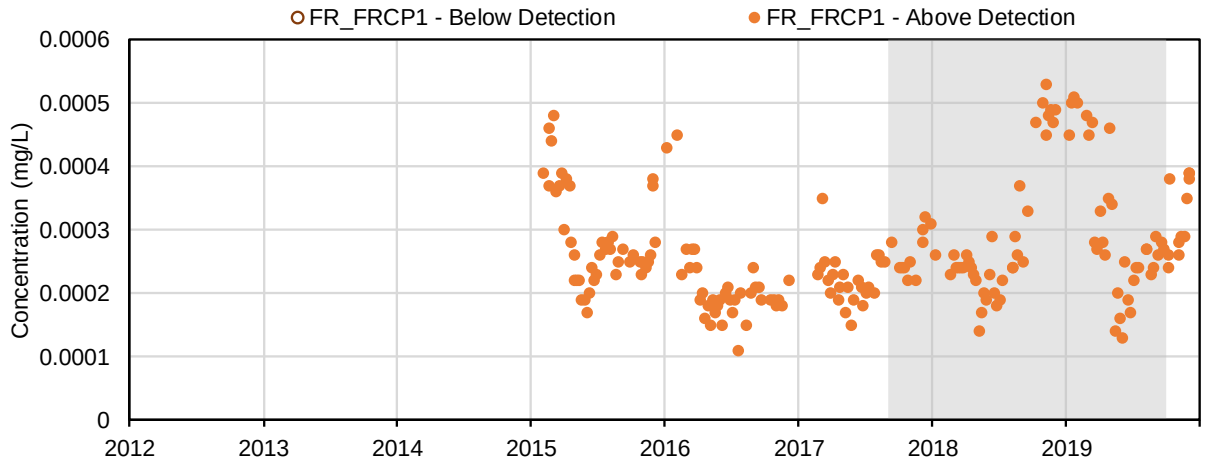
(68) Zinc (mg/L); Total Metals



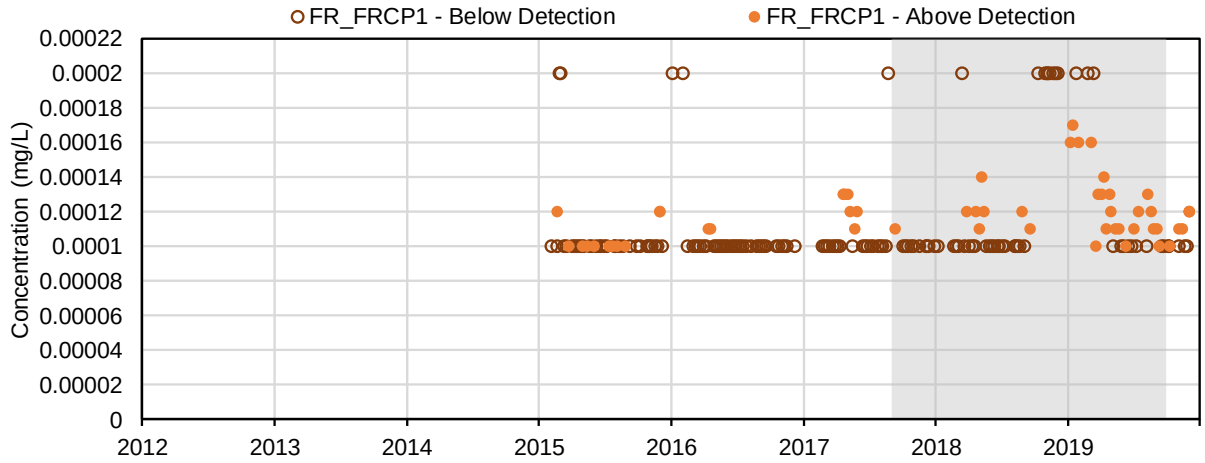
(69) Aluminum (mg/L); Dissolved Metals



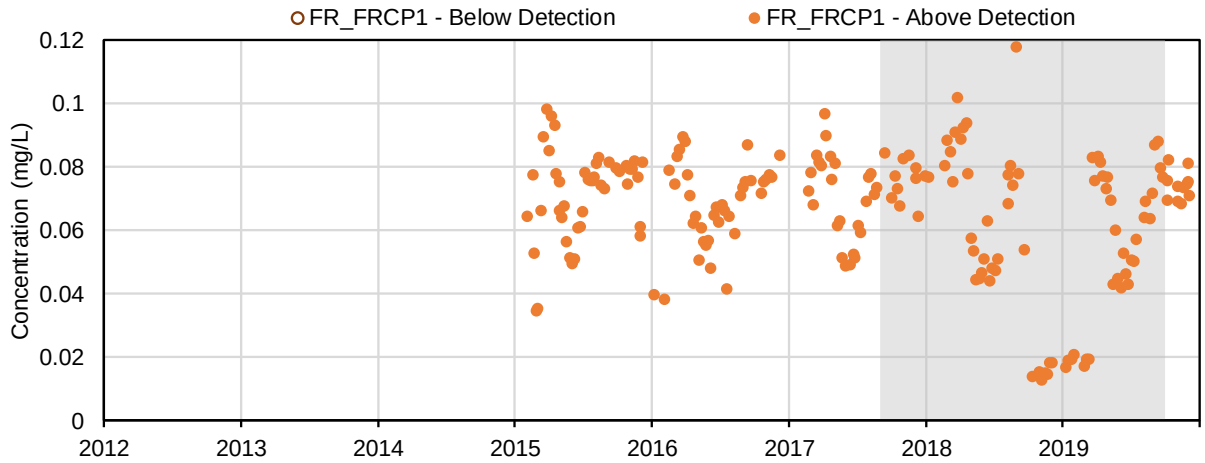
(70) Antimony (mg/L); Dissolved Metals



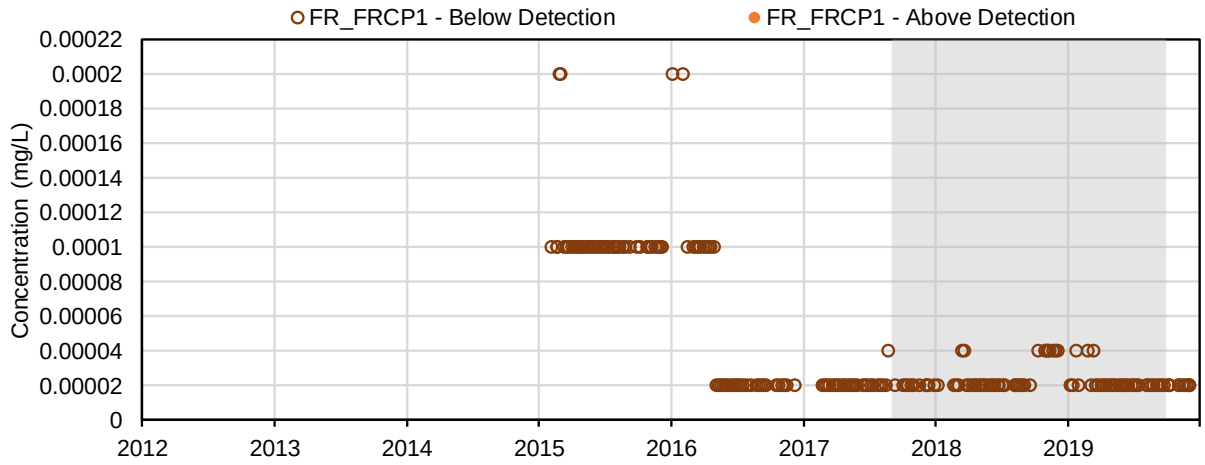
(71) Arsenic (mg/L); Dissolved Metals



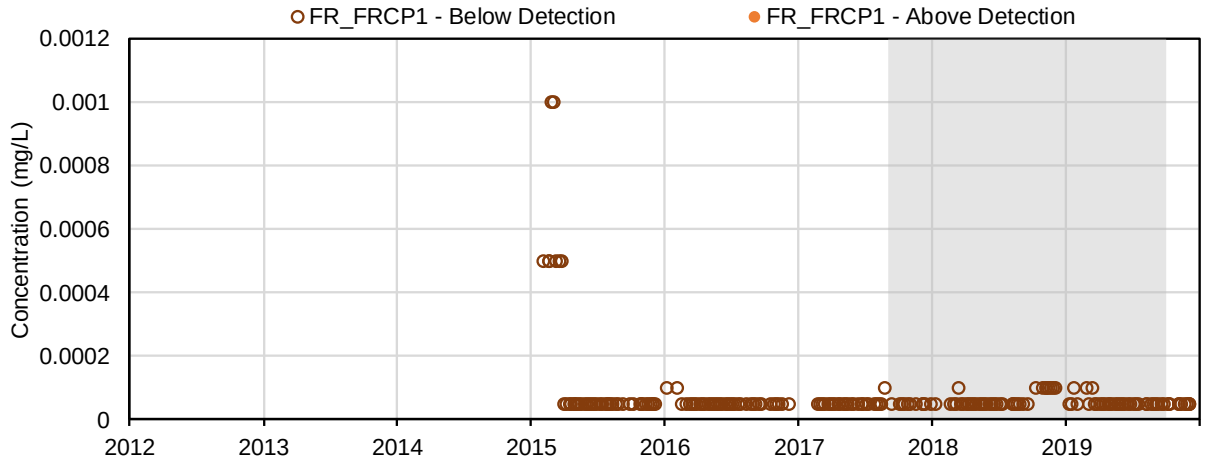
(72) Barium (mg/L); Dissolved Metals



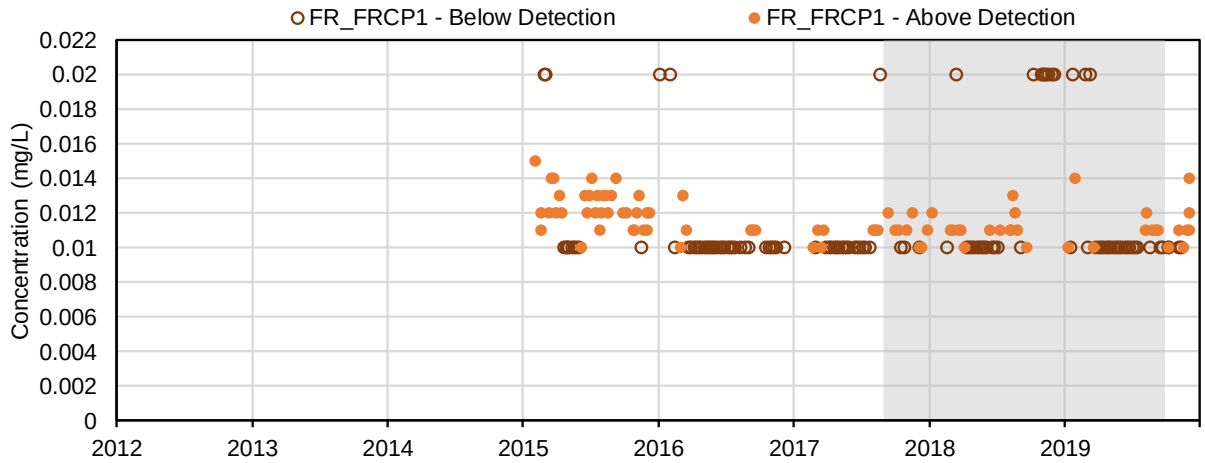
(73) Beryllium (mg/L); Dissolved Metals



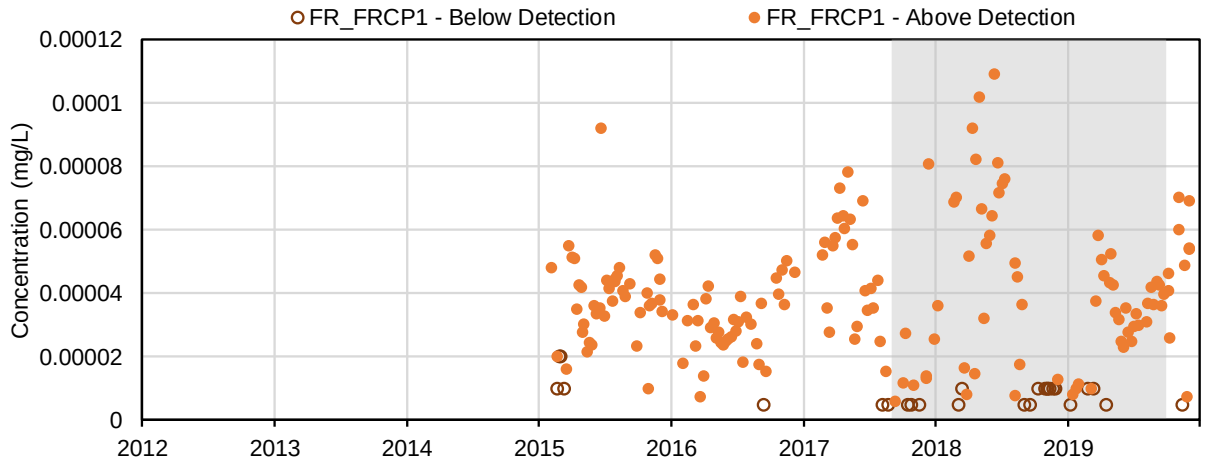
(74) Bismuth (mg/L); Dissolved Metals



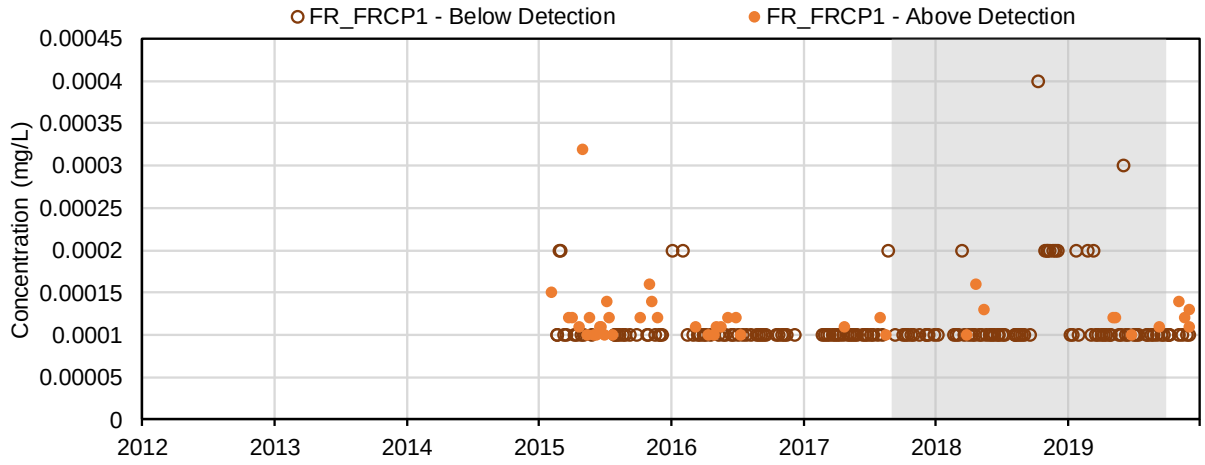
(75) Boron (mg/L); Dissolved Metals



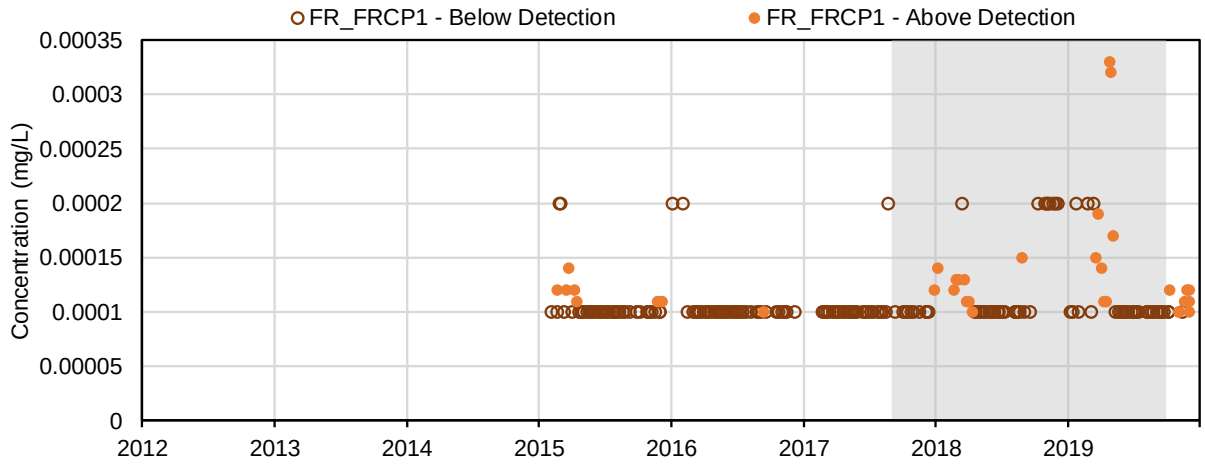
(76) Cadmium (mg/L); Dissolved Metals



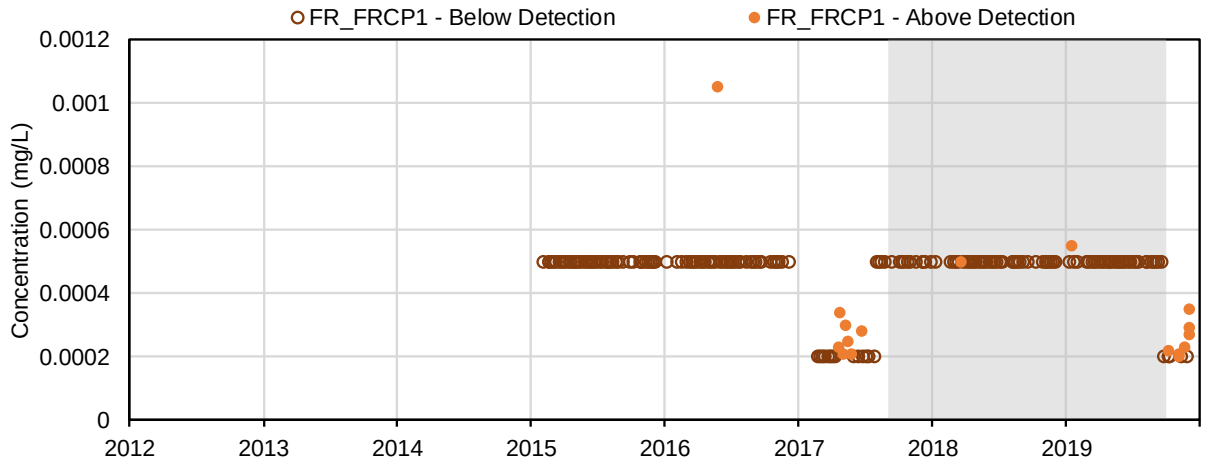
(77) Chromium (mg/L); Dissolved Metals



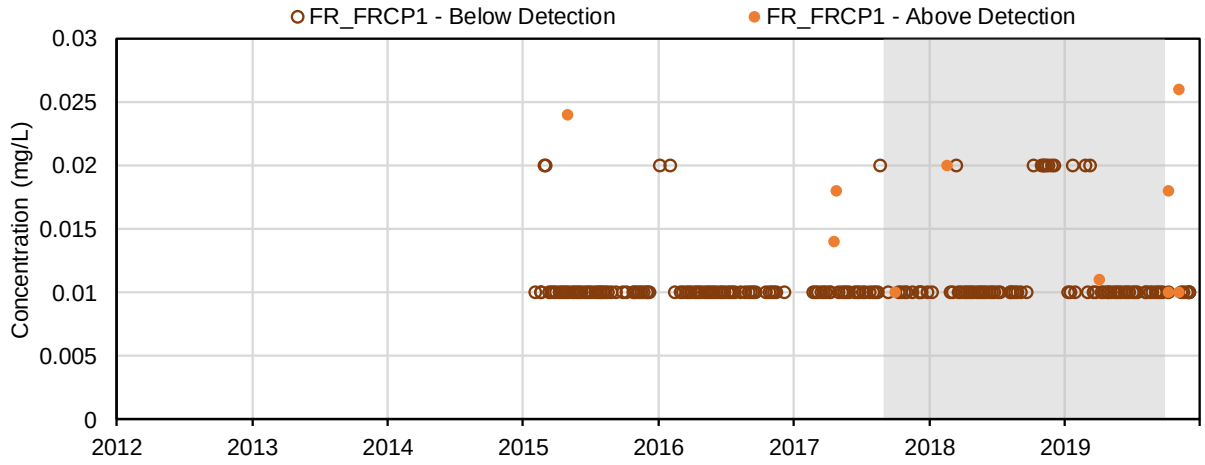
(78) Cobalt (mg/L); Dissolved Metals



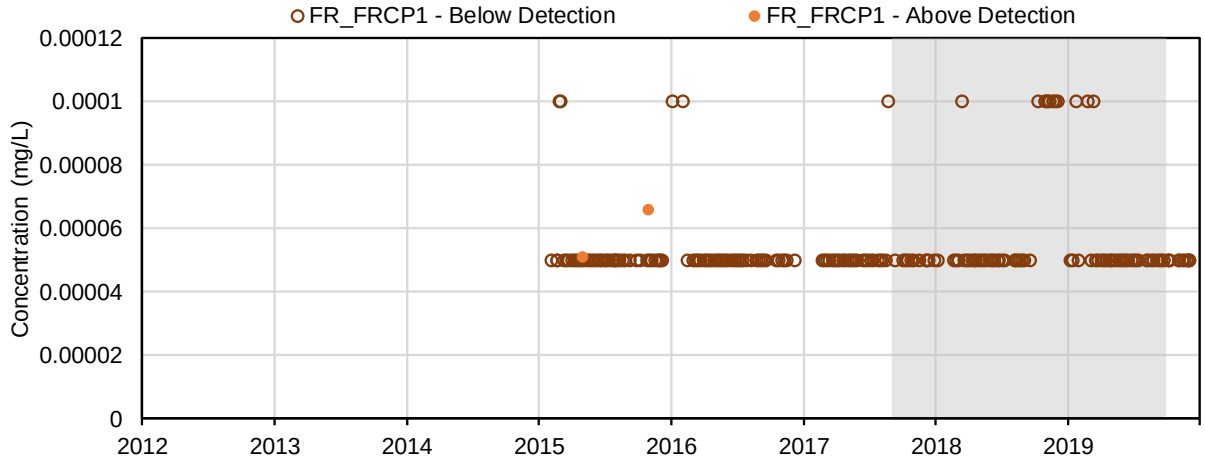
(79) Copper (mg/L); Dissolved Metals



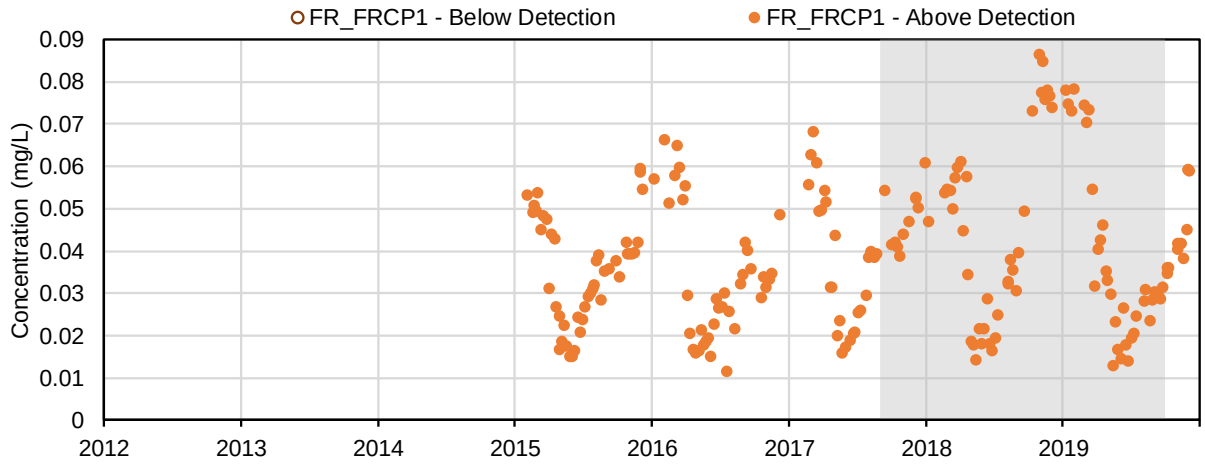
(80) Iron (mg/L); Dissolved Metals



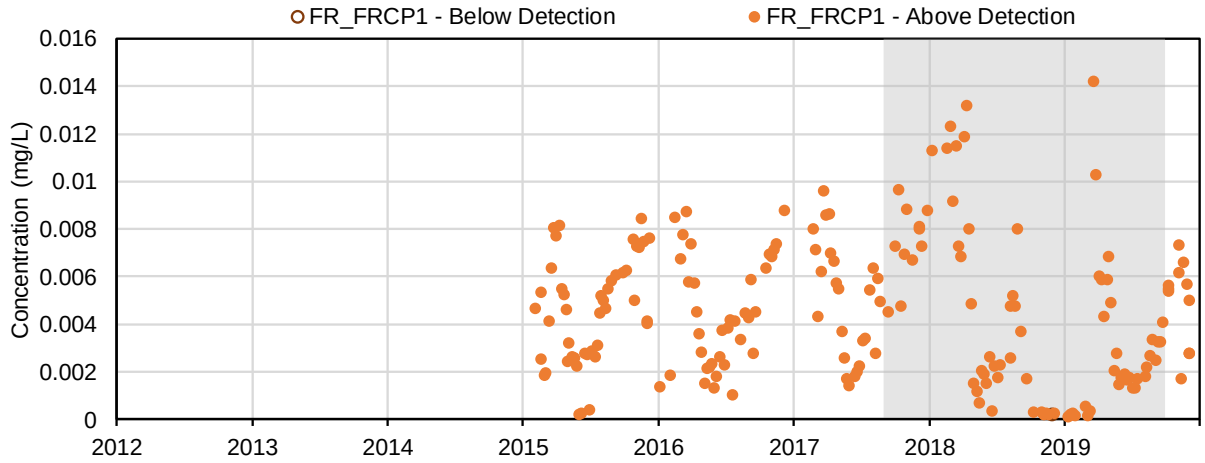
(81) Lead (mg/L); Dissolved Metals



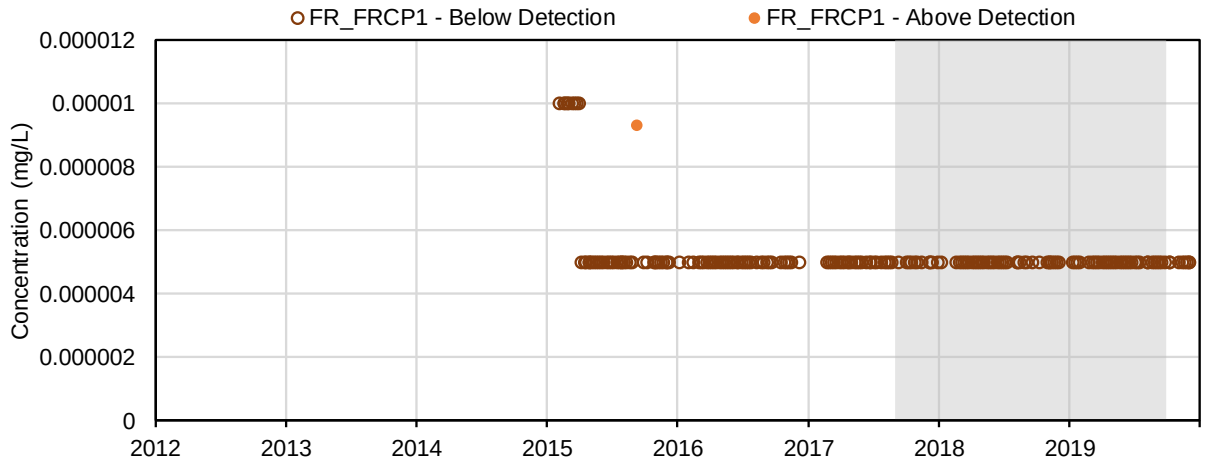
(82) Lithium (mg/L); Dissolved Metals



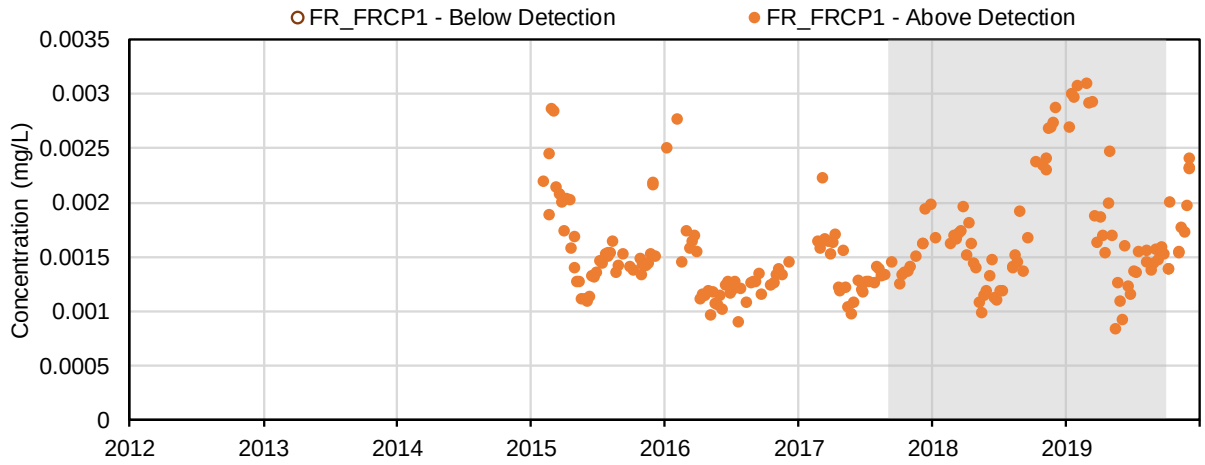
(83) Manganese (mg/L); Dissolved Metals



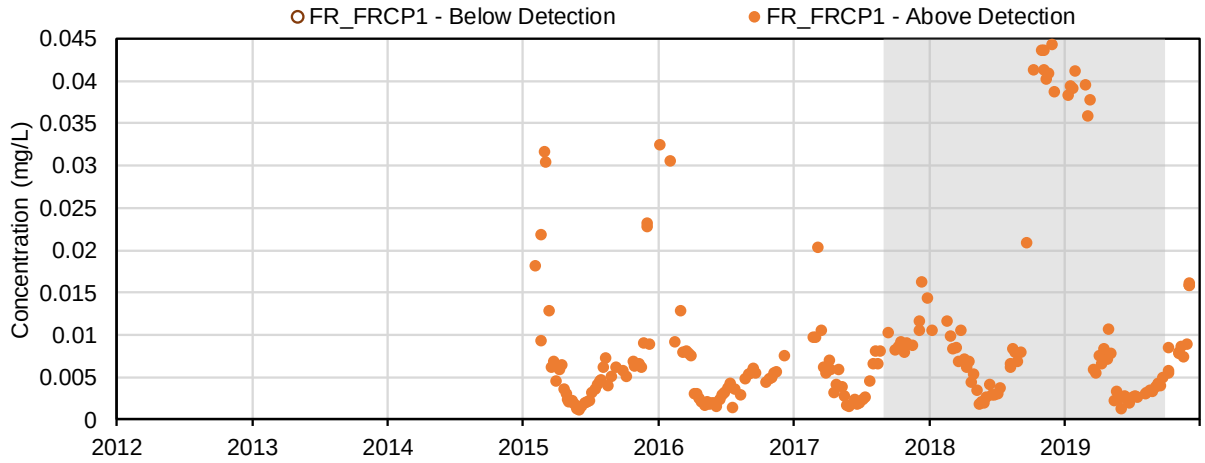
(84) Mercury (mg/L); Dissolved Metals



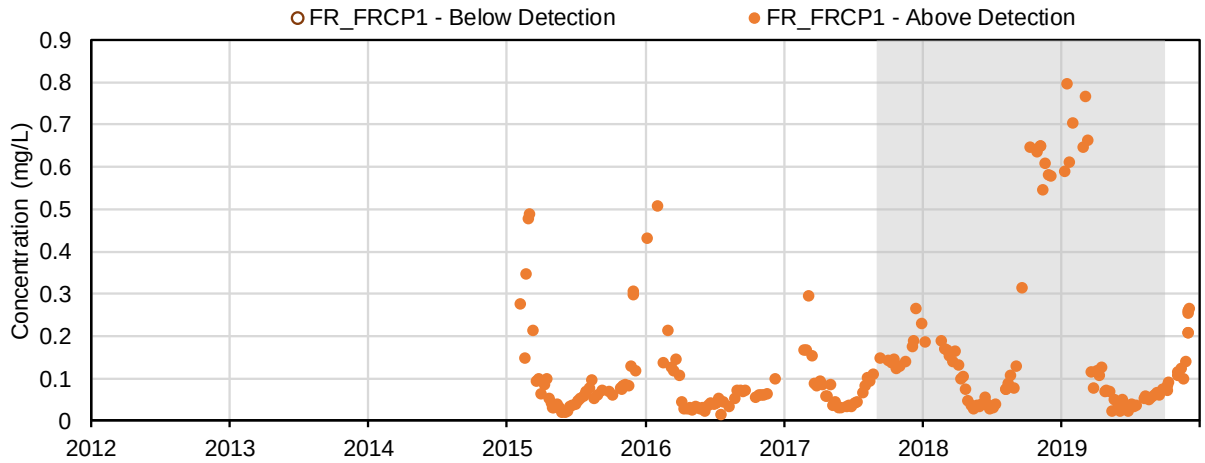
(85) Molybdenum (mg/L); Dissolved Metals



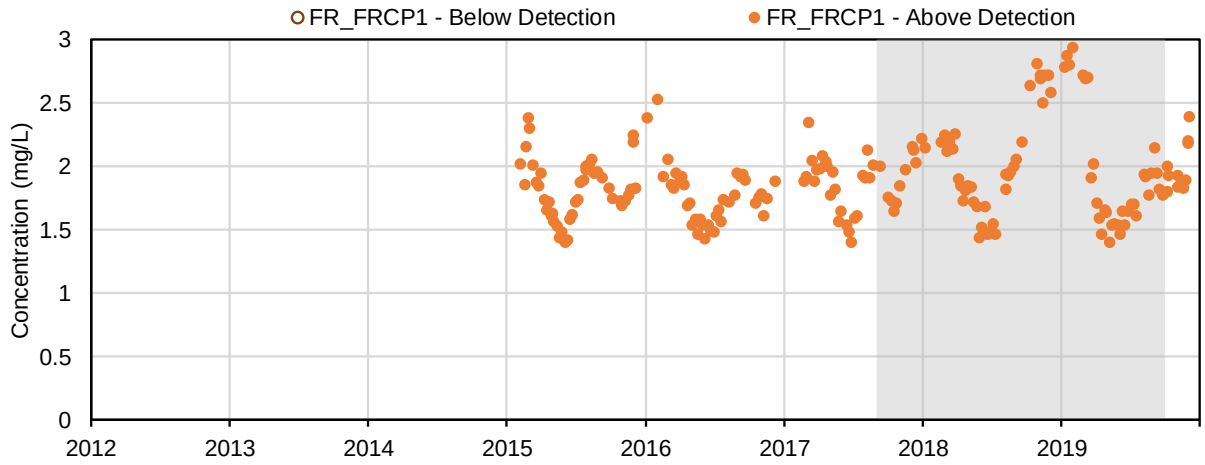
(86) Nickel (mg/L); Dissolved Metals



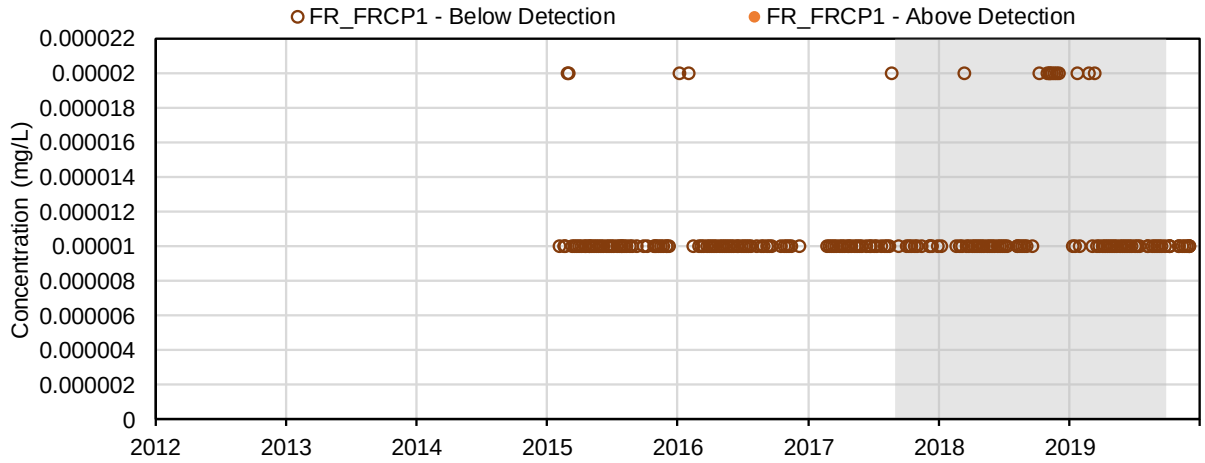
(87) Selenium (mg/L); Dissolved Metals



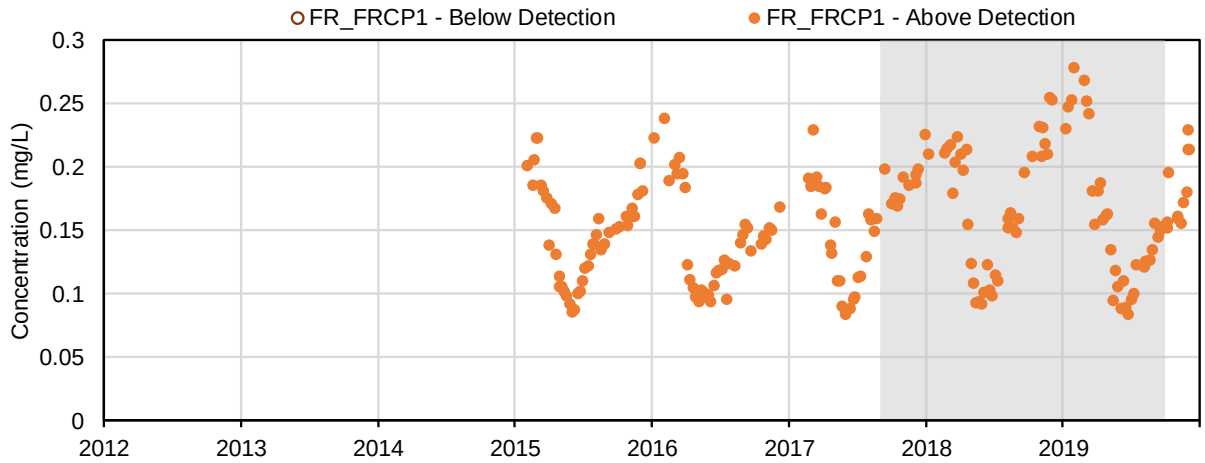
(88) Silicon (mg/L); Dissolved Metals



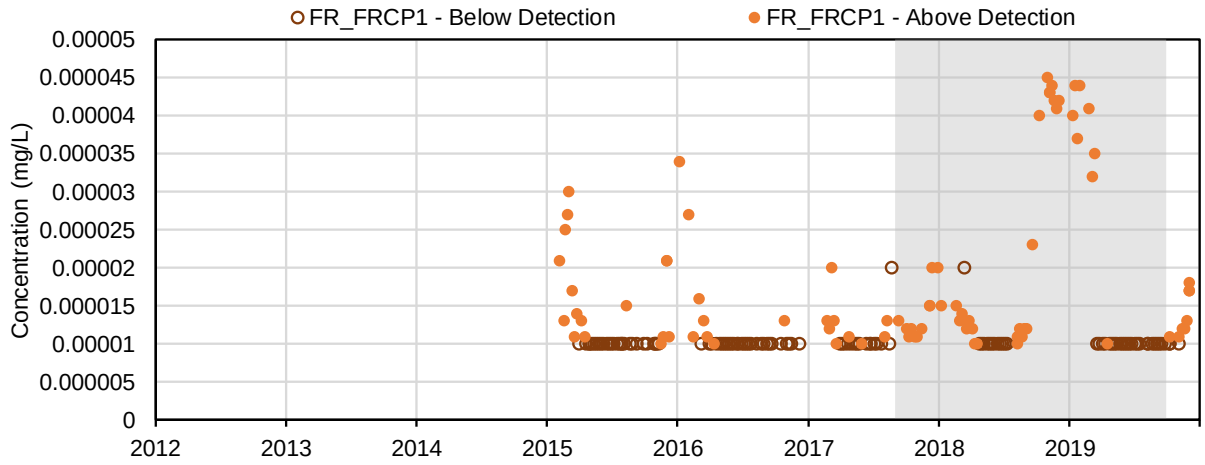
(89) Silver (mg/L); Dissolved Metals



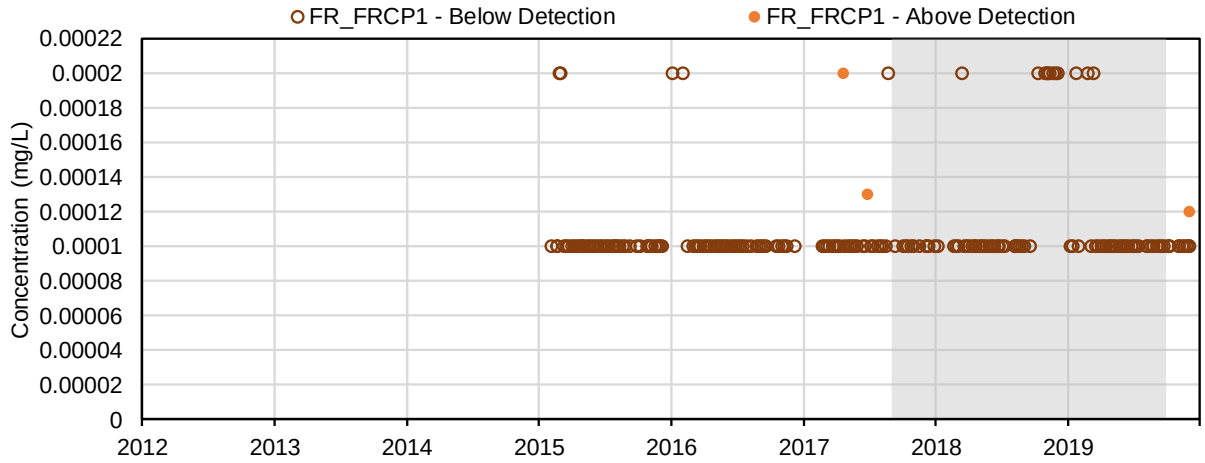
(90) Strontium (mg/L); Dissolved Metals



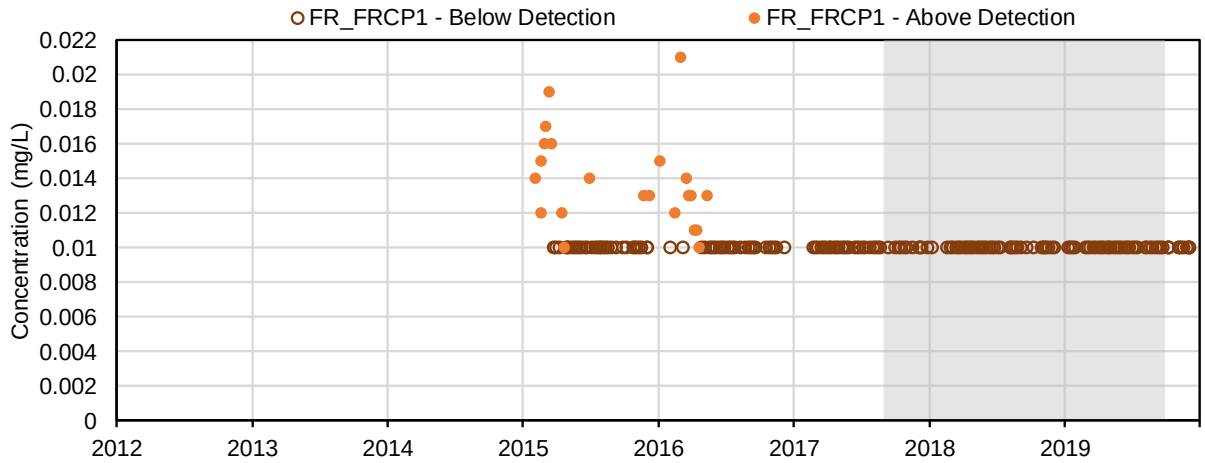
(91) Thallium (mg/L); Dissolved Metals



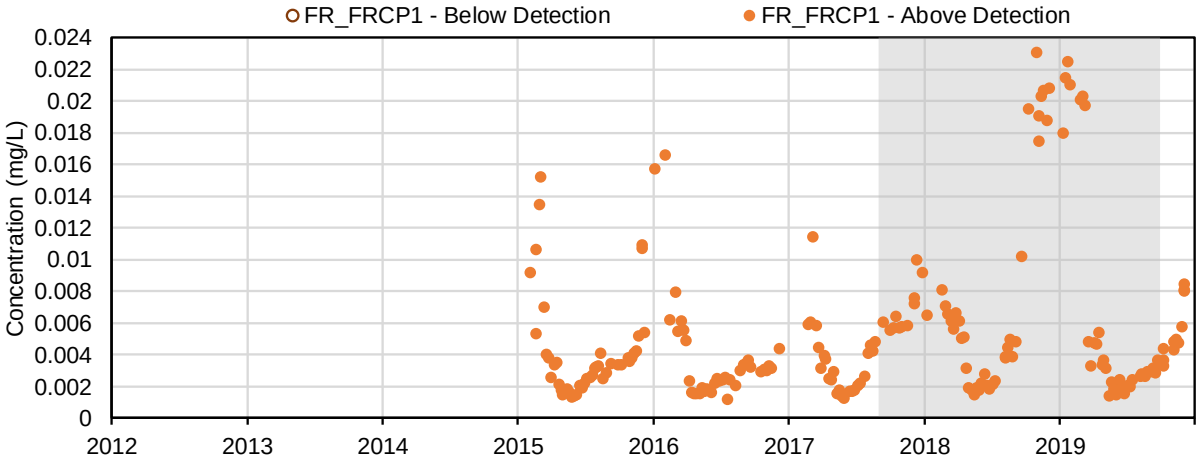
(92) Tin (mg/L); Dissolved Metals



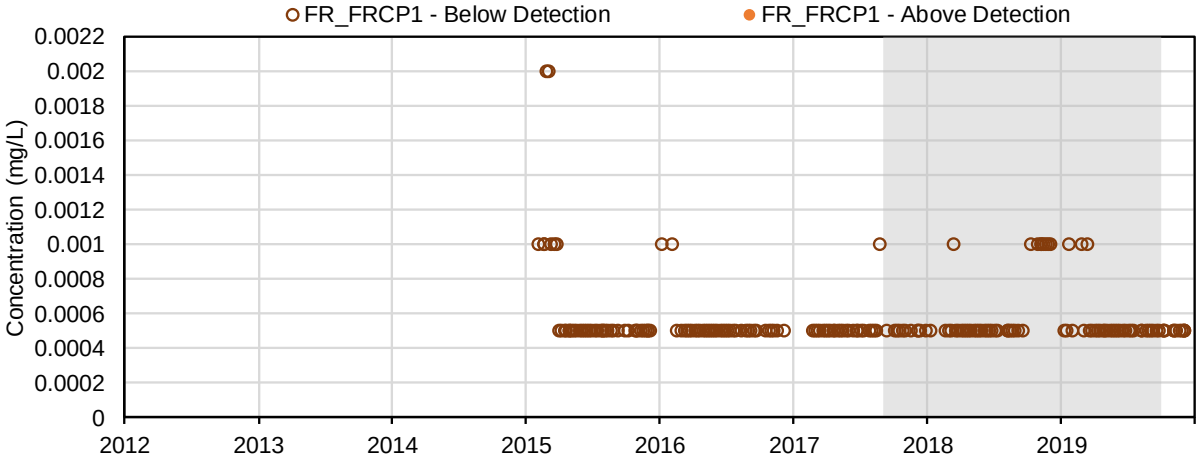
(93) Titanium (mg/L); Dissolved Metals



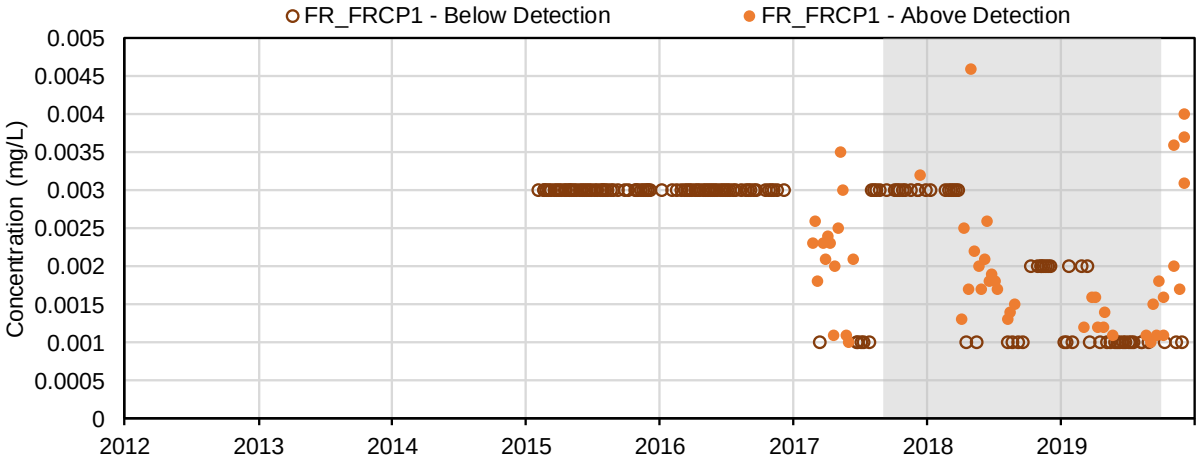
(94) Uranium (mg/L); Dissolved Metals



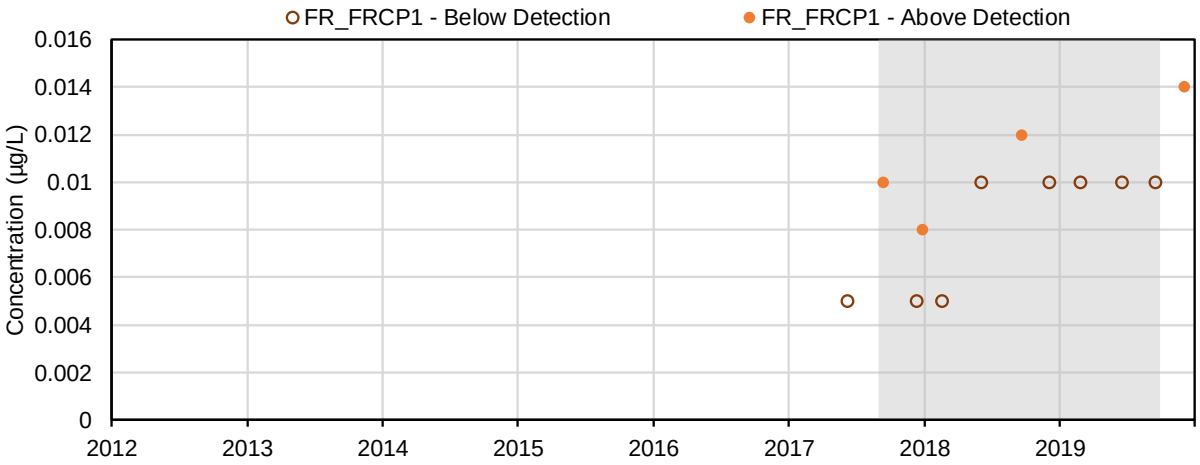
(95) Vanadium (mg/L); Dissolved Metals



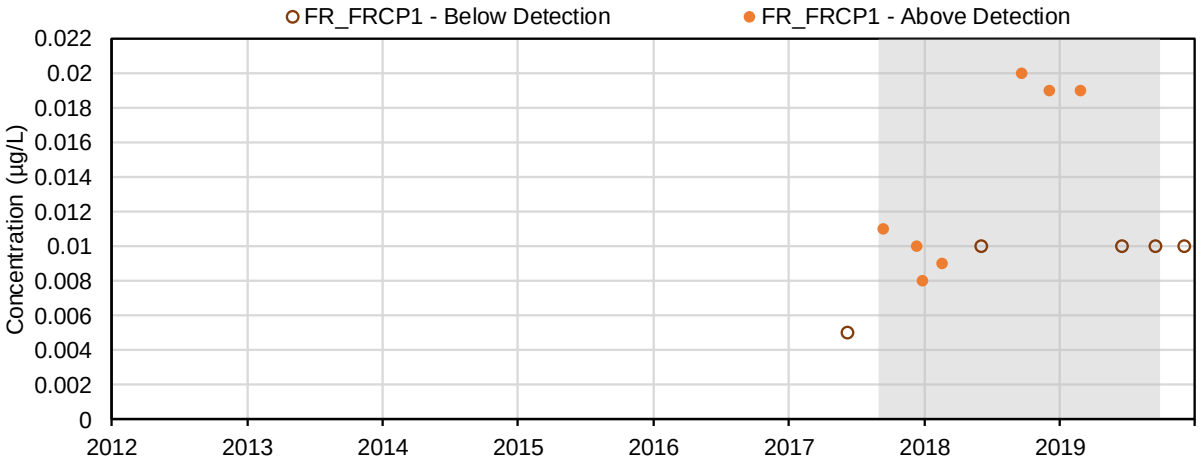
(96) Zinc (mg/L); Dissolved Metals



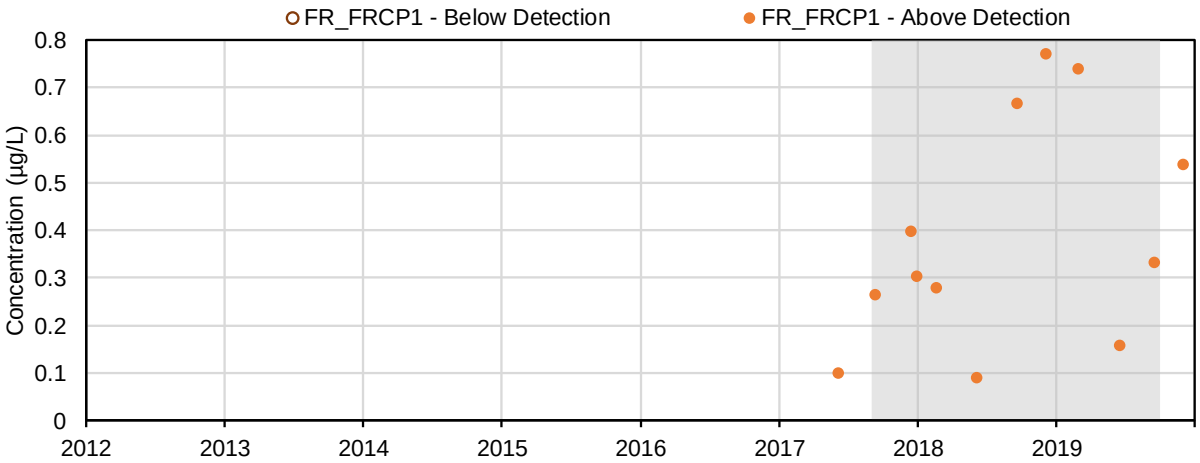
(97) Dissolved Dimethylseleneoxide (µg/L); Speciation of Selenium



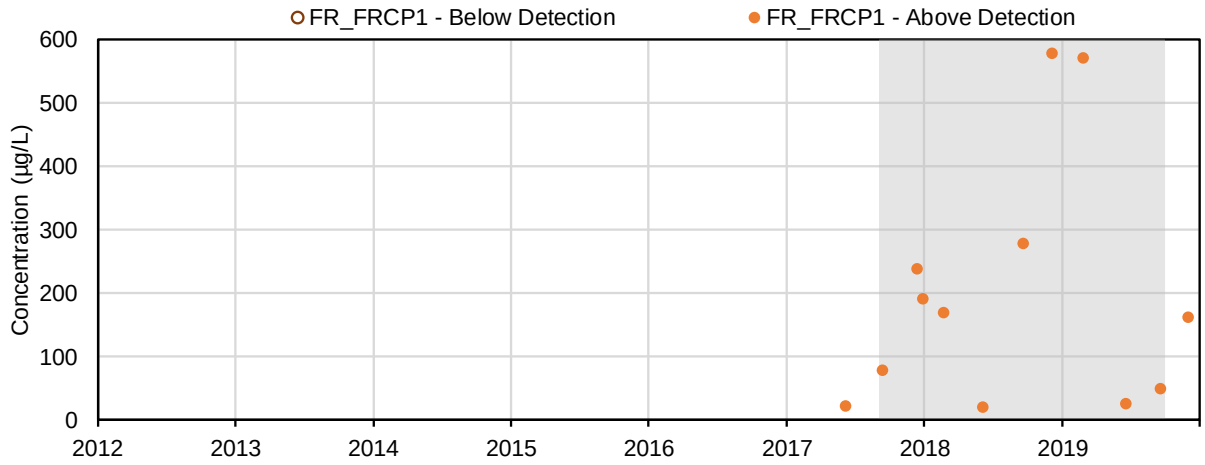
(98) Dissolved Methylseleninic Acid (µg/L); Speciation of Selenium



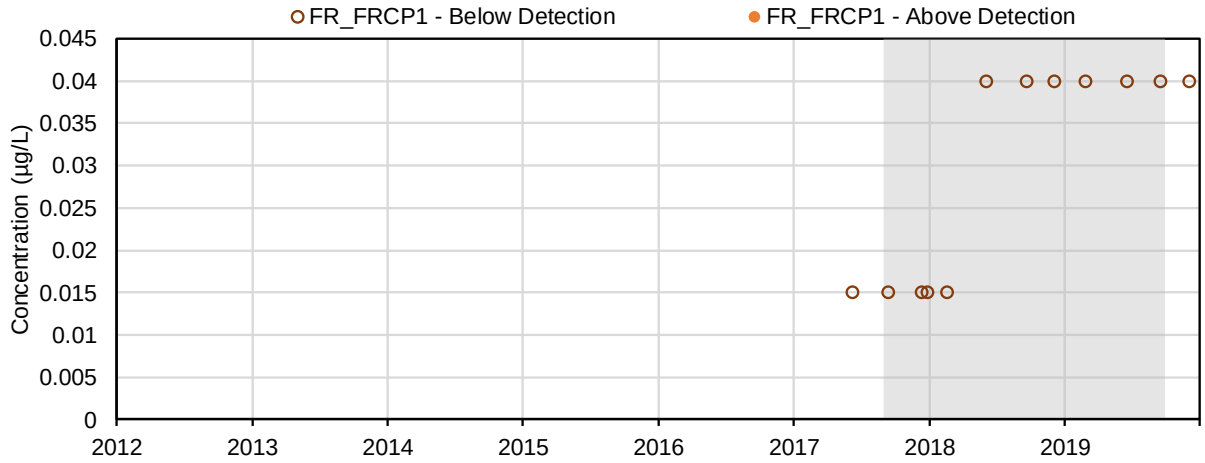
(99) Dissolved Selenite (µg/L); Speciation of Selenium



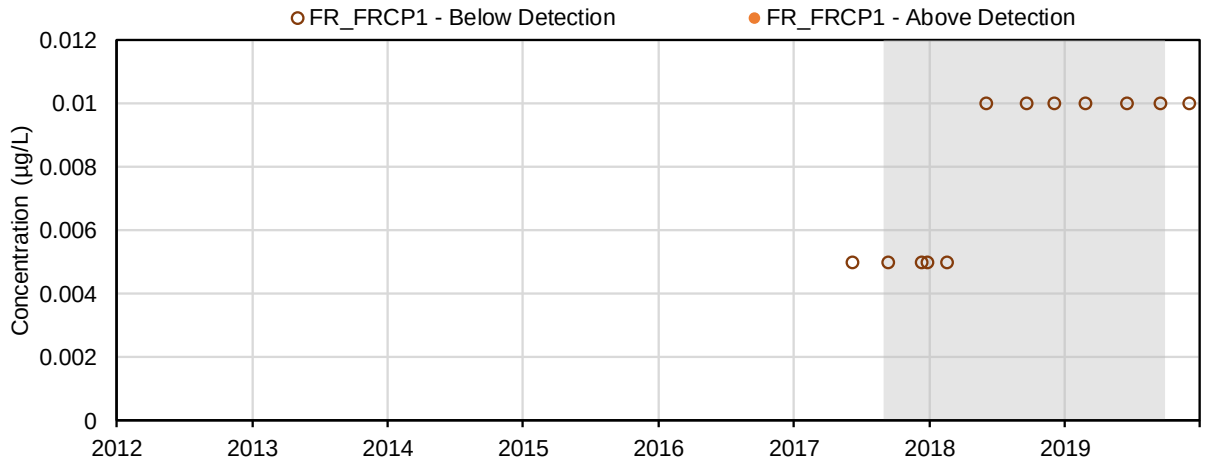
(100) Dissolved Selenate (µg/L); Speciation of Selenium



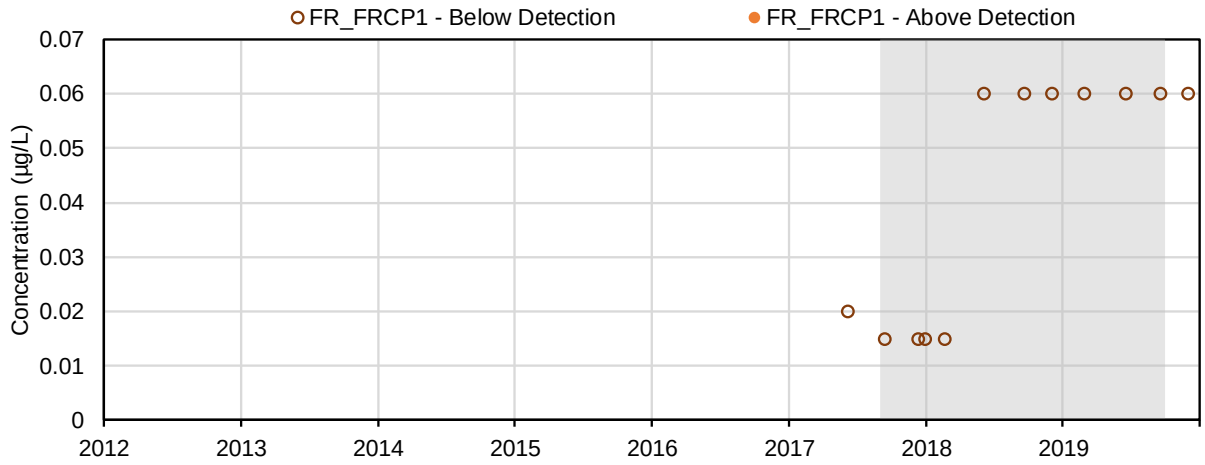
(101) Dissolved Selenocyanate (µg/L); Speciation of Selenium



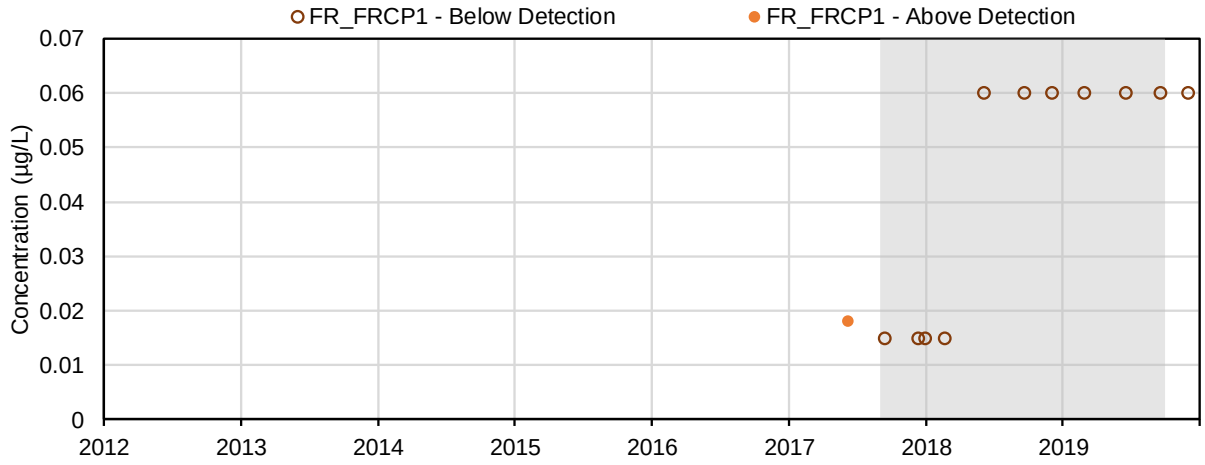
(102) Dissolved Selenomethionine (µg/L); Speciation of Selenium

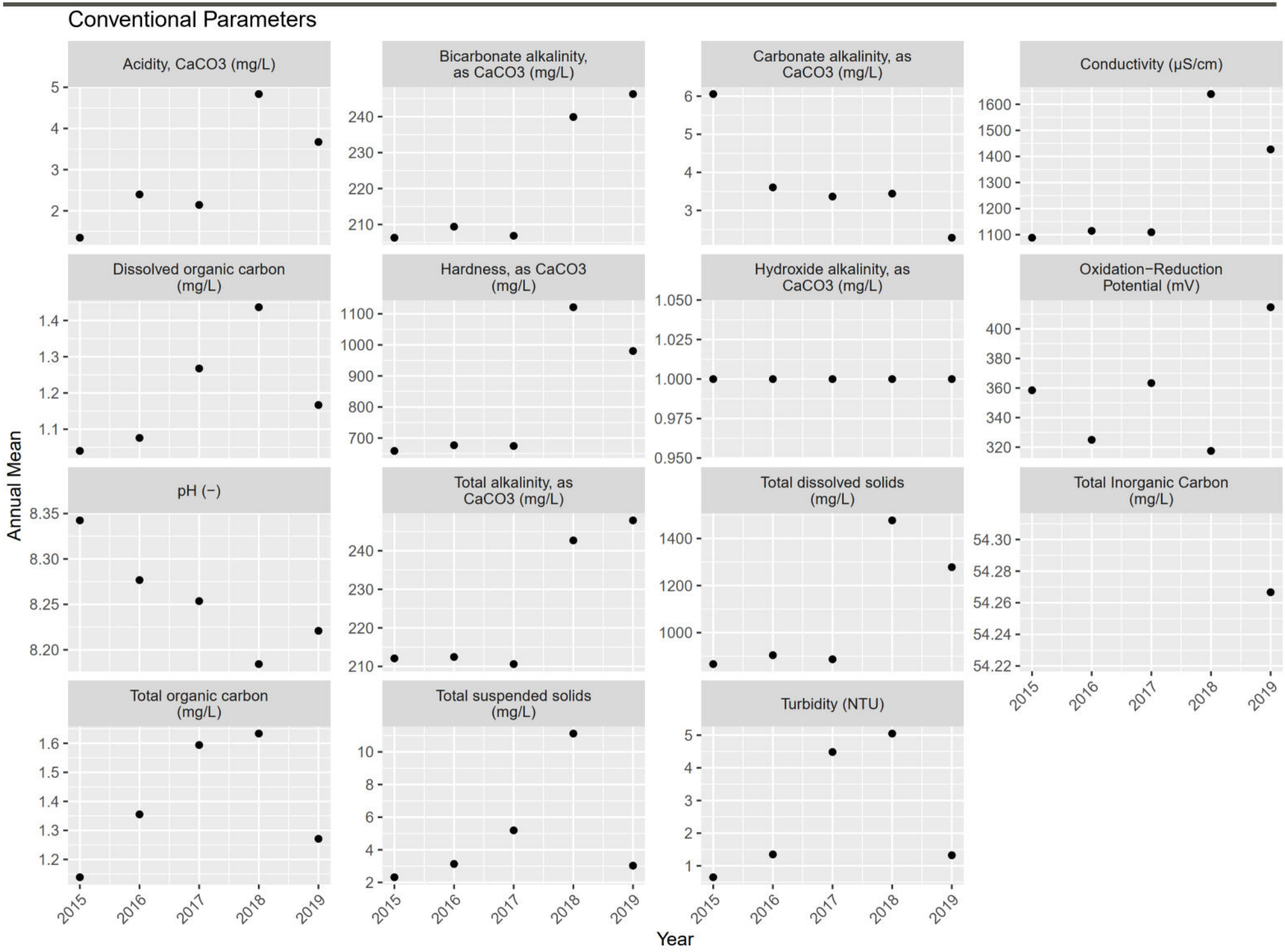


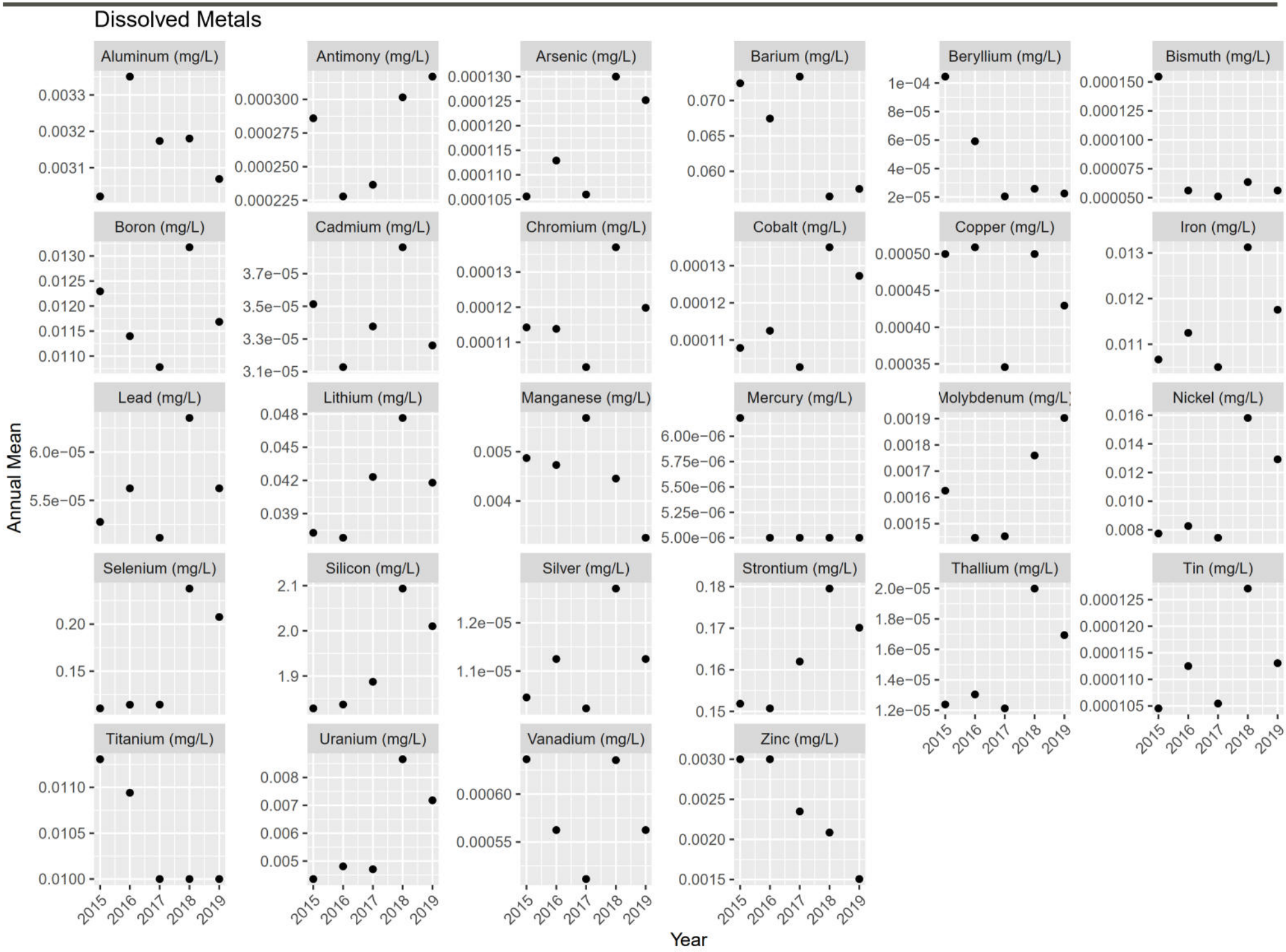
(103) Dissolved Selenosulphate (µg/L); Speciation of Selenium

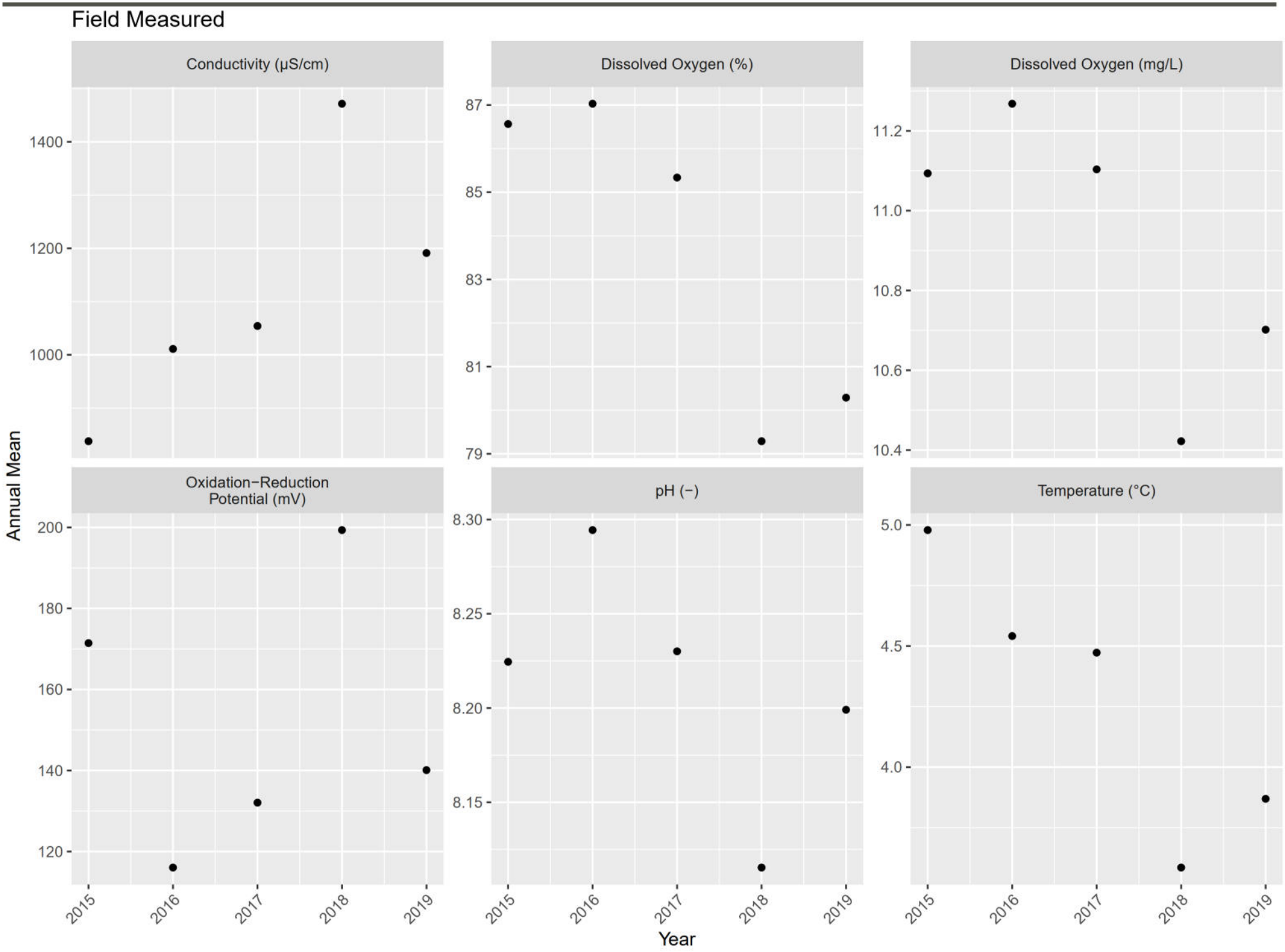


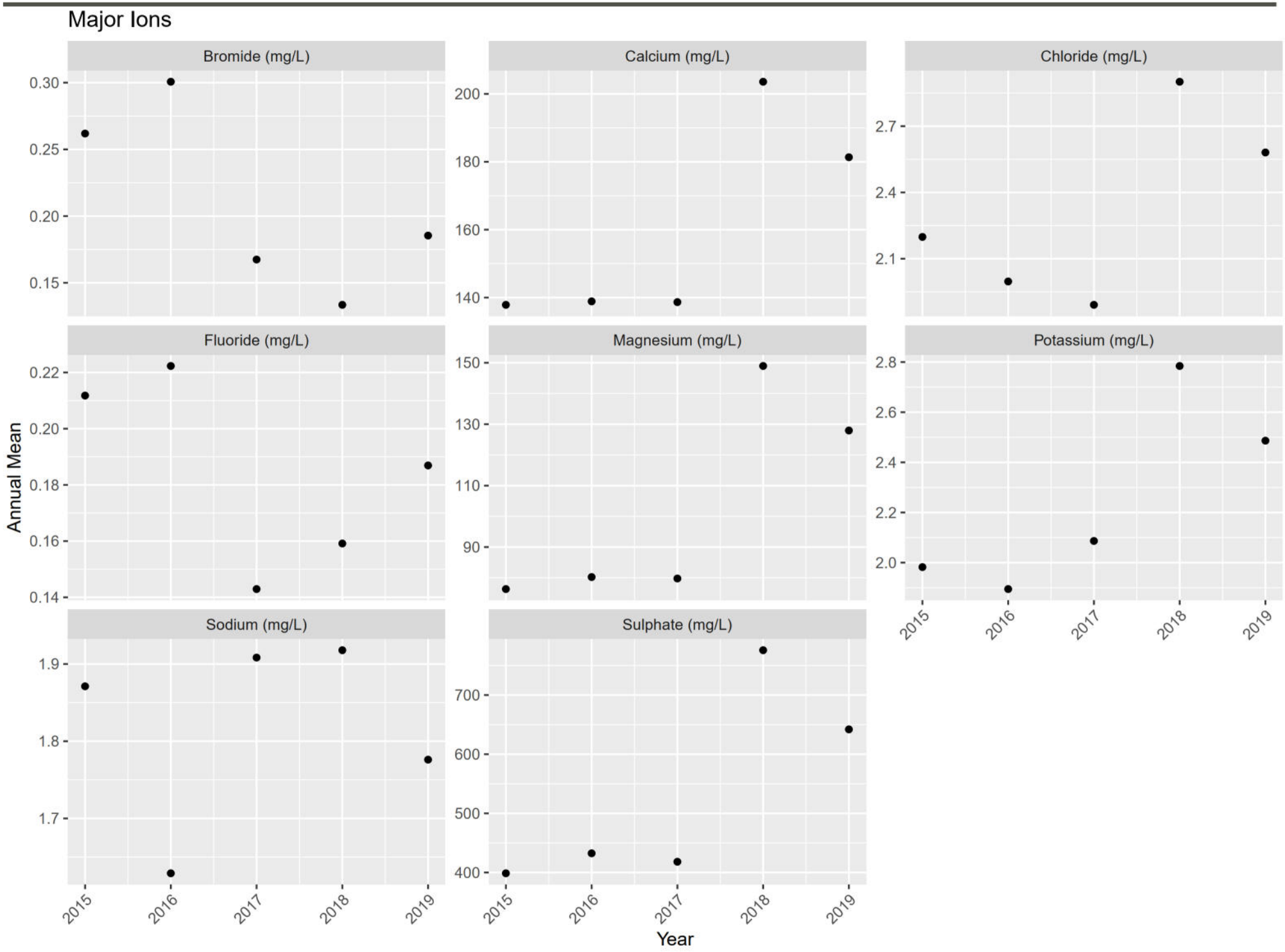
(104) Unknown Dissolved Selenium Species (µg/L); Speciation of Selenium

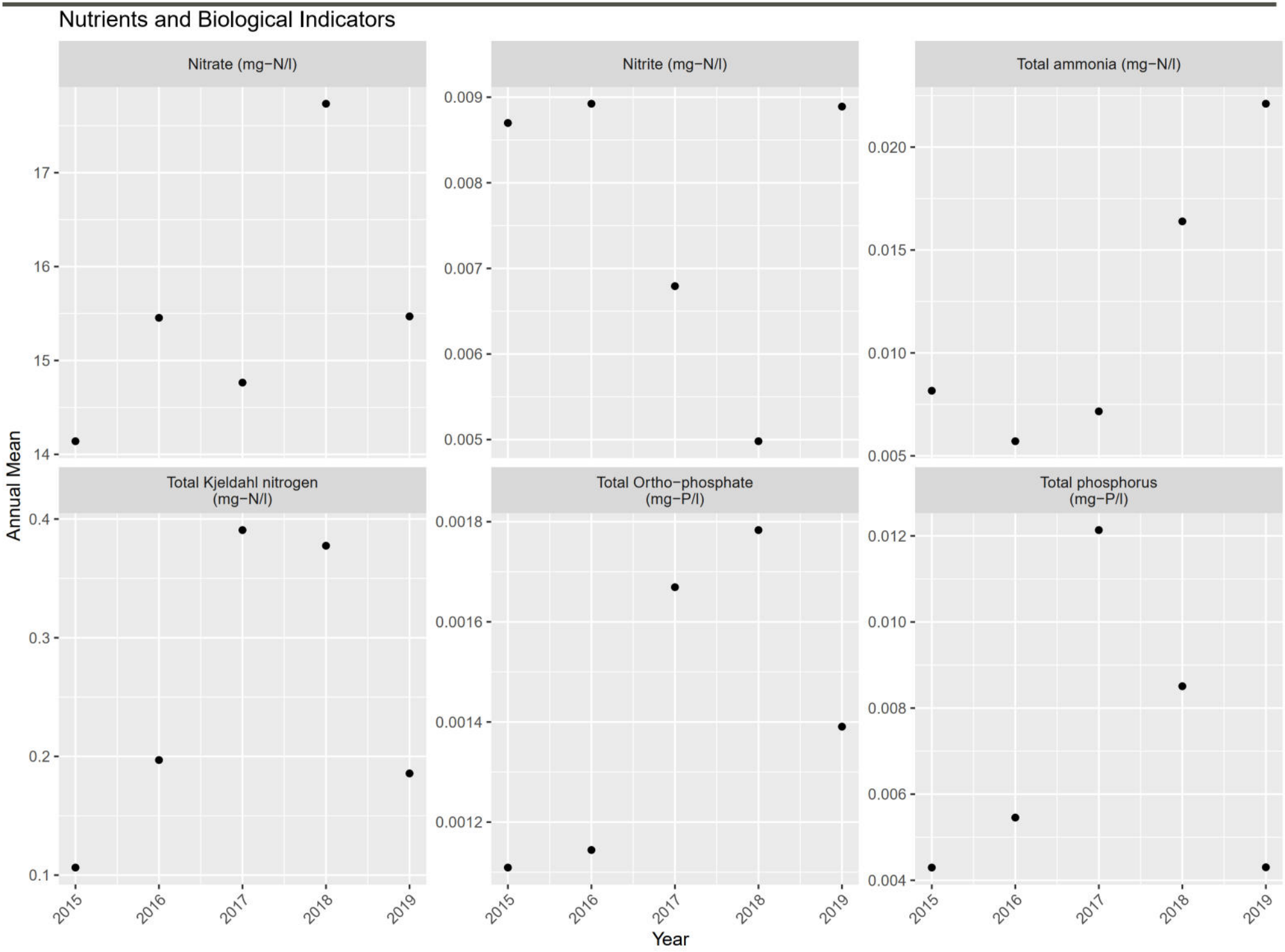


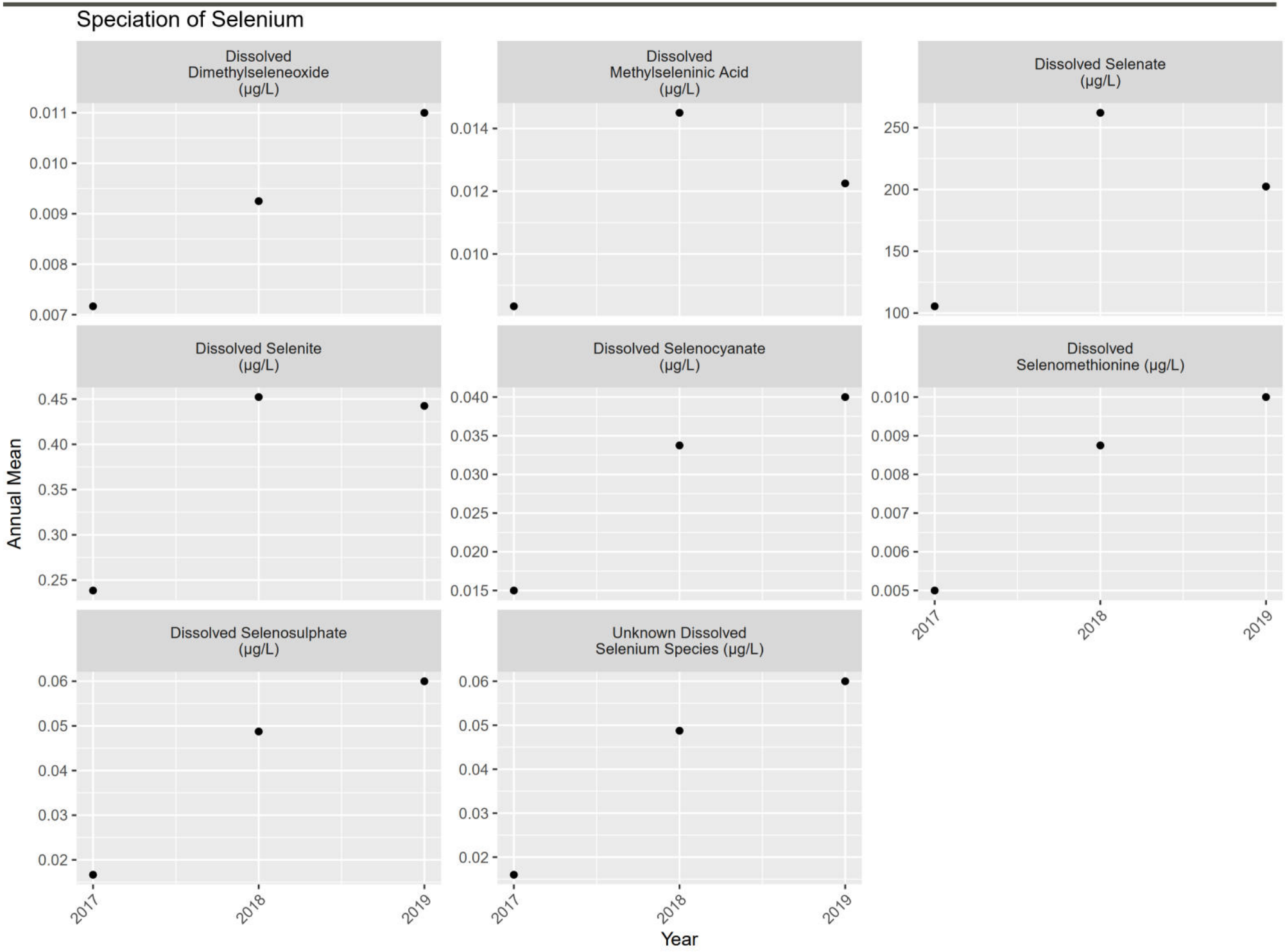

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total Inorganic Carbon (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2015
2016
2017
2018
2019

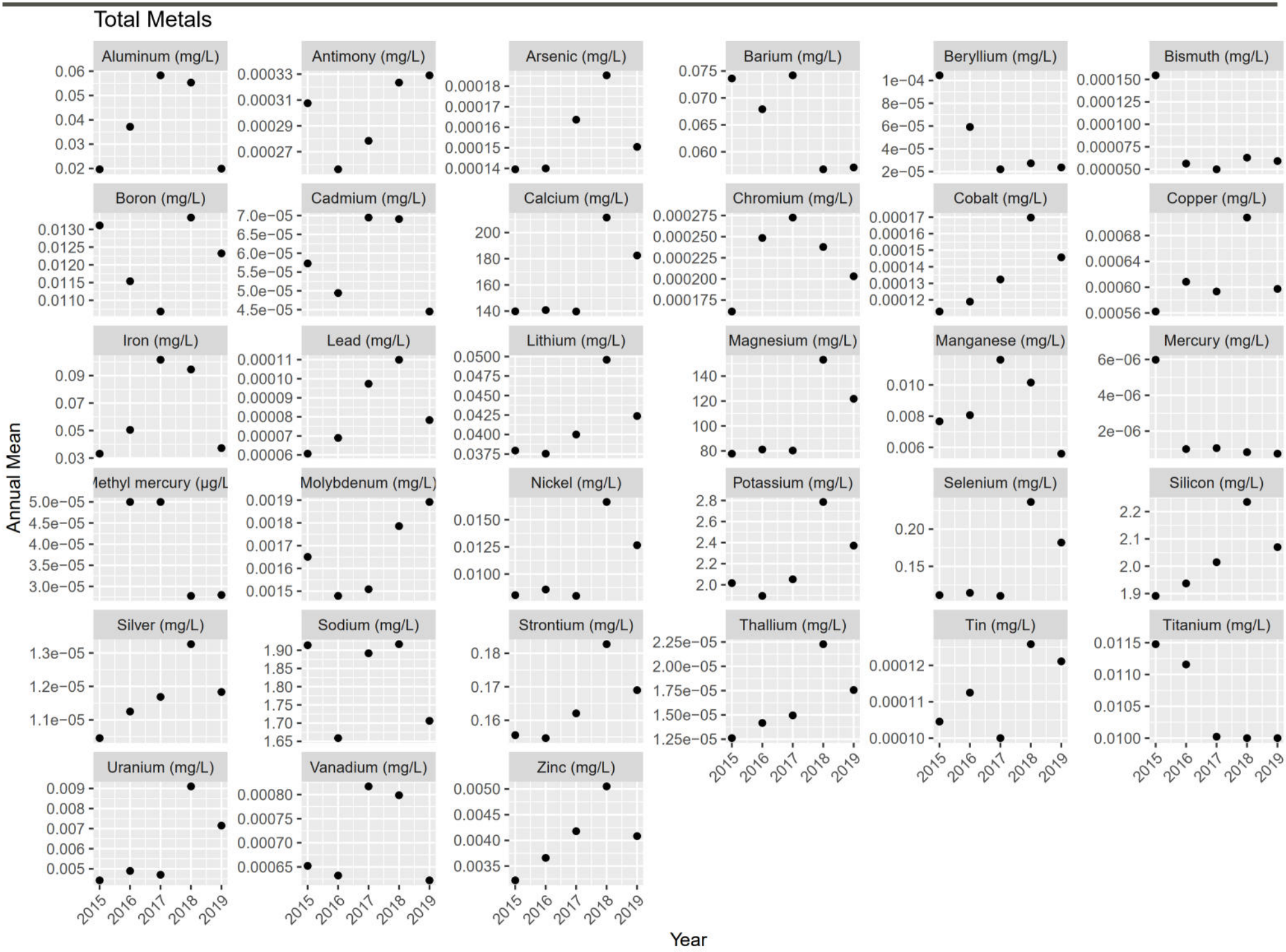

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2015
2016
2017
2018
2019


Field Measured
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Temperature (°C)
Annual Mean
Year
1400
1200
1000
87
85
83
81
79
11.2
11.0
10.8
10.6
10.4
200
180
160
140
120
8.30
8.25
8.20
8.15
5.0
4.5
4.0
2015
2016
2017
2018
2019


Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
0.30
0.25
0.20
0.15
200
180
160
140
2.7
2.4
2.1
0.22
0.20
0.18
0.16
0.14
150
130
110
90
2.8
2.6
2.4
2.2
2.0
1.9
1.8
1.7
700
600
500
400
2015
2016
2017
2018
2019


Nutrients and Biological Indicators
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2015
2016
2017
2018
2019

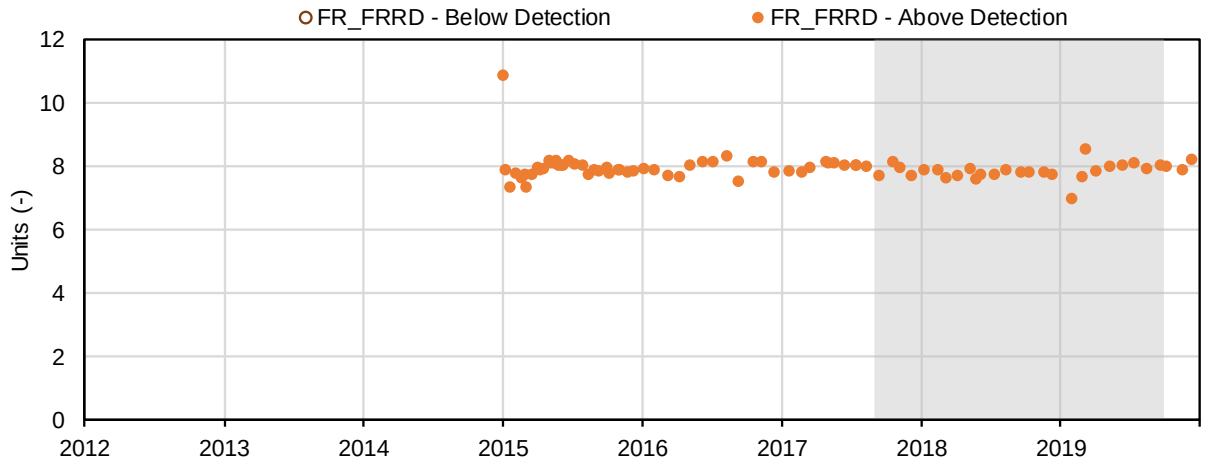

Speciation of Selenium
Dissolved Dimethylseleneoxide (µg/L)
Dissolved Methylseleninic Acid (µg/L)
Dissolved Selenate (µg/L)
Dissolved Selenite (µg/L)
Dissolved Selenocyanate (µg/L)
Dissolved Selenomethionine (µg/L)
Dissolved Selenosulphate (µg/L)
Unknown Dissolved Selenium Species (µg/L)
Annual Mean
Year
2017
2018
2019


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Methyl mercury (µg/L
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2015
2016
2017
2018
2019

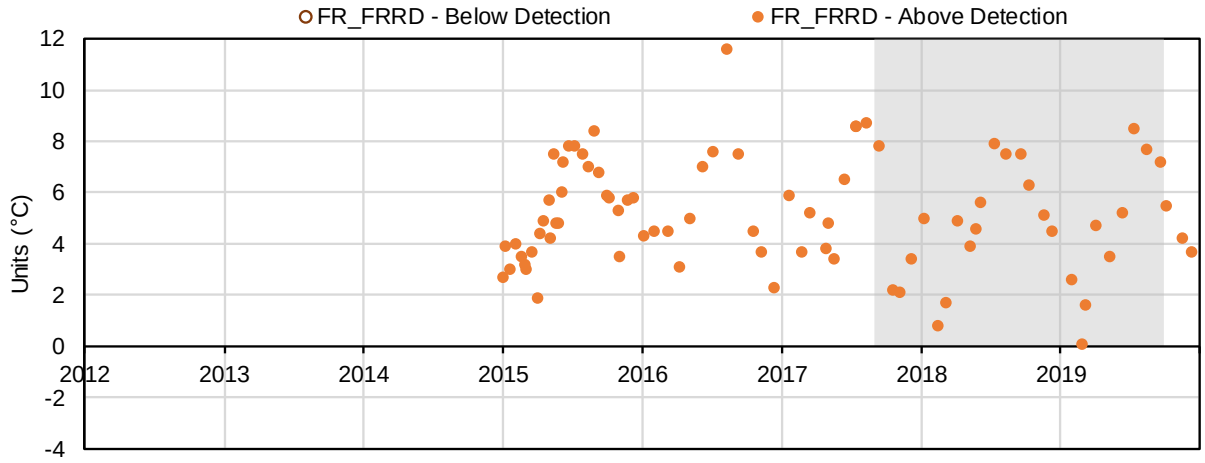
ATTACHMENT F10

FR_FRRD Plots

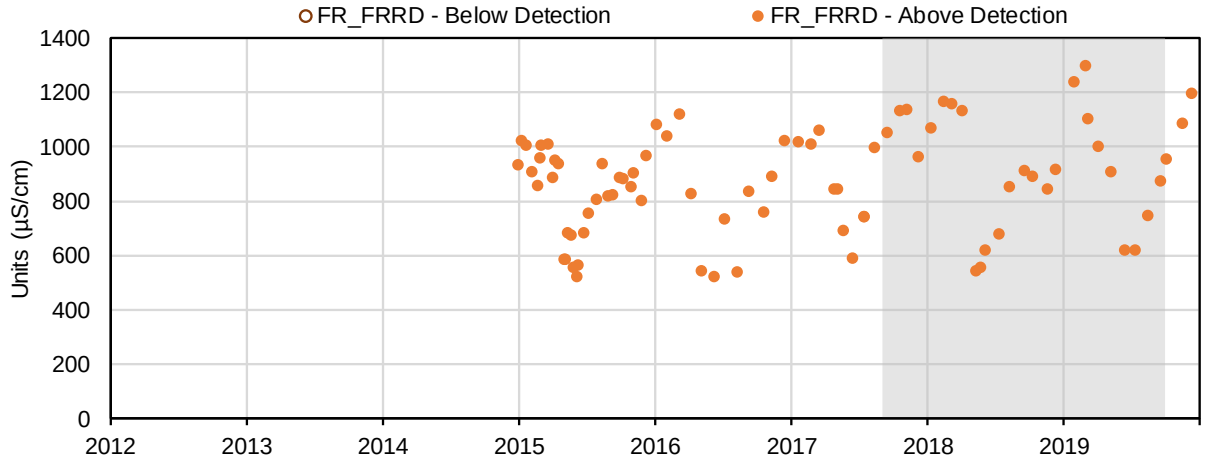
(1) pH (-); Field Measured



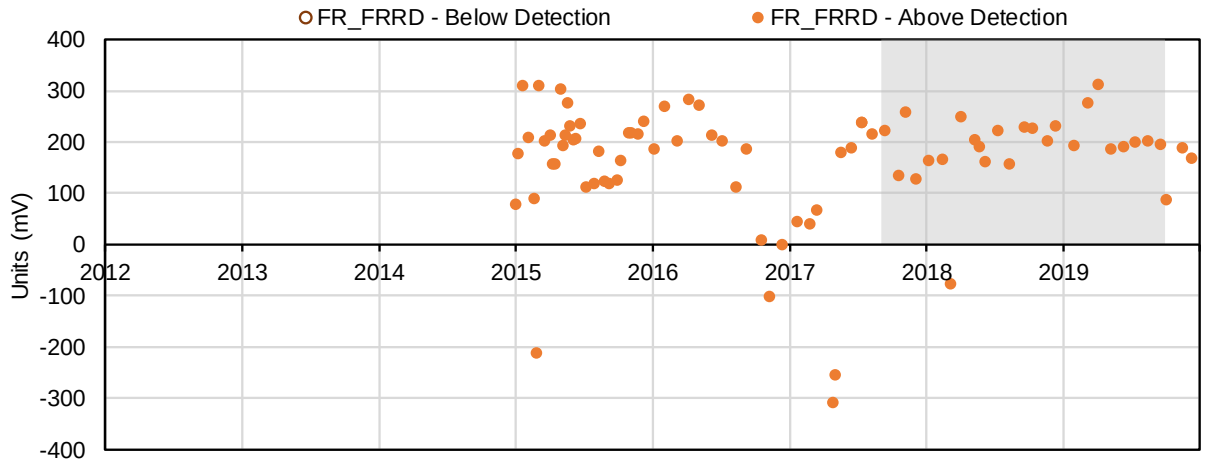
(2) Temperature (°C); Field Measured



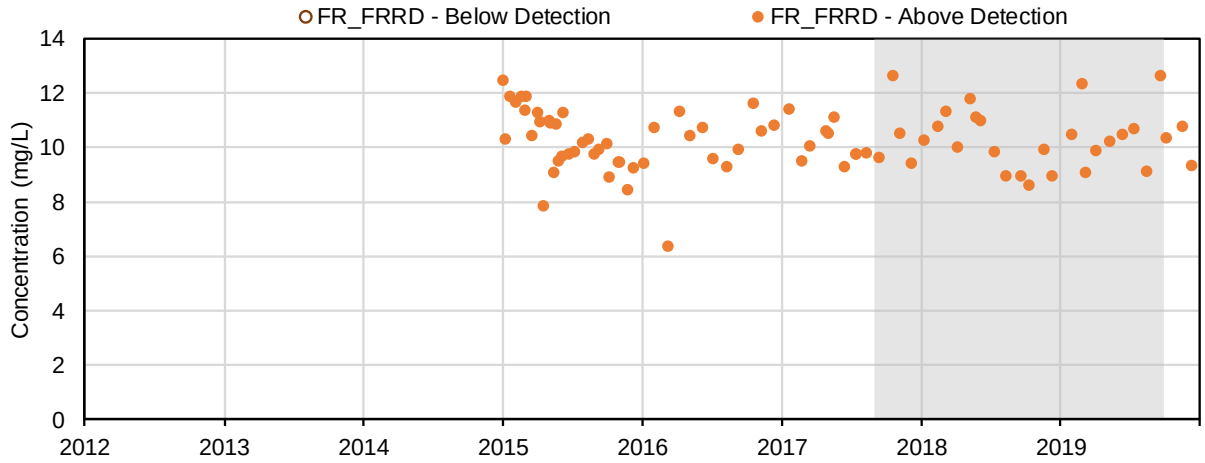
(3) Conductivity (µS/cm); Field Measured



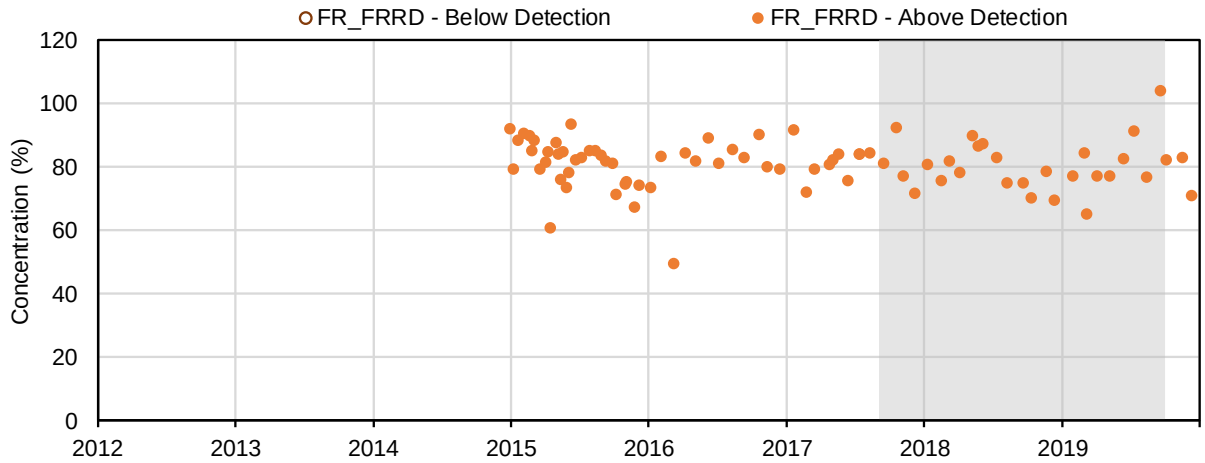
(4) Oxidation-Reduction Potential (mV); Field Measured



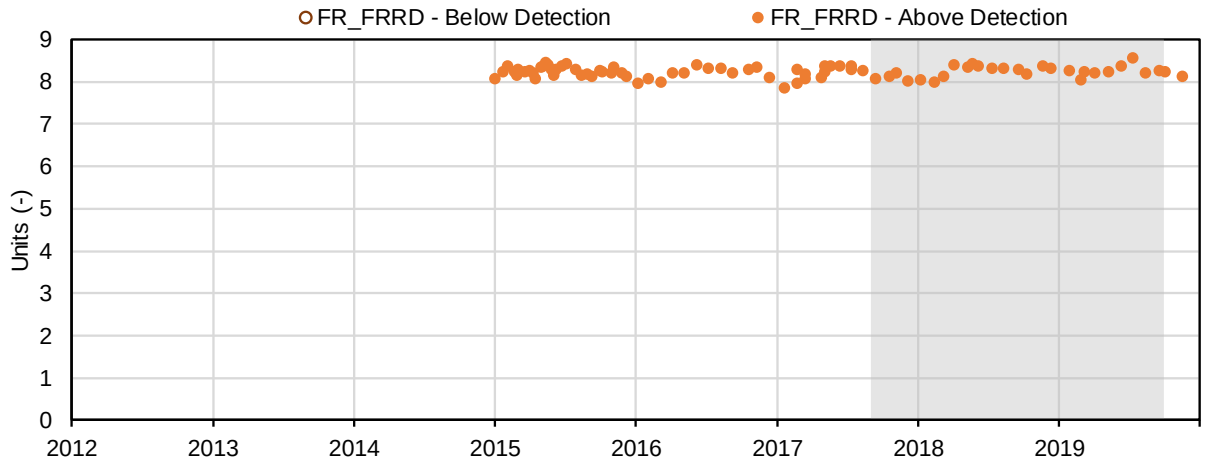
(5) Dissolved Oxygen (mg/L); Field Measured



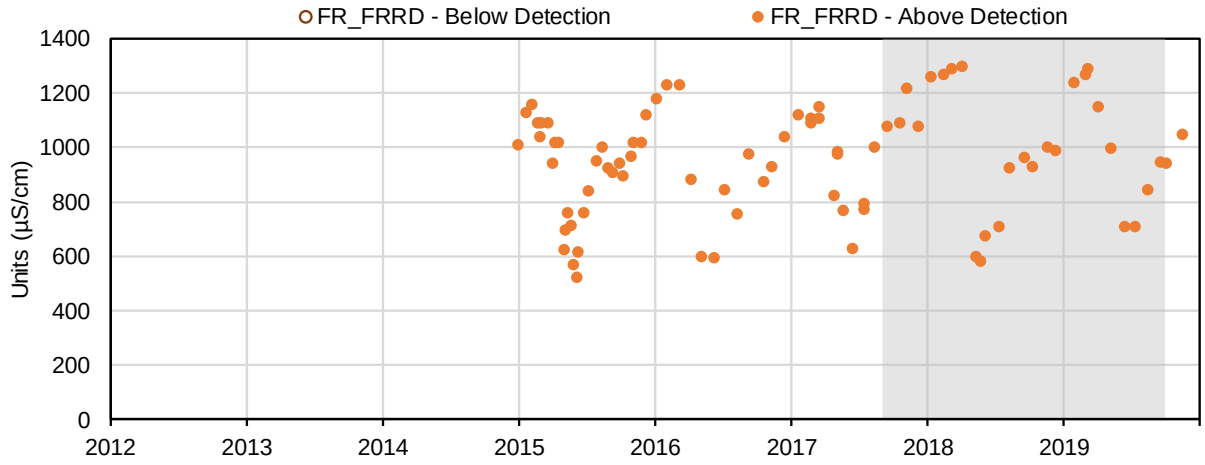
(6) Dissolved Oxygen (%); Field Measured



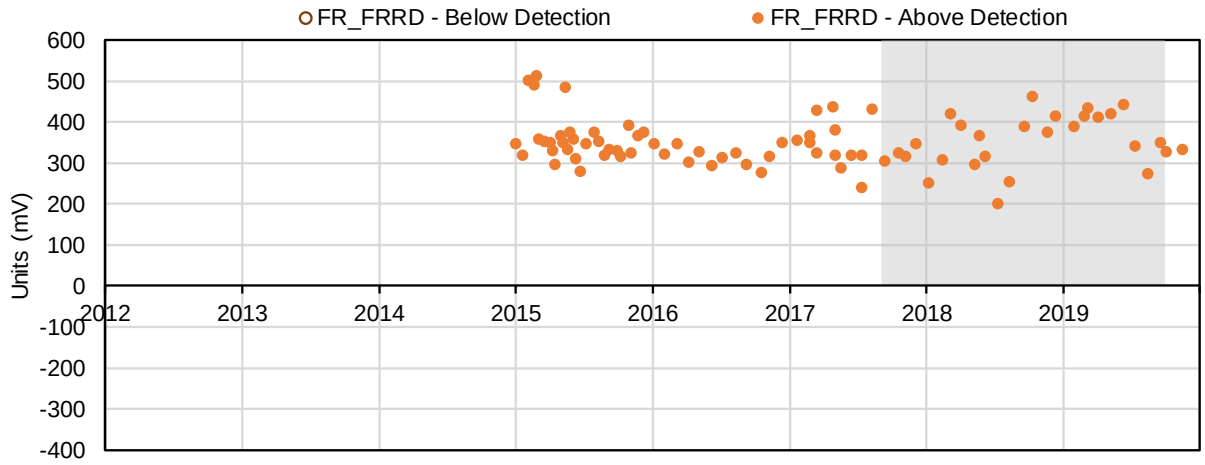
(7) pH (-); Conventional Parameters



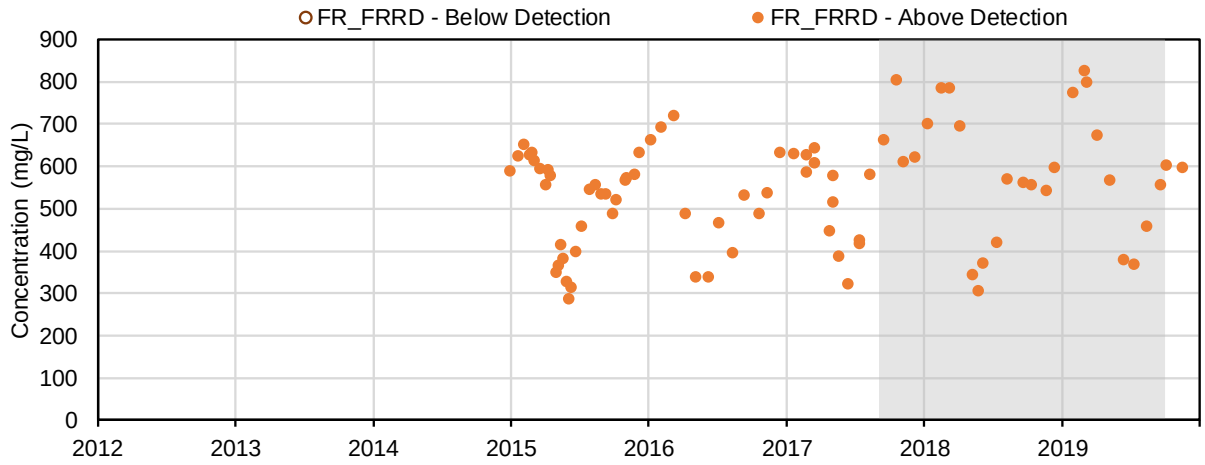
(8) Conductivity (µS/cm); Conventional Parameters



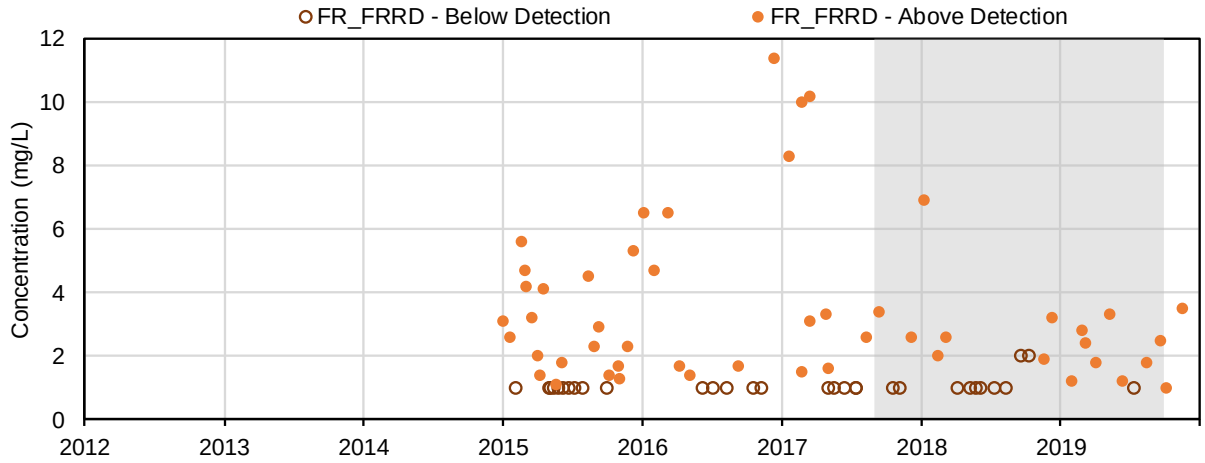
(9) Oxidation-Reduction Potential (mV); Conventional Parameters



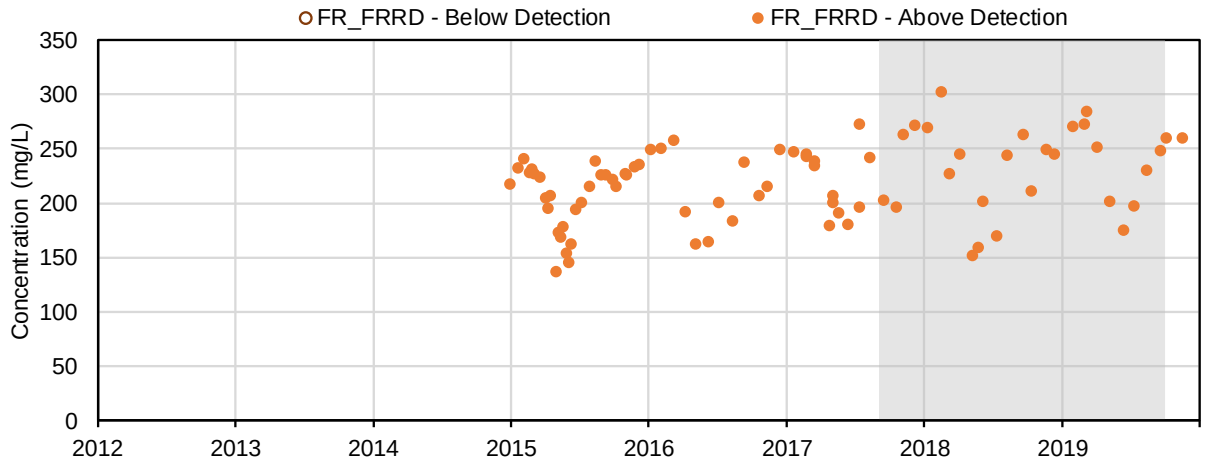
(10) Hardness, as CaCO3 (mg/L); Conventional Parameters



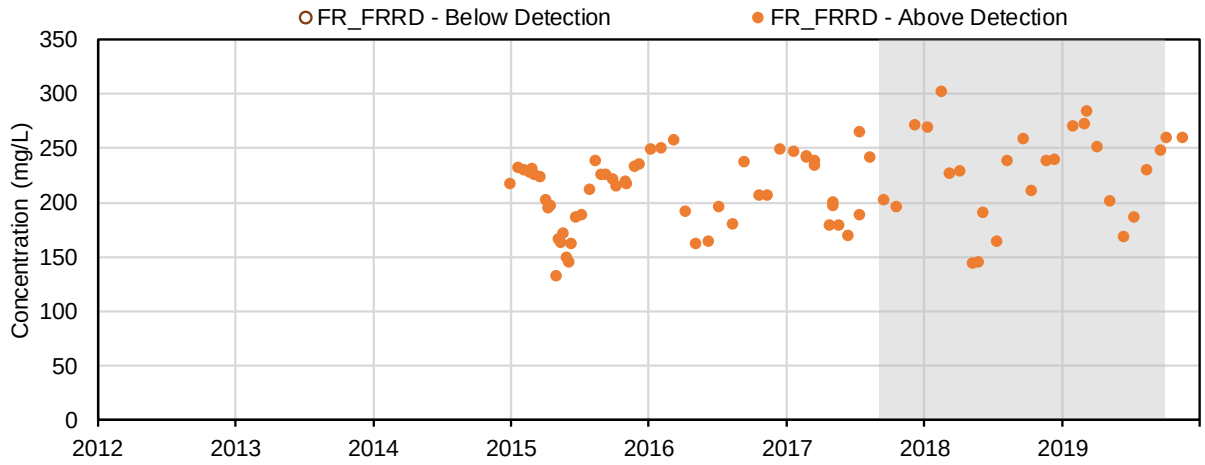
(11) Acidity, CaCO3 (mg/L); Conventional Parameters



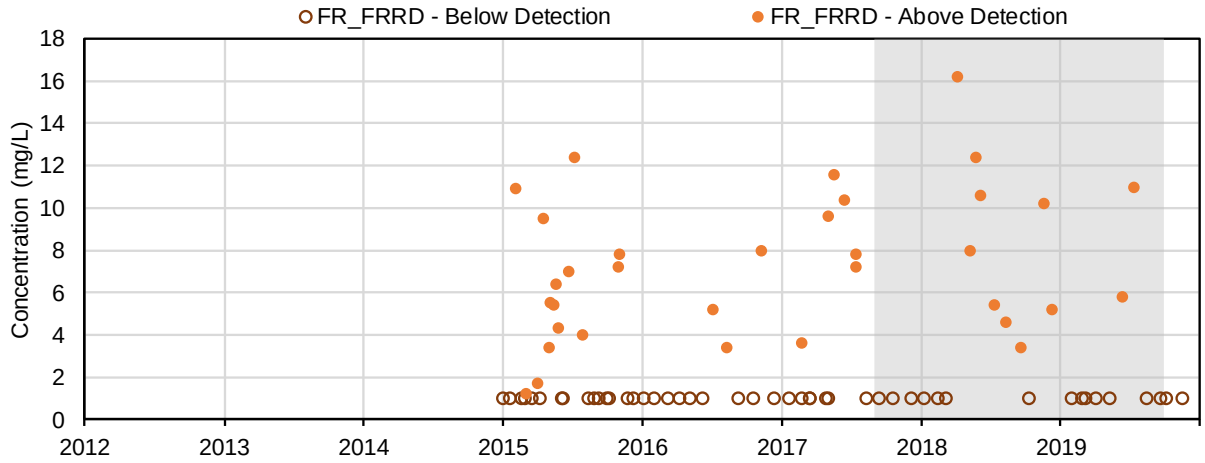
(12) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



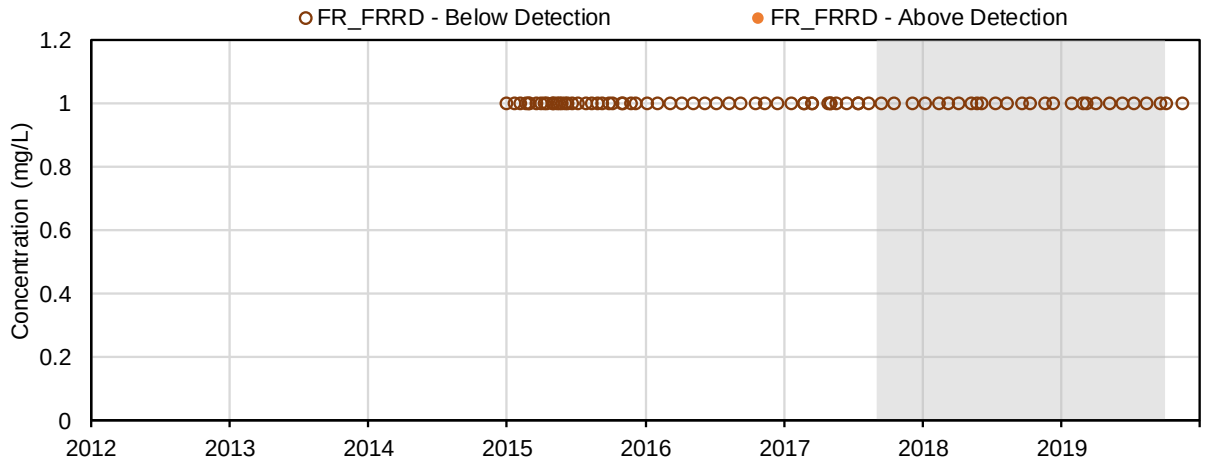
(13) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



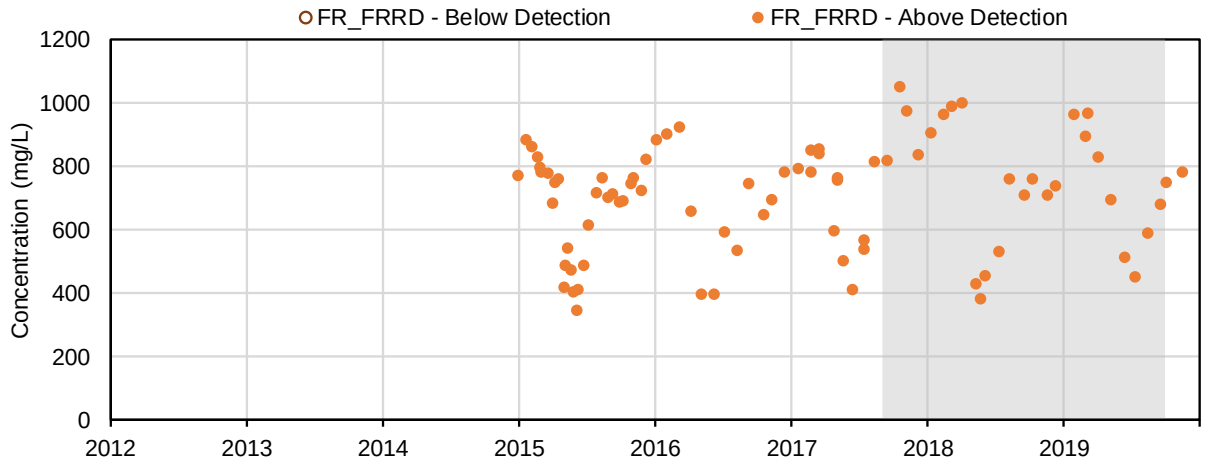
(14) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



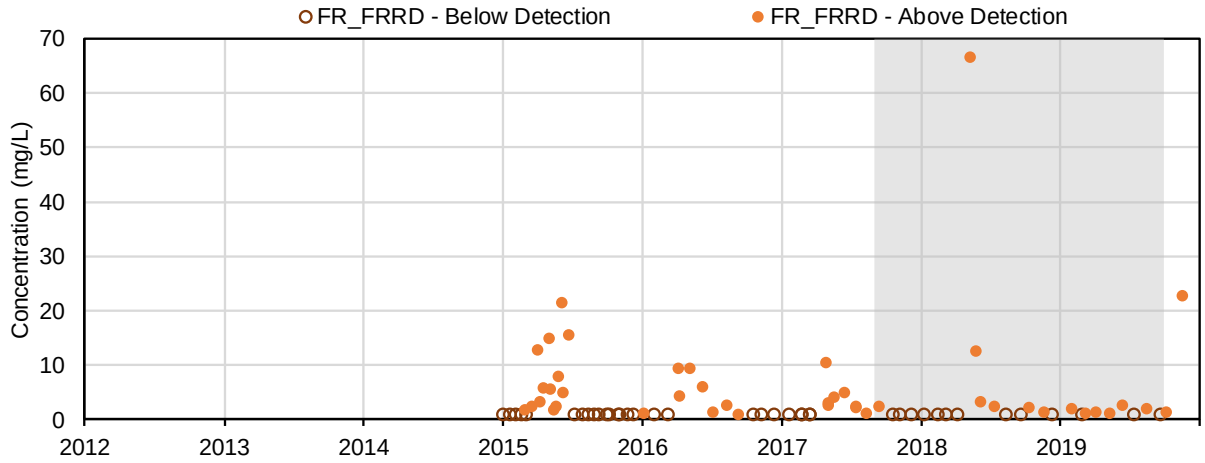
(15) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



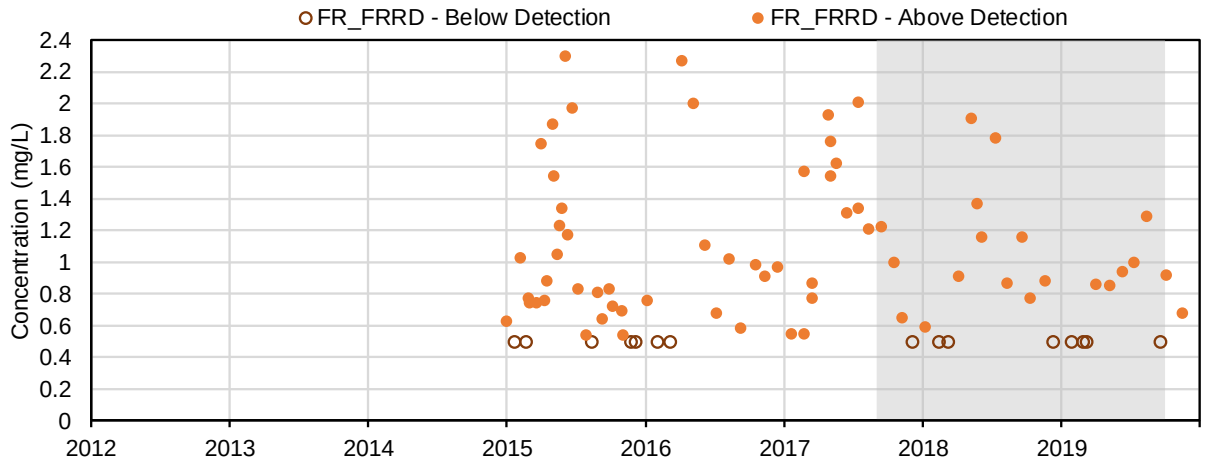
(16) Total dissolved solids (mg/L); Conventional Parameters



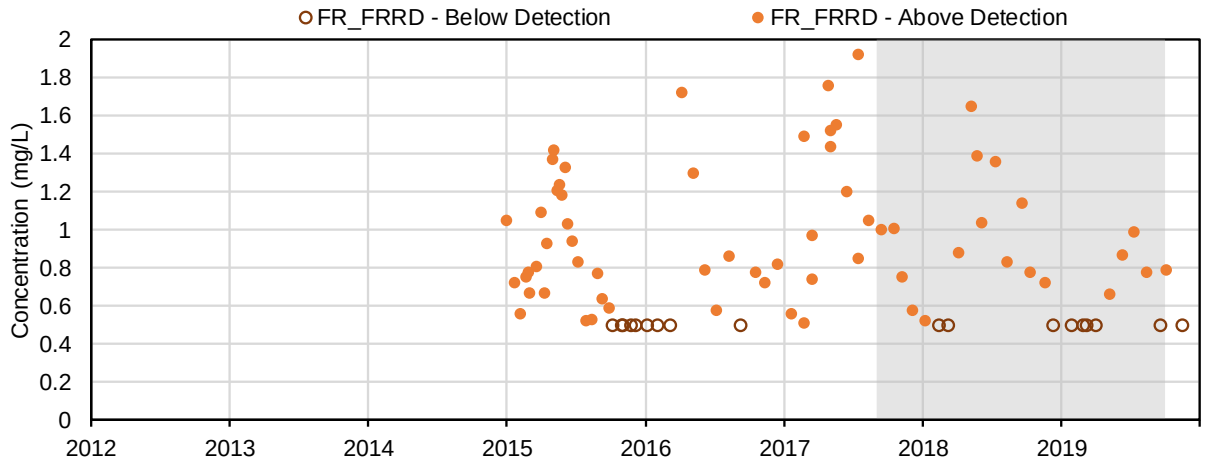
(17) Total suspended solids (mg/L); Conventional Parameters



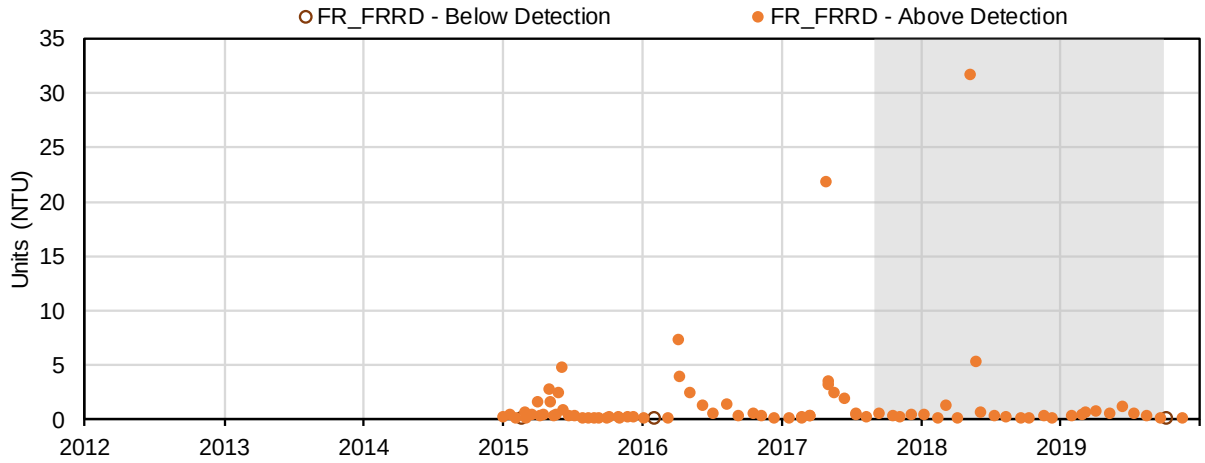
(18) Total organic carbon (mg/L); Conventional Parameters



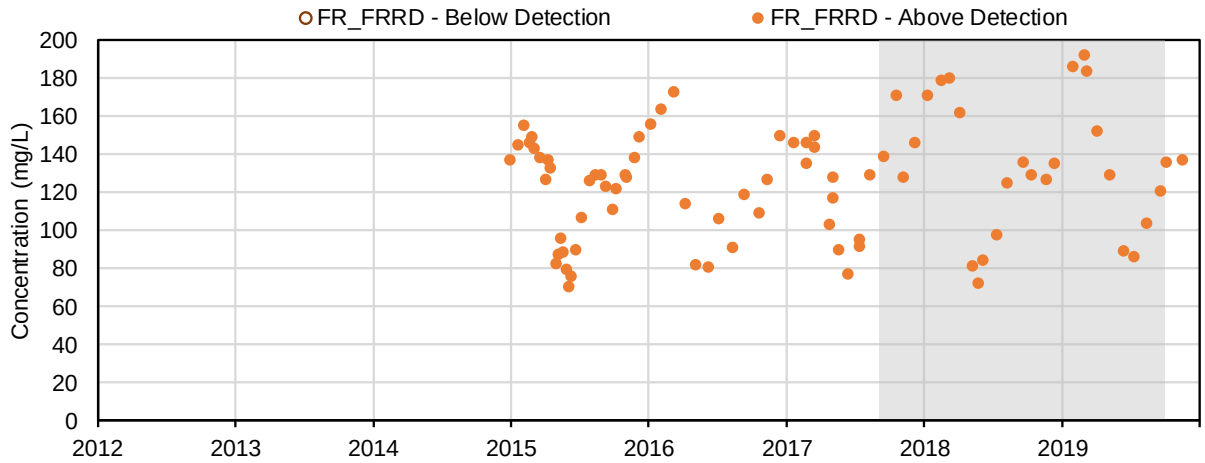
(19) Dissolved organic carbon (mg/L); Conventional Parameters



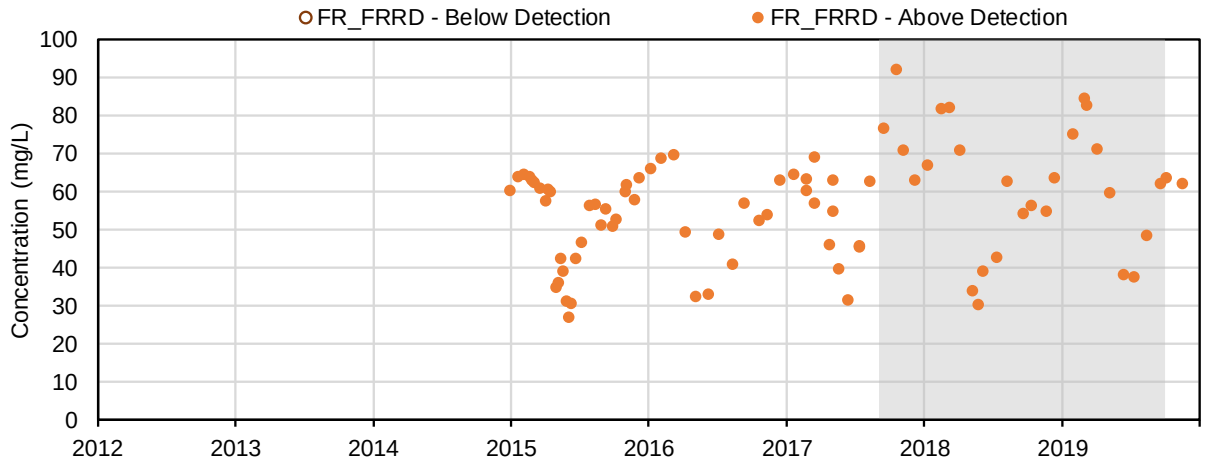
(20) Turbidity (NTU); Conventional Parameters



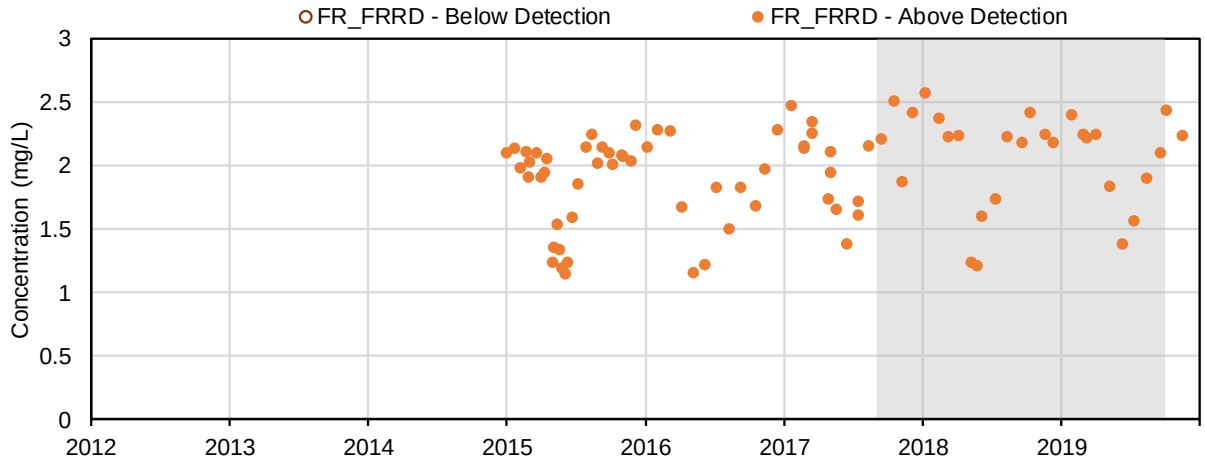
(21) Calcium (mg/L); Major Ions



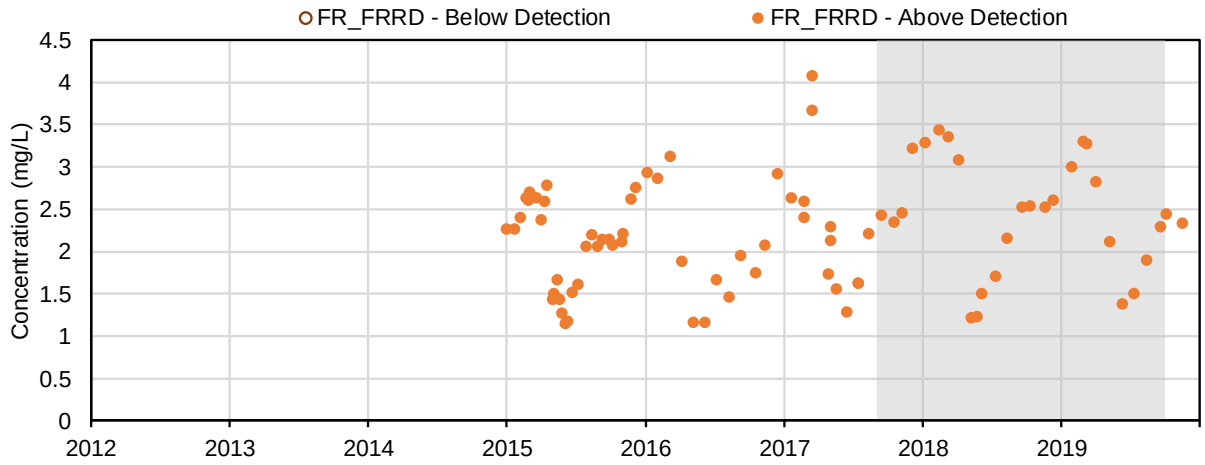
(22) Magnesium (mg/L); Major Ions



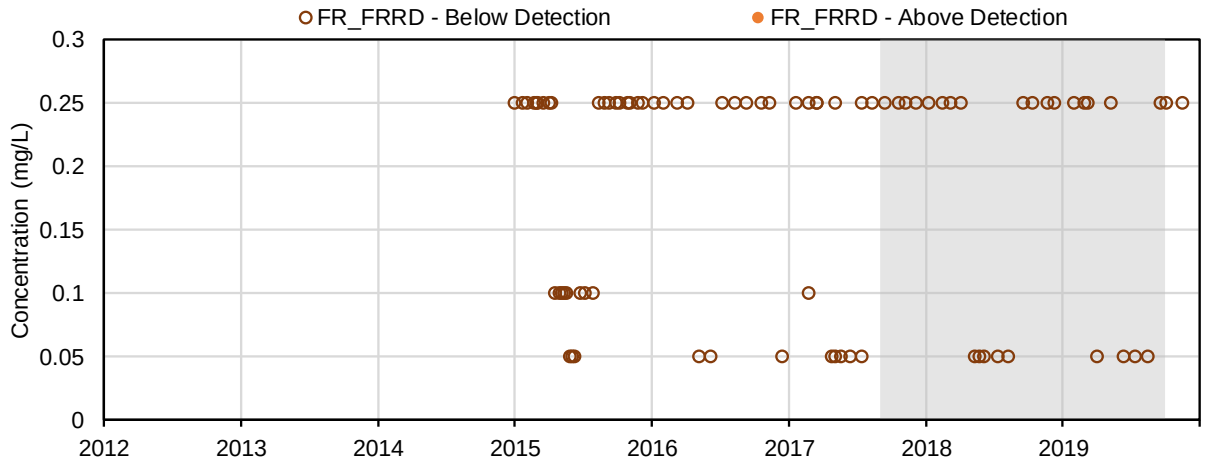
(23) Potassium (mg/L); Major Ions



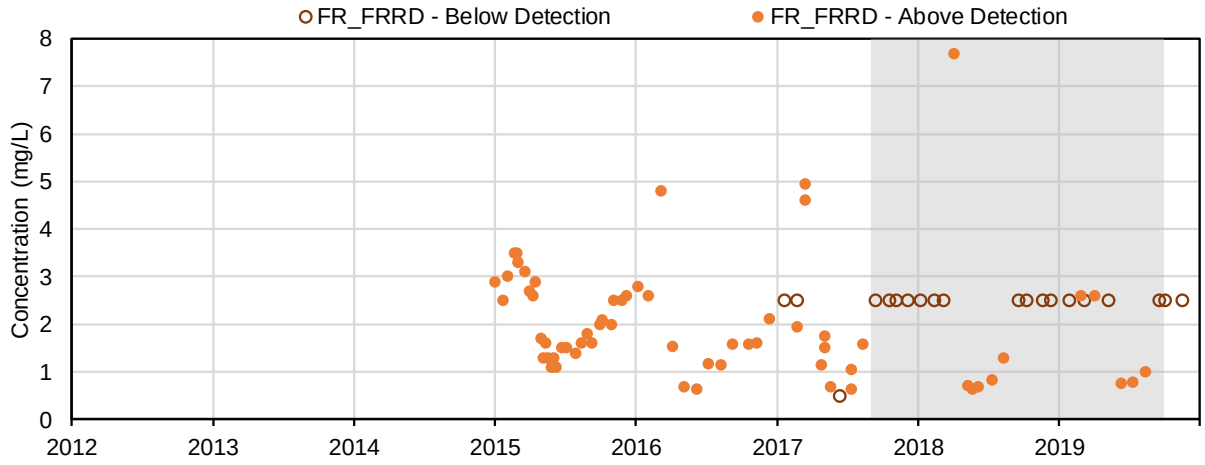
(24) Sodium (mg/L); Major Ions



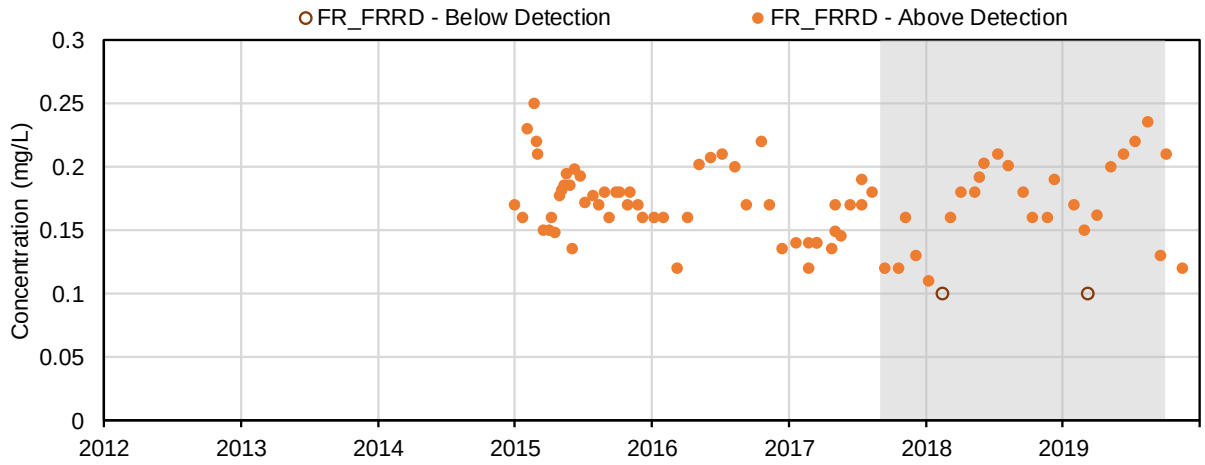
(25) Bromide (mg/L); Major Ions



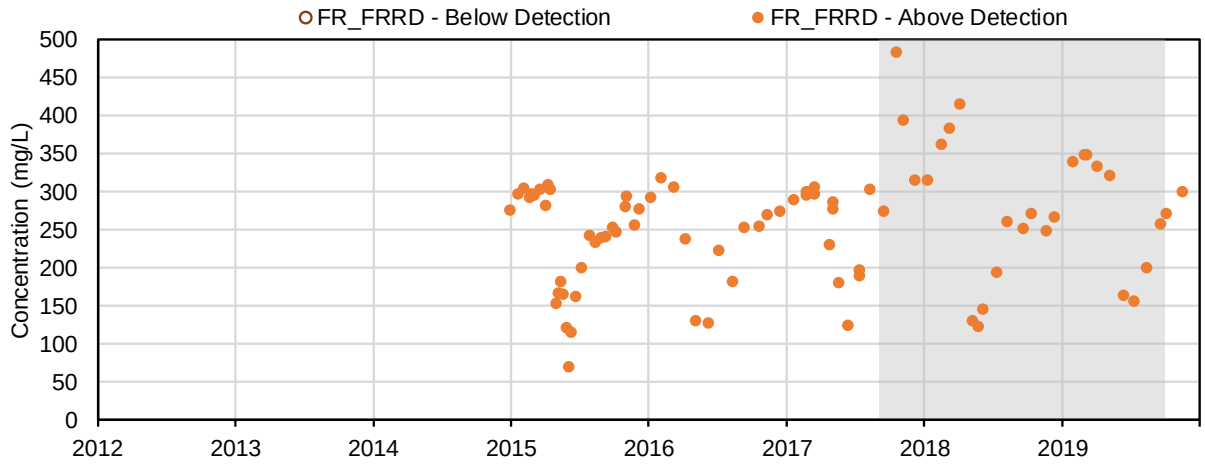
(26) Chloride (mg/L); Major Ions



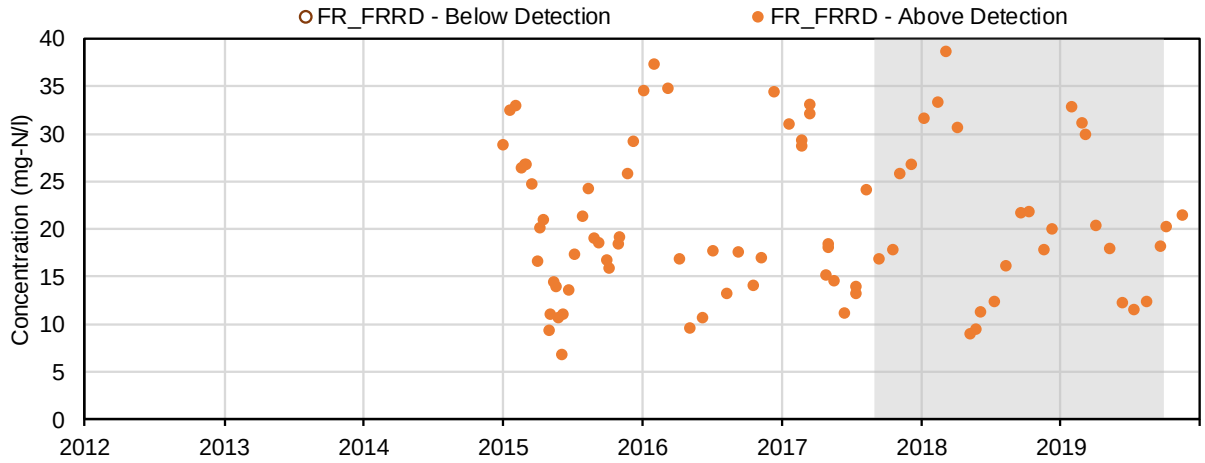
(27) Fluoride (mg/L); Major Ions



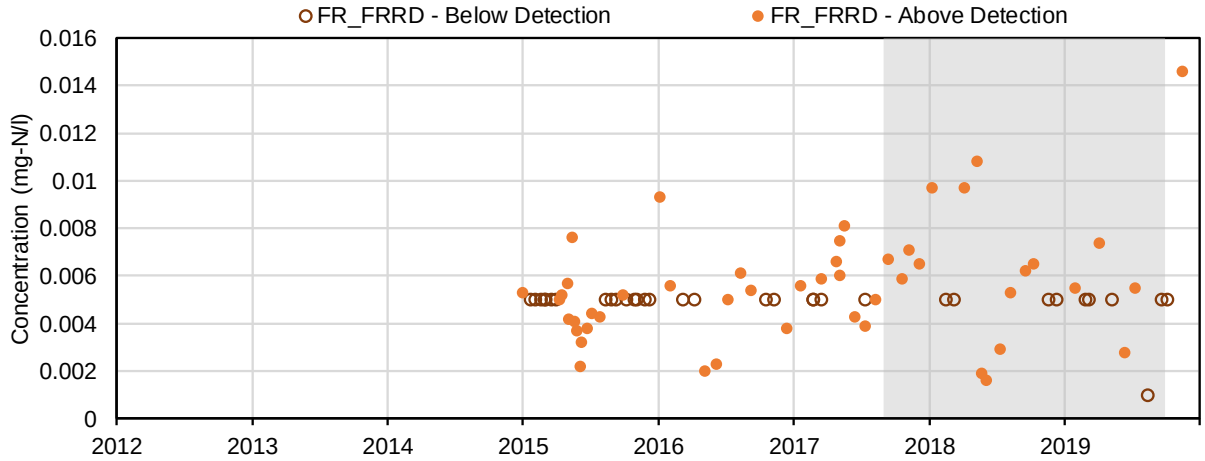
(28) Sulphate (mg/L); Major Ions



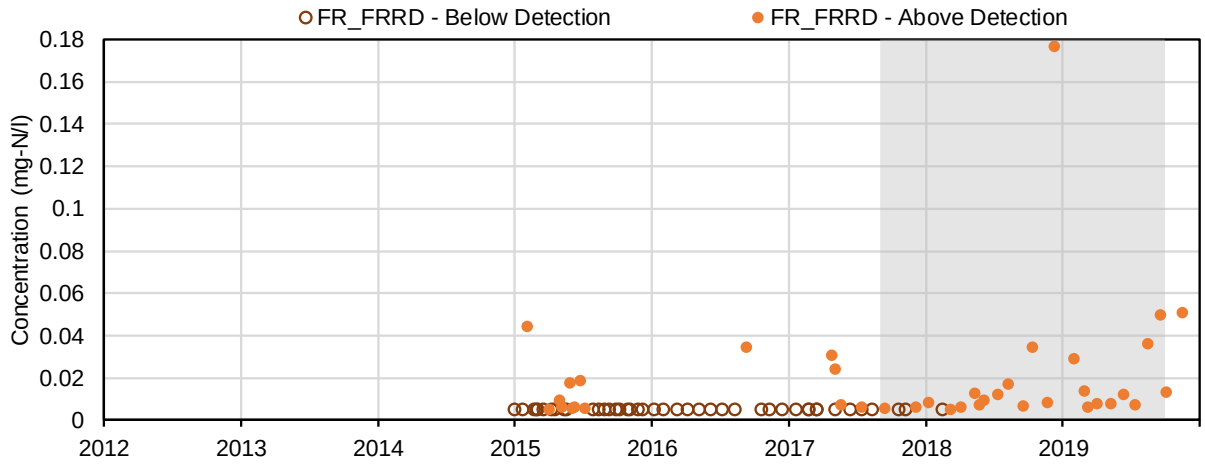
(29) Nitrate (mg-N/l); Nutrients and Biological Indicators



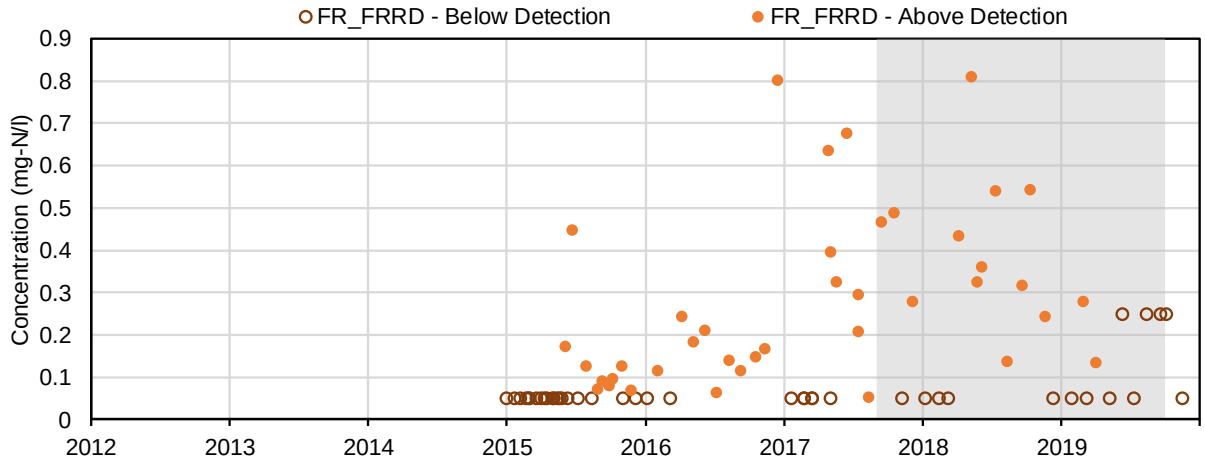
(30) Nitrite (mg-N/l); Nutrients and Biological Indicators



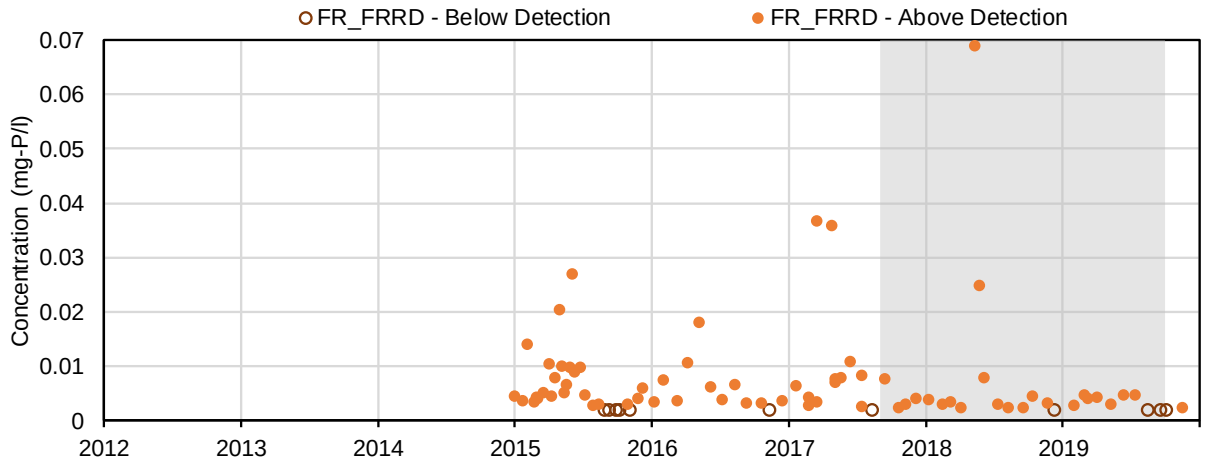
(31) Total ammonia (mg-N/l); Nutrients and Biological Indicators



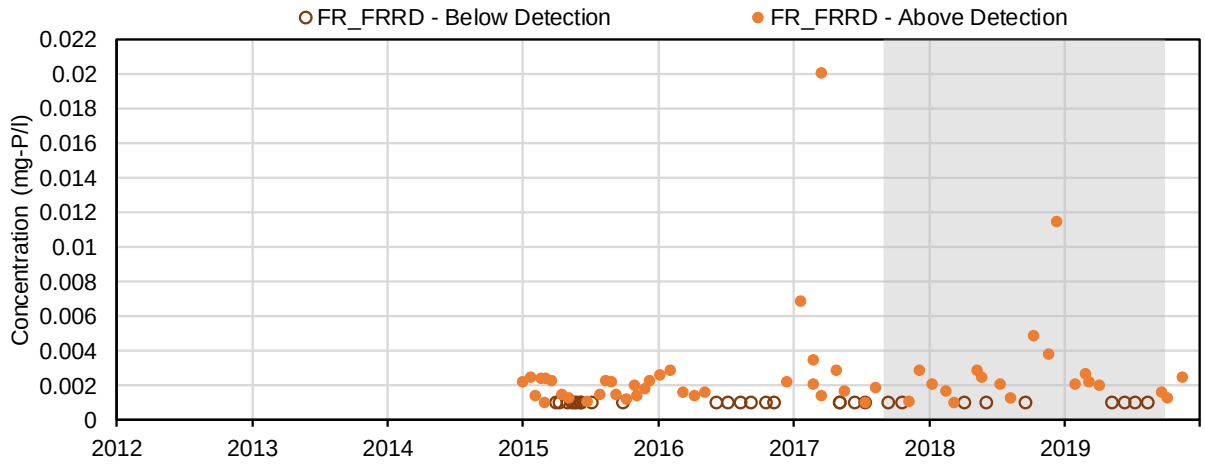
(32) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



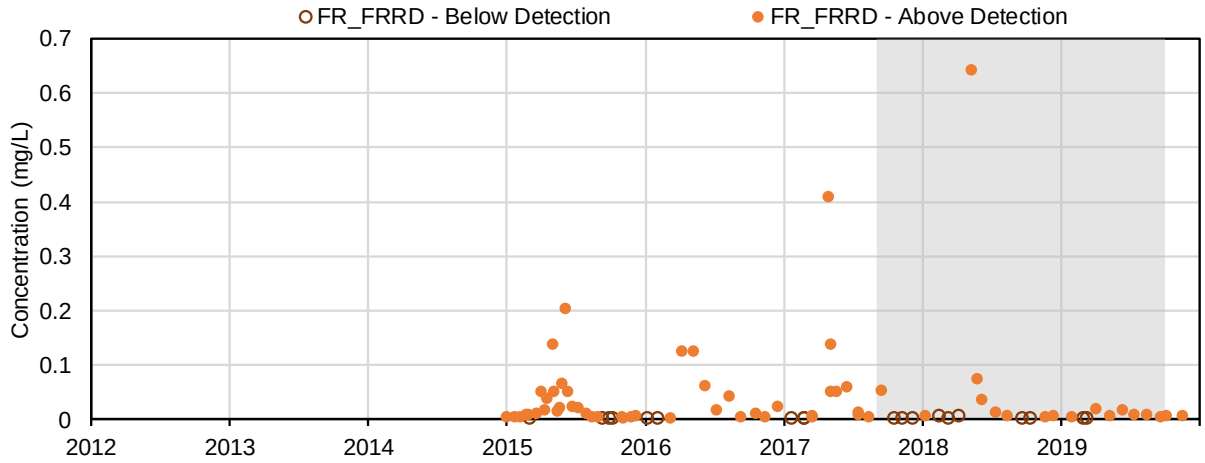
(33) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



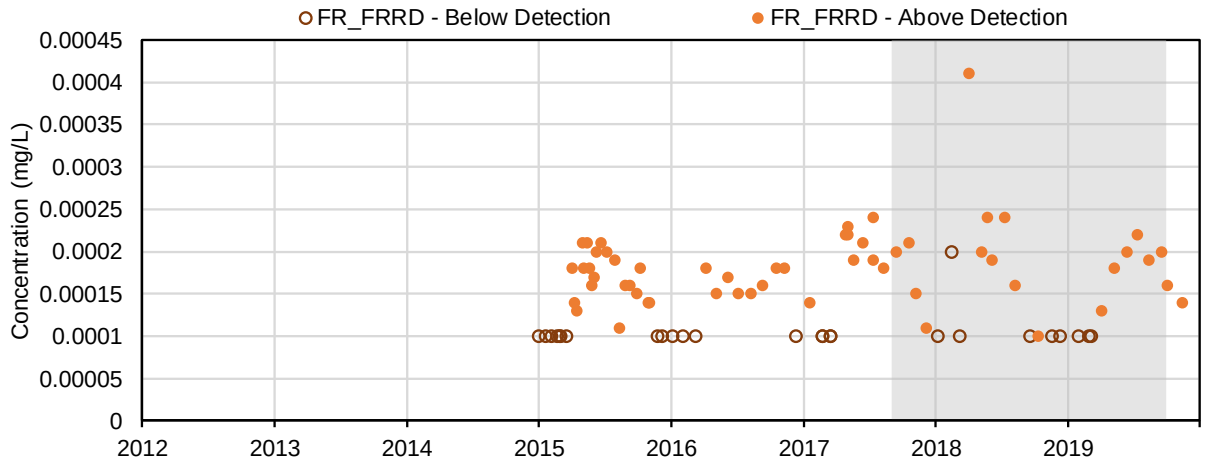
(34) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



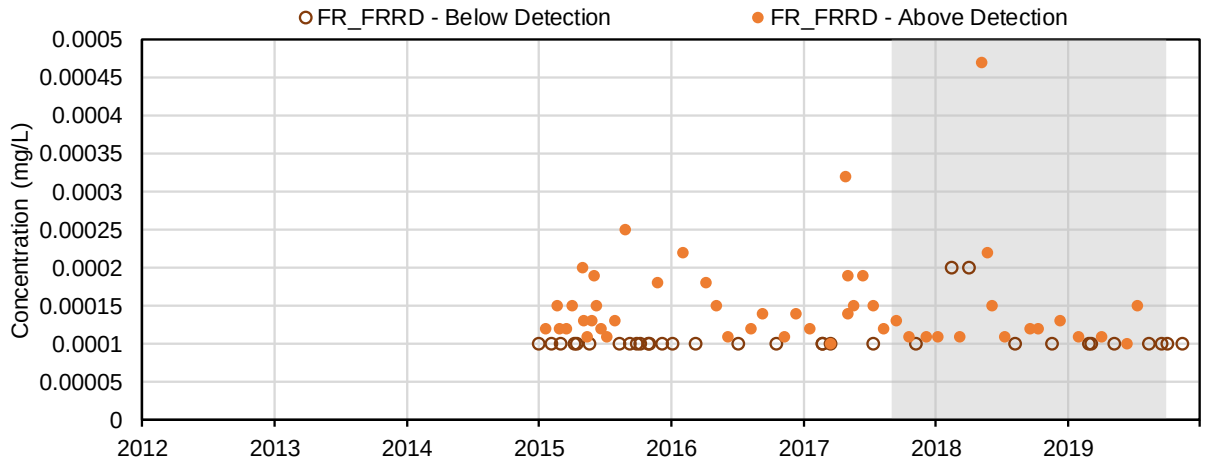
(35) Aluminum (mg/L); Total Metals



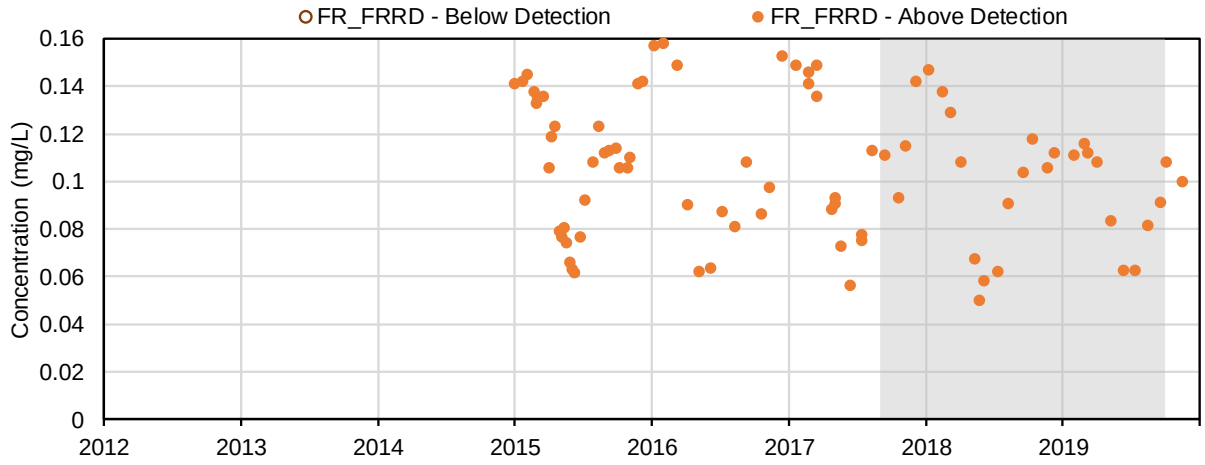
(36) Antimony (mg/L); Total Metals



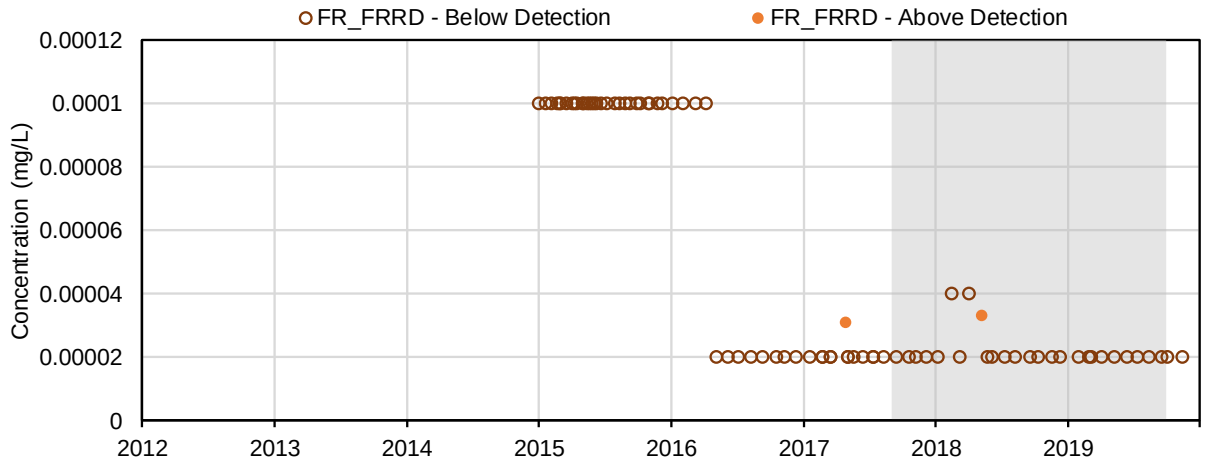
(37) Arsenic (mg/L); Total Metals



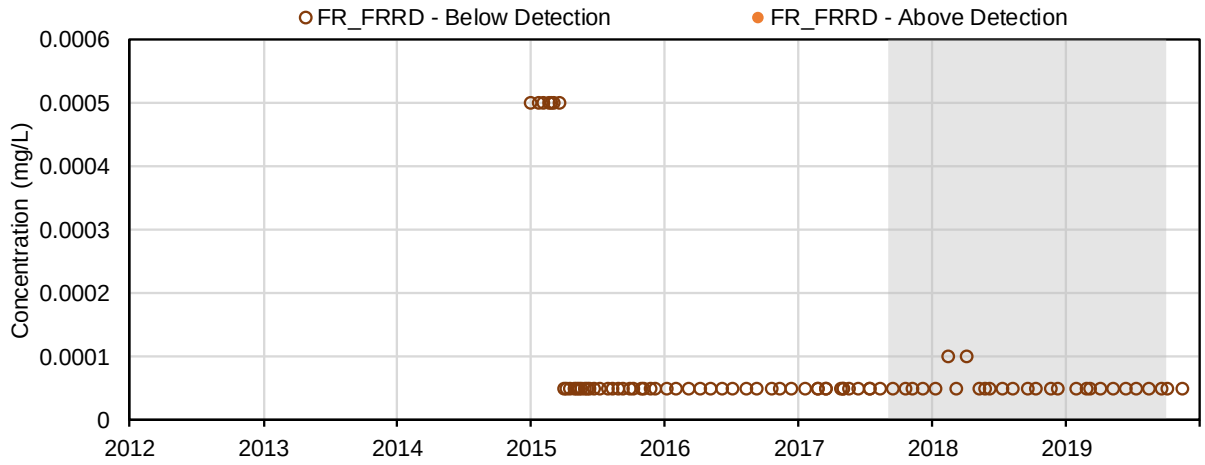
(38) Barium (mg/L); Total Metals



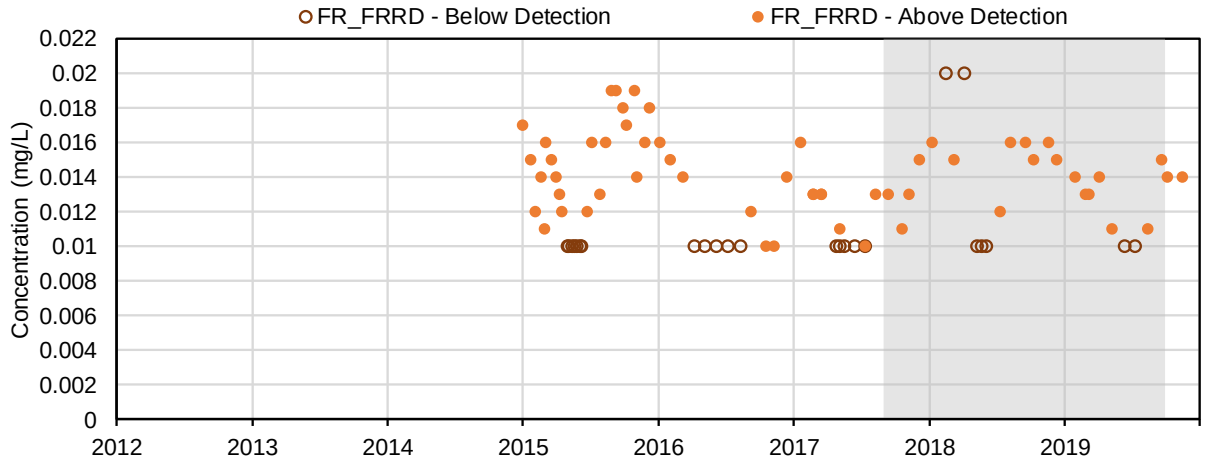
(39) Beryllium (mg/L); Total Metals



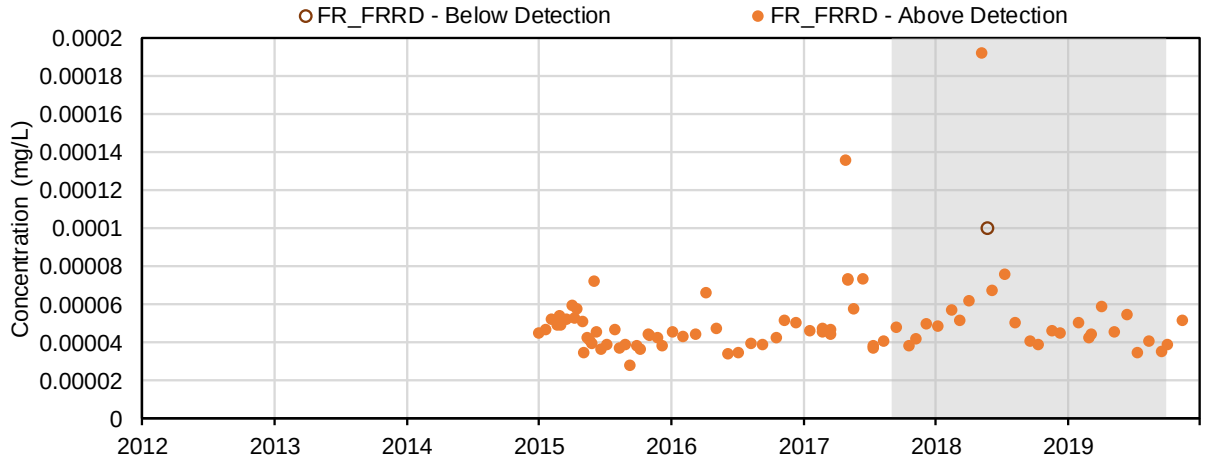
(40) Bismuth (mg/L); Total Metals



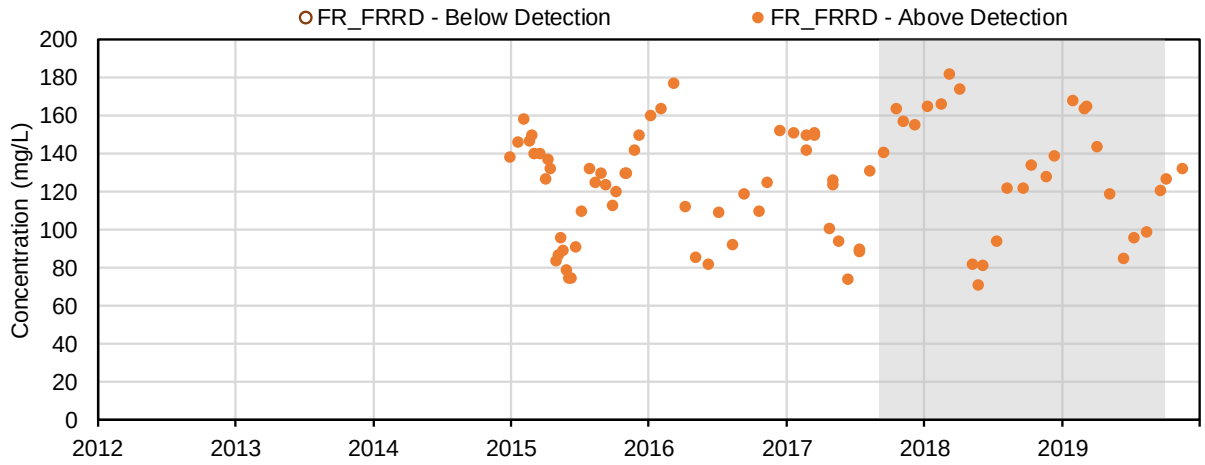
(41) Boron (mg/L); Total Metals



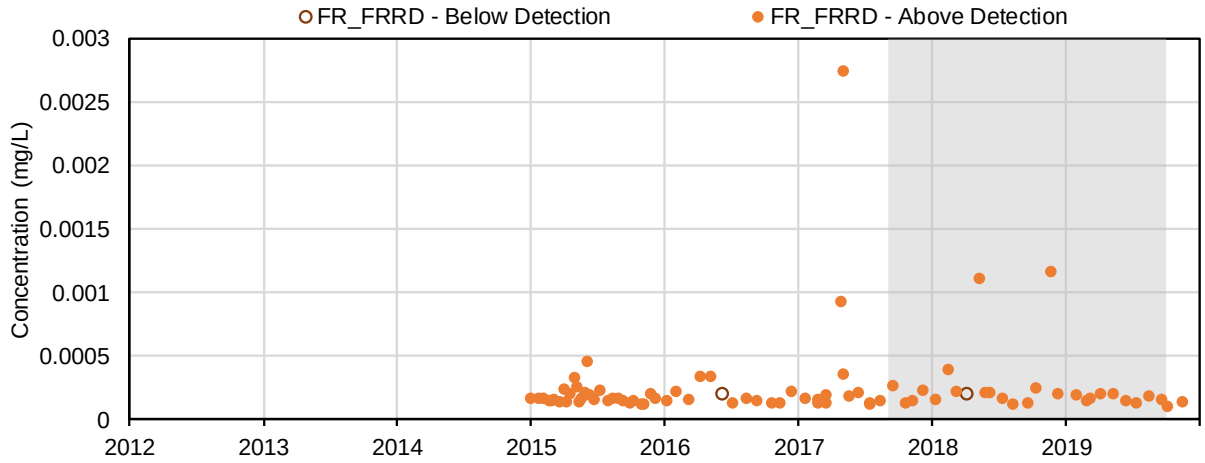
(42) Cadmium (mg/L); Total Metals



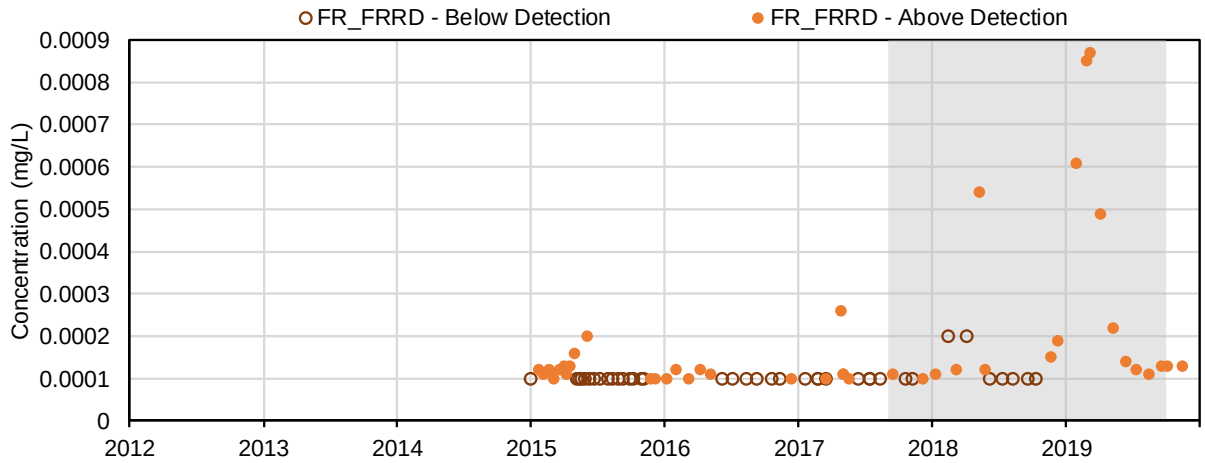
(43) Calcium (mg/L); Total Metals



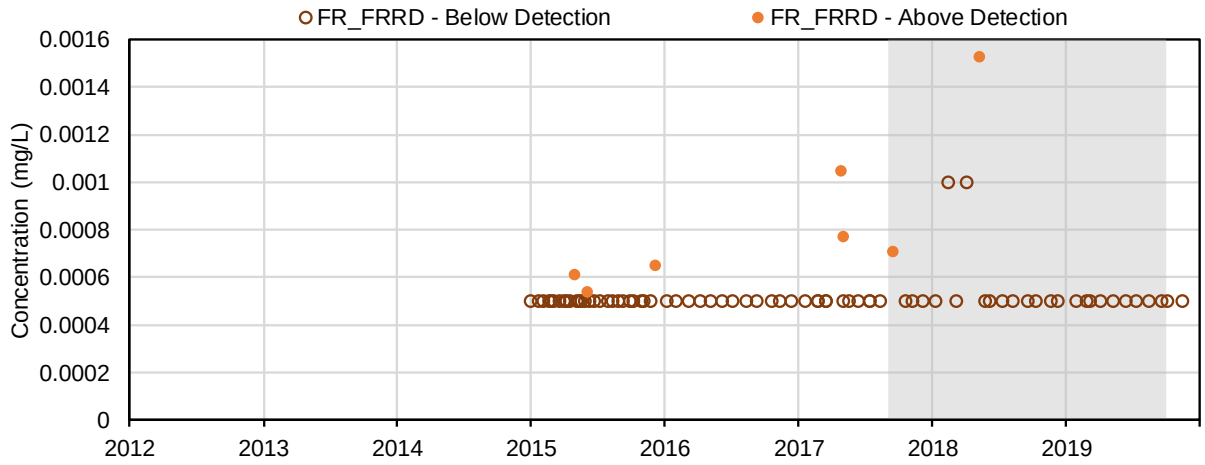
(44) Chromium (mg/L); Total Metals



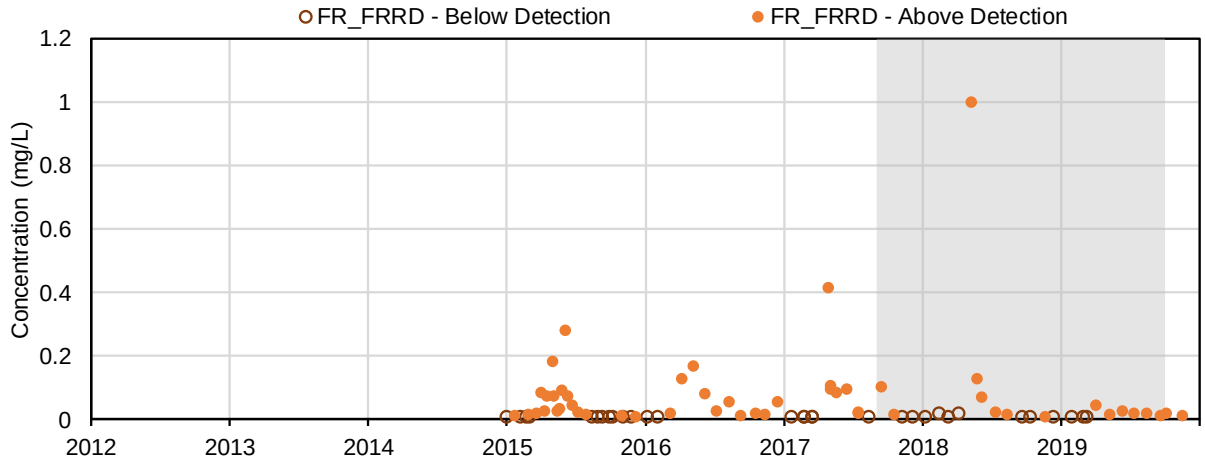
(45) Cobalt (mg/L); Total Metals



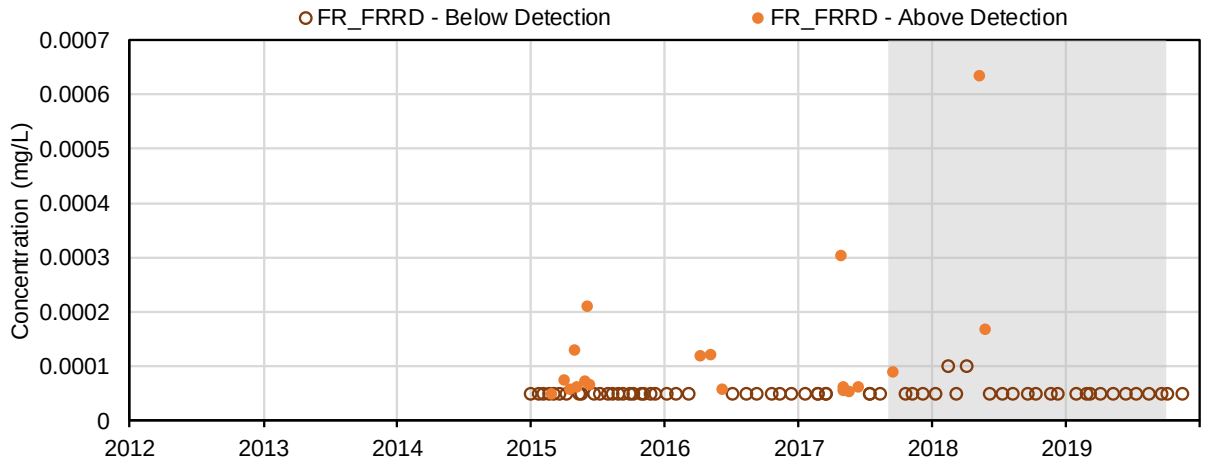
(46) Copper (mg/L); Total Metals



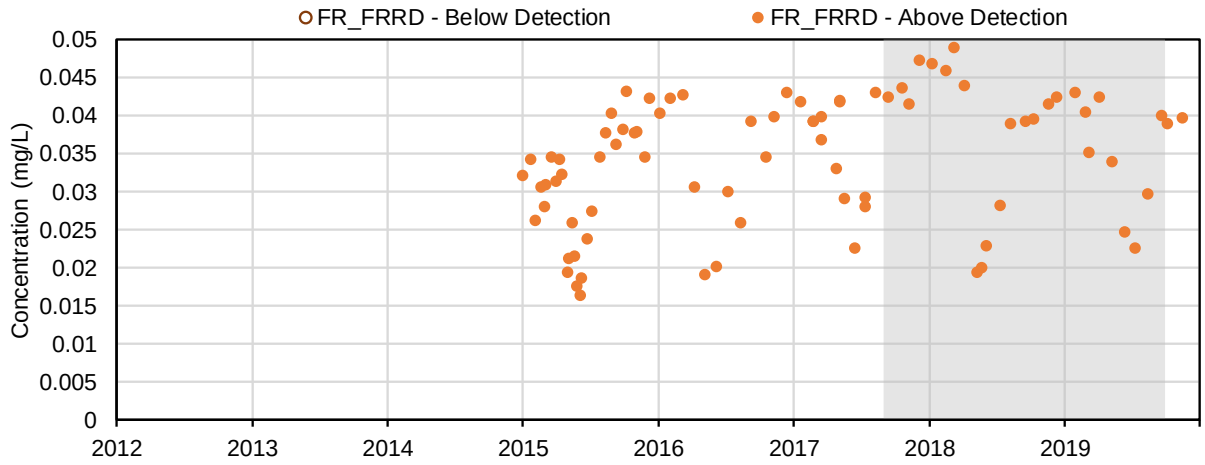
(47) Iron (mg/L); Total Metals



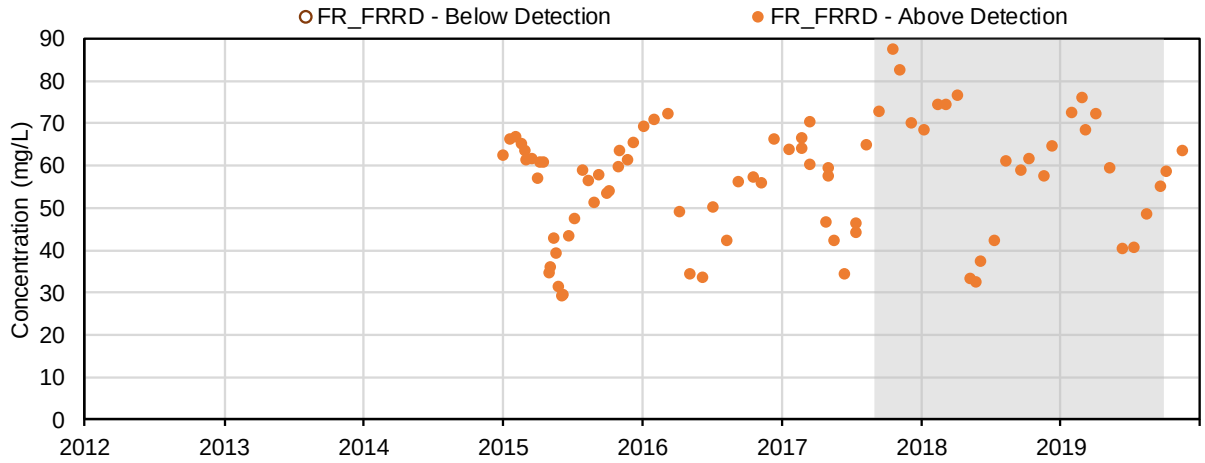
(48) Lead (mg/L); Total Metals



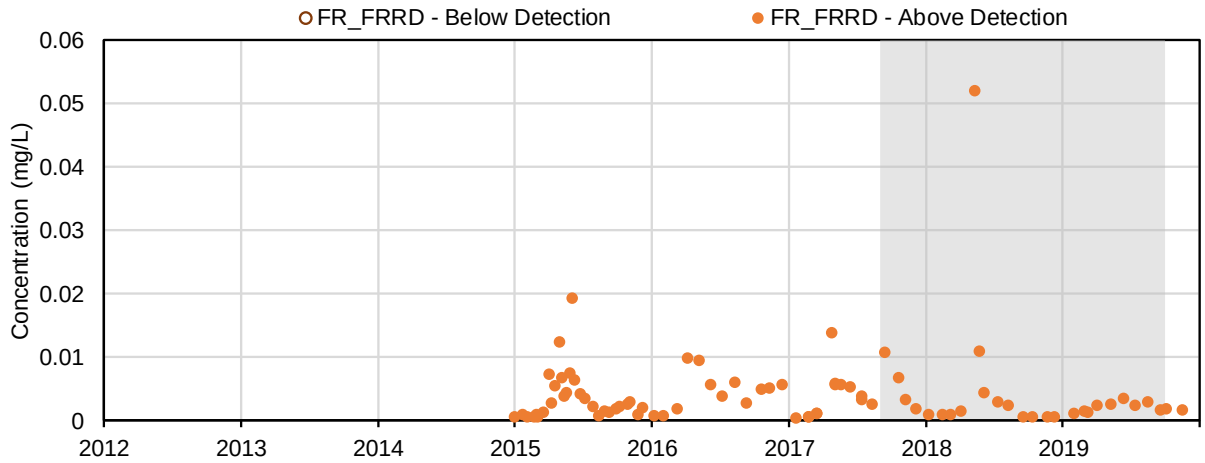
(49) Lithium (mg/L); Total Metals



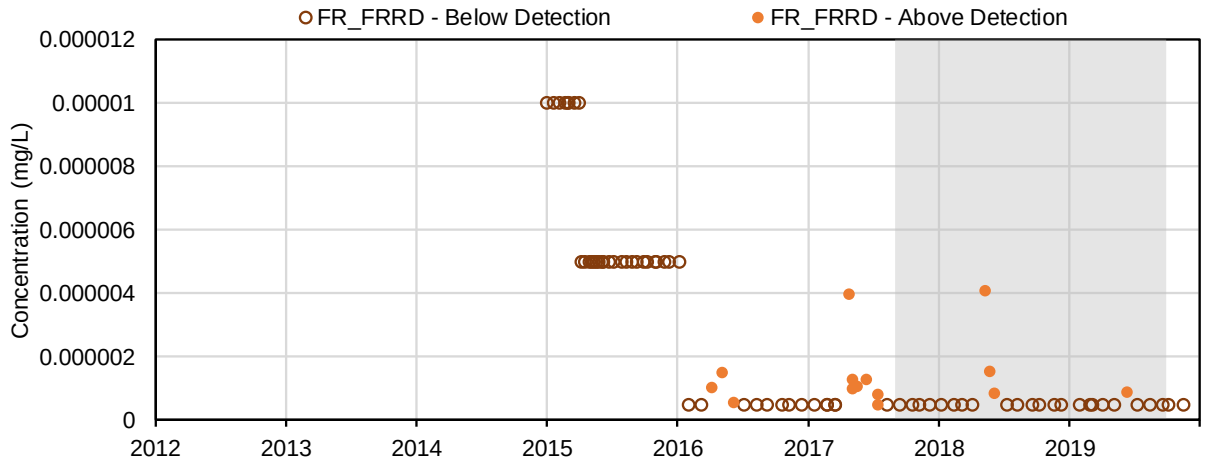
(50) Magnesium (mg/L); Total Metals



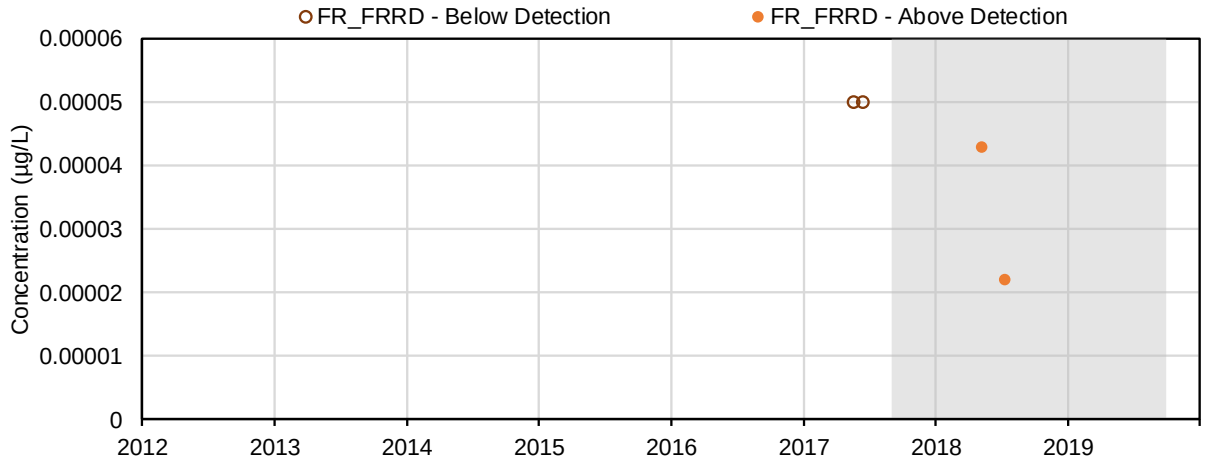
(51) Manganese (mg/L); Total Metals



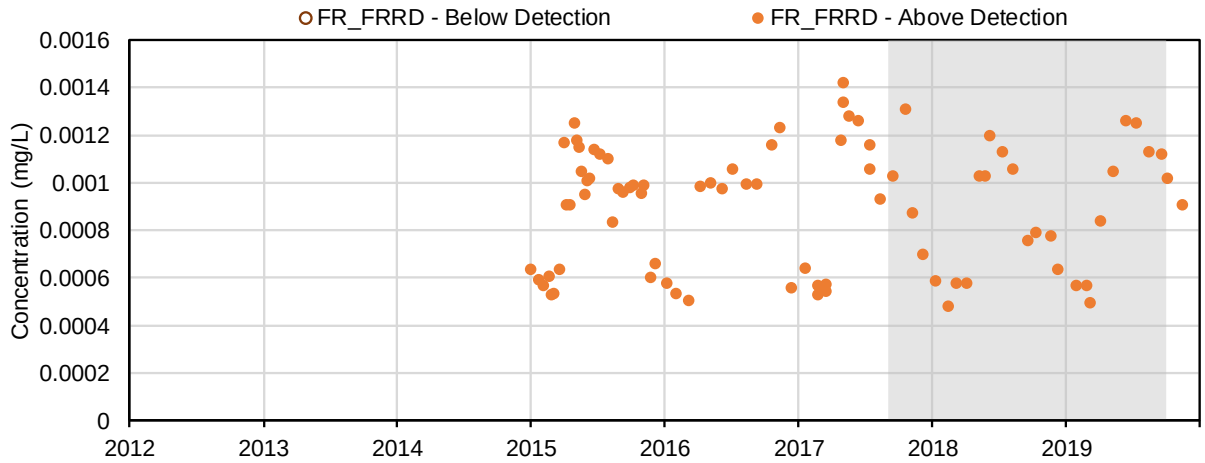
(52) Mercury (mg/L); Total Metals



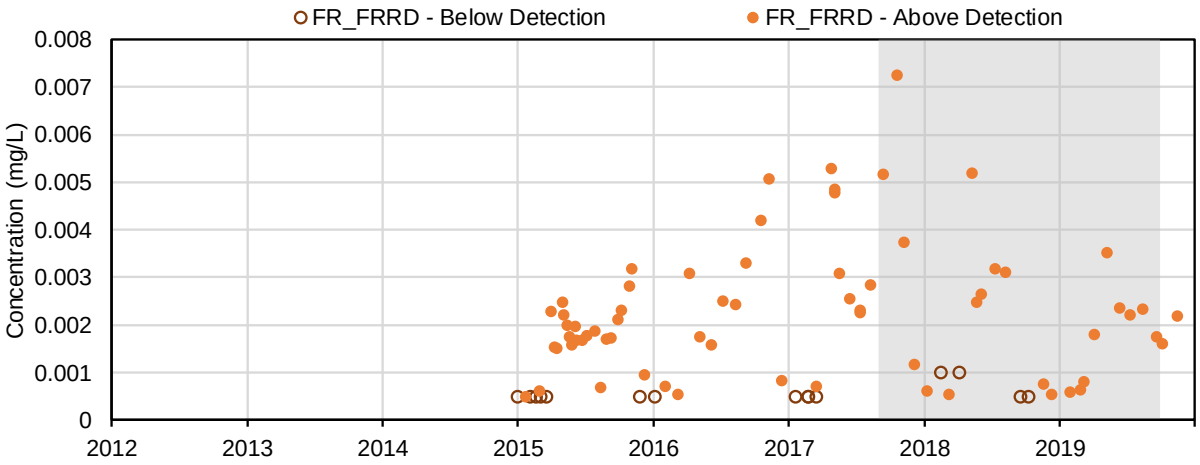
(53) Methyl mercury (µg/L); Total Metals



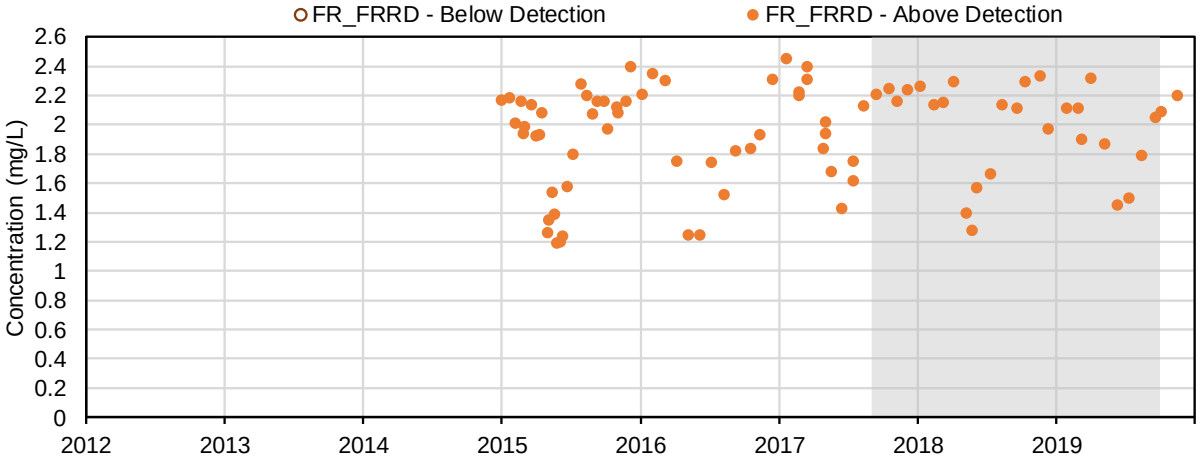
(54) Molybdenum (mg/L); Total Metals



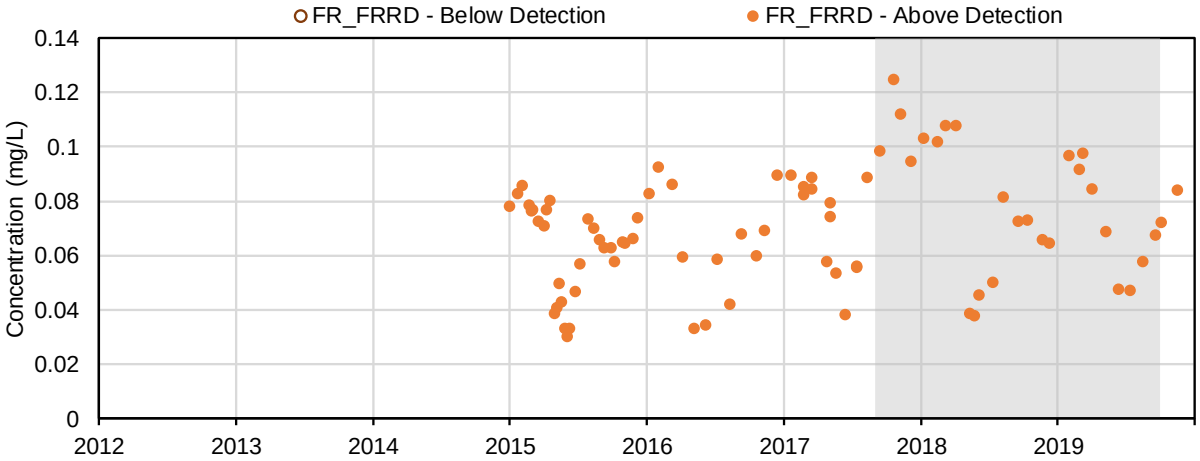
(55) Nickel (mg/L); Total Metals



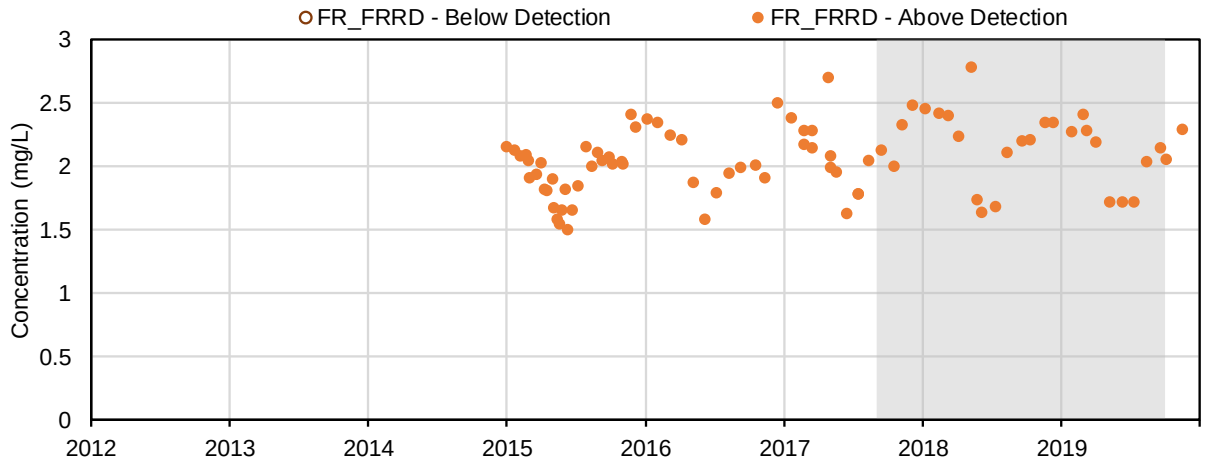
(56) Potassium (mg/L); Total Metals



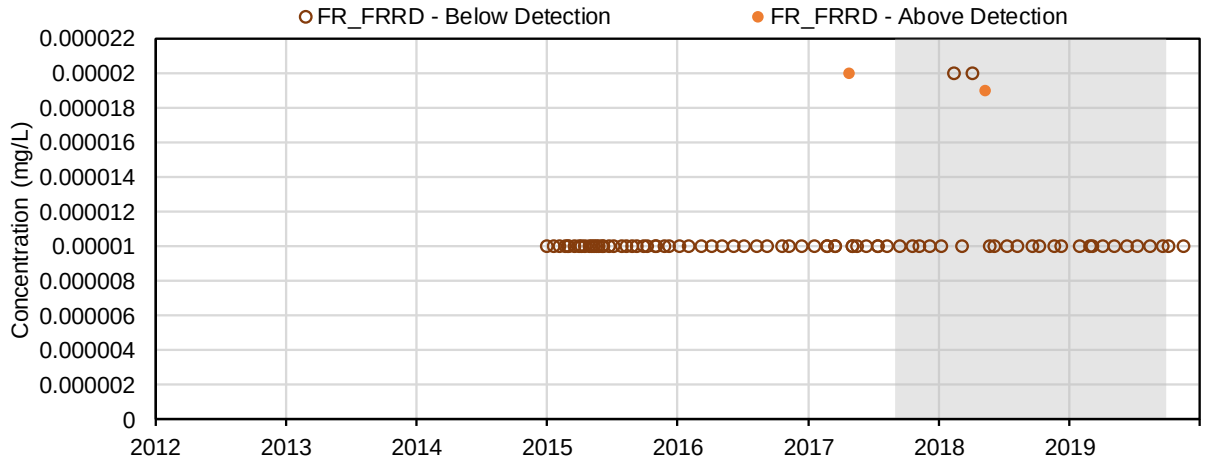
(57) Selenium (mg/L); Total Metals



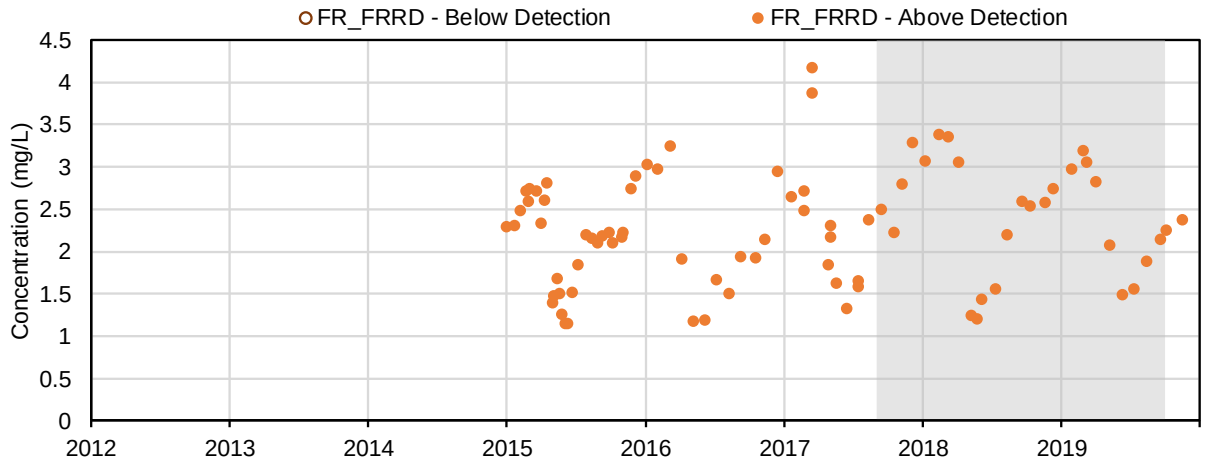
(58) Silicon (mg/L); Total Metals



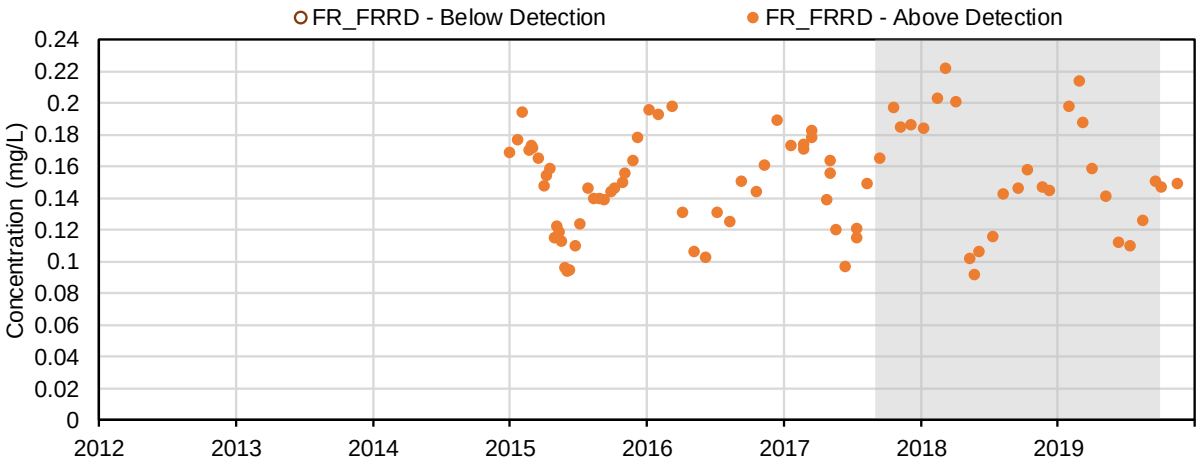
(59) Silver (mg/L); Total Metals



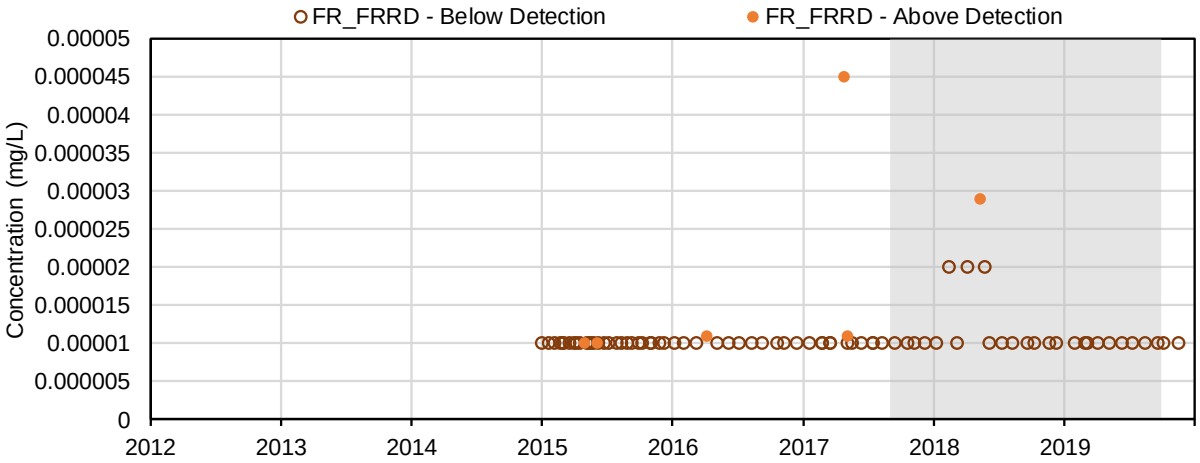
(60) Sodium (mg/L); Total Metals



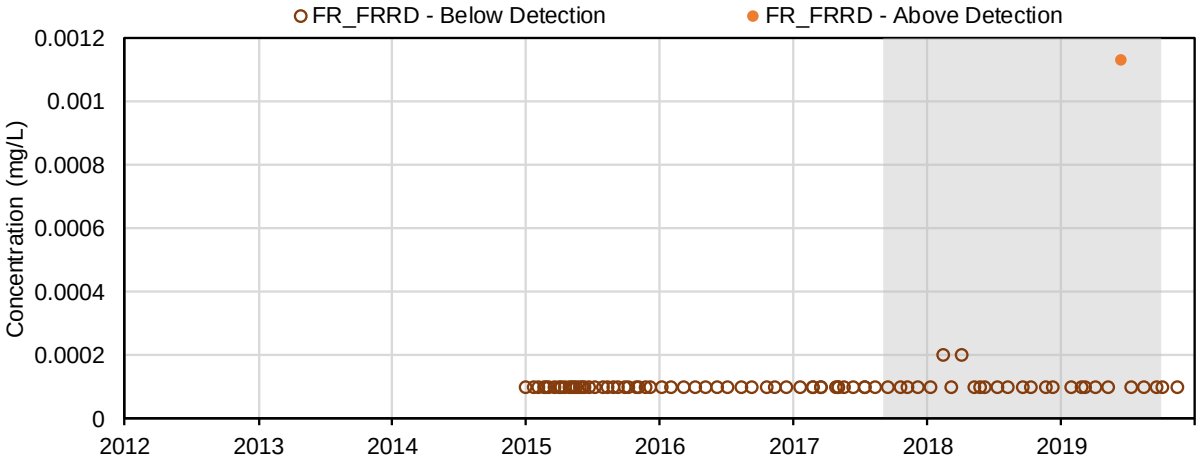
(61) Strontium (mg/L); Total Metals



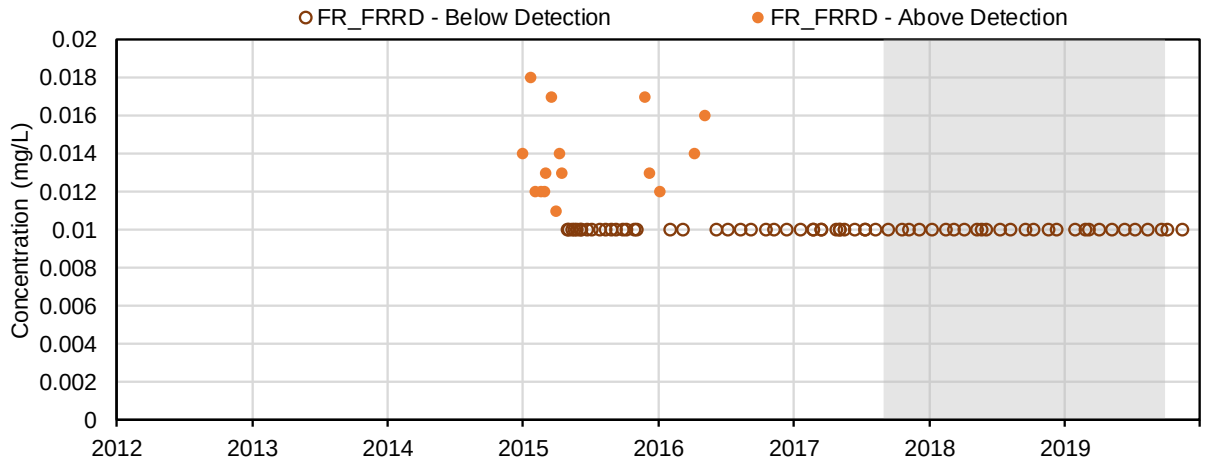
(62) Thallium (mg/L); Total Metals



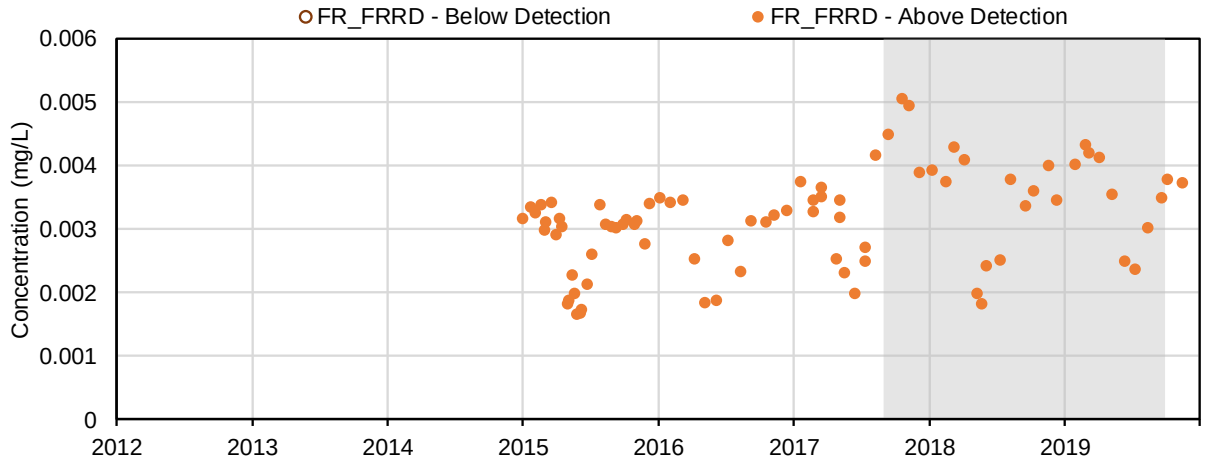
(63) Tin (mg/L); Total Metals



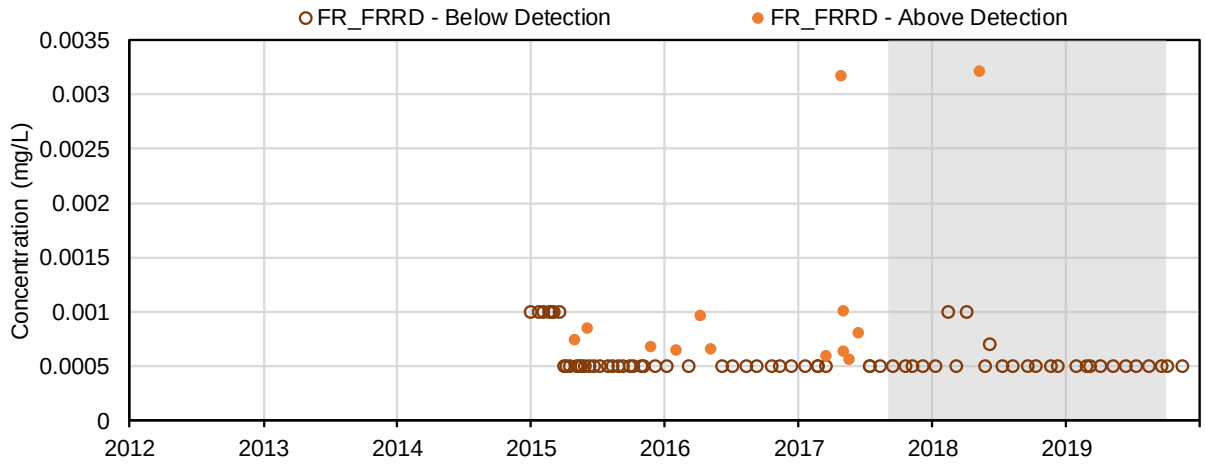
(64) Titanium (mg/L); Total Metals



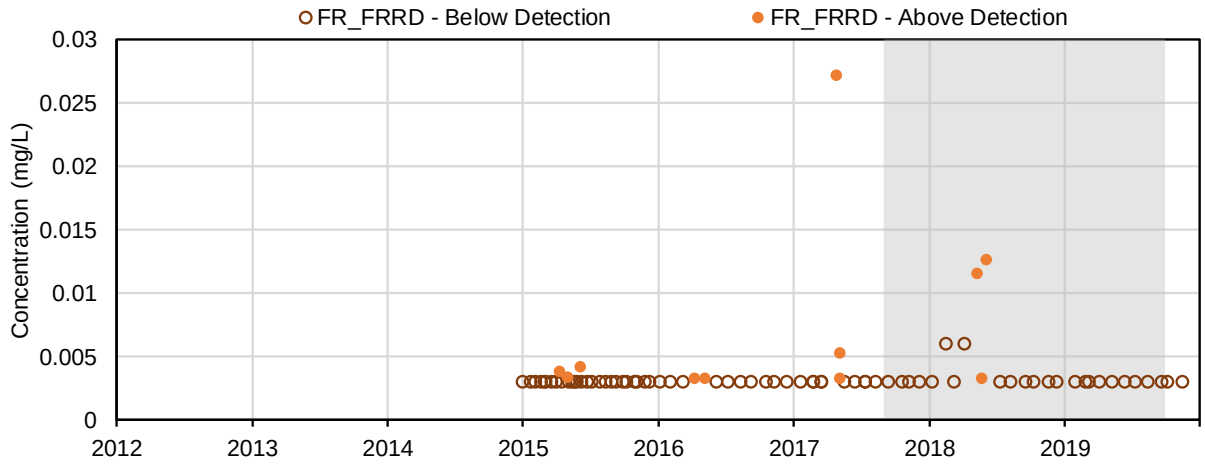
(65) Uranium (mg/L); Total Metals



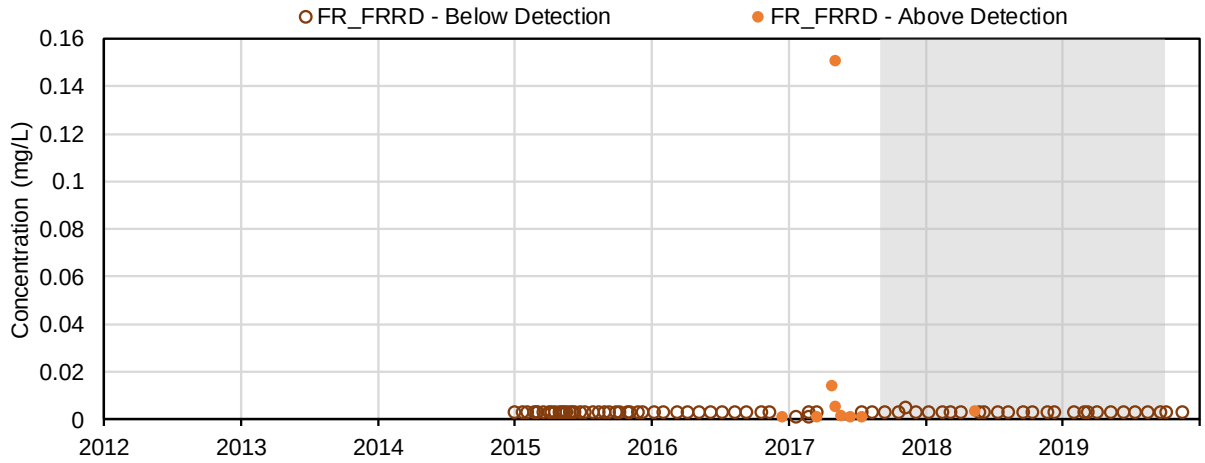
(66) Vanadium (mg/L); Total Metals



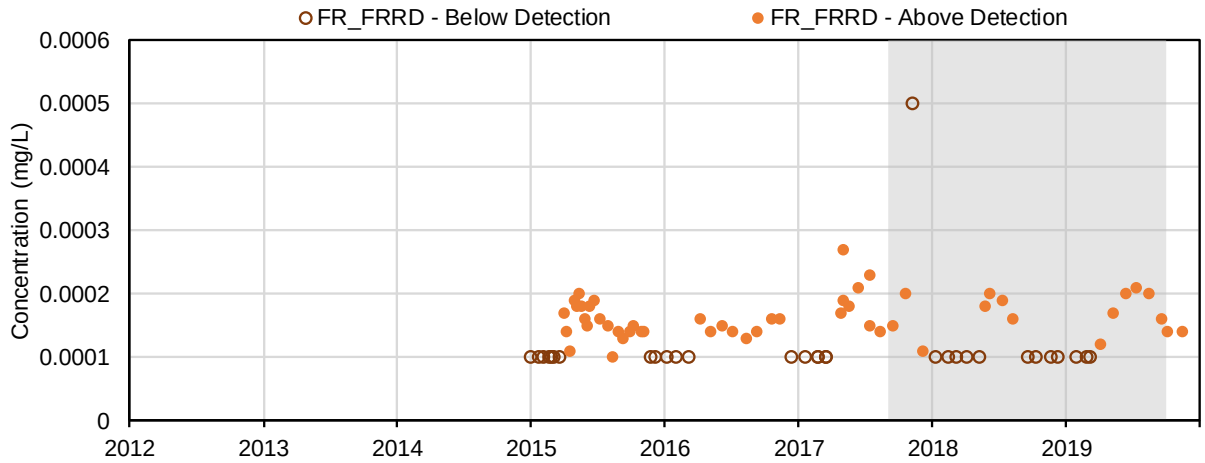
(67) Zinc (mg/L); Total Metals



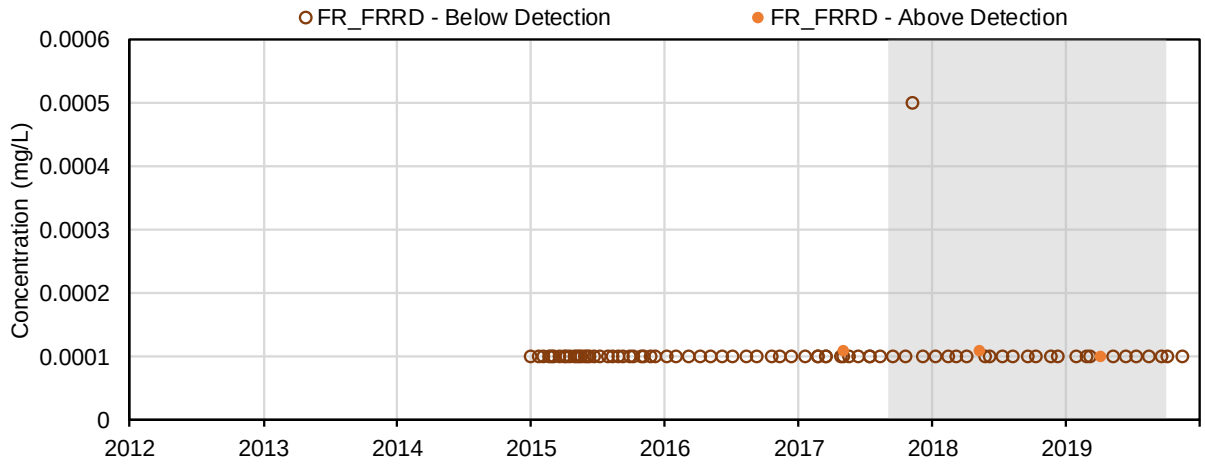
(68) Aluminum (mg/L); Dissolved Metals



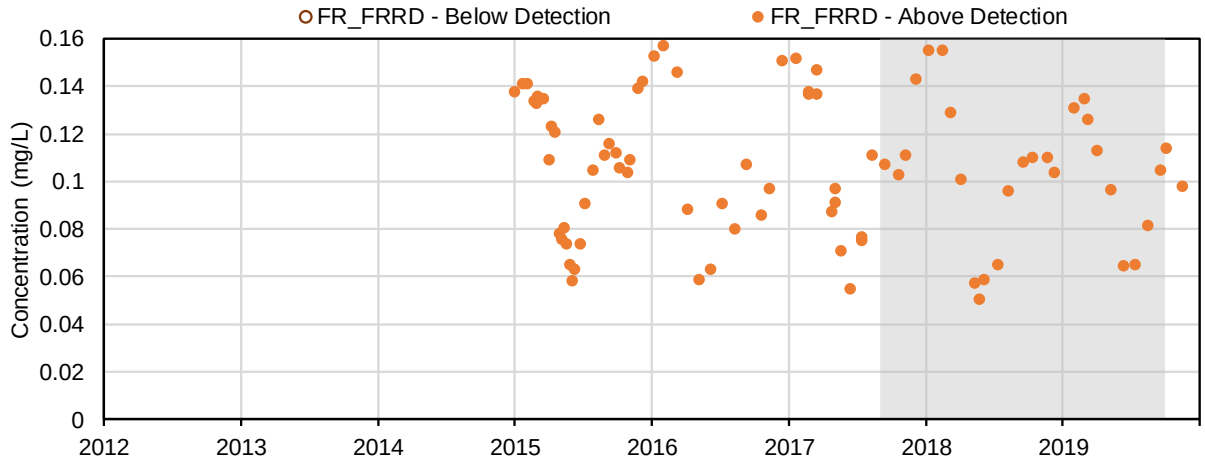
(69) Antimony (mg/L); Dissolved Metals



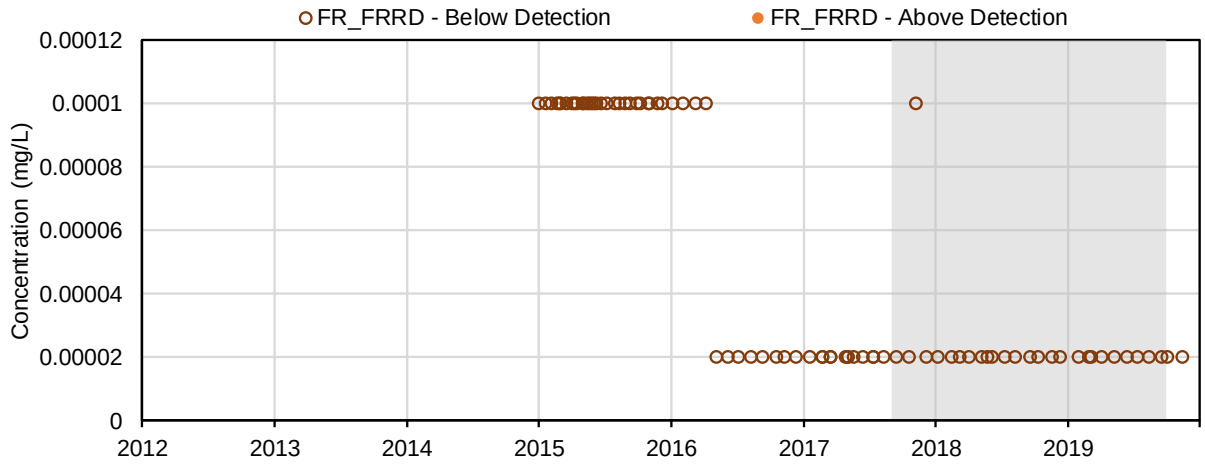
(70) Arsenic (mg/L); Dissolved Metals



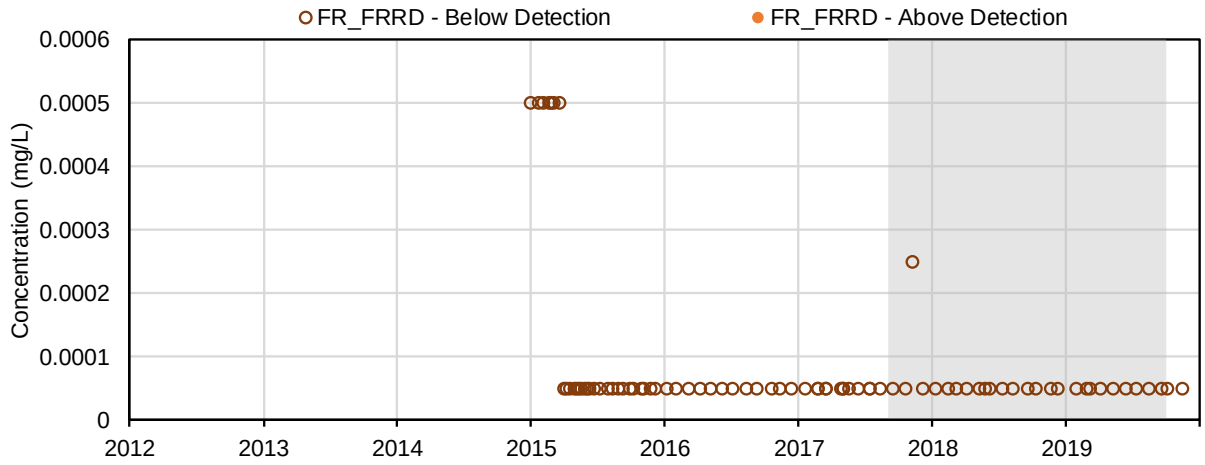
(71) Barium (mg/L); Dissolved Metals



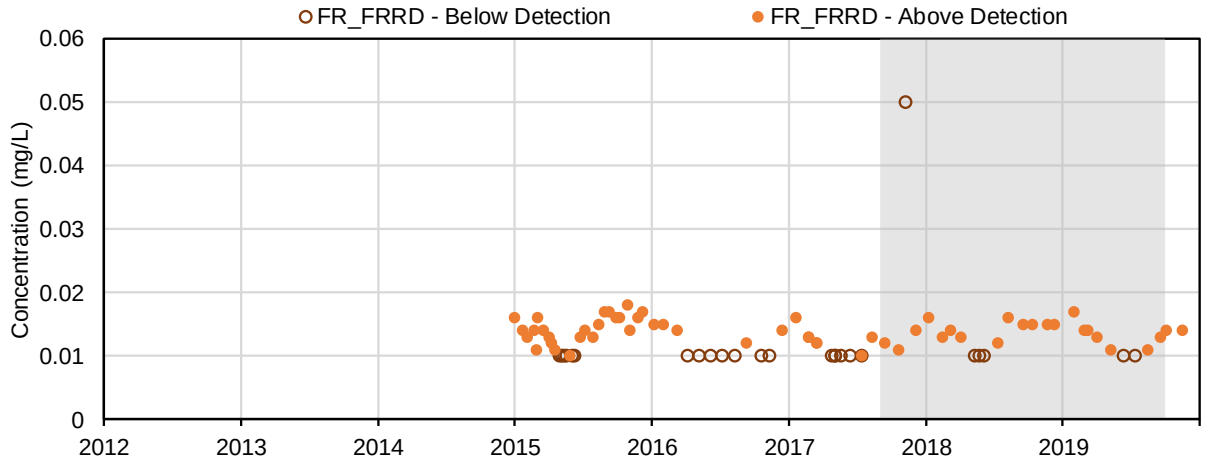
(72) Beryllium (mg/L); Dissolved Metals



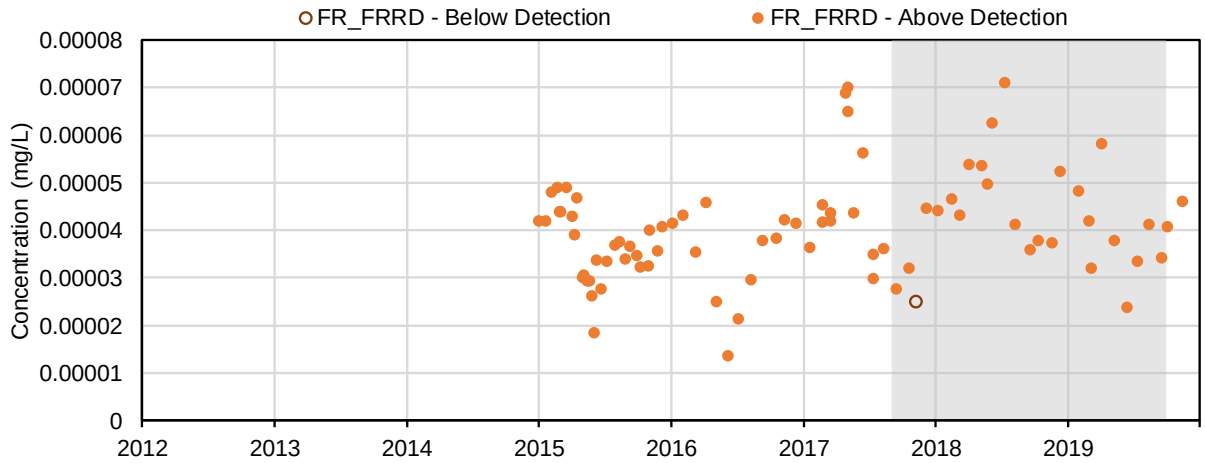
(73) Bismuth (mg/L); Dissolved Metals



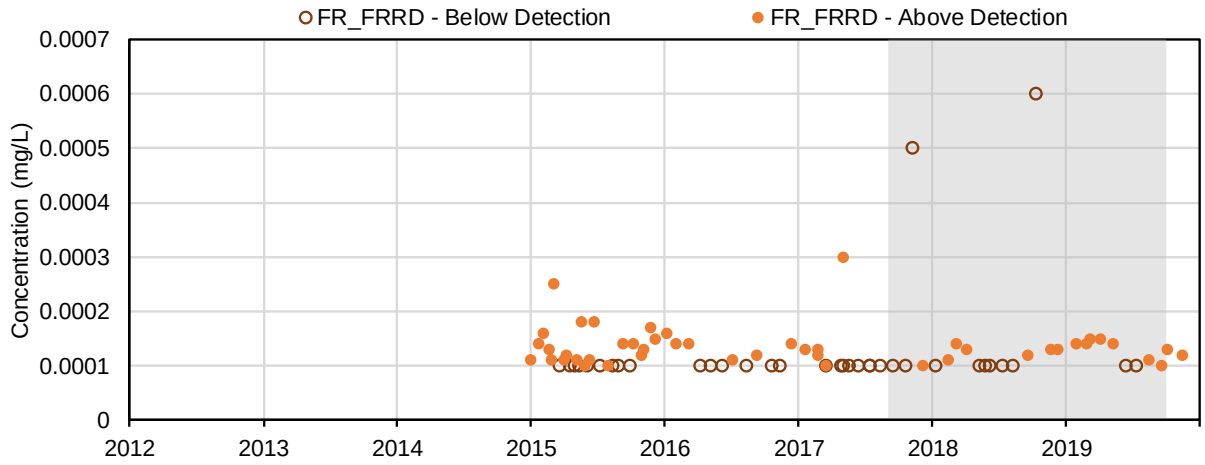
(74) Boron (mg/L); Dissolved Metals



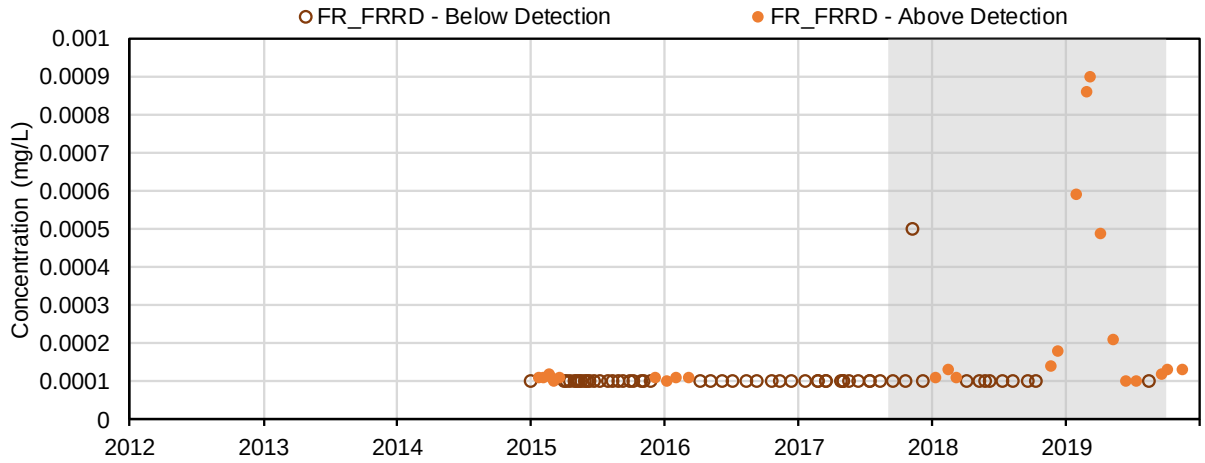
(75) Cadmium (mg/L); Dissolved Metals



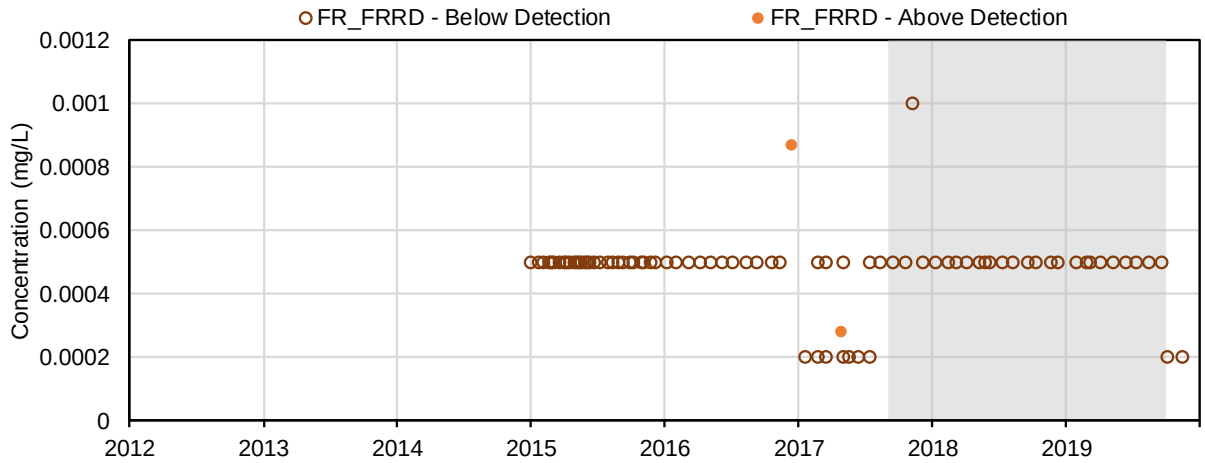
(76) Chromium (mg/L); Dissolved Metals



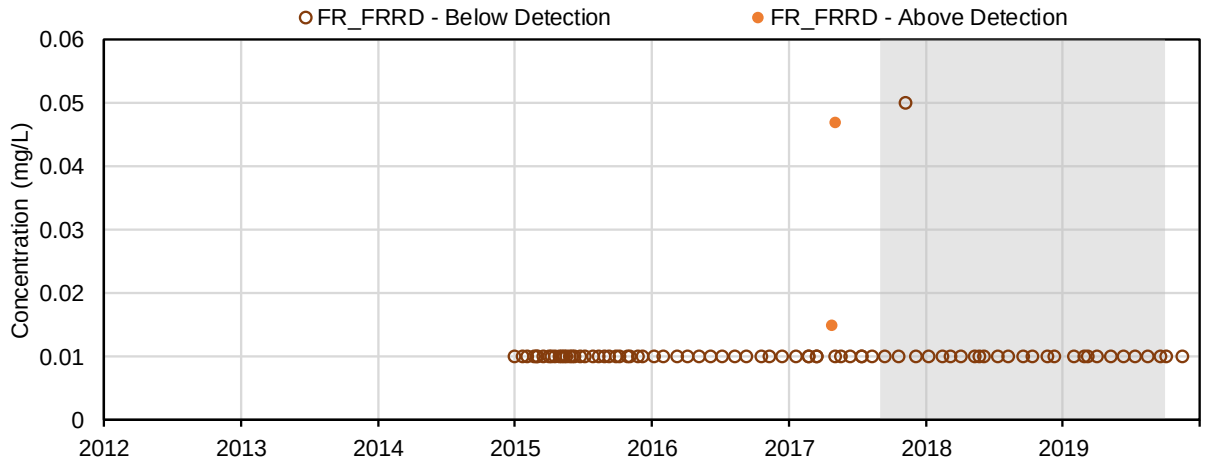
(77) Cobalt (mg/L); Dissolved Metals



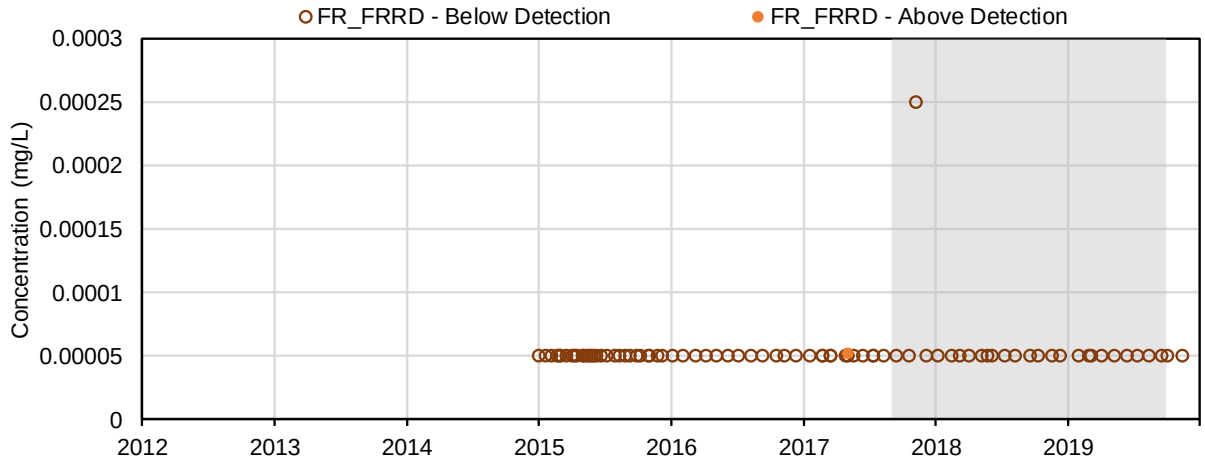
(78) Copper (mg/L); Dissolved Metals



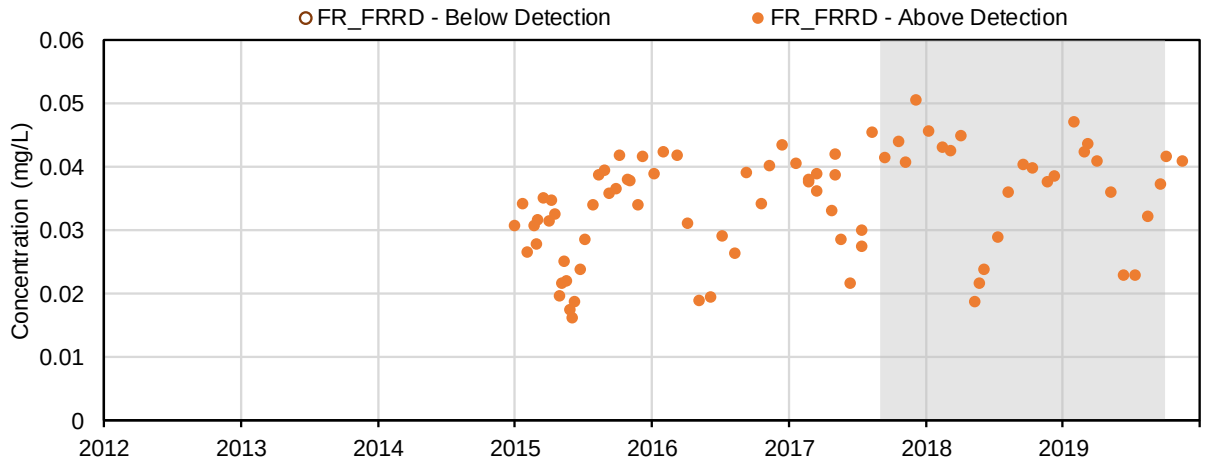
(79) Iron (mg/L); Dissolved Metals



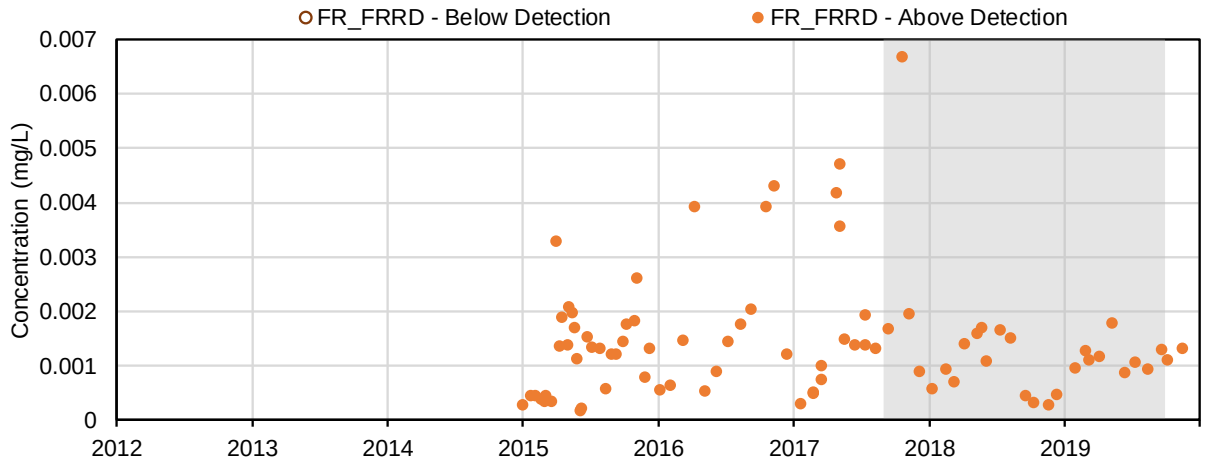
(80) Lead (mg/L); Dissolved Metals



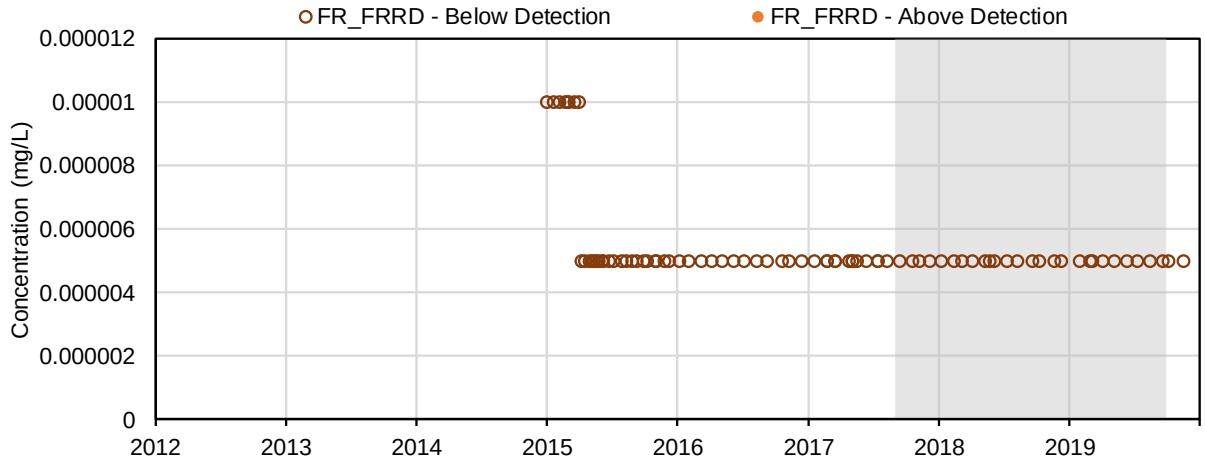
(81) Lithium (mg/L); Dissolved Metals



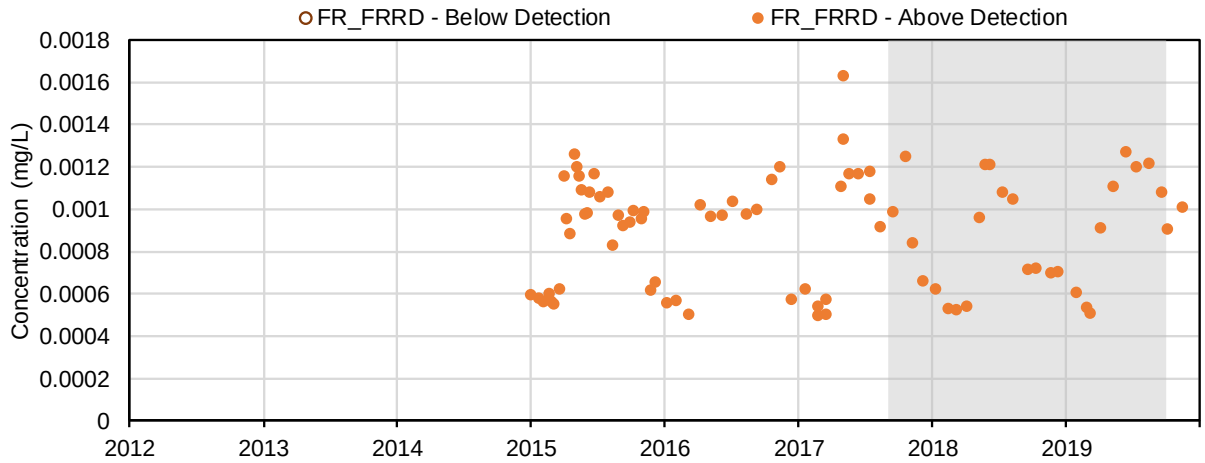
(82) Manganese (mg/L); Dissolved Metals



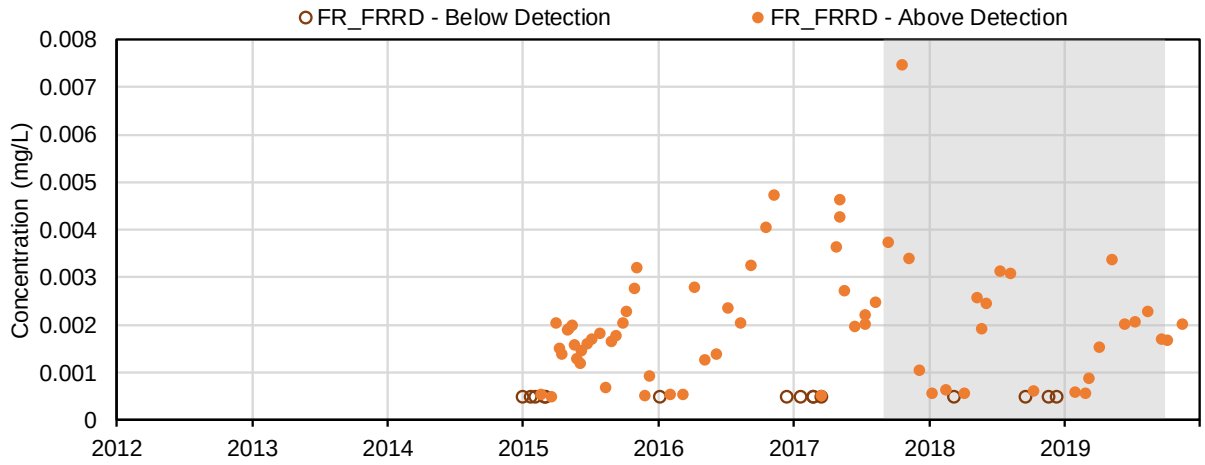
(83) Mercury (mg/L); Dissolved Metals



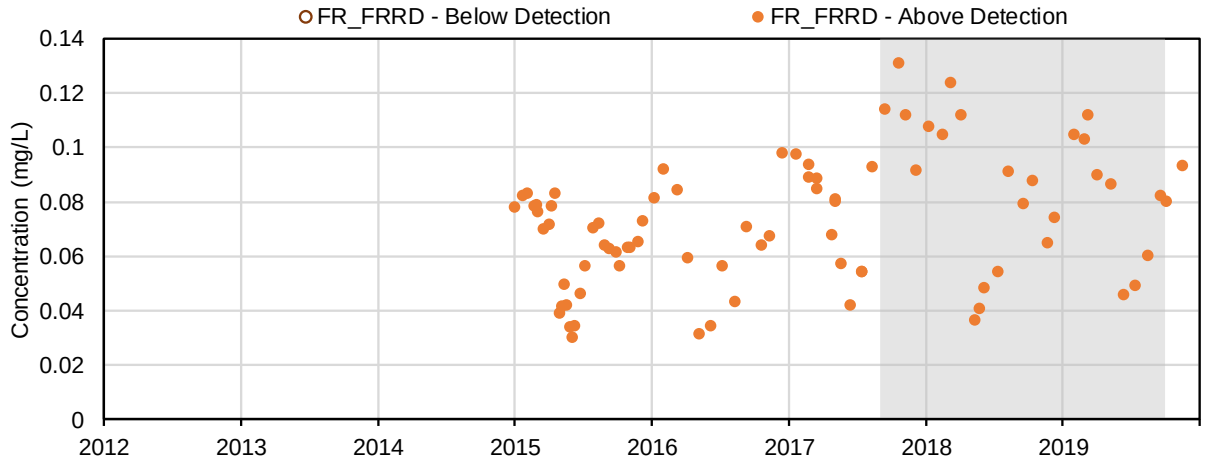
(84) Molybdenum (mg/L); Dissolved Metals



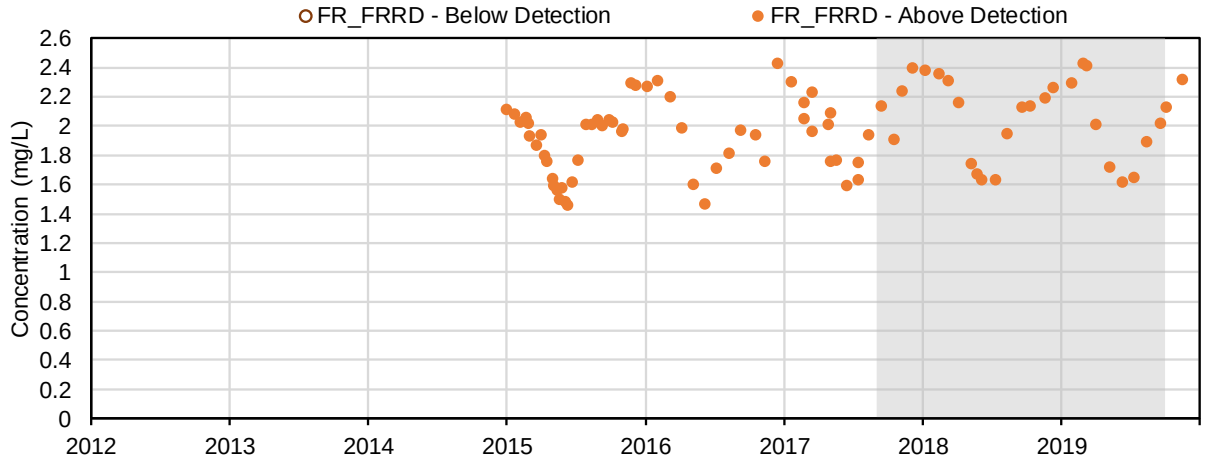
(85) Nickel (mg/L); Dissolved Metals



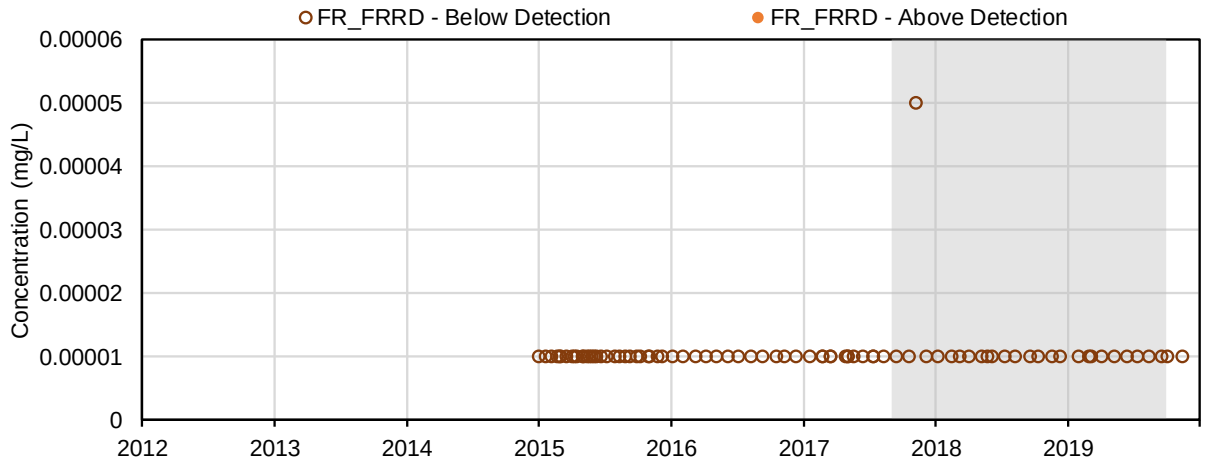
(86) Selenium (mg/L); Dissolved Metals



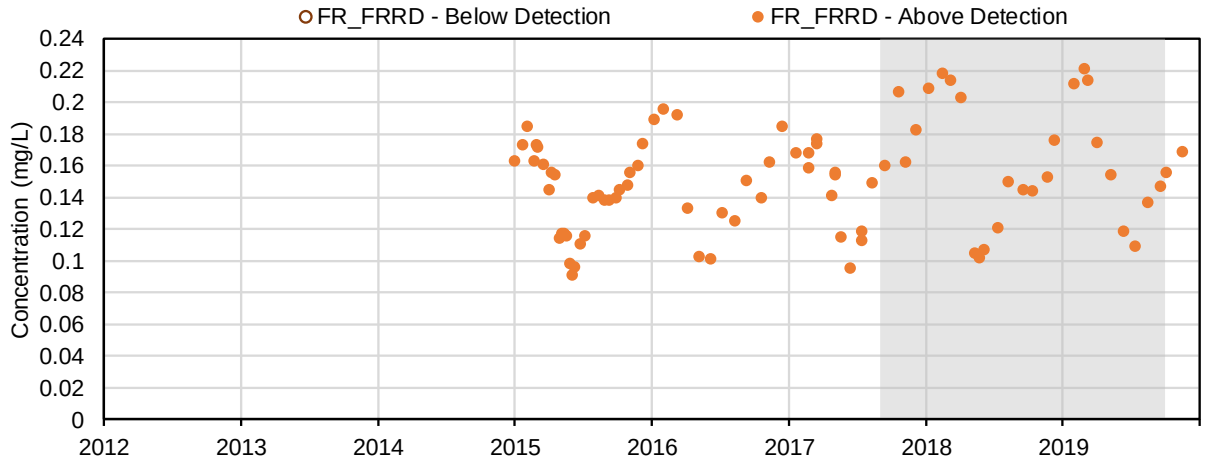
(87) Silicon (mg/L); Dissolved Metals



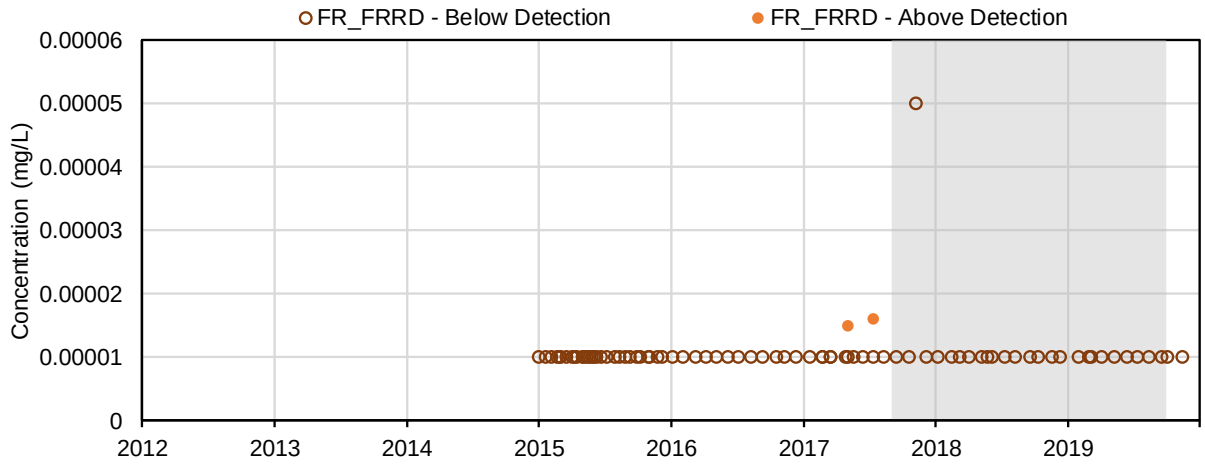
(88) Silver (mg/L); Dissolved Metals



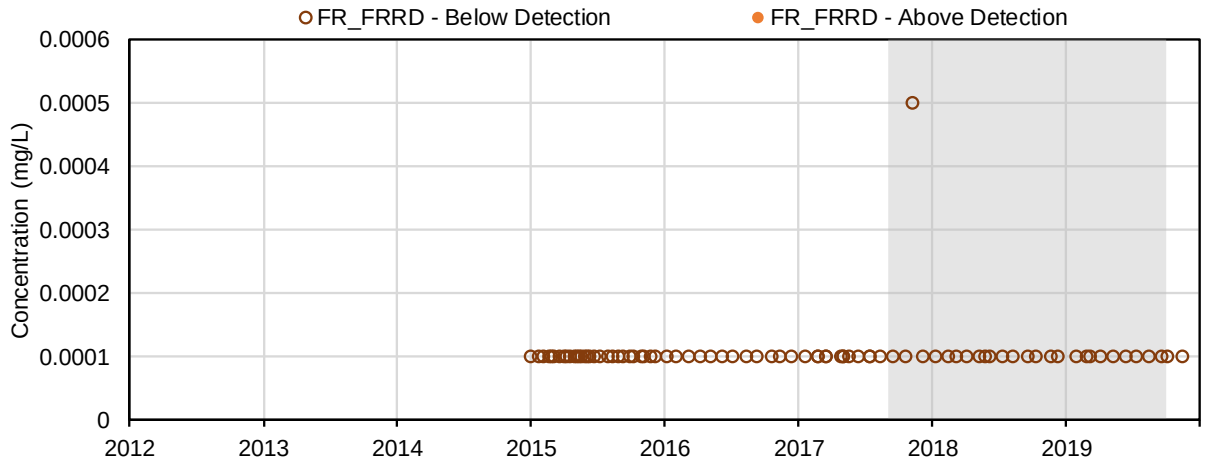
(89) Strontium (mg/L); Dissolved Metals



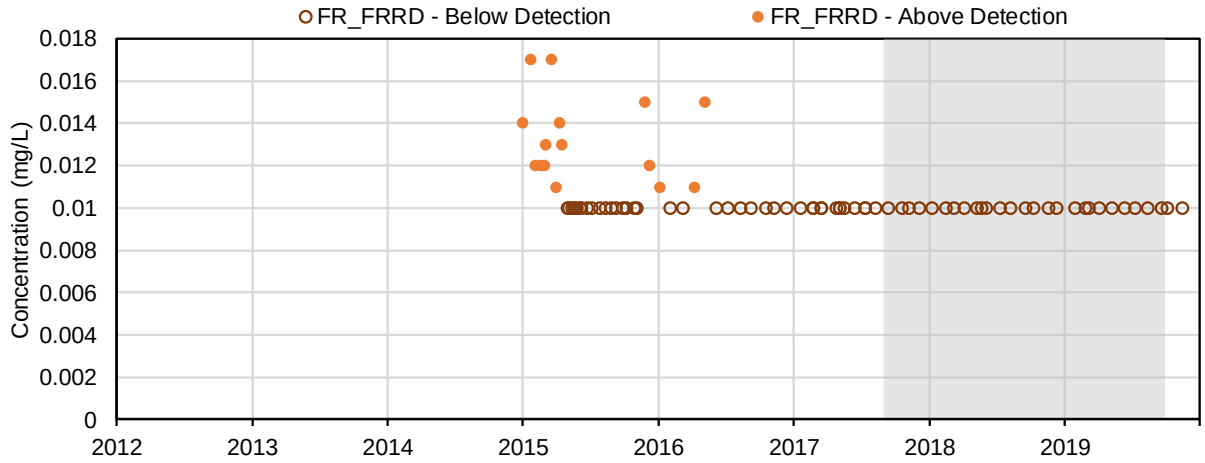
(90) Thallium (mg/L); Dissolved Metals



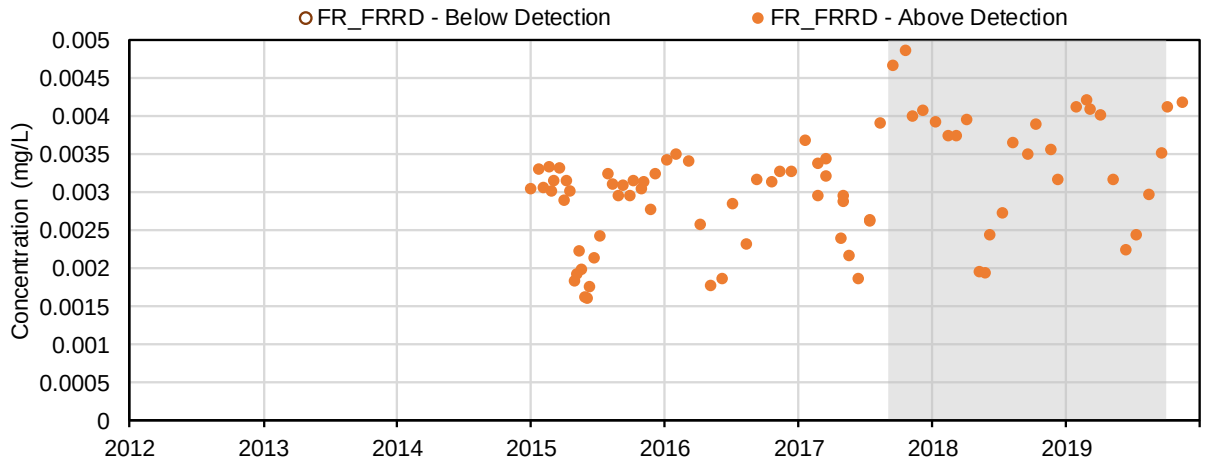
(91) Tin (mg/L); Dissolved Metals



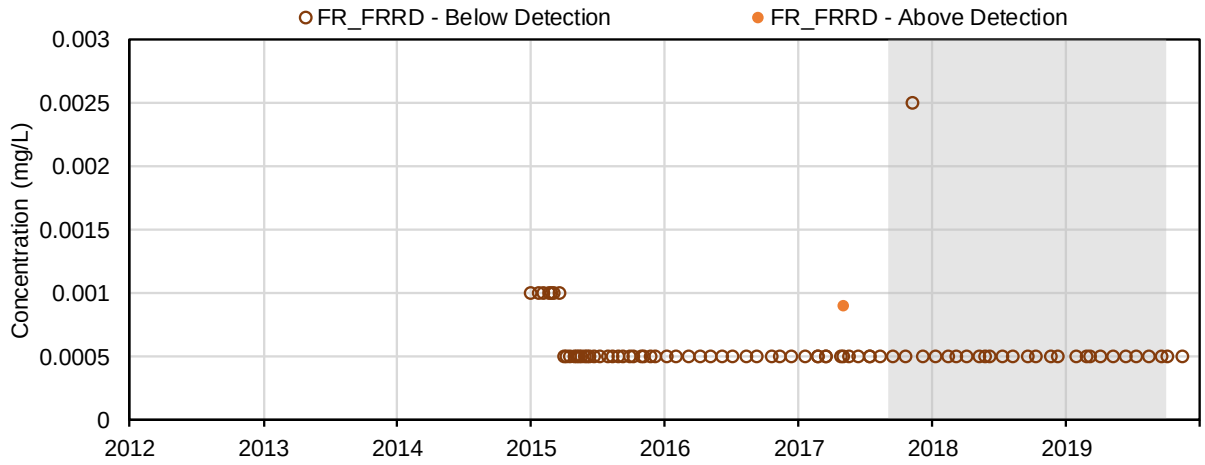
(92) Titanium (mg/L); Dissolved Metals



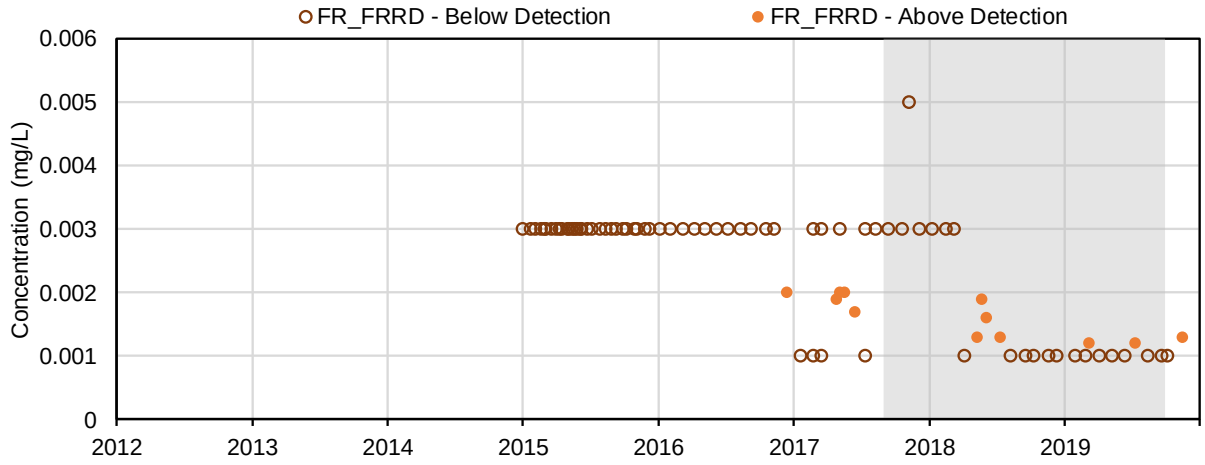
(93) Uranium (mg/L); Dissolved Metals

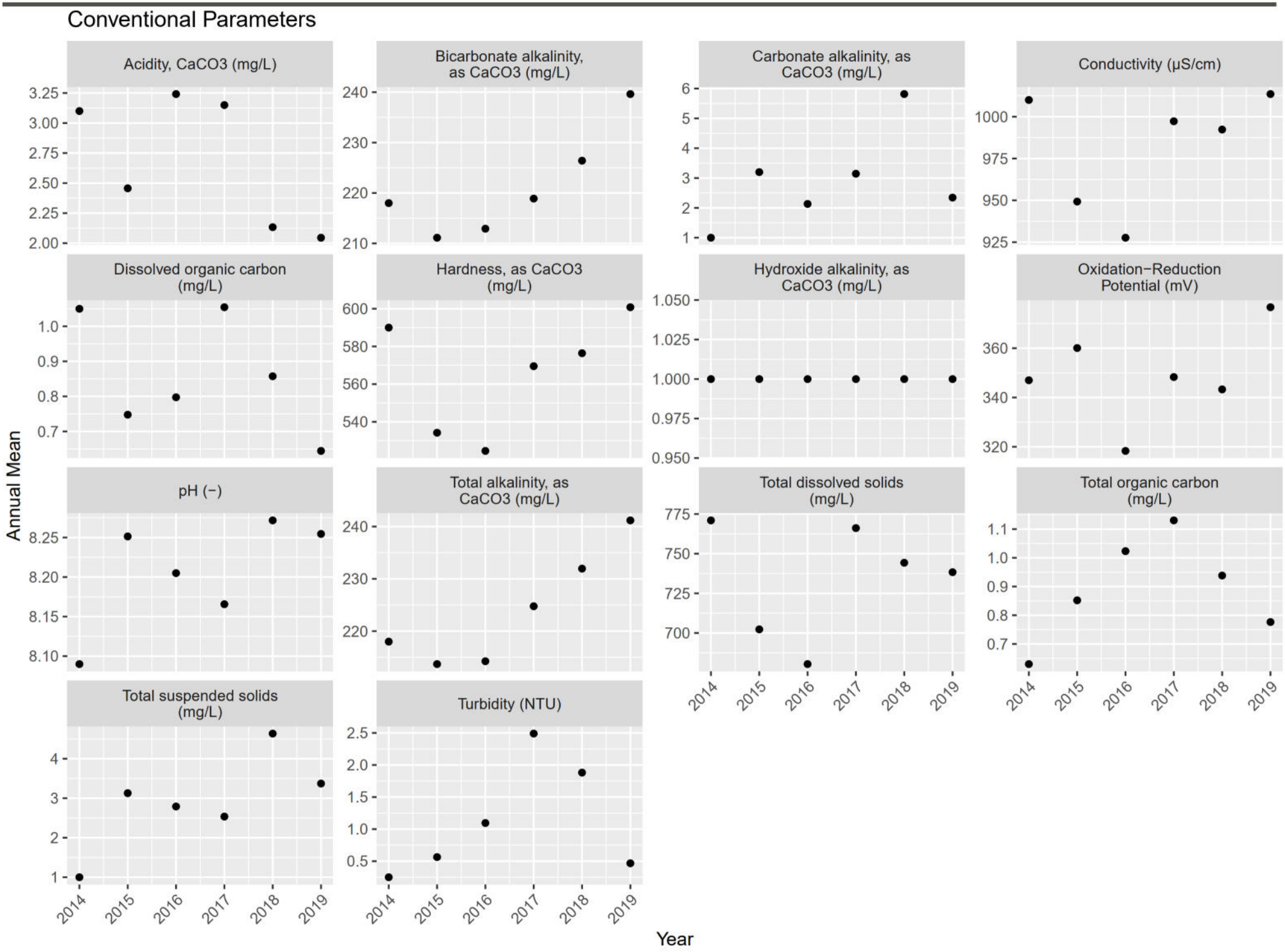


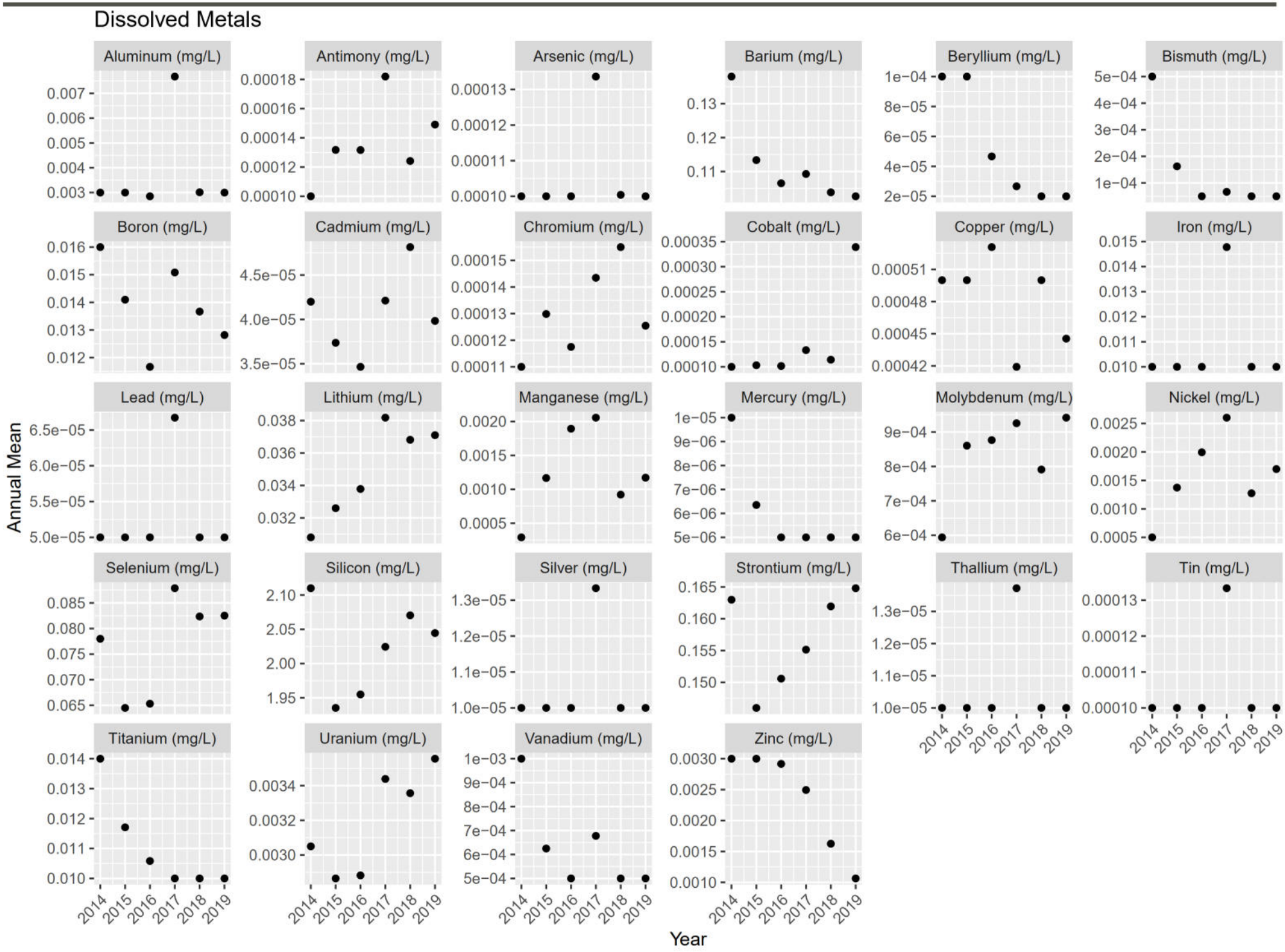
(94) Vanadium (mg/L); Dissolved Metals

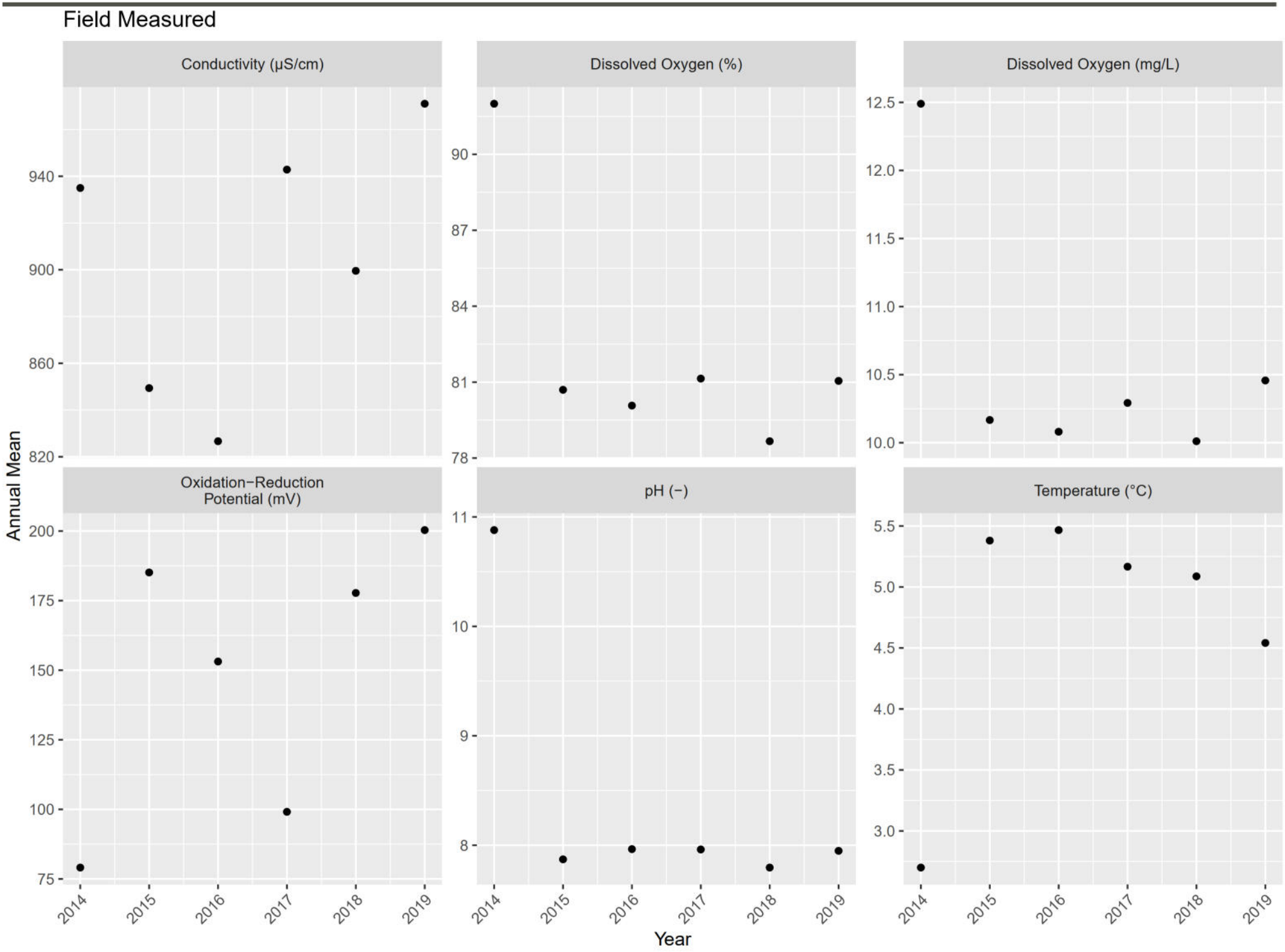


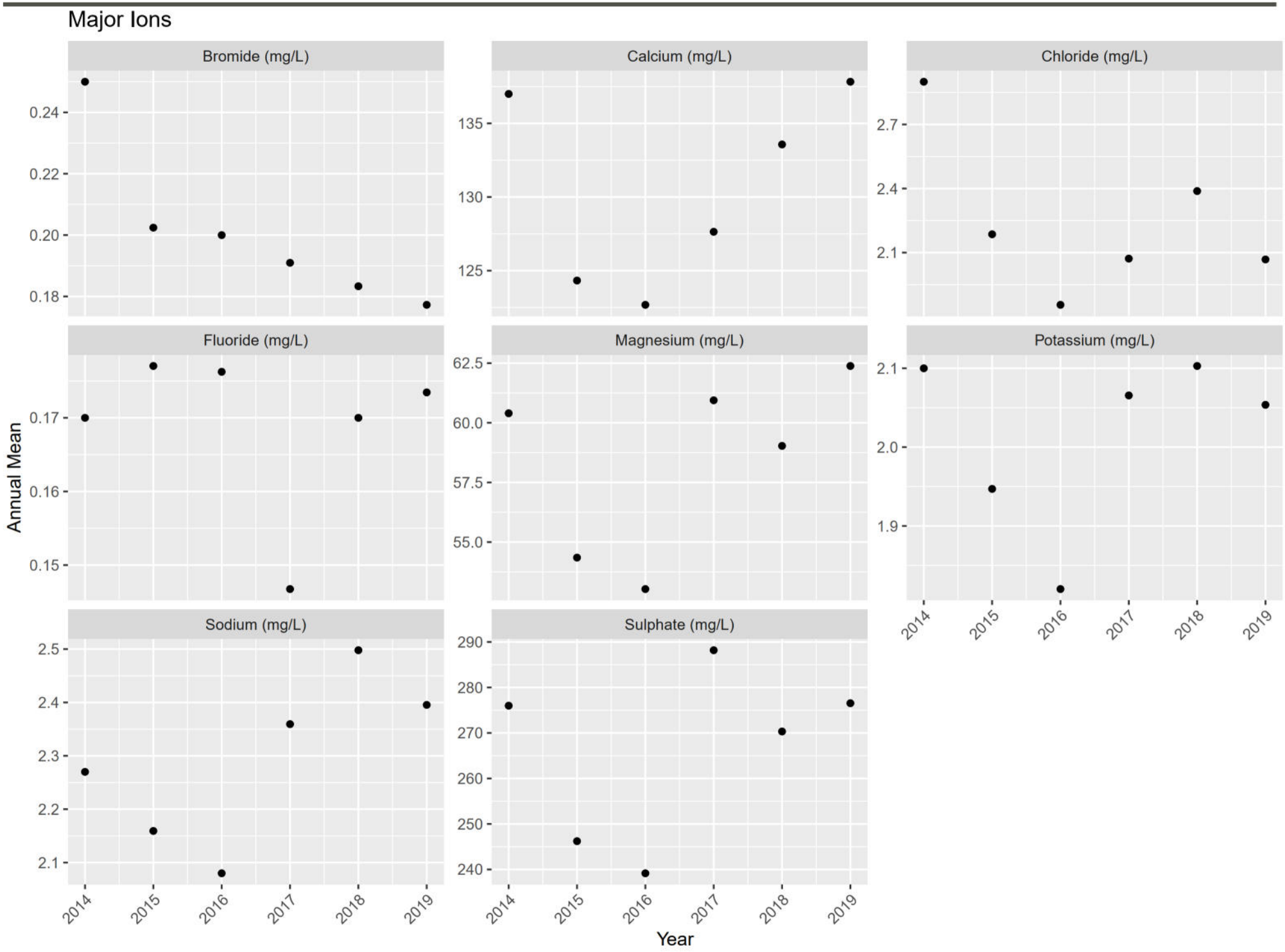
(95) Zinc (mg/L); Dissolved Metals

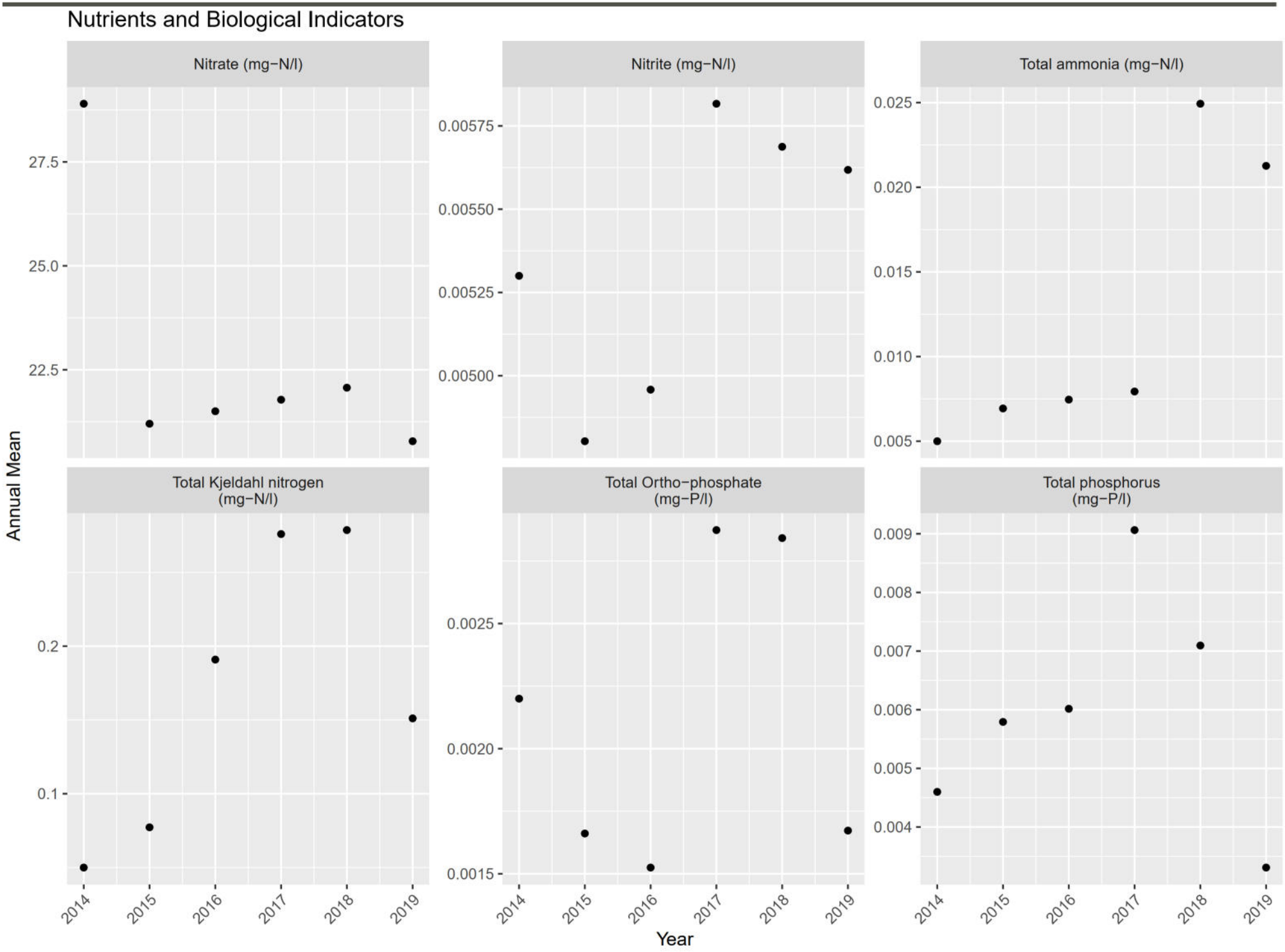


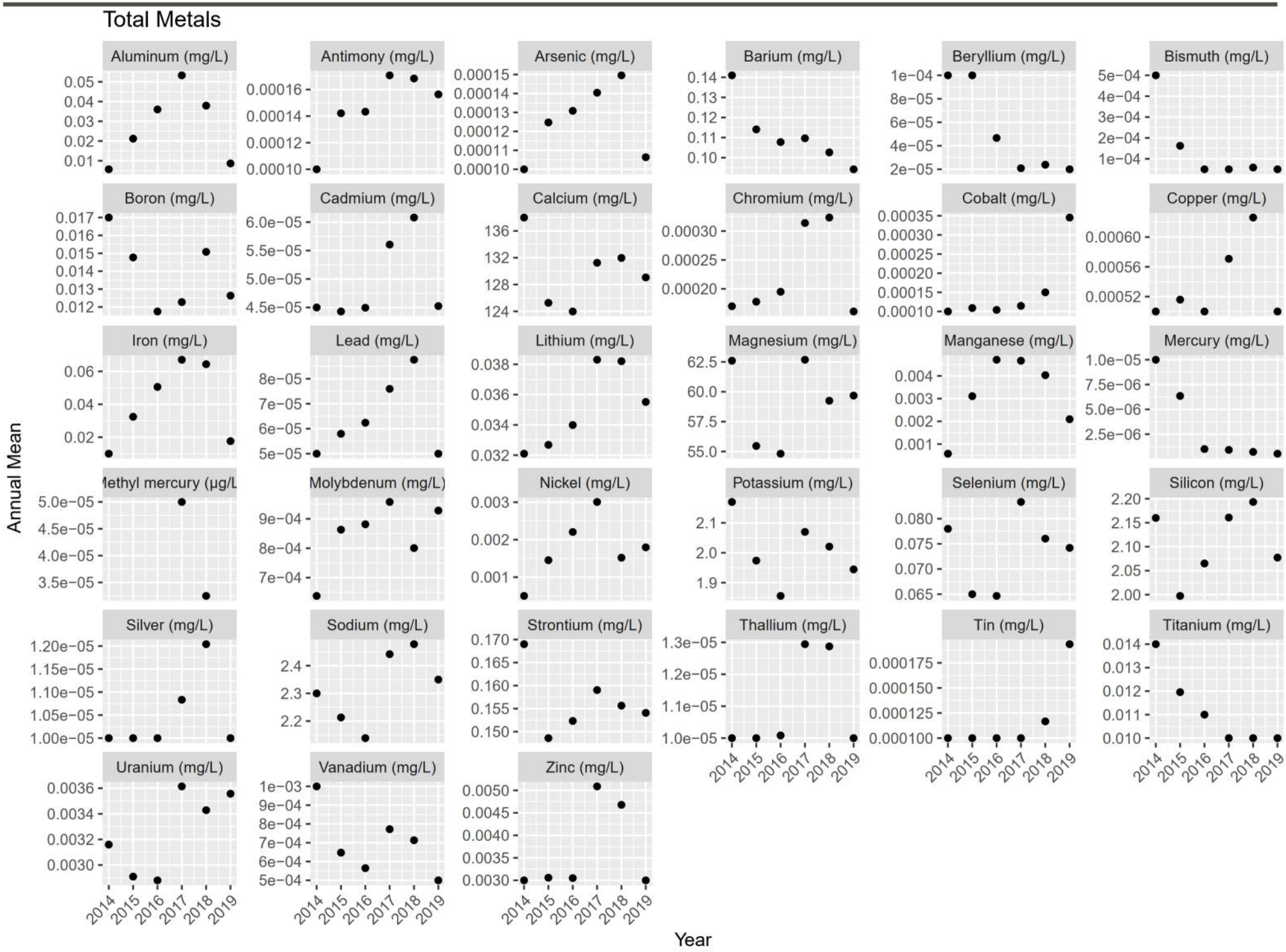

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2014
2015
2016
2017
2018
2019


Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2014
2015
2016
2017
2018
2019


Field Measured
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Temperature (°C)
Annual Mean
Year
940
900
860
820
90
87
84
81
78
12.5
12.0
11.5
11.0
10.5
10.0
200
175
150
125
100
75
11
10
9
8
5.5
5.0
4.5
4.0
3.5
3.0
2014
2015
2016
2017
2018
2019


Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
0.24
0.22
0.20
0.18
135
130
125
2.7
2.4
2.1
0.17
0.16
0.15
62.5
60.0
57.5
55.0
2.1
2.0
1.9
2.5
2.4
2.3
2.2
2.1
290
280
270
260
250
240
2014
2015
2016
2017
2018
2019

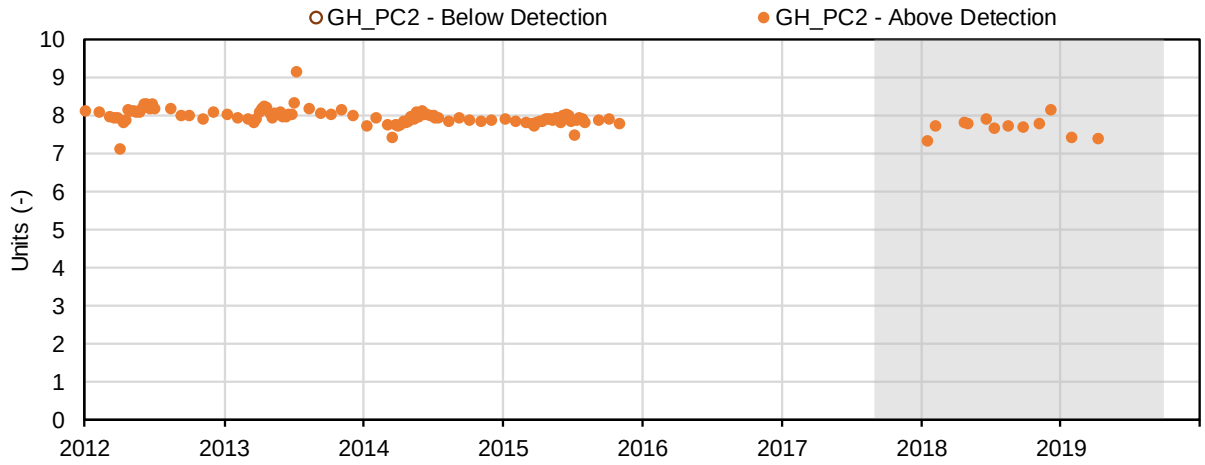

Nutrients and Biological Indicators
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
27.5
25.0
22.5
0.00575
0.00550
0.00525
0.00500
0.025
0.020
0.015
0.010
0.005
0.2
0.1
0.0025
0.0020
0.0015
0.009
0.008
0.007
0.006
0.005
0.004
2014
2015
2016
2017
2018
2019


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Methyl mercury (µg/L
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2014
2015
2016
2017
2018
2019

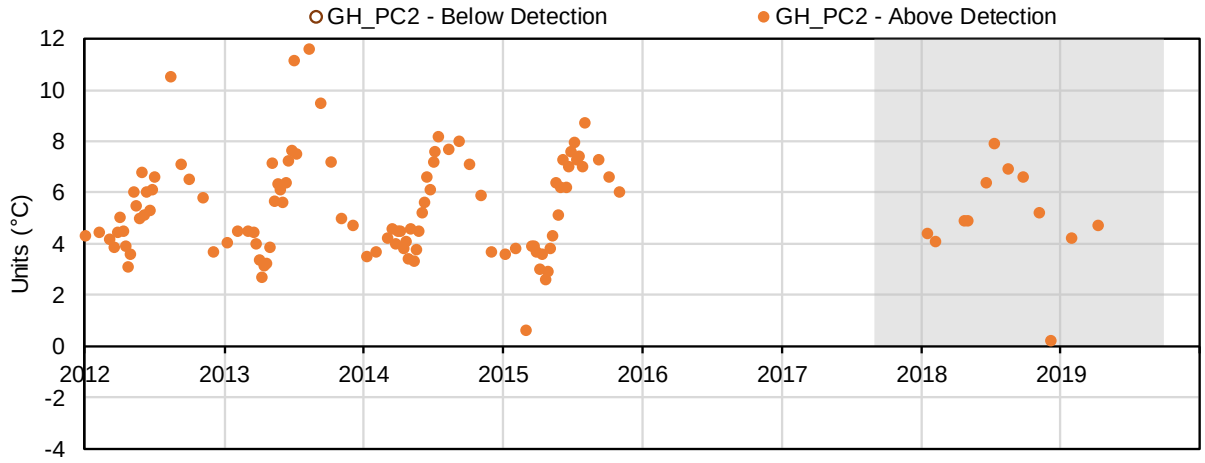
ATTACHMENT F11

GH_PC2 Plots

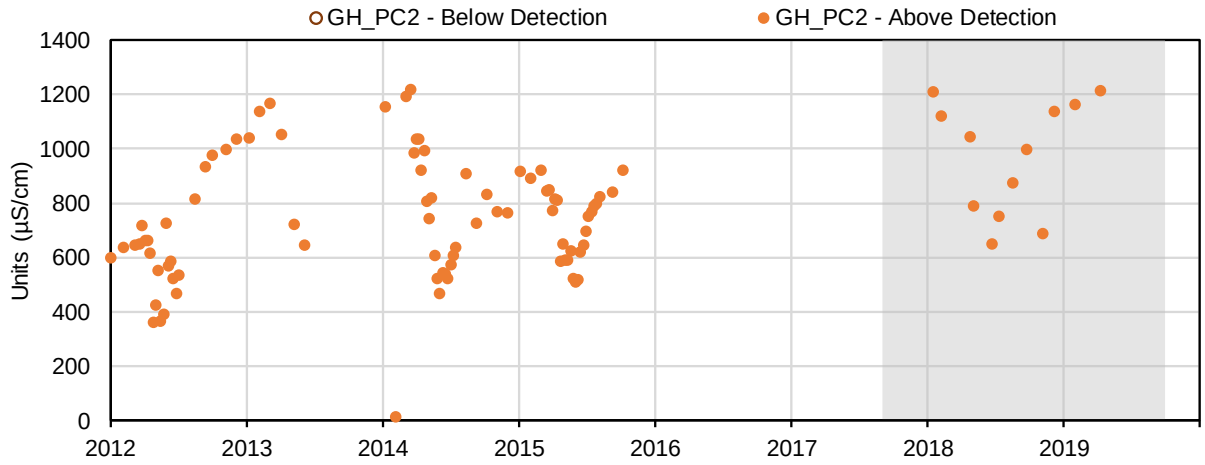
(1) pH (-); Field Measured



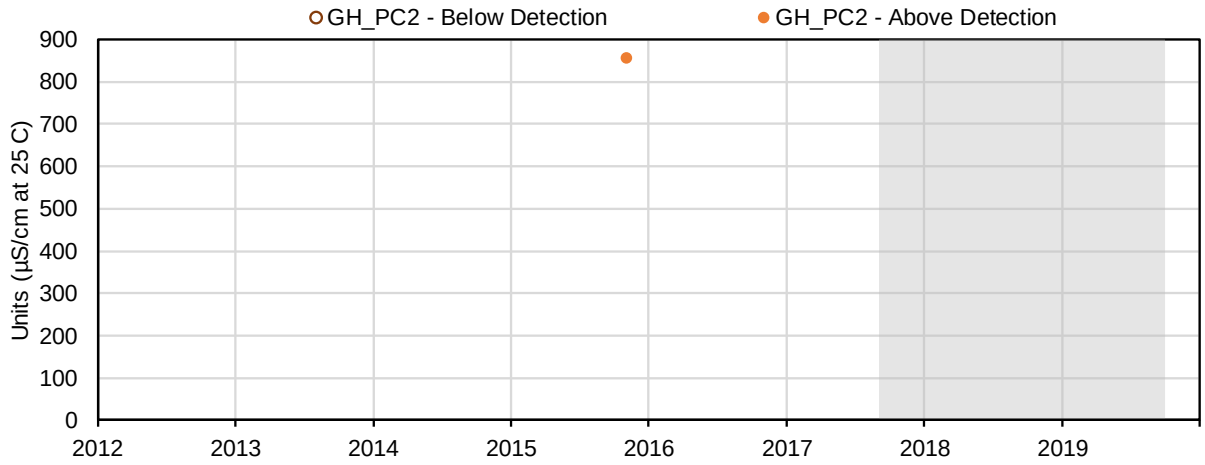
(2) Temperature (°C); Field Measured



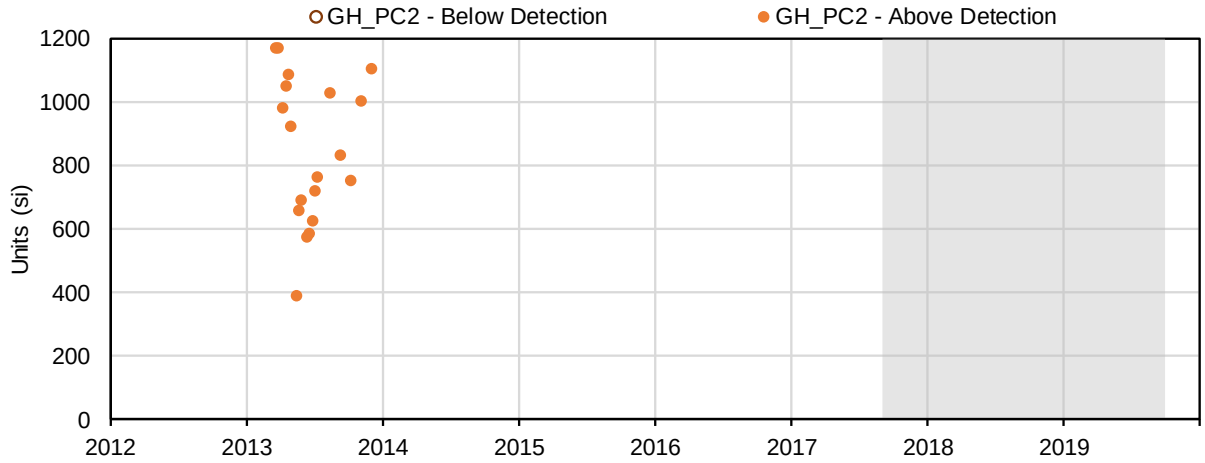
(3) Conductivity (µS/cm); Field Measured



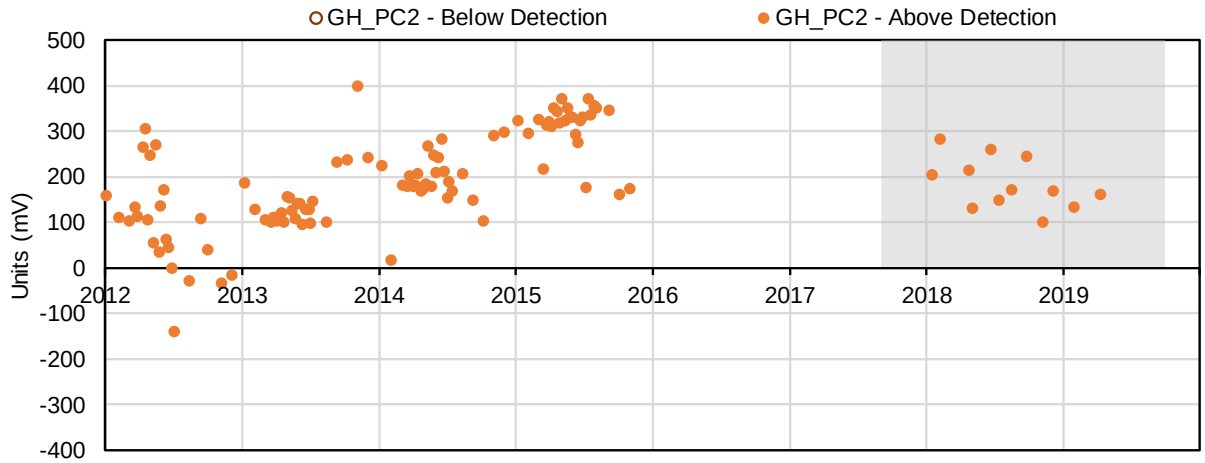
(4) Conductivity (µS/cm at 25 C); Field Measured



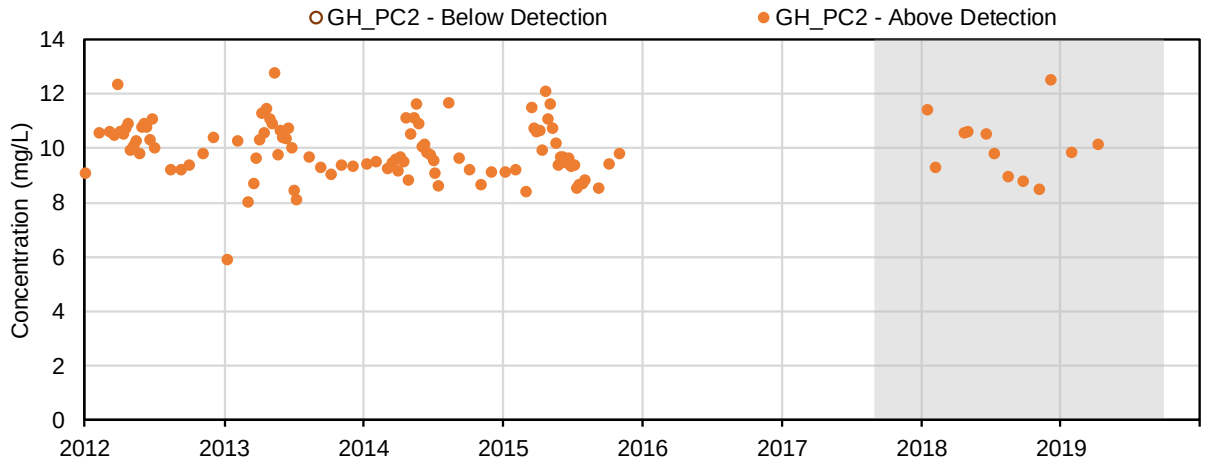
(5) Conductivity (si); Field Measured



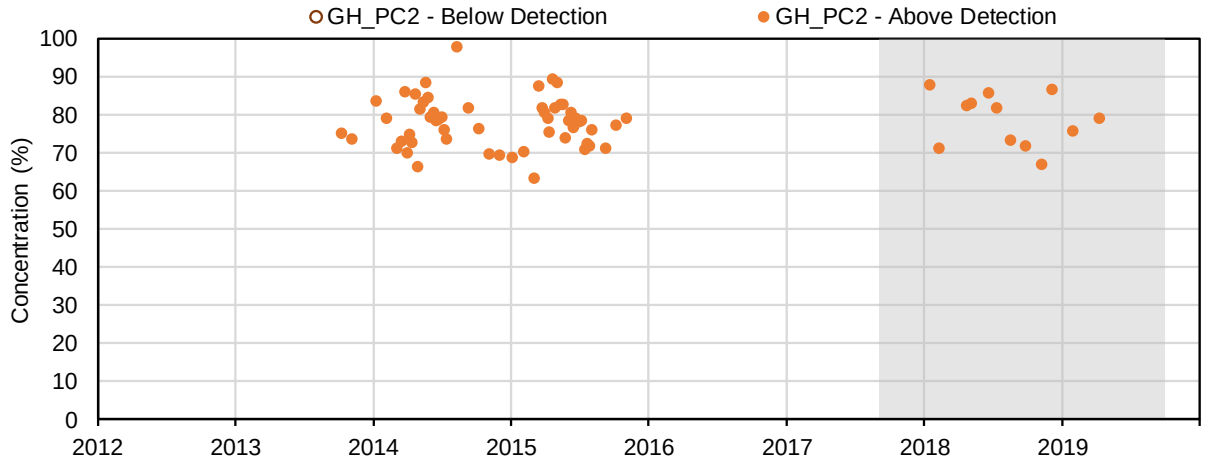
(6) Oxidation-Reduction Potential (mV); Field Measured



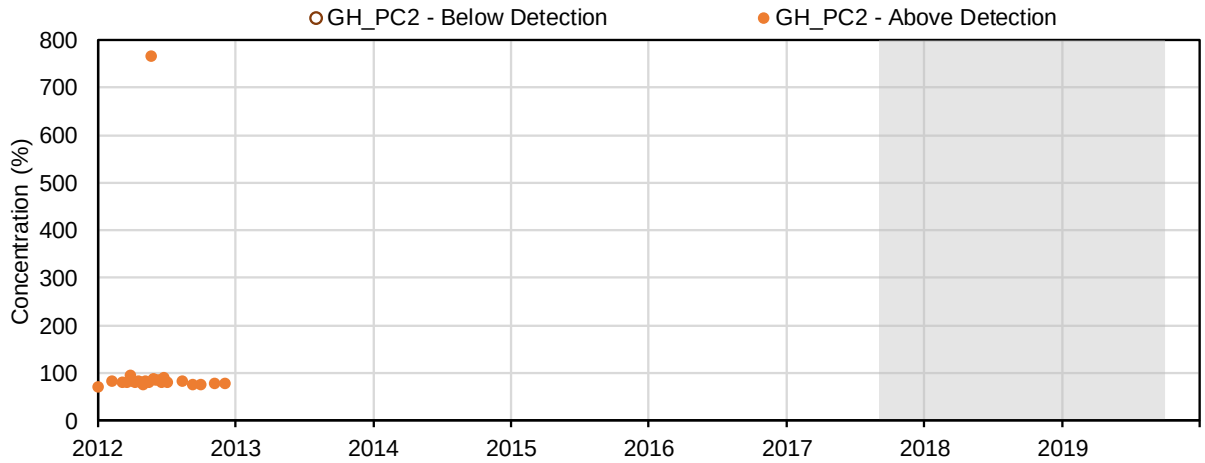
(7) Dissolved Oxygen (mg/L); Field Measured



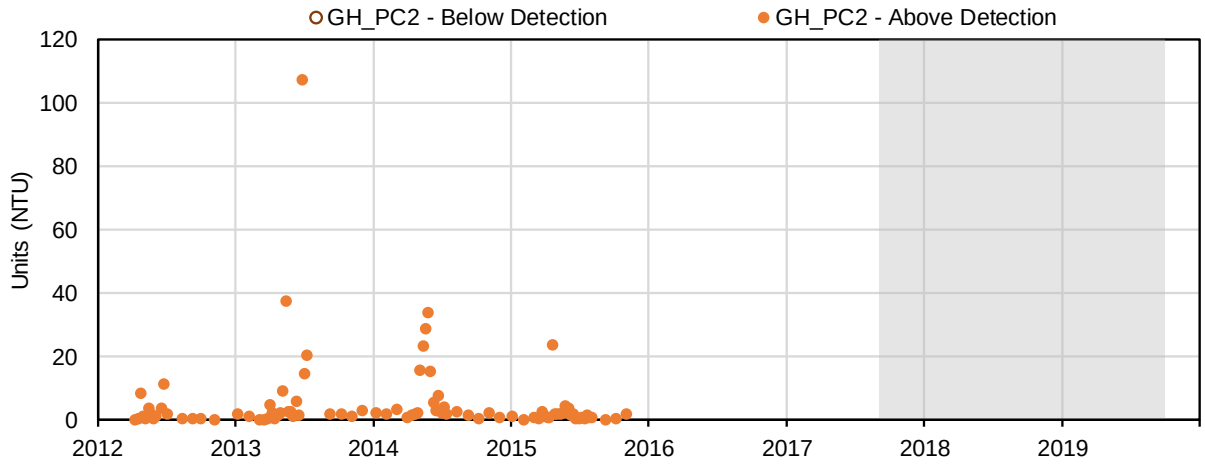
(8) Dissolved Oxygen (%); Field Measured



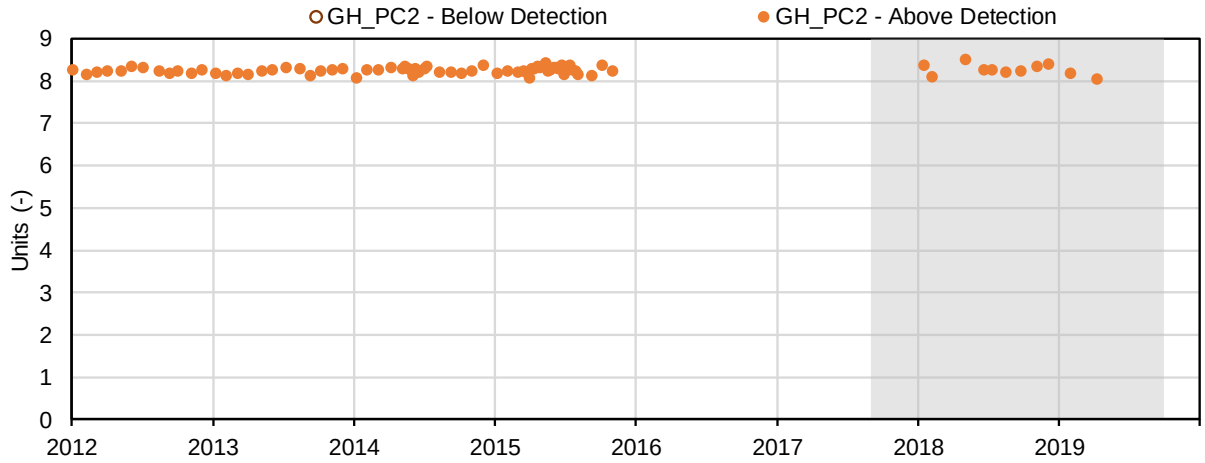
(9) Oxygen Saturation (%); Field Measured



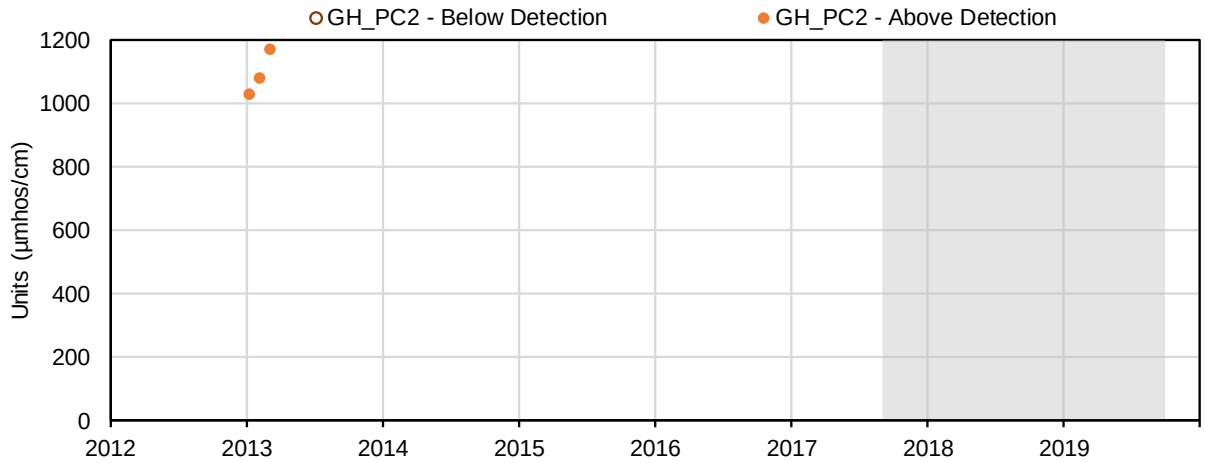
(10) Turbidity (NTU); Field Measured



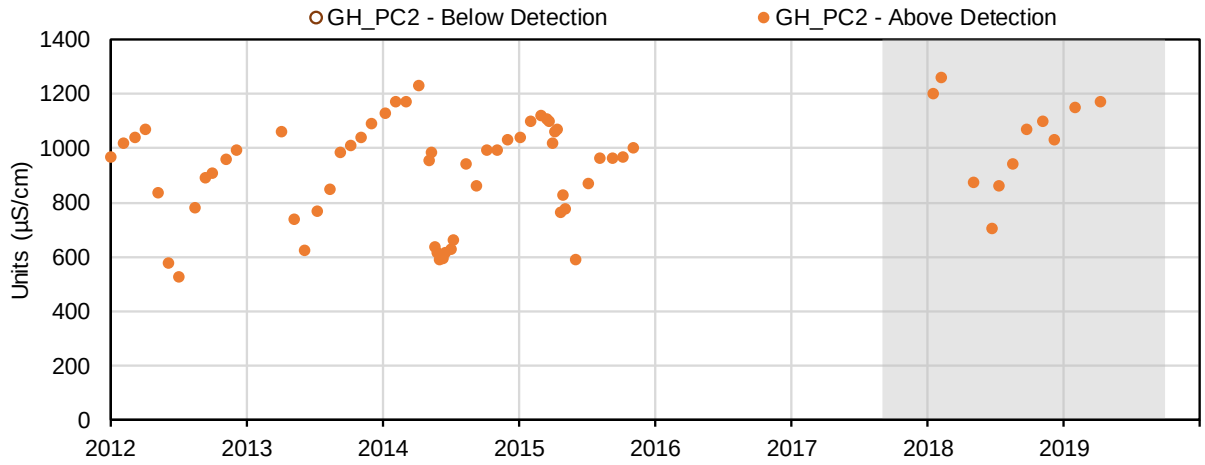
(11) pH (-); Conventional Parameters



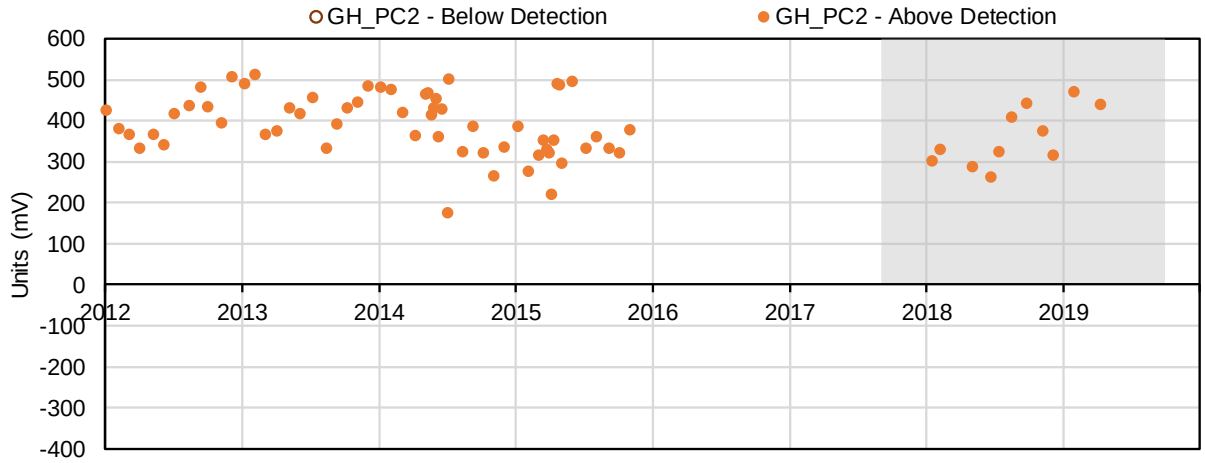
(12) Conductivity (µmhos/cm); Conventional Parameters



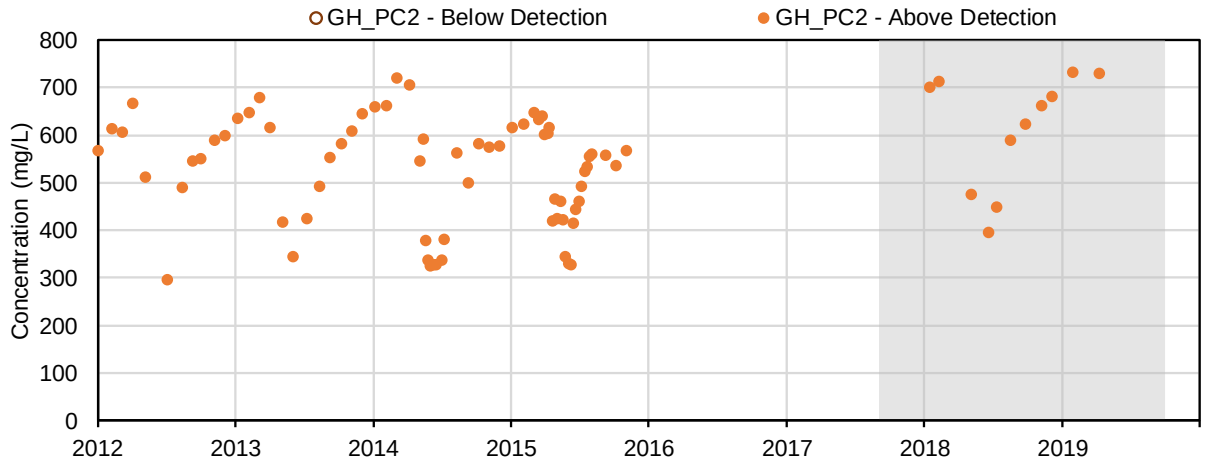
(13) Conductivity (µS/cm); Conventional Parameters



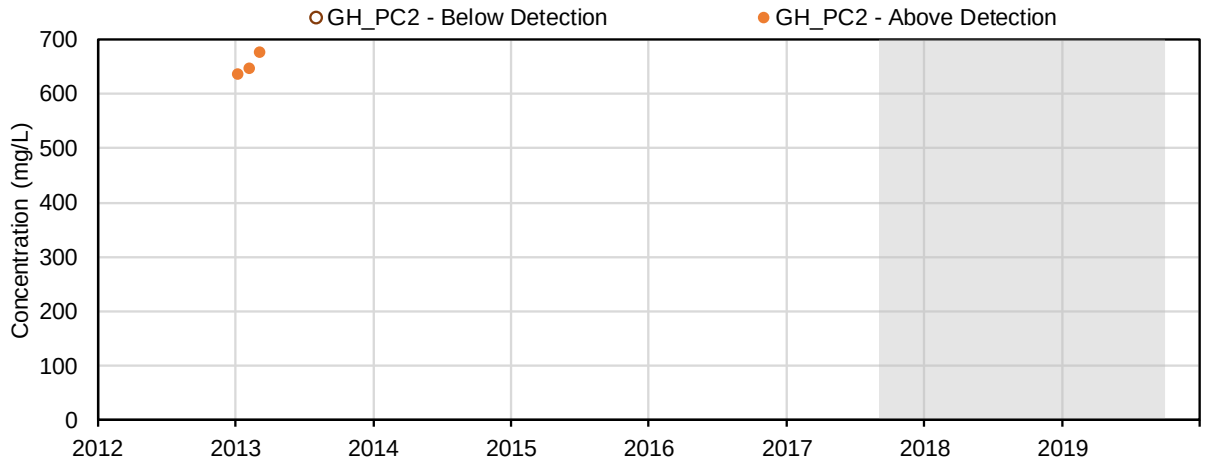
(14) Oxidation-Reduction Potential (mV); Conventional Parameters



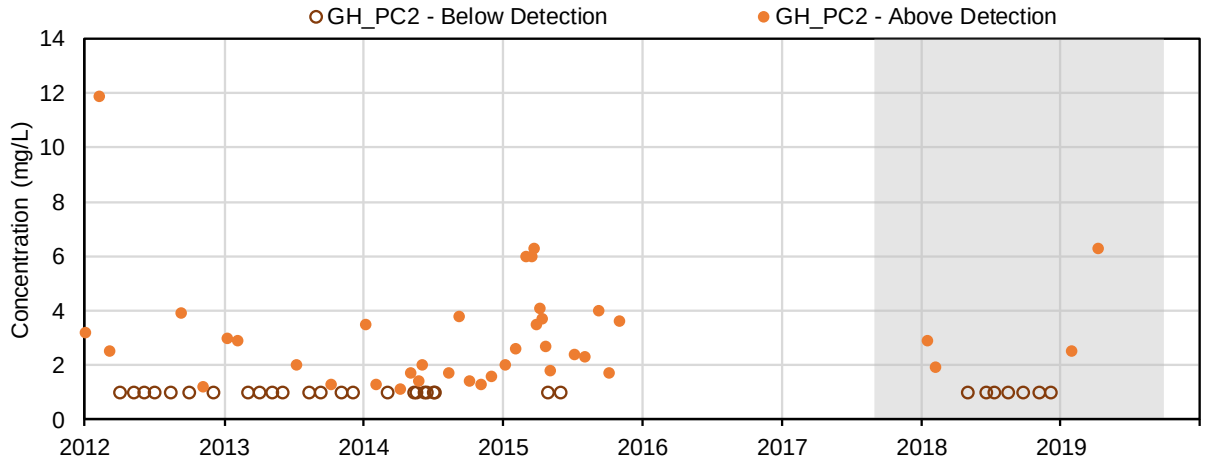
(15) Hardness, as CaCO3 (mg/L); Conventional Parameters



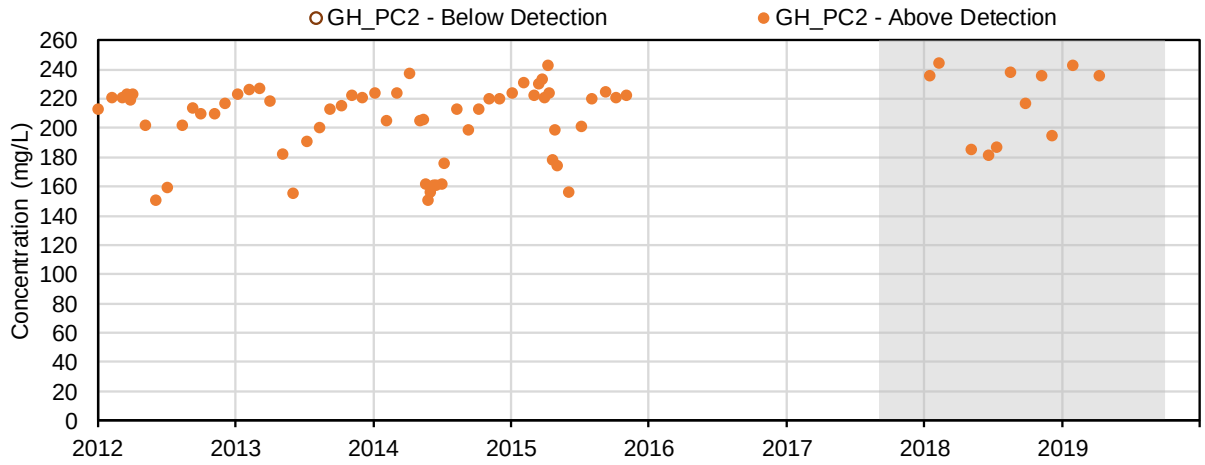
(16) Hardness, as CaCO3 (Calculated) (mg/L); Conventional Parameters



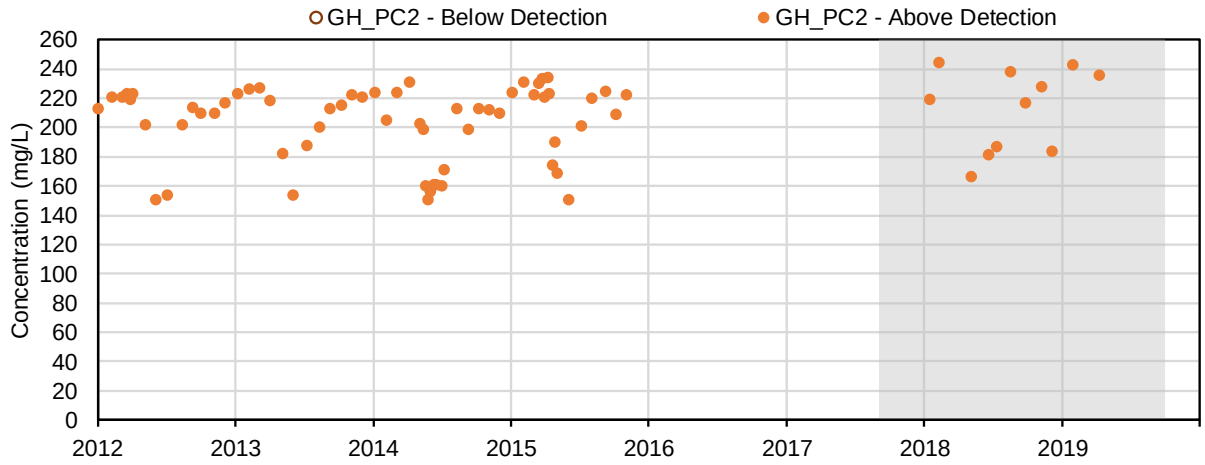
(17) Acidity, CaCO3 (mg/L); Conventional Parameters



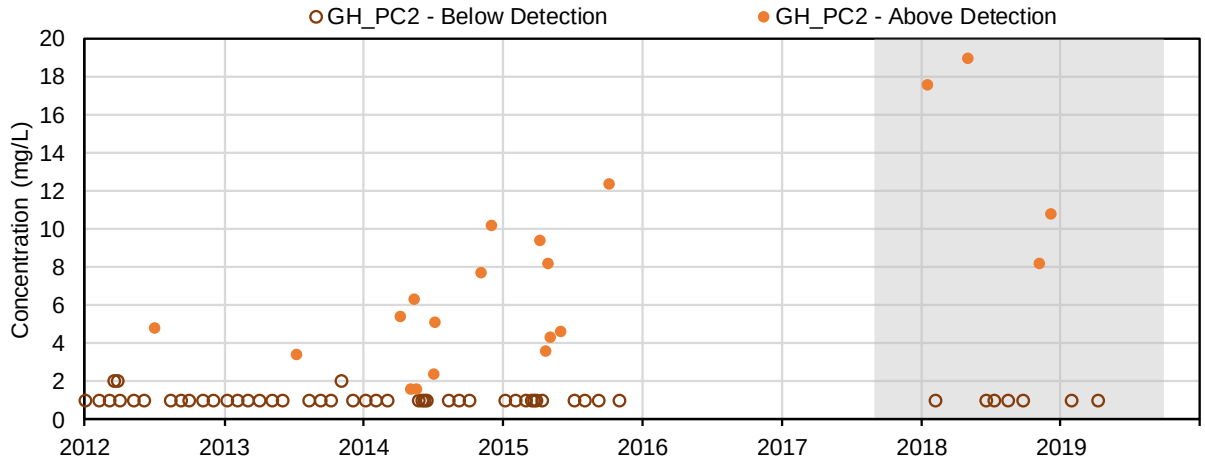
(18) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



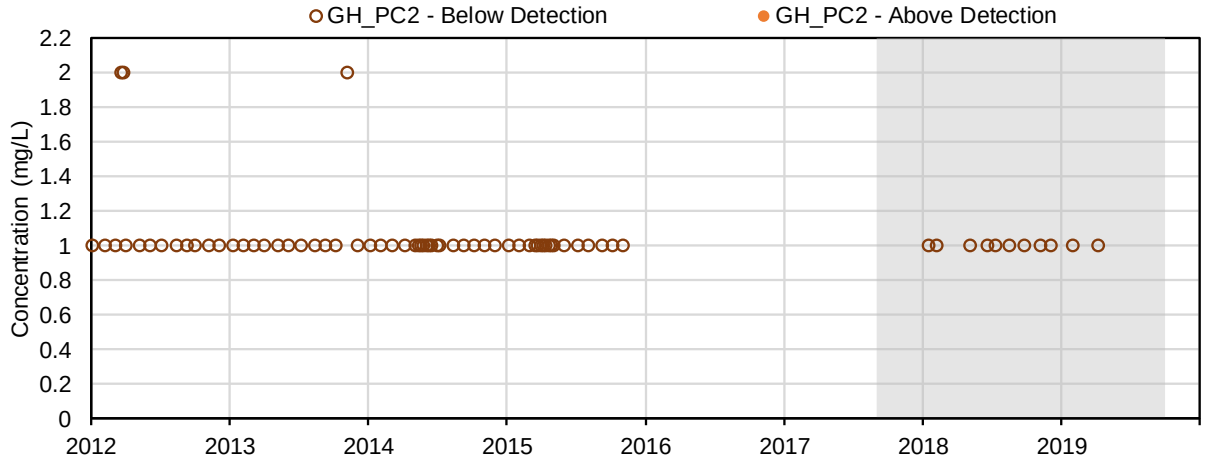
(19) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



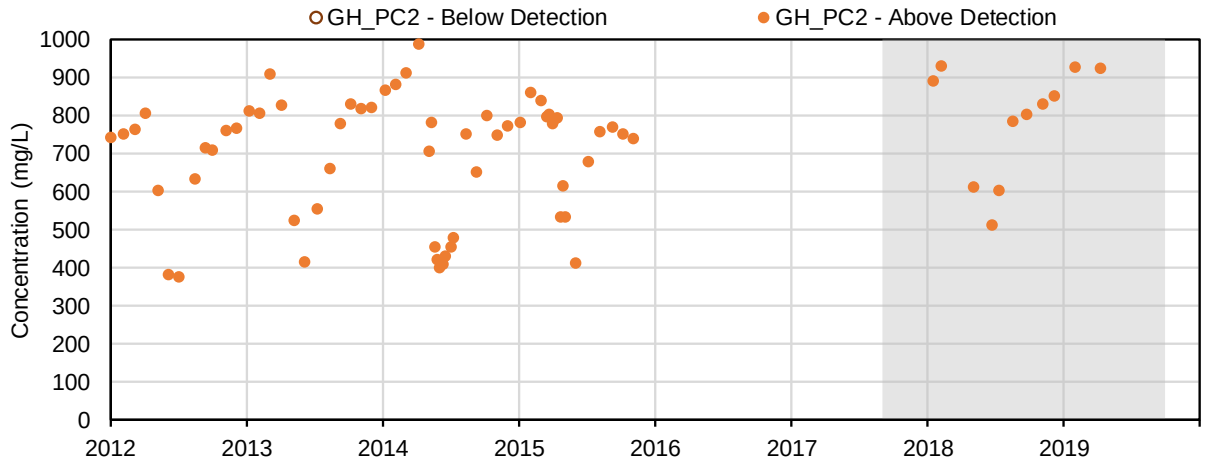
(20) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



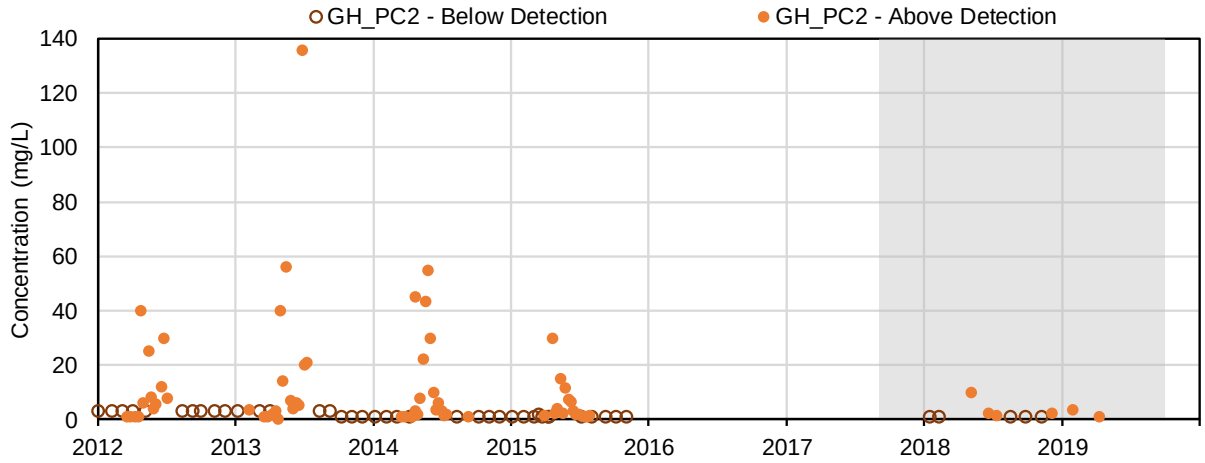
(21) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



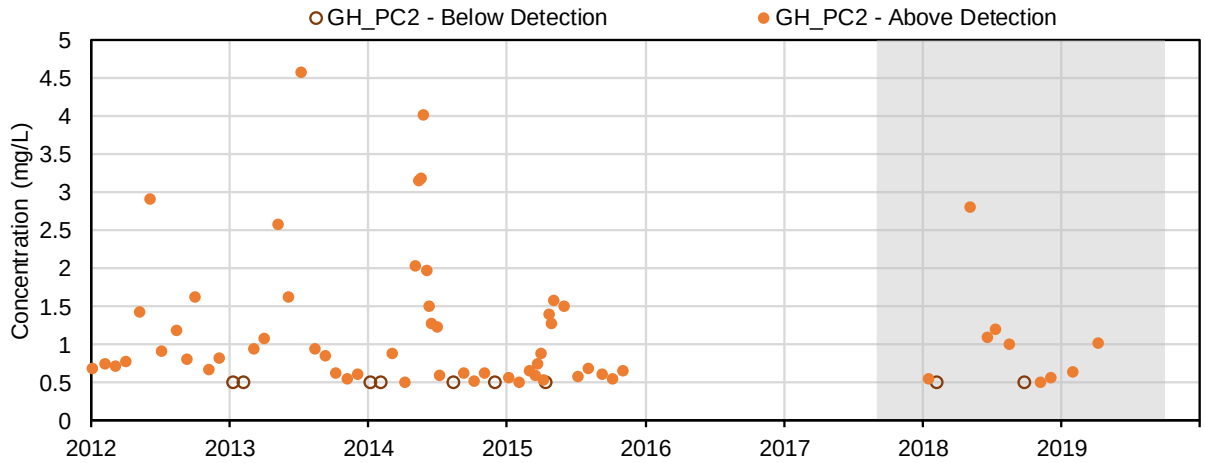
(22) Total dissolved solids (mg/L); Conventional Parameters



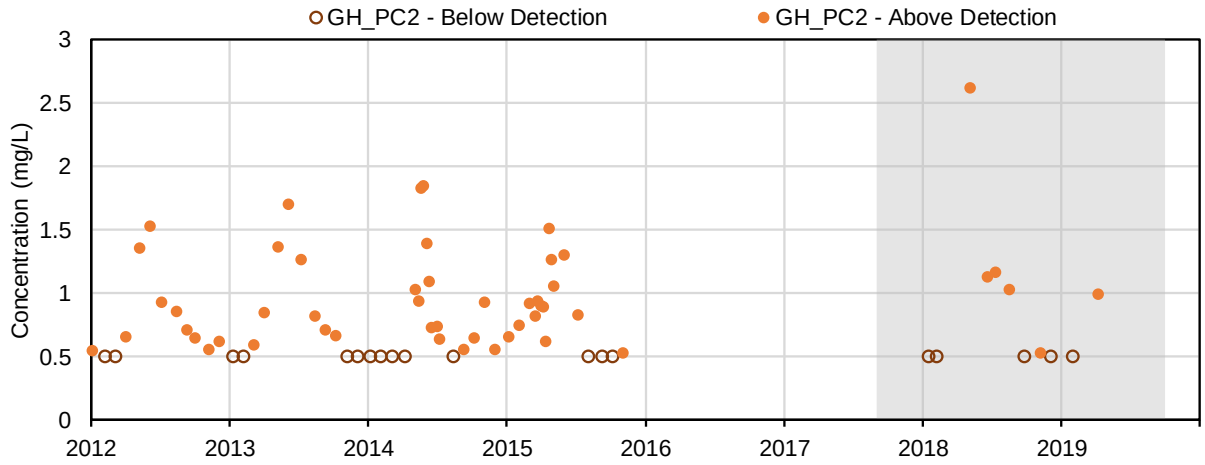
(23) Total suspended solids (mg/L); Conventional Parameters



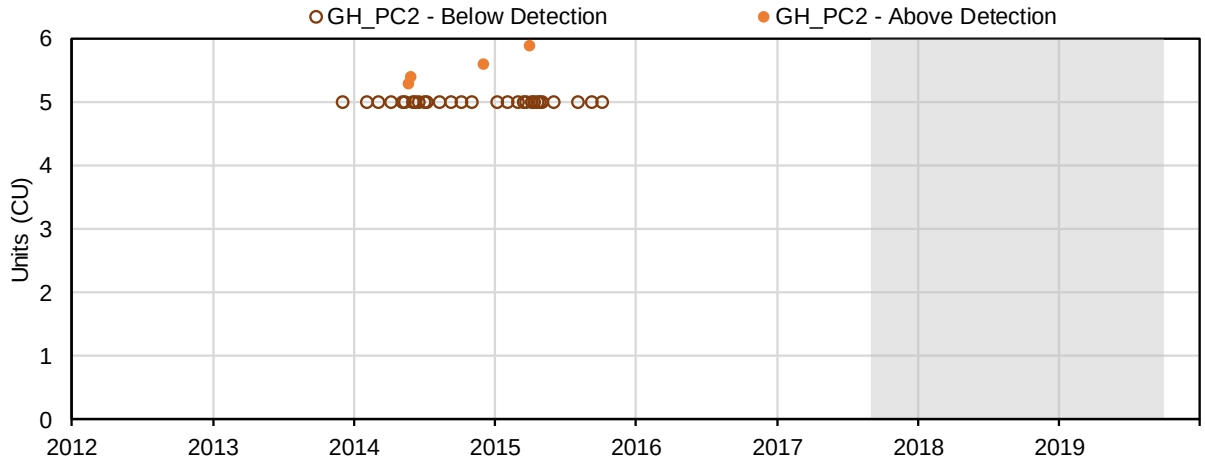
(24) Total organic carbon (mg/L); Conventional Parameters



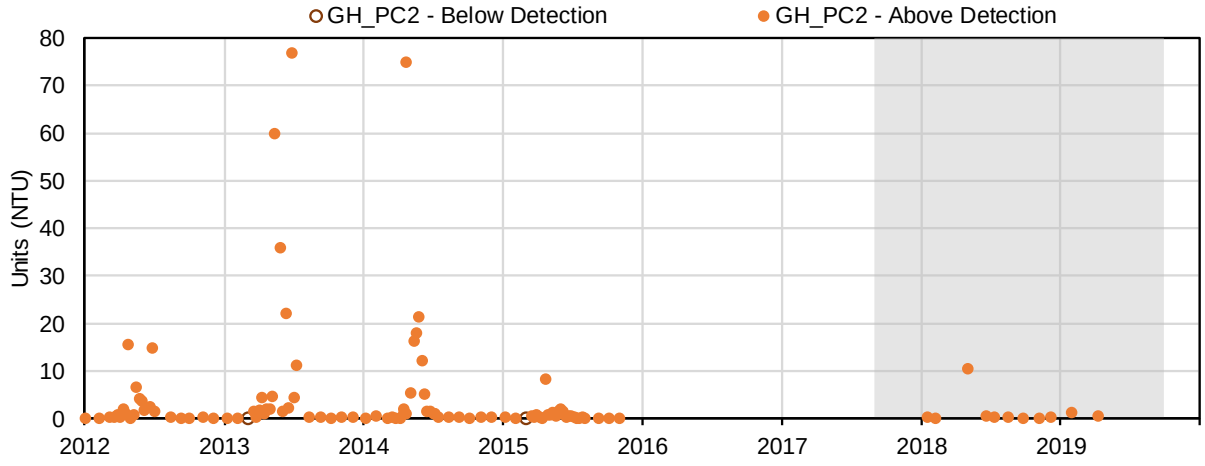
(25) Dissolved organic carbon (mg/L); Conventional Parameters



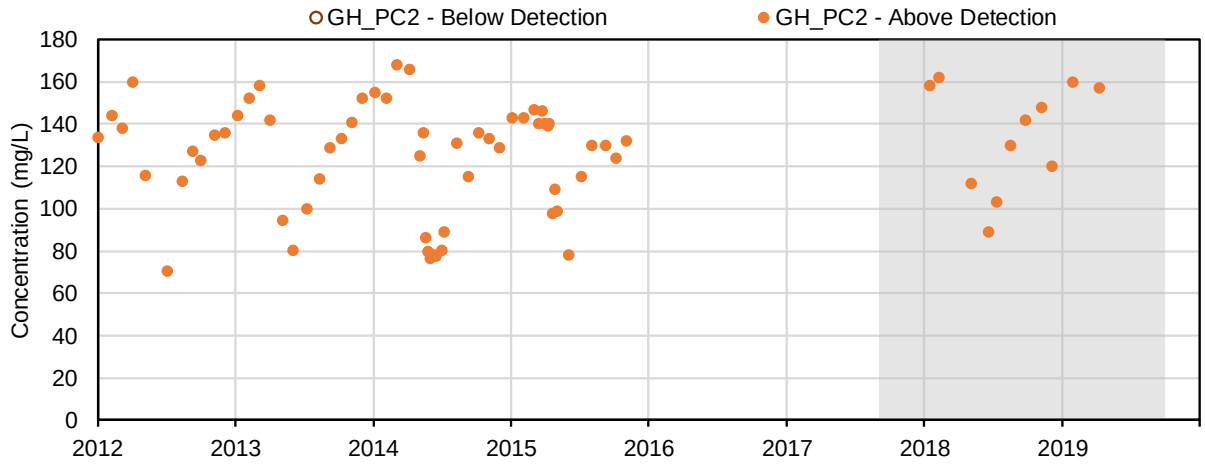
(26) Colour (CU); Conventional Parameters



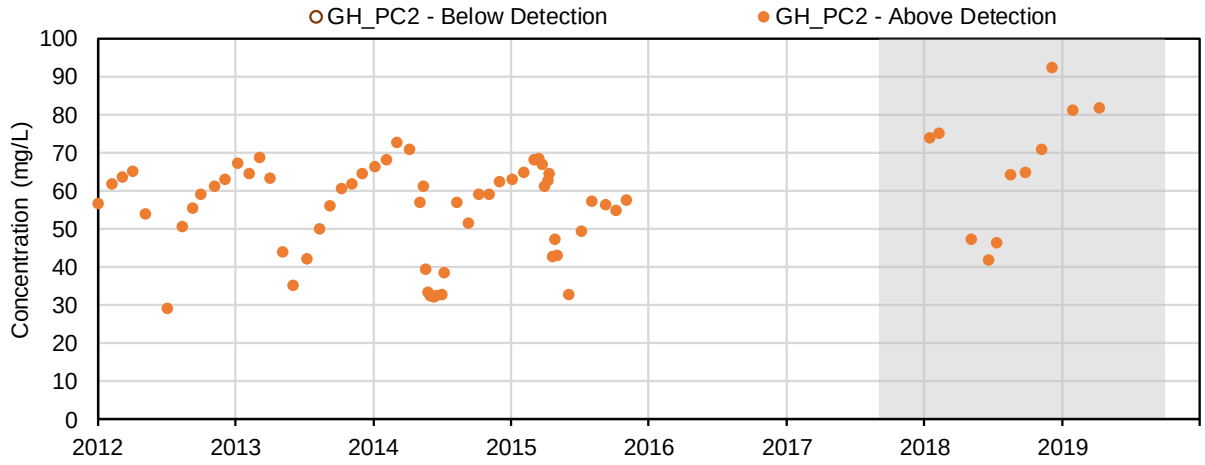
(27) Turbidity (NTU); Conventional Parameters



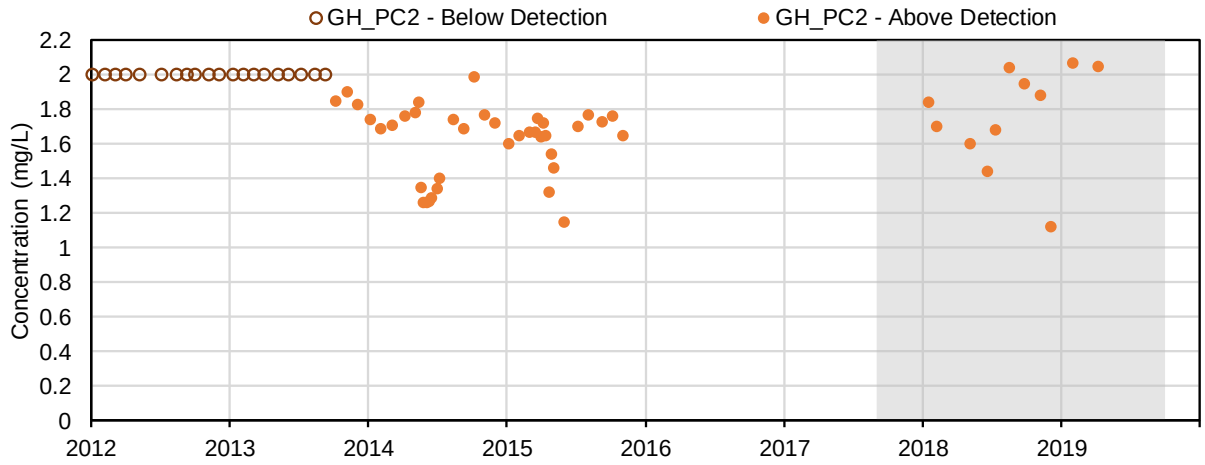
(28) Calcium (mg/L); Major Ions



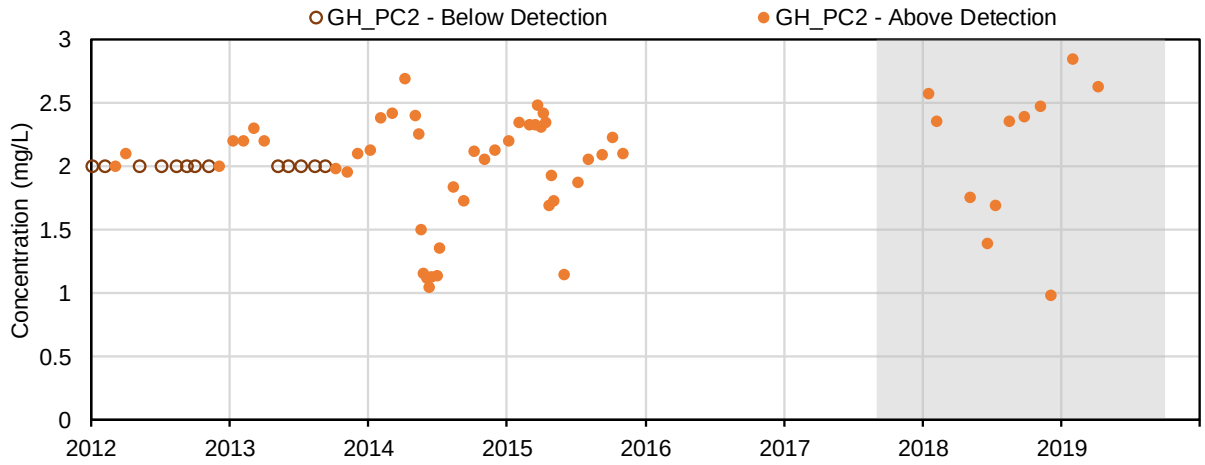
(29) Magnesium (mg/L); Major Ions



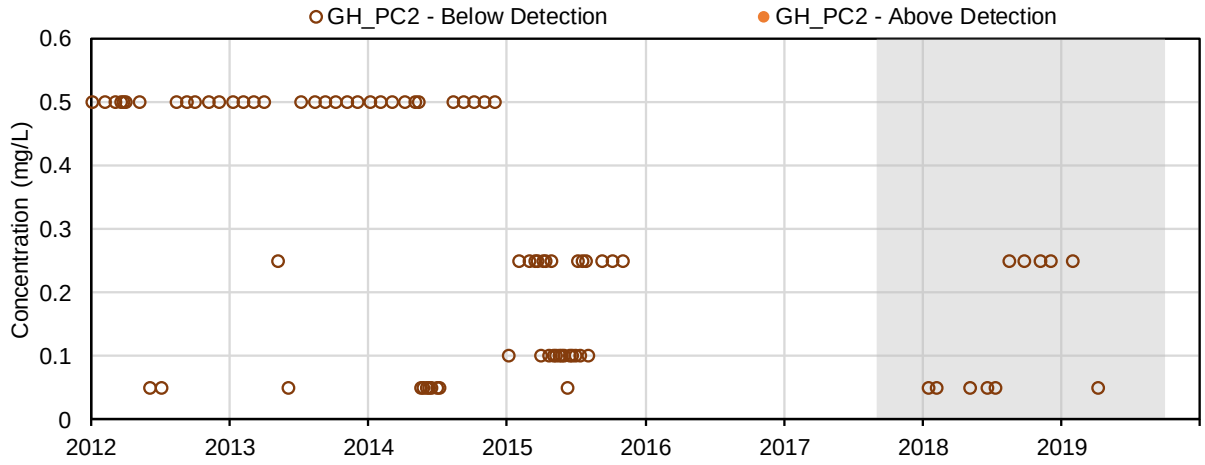
(30) Potassium (mg/L); Major Ions



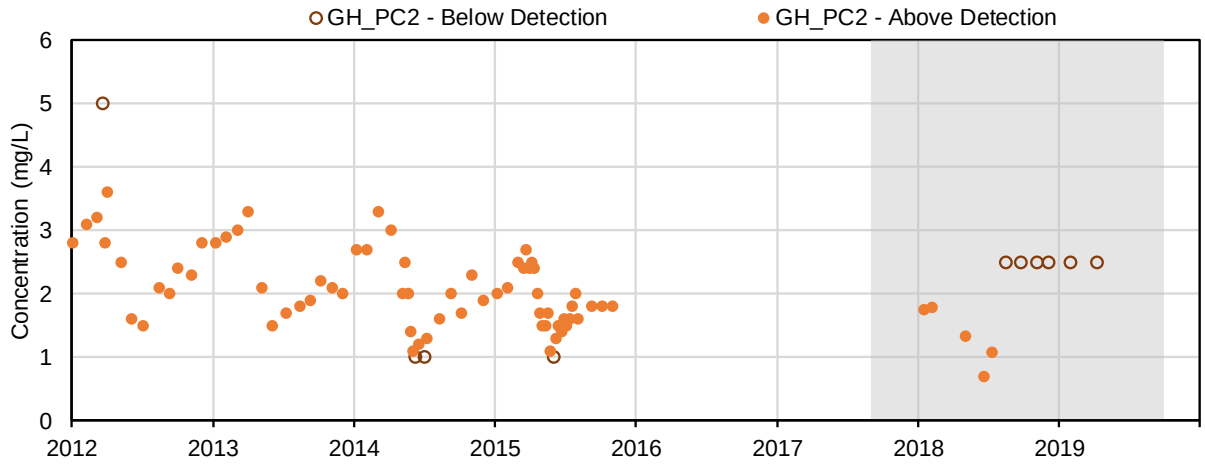
(31) Sodium (mg/L); Major Ions



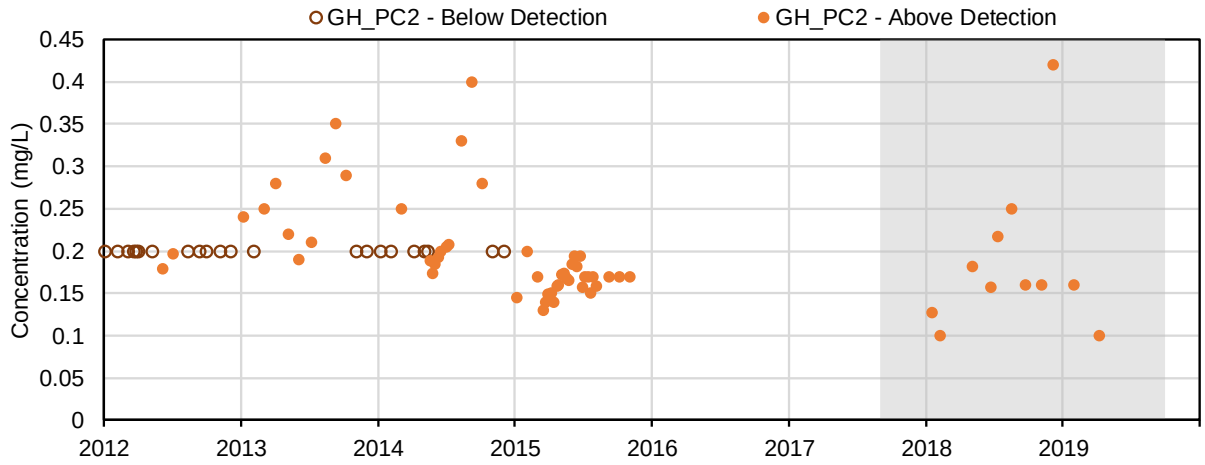
(32) Bromide (mg/L); Major Ions



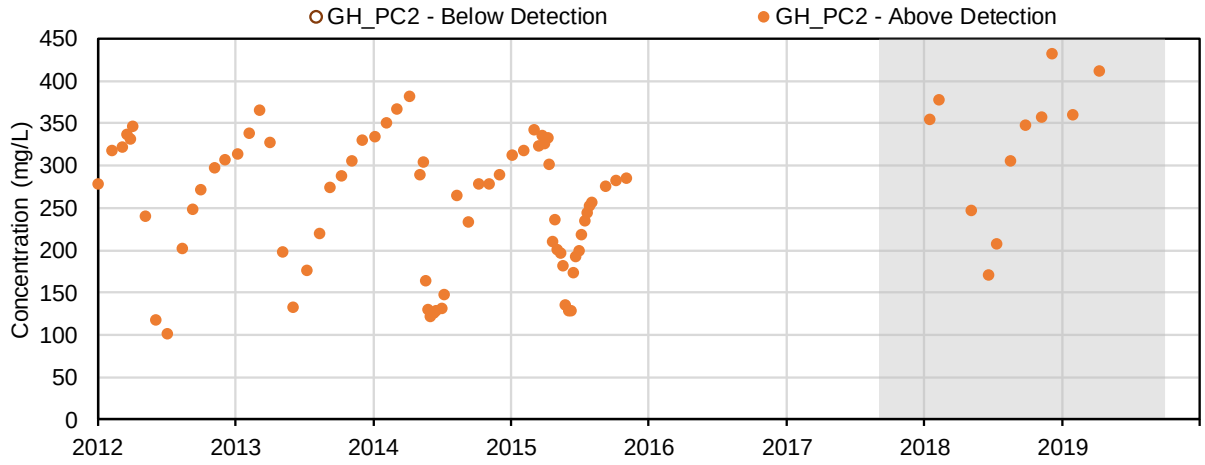
(33) Chloride (mg/L); Major Ions



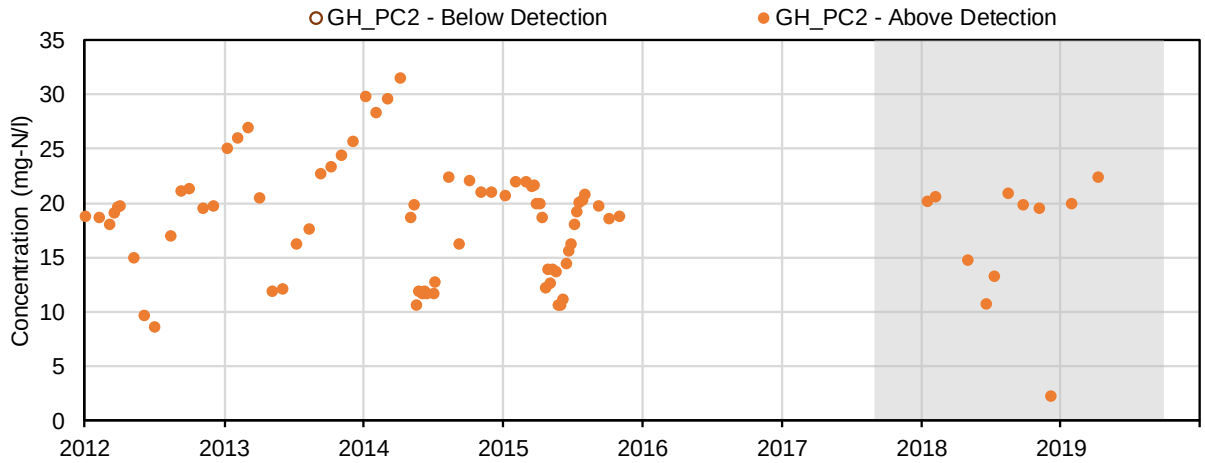
(34) Fluoride (mg/L); Major Ions



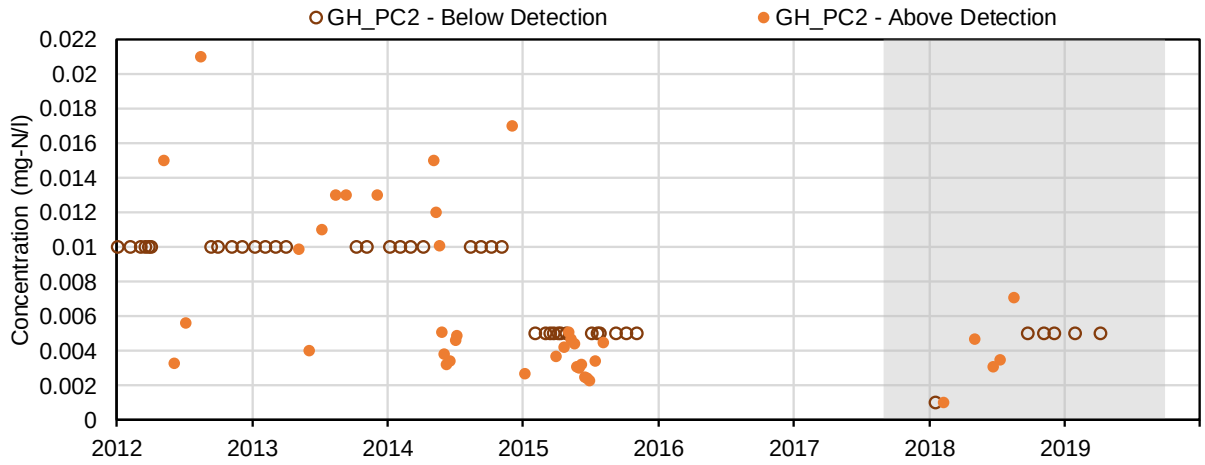
(35) Sulphate (mg/L); Major Ions



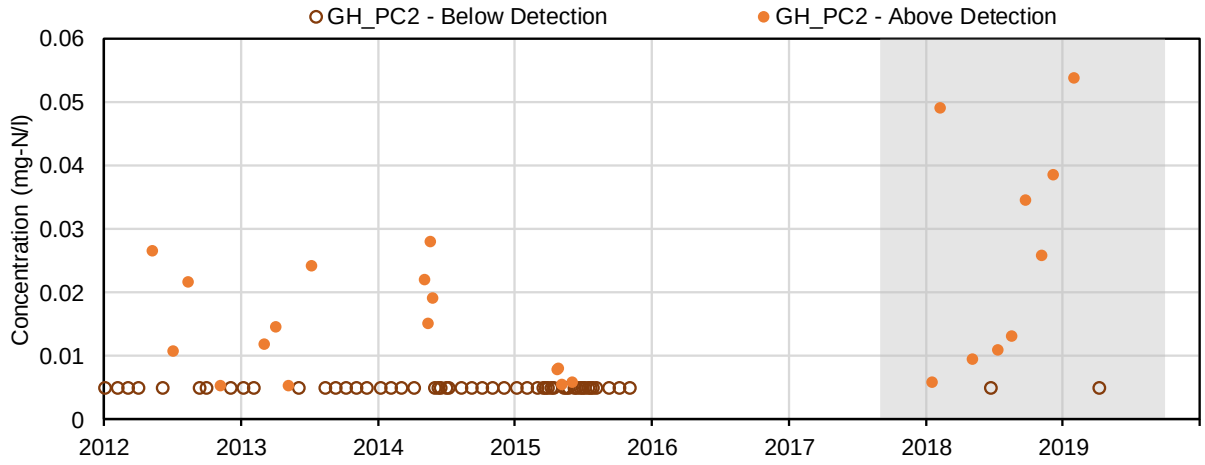
(36) Nitrate (mg-N/l); Nutrients and Biological Indicators



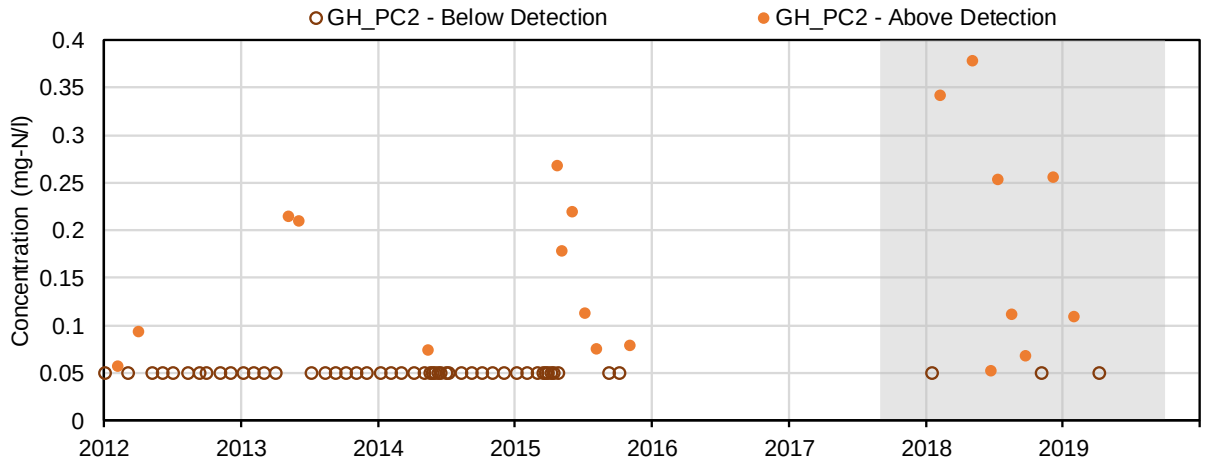
(37) Nitrite (mg-N/l); Nutrients and Biological Indicators



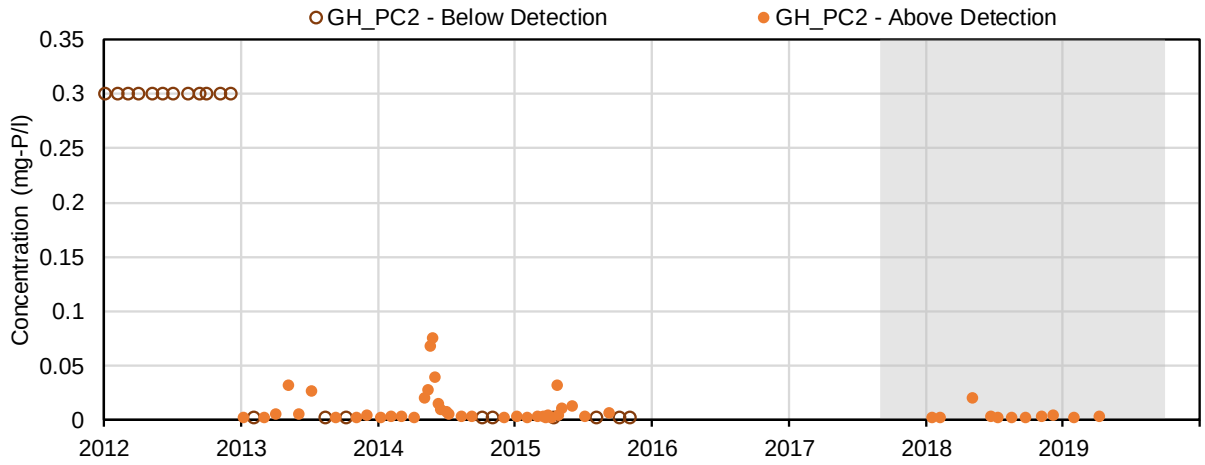
(38) Total ammonia (mg-N/l); Nutrients and Biological Indicators



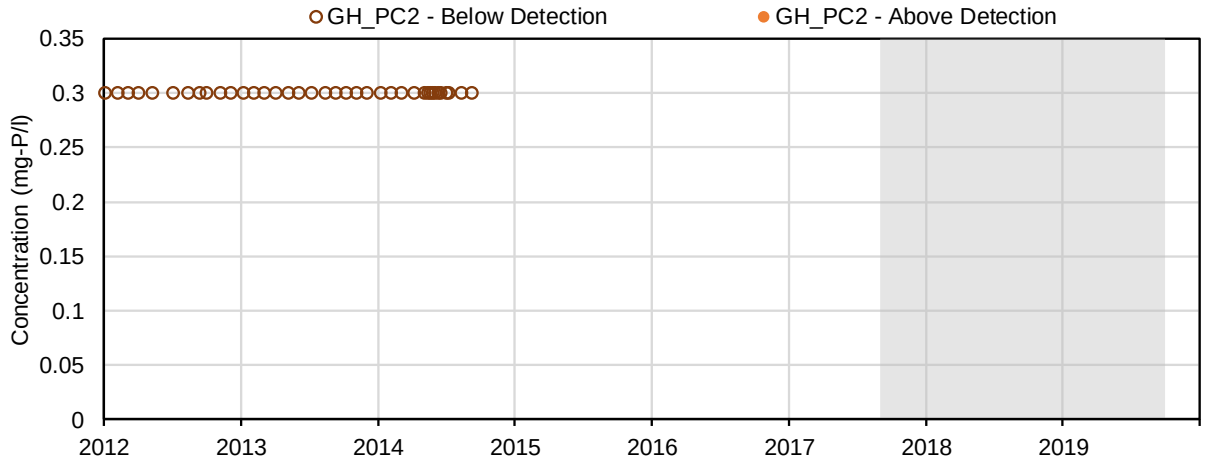
(39) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



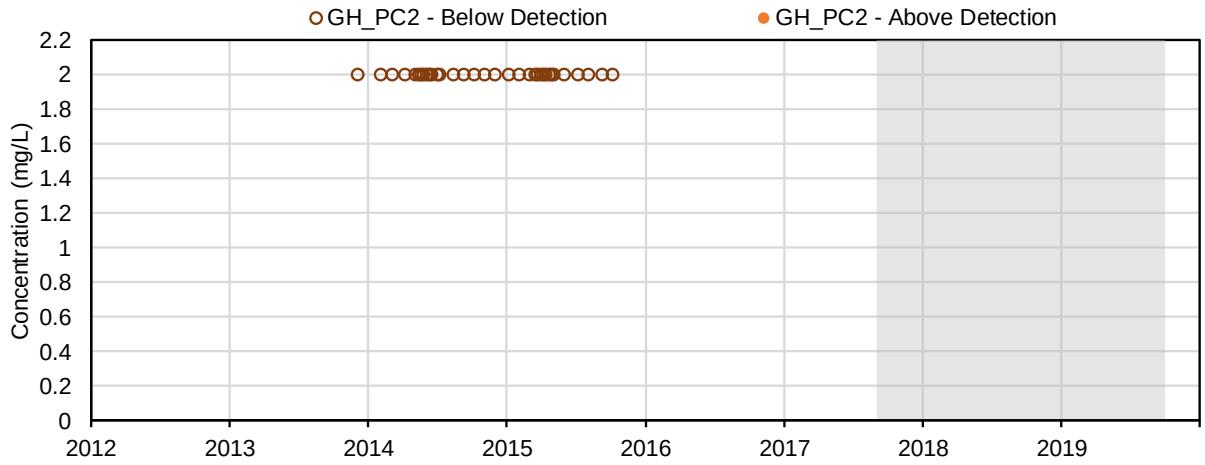
(40) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



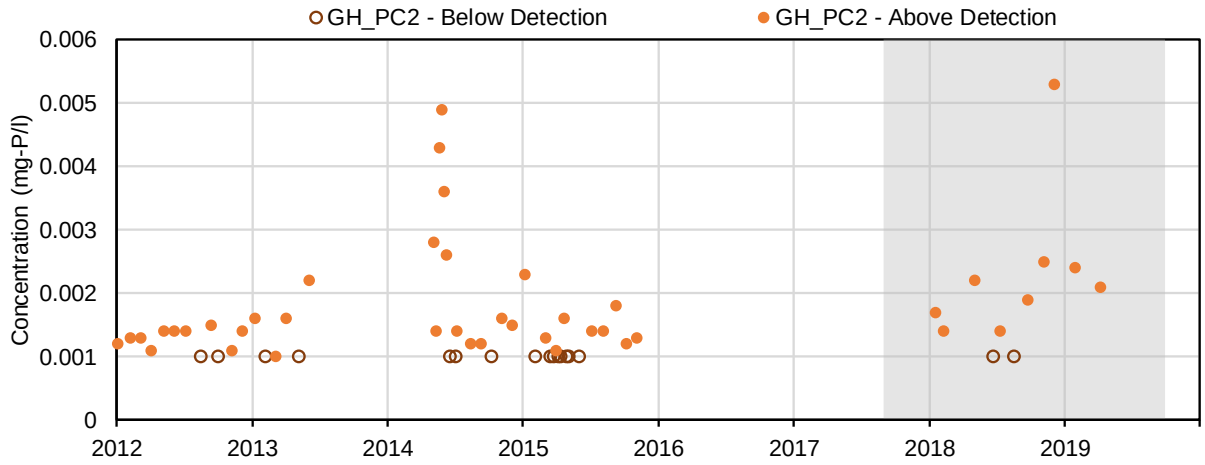
(41) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



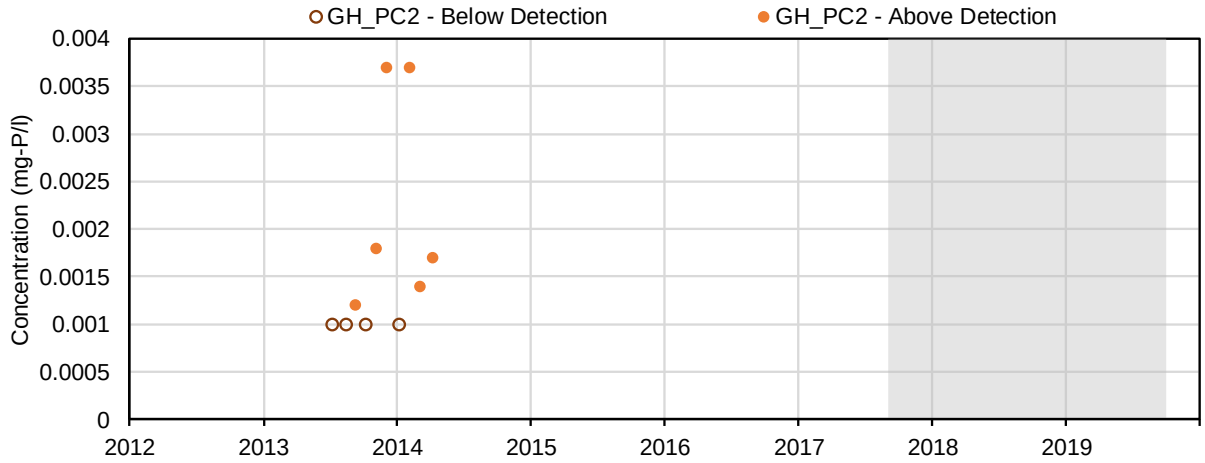
(42) Biochemical oxygen demand (mg/L); Nutrients and Biological Indicators



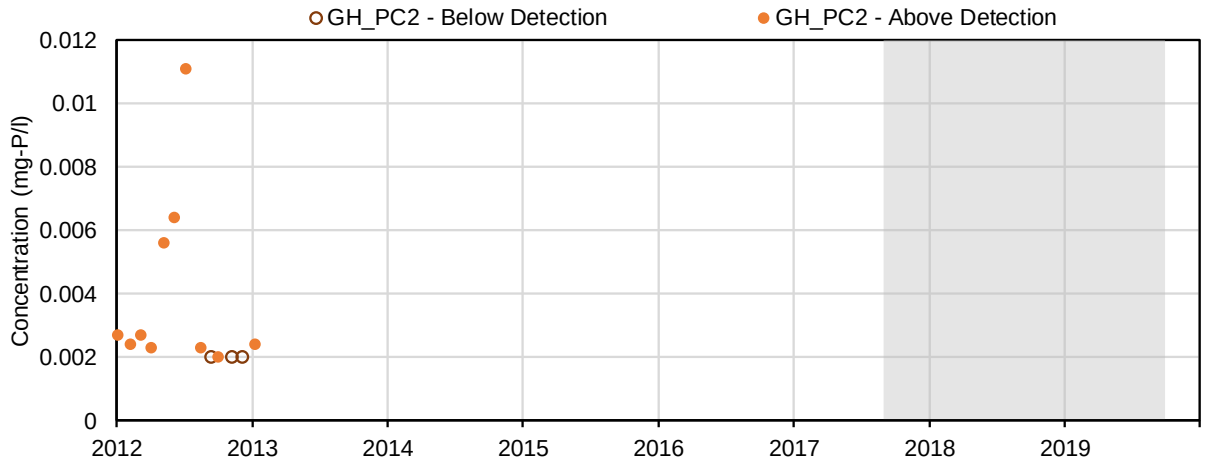
(43) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



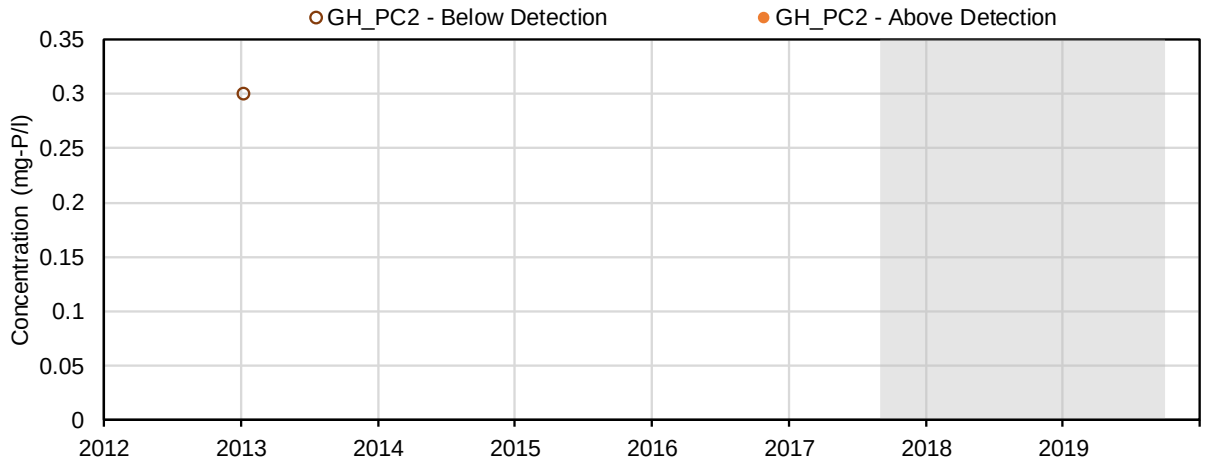
(44) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



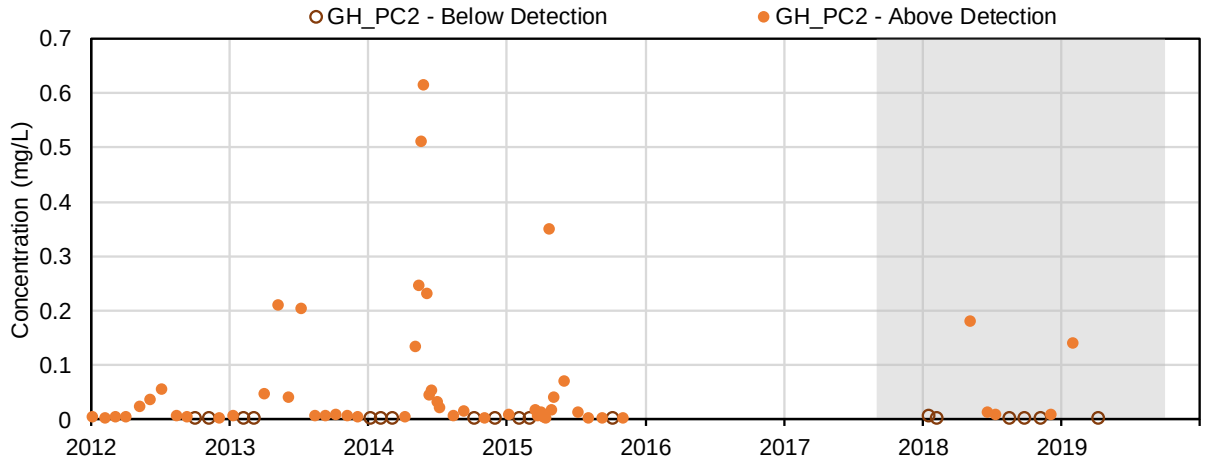
(45) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



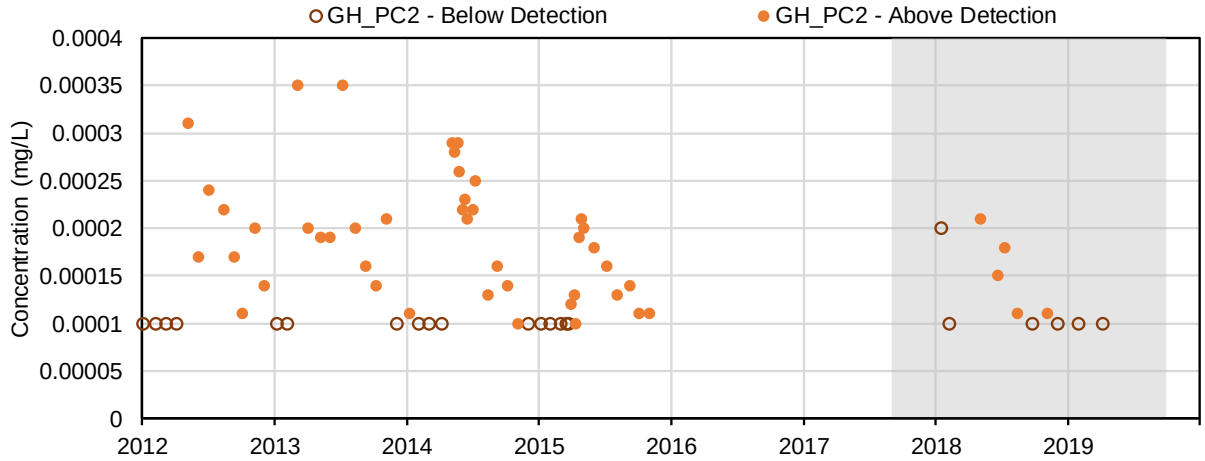
(46) Dissolved Phosphate (mg-P/l); Nutrients and Biological Indicators



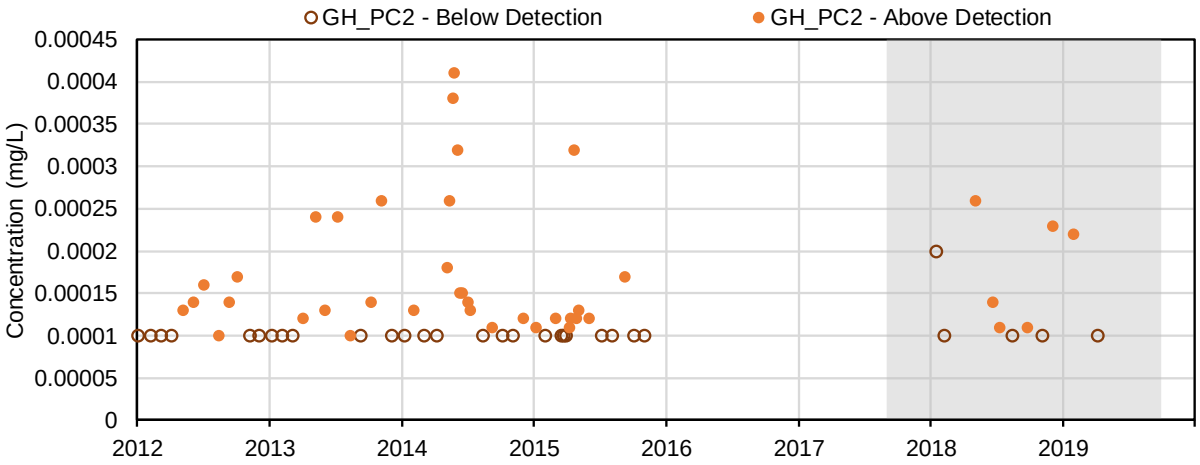
(47) Aluminum (mg/L); Total Metals



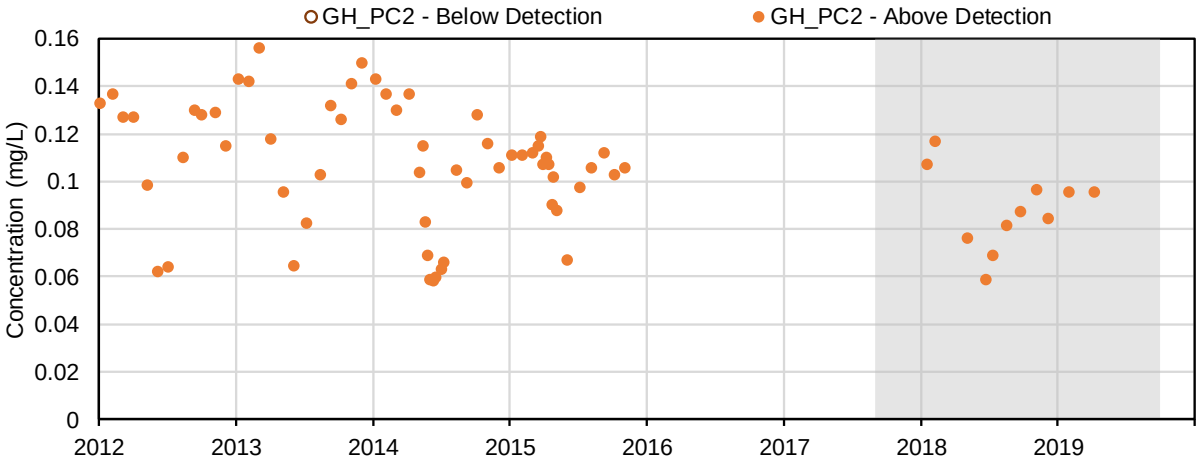
(48) Antimony (mg/L); Total Metals



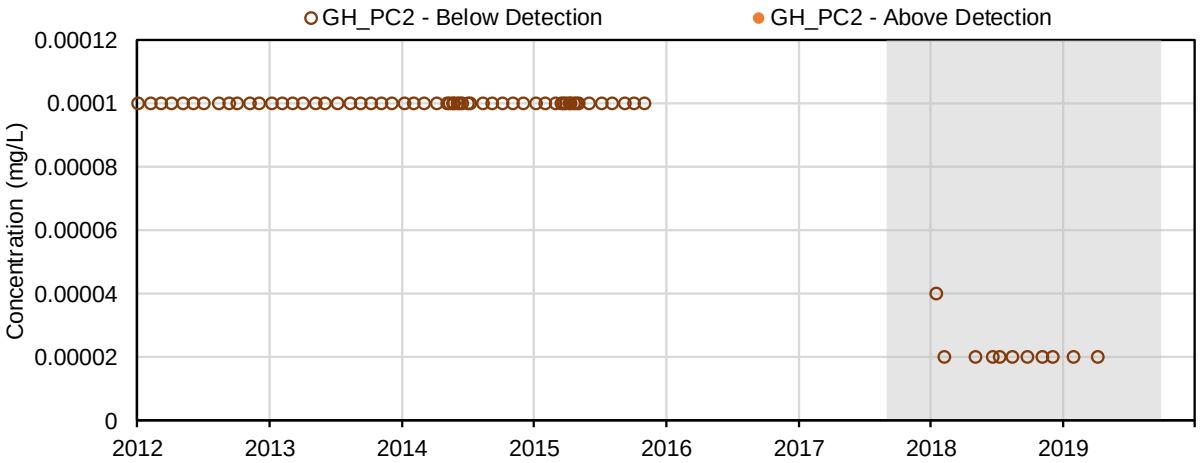
(49) Arsenic (mg/L); Total Metals



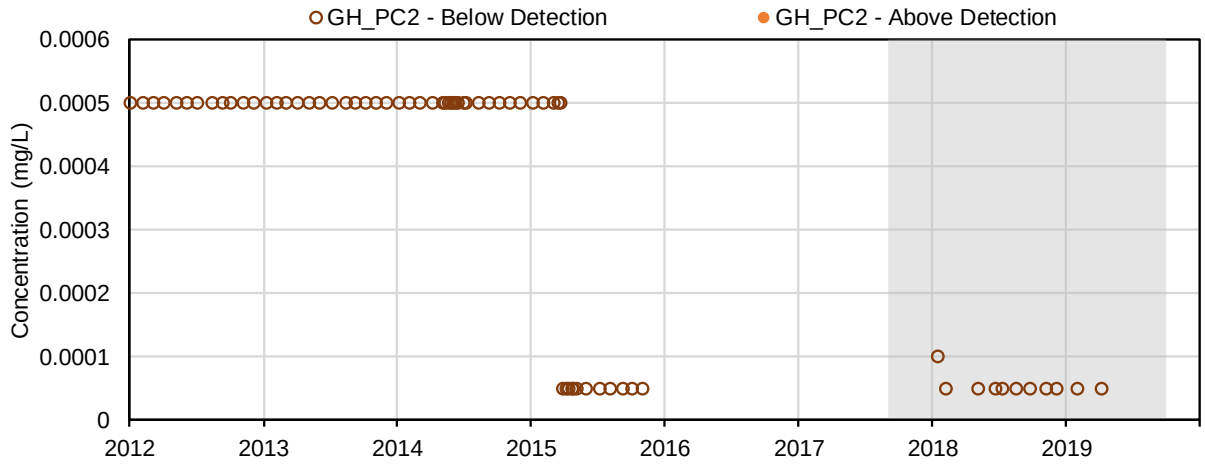
(50) Barium (mg/L); Total Metals



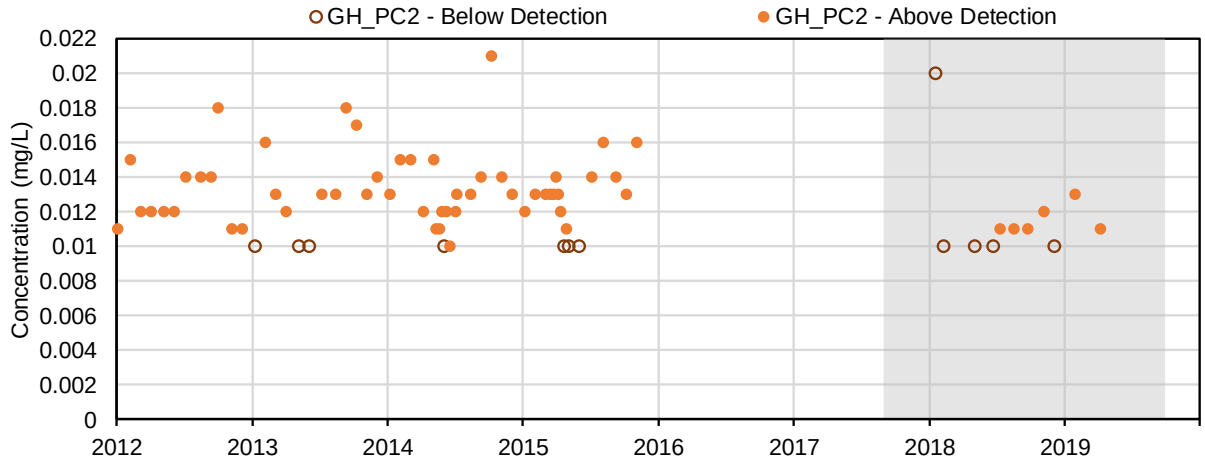
(51) Beryllium (mg/L); Total Metals



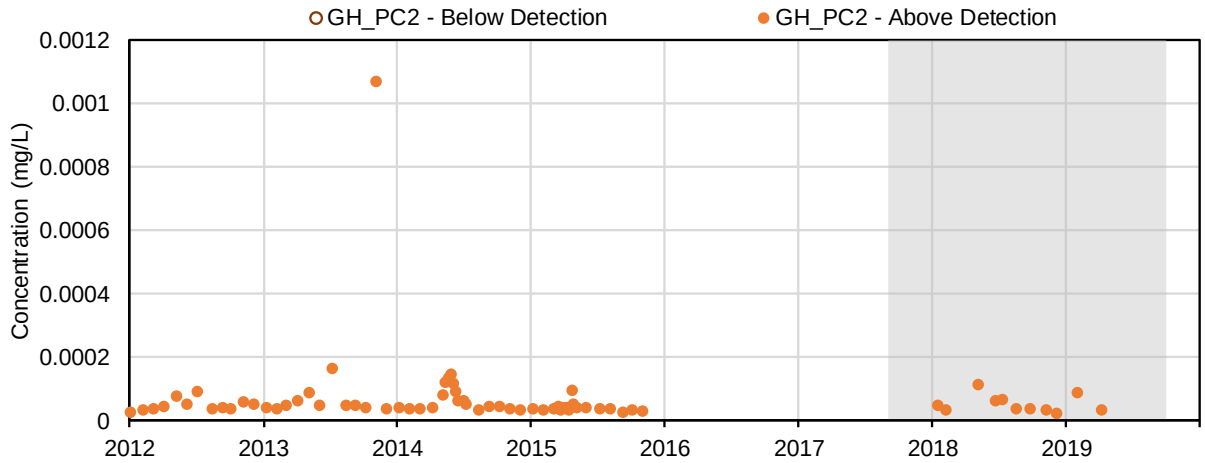
(52) Bismuth (mg/L); Total Metals



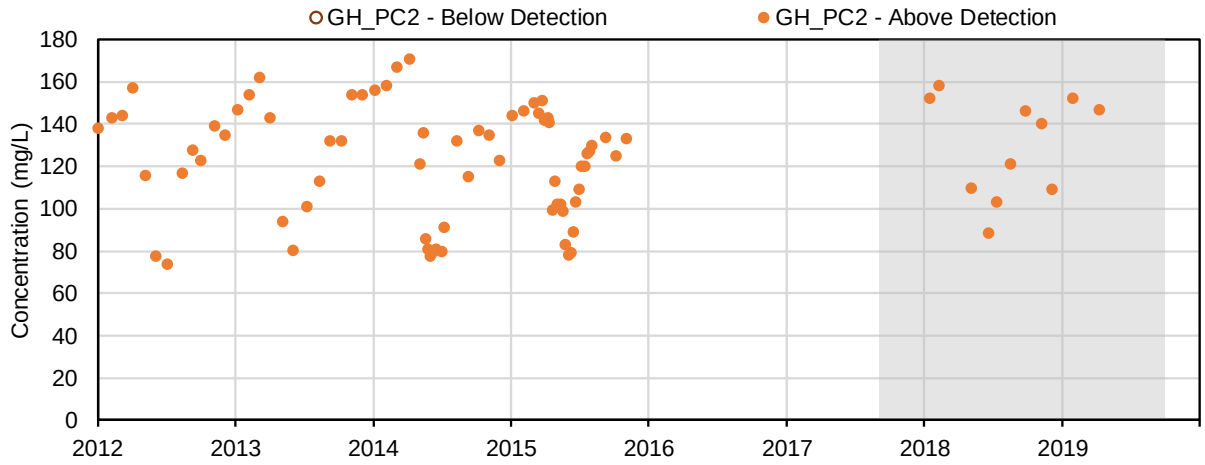
(53) Boron (mg/L); Total Metals



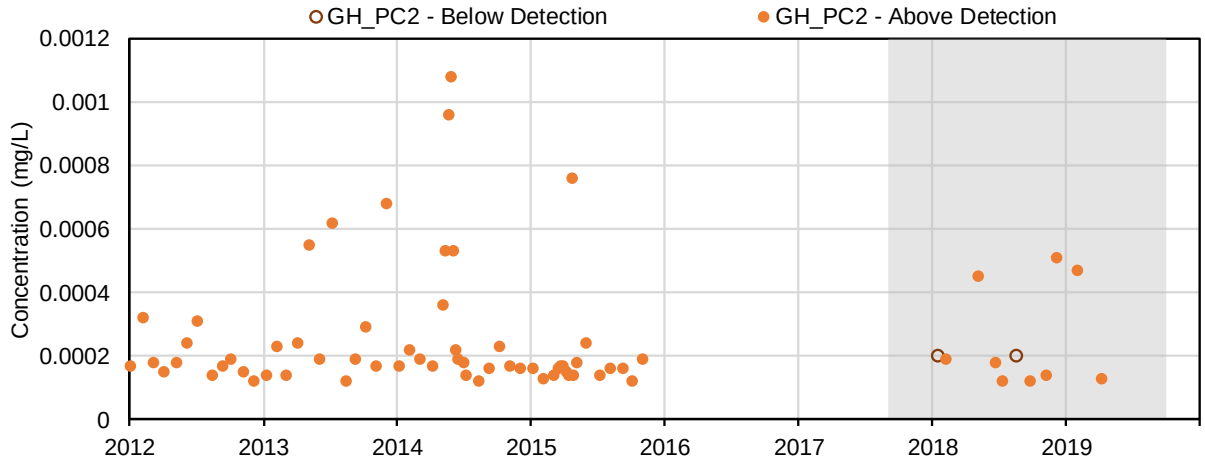
(54) Cadmium (mg/L); Total Metals



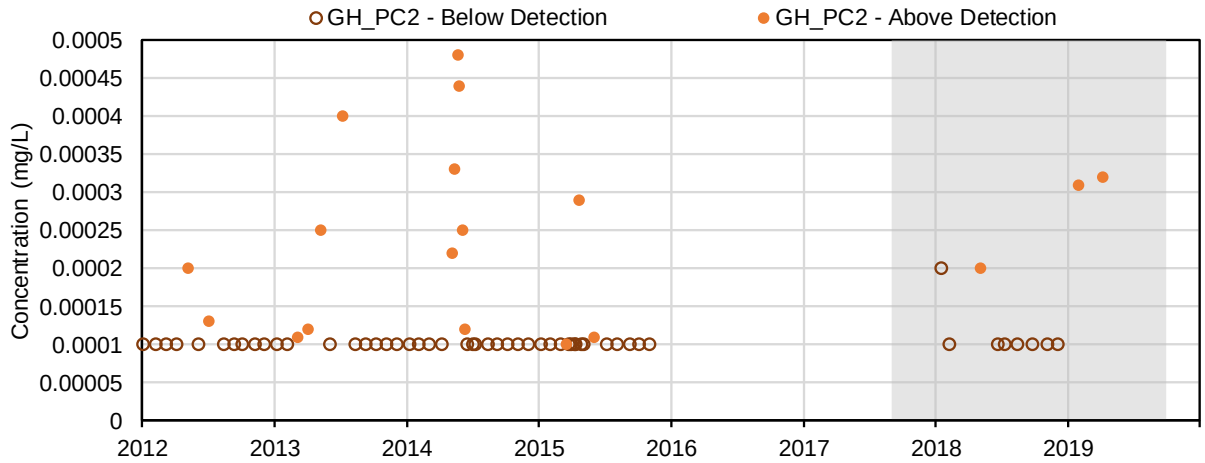
(55) Calcium (mg/L); Total Metals



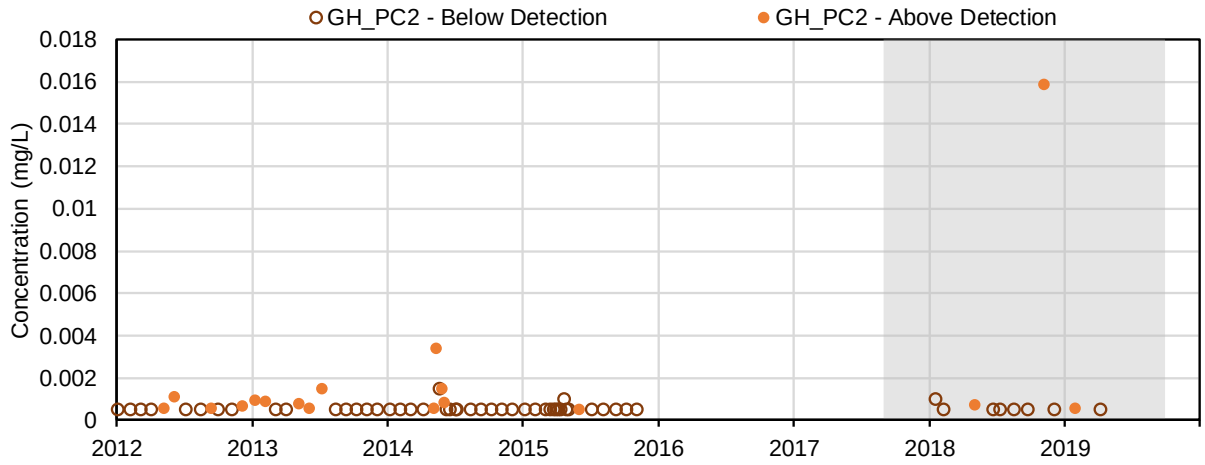
(56) Chromium (mg/L); Total Metals



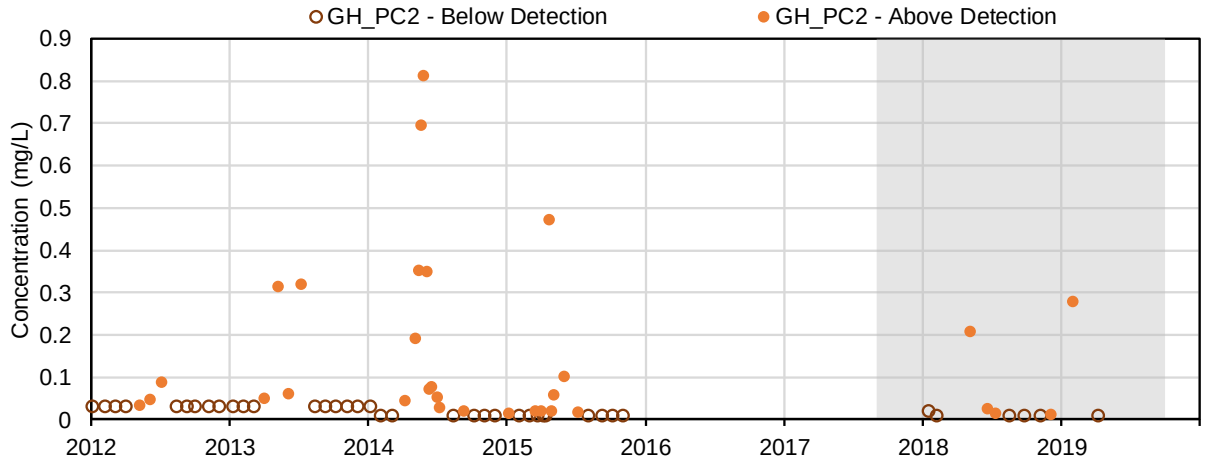
(57) Cobalt (mg/L); Total Metals



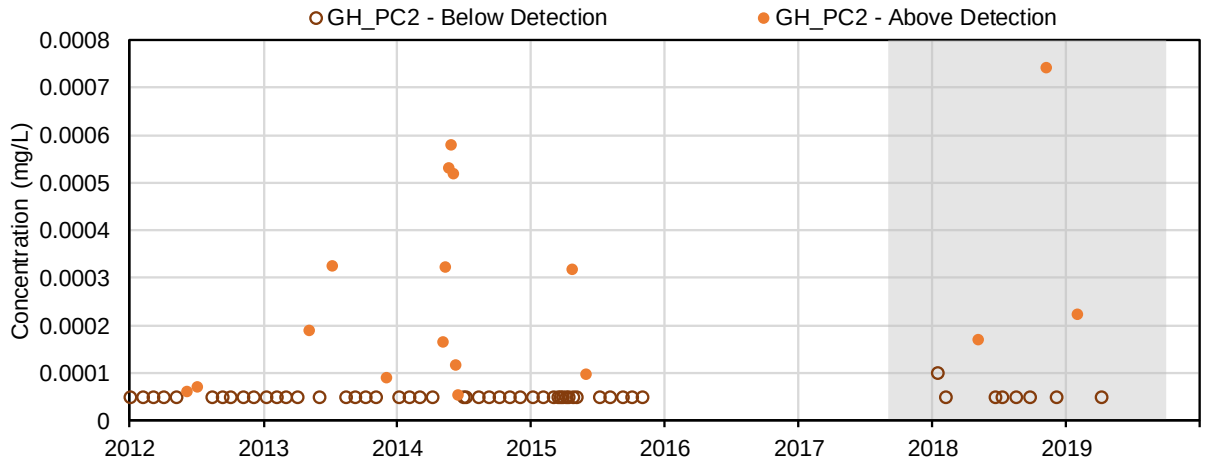
(58) Copper (mg/L); Total Metals



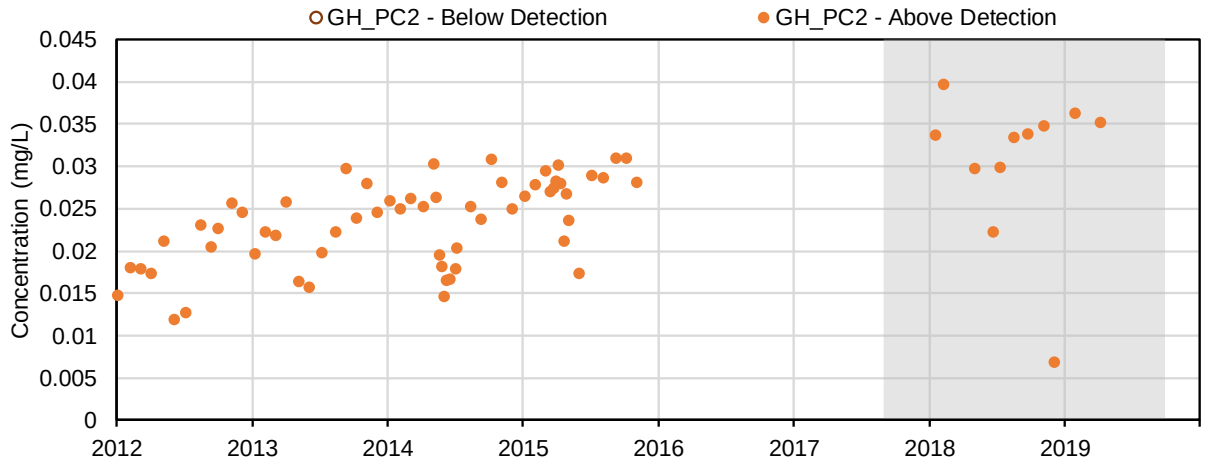
(59) Iron (mg/L); Total Metals



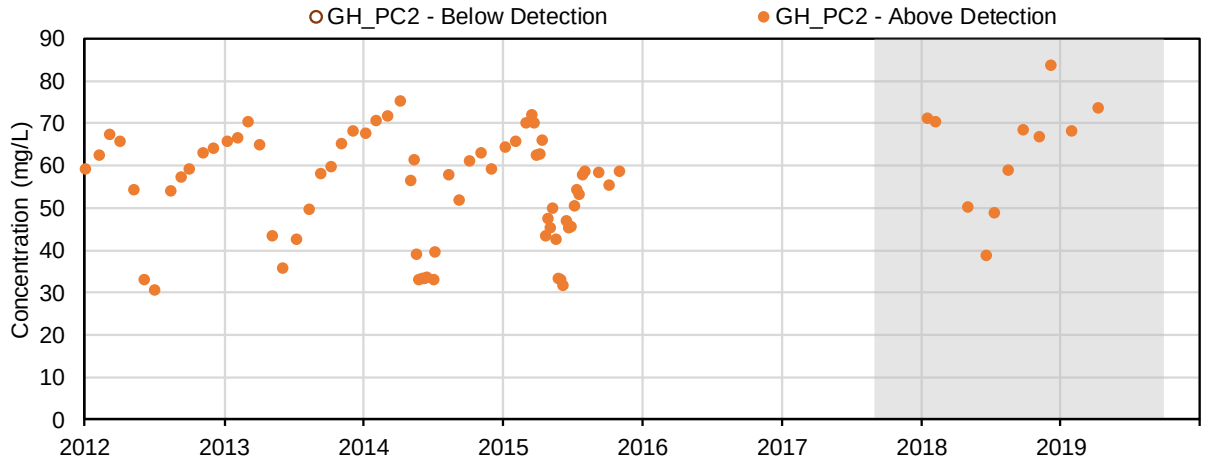
(60) Lead (mg/L); Total Metals



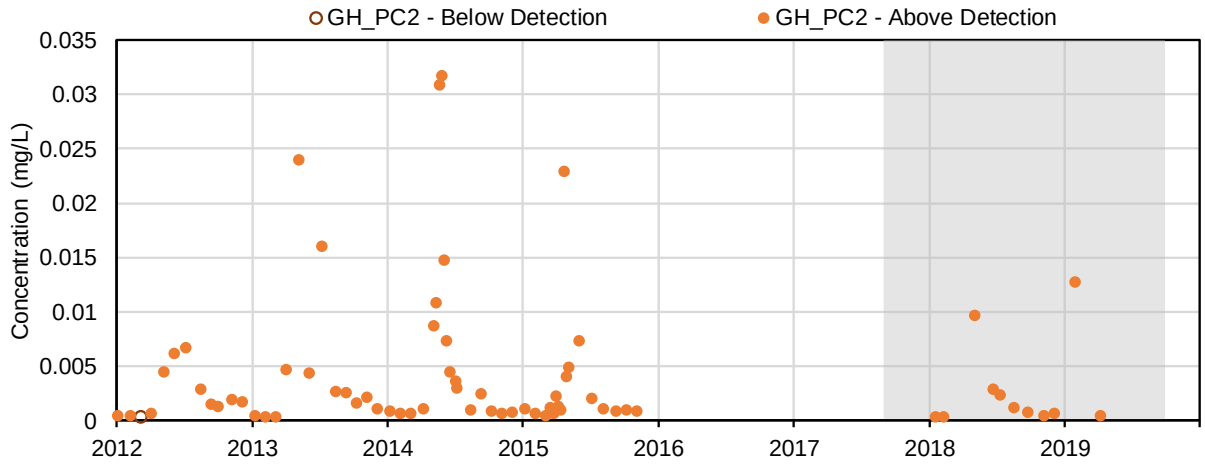
(61) Lithium (mg/L); Total Metals



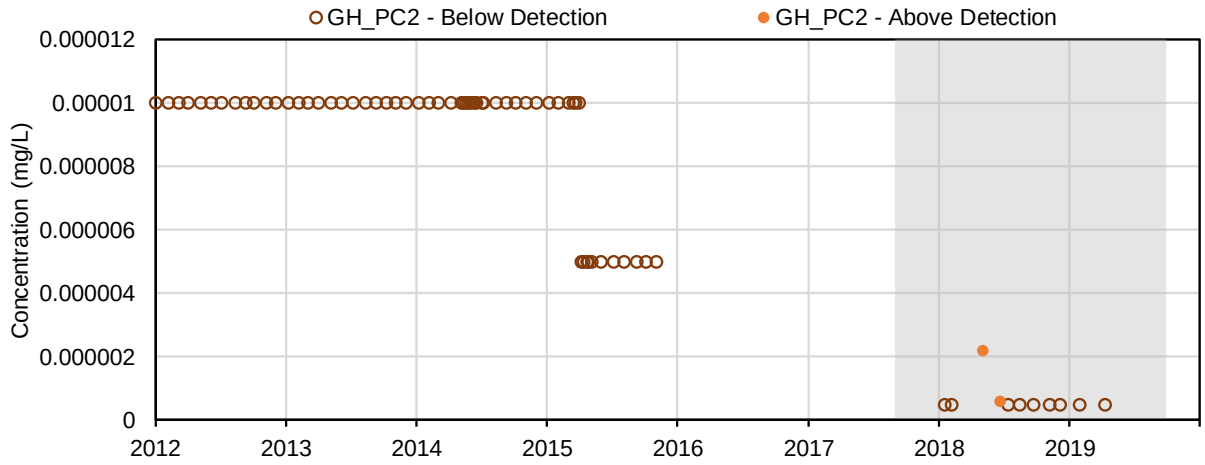
(62) Magnesium (mg/L); Total Metals



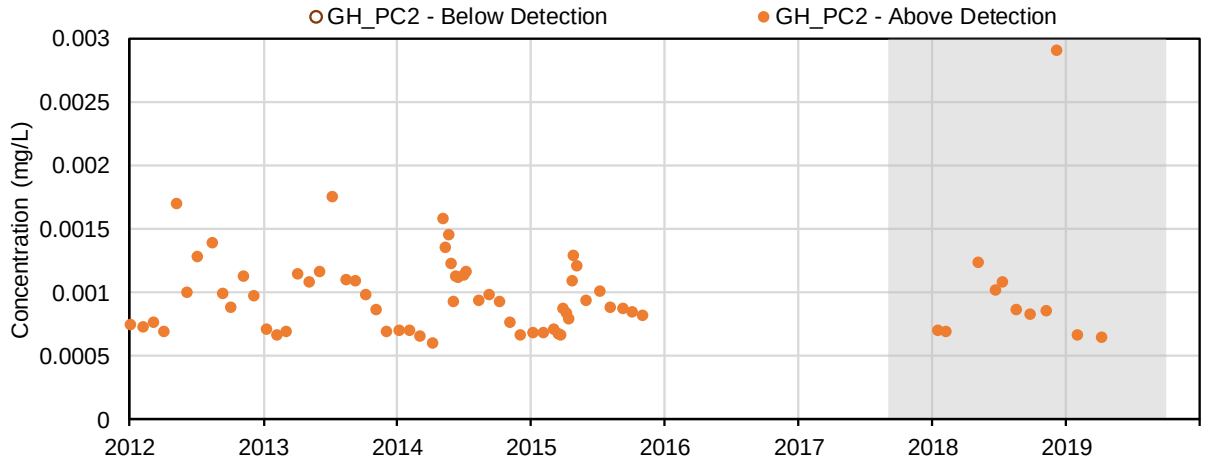
(63) Manganese (mg/L); Total Metals



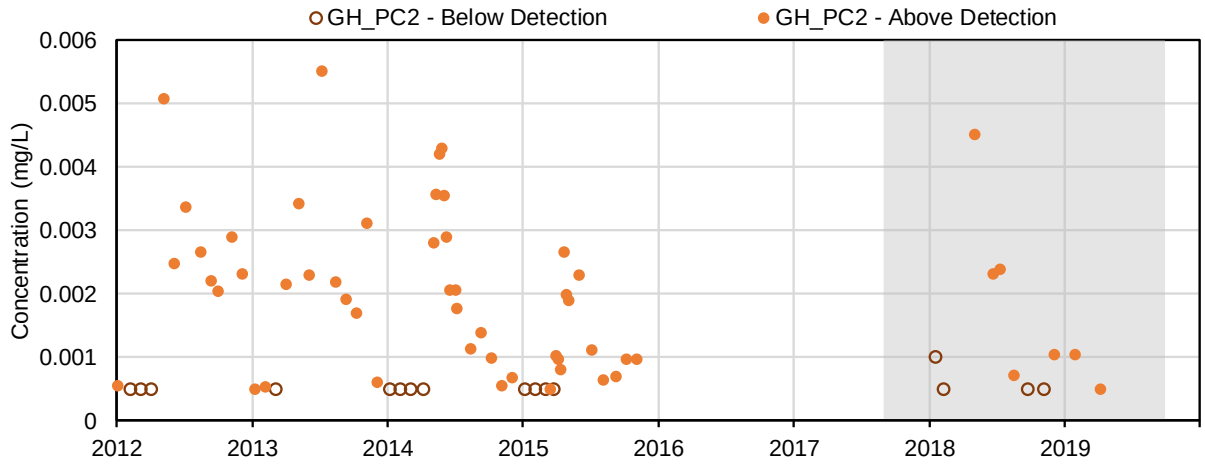
(64) Mercury (mg/L); Total Metals



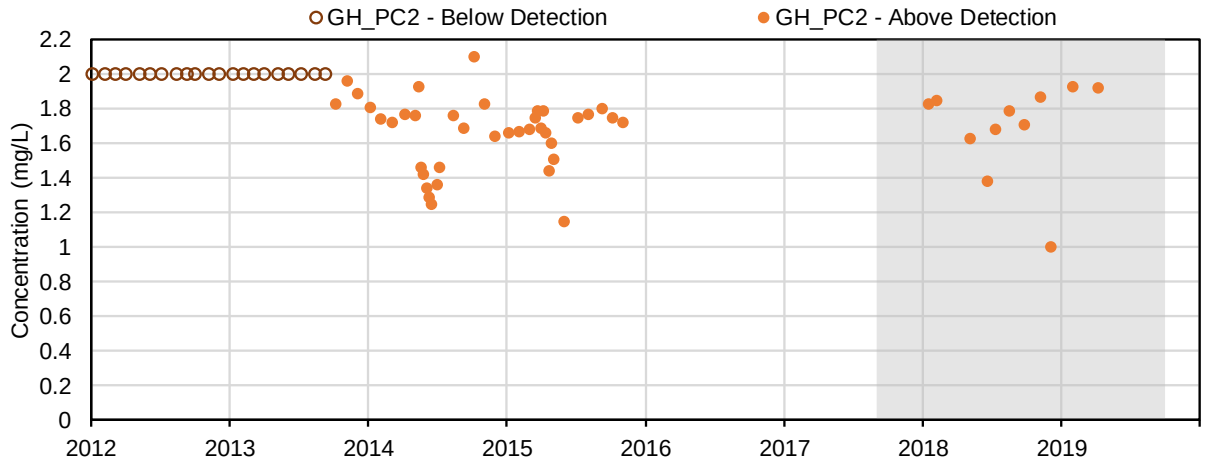
(65) Molybdenum (mg/L); Total Metals



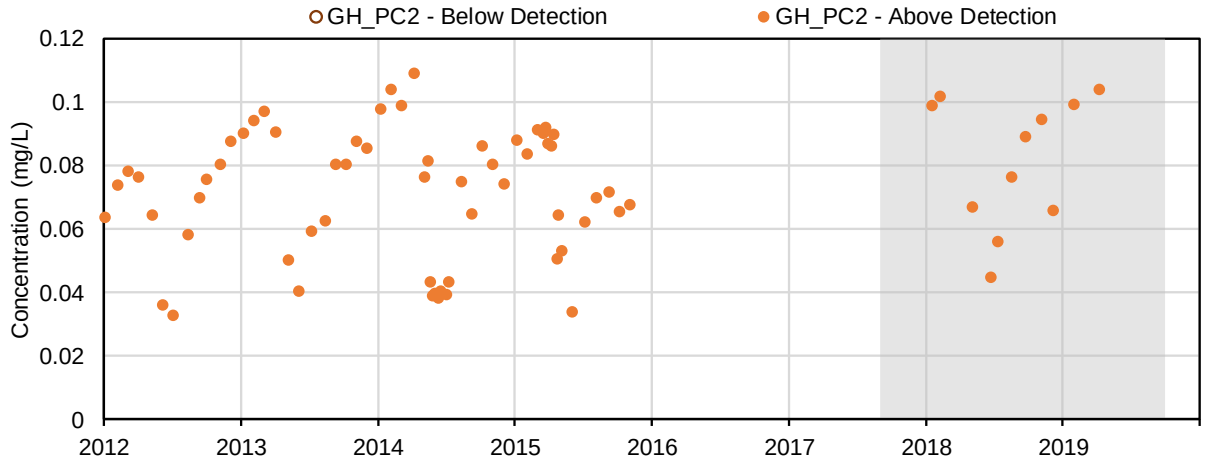
(66) Nickel (mg/L); Total Metals



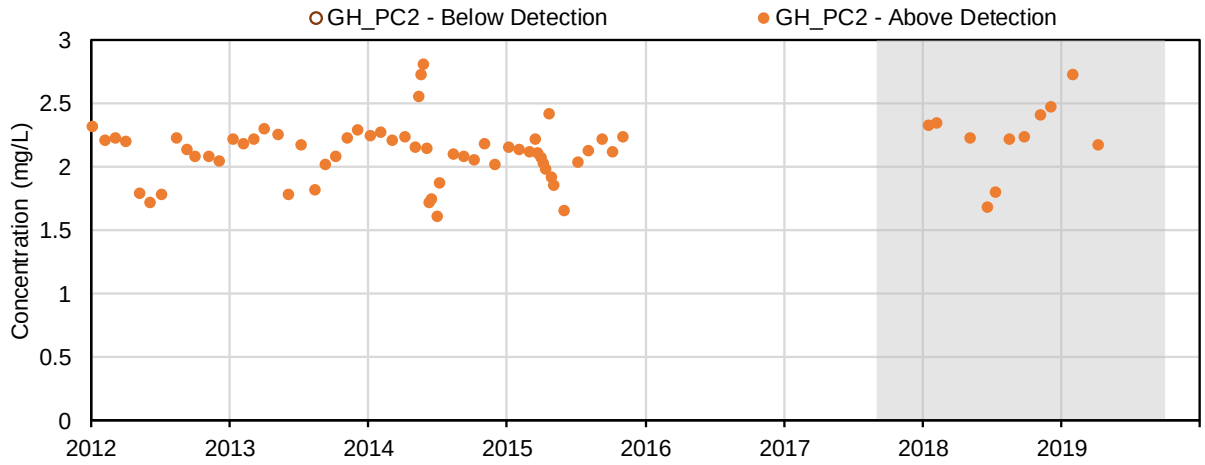
(67) Potassium (mg/L); Total Metals



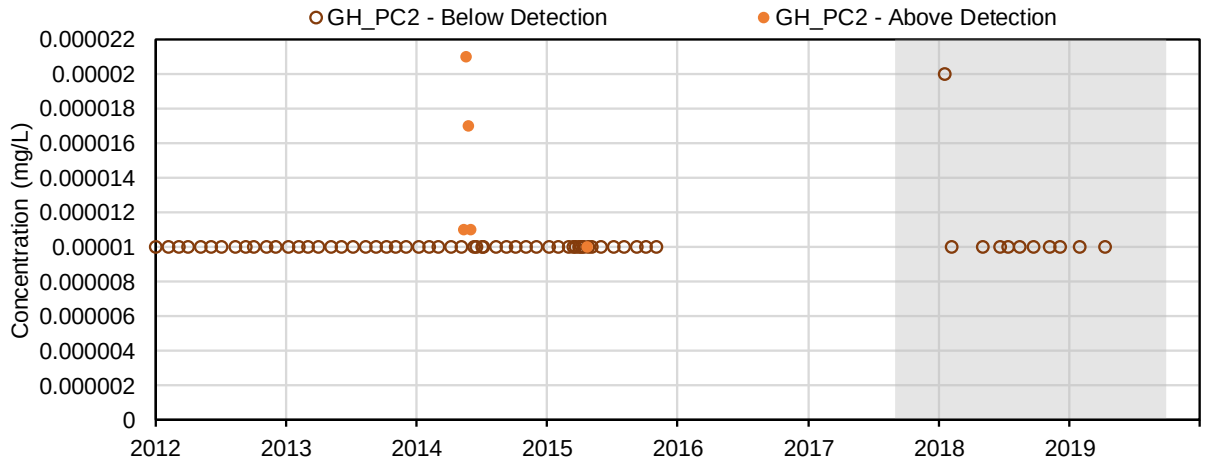
(68) Selenium (mg/L); Total Metals



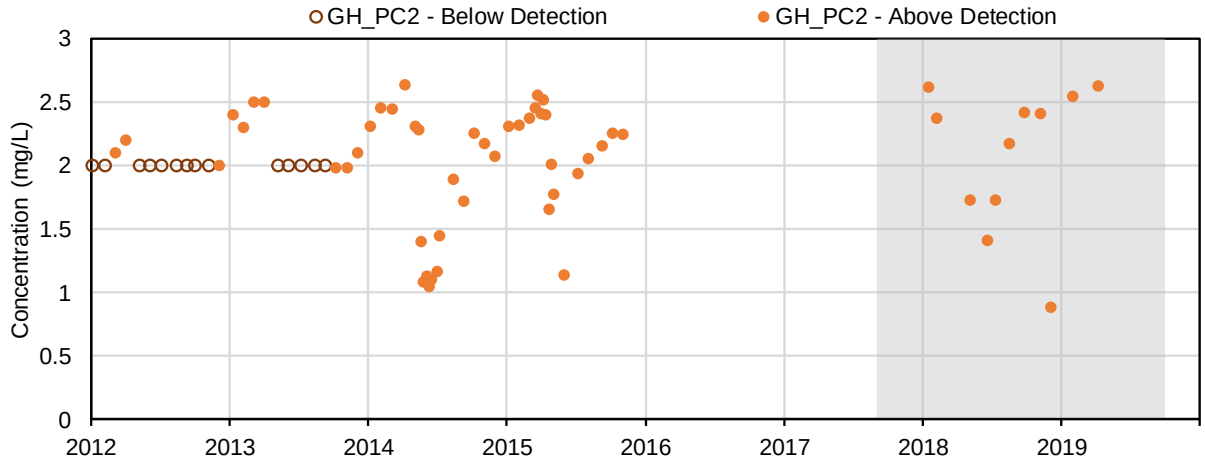
(69) Silicon (mg/L); Total Metals



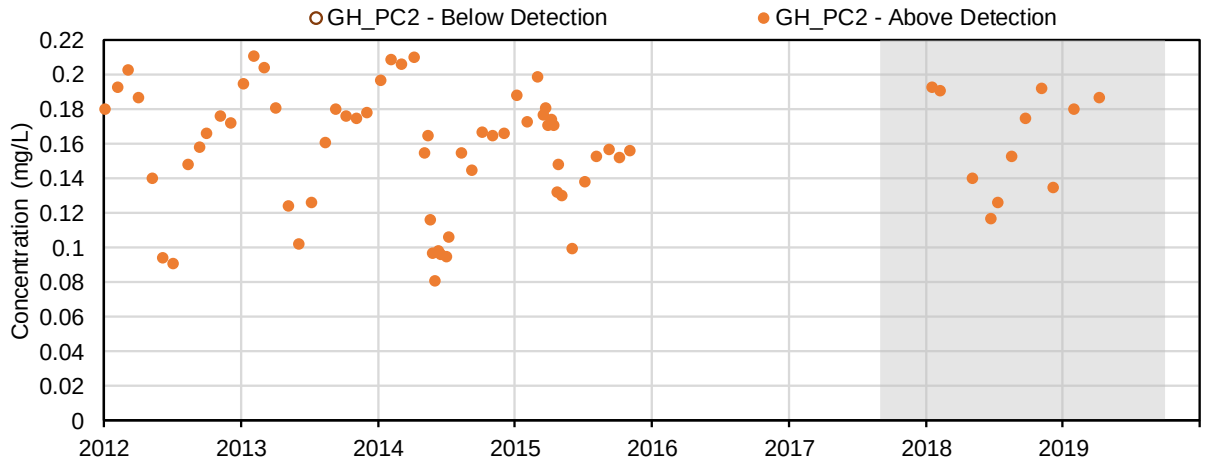
(70) Silver (mg/L); Total Metals



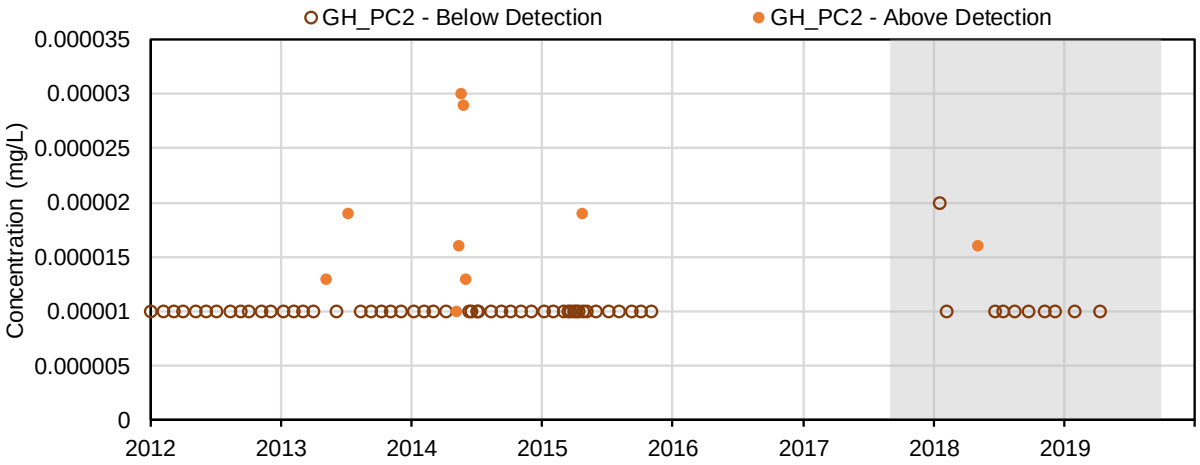
(71) Sodium (mg/L); Total Metals



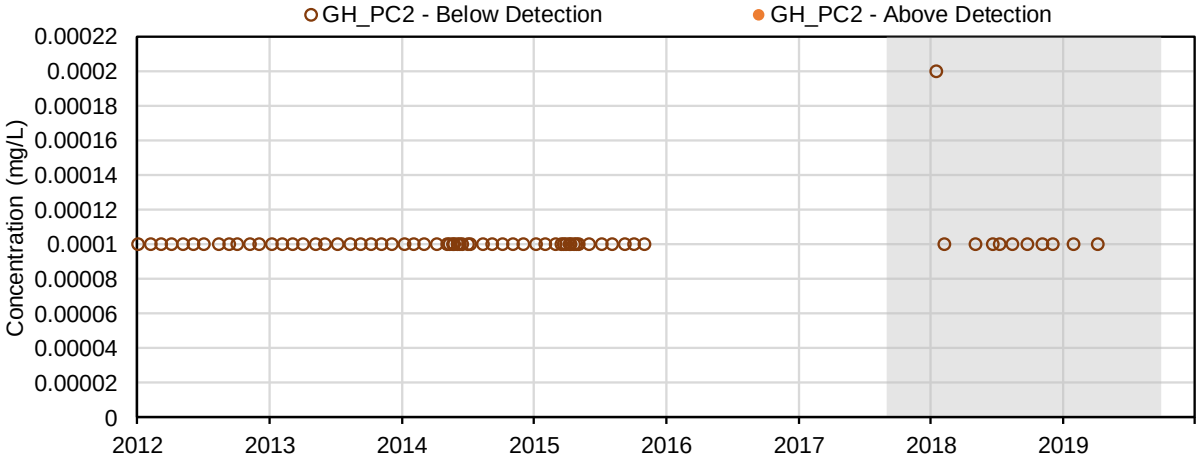
(72) Strontium (mg/L); Total Metals



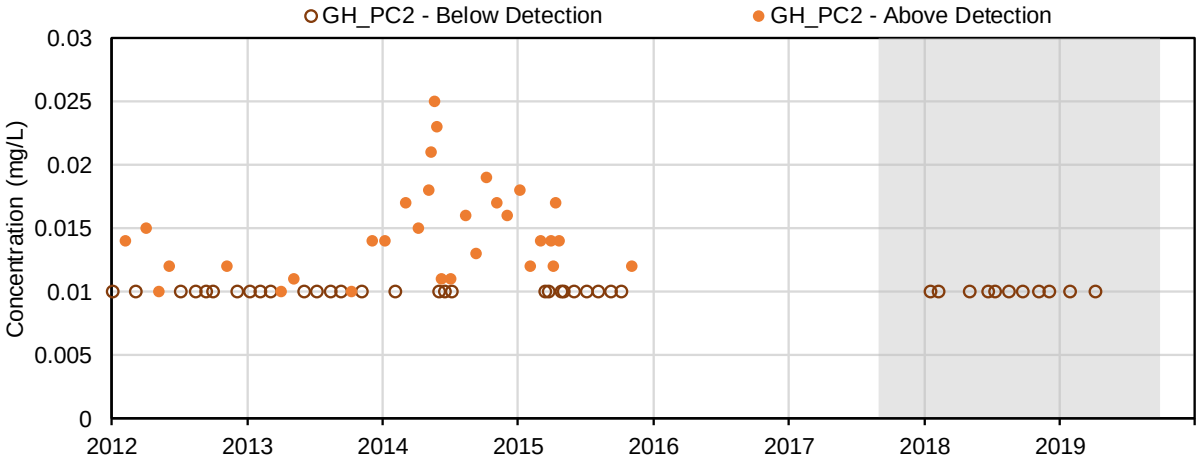
(73) Thallium (mg/L); Total Metals



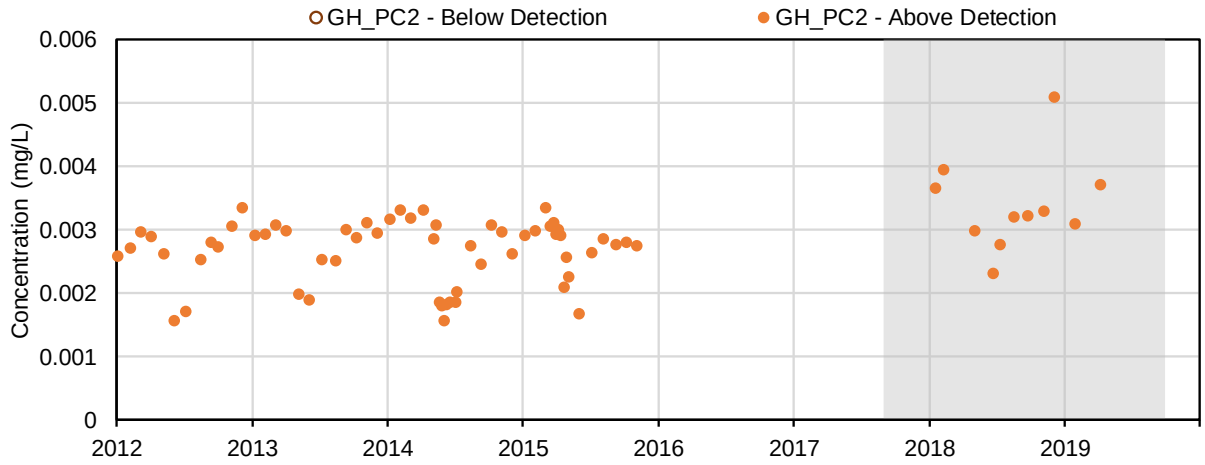
(74) Tin (mg/L); Total Metals



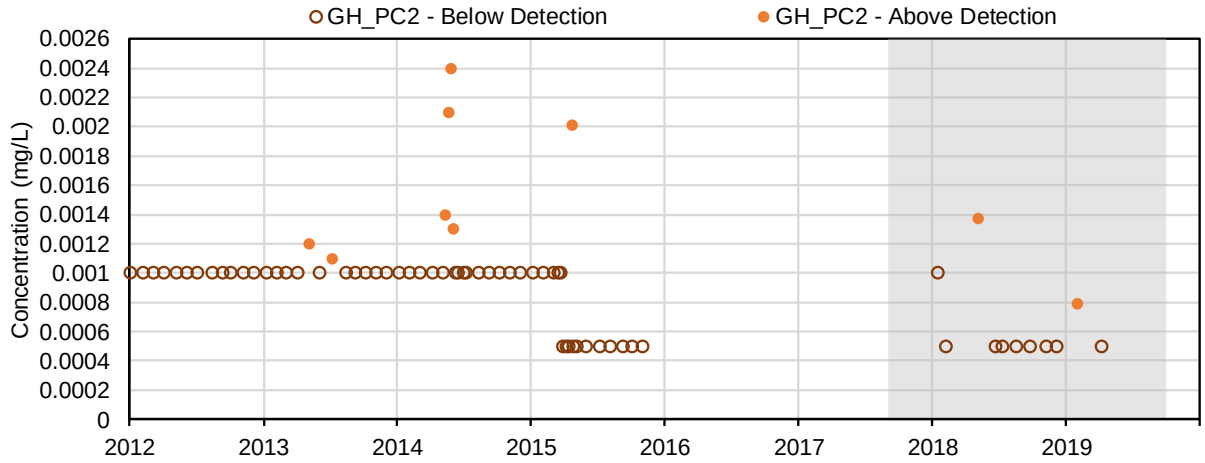
(75) Titanium (mg/L); Total Metals



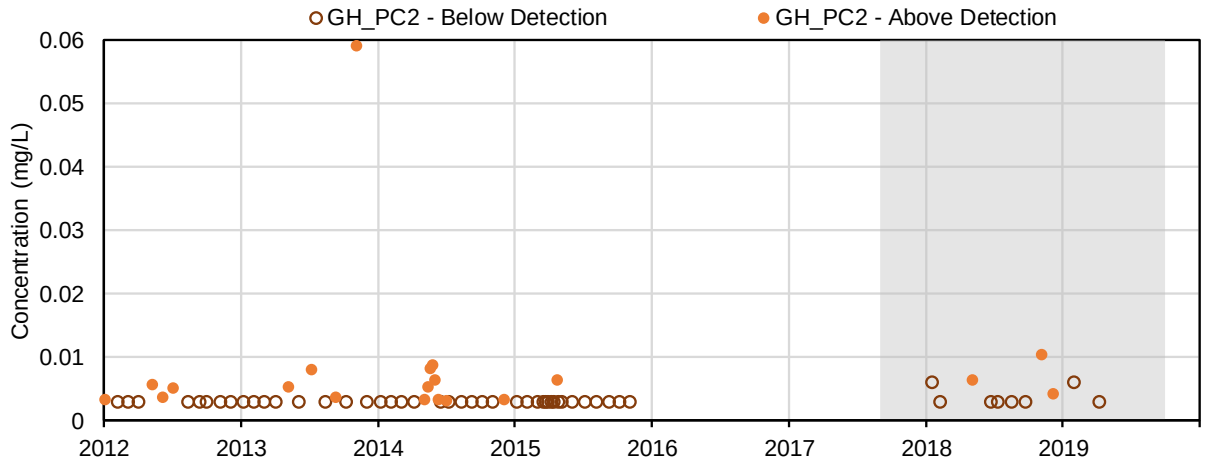
(76) Uranium (mg/L); Total Metals



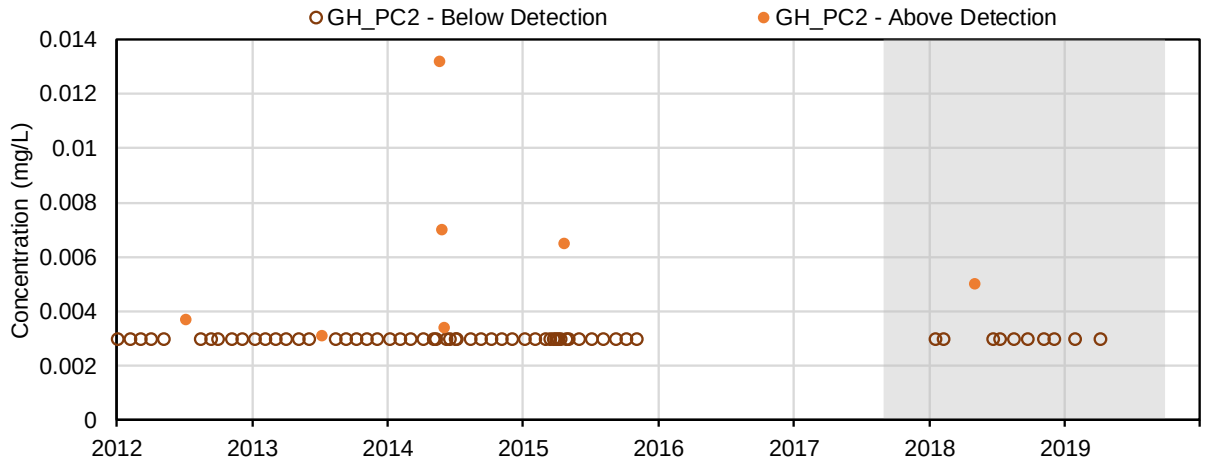
(77) Vanadium (mg/L); Total Metals



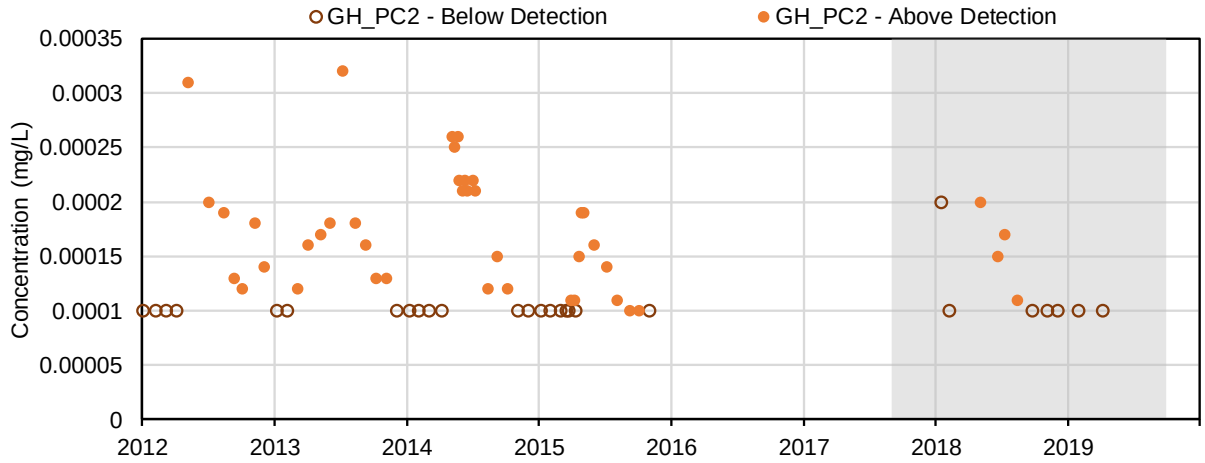
(78) Zinc (mg/L); Total Metals



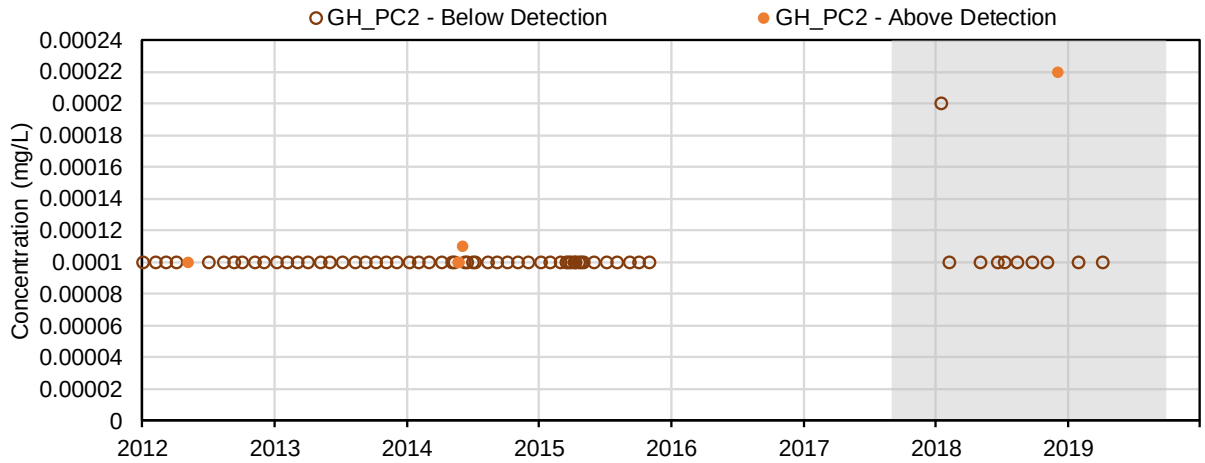
(79) Aluminum (mg/L); Dissolved Metals



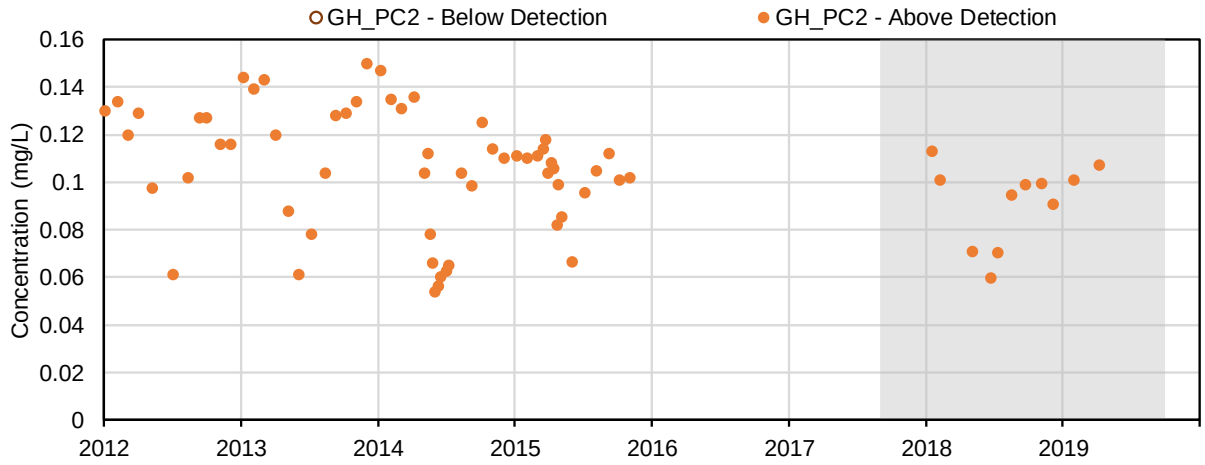
(80) Antimony (mg/L); Dissolved Metals



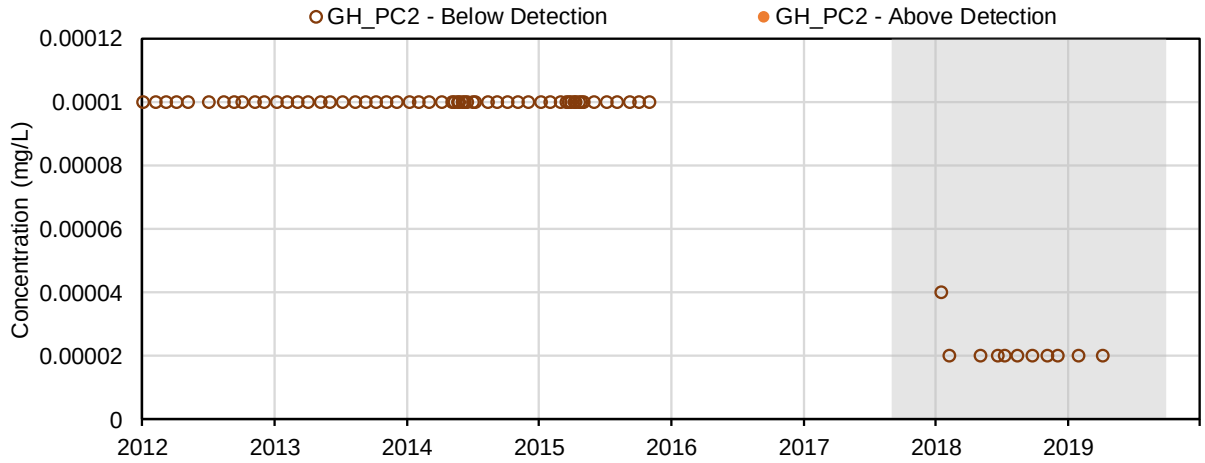
(81) Arsenic (mg/L); Dissolved Metals



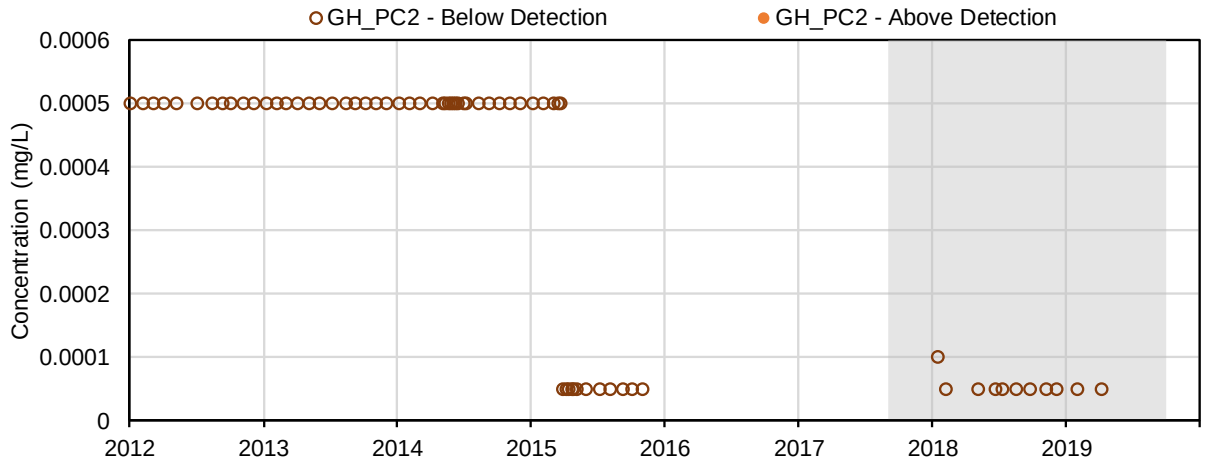
(82) Barium (mg/L); Dissolved Metals



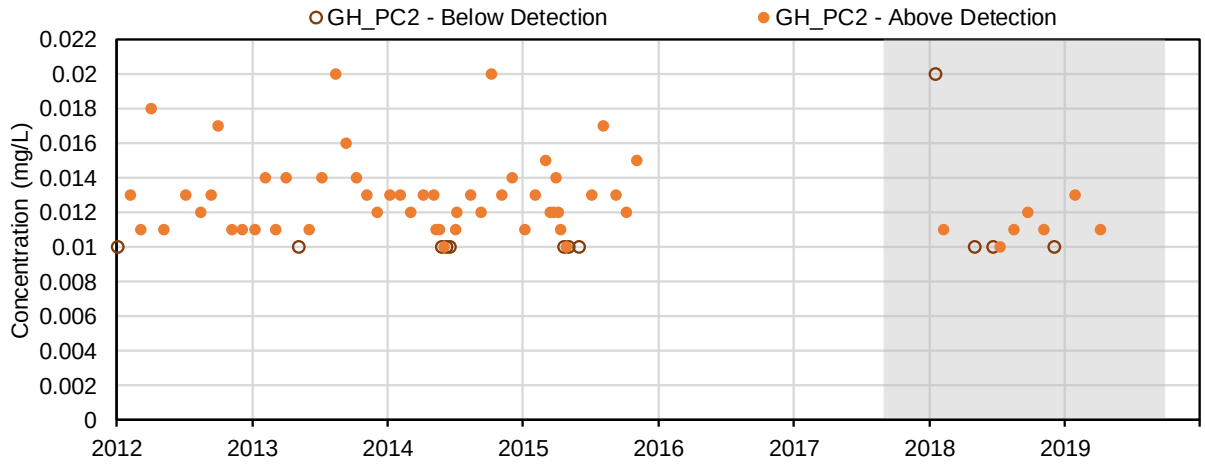
(83) Beryllium (mg/L); Dissolved Metals



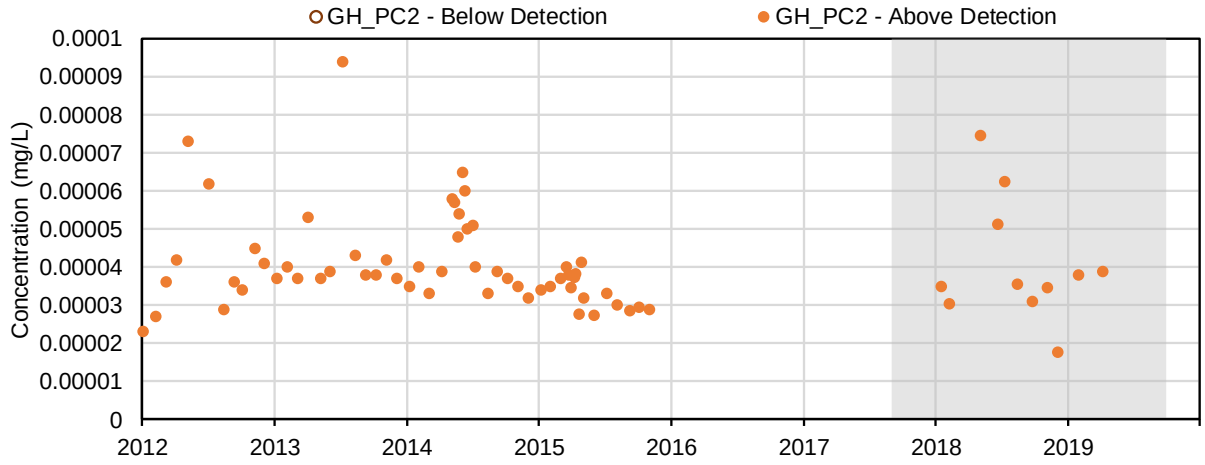
(84) Bismuth (mg/L); Dissolved Metals



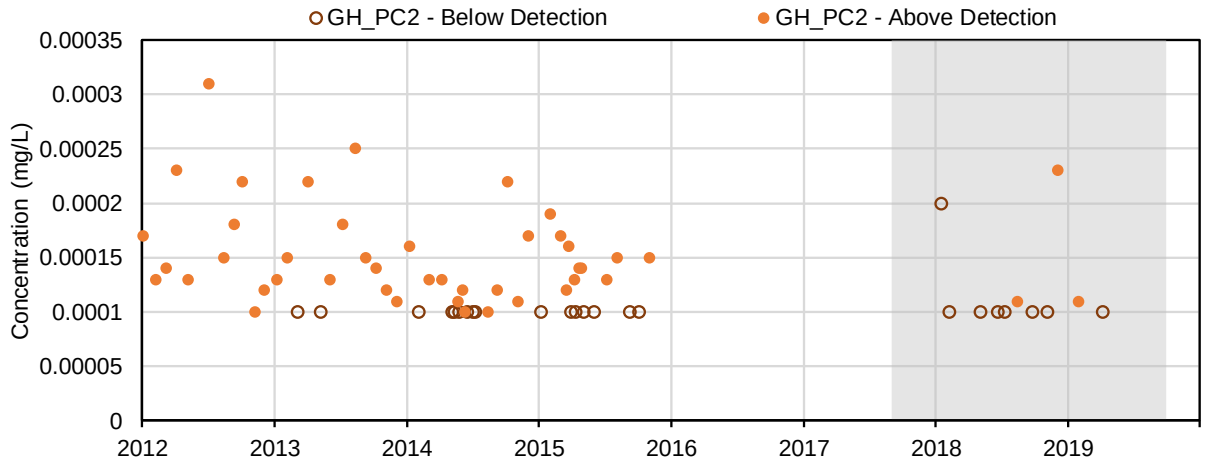
(85) Boron (mg/L); Dissolved Metals



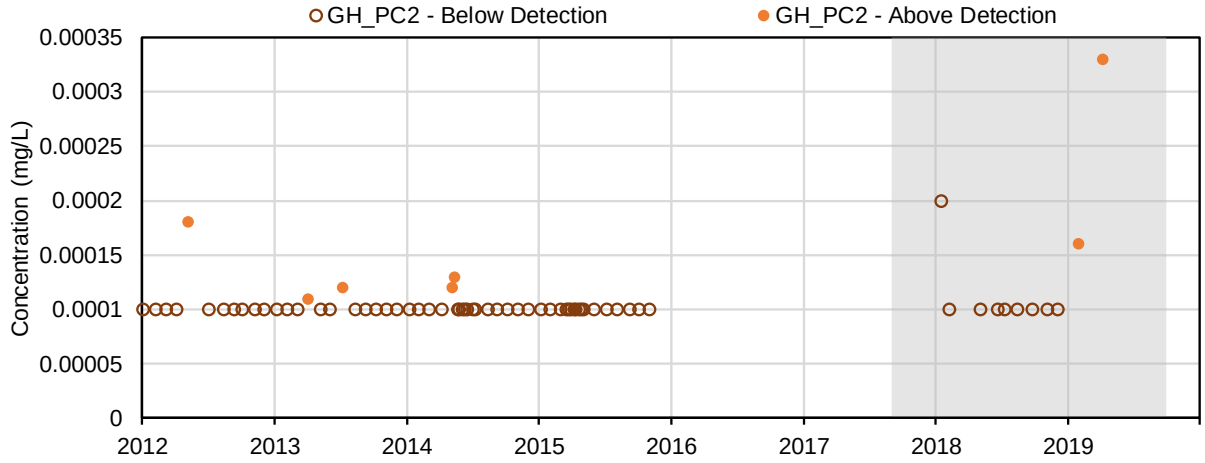
(86) Cadmium (mg/L); Dissolved Metals



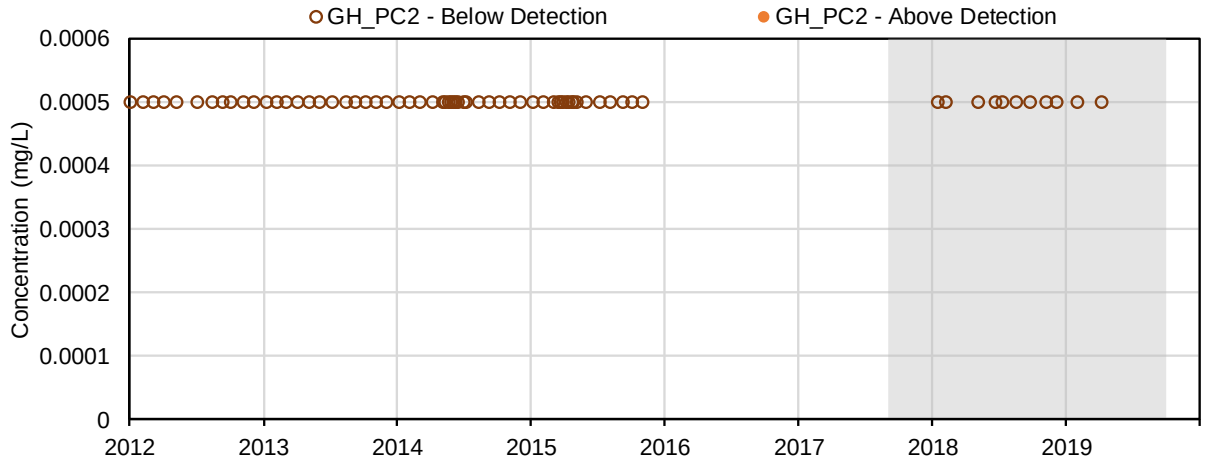
(87) Chromium (mg/L); Dissolved Metals



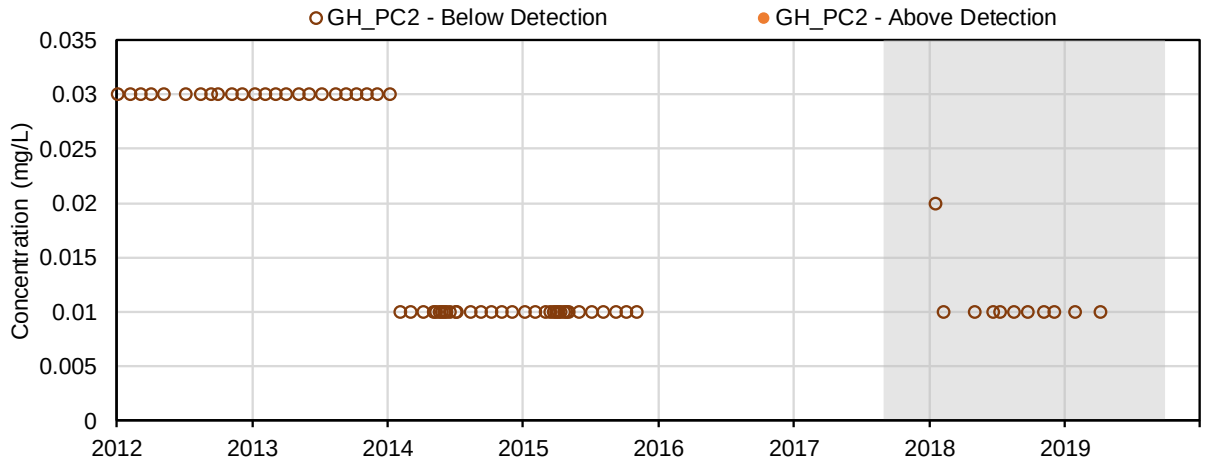
(88) Cobalt (mg/L); Dissolved Metals



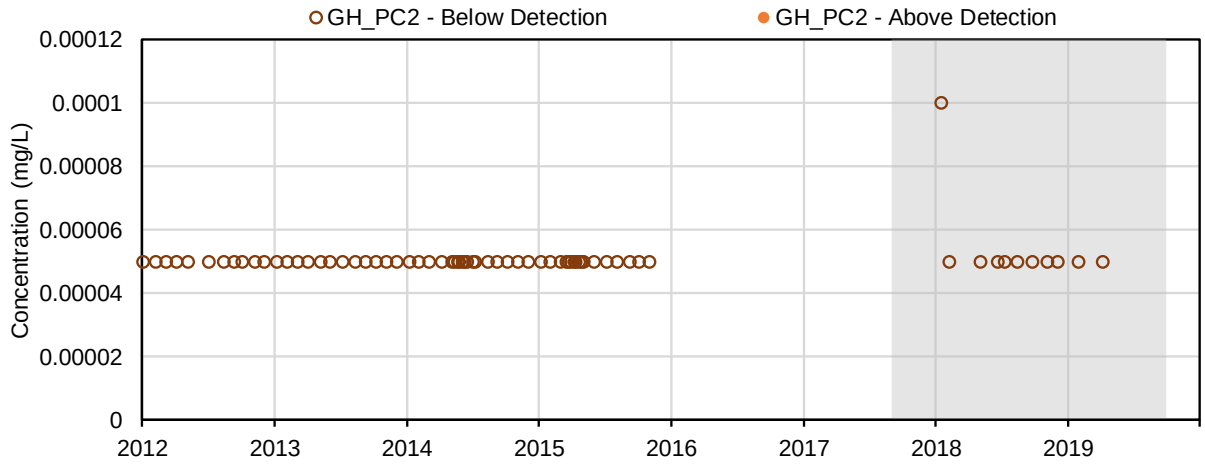
(89) Copper (mg/L); Dissolved Metals



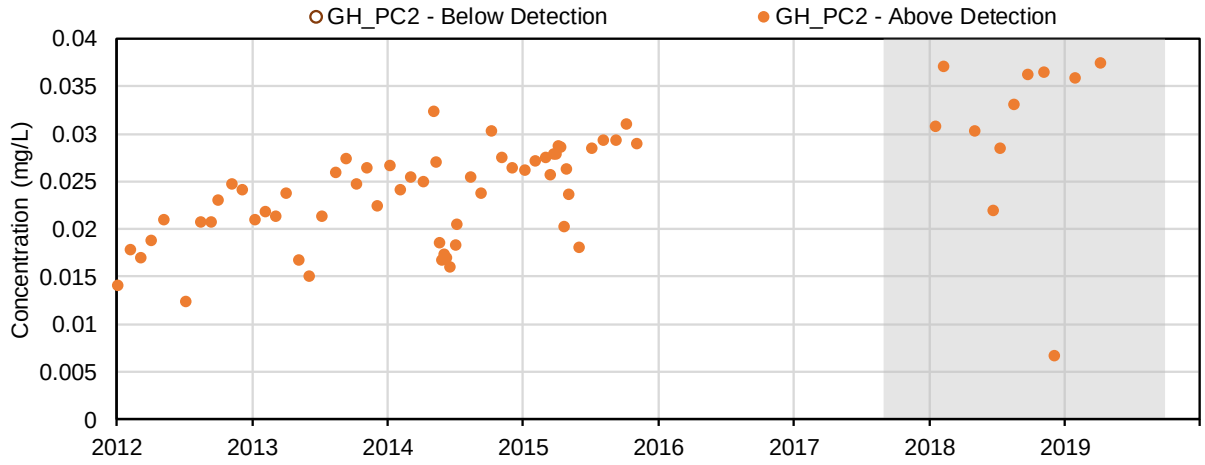
(90) Iron (mg/L); Dissolved Metals



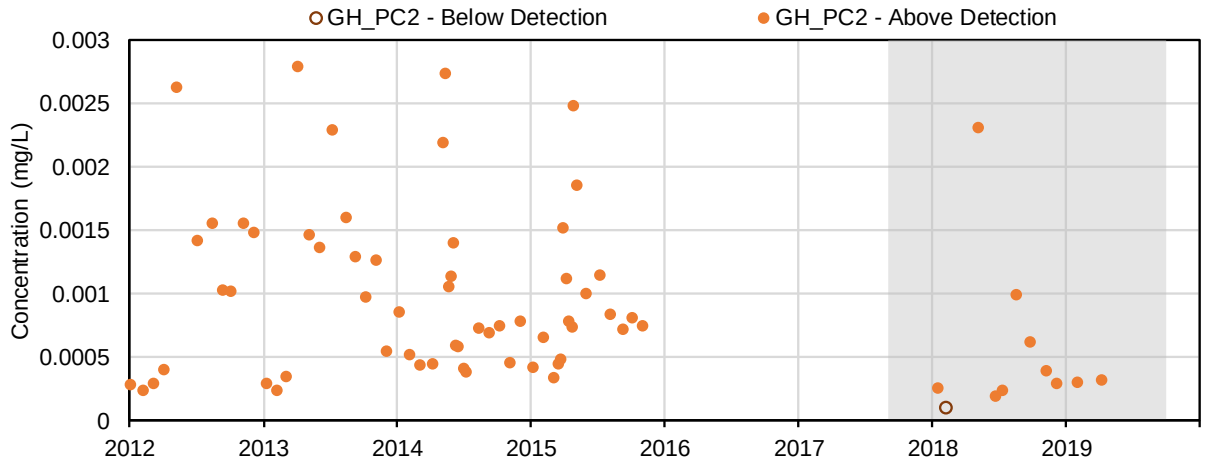
(91) Lead (mg/L); Dissolved Metals



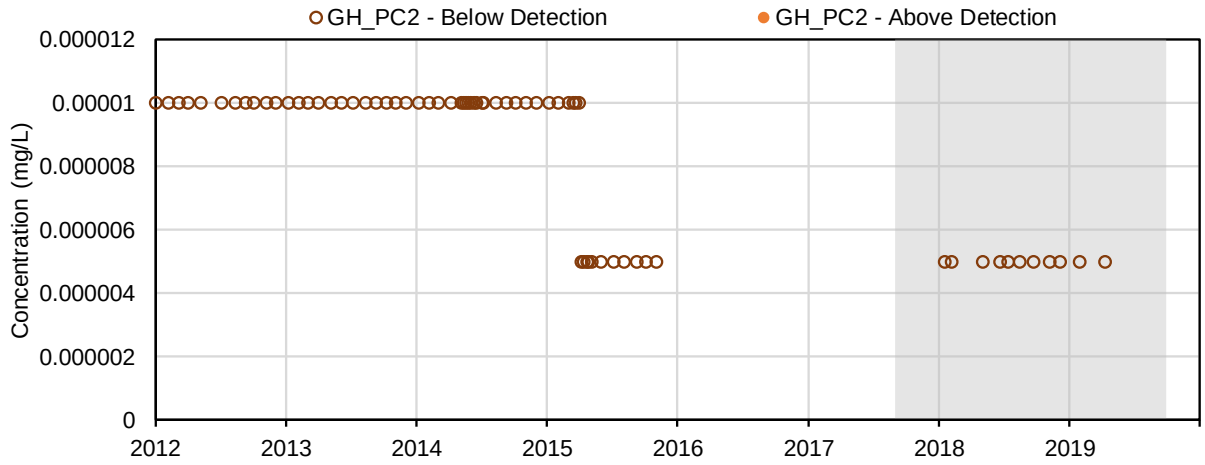
(92) Lithium (mg/L); Dissolved Metals



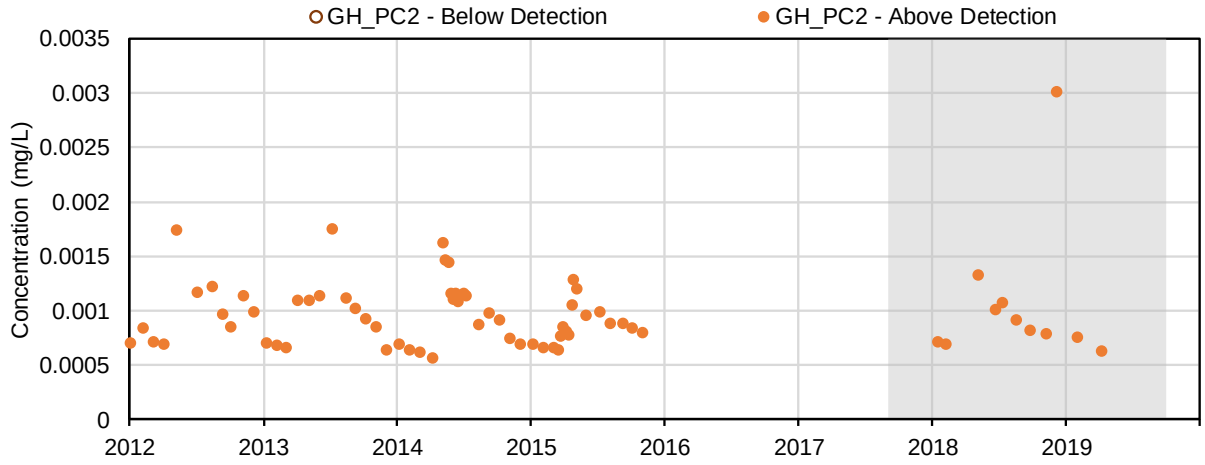
(93) Manganese (mg/L); Dissolved Metals



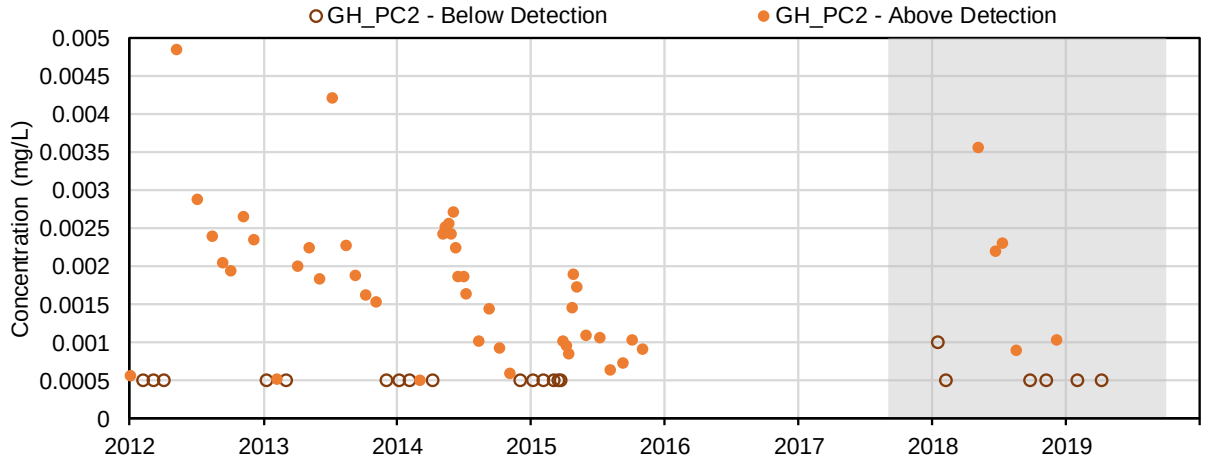
(94) Mercury (mg/L); Dissolved Metals



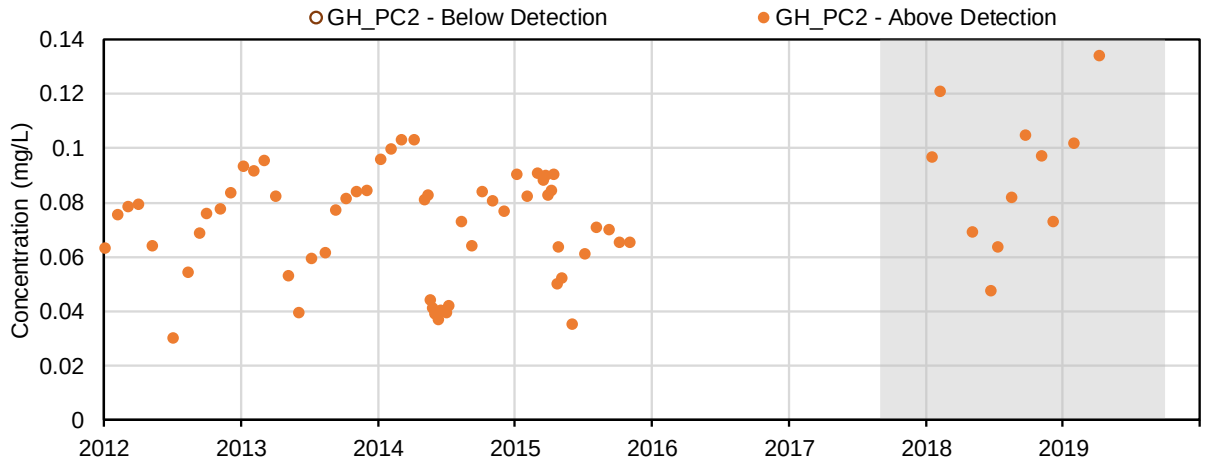
(95) Molybdenum (mg/L); Dissolved Metals



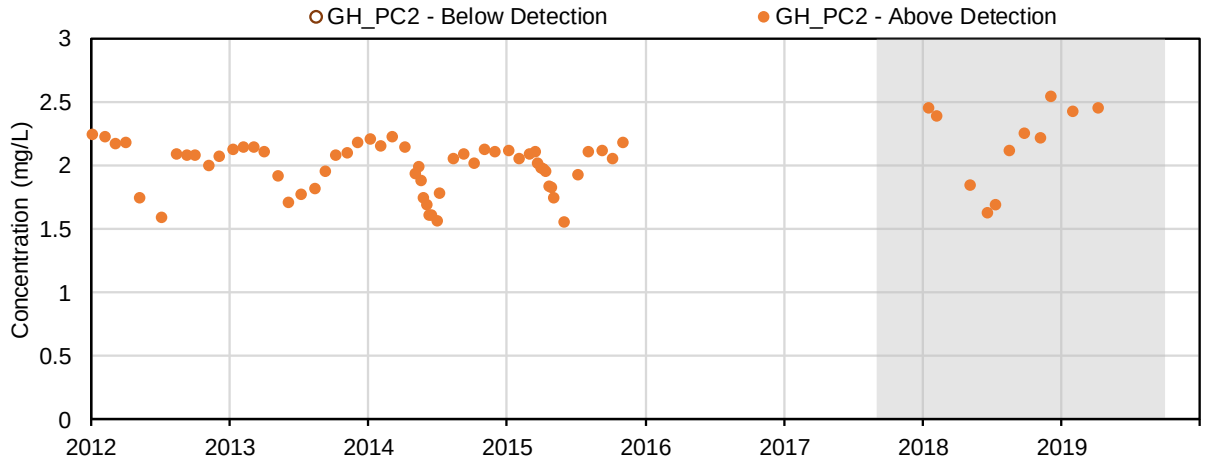
(96) Nickel (mg/L); Dissolved Metals



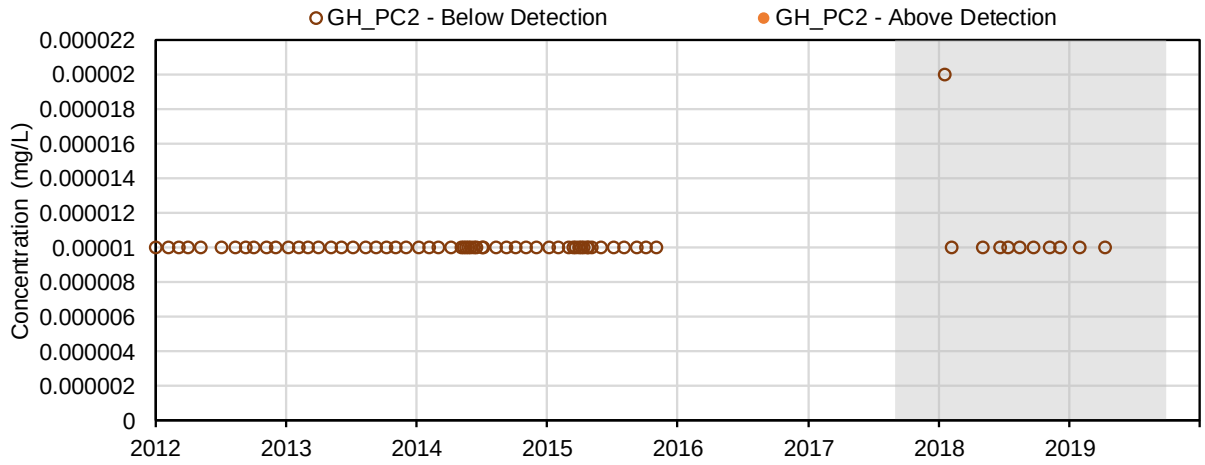
(97) Selenium (mg/L); Dissolved Metals



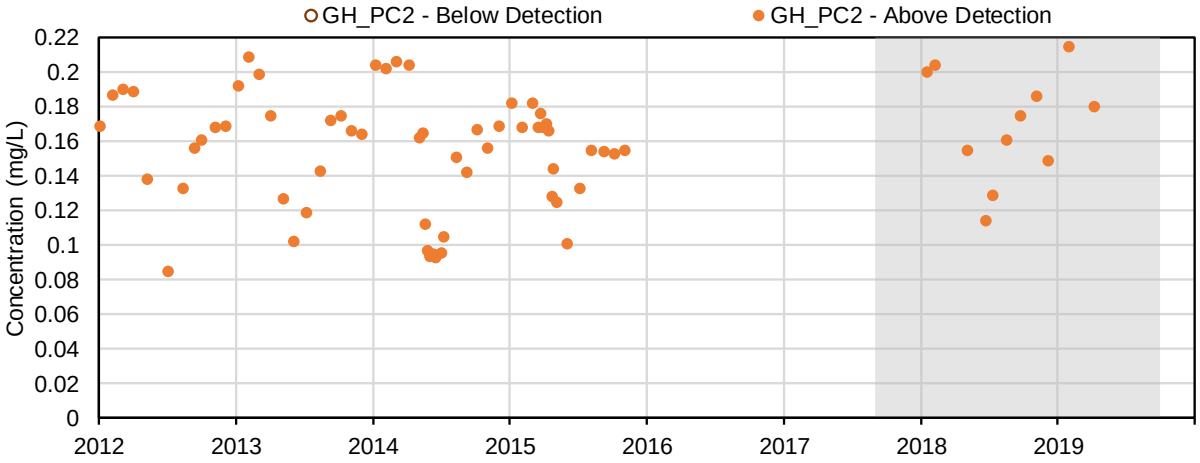
(98) Silicon (mg/L); Dissolved Metals



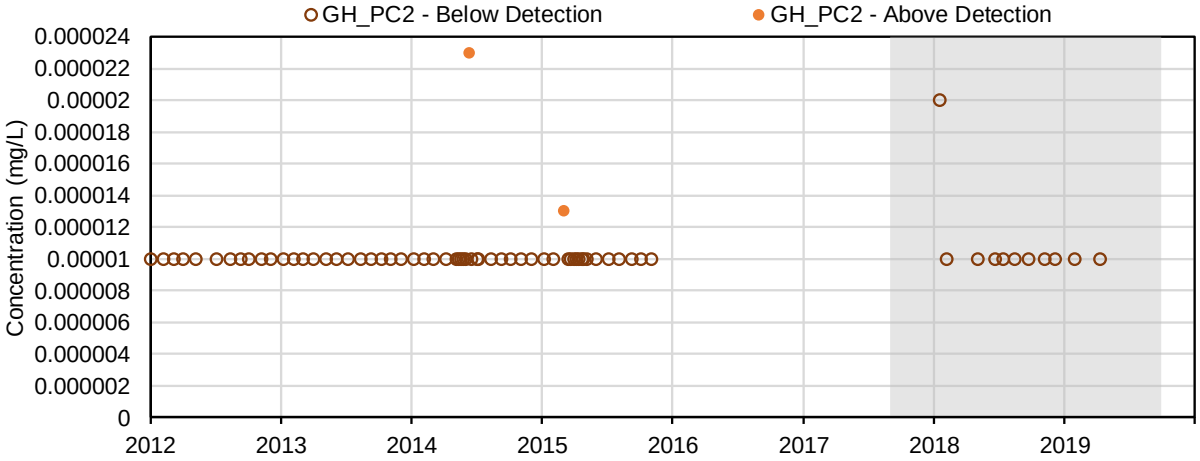
(99) Silver (mg/L); Dissolved Metals



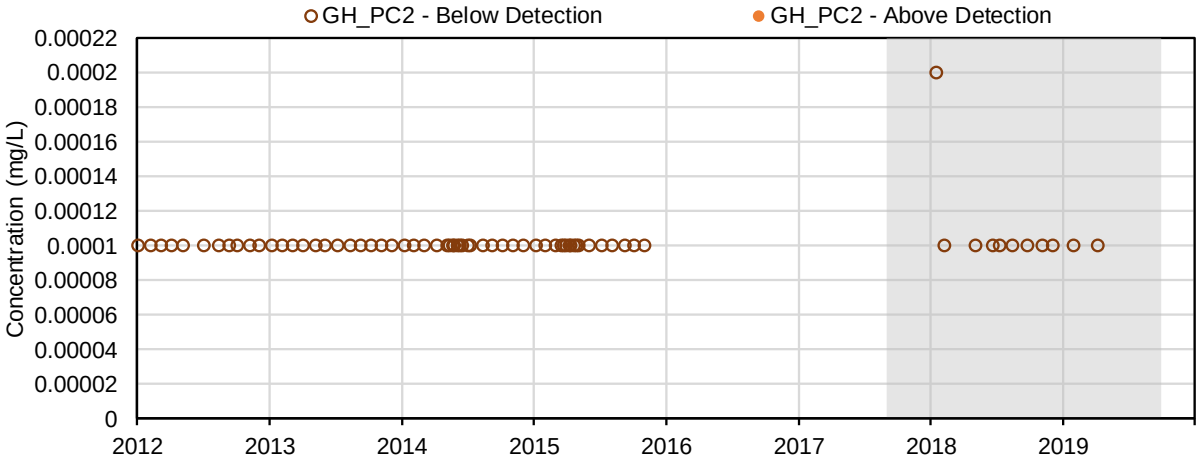
(100) Strontium (mg/L); Dissolved Metals



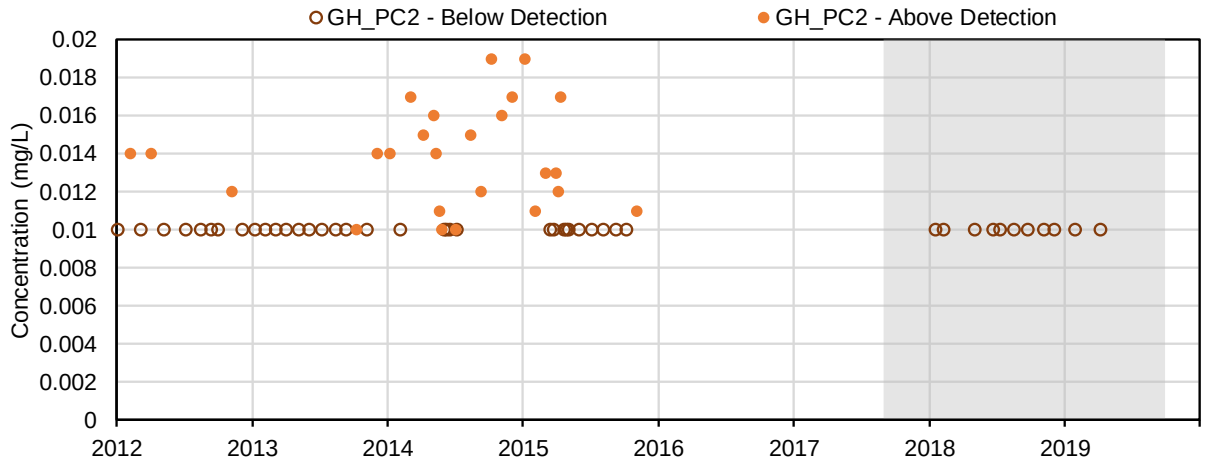
(101) Thallium (mg/L); Dissolved Metals



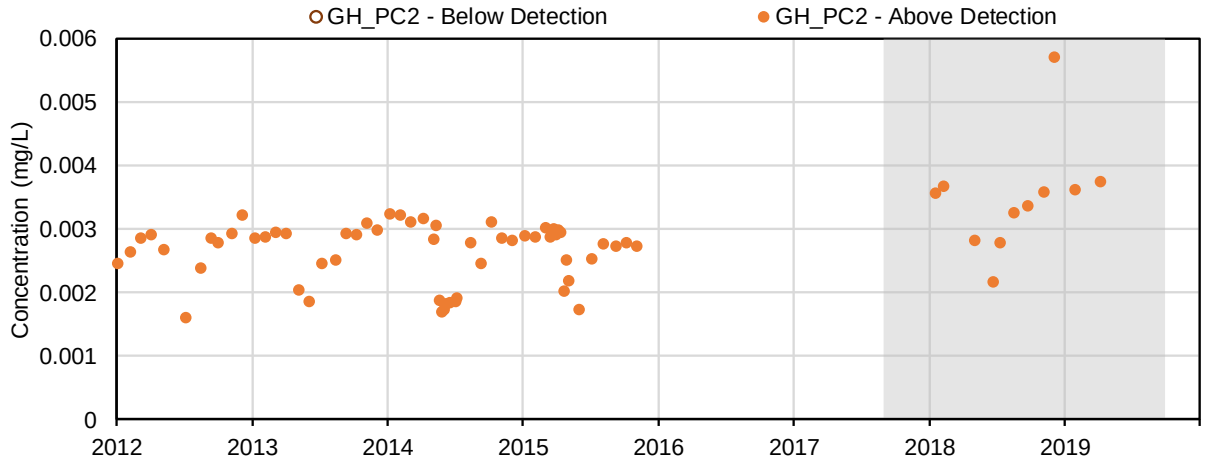
(102) Tin (mg/L); Dissolved Metals



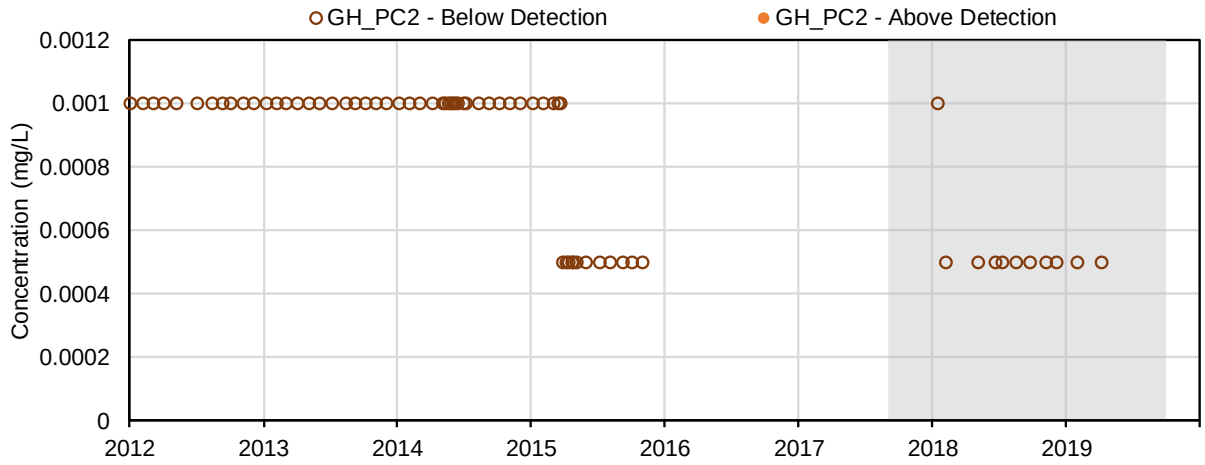
(103) Titanium (mg/L); Dissolved Metals



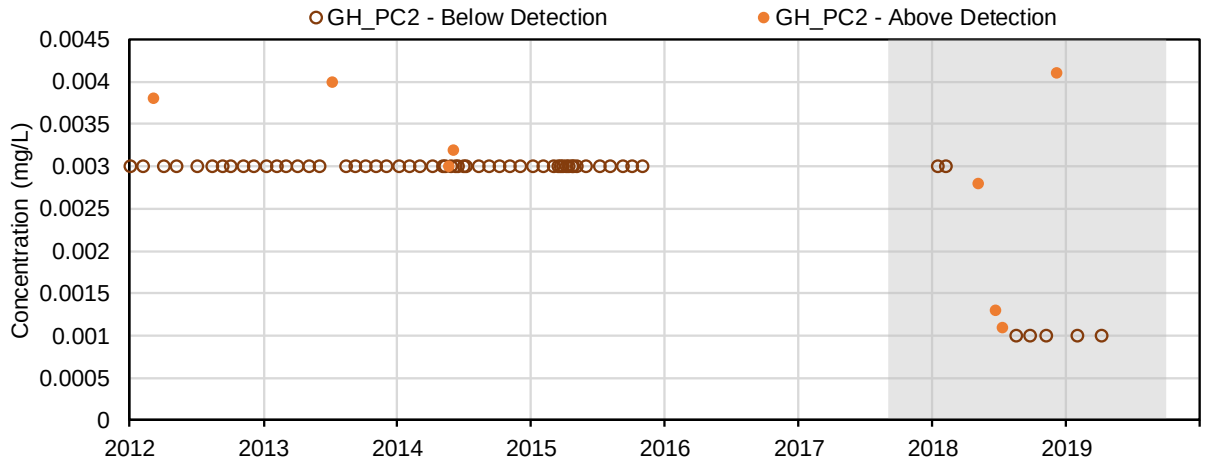
(104) Uranium (mg/L); Dissolved Metals



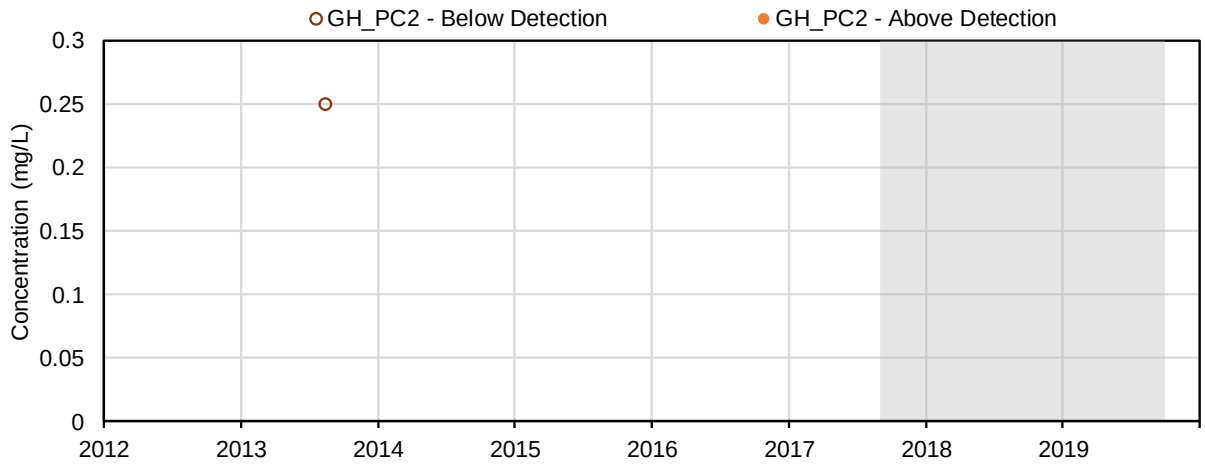
(105) Vanadium (mg/L); Dissolved Metals



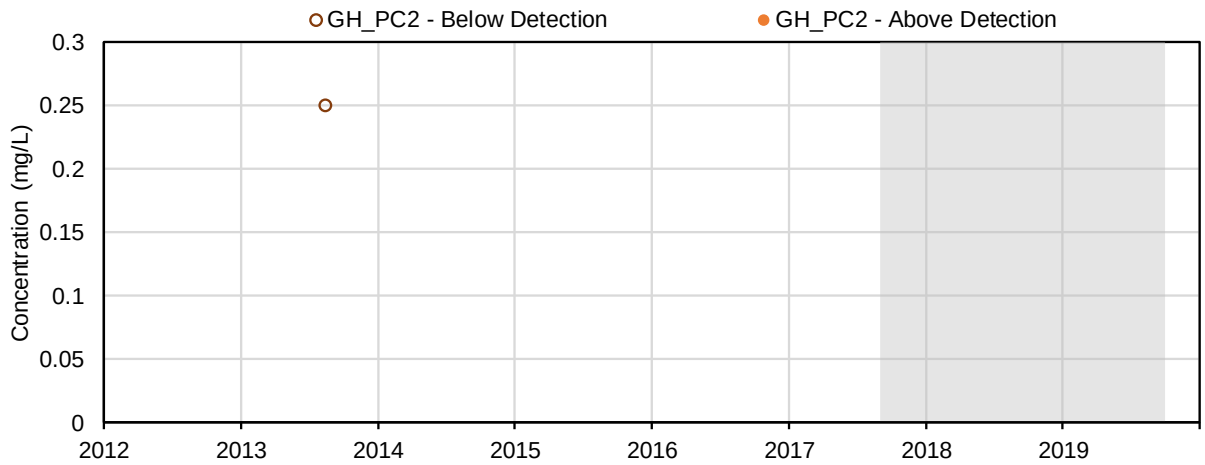
(106) Zinc (mg/L); Dissolved Metals



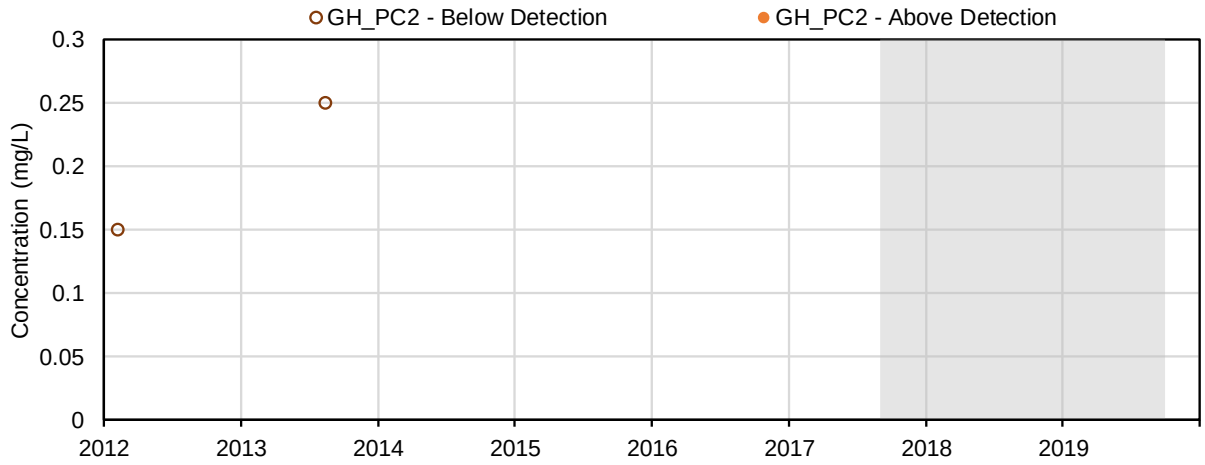
(107) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



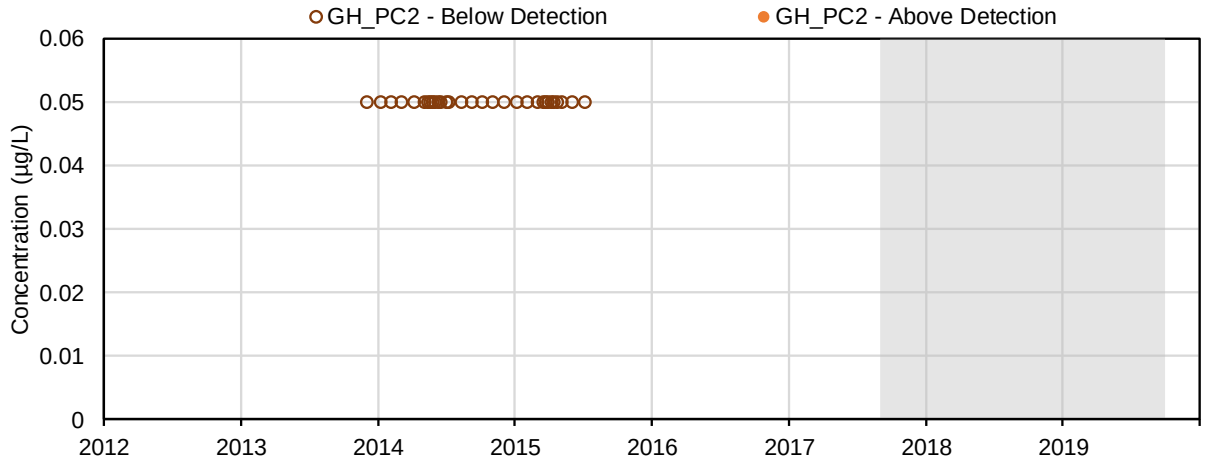
(108) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



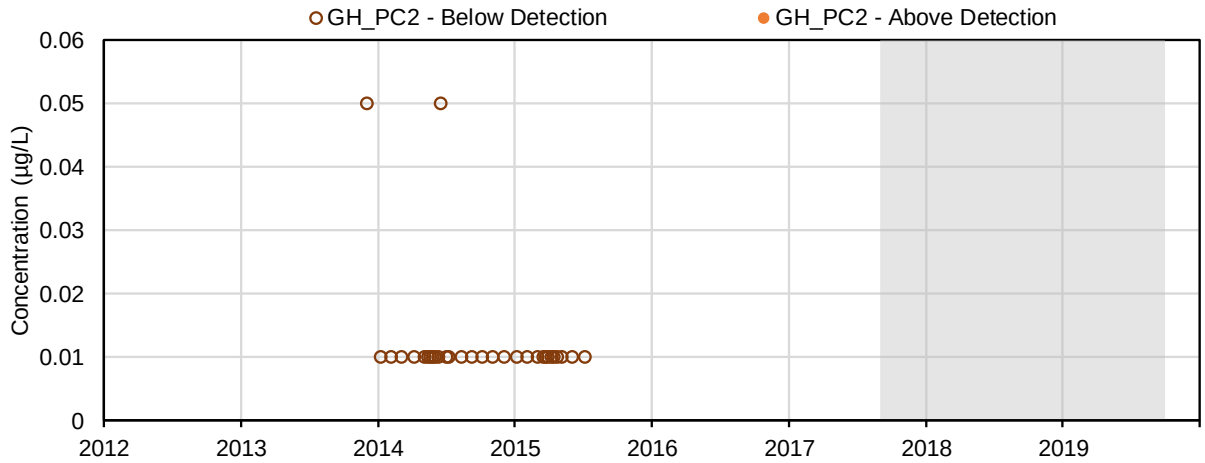
(109) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics



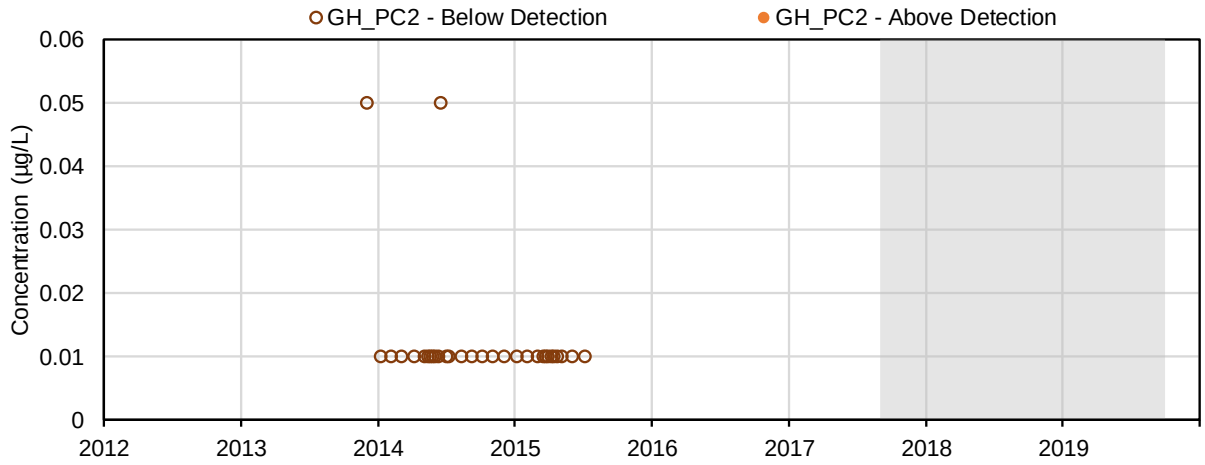
(110) Naphthalene (µg/L); Parent PAHs



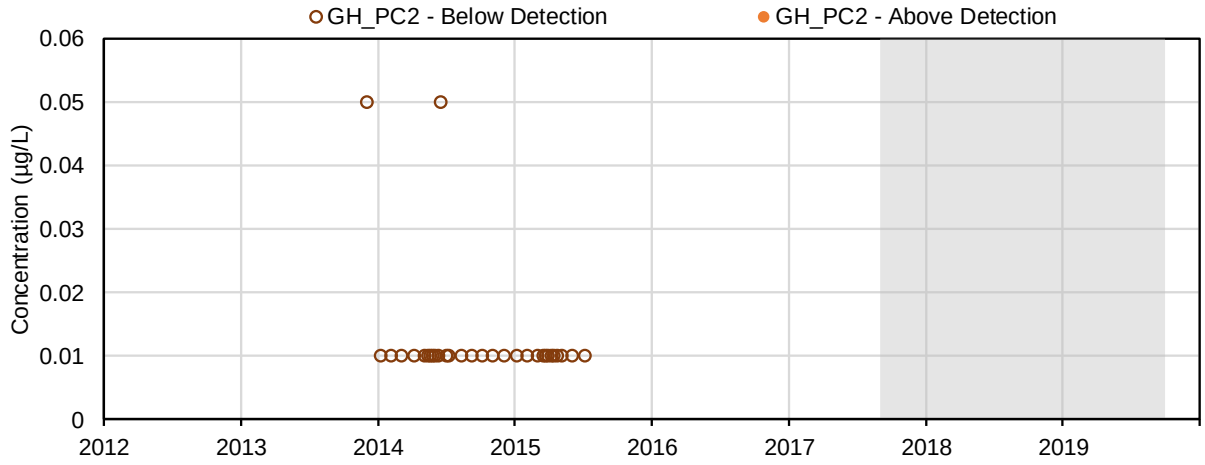
(111) Acenaphthylene (µg/L); Parent PAHs



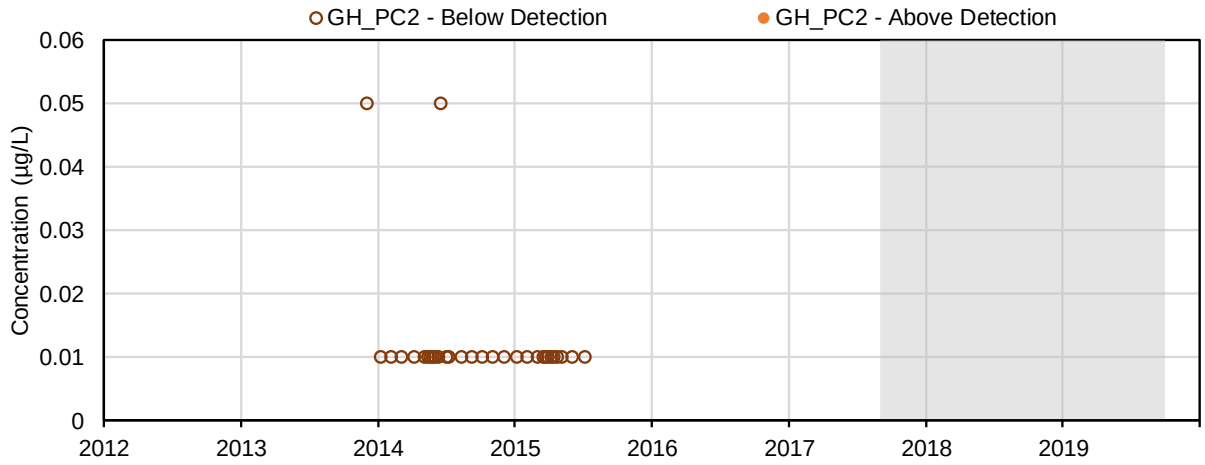
(112) Acenaphthene (µg/L); Parent PAHs



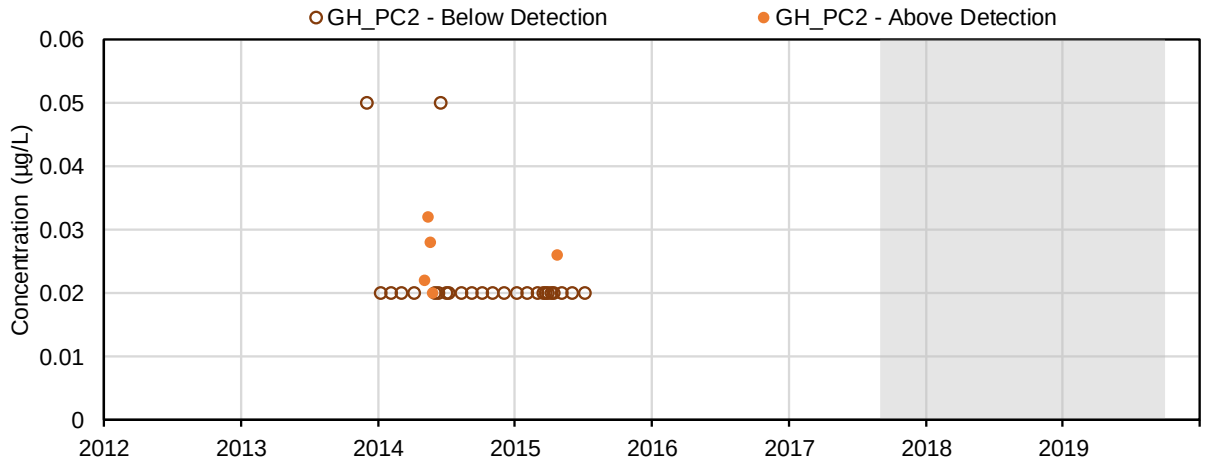
(113) Acridine (µg/L); Parent PAHs



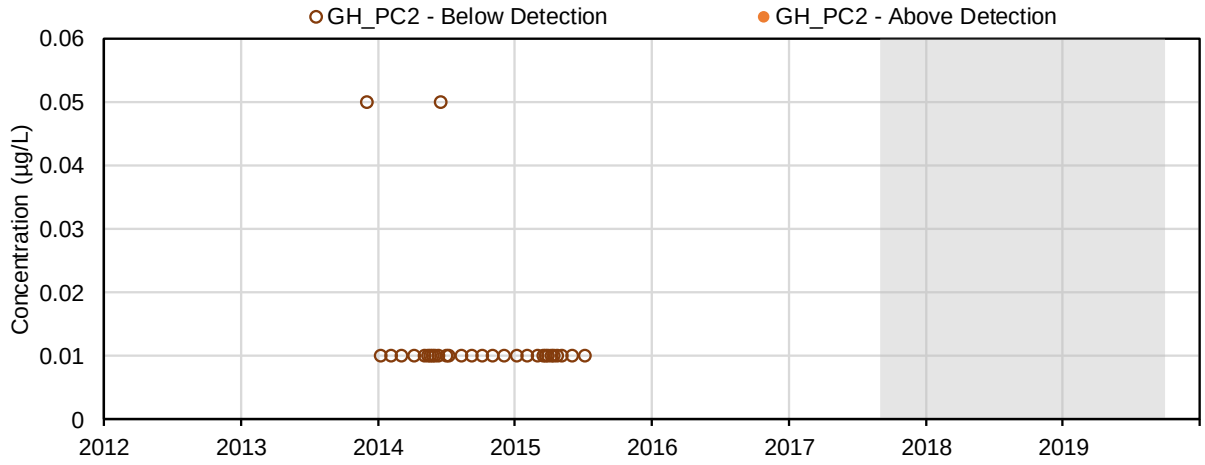
(114) Fluorene (µg/L); Parent PAHs



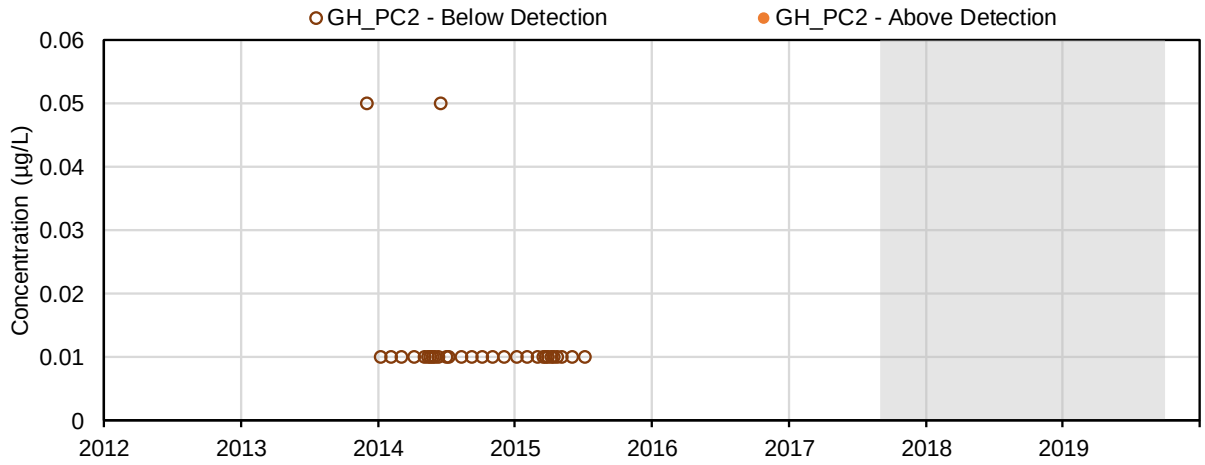
(115) Phenanthrene (µg/L); Parent PAHs



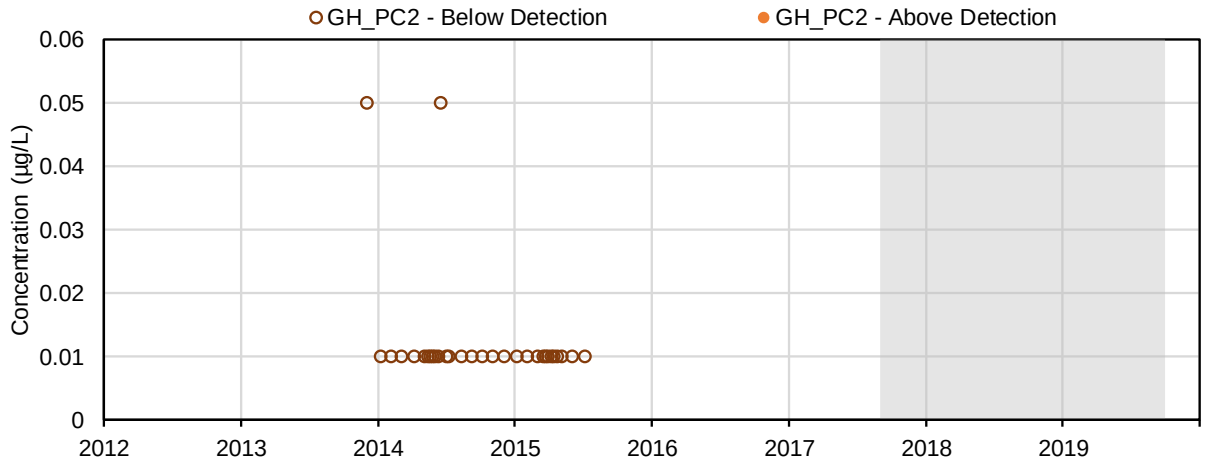
(116) Anthracene (µg/L); Parent PAHs



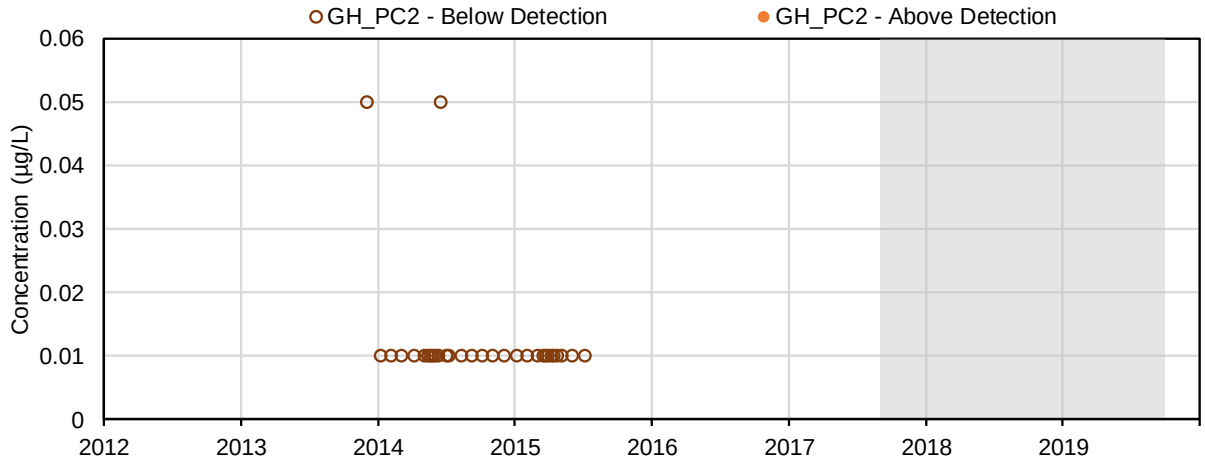
(117) Pyrene (µg/L); Parent PAHs



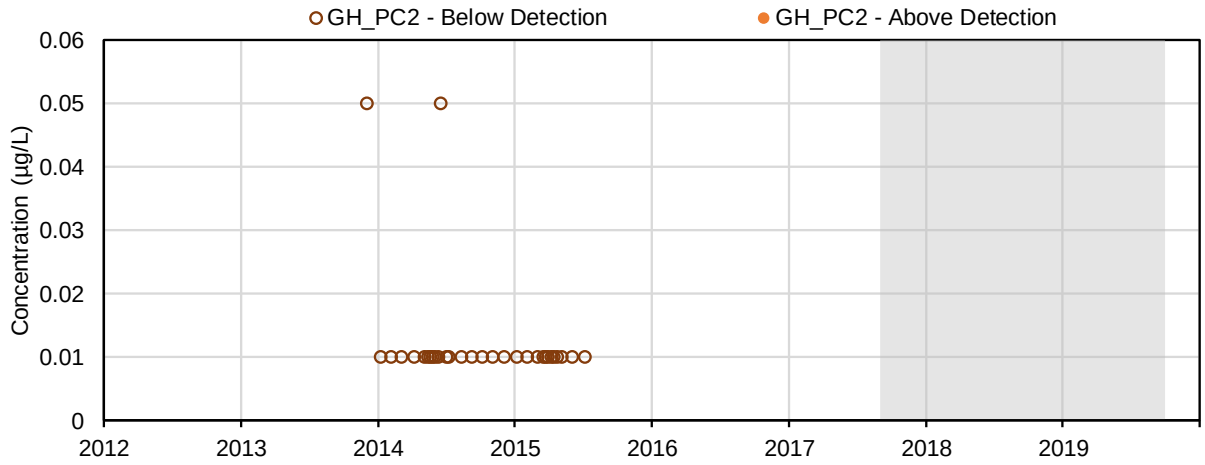
(118) Fluoranthene (µg/L); Parent PAHs



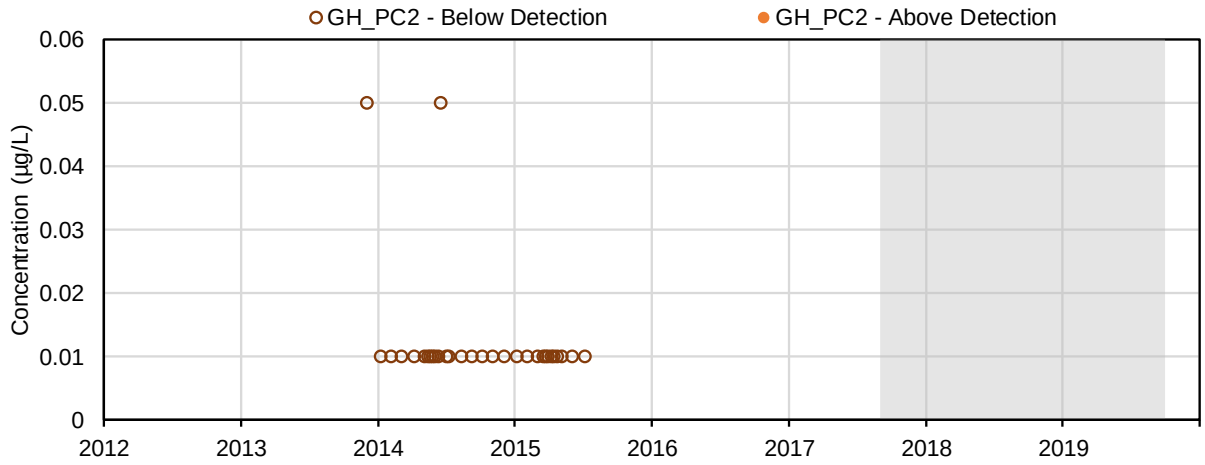
(119) Benzo(a)anthracene (µg/L); Parent PAHs



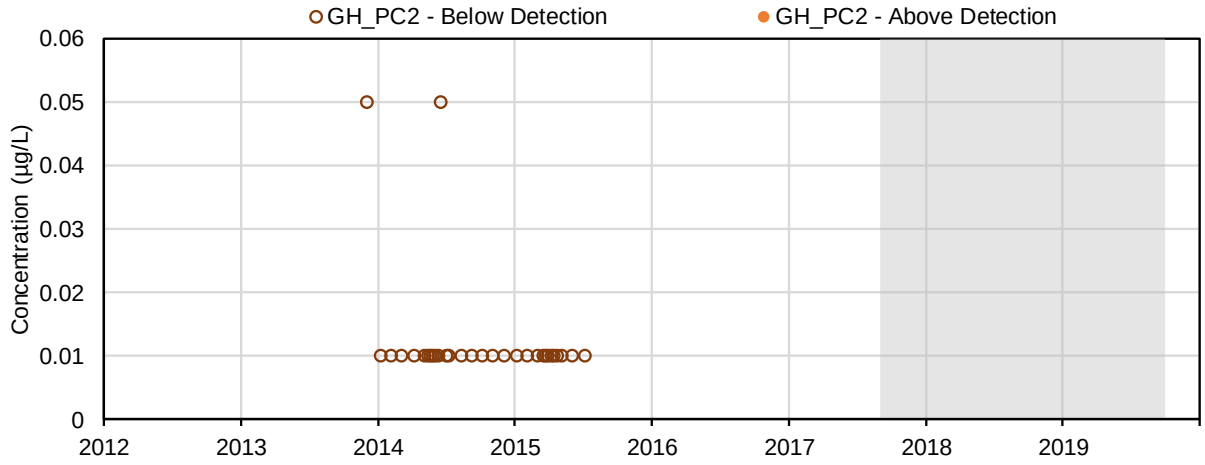
(120) Chrysene (µg/L); Parent PAHs



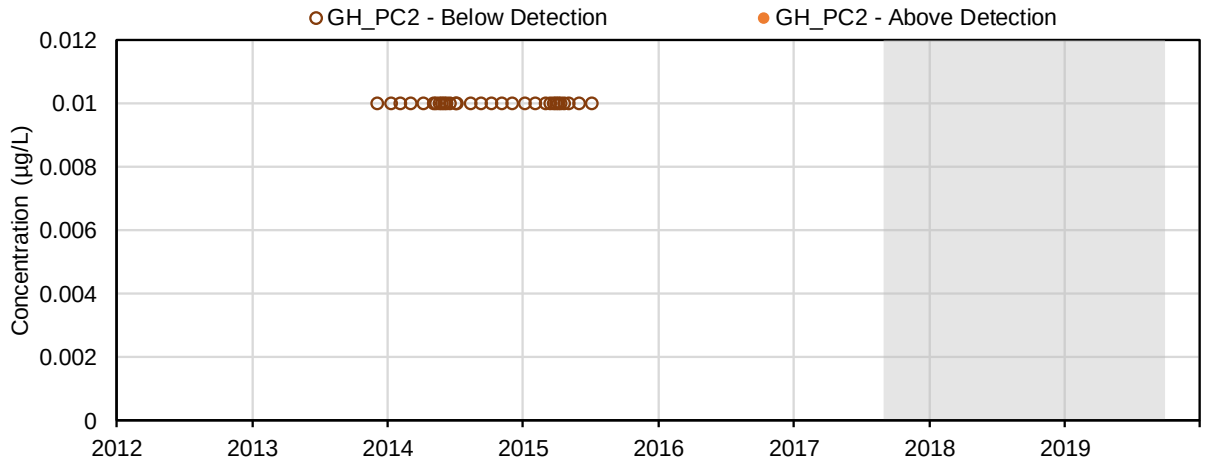
(121) Benzo(b)fluoranthene (µg/L); Parent PAHs



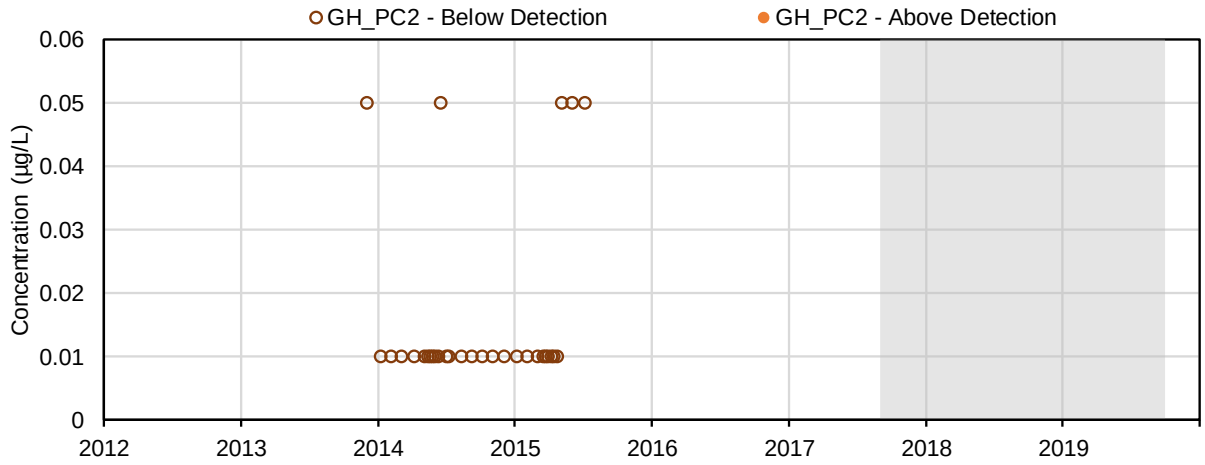
(122) Benzo(k)fluoranthene (µg/L); Parent PAHs



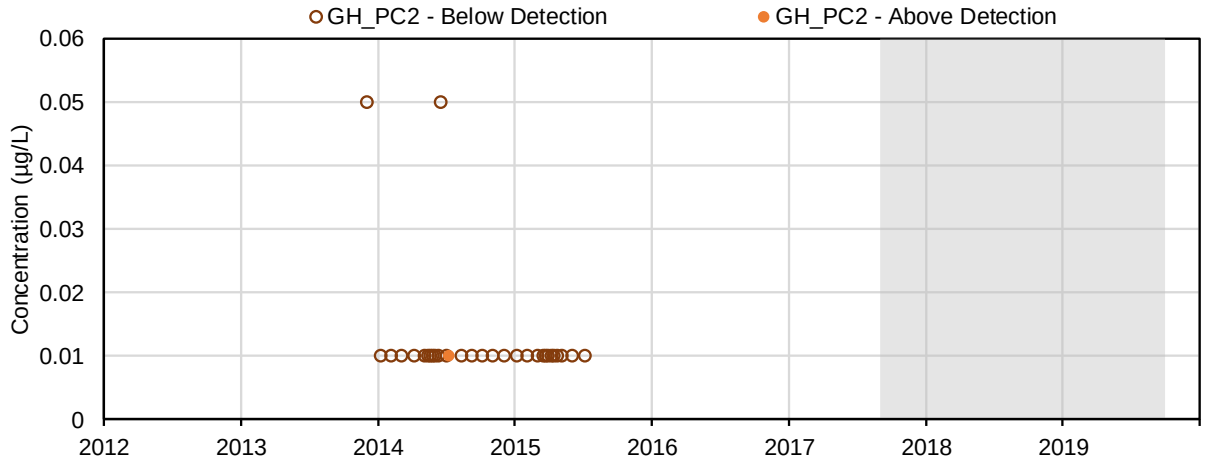
(123) Benzo(a)pyrene (µg/L); Parent PAHs



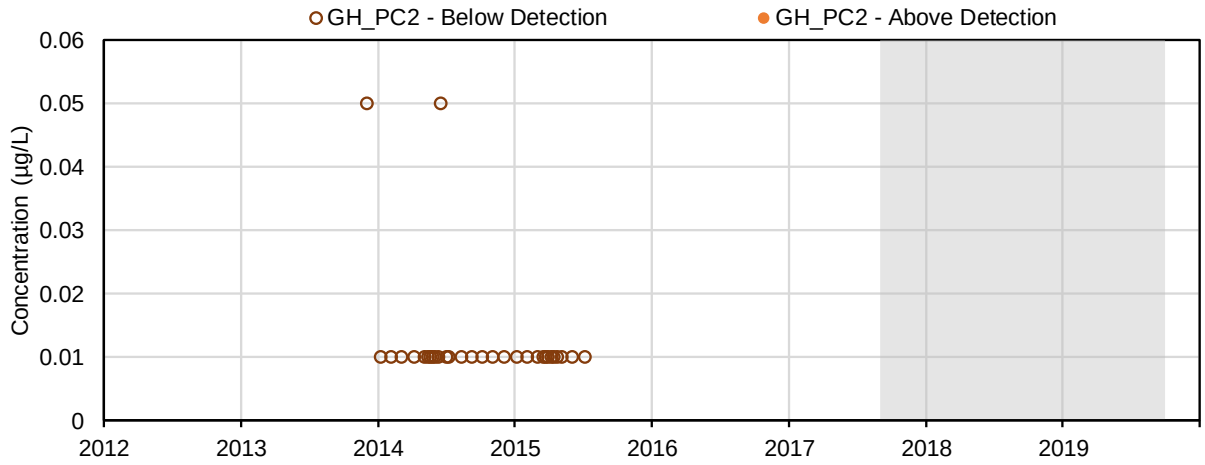
(124) Quinoline (µg/L); Parent PAHs



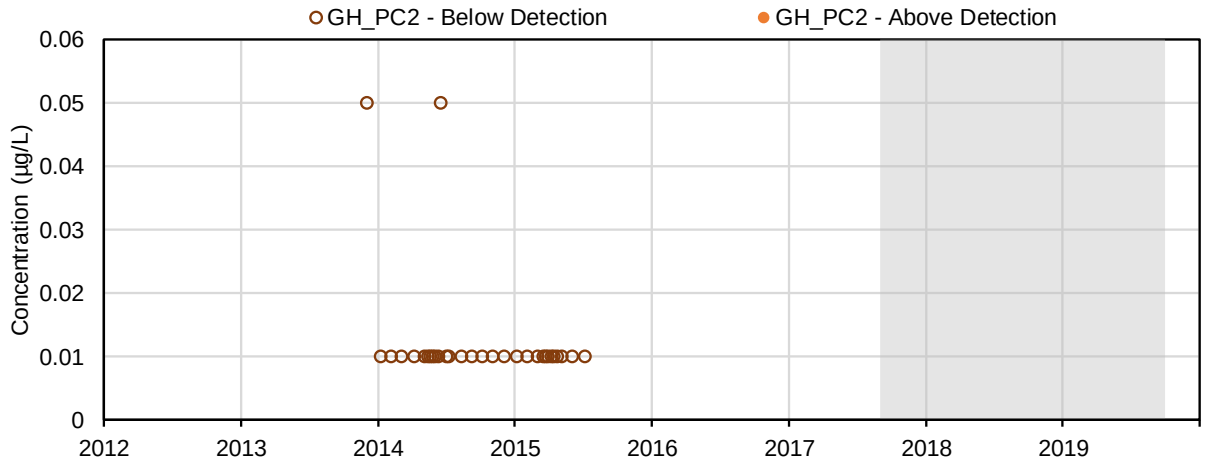
(125) Benzo(g,h,i)perylene (µg/L); Parent PAHs

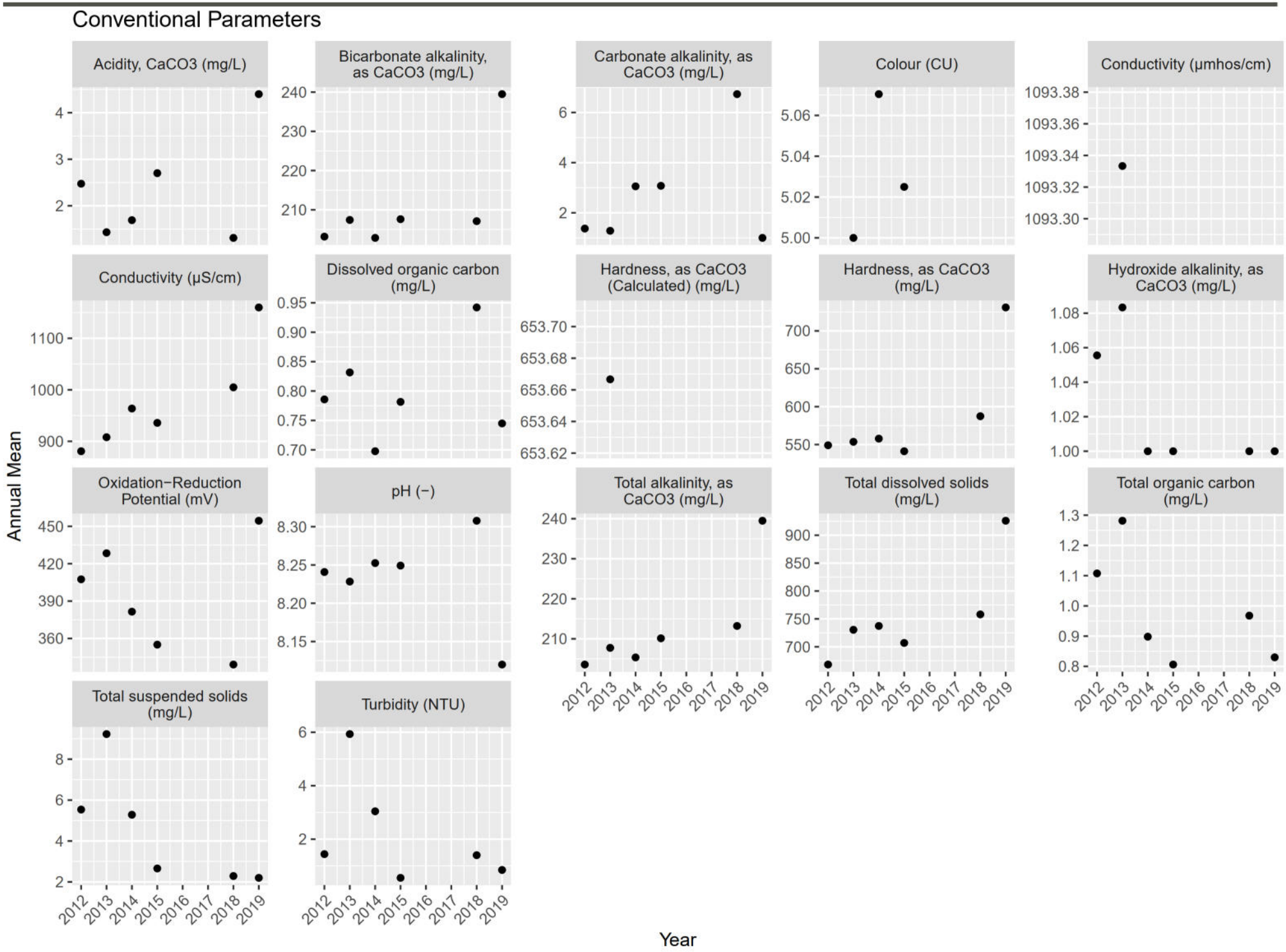


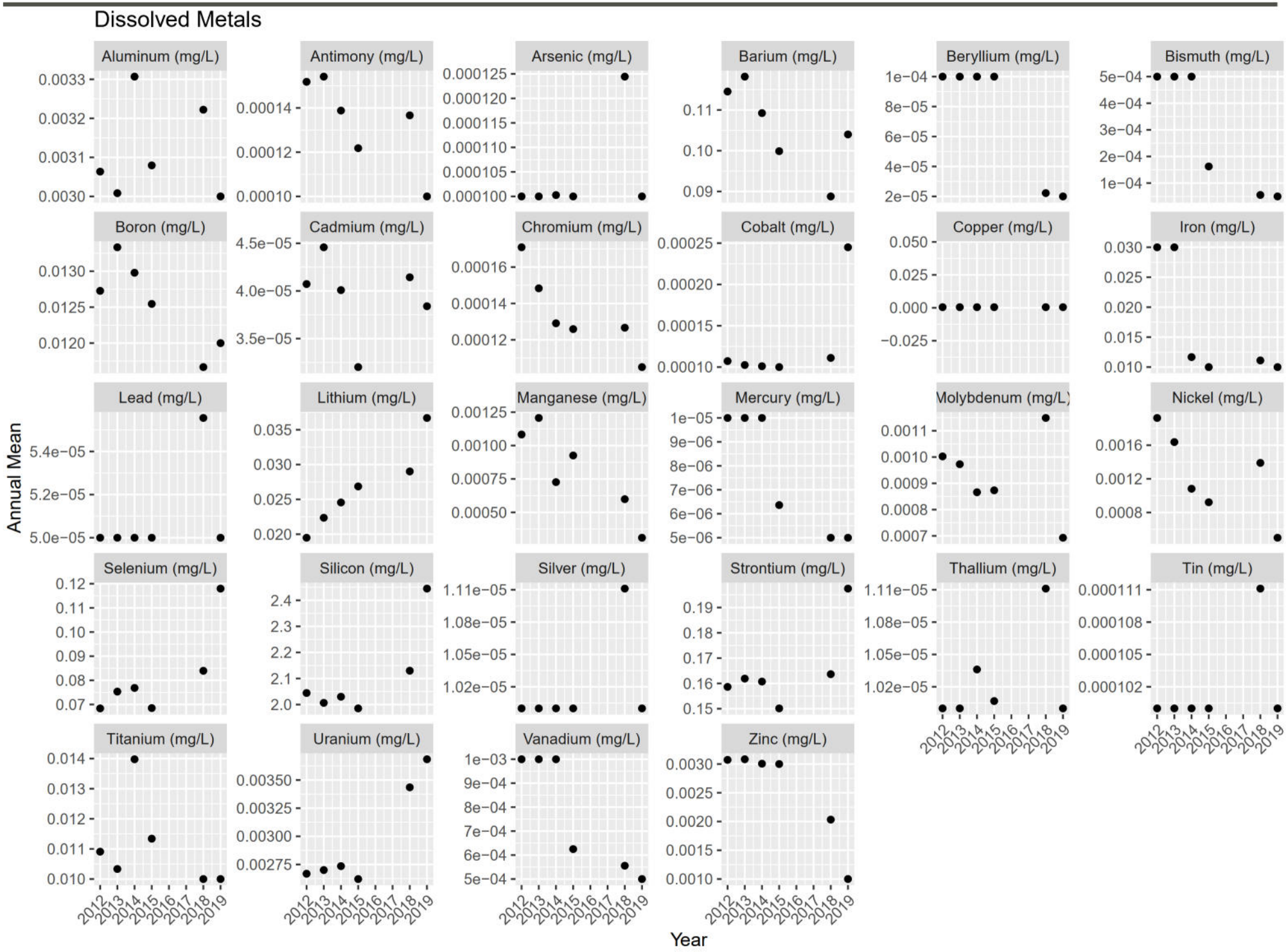
(126) Indeno(c,d-123)pyrene (µg/L); Parent PAHs

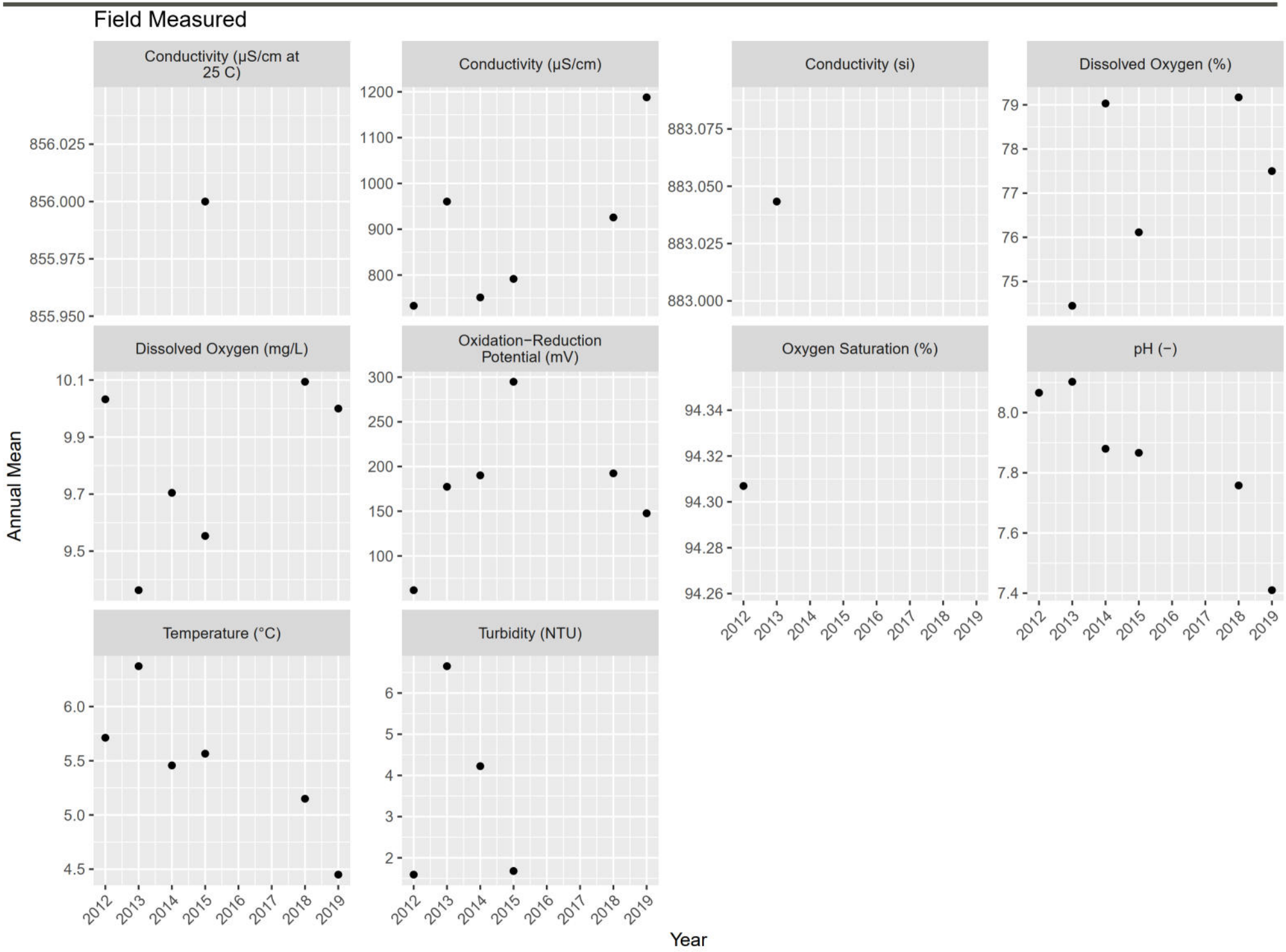


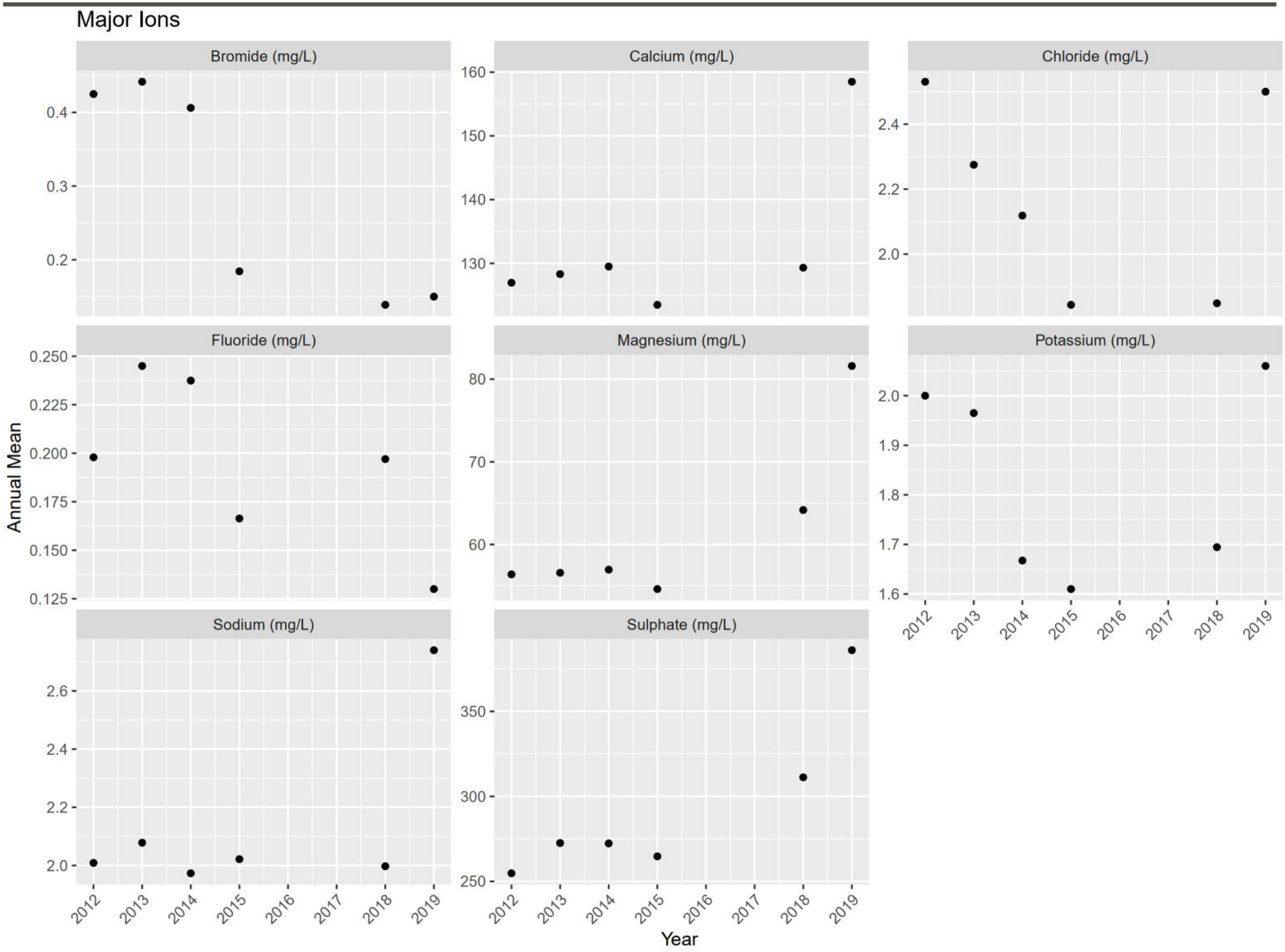
(127) Dibenzo(a,h)anthracene (µg/L); Parent PAHs

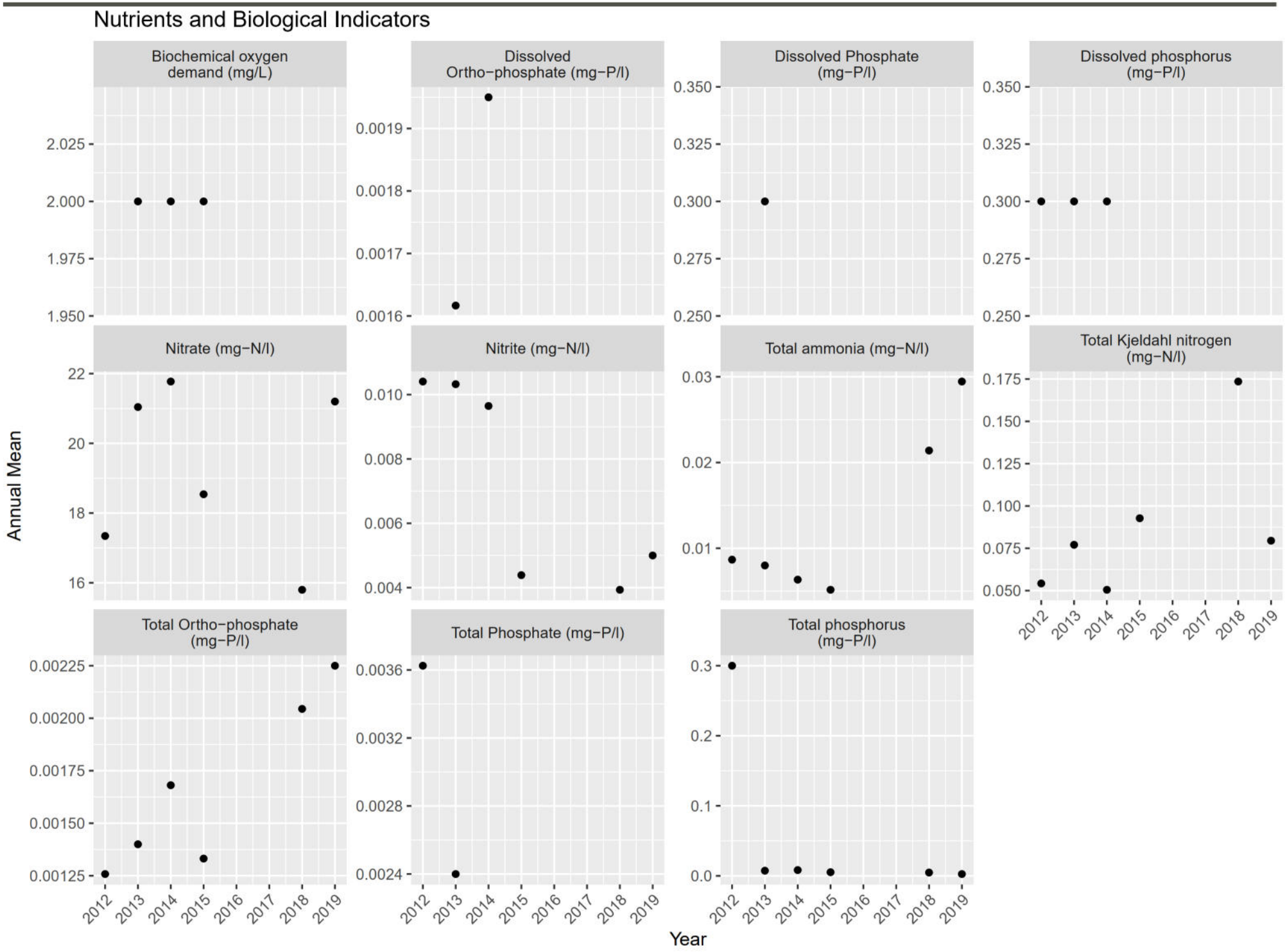


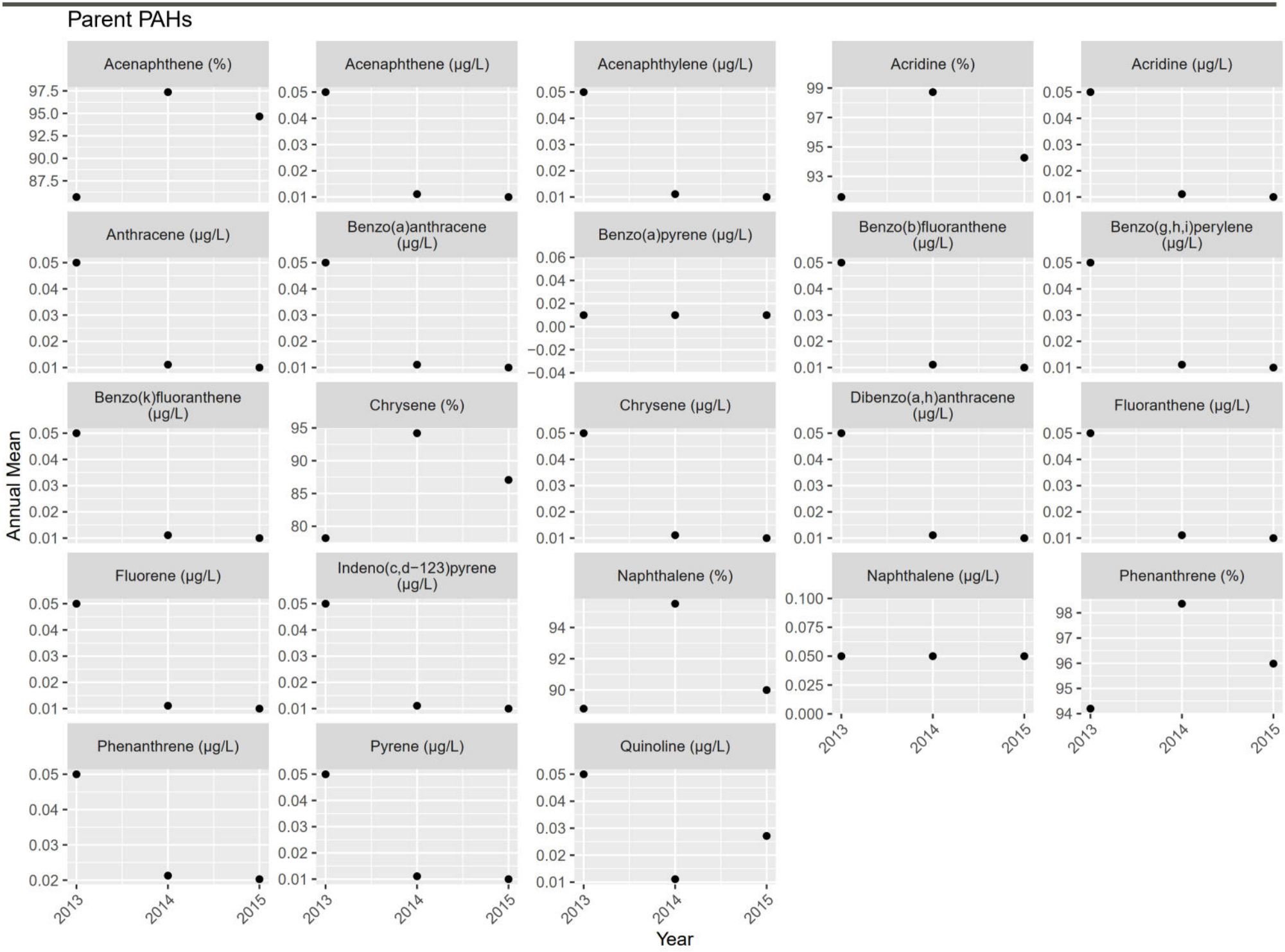

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Colour (CU)
Conductivity (µmhos/cm)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (Calculated) (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year

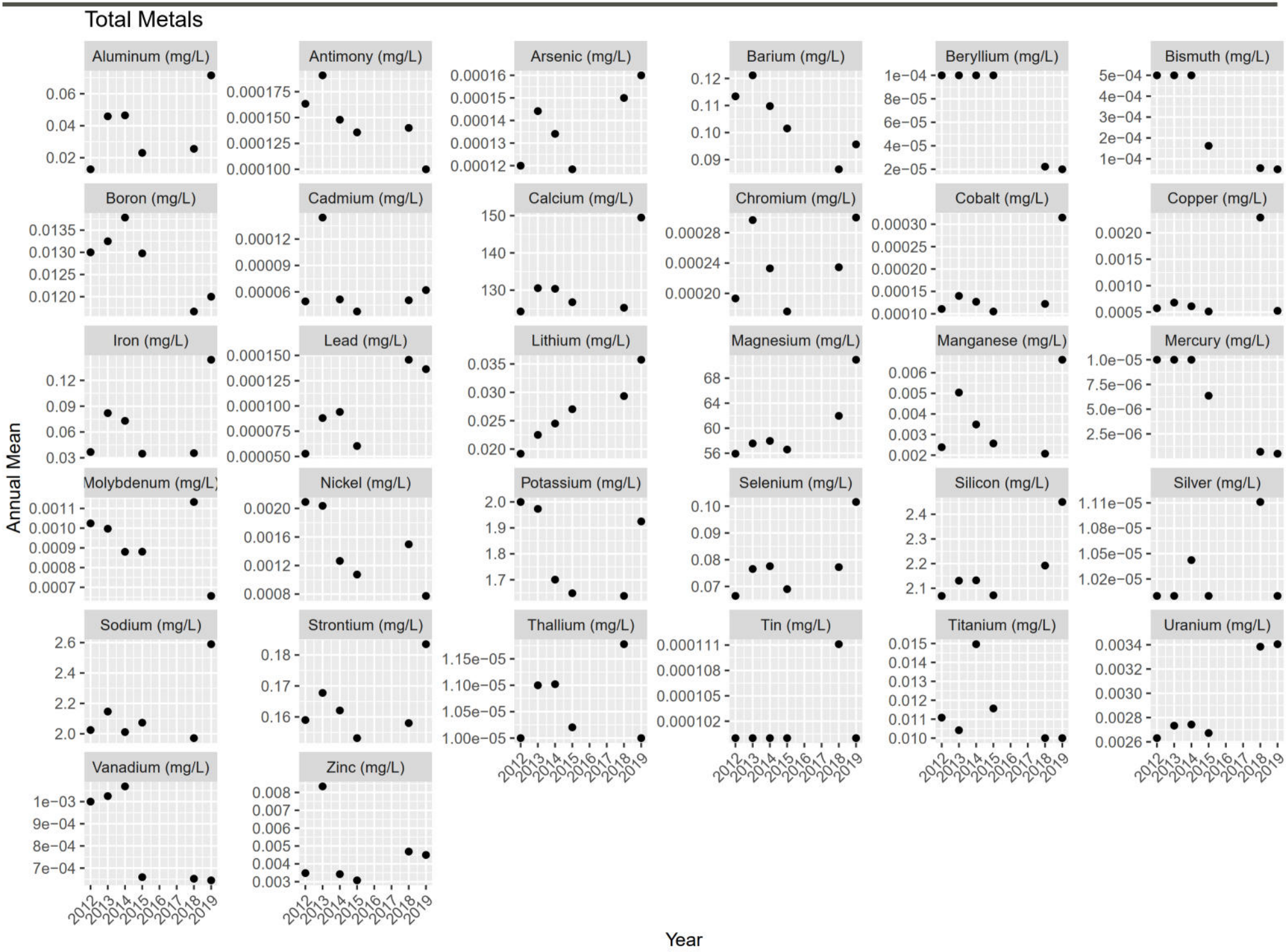

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

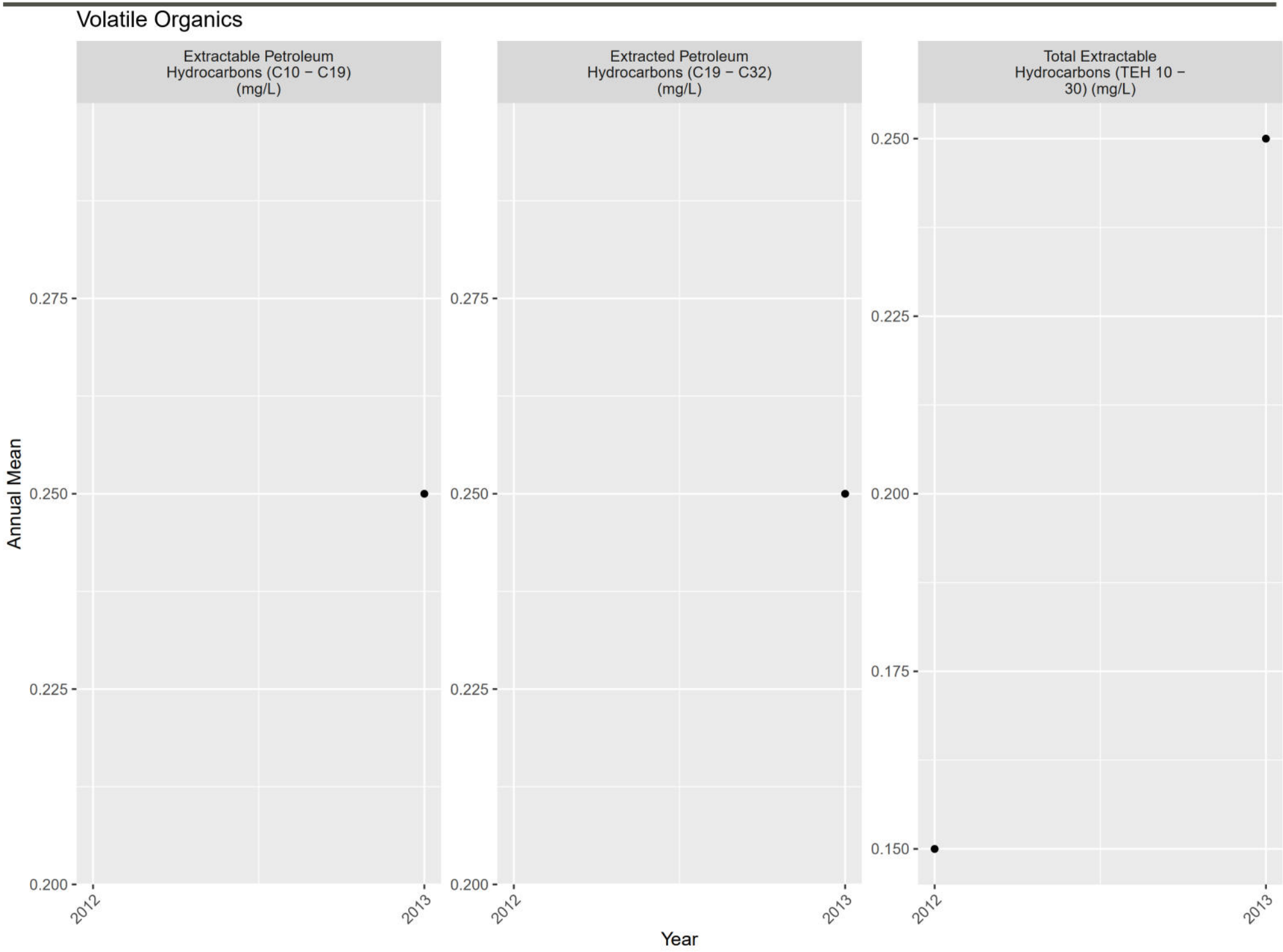

Field Measured
Conductivity (µS/cm at 25 C)
Conductivity (µS/cm)
Conductivity (si)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
Oxygen Saturation (%)
pH (−)
Temperature (°C)
Turbidity (NTU)
Annual Mean
Year


Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Nutrients and Biological Indicators
Biochemical oxygen demand (mg/L)
Dissolved Ortho−phosphate (mg−P/l)
Dissolved Phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Parent PAHs
Acenaphthene (%)
Acenaphthene (µg/L)
Acenaphthylene (µg/L)
Acridine (%)
Acridine (µg/L)
Anthracene (µg/L)
Benzo(a)anthracene (µg/L)
Benzo(a)pyrene (µg/L)
Benzo(b)fluoranthene (µg/L)
Benzo(g,h,i)perylene (µg/L)
Benzo(k)fluoranthene (µg/L)
Chrysene (%)
Chrysene (µg/L)
Dibenzo(a,h)anthracene (µg/L)
Fluoranthene (µg/L)
Fluorene (µg/L)
Indeno(c,d−123)pyrene (µg/L)
Naphthalene (%)
Naphthalene (µg/L)
Phenanthrene (%)
Phenanthrene (µg/L)
Pyrene (µg/L)
Quinoline (µg/L)
Annual Mean
Year
2013
2014
2015

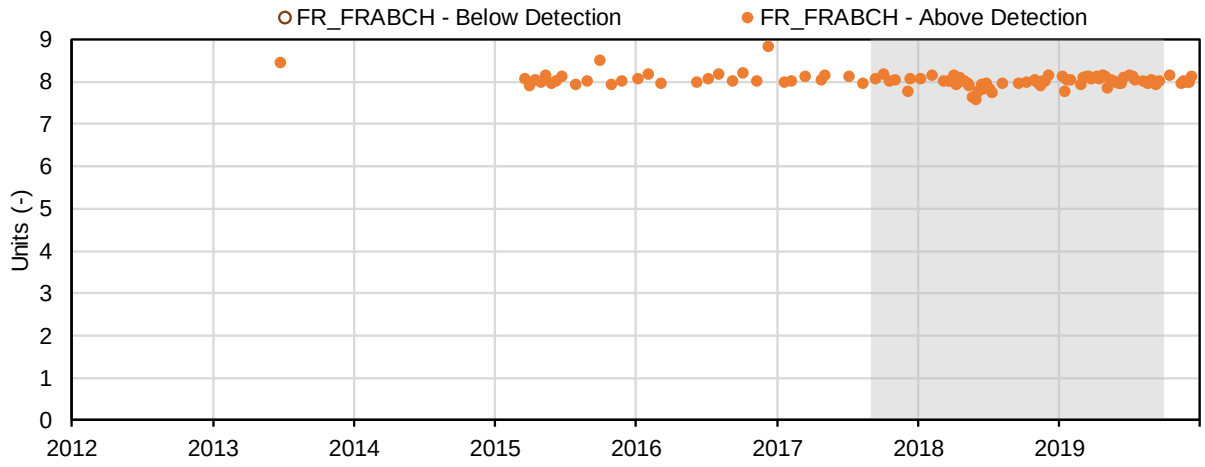

Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
0.275
0.250
0.225
0.200
0.250
0.225
0.200
0.175
0.150
2012
2013
Year

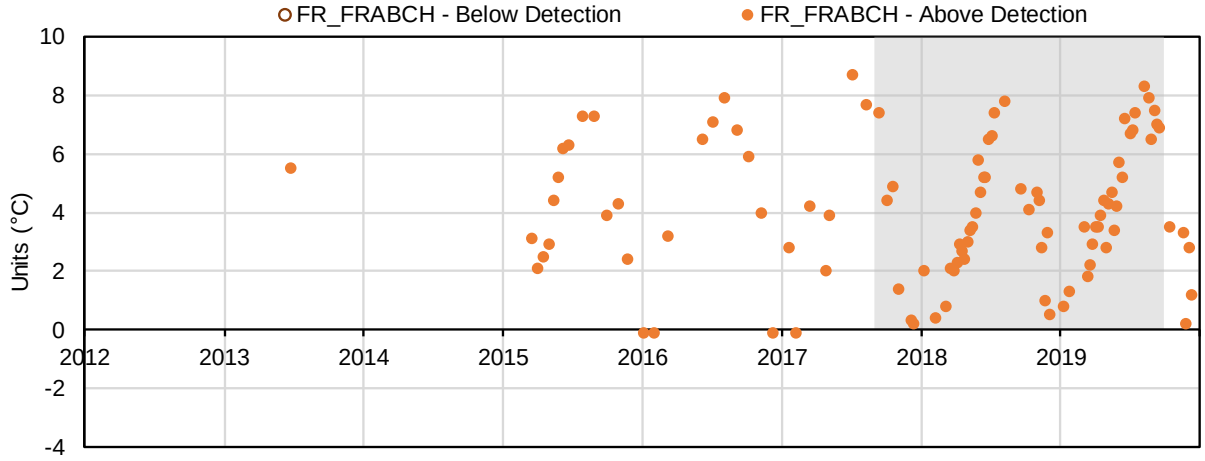
ATTACHMENT F12

FR_FRABCH Plots

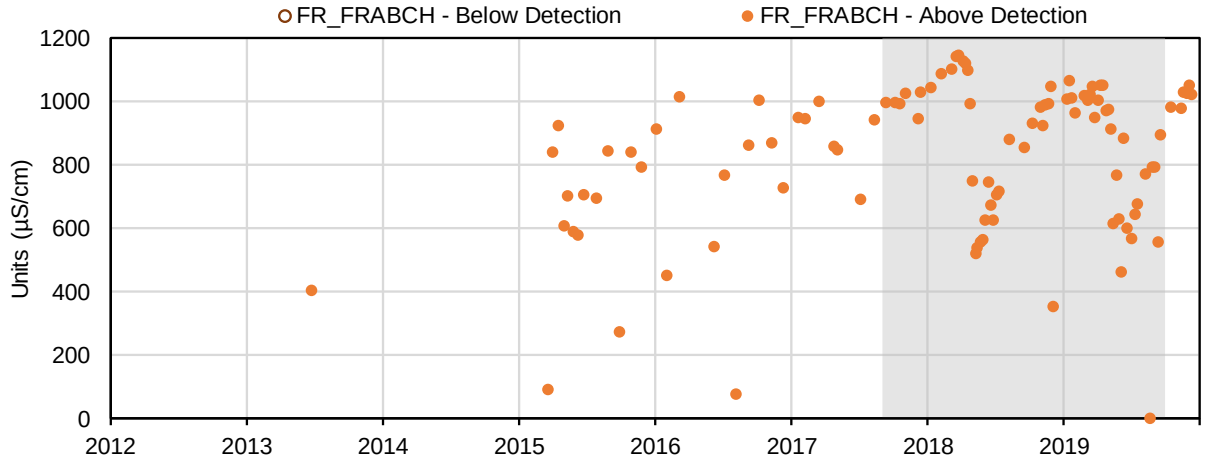
(1) pH (-); Field Measured



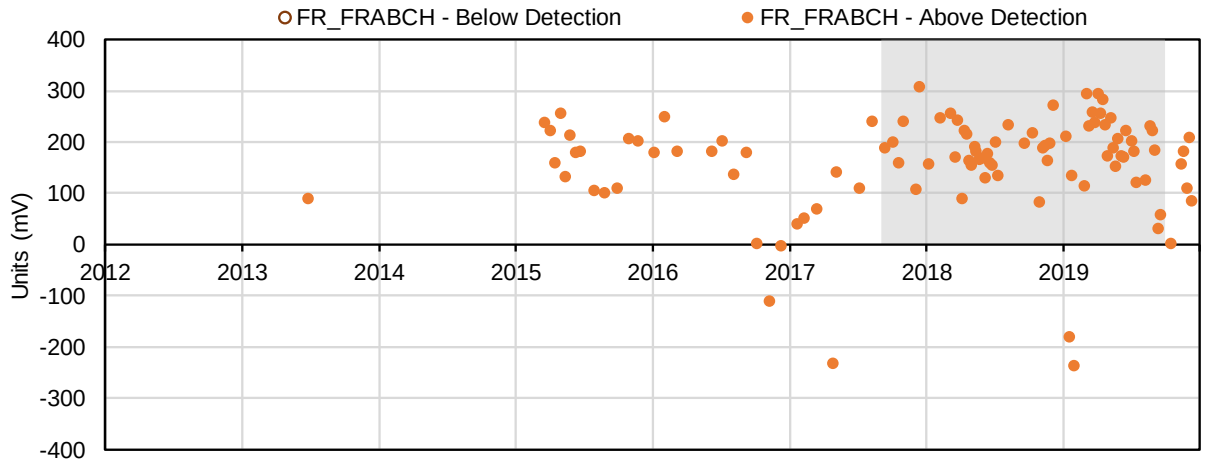
(2) Temperature (°C); Field Measured



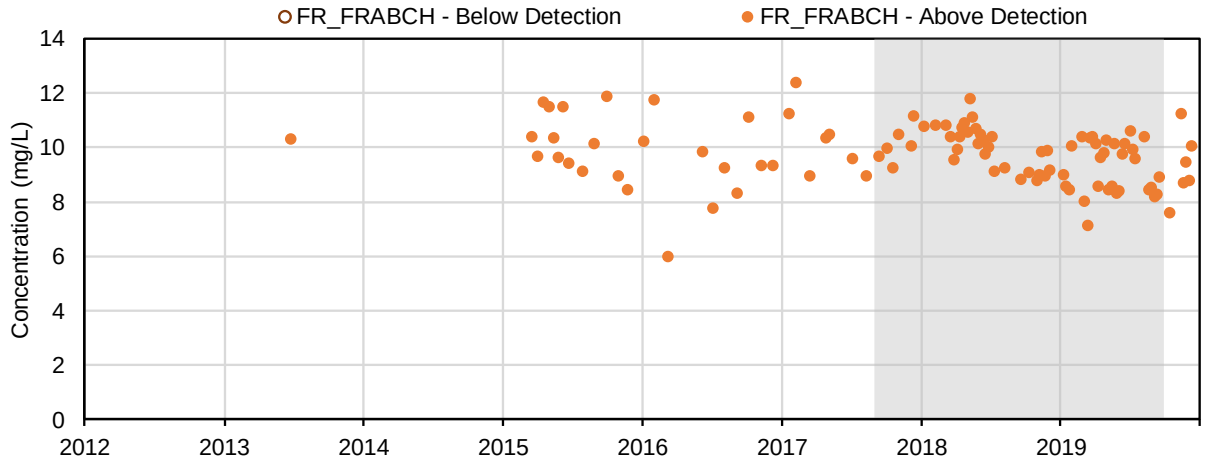
(3) Conductivity (µS/cm); Field Measured



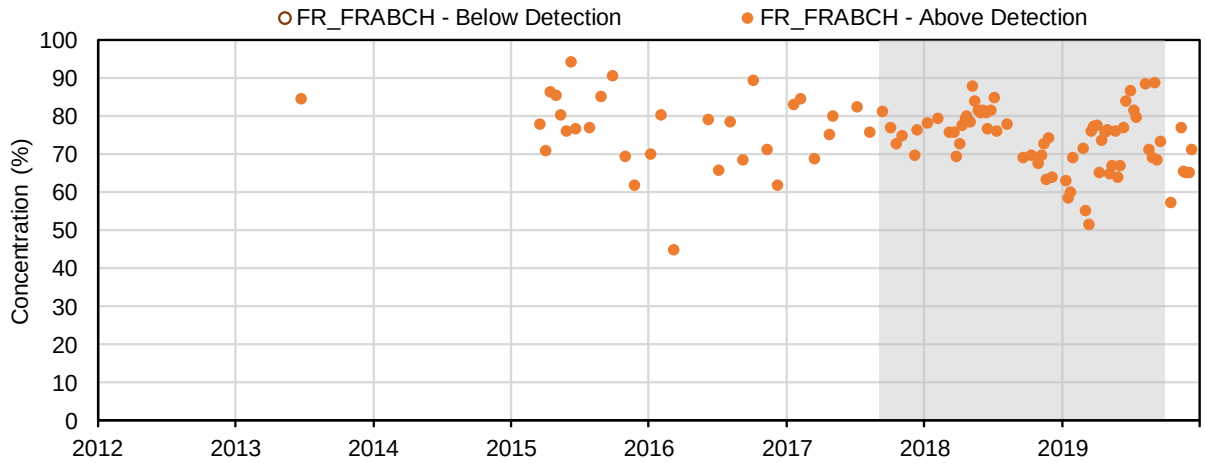
(4) Oxidation-Reduction Potential (mV); Field Measured



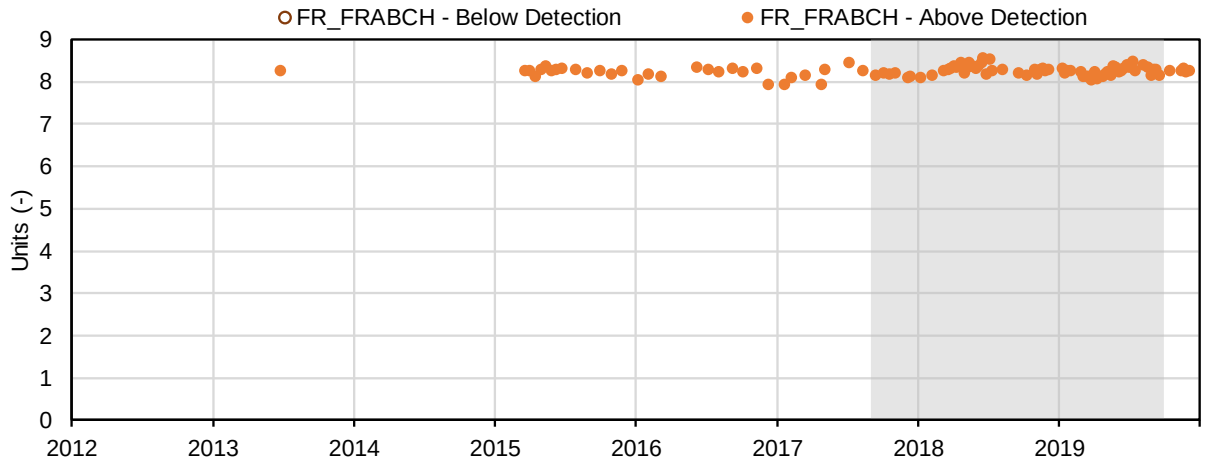
(5) Dissolved Oxygen (mg/L); Field Measured



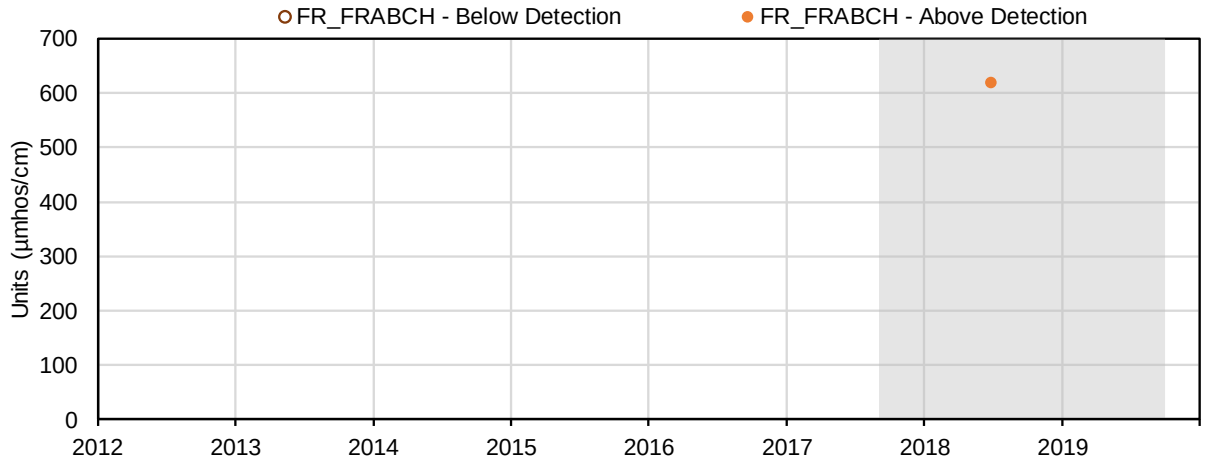
(6) Dissolved Oxygen (%); Field Measured



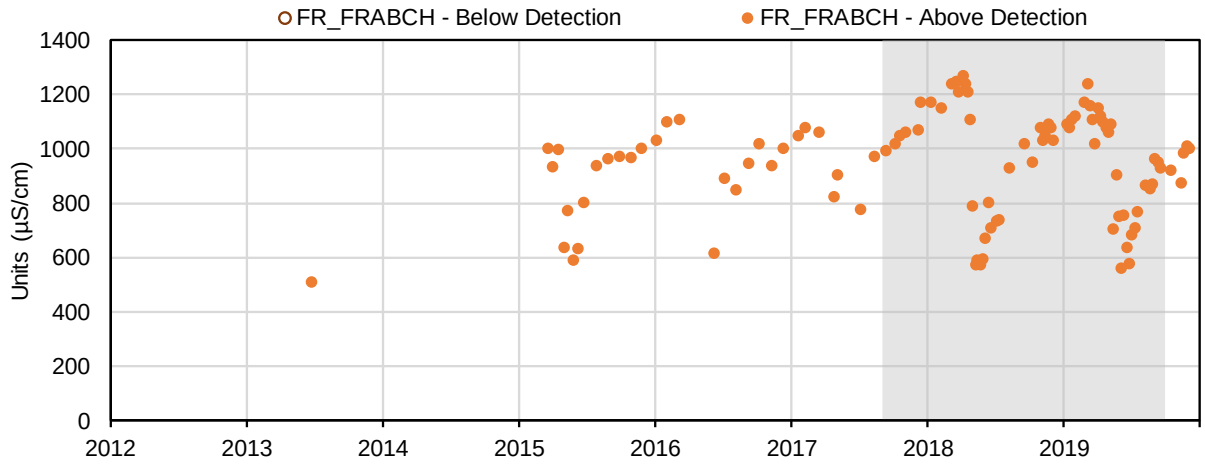
(7) pH (-); Conventional Parameters



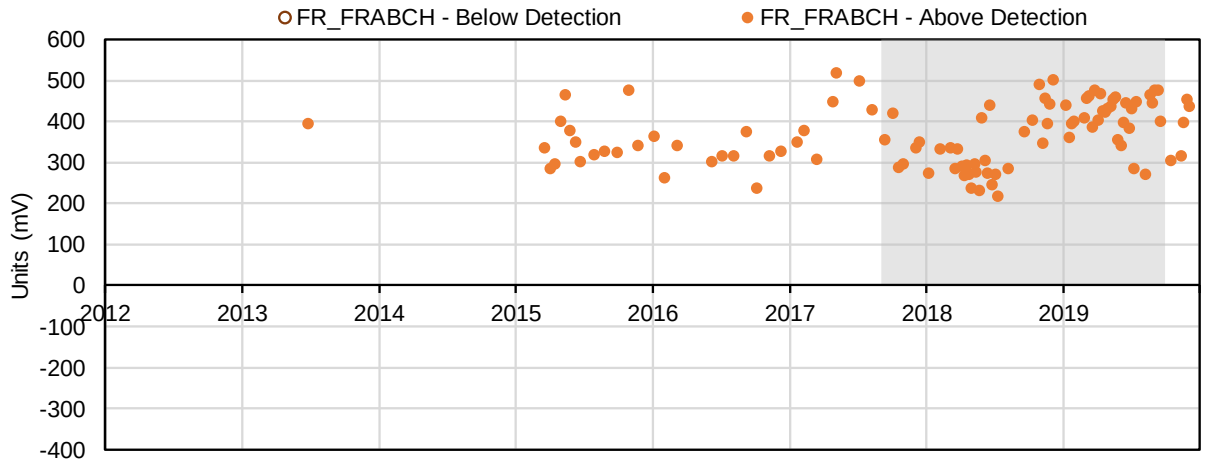
(8) Conductivity (µmhos/cm); Conventional Parameters



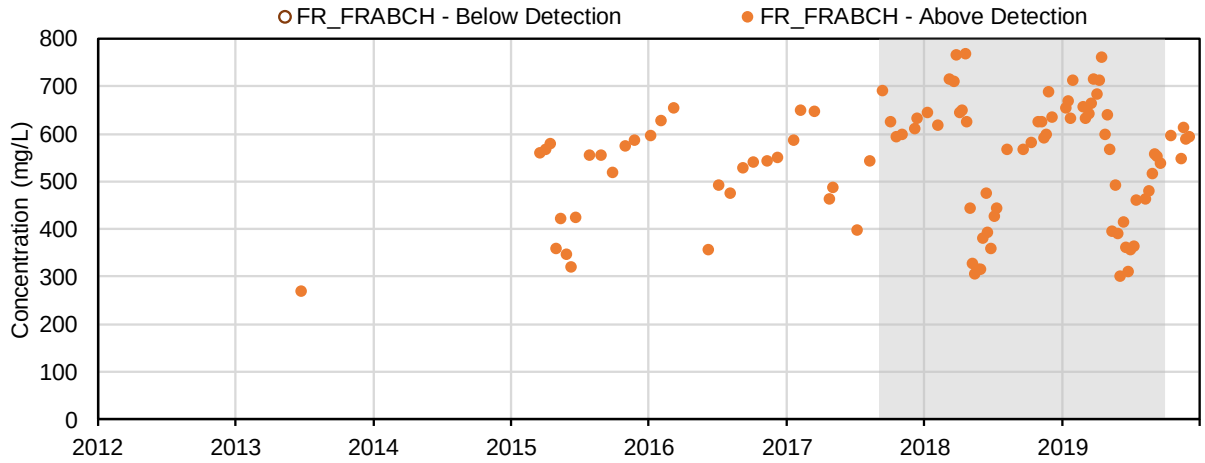
(9) Conductivity (µS/cm); Conventional Parameters



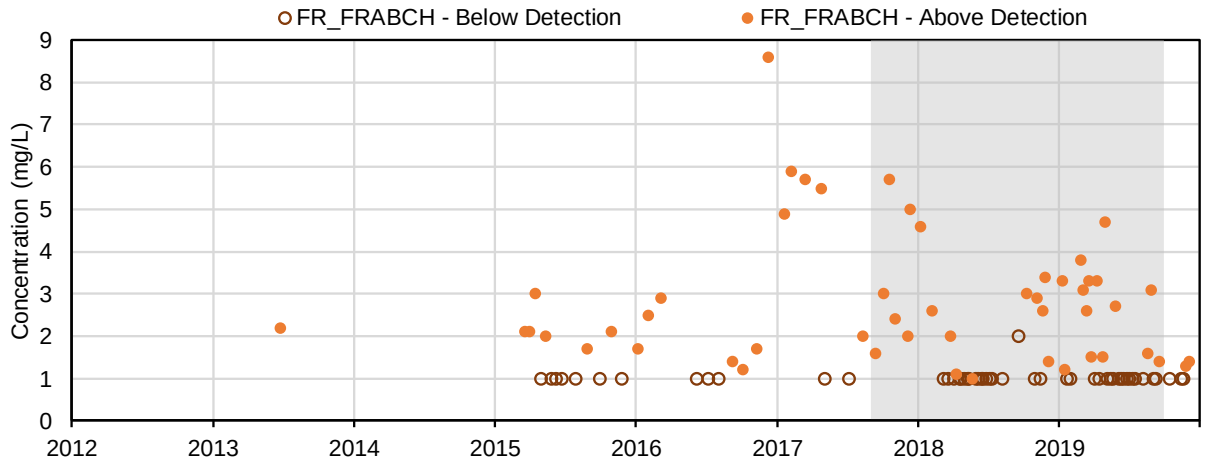
(10) Oxidation-Reduction Potential (mV); Conventional Parameters



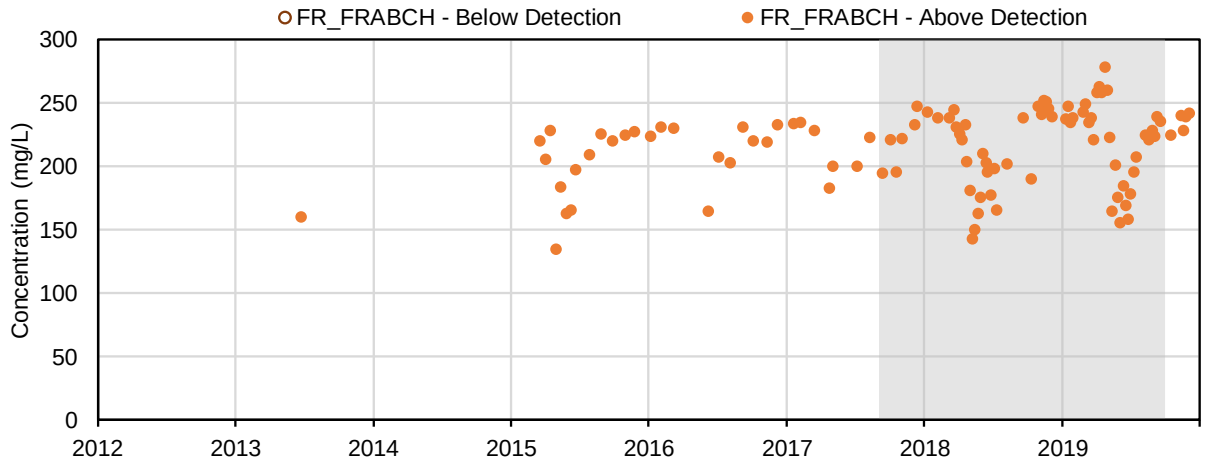
(11) Hardness, as CaCO3 (mg/L); Conventional Parameters



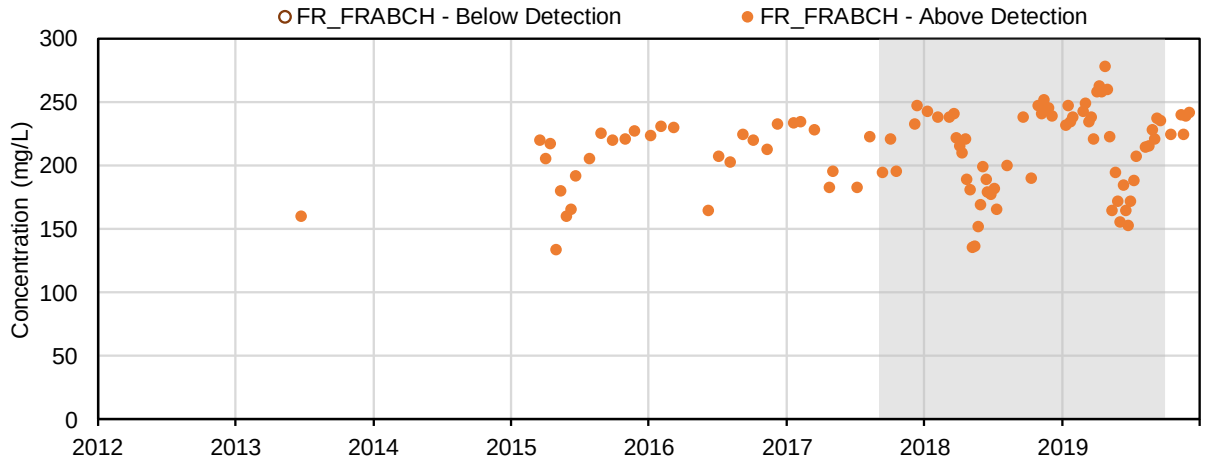
(12) Acidity, CaCO3 (mg/L); Conventional Parameters



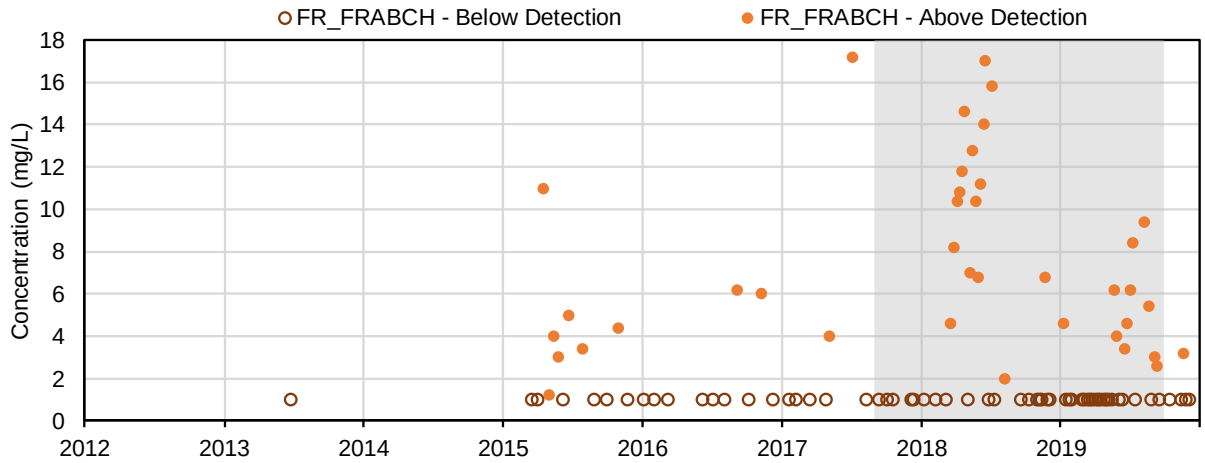
(13) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



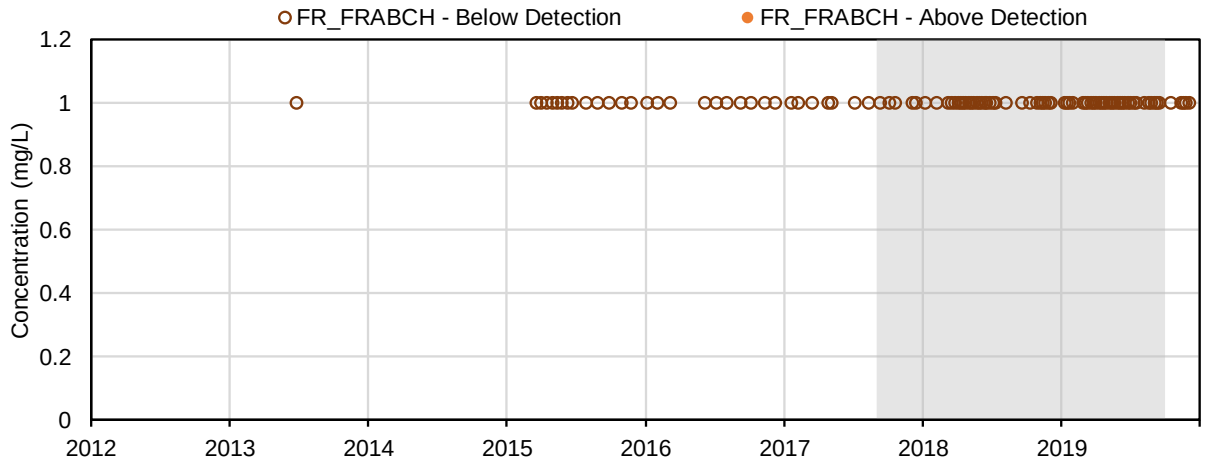
(14) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



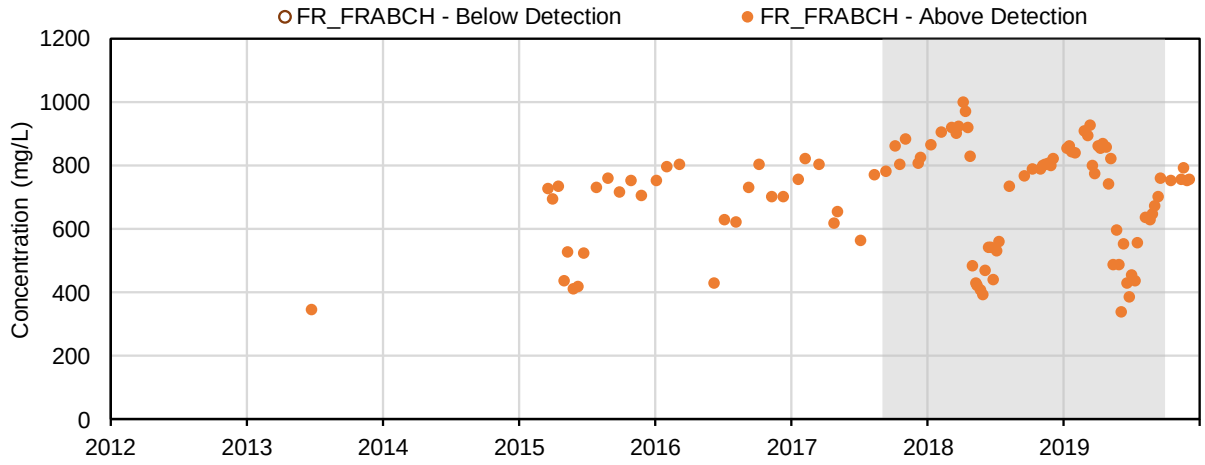
(15) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



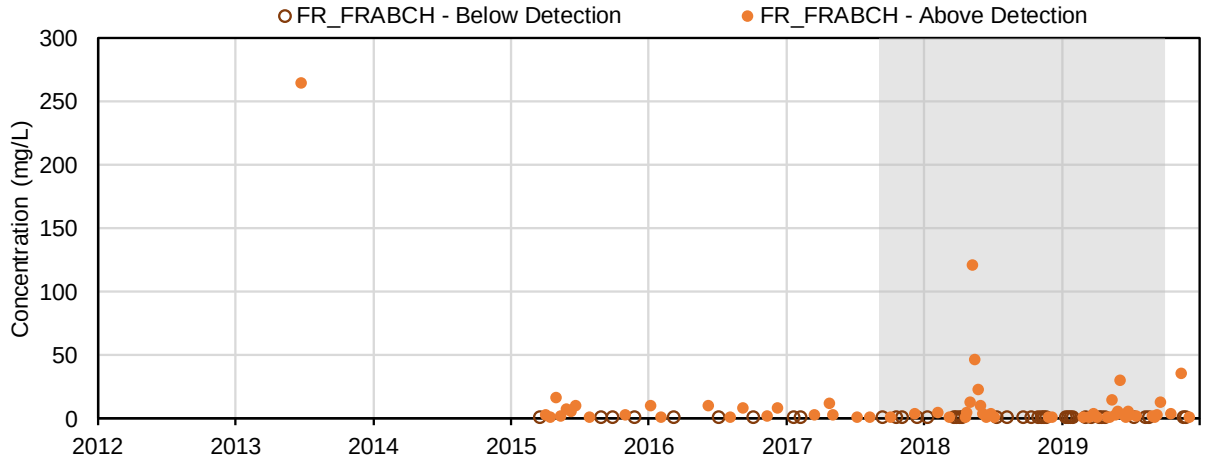
(16) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



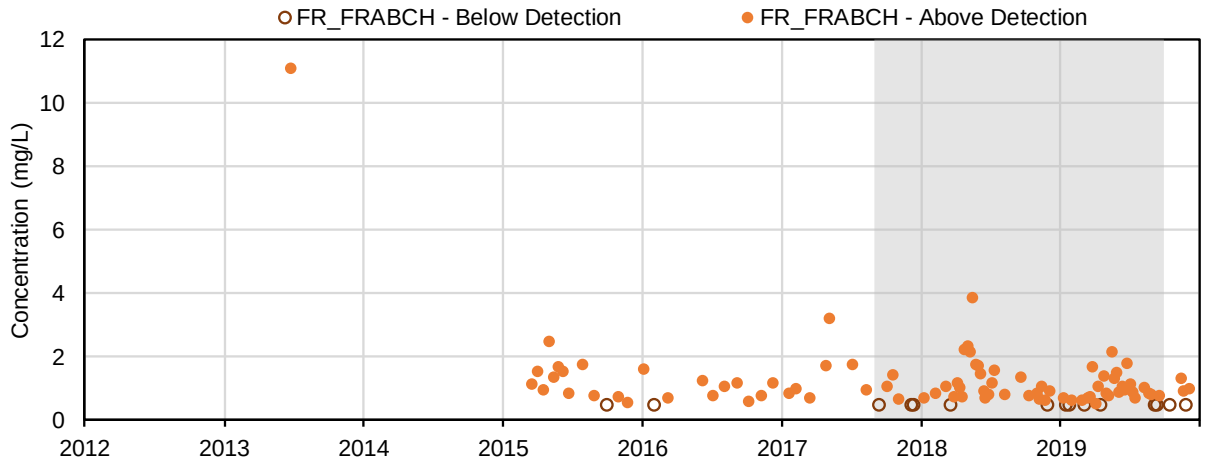
(17) Total dissolved solids (mg/L); Conventional Parameters



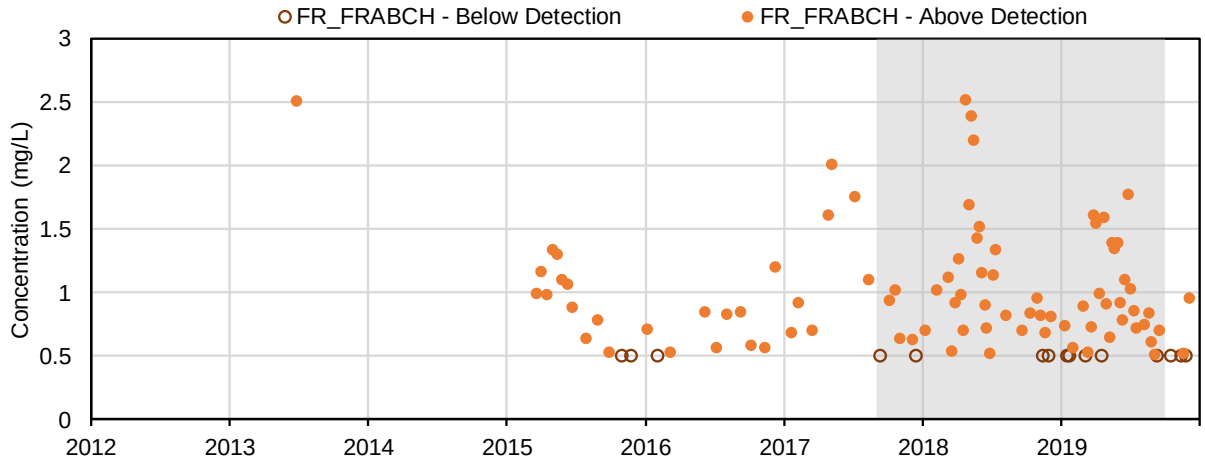
(18) Total suspended solids (mg/L); Conventional Parameters



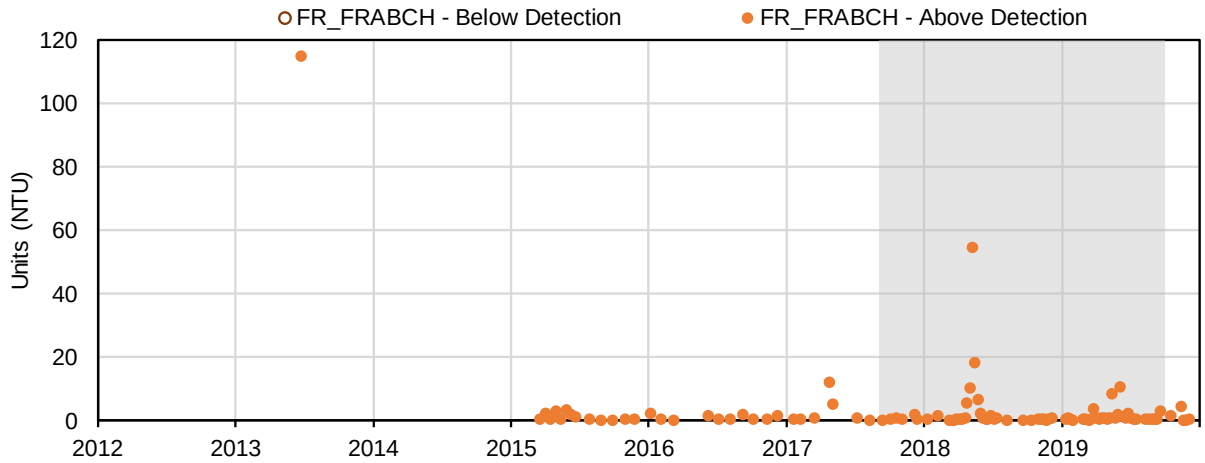
(19) Total organic carbon (mg/L); Conventional Parameters



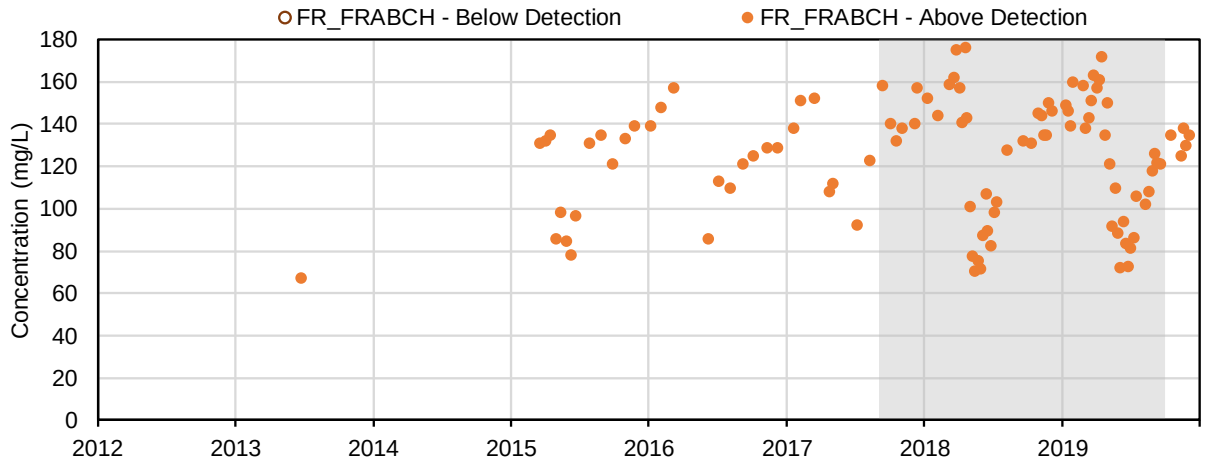
(20) Dissolved organic carbon (mg/L); Conventional Parameters



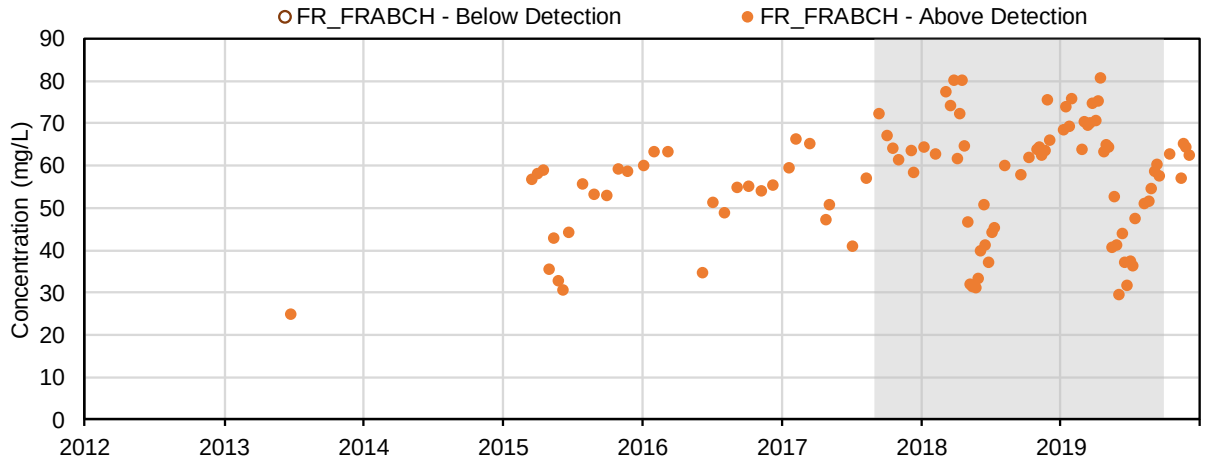
(21) Turbidity (NTU); Conventional Parameters



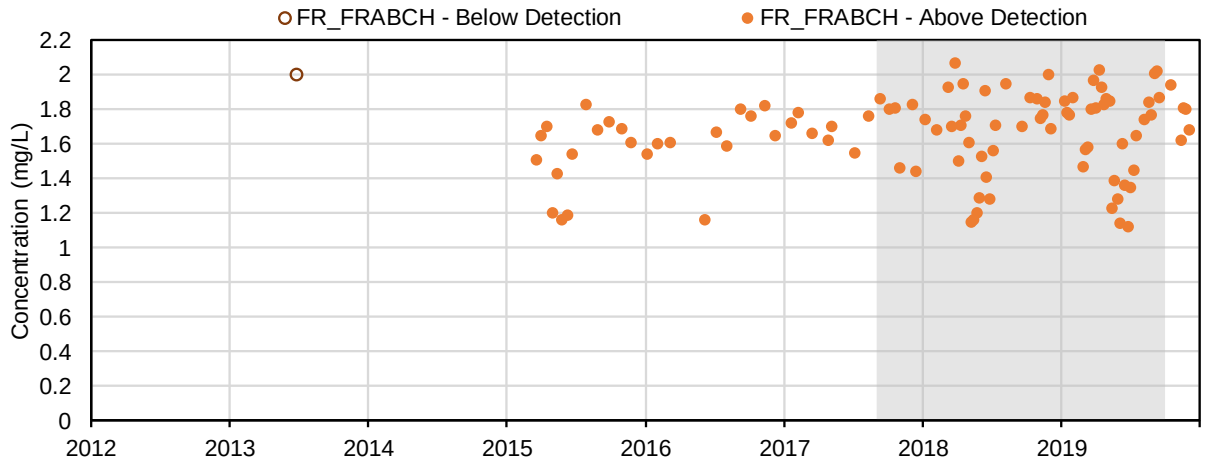
(22) Calcium (mg/L); Major Ions



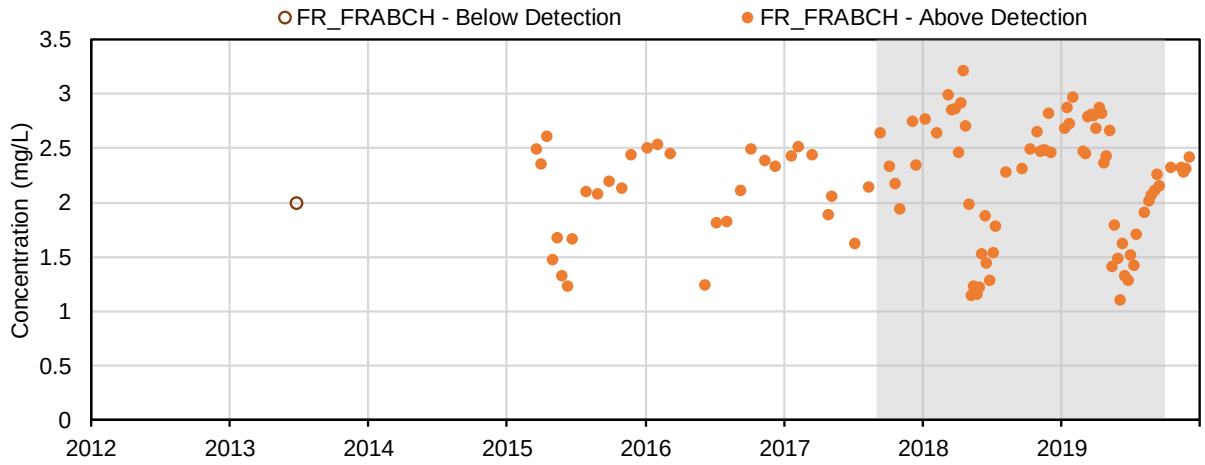
(23) Magnesium (mg/L); Major Ions



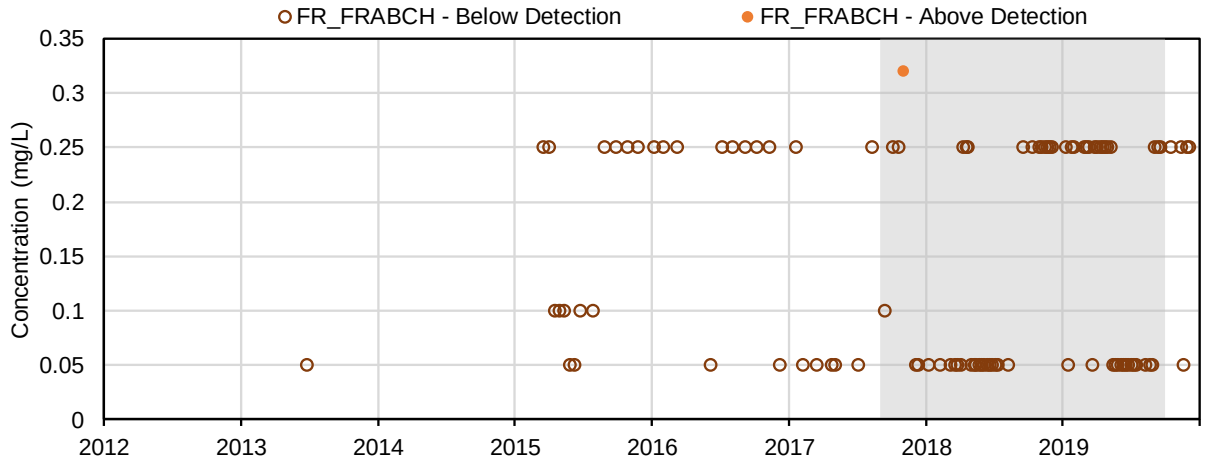
(24) Potassium (mg/L); Major Ions



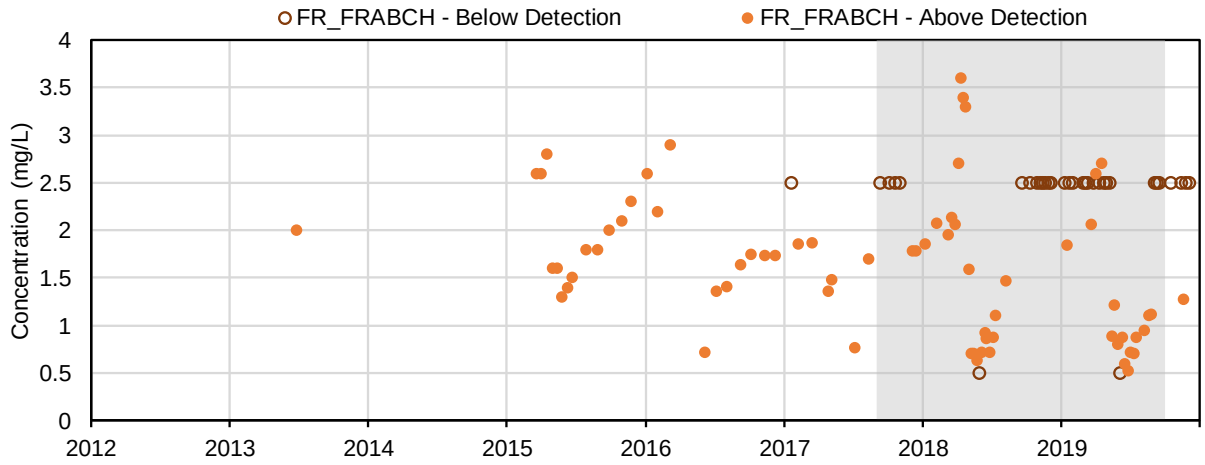
(25) Sodium (mg/L); Major Ions



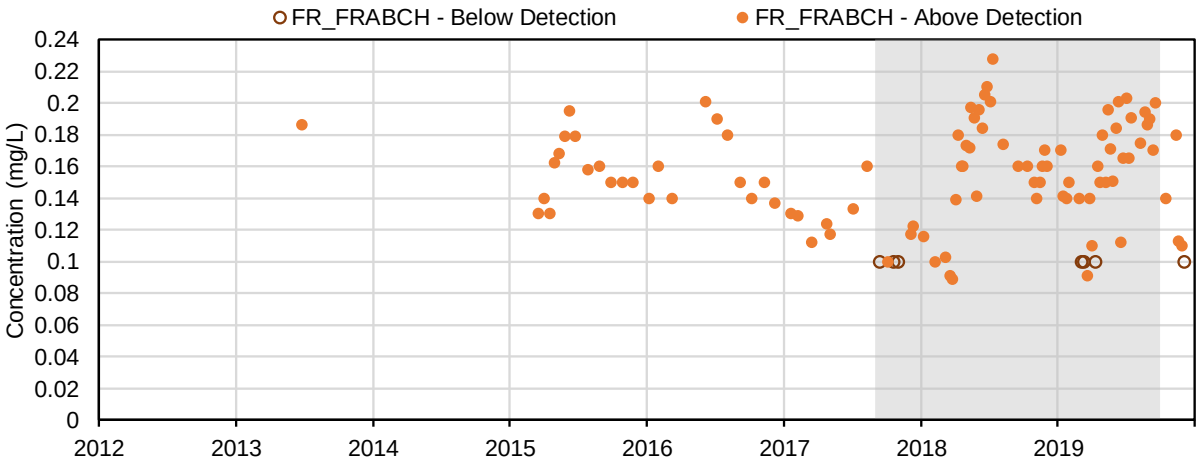
(26) Bromide (mg/L); Major Ions



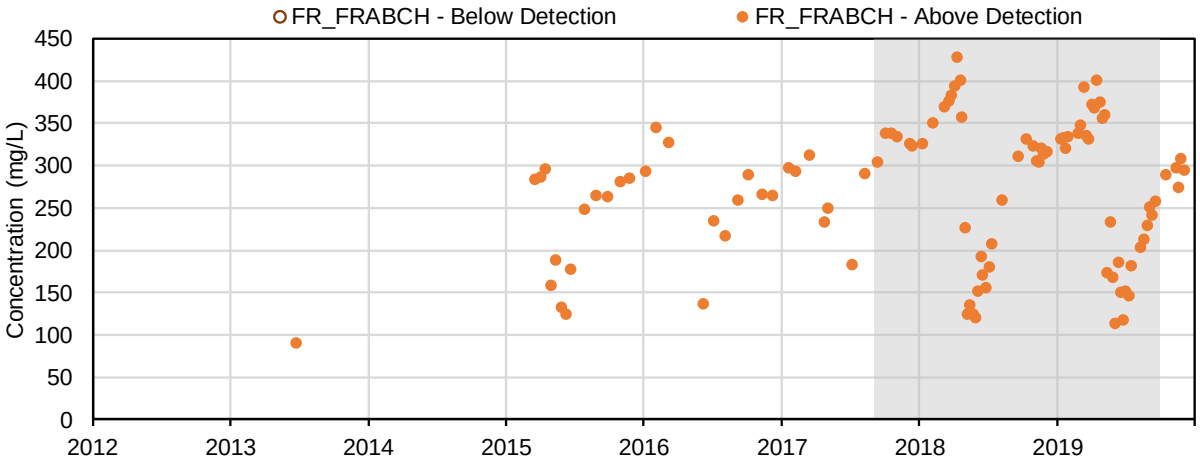
(27) Chloride (mg/L); Major Ions



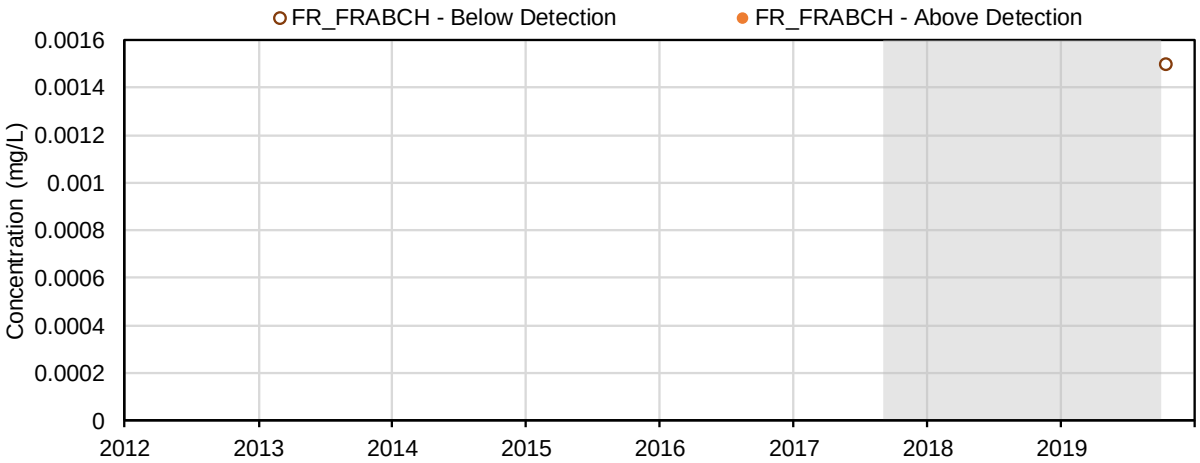
(28) Fluoride (mg/L); Major Ions



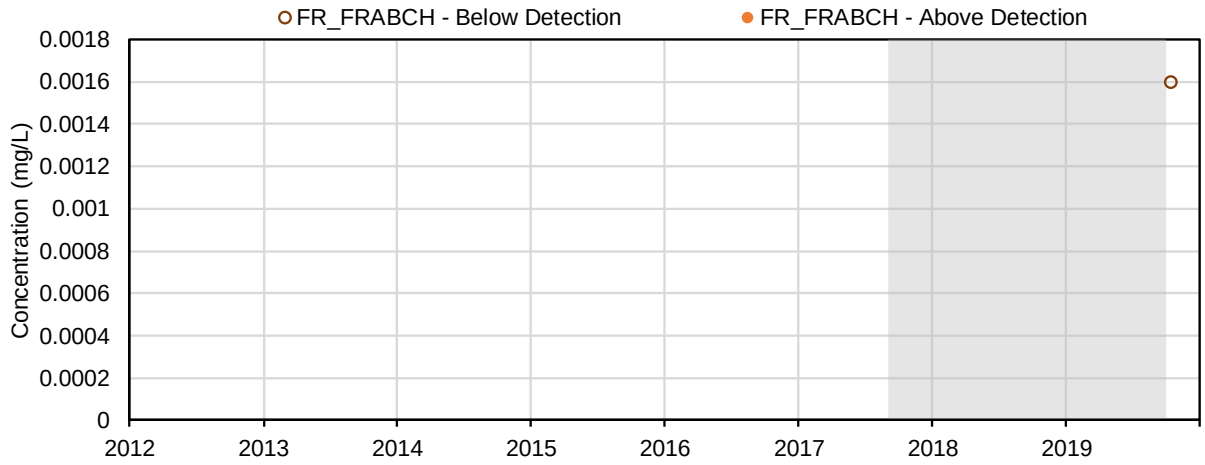
(29) Sulphate (mg/L); Major Ions



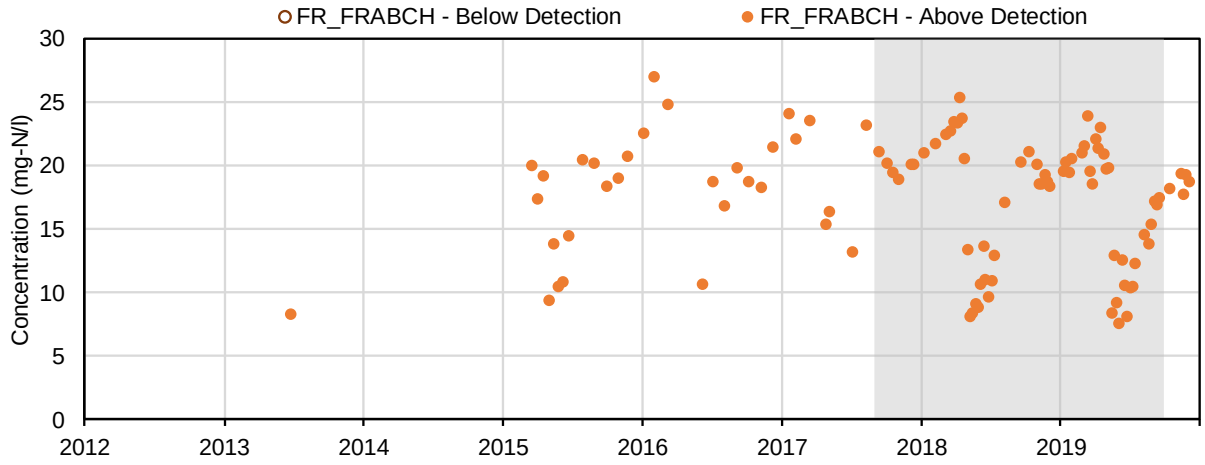
(30) Sulphide (mg/L); Major Ions



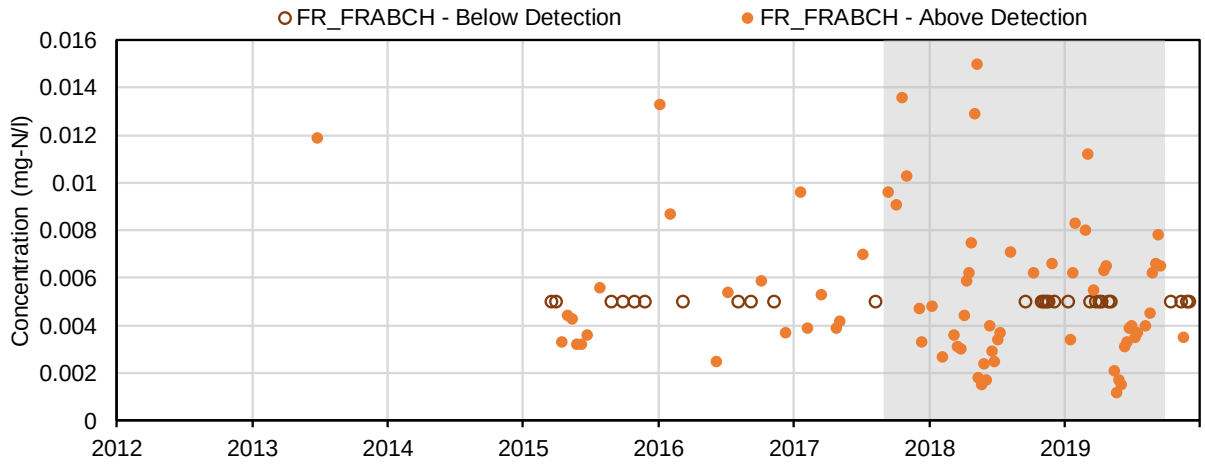
(31) Hydrogen Sulphide (mg/L); Major Ions



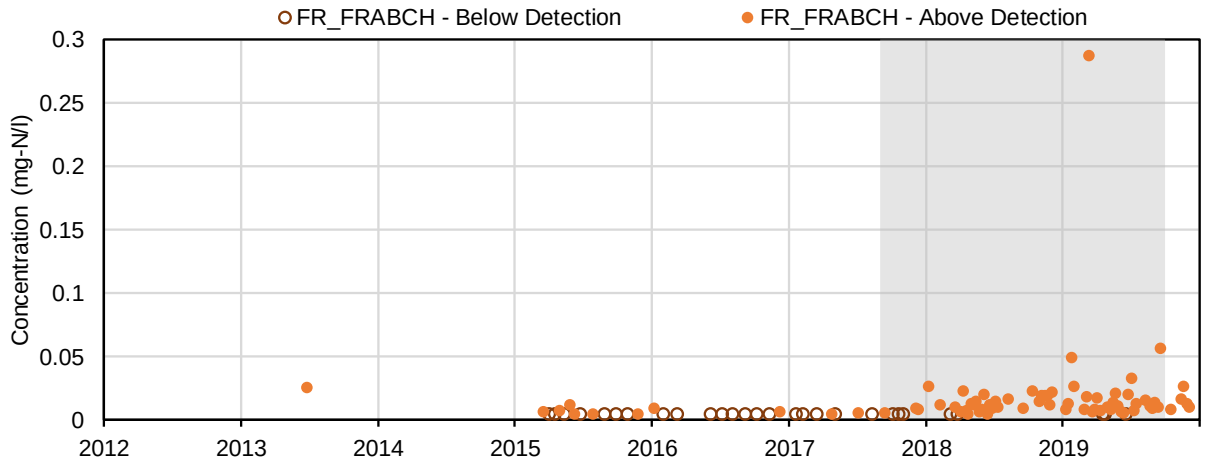
(32) Nitrate (mg-N/l); Nutrients and Biological Indicators



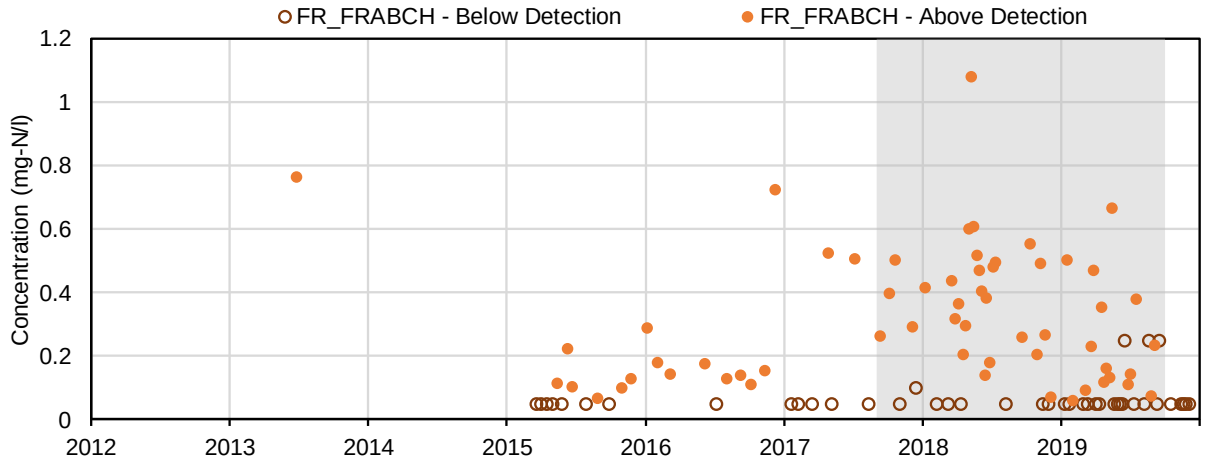
(33) Nitrite (mg-N/l); Nutrients and Biological Indicators



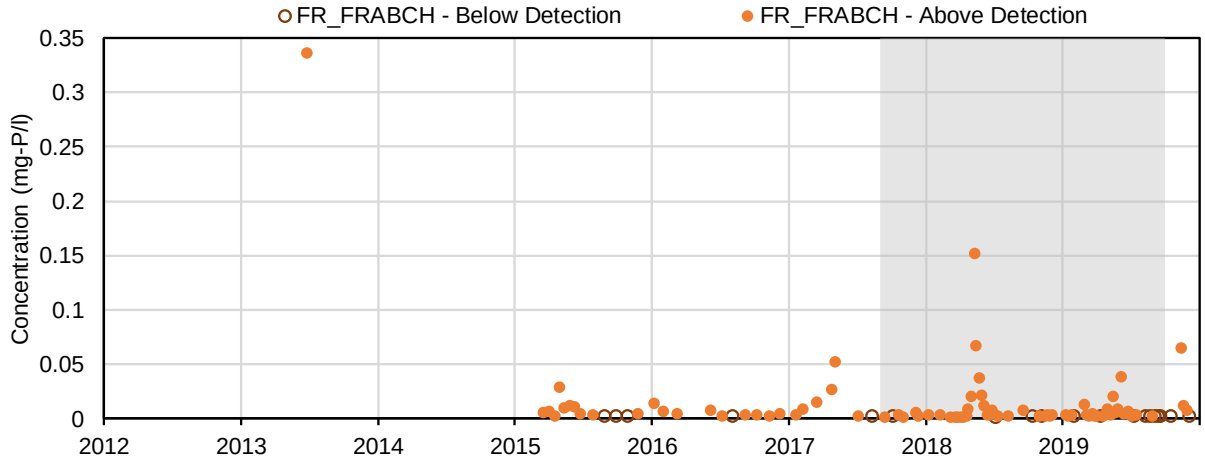
(34) Total ammonia (mg-N/l); Nutrients and Biological Indicators



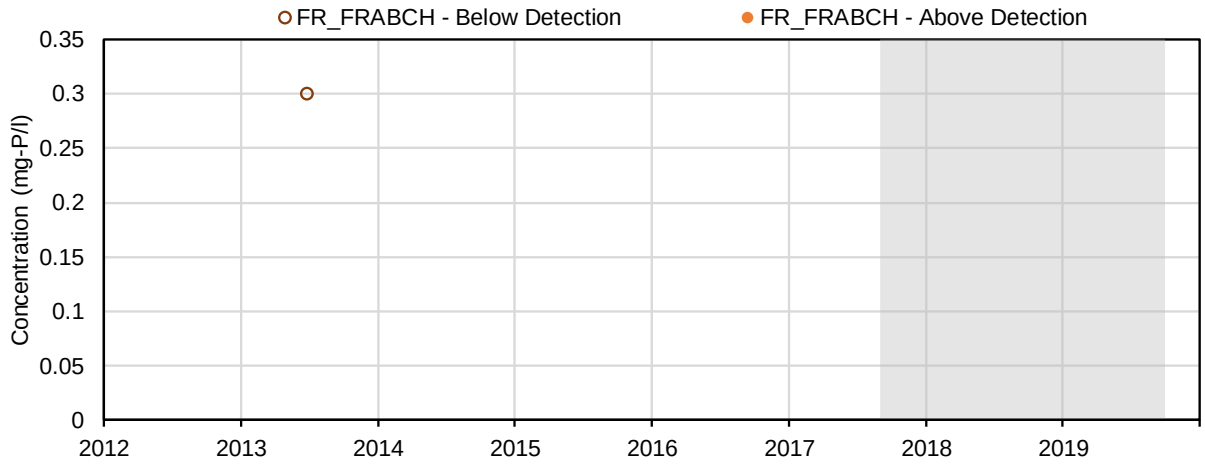
(35) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



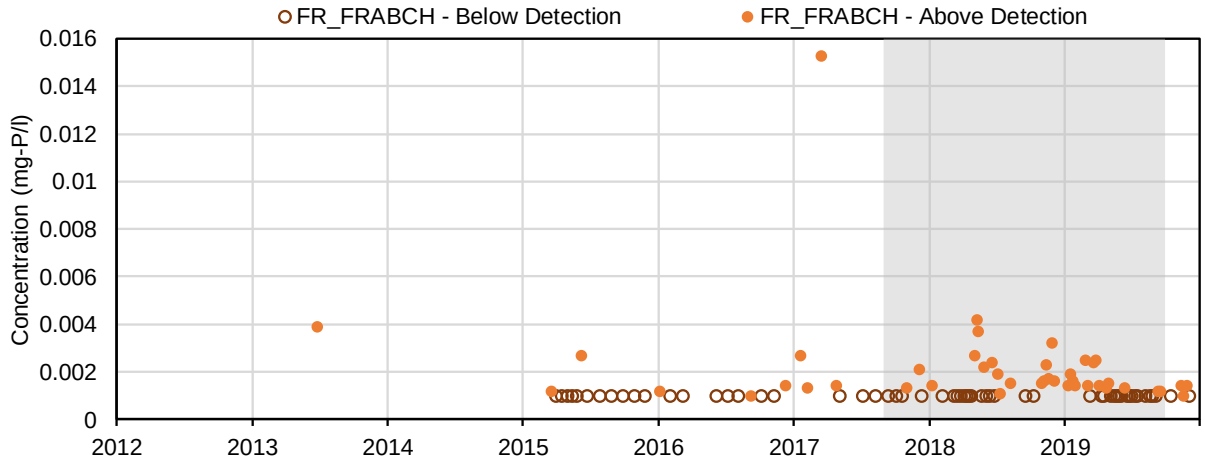
(36) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



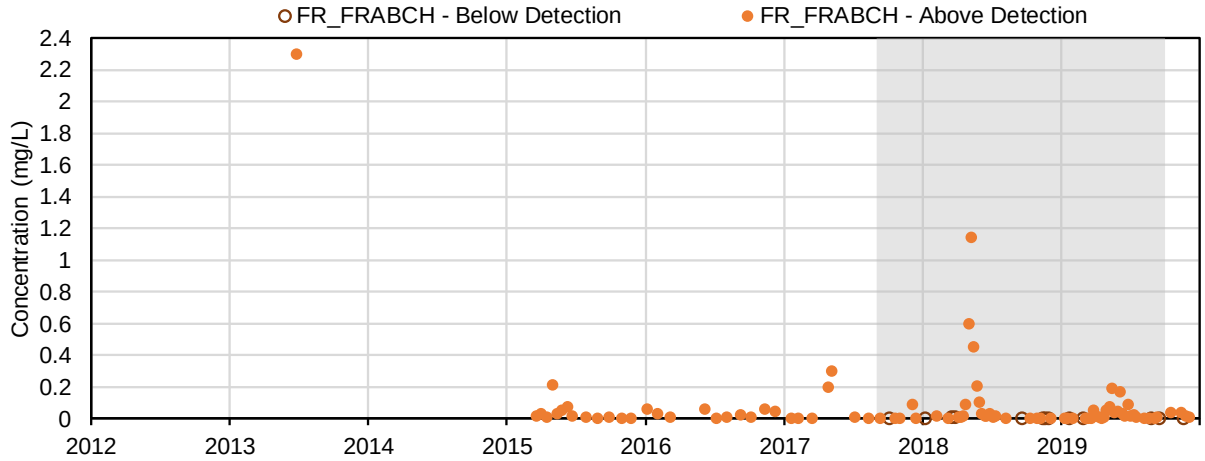
(37) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



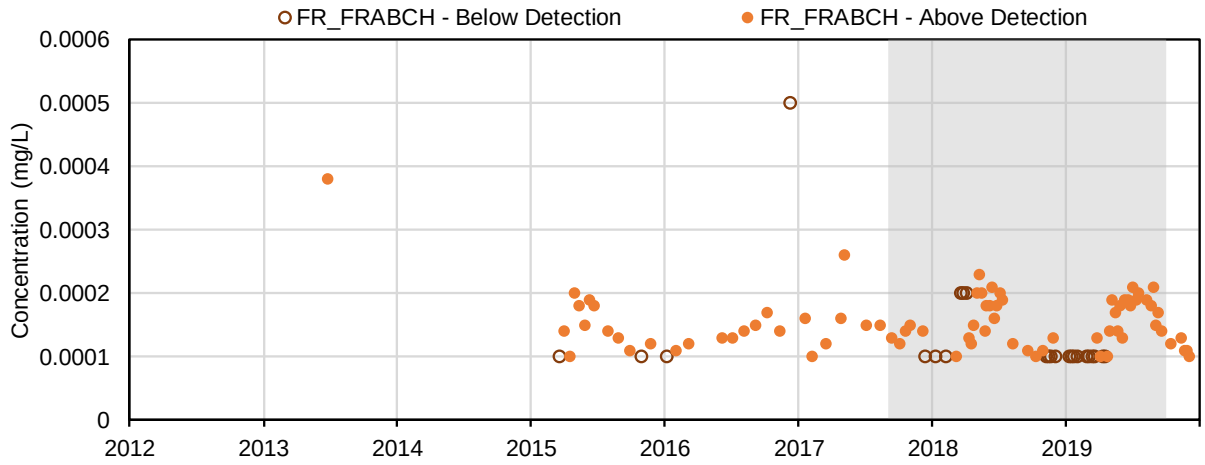
(38) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



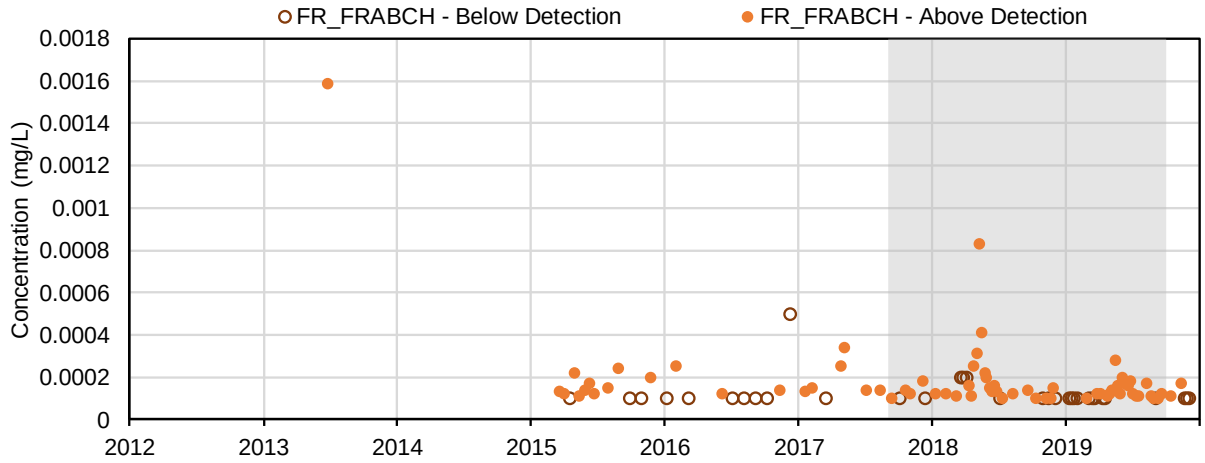
(39) Aluminum (mg/L); Total Metals



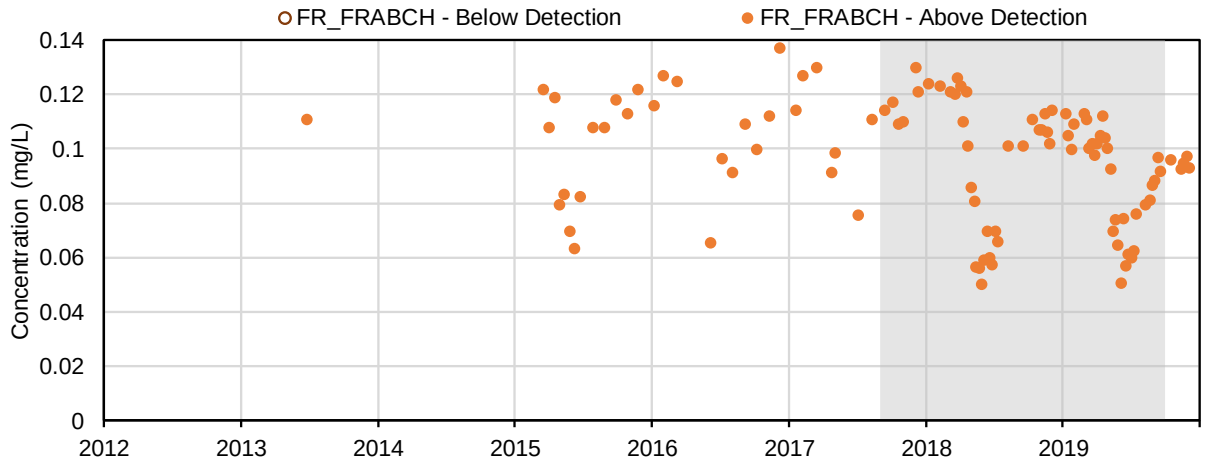
(40) Antimony (mg/L); Total Metals



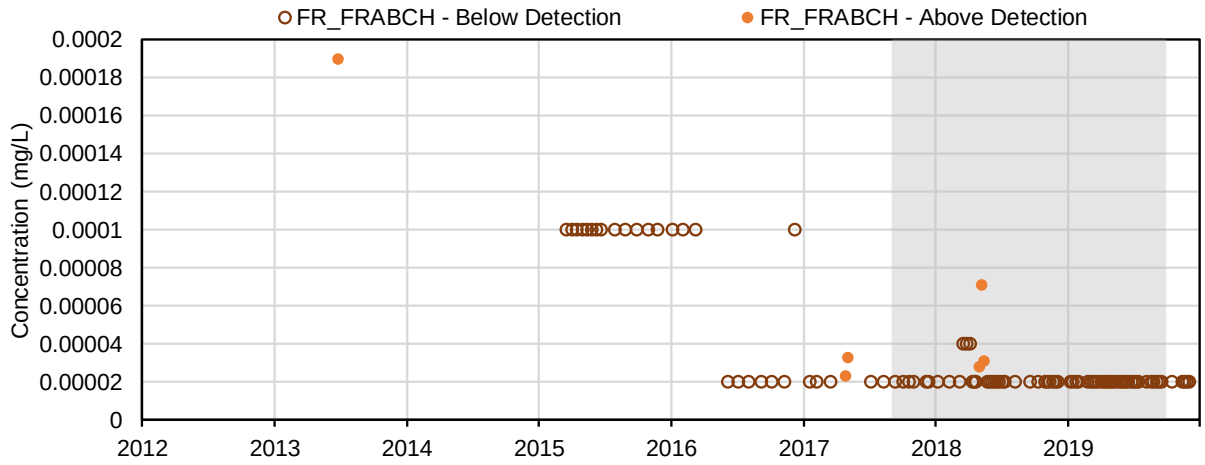
(41) Arsenic (mg/L); Total Metals



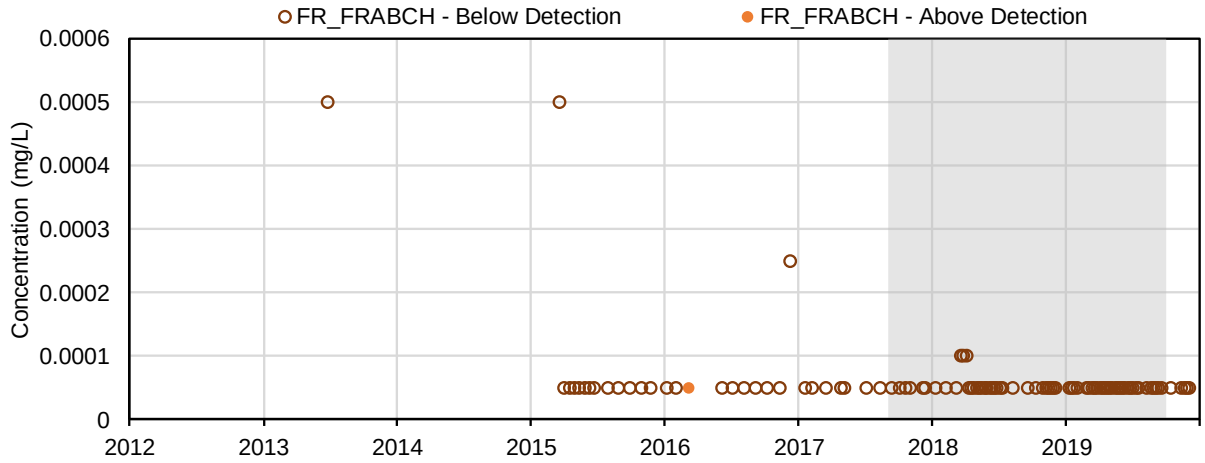
(42) Barium (mg/L); Total Metals



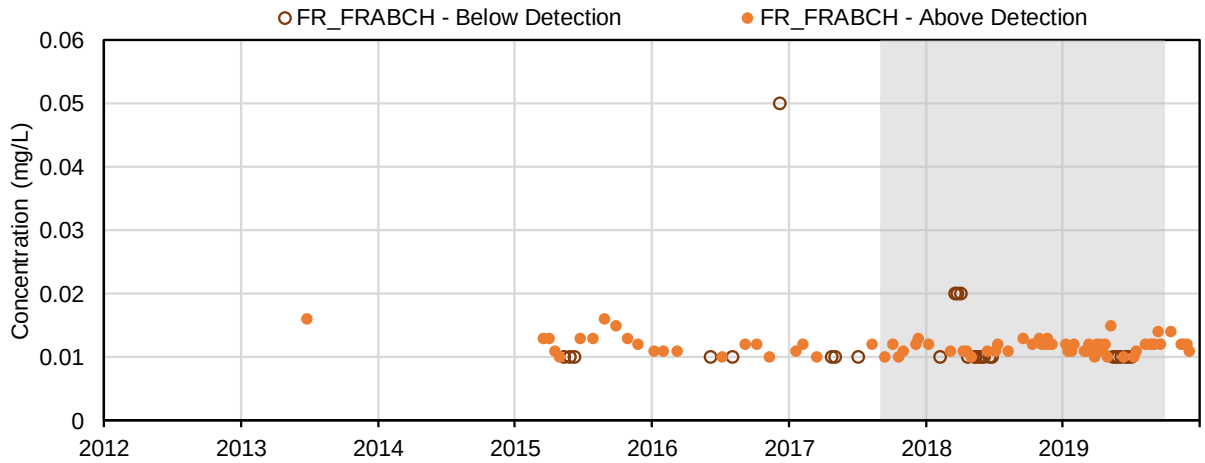
(43) Beryllium (mg/L); Total Metals



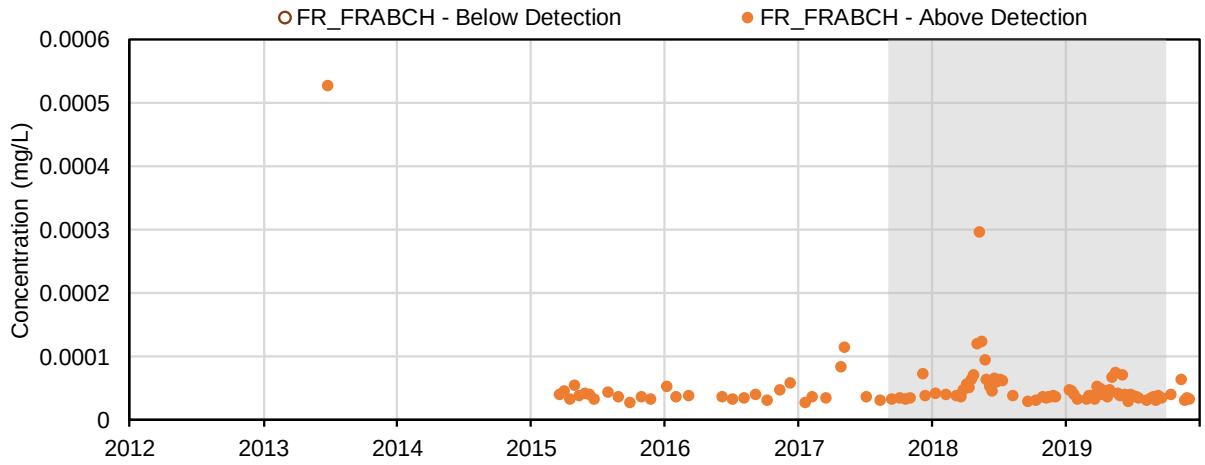
(44) Bismuth (mg/L); Total Metals



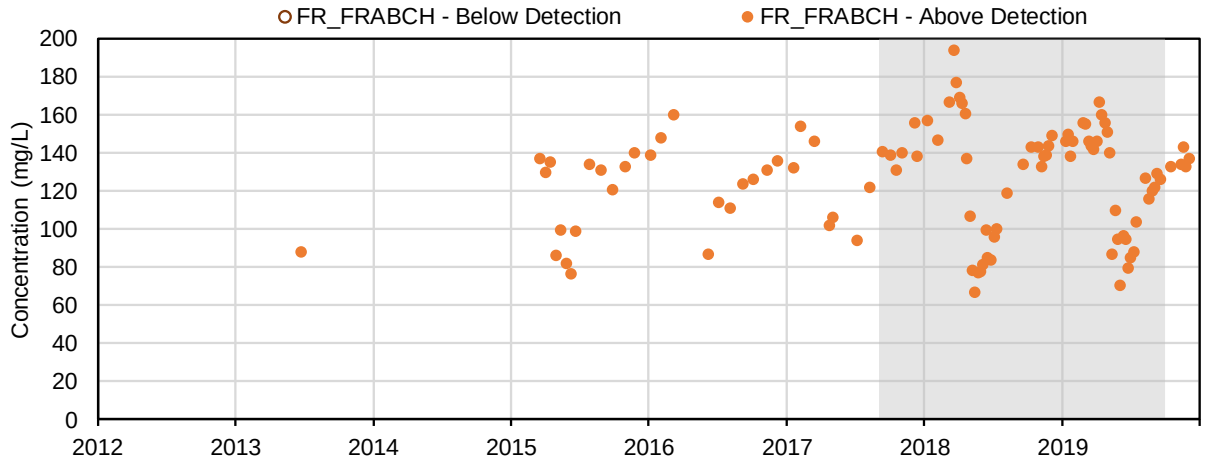
(45) Boron (mg/L); Total Metals



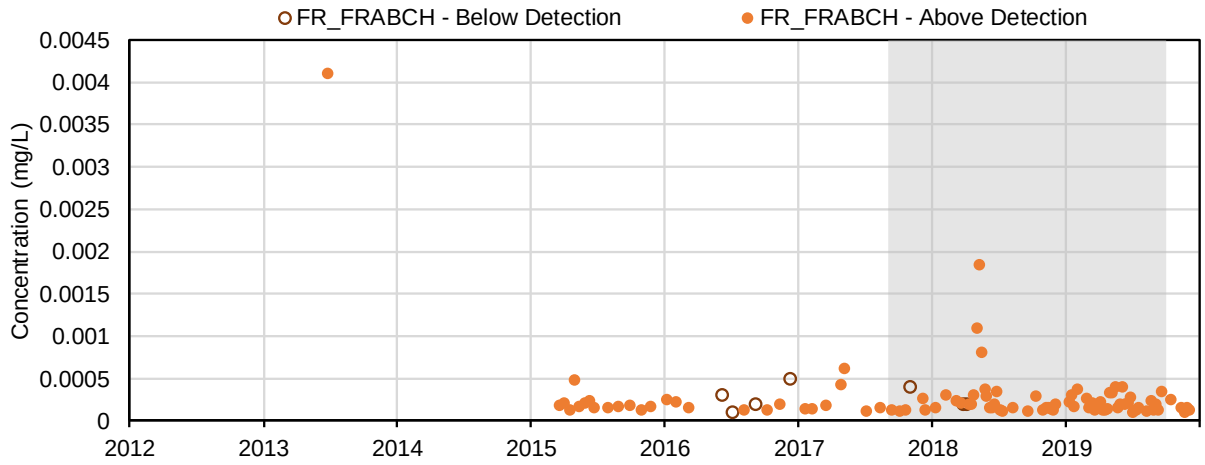
(46) Cadmium (mg/L); Total Metals



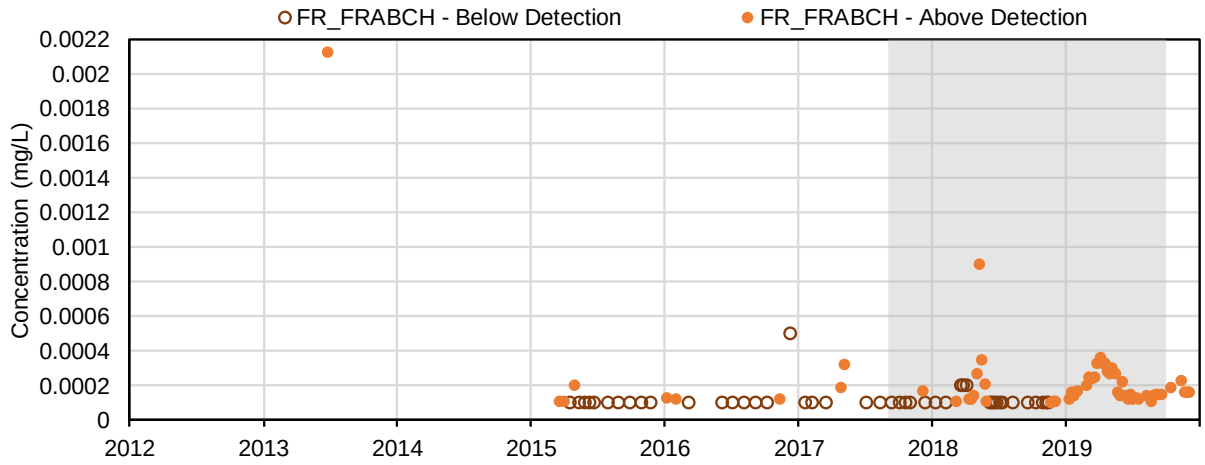
(47) Calcium (mg/L); Total Metals



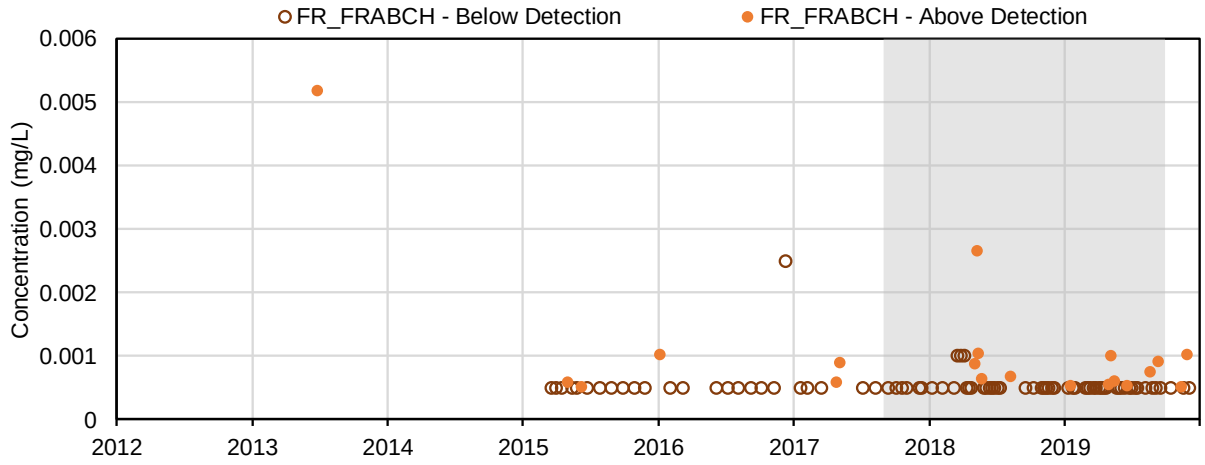
(48) Chromium (mg/L); Total Metals



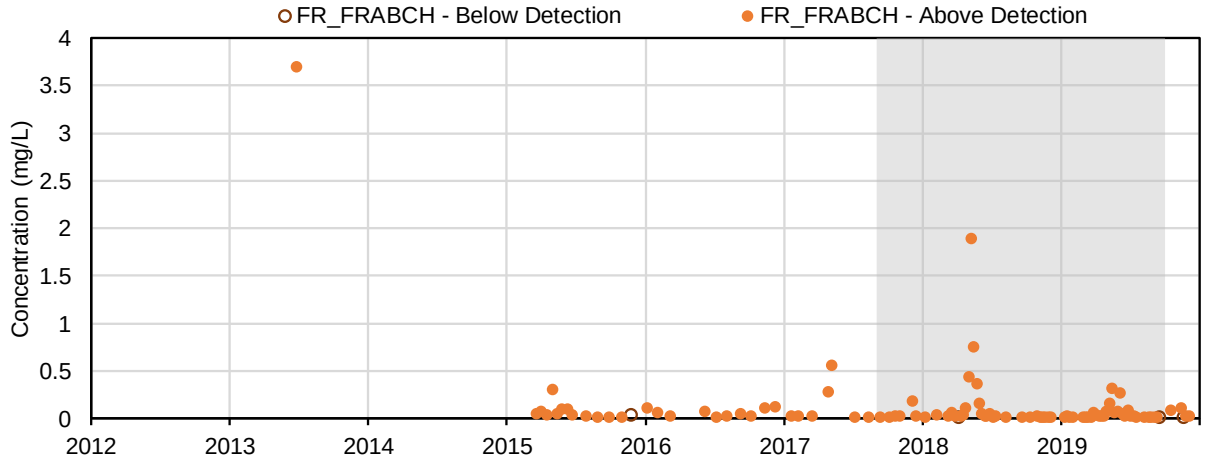
(49) Cobalt (mg/L); Total Metals



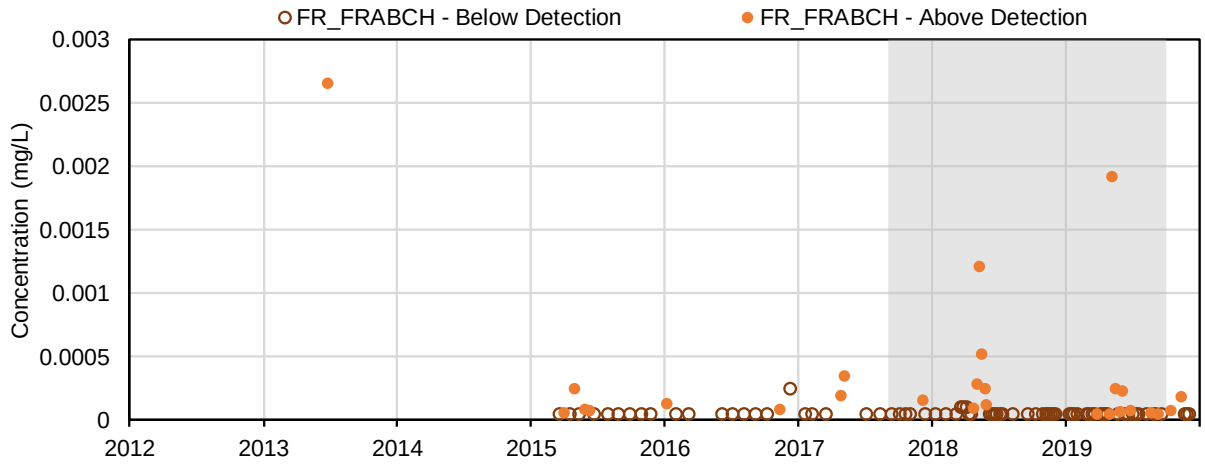
(50) Copper (mg/L); Total Metals



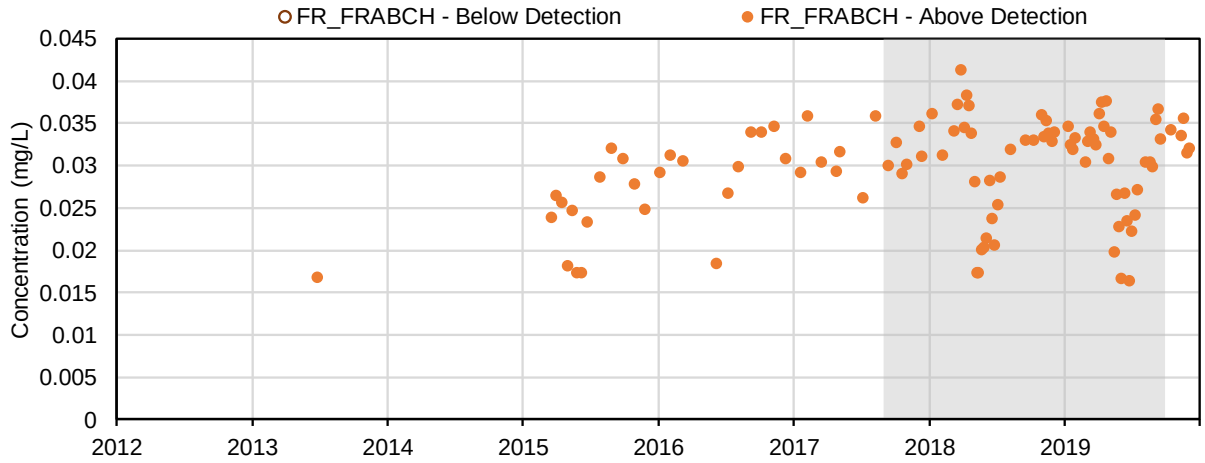
(51) Iron (mg/L); Total Metals



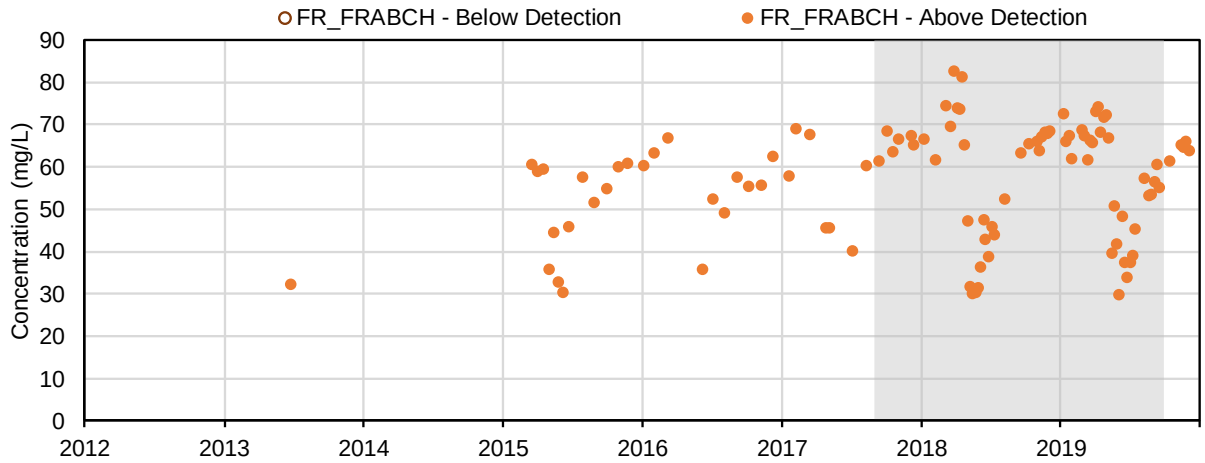
(52) Lead (mg/L); Total Metals



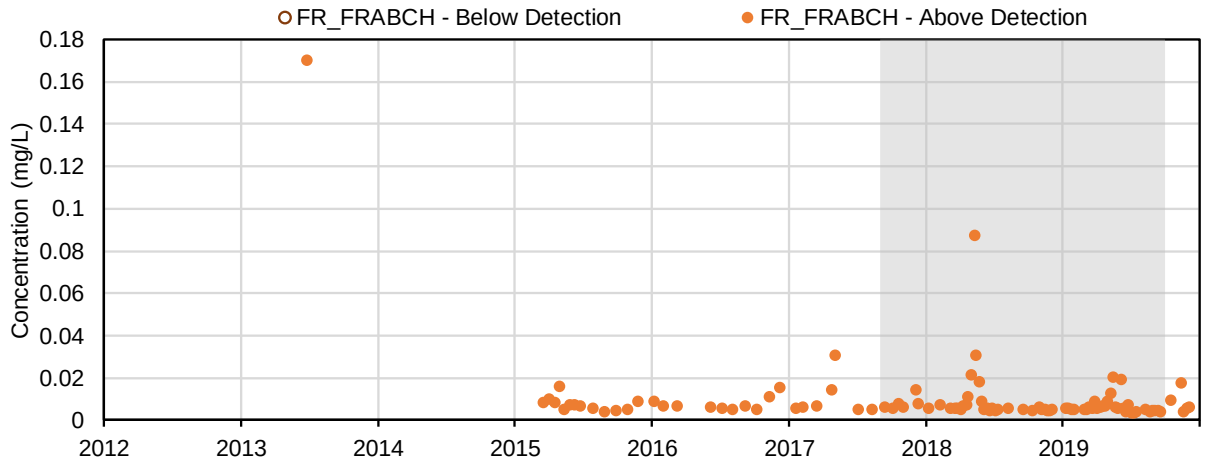
(53) Lithium (mg/L); Total Metals



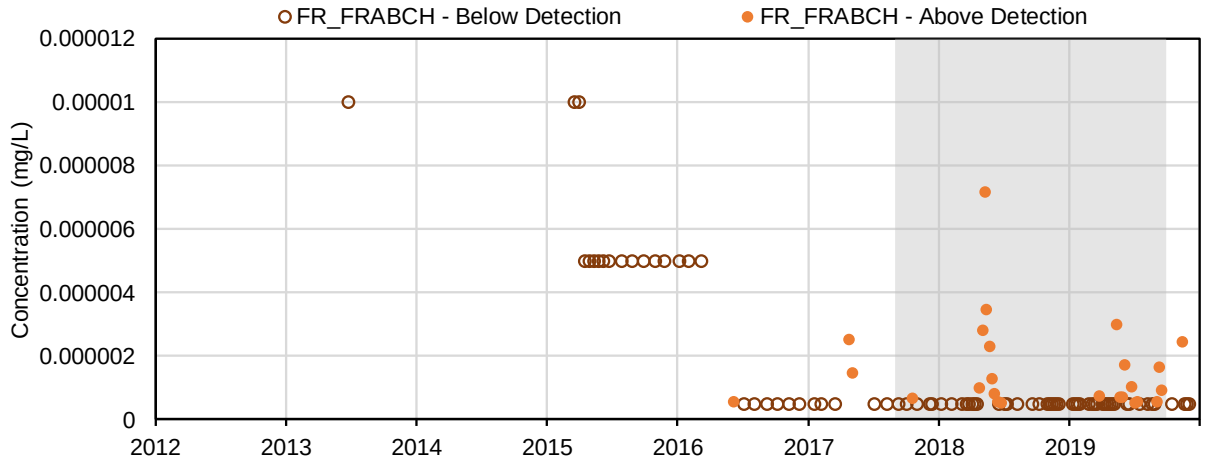
(54) Magnesium (mg/L); Total Metals



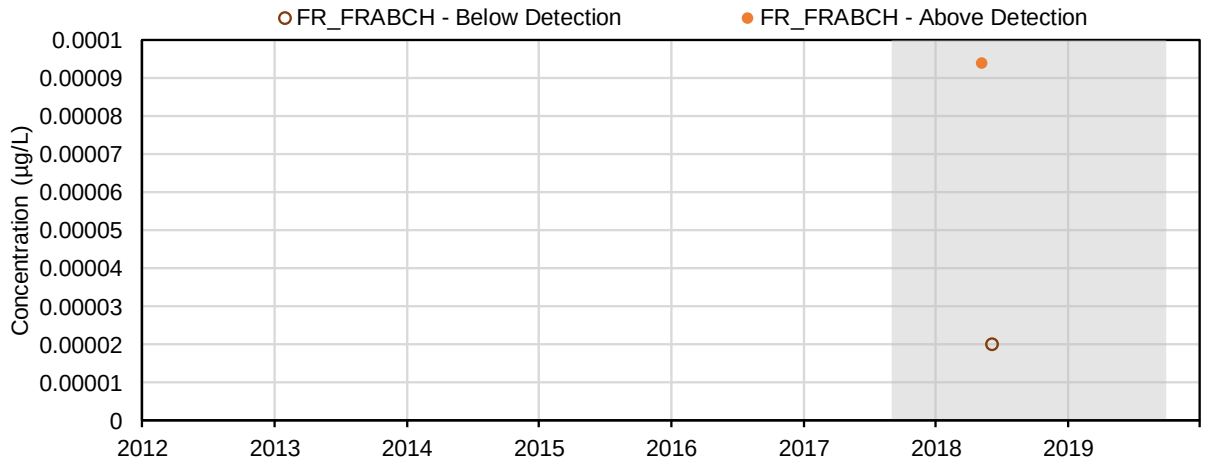
(55) Manganese (mg/L); Total Metals



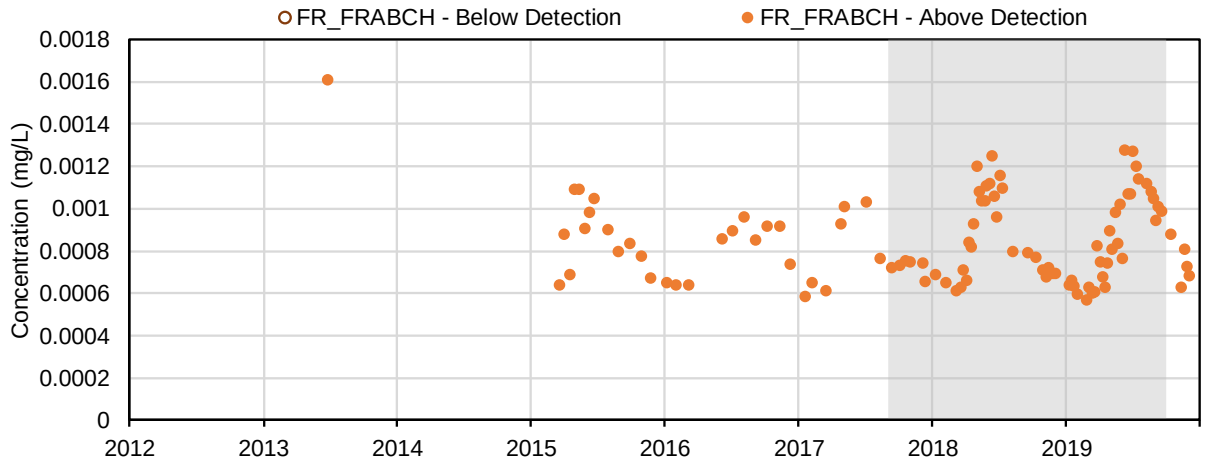
(56) Mercury (mg/L); Total Metals



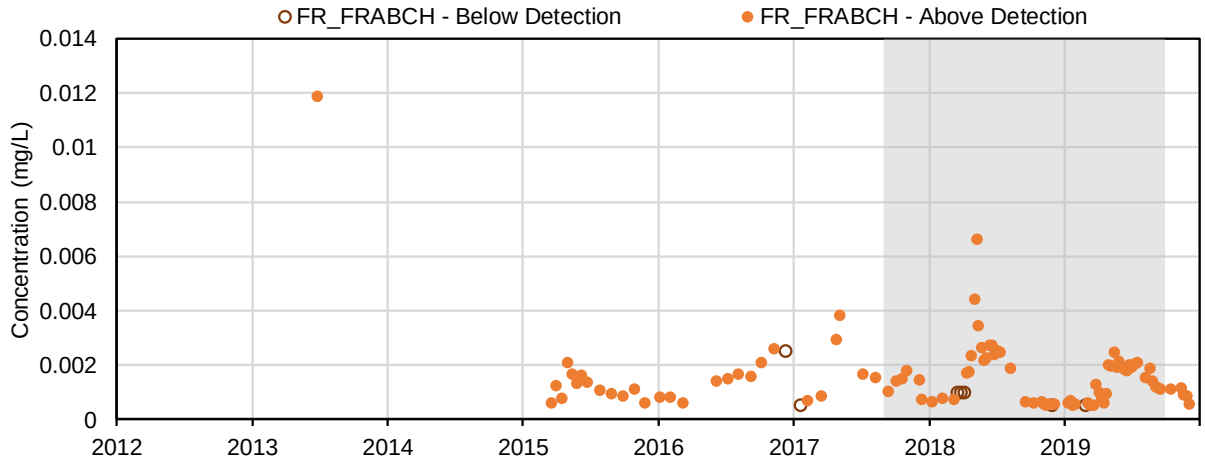
(57) Methyl mercury (µg/L); Total Metals



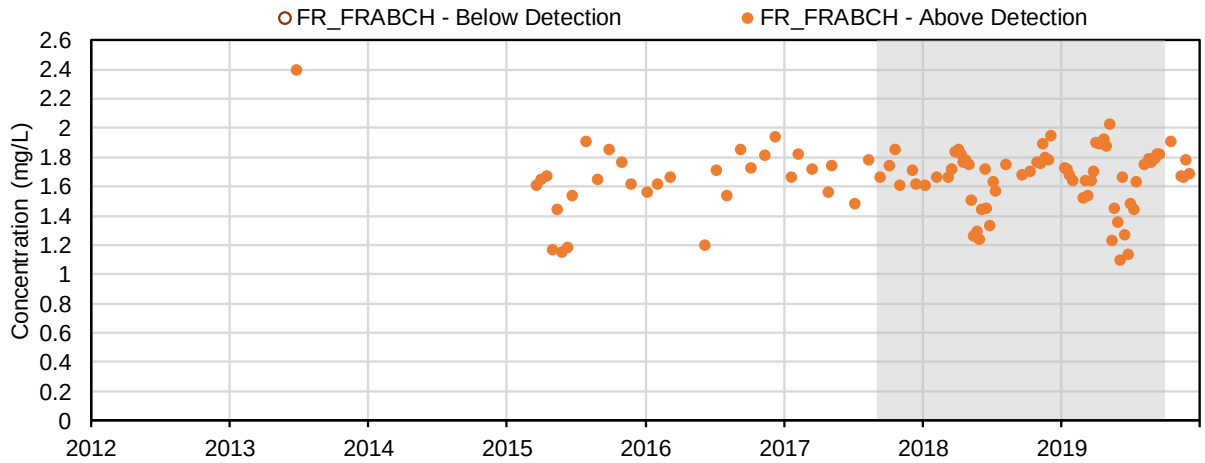
(58) Molybdenum (mg/L); Total Metals



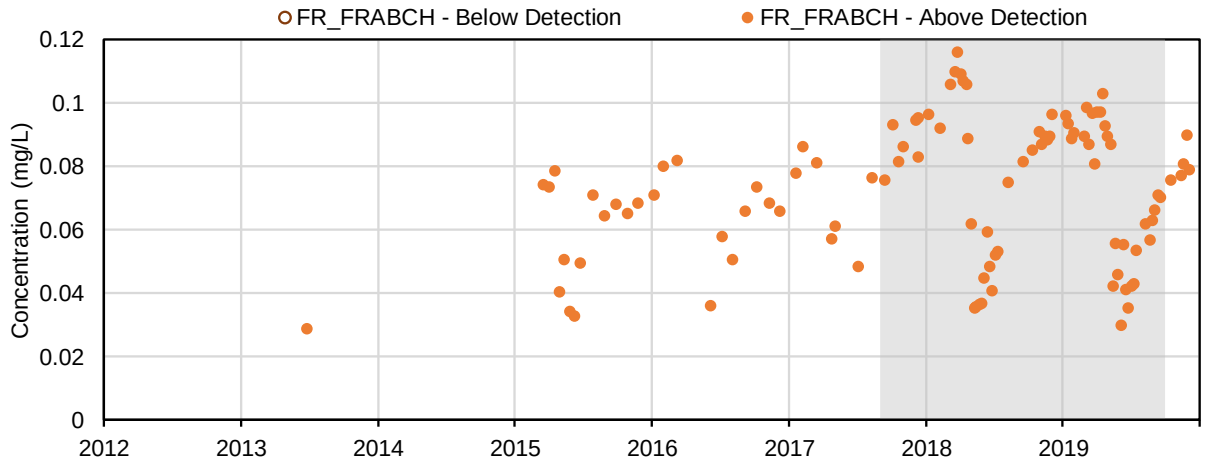
(59) Nickel (mg/L); Total Metals



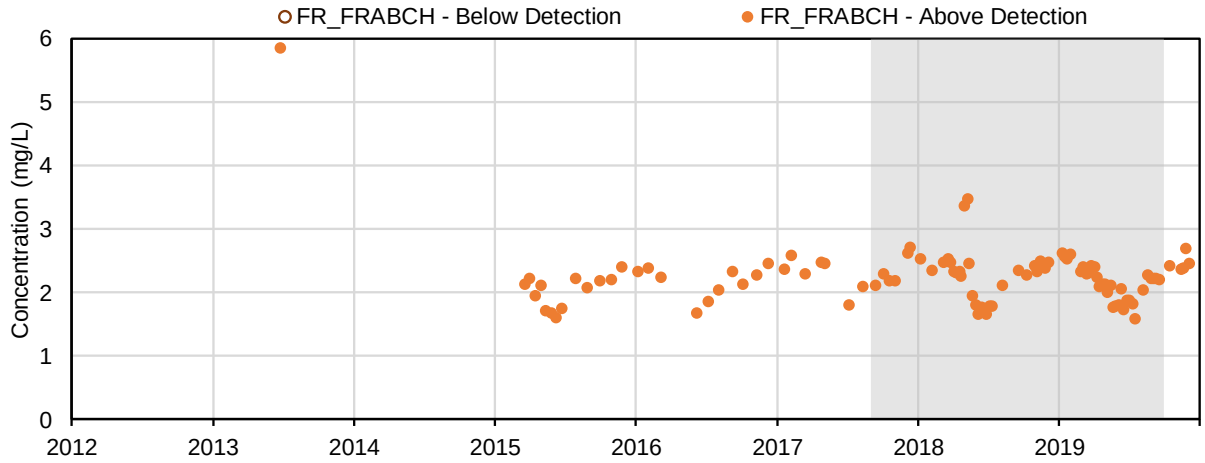
(60) Potassium (mg/L); Total Metals



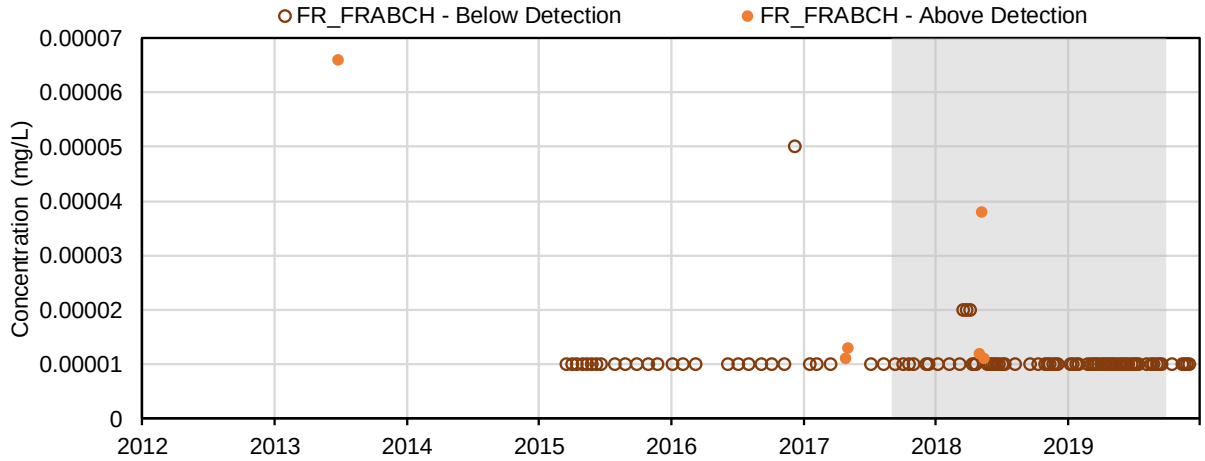
(61) Selenium (mg/L); Total Metals



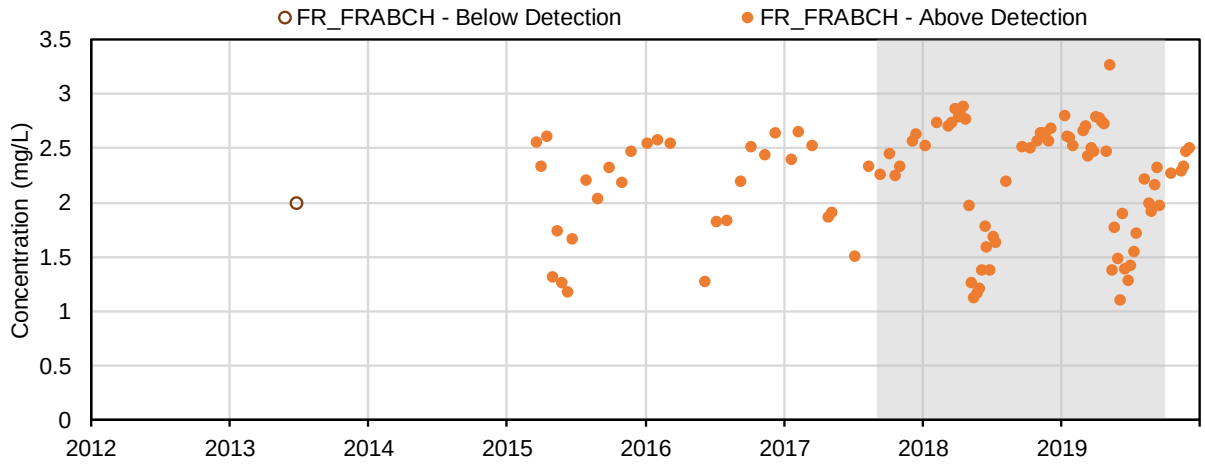
(62) Silicon (mg/L); Total Metals



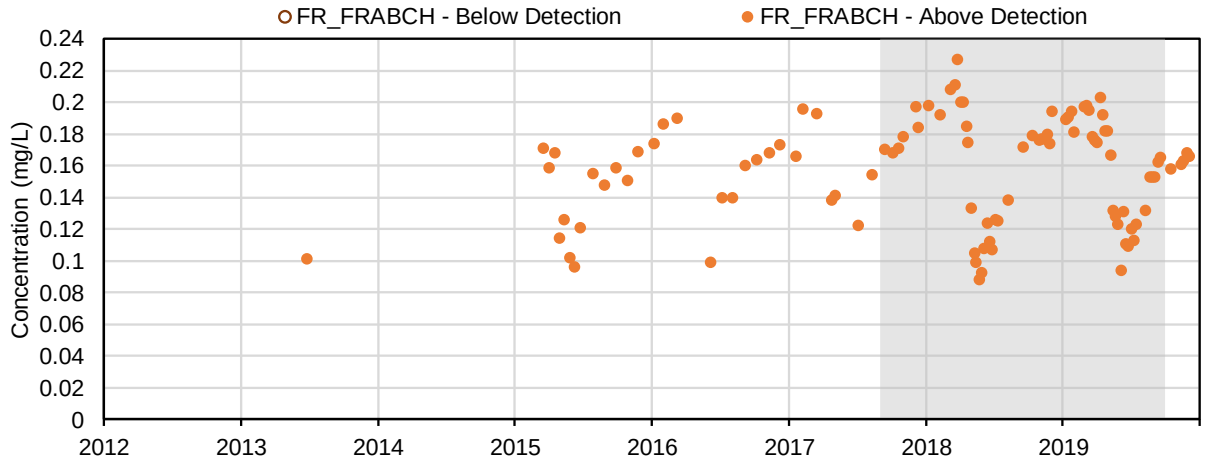
(63) Silver (mg/L); Total Metals



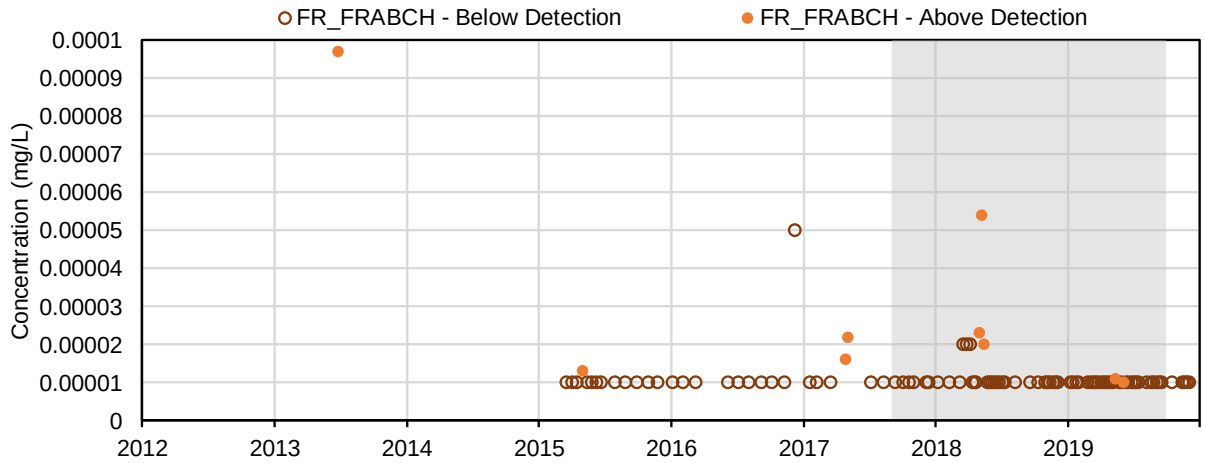
(64) Sodium (mg/L); Total Metals



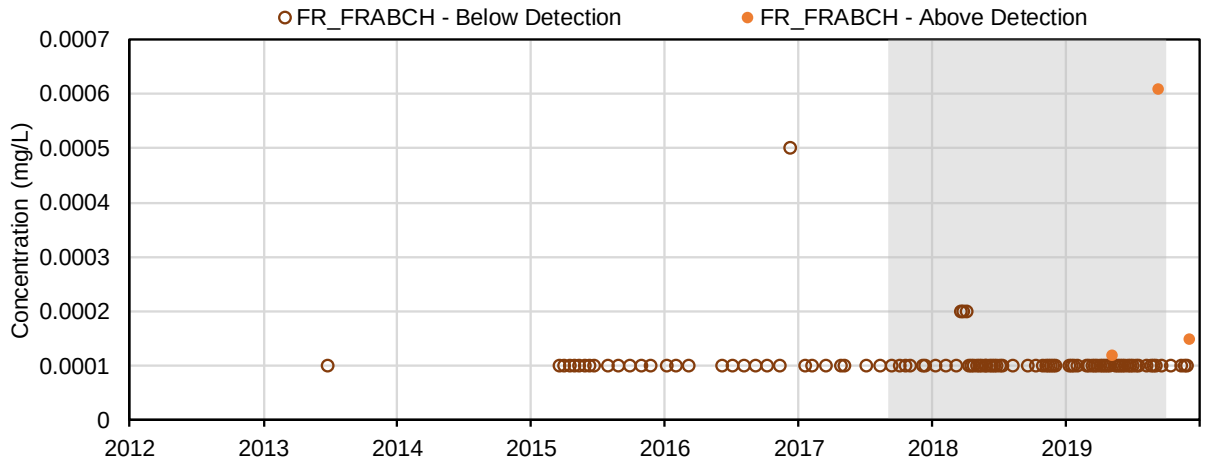
(65) Strontium (mg/L); Total Metals



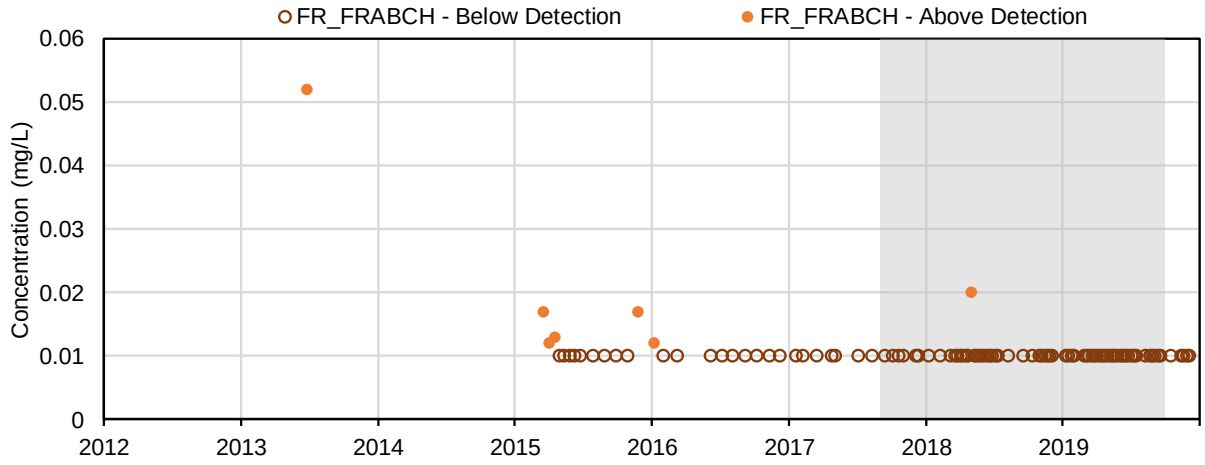
(66) Thallium (mg/L); Total Metals



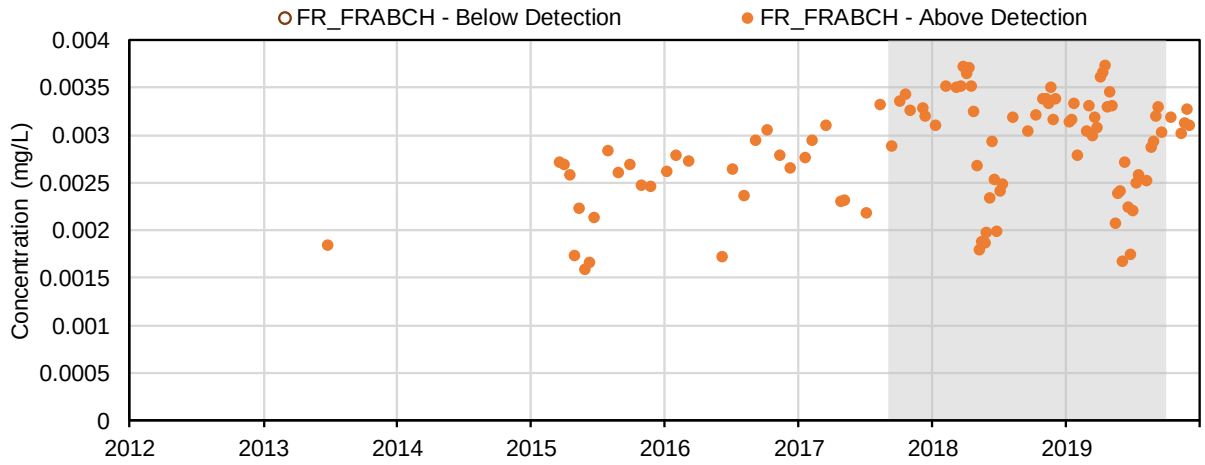
(67) Tin (mg/L); Total Metals



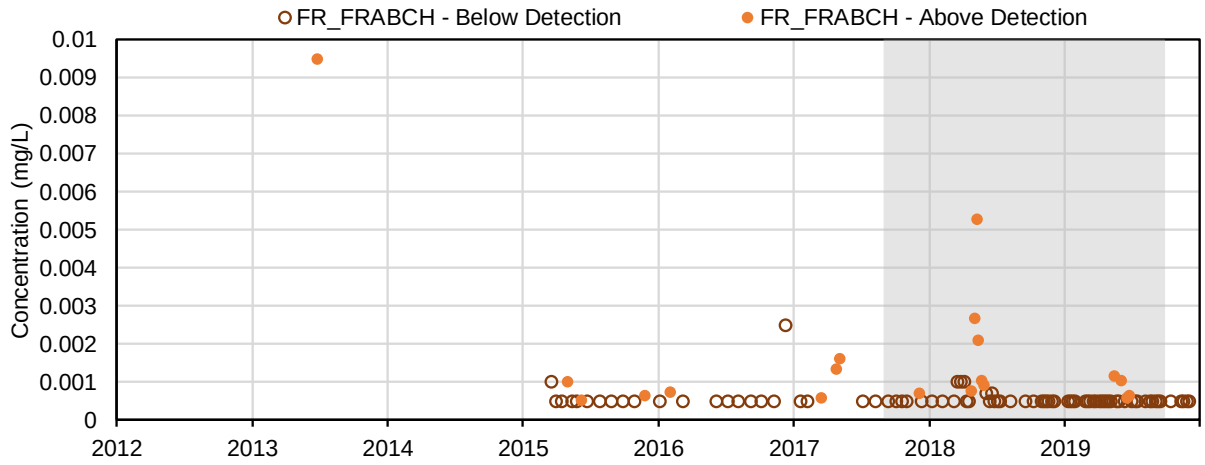
(68) Titanium (mg/L); Total Metals



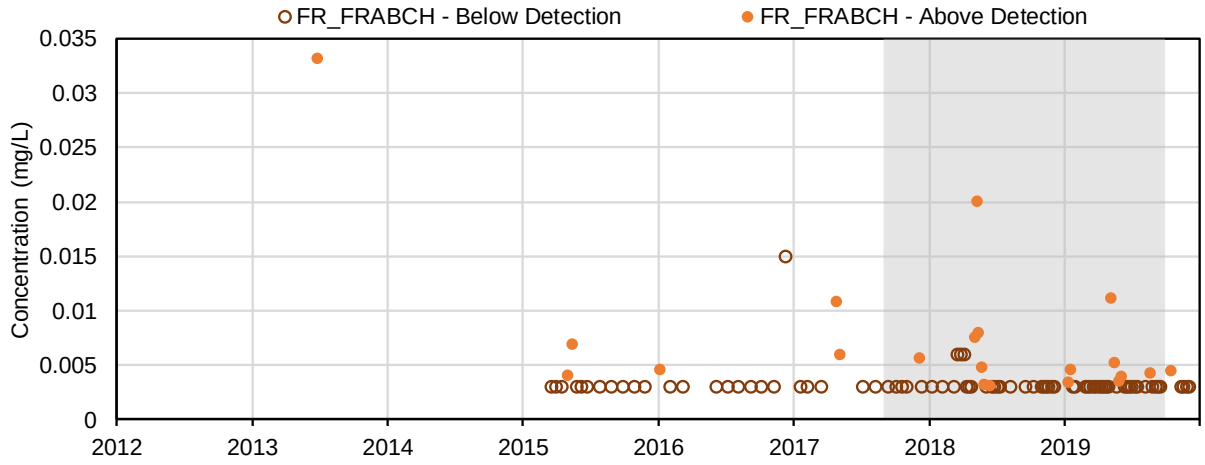
(69) Uranium (mg/L); Total Metals



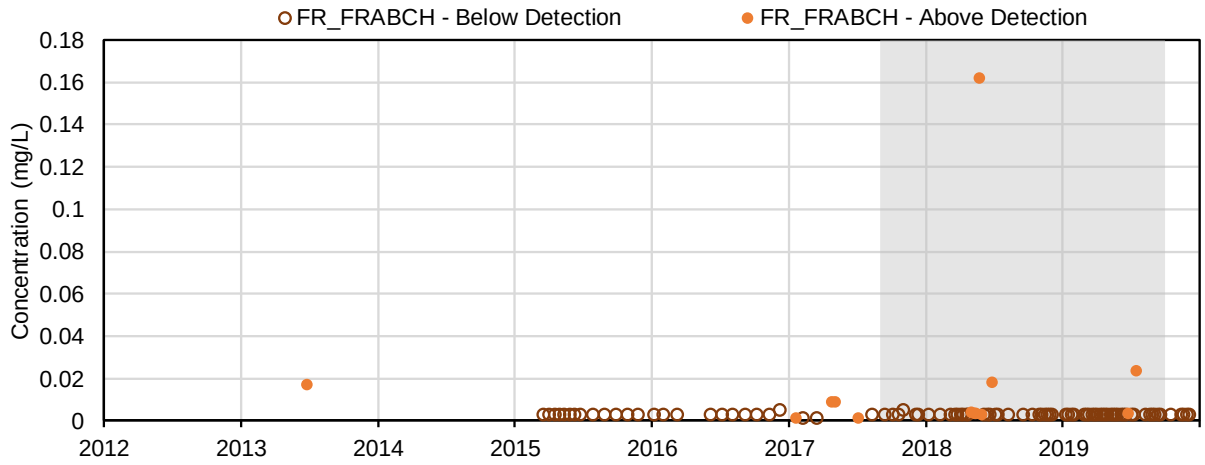
(70) Vanadium (mg/L); Total Metals



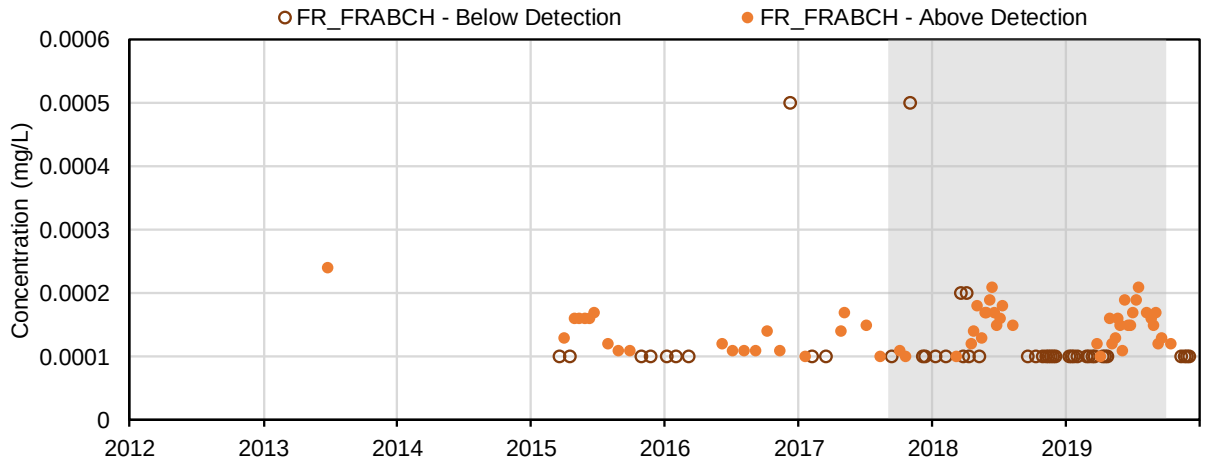
(71) Zinc (mg/L); Total Metals



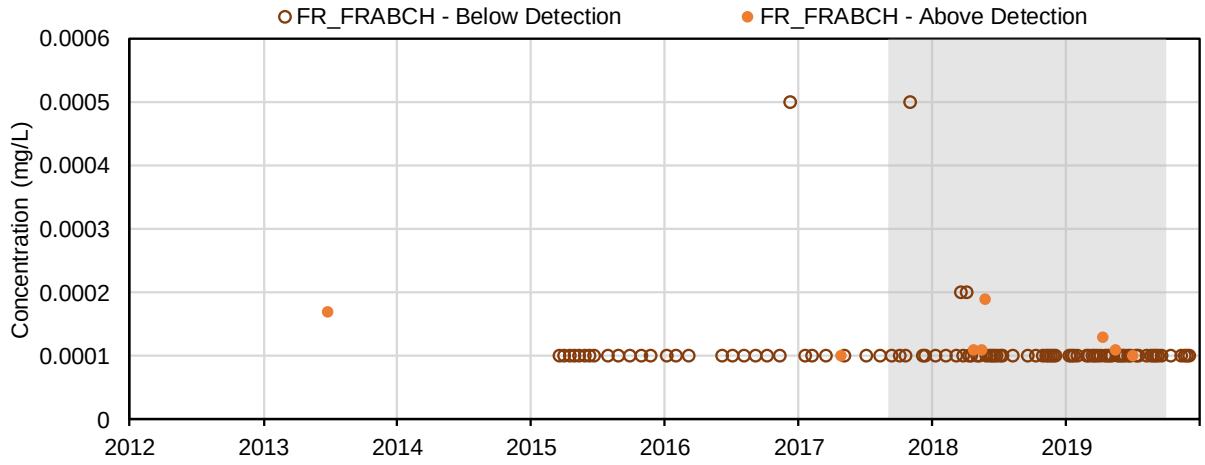
(72) Aluminum (mg/L); Dissolved Metals



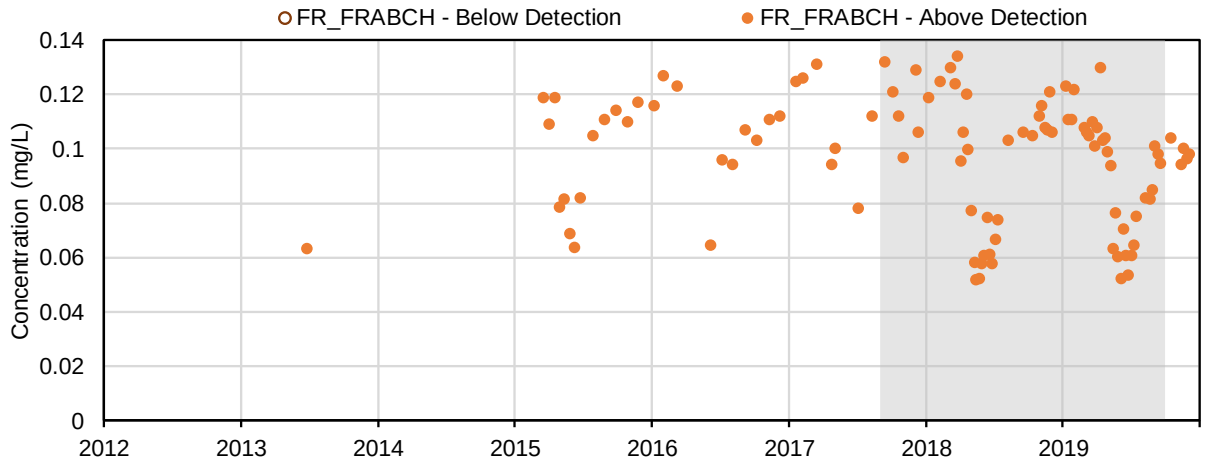
(73) Antimony (mg/L); Dissolved Metals



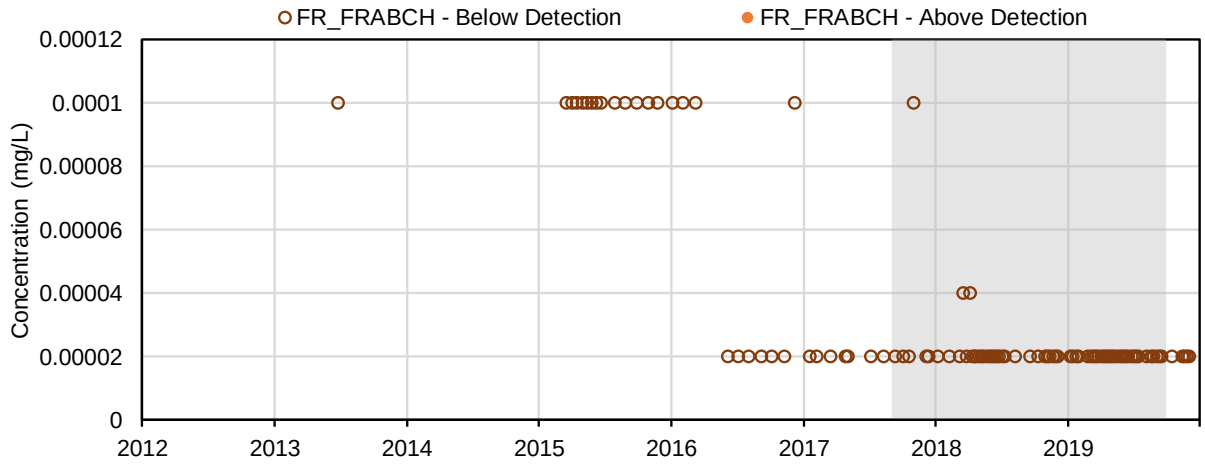
(74) Arsenic (mg/L); Dissolved Metals



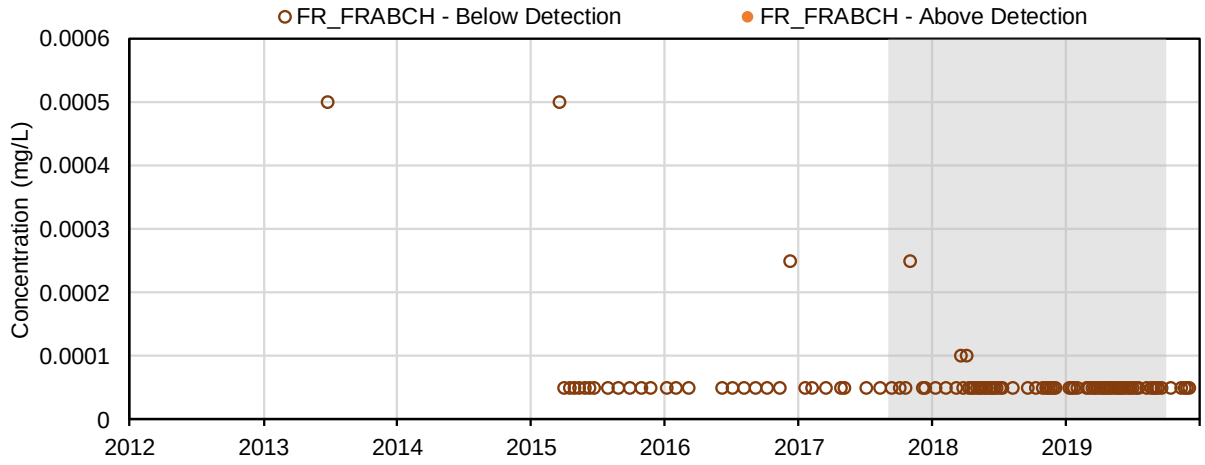
(75) Barium (mg/L); Dissolved Metals



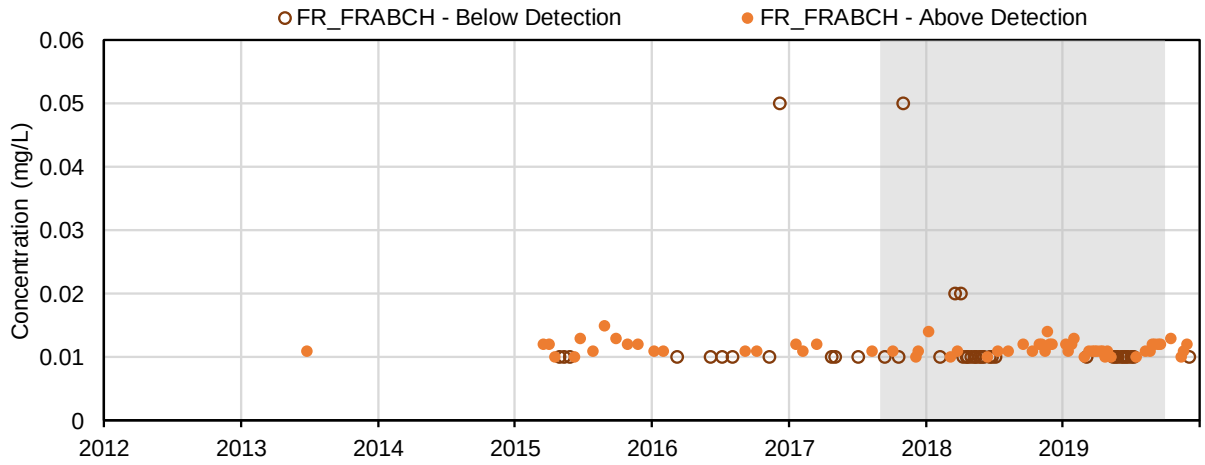
(76) Beryllium (mg/L); Dissolved Metals



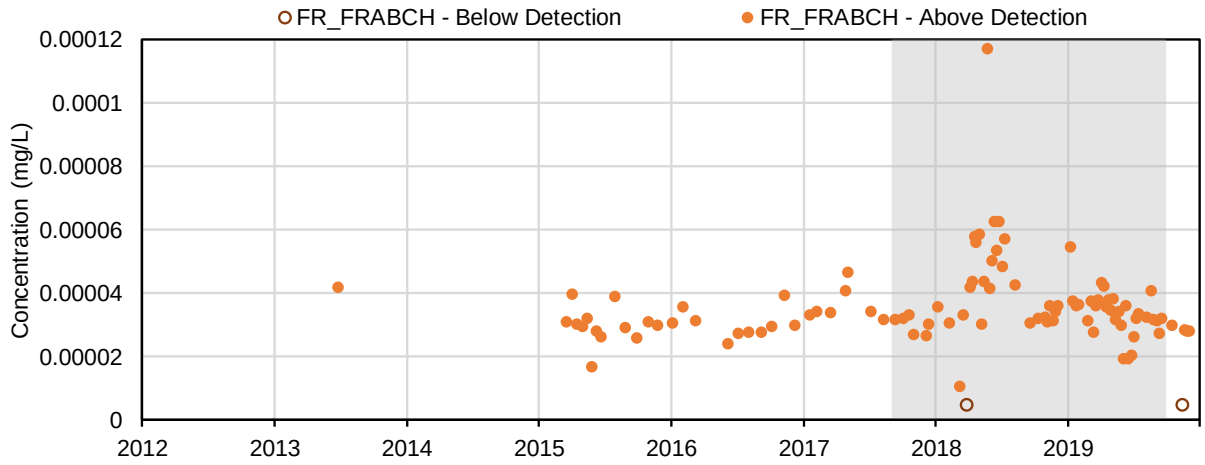
(77) Bismuth (mg/L); Dissolved Metals



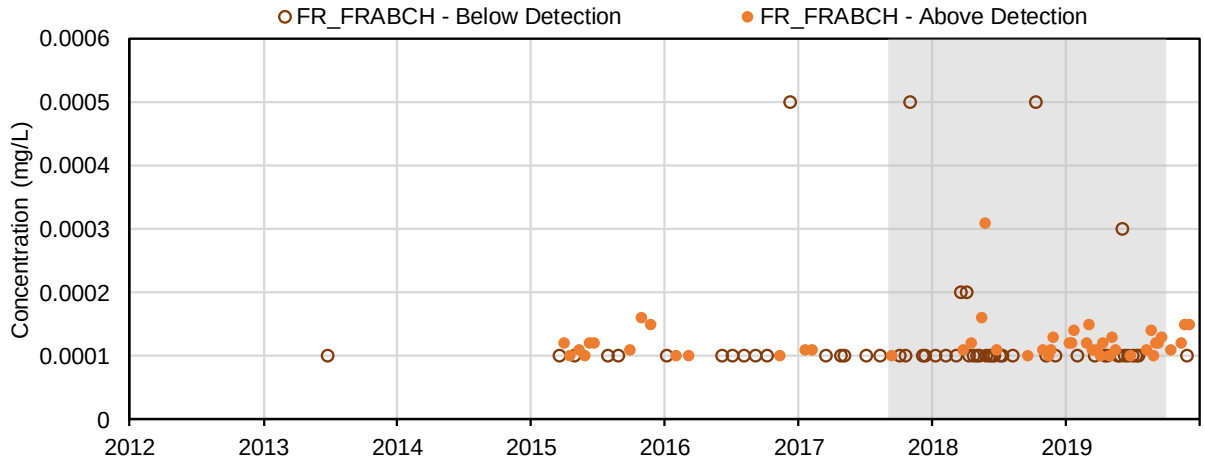
(78) Boron (mg/L); Dissolved Metals



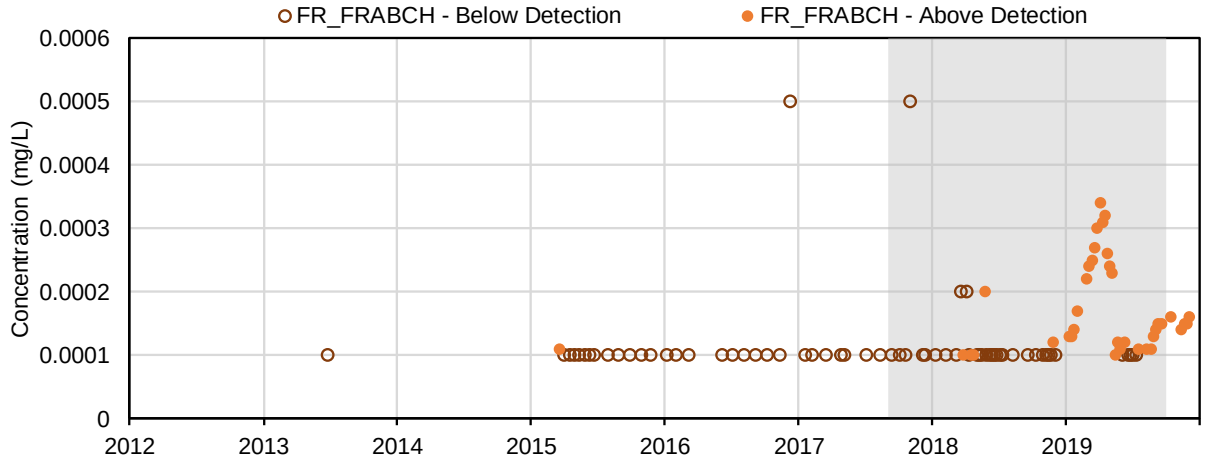
(79) Cadmium (mg/L); Dissolved Metals



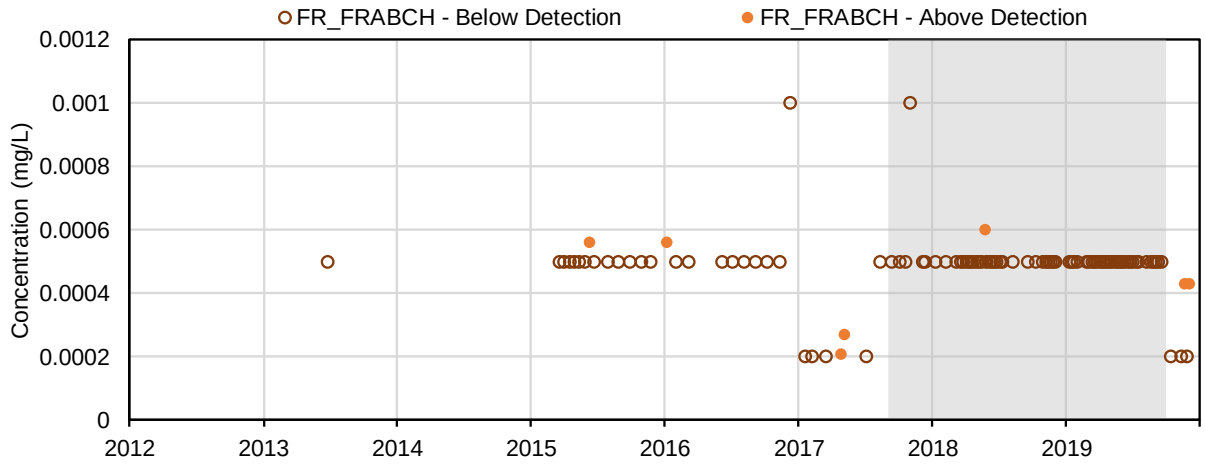
(80) Chromium (mg/L); Dissolved Metals



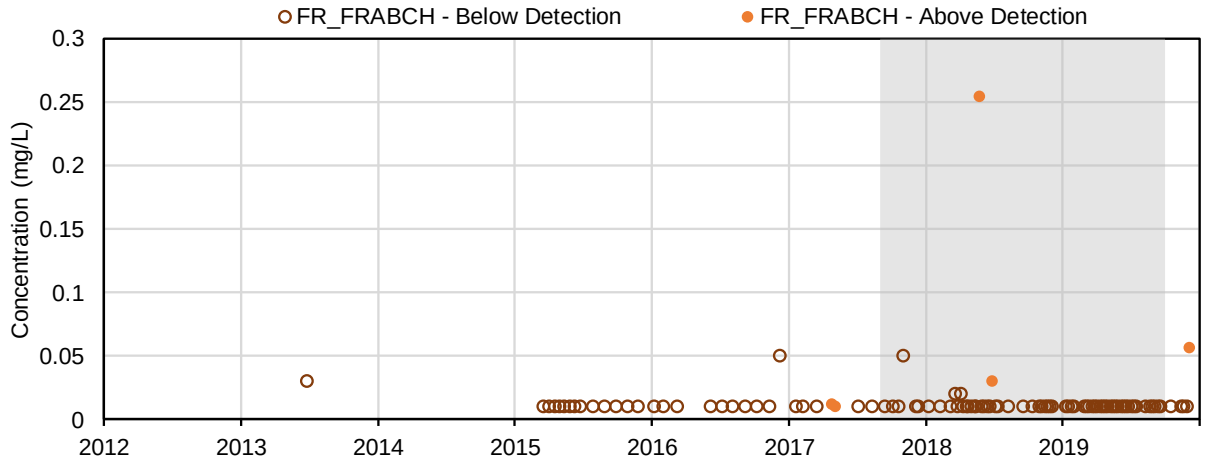
(81) Cobalt (mg/L); Dissolved Metals



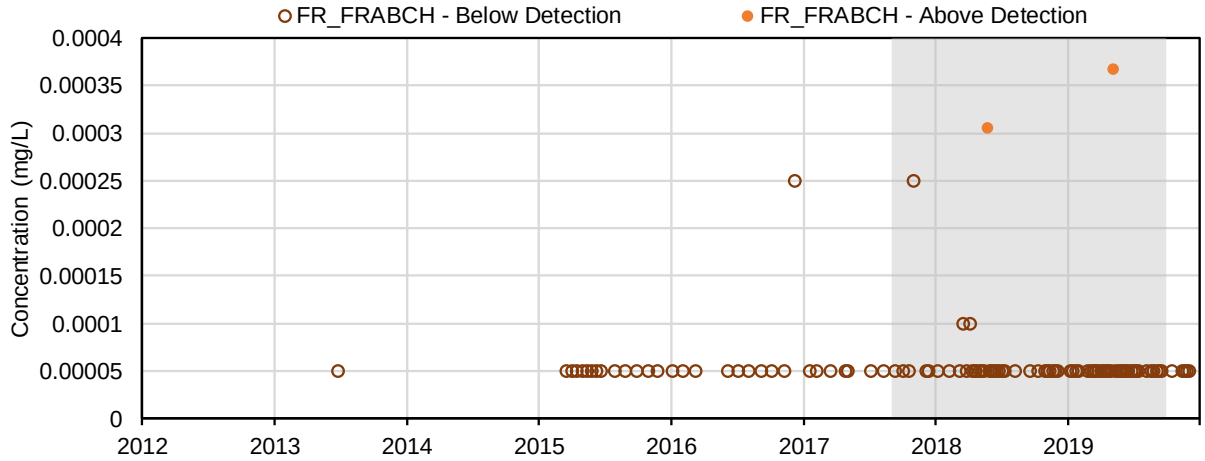
(82) Copper (mg/L); Dissolved Metals



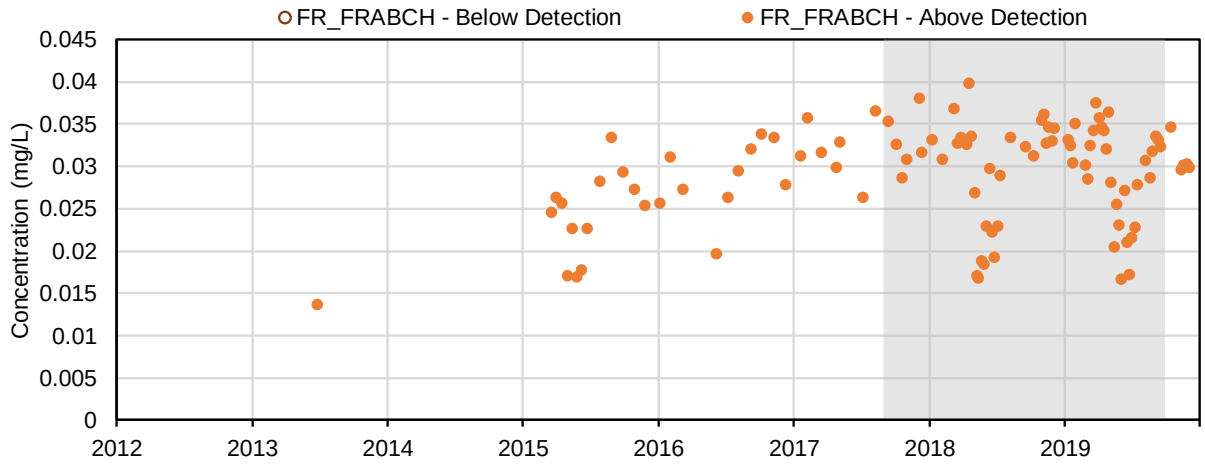
(83) Iron (mg/L); Dissolved Metals



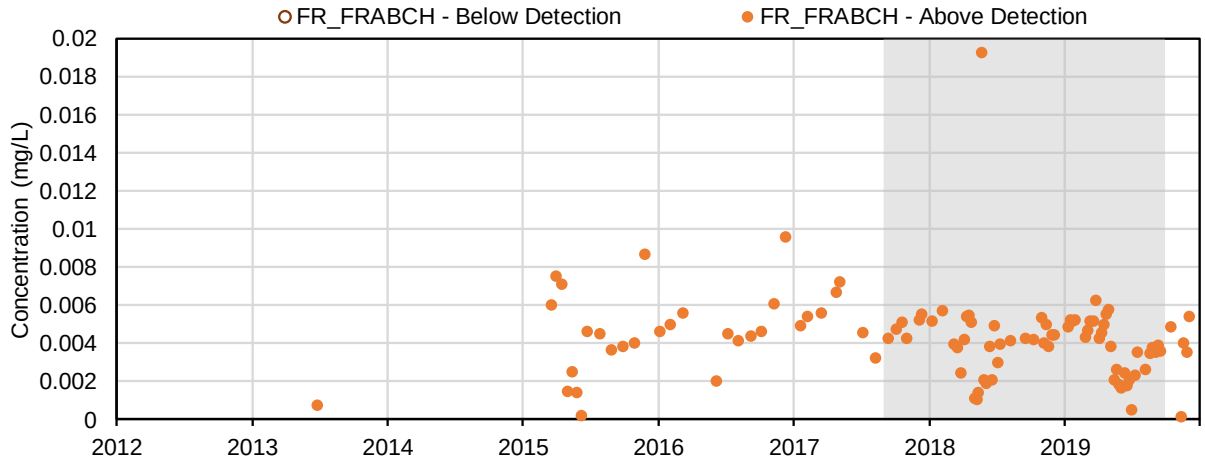
(84) Lead (mg/L); Dissolved Metals



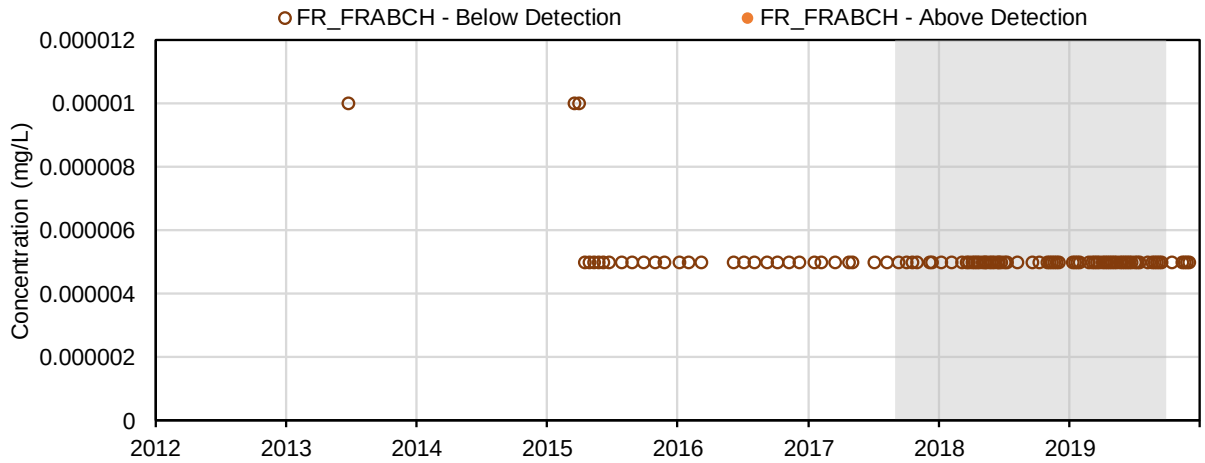
(85) Lithium (mg/L); Dissolved Metals



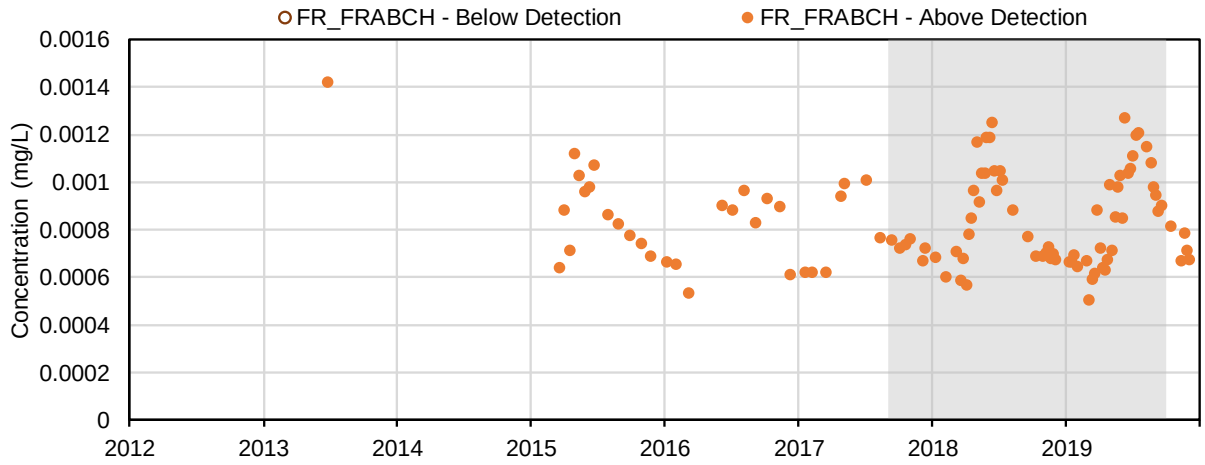
(86) Manganese (mg/L); Dissolved Metals



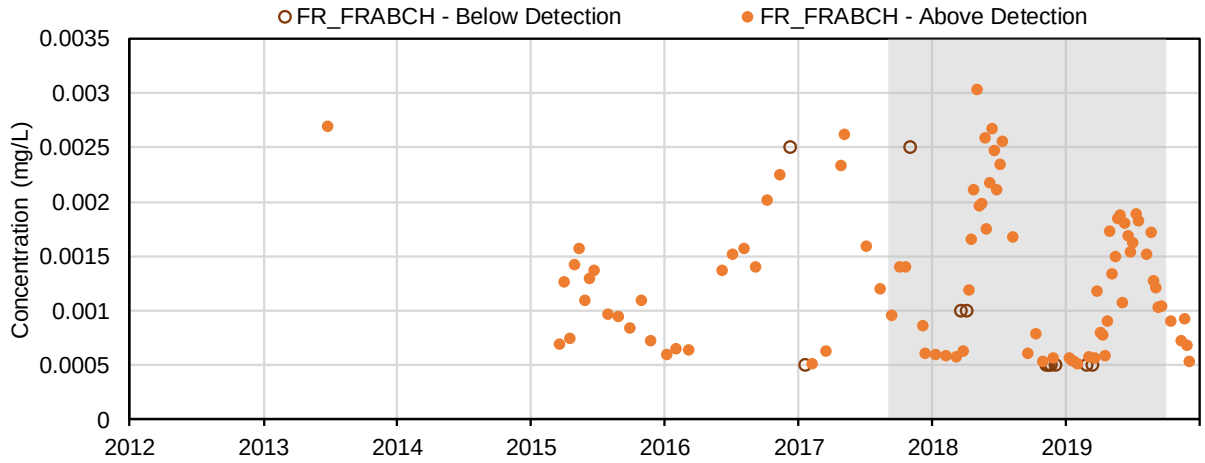
(87) Mercury (mg/L); Dissolved Metals



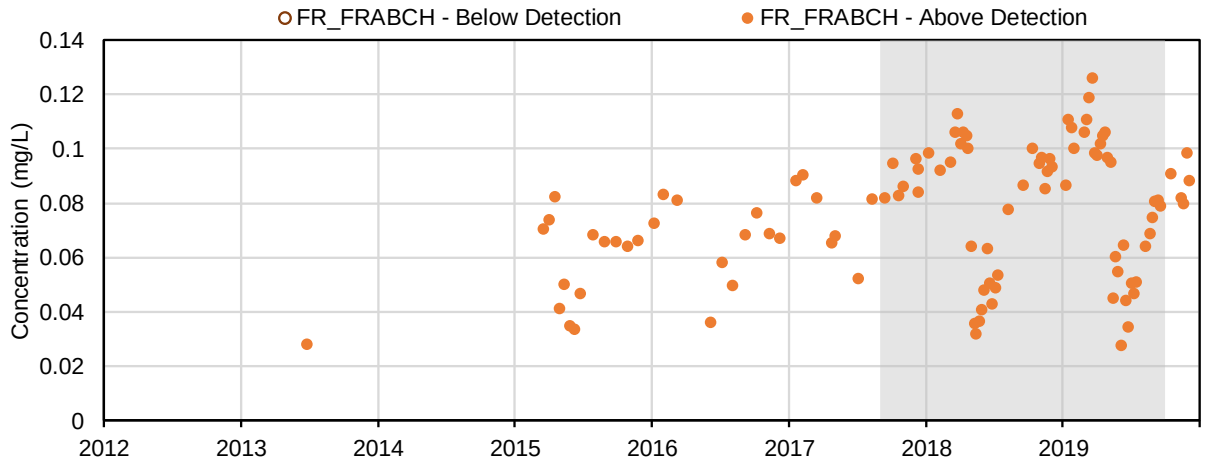
(88) Molybdenum (mg/L); Dissolved Metals



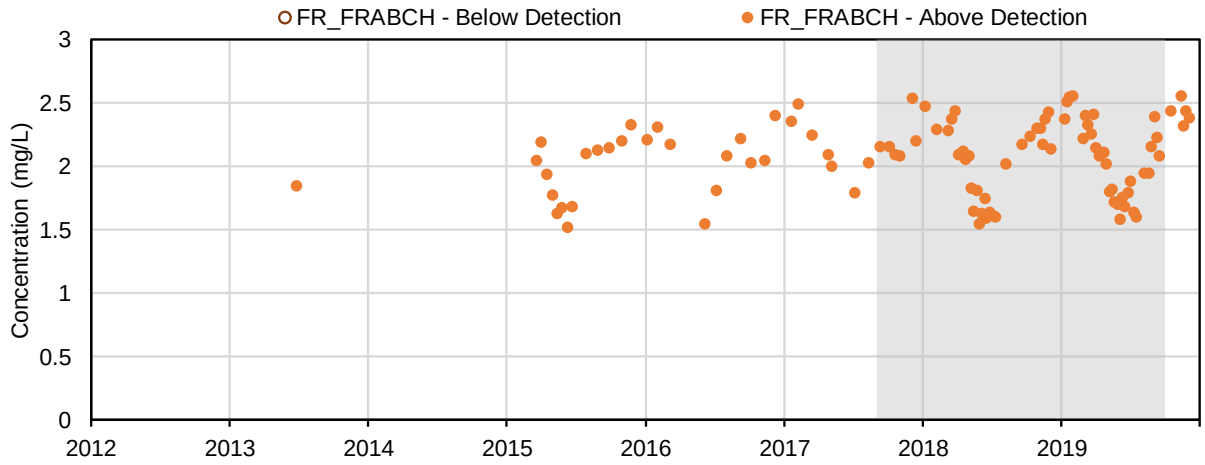
(89) Nickel (mg/L); Dissolved Metals



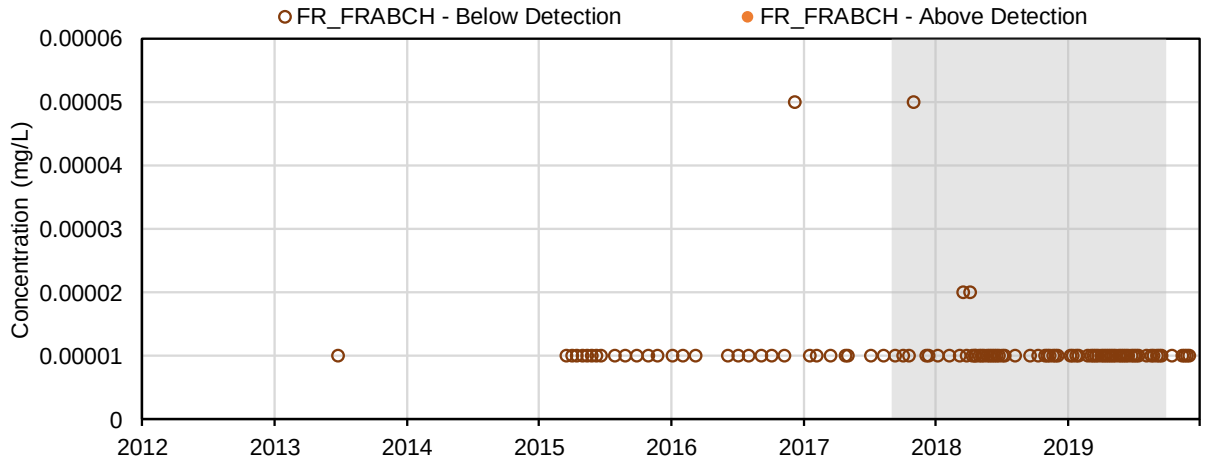
(90) Selenium (mg/L); Dissolved Metals



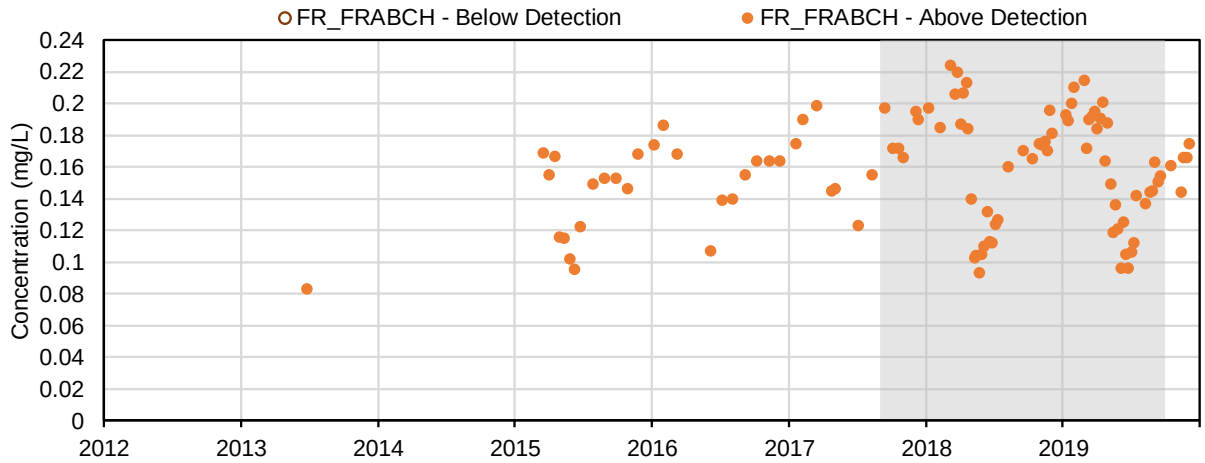
(91) Silicon (mg/L); Dissolved Metals



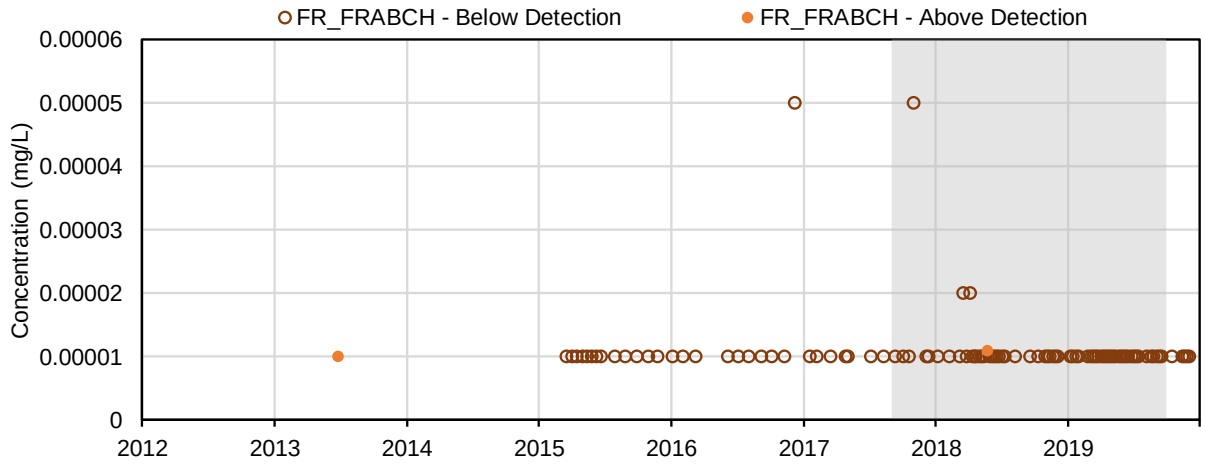
(92) Silver (mg/L); Dissolved Metals



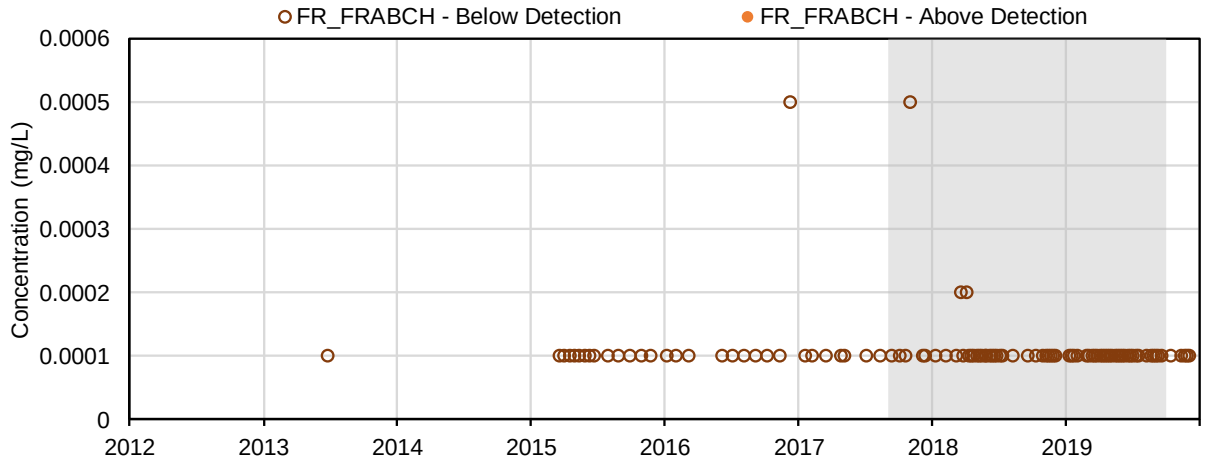
(93) Strontium (mg/L); Dissolved Metals



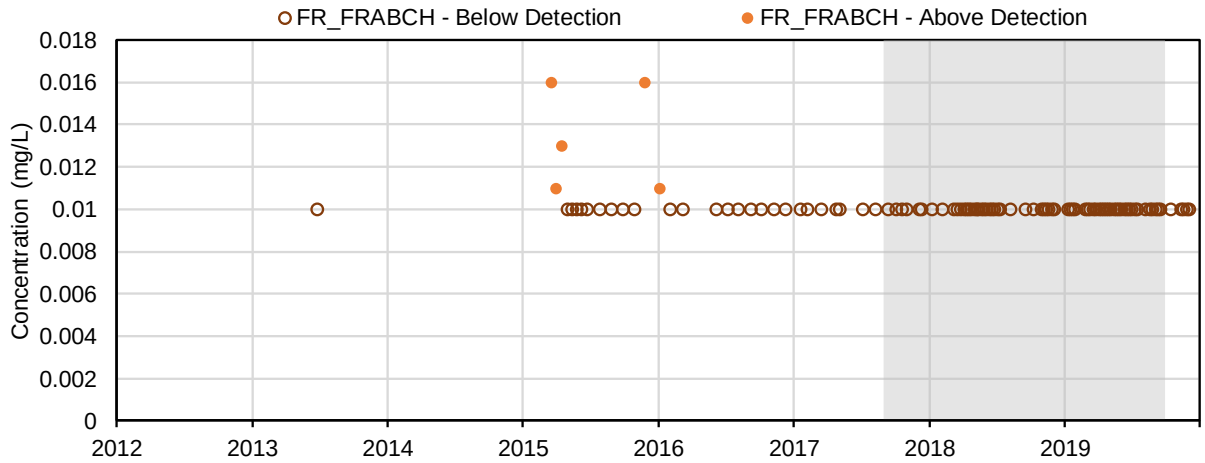
(94) Thallium (mg/L); Dissolved Metals



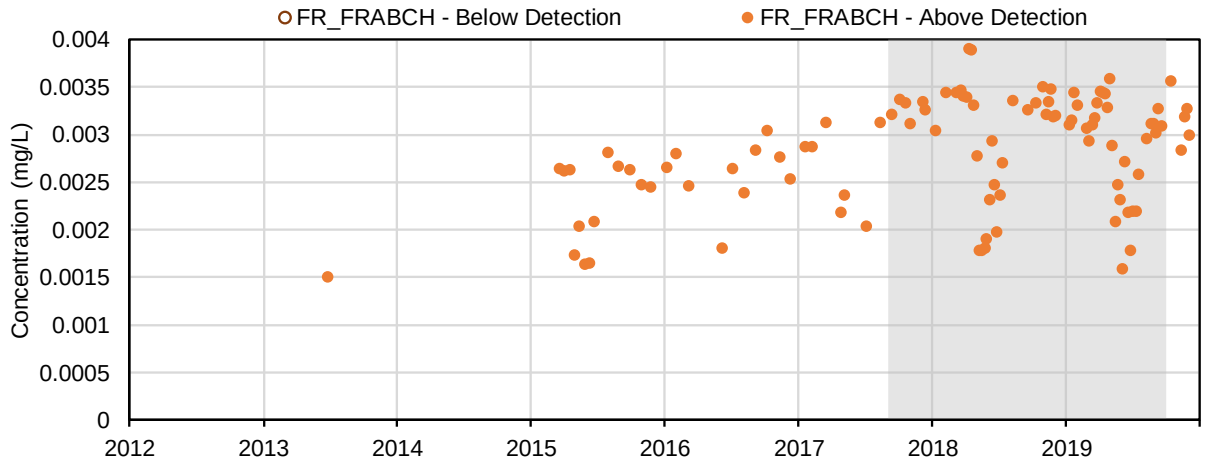
(95) Tin (mg/L); Dissolved Metals



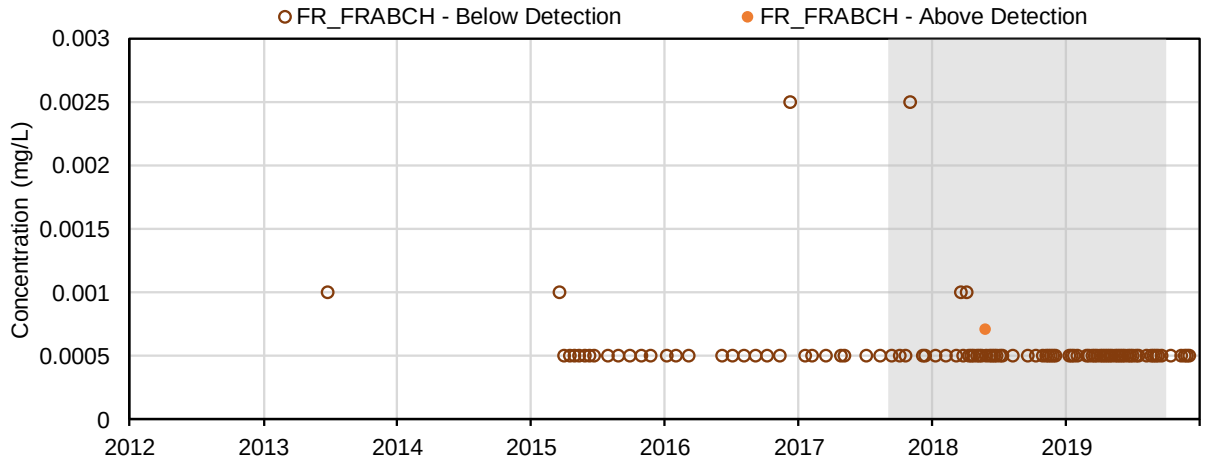
(96) Titanium (mg/L); Dissolved Metals



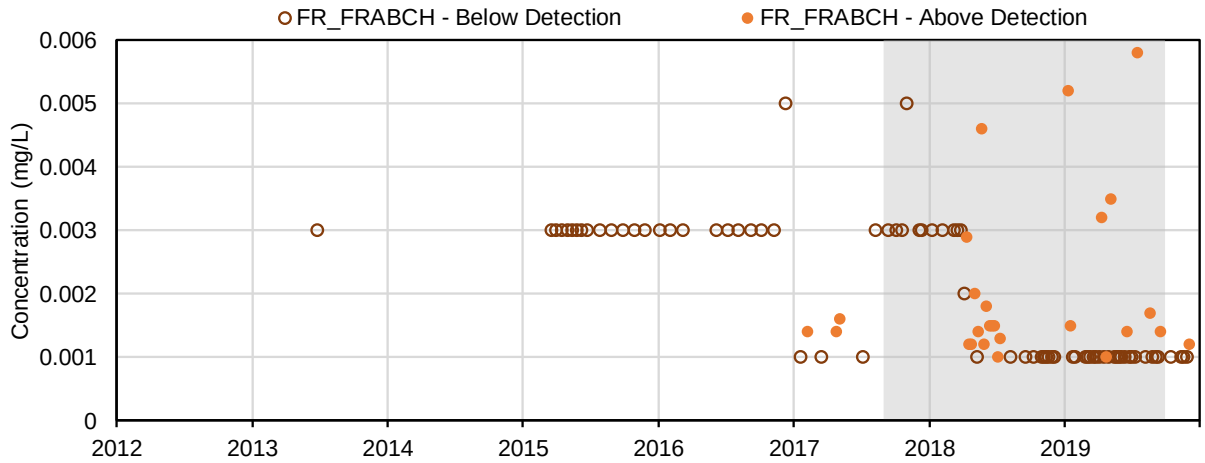
(97) Uranium (mg/L); Dissolved Metals



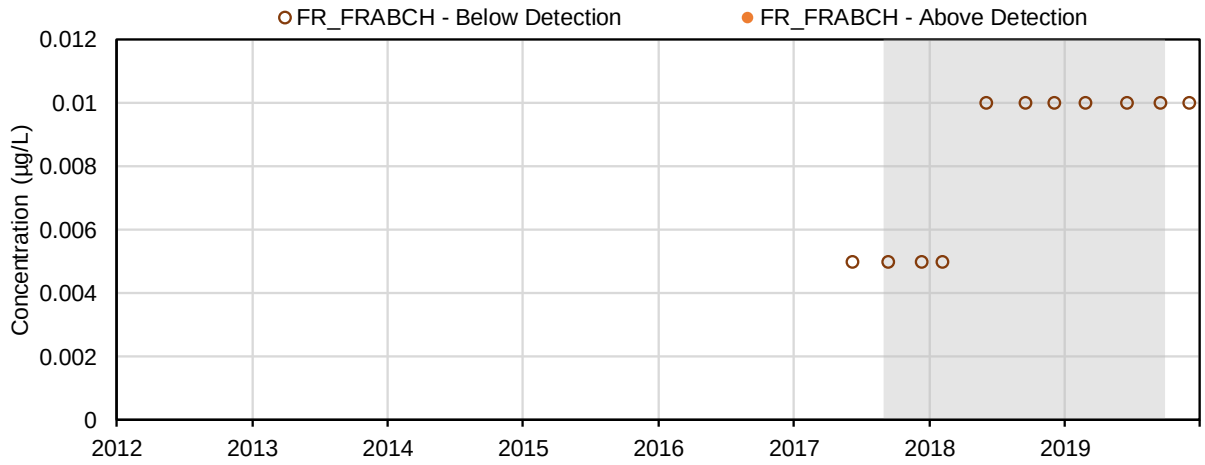
(98) Vanadium (mg/L); Dissolved Metals



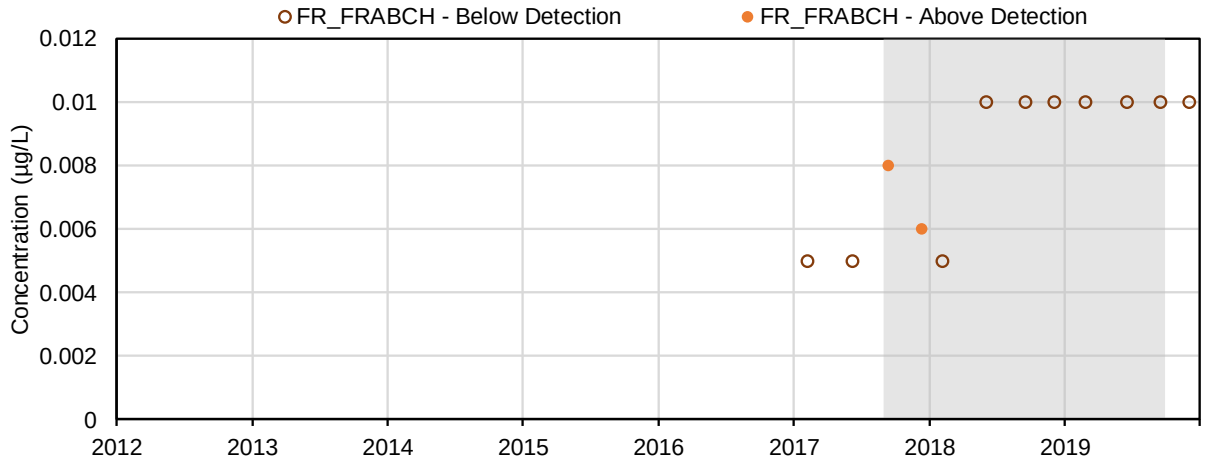
(99) Zinc (mg/L); Dissolved Metals



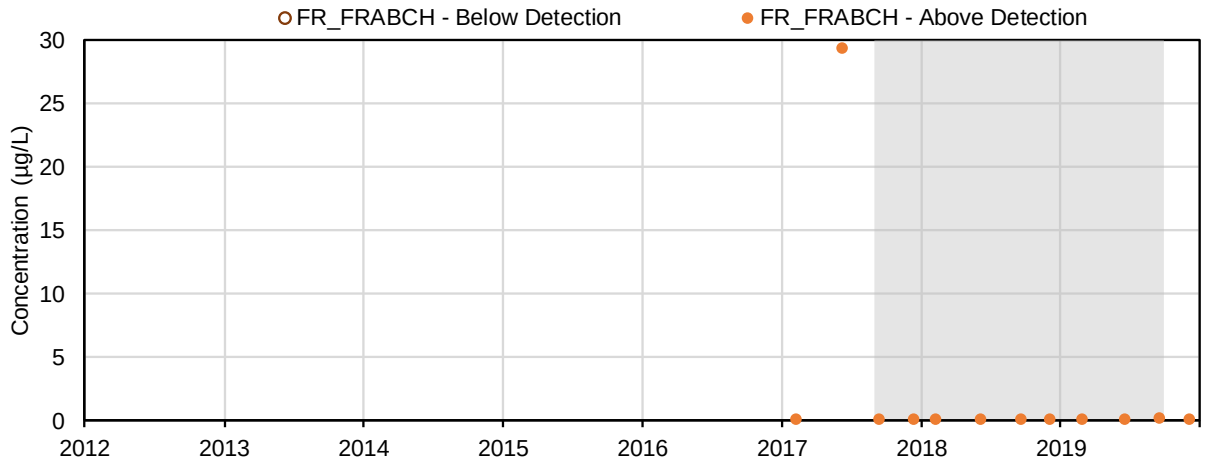
(100) Dissolved Dimethylseleneoxide (µg/L); Speciation of Selenium



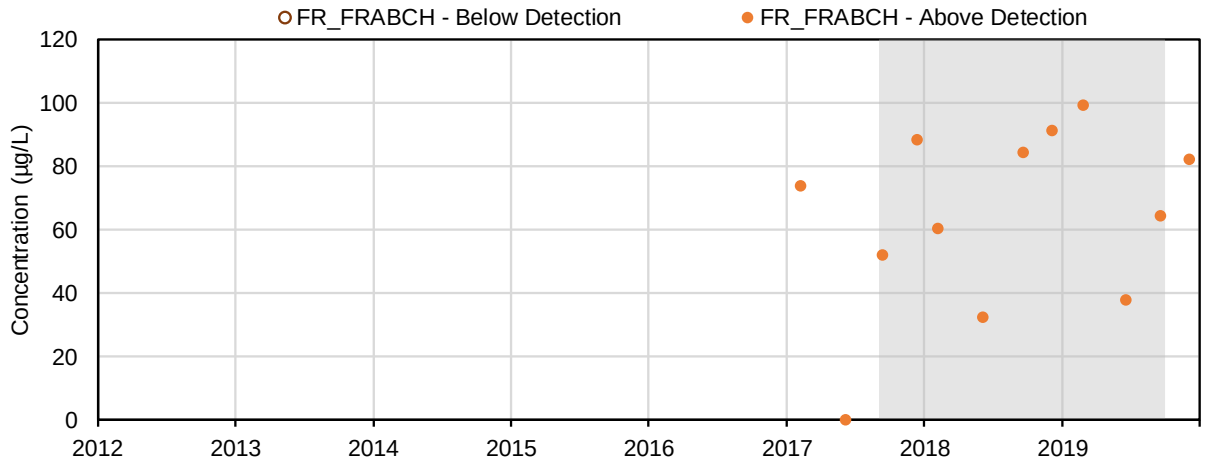
(101) Dissolved Methylseleninic Acid (µg/L); Speciation of Selenium



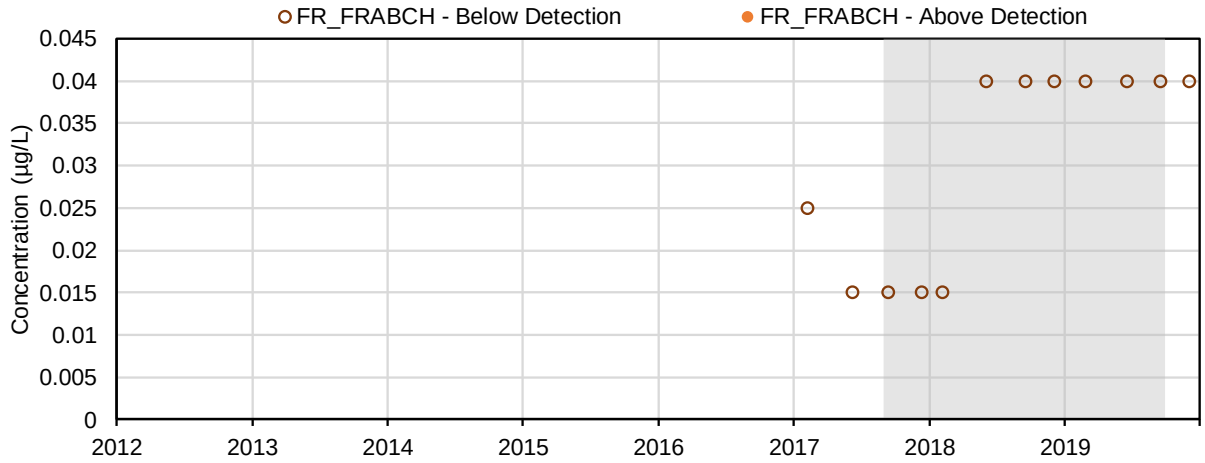
(102) Dissolved Selenite (µg/L); Speciation of Selenium



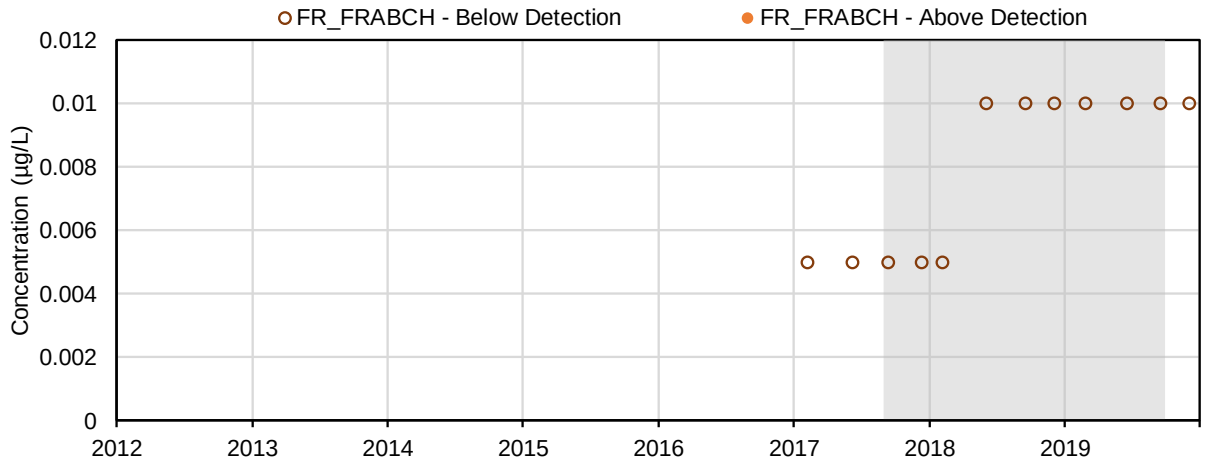
(103) Dissolved Selenate (µg/L); Speciation of Selenium



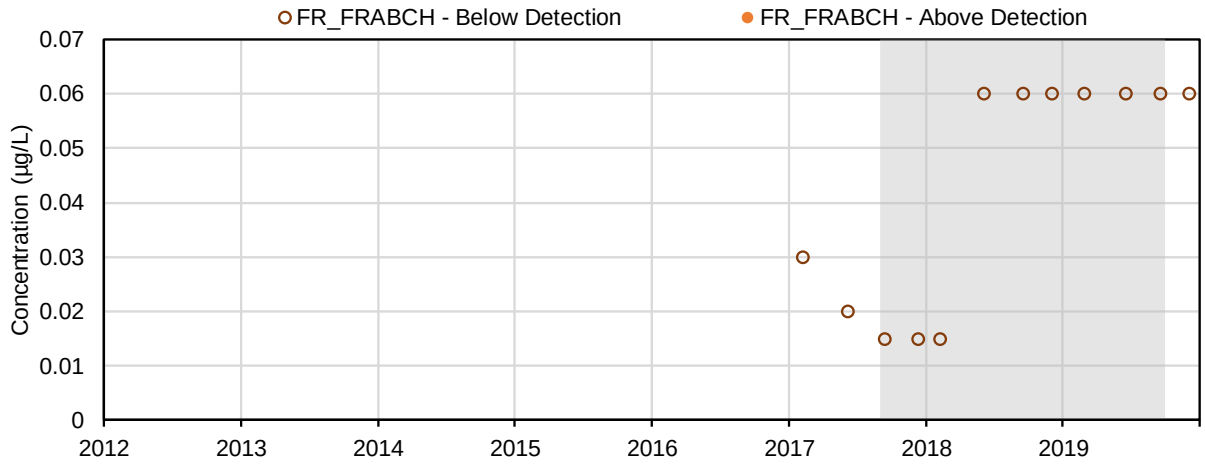
(104) Dissolved Selenocyanate (µg/L); Speciation of Selenium



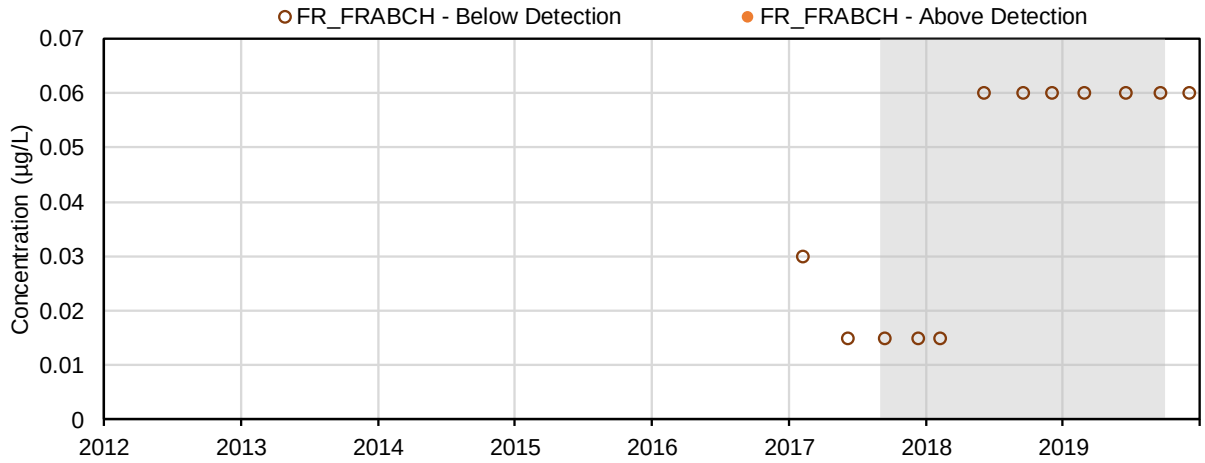
(105) Dissolved Selenomethionine (µg/L); Speciation of Selenium



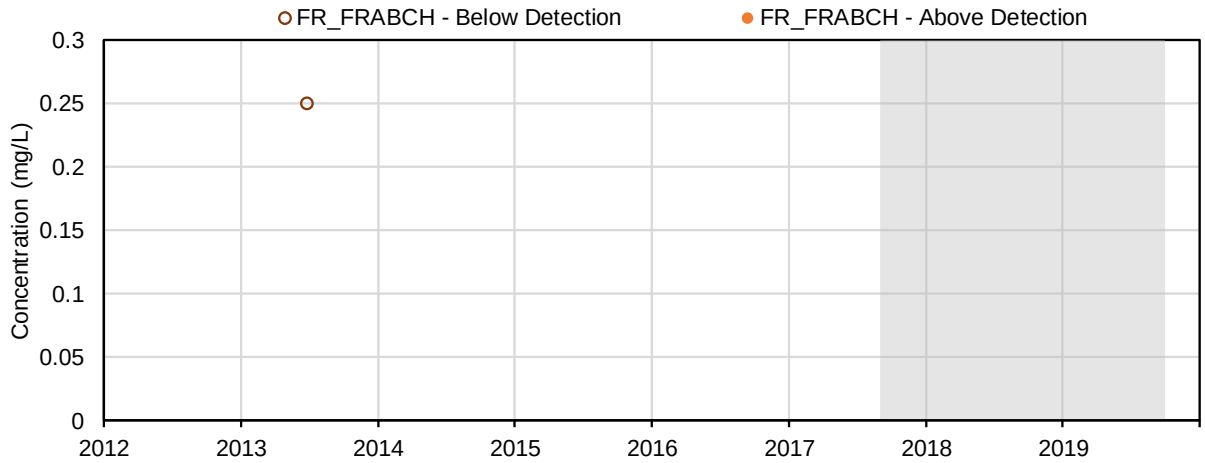
(106) Dissolved Selenosulphate (µg/L); Speciation of Selenium



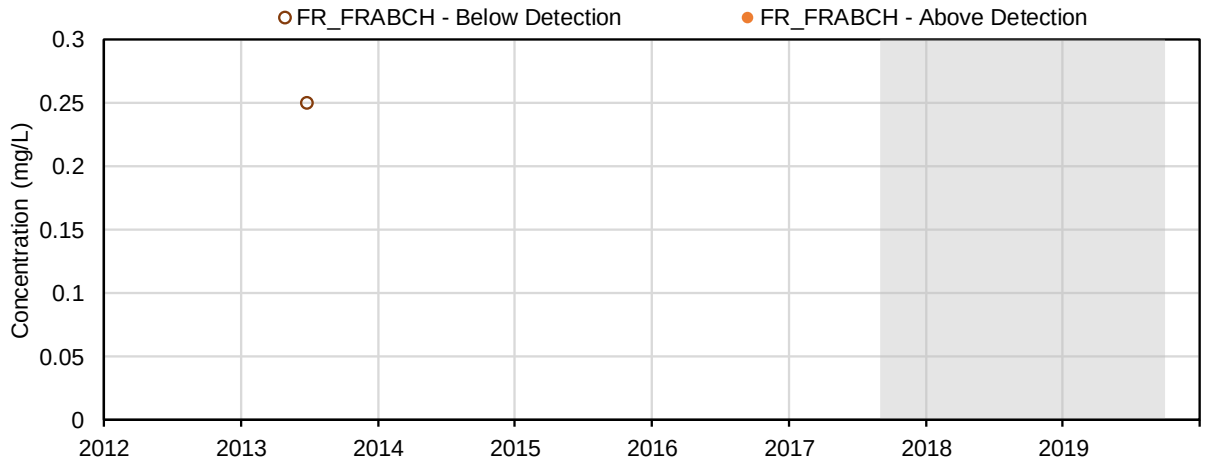
(107) Unknown Dissolved Selenium Species (µg/L); Speciation of Selenium



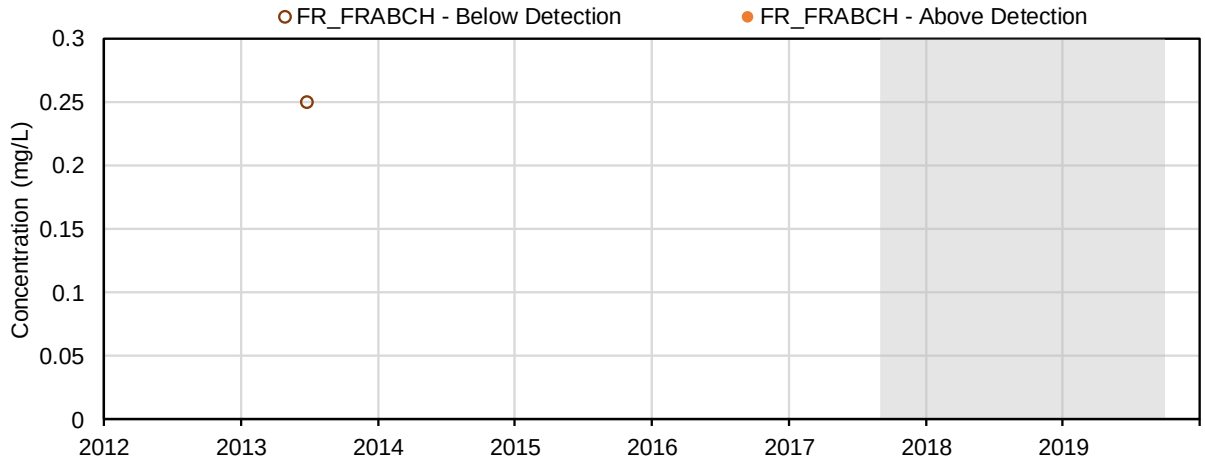
(108) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics

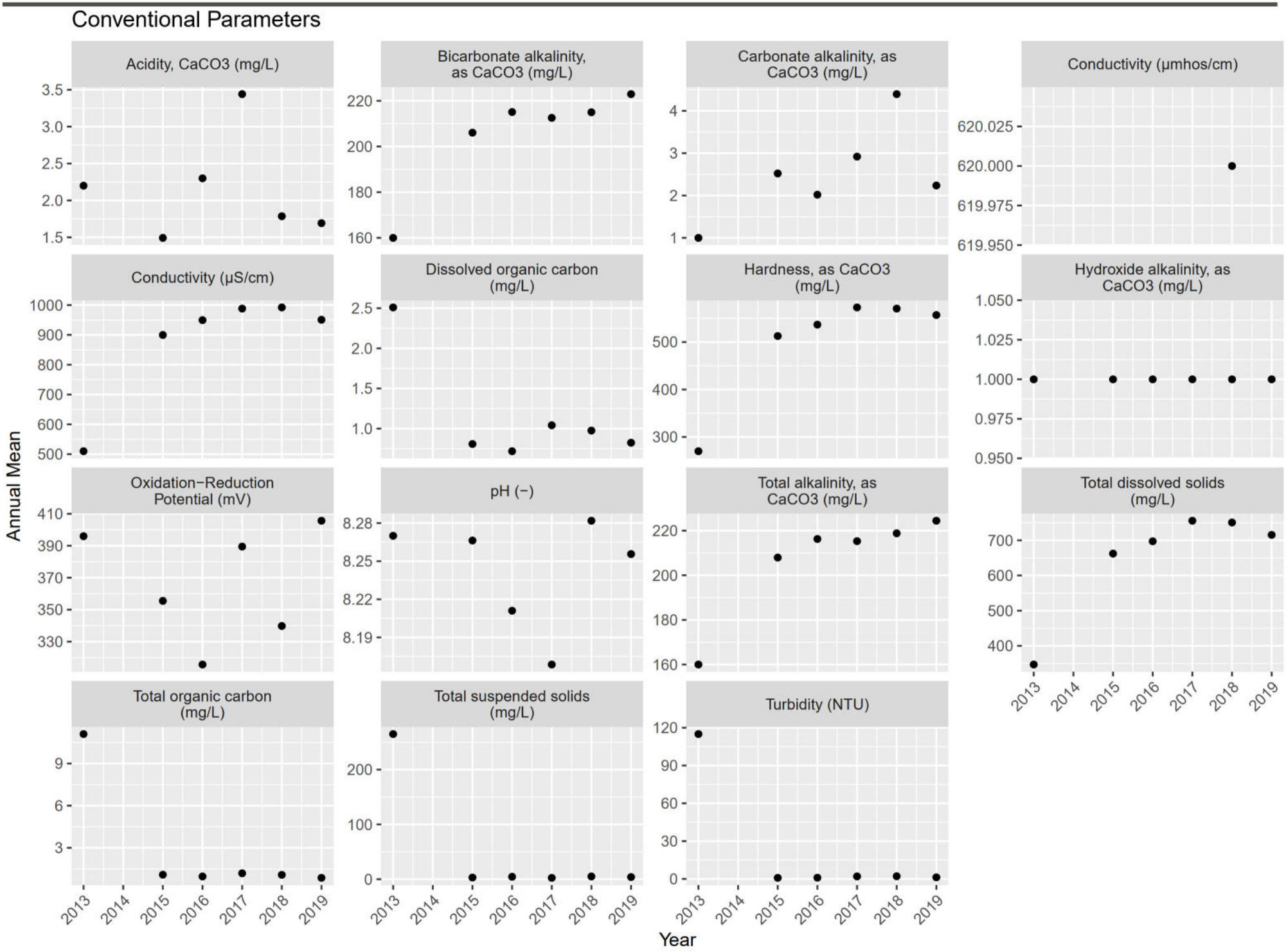


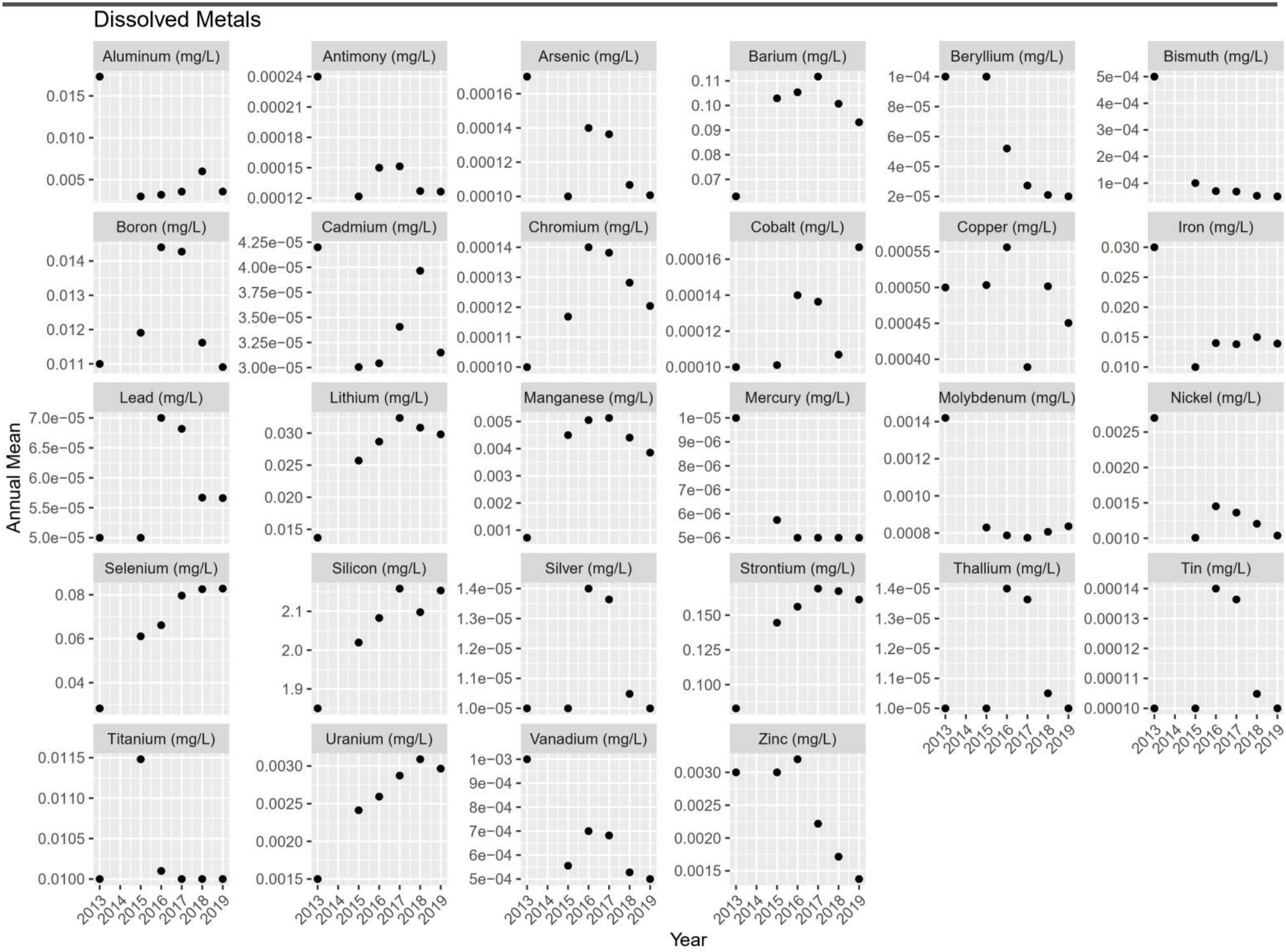
(109) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics

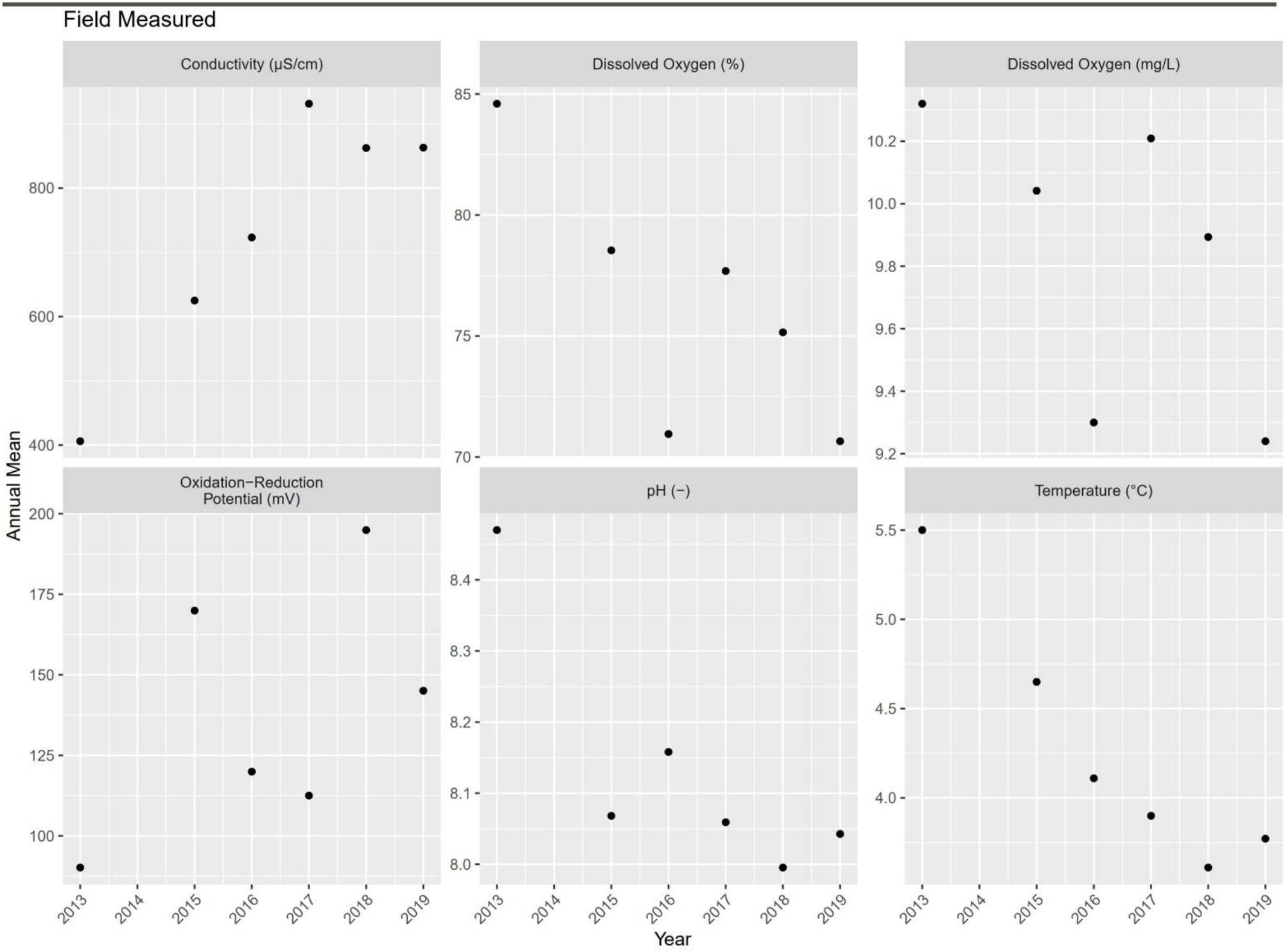


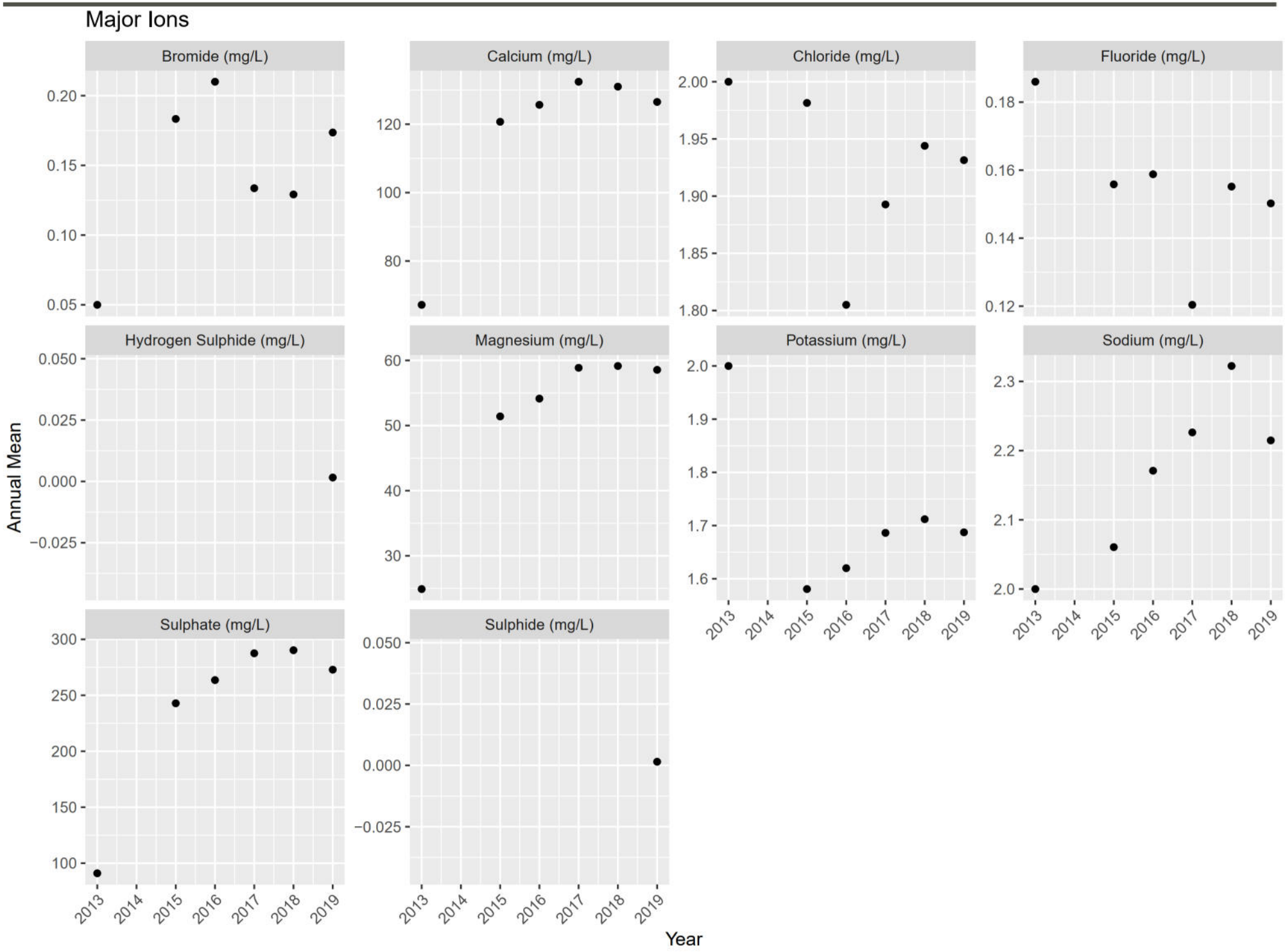
(110) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics

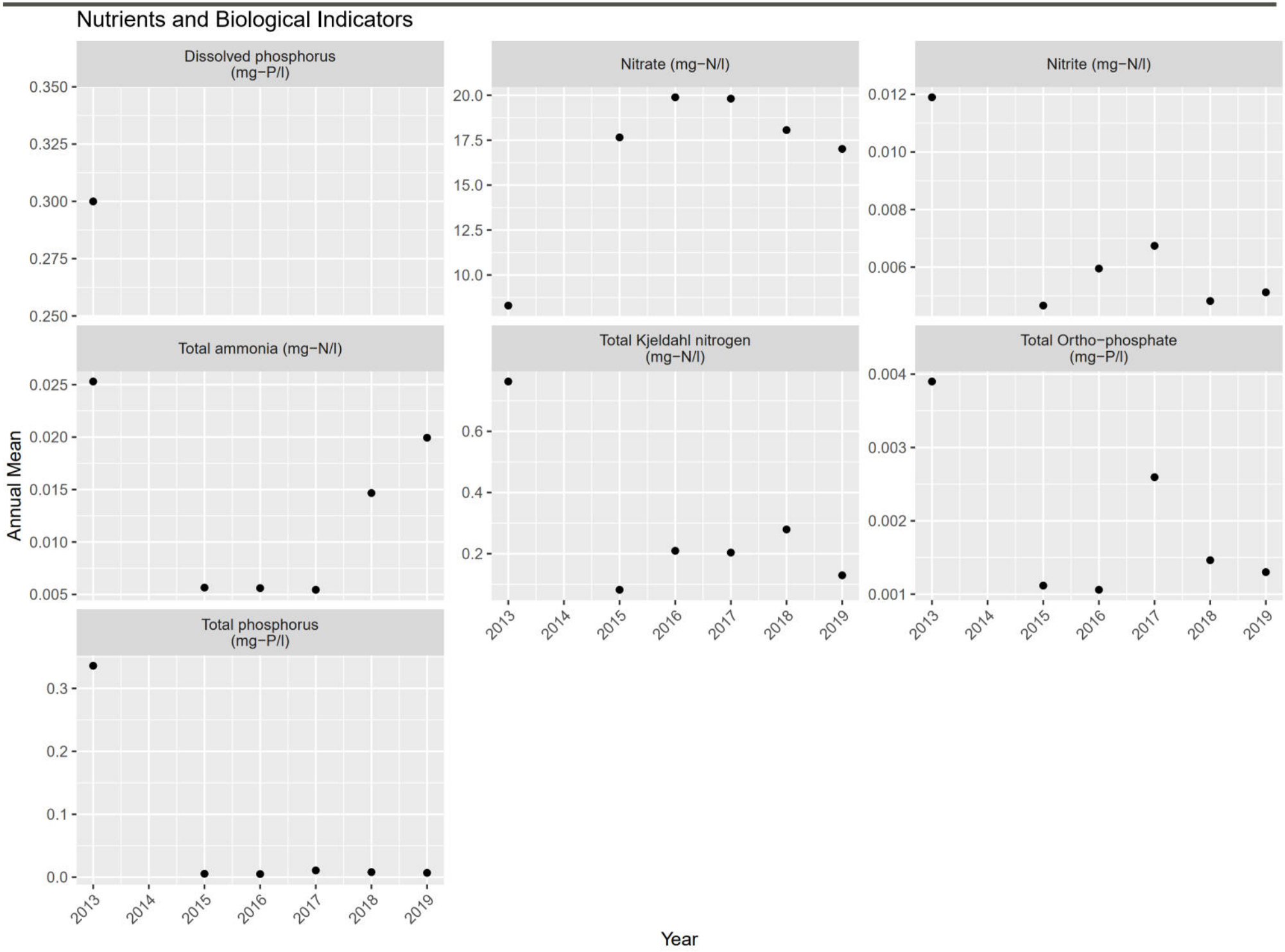


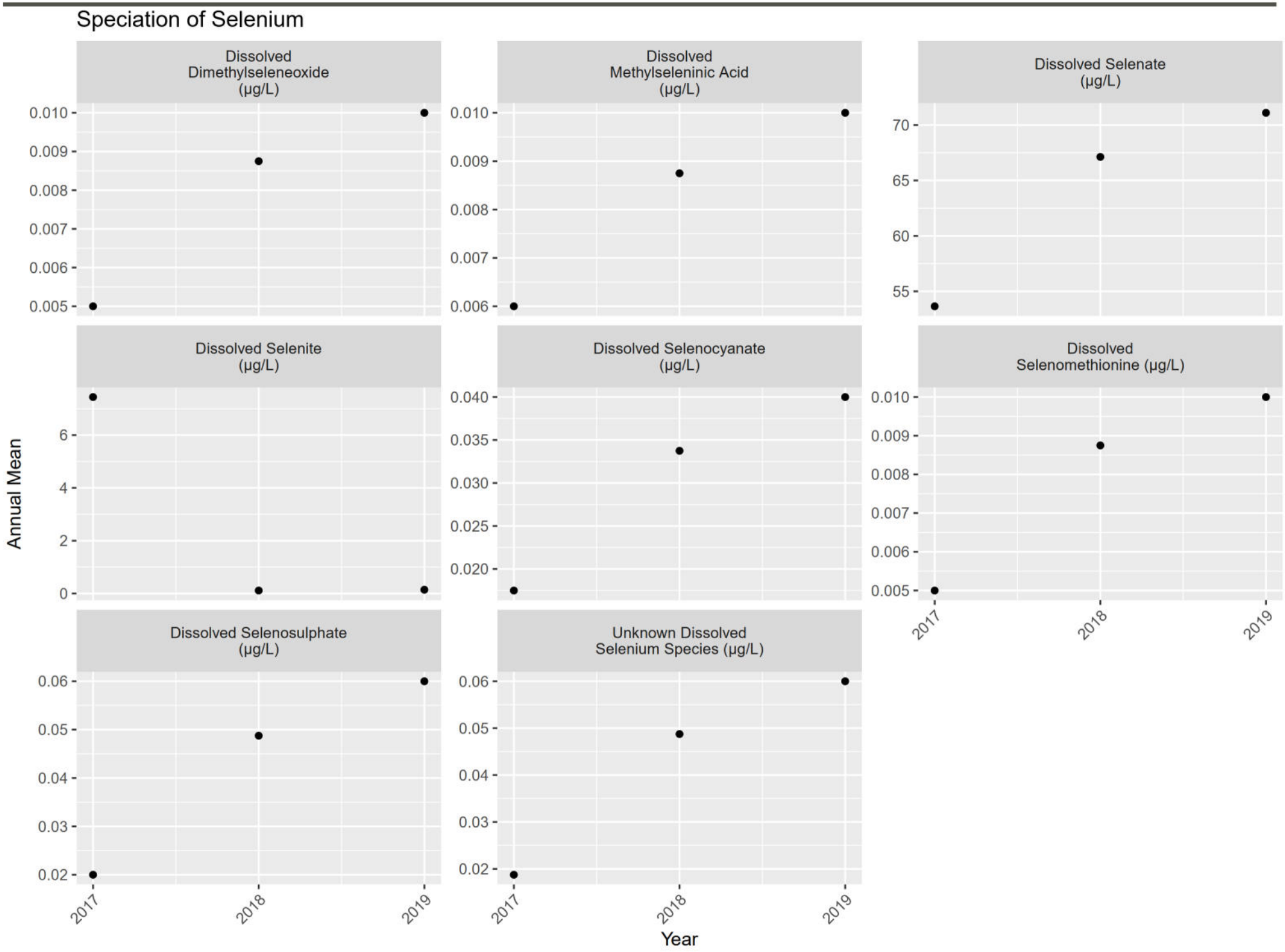

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Conductivity (µmhos/cm)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2013
2014
2015
2016
2017
2018
2019

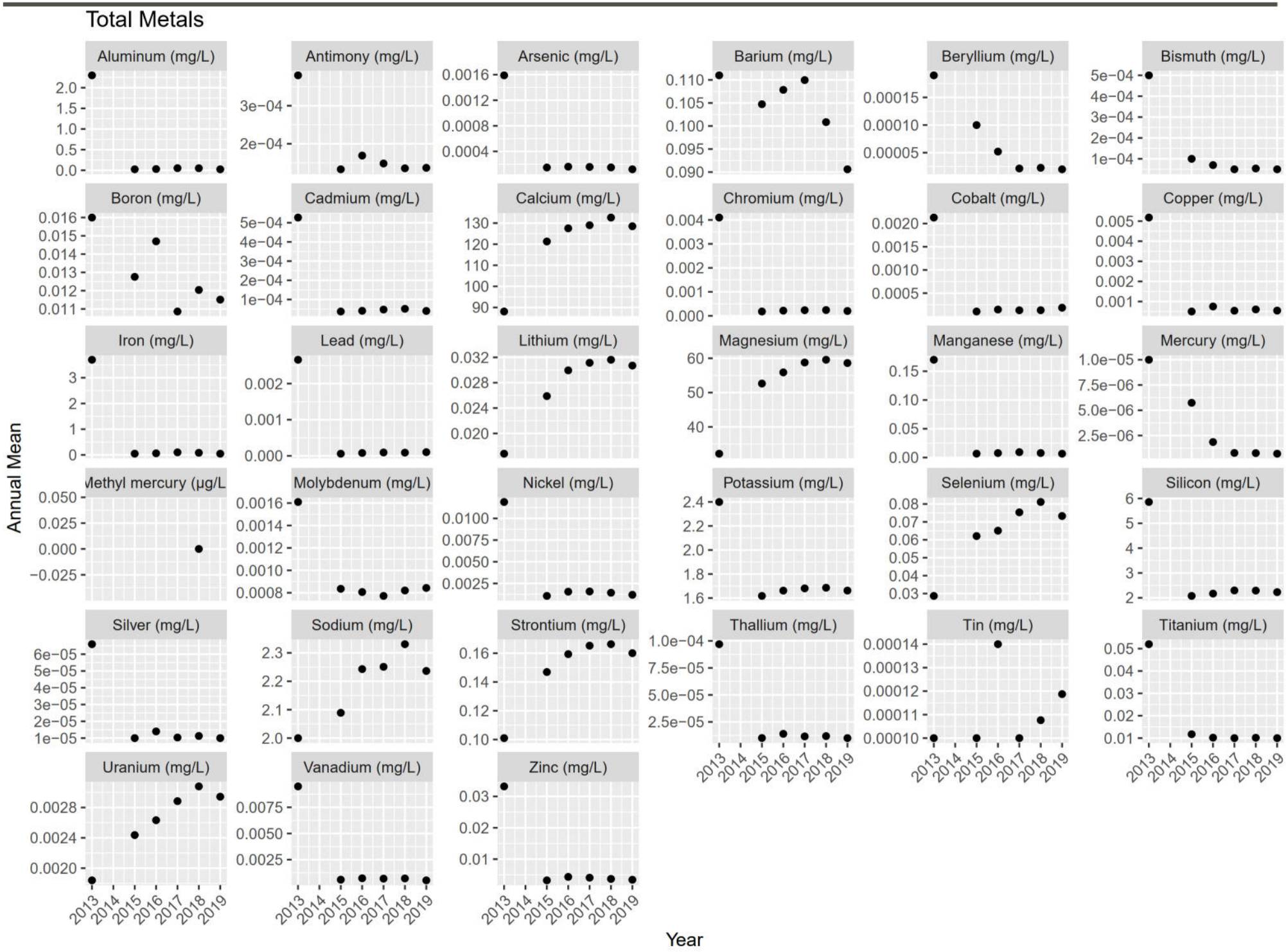

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2013
2014
2015
2016
2017
2018
2019

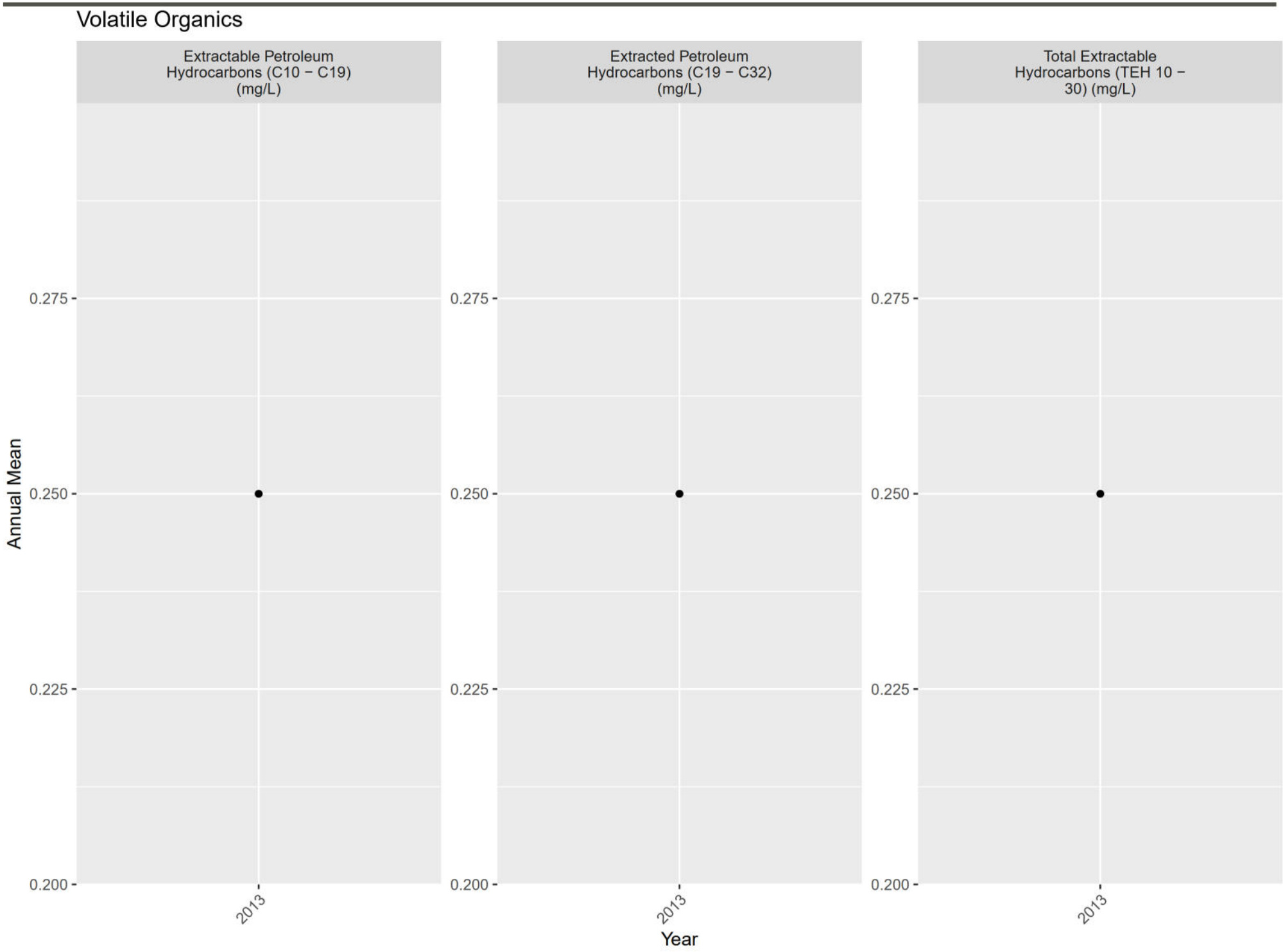

Field Measured
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Temperature (°C)
Annual Mean
Year
800
600
400
85
80
75
70
10.2
10.0
9.8
9.6
9.4
9.2
200
175
150
125
100
8.4
8.3
8.2
8.1
8.0
5.5
5.0
4.5
4.0
2013
2014
2015
2016
2017
2018
2019


Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Hydrogen Sulphide (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Sulphide (mg/L)
Annual Mean
Year
2013
2014
2015
2016
2017
2018
2019


Nutrients and Biological Indicators
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2013
2014
2015
2016
2017
2018
2019


Speciation of Selenium
Dissolved Dimethylseleneoxide (µg/L)
Dissolved Methylseleninic Acid (µg/L)
Dissolved Selenate (µg/L)
Dissolved Selenite (µg/L)
Dissolved Selenocyanate (µg/L)
Dissolved Selenomethionine (µg/L)
Dissolved Selenosulphate (µg/L)
Unknown Dissolved Selenium Species (µg/L)
Annual Mean
Year
2017
2018
2019

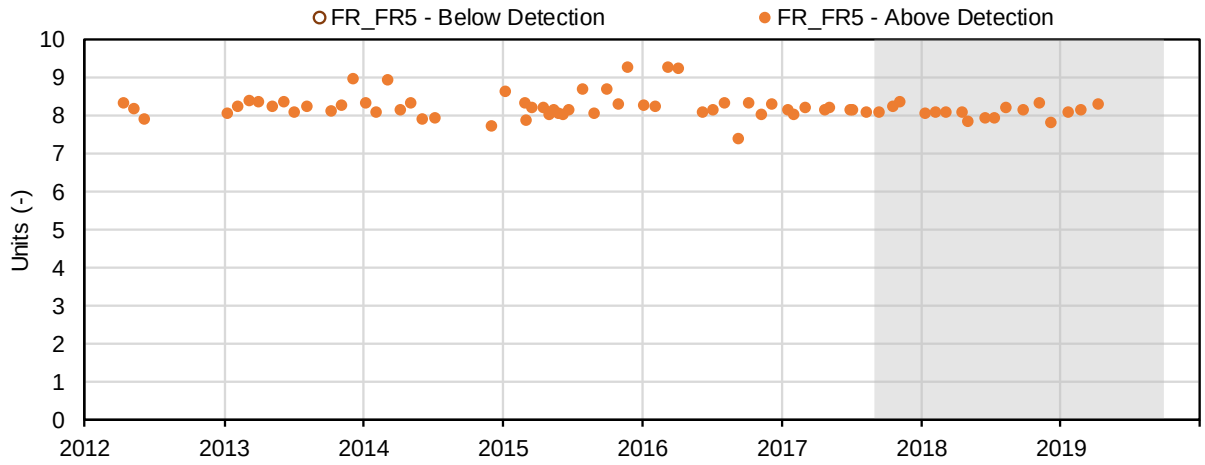

Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Methyl mercury (µg/L
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
0.275
0.250
0.225
0.200
2013
Year

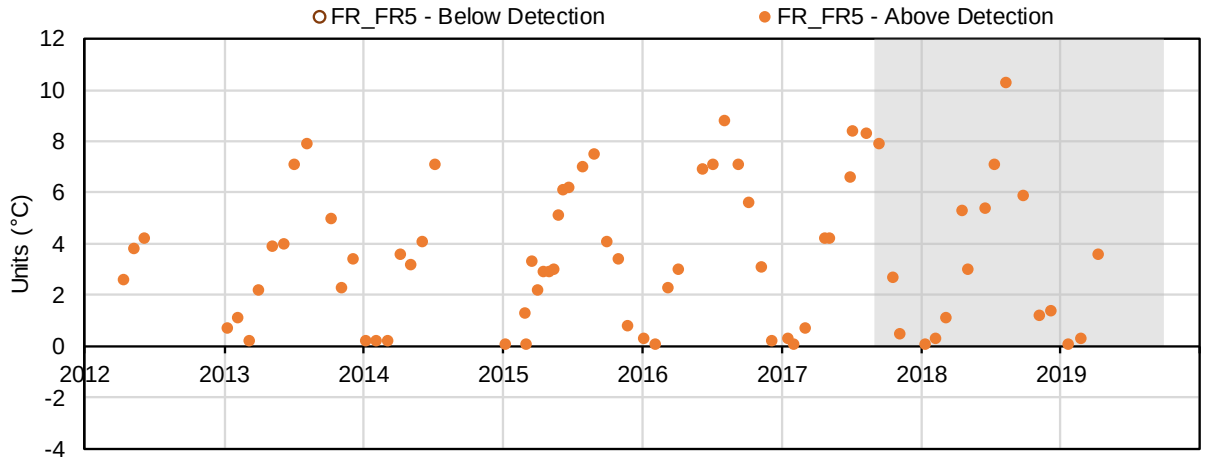
ATTACHMENT F13

FR_FR5 Plots

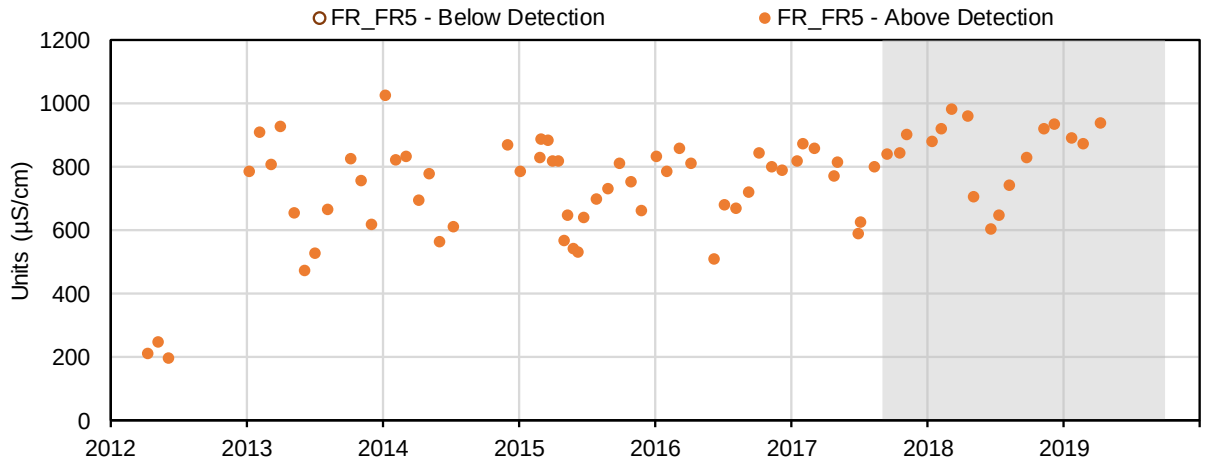
(1) pH (-); Field Measured



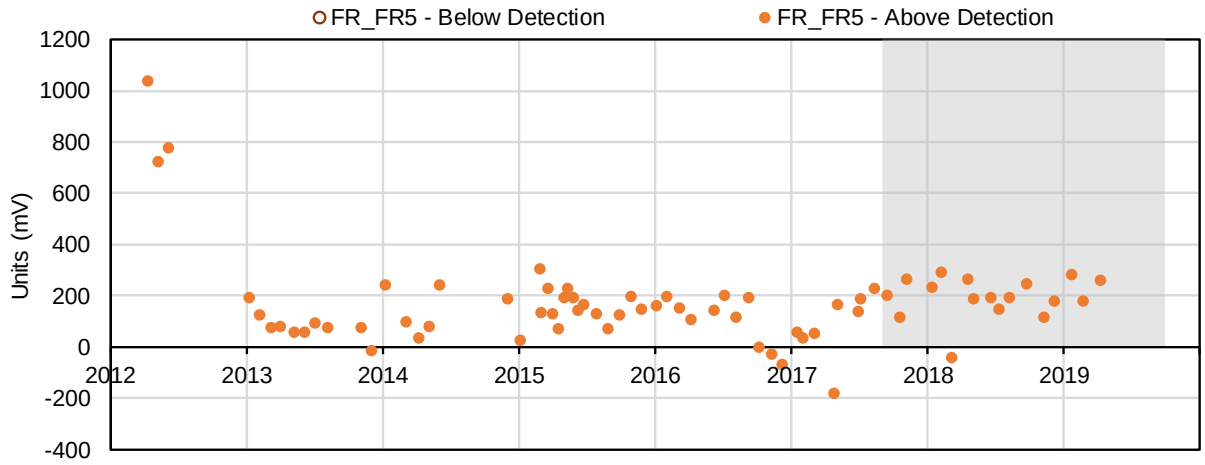
(2) Temperature (°C); Field Measured



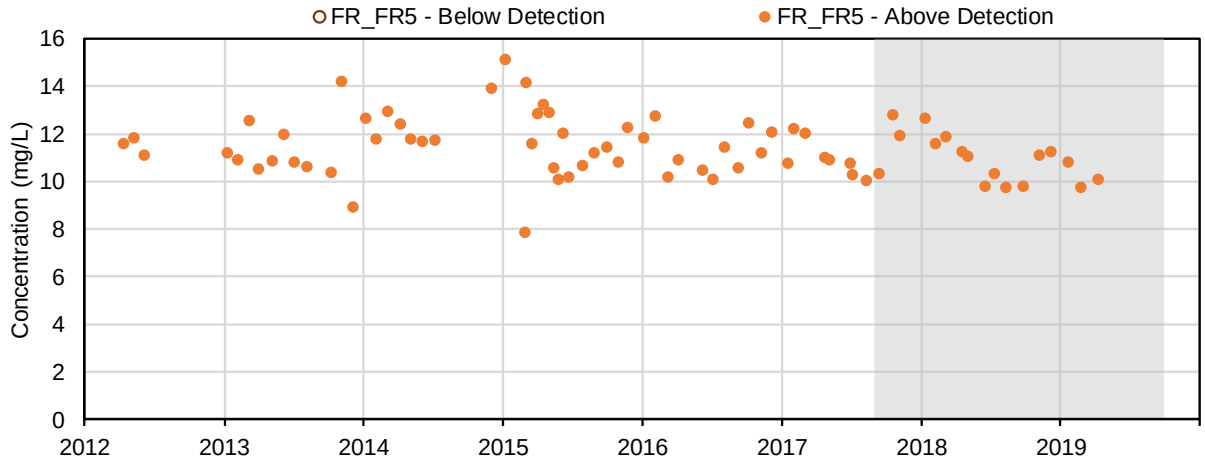
(3) Conductivity (µS/cm); Field Measured



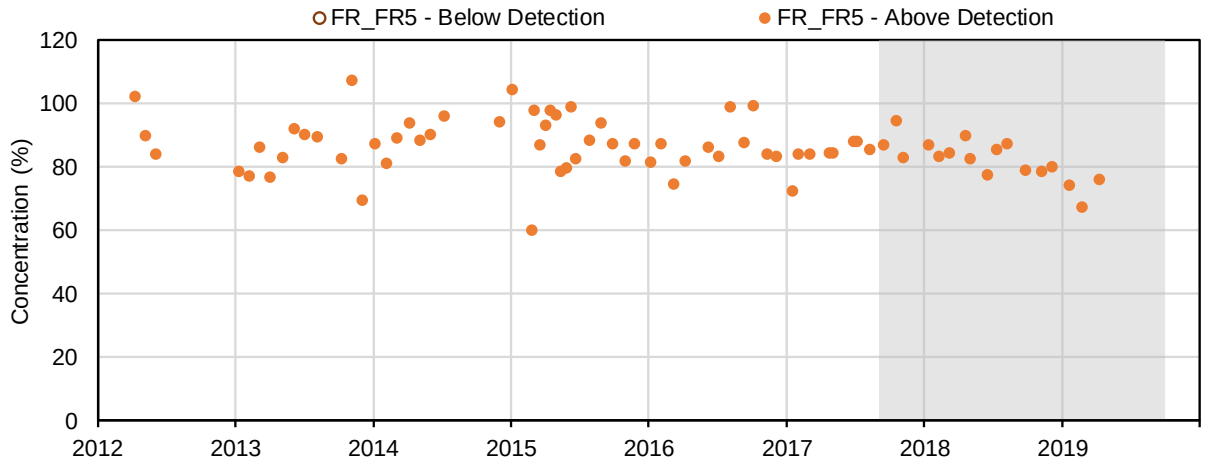
(4) Oxidation-Reduction Potential (mV); Field Measured



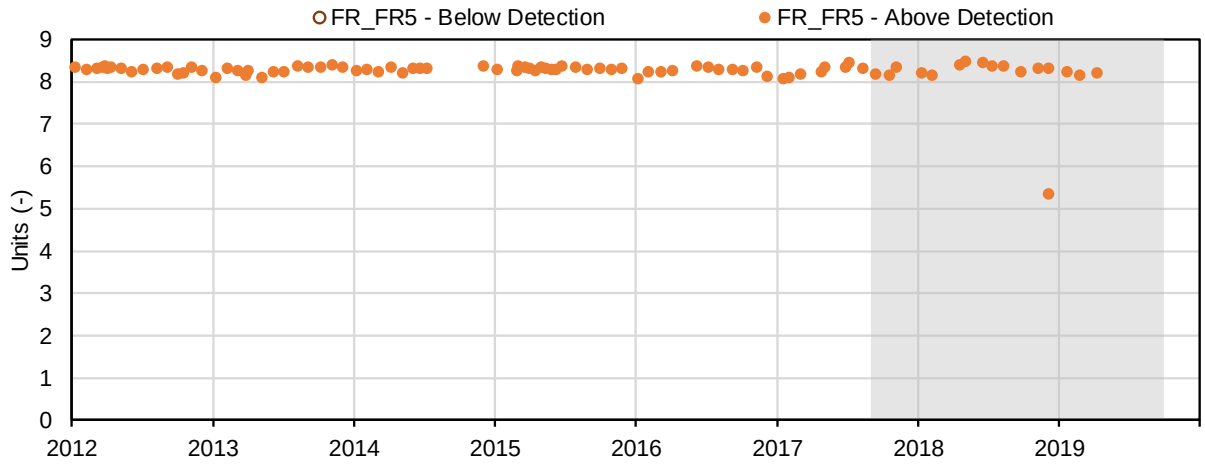
(5) Dissolved Oxygen (mg/L); Field Measured



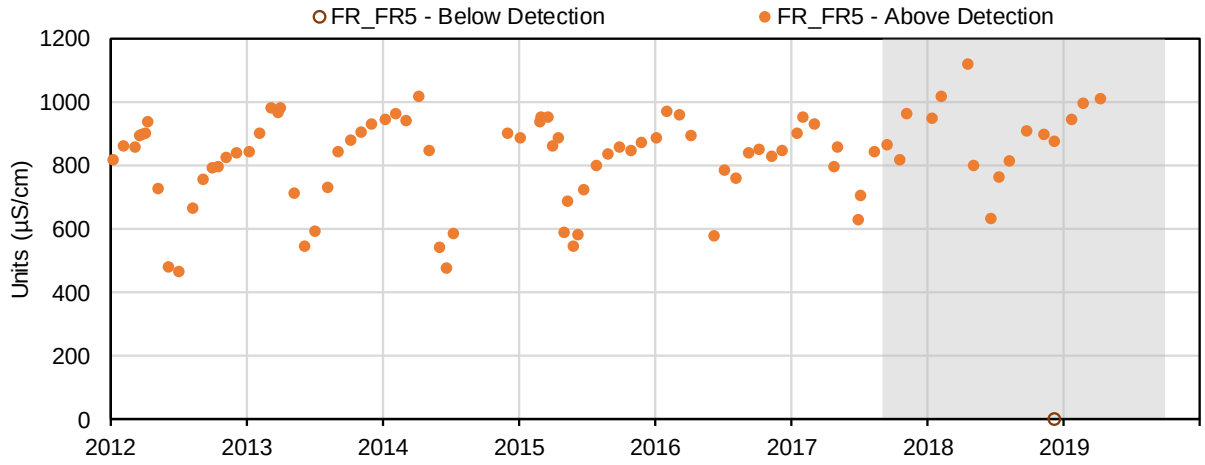
(6) Dissolved Oxygen (%); Field Measured



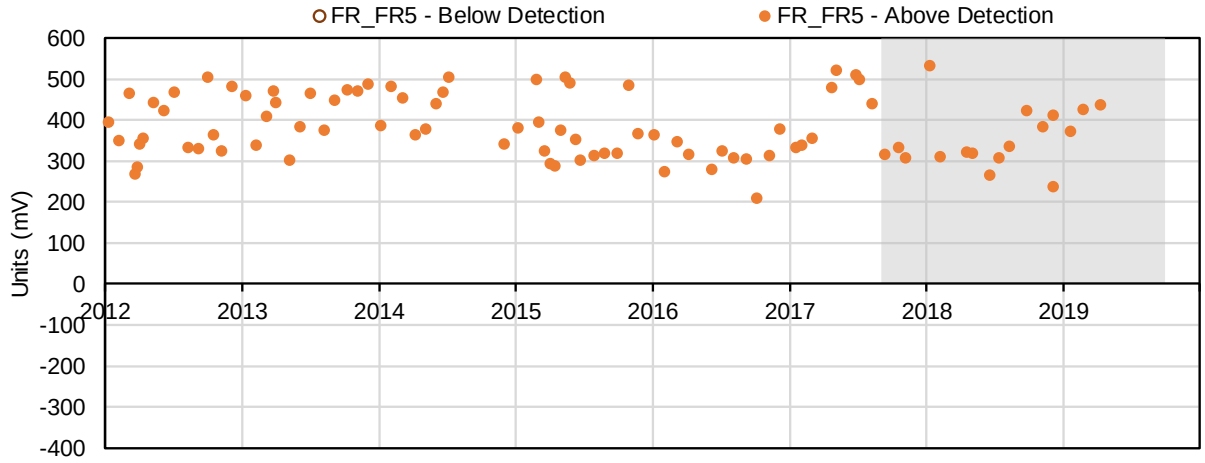
(7) pH (-); Conventional Parameters



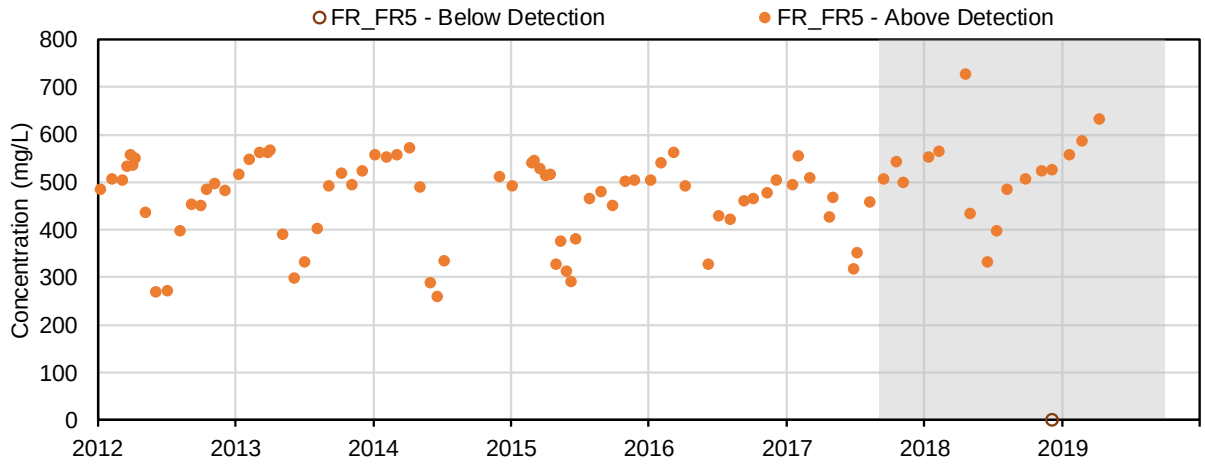
(8) Conductivity (µS/cm); Conventional Parameters



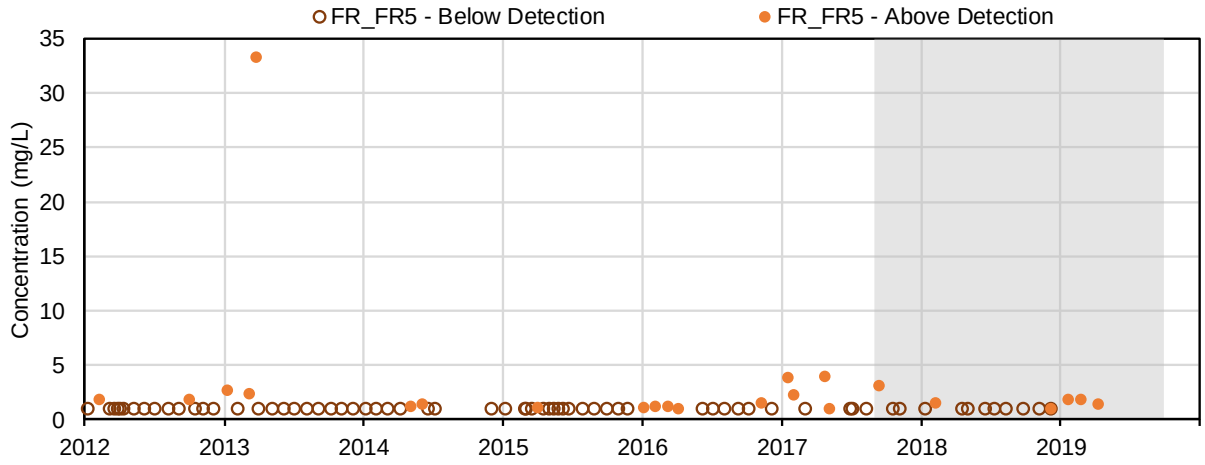
(9) Oxidation-Reduction Potential (mV); Conventional Parameters



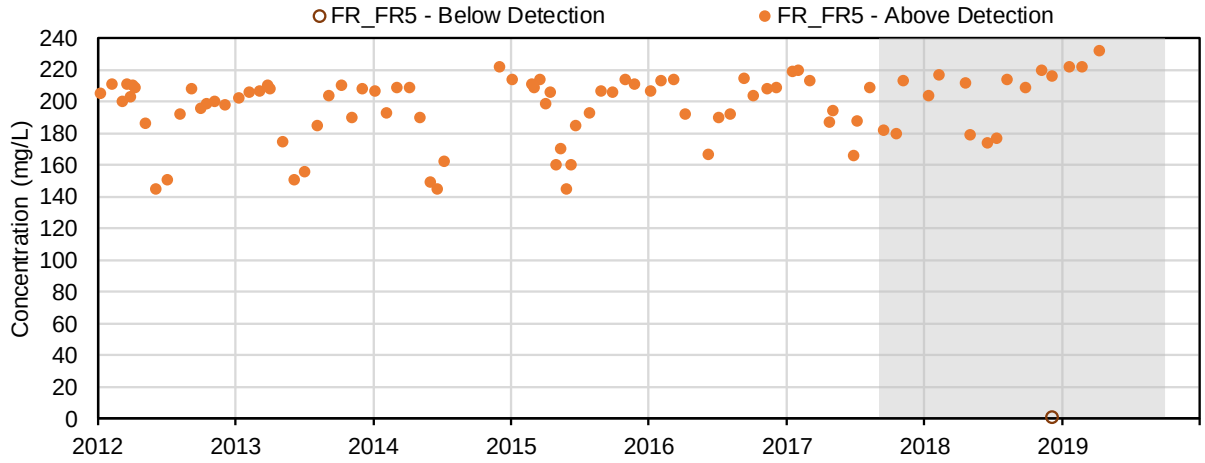
(10) Hardness, as CaCO3 (mg/L); Conventional Parameters



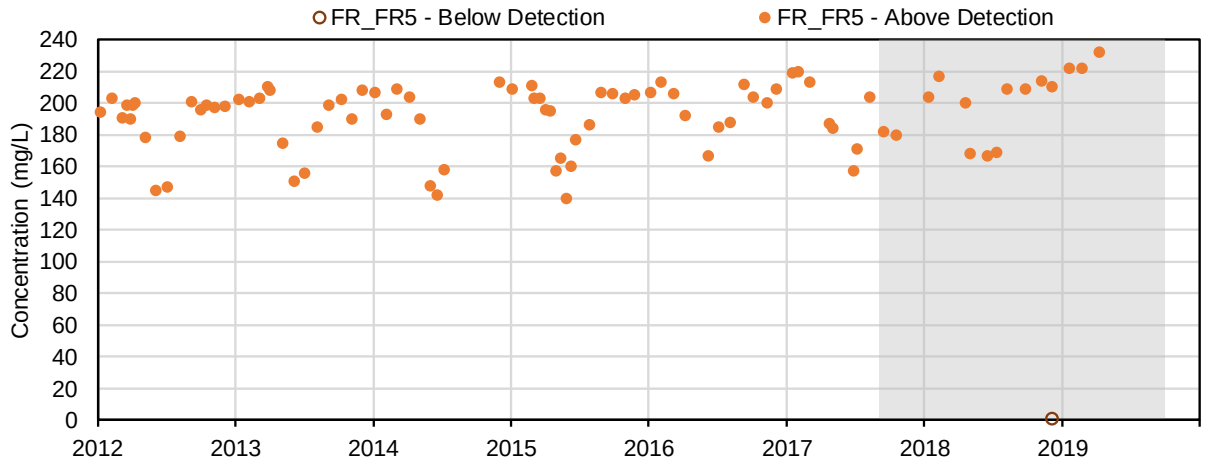
(11) Acidity, CaCO3 (mg/L); Conventional Parameters



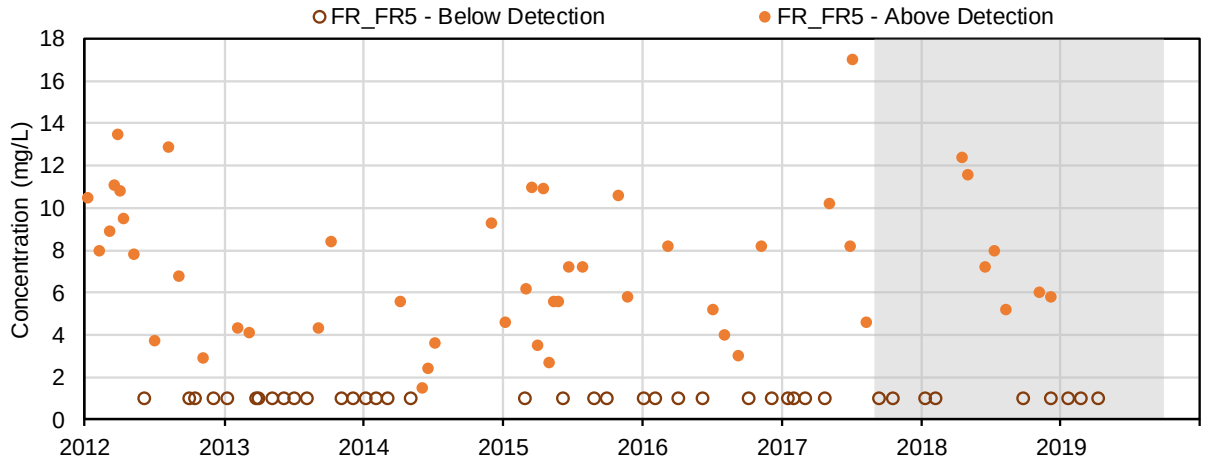
(12) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



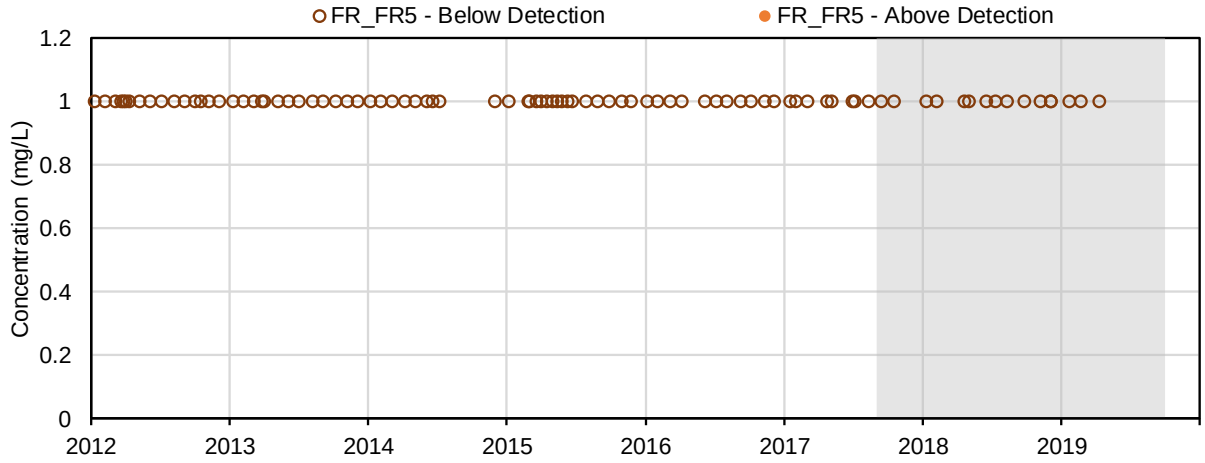
(13) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



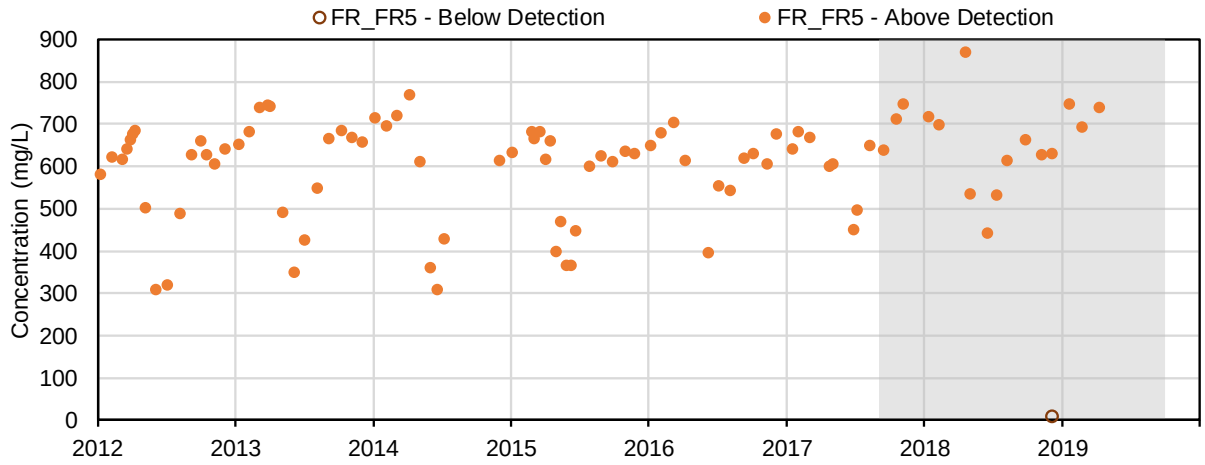
(14) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



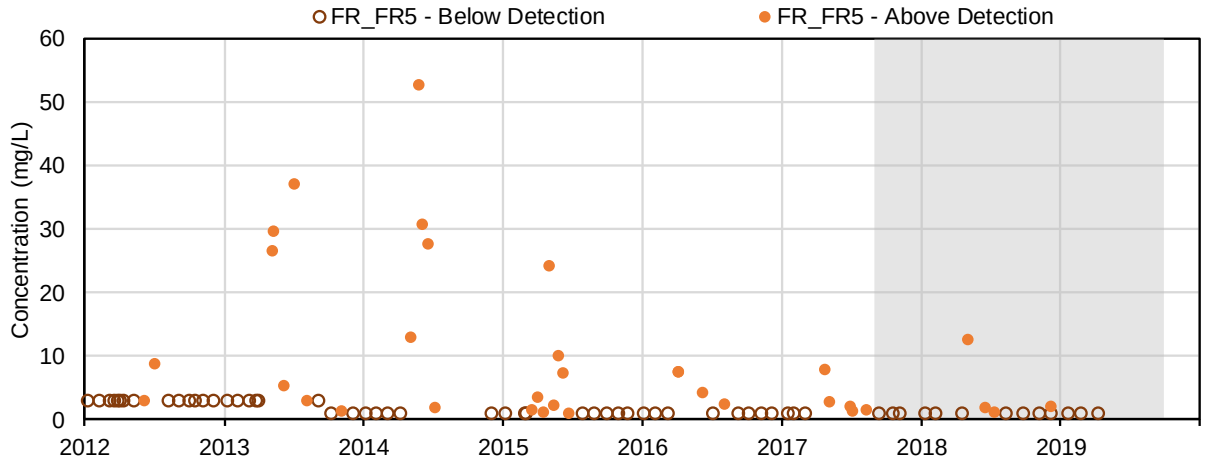
(15) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



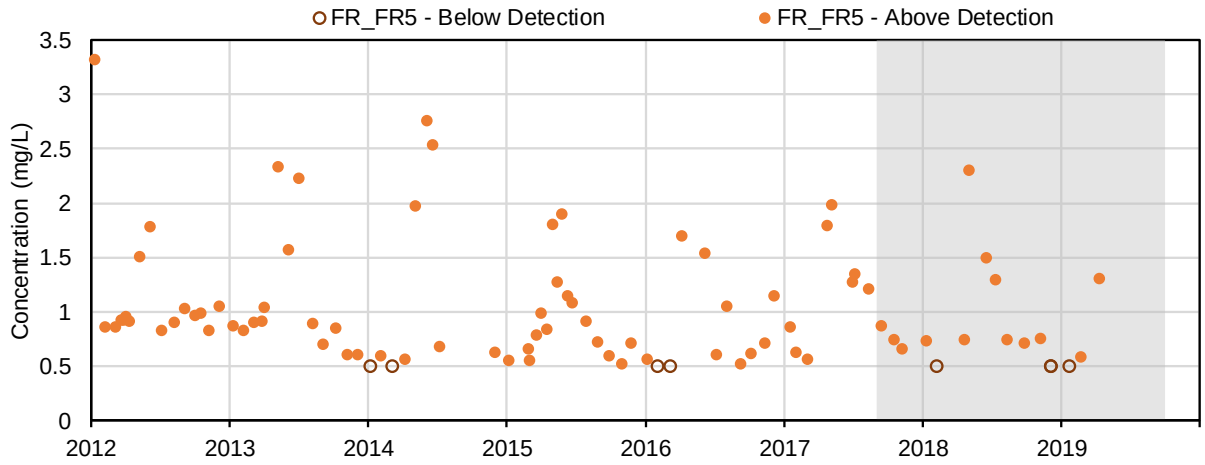
(16) Total dissolved solids (mg/L); Conventional Parameters



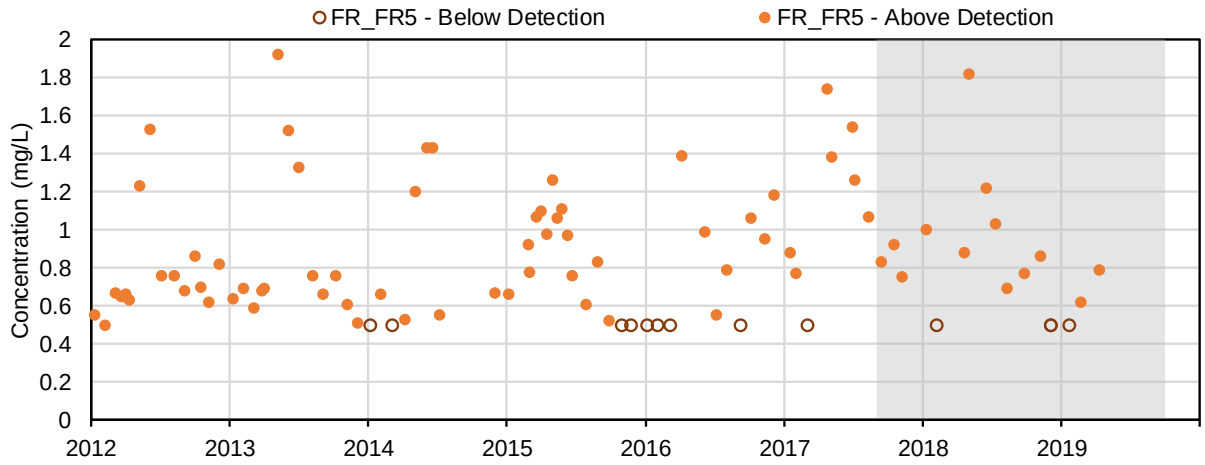
(17) Total suspended solids (mg/L); Conventional Parameters



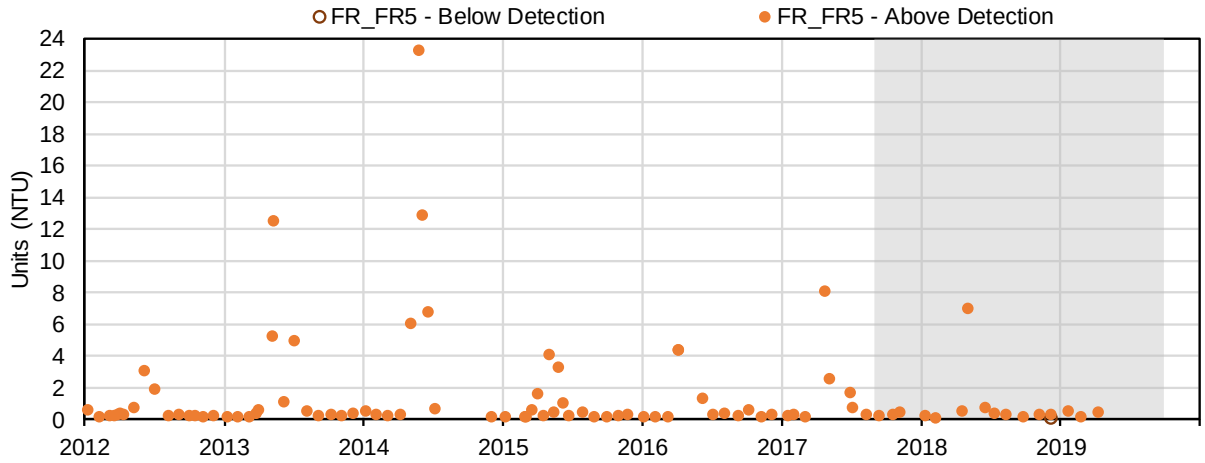
(18) Total organic carbon (mg/L); Conventional Parameters



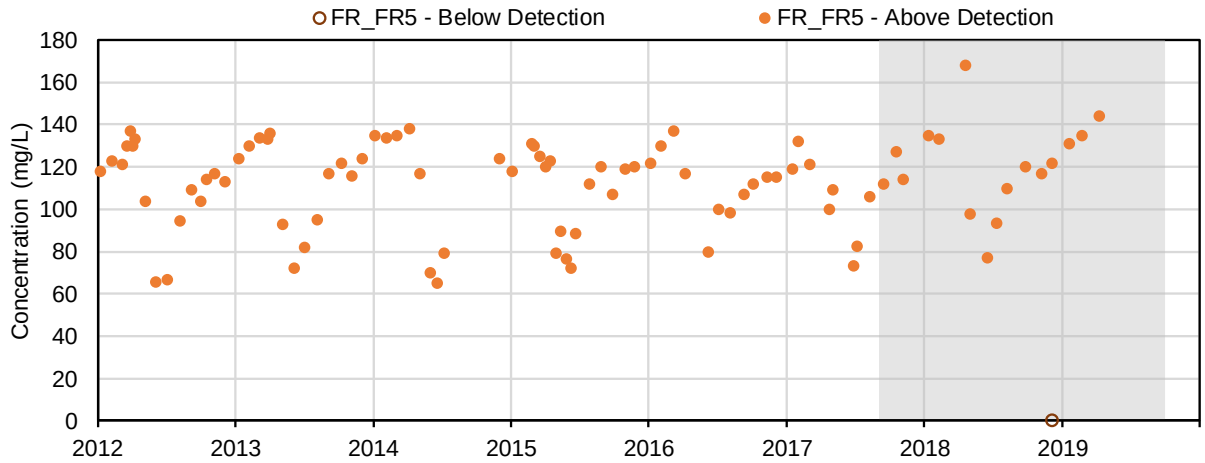
(19) Dissolved organic carbon (mg/L); Conventional Parameters



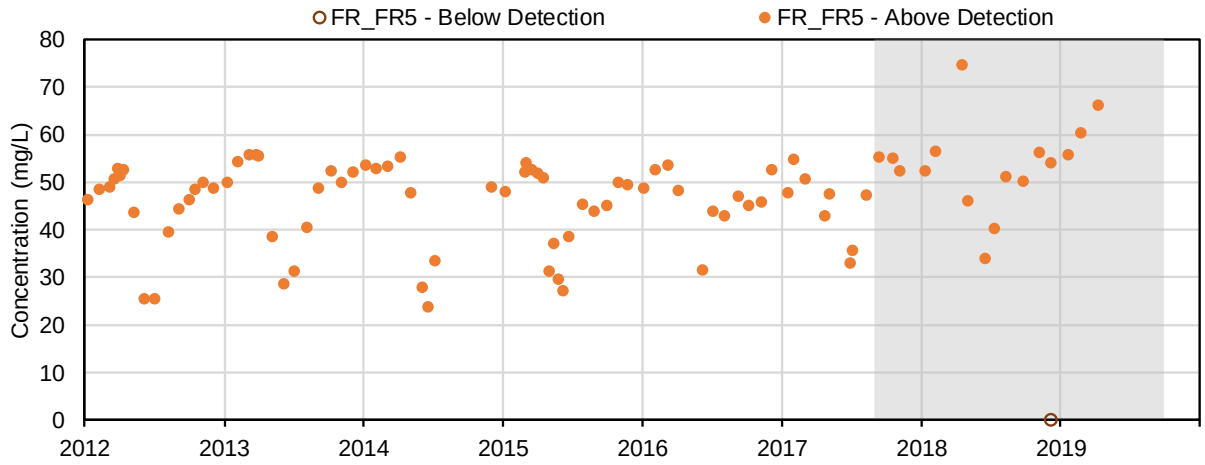
(20) Turbidity (NTU); Conventional Parameters



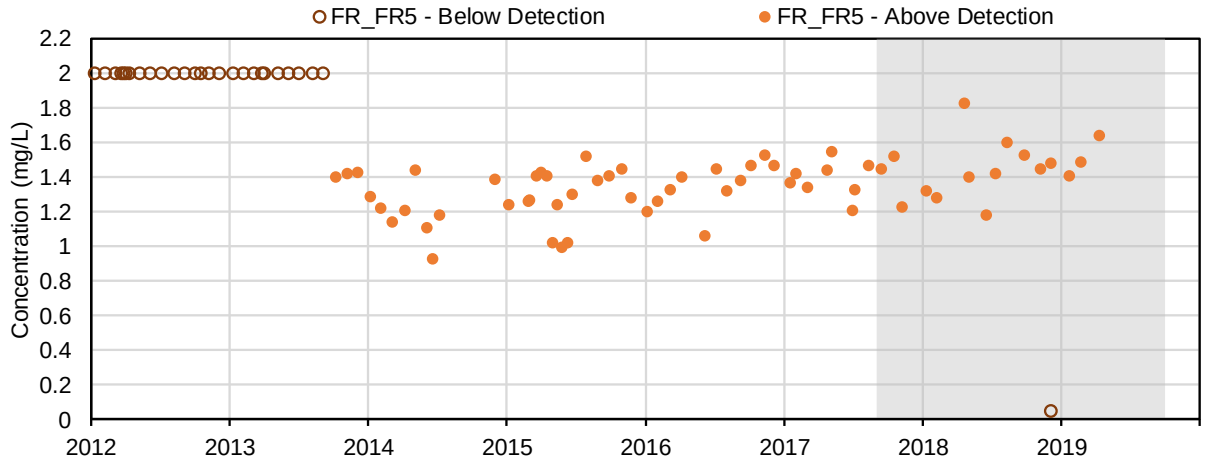
(21) Calcium (mg/L); Major Ions



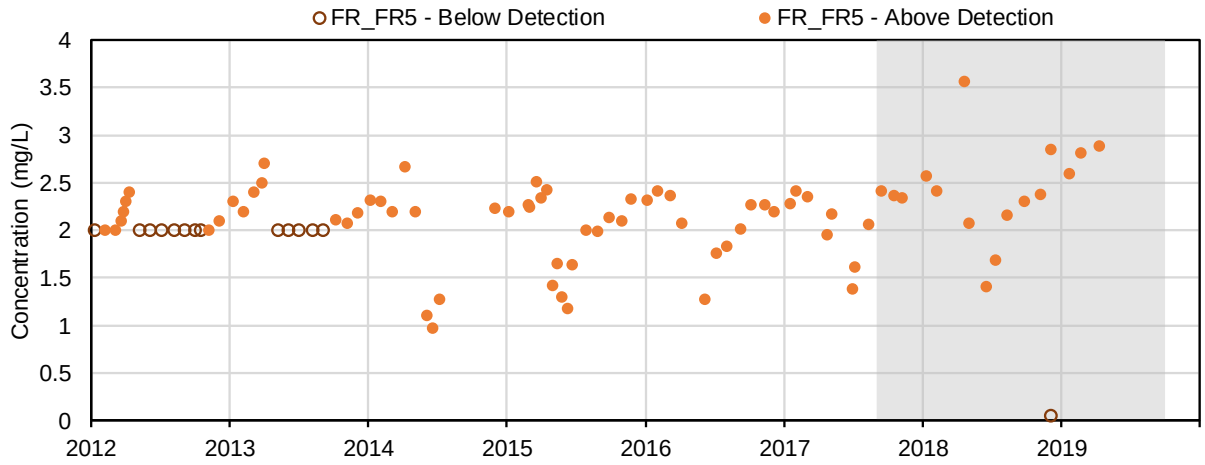
(22) Magnesium (mg/L); Major Ions



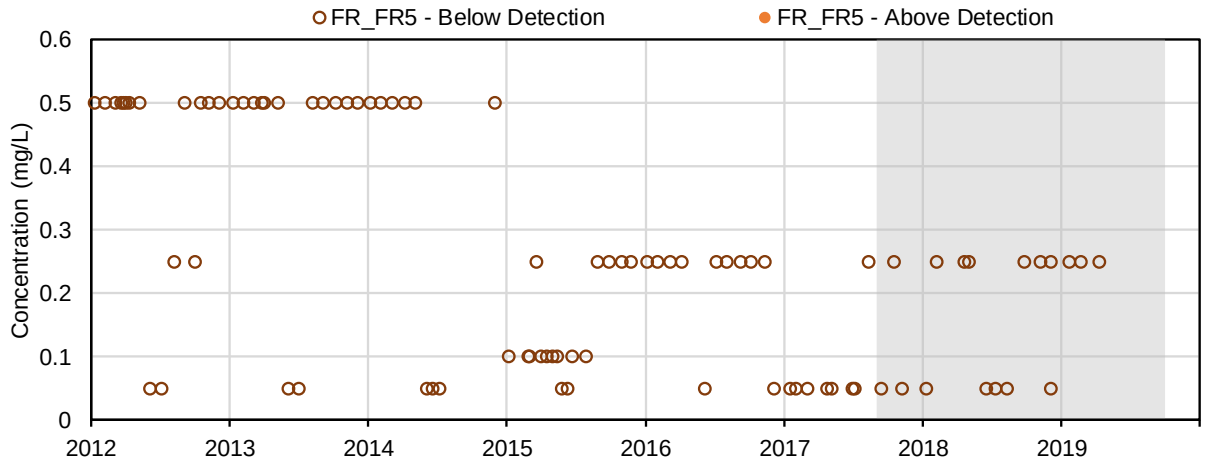
(23) Potassium (mg/L); Major Ions



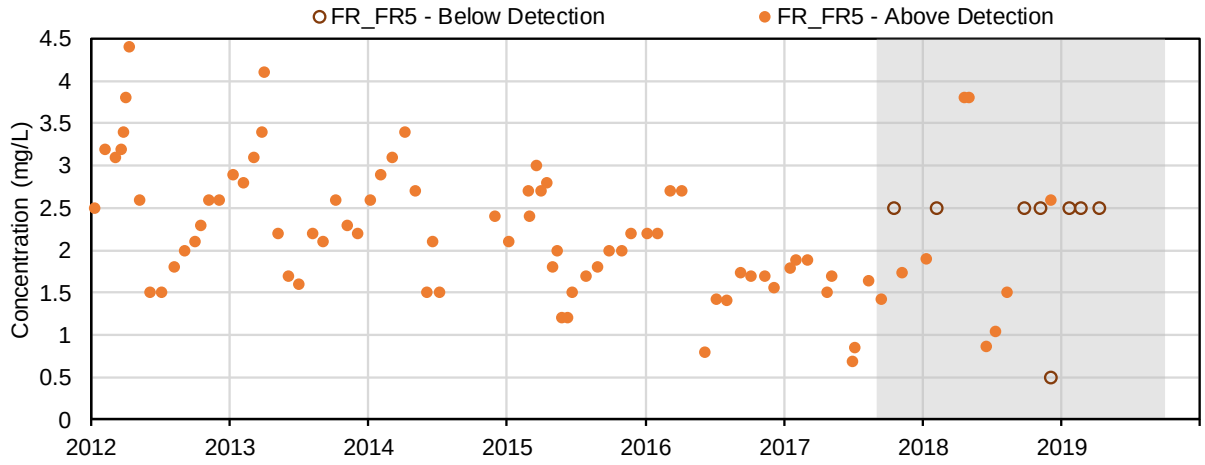
(24) Sodium (mg/L); Major Ions



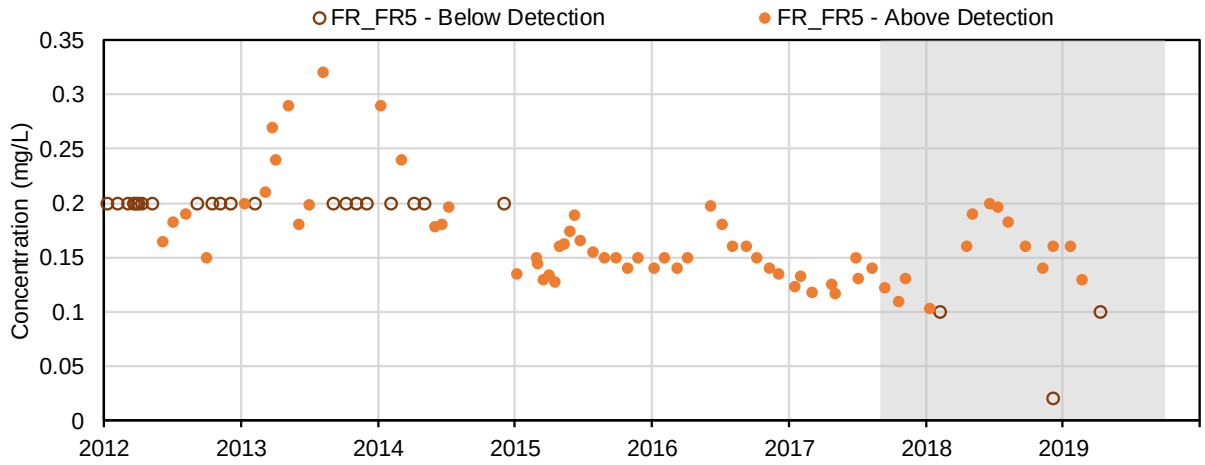
(25) Bromide (mg/L); Major Ions



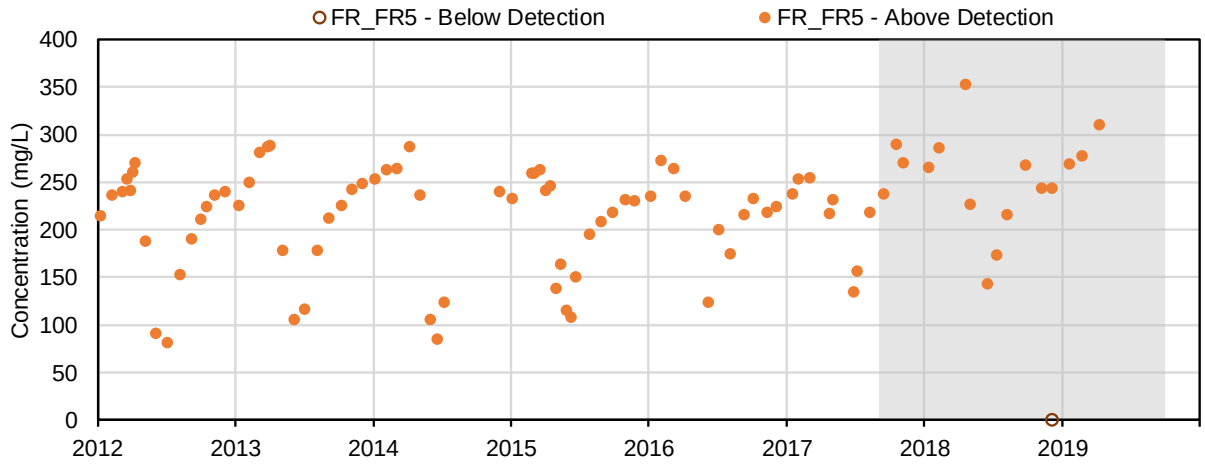
(26) Chloride (mg/L); Major Ions



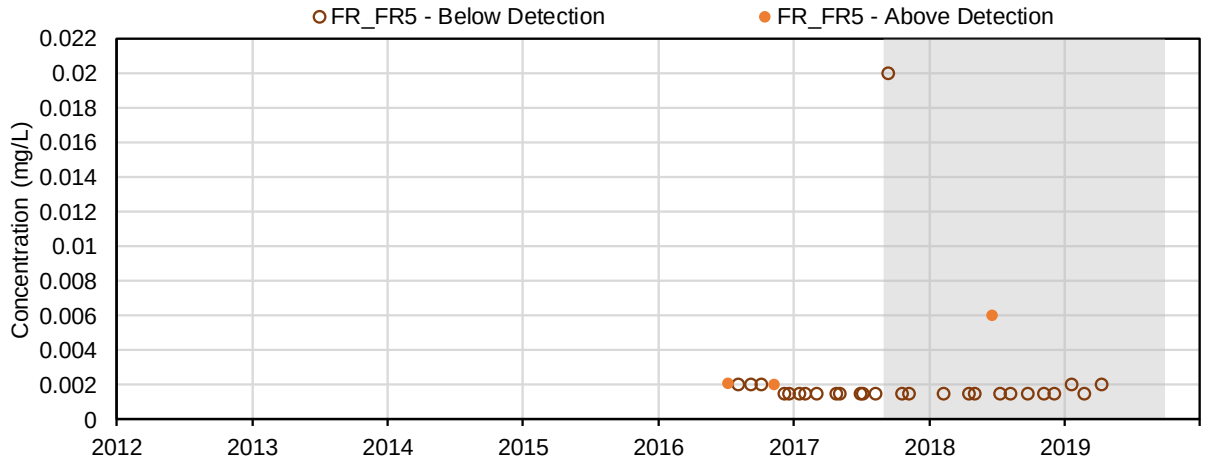
(27) Fluoride (mg/L); Major Ions



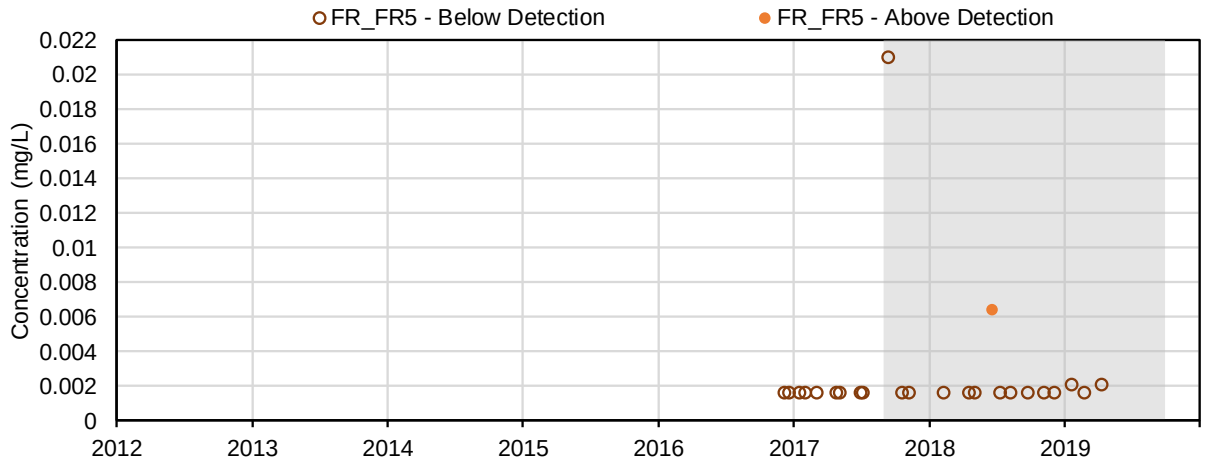
(28) Sulphate (mg/L); Major Ions



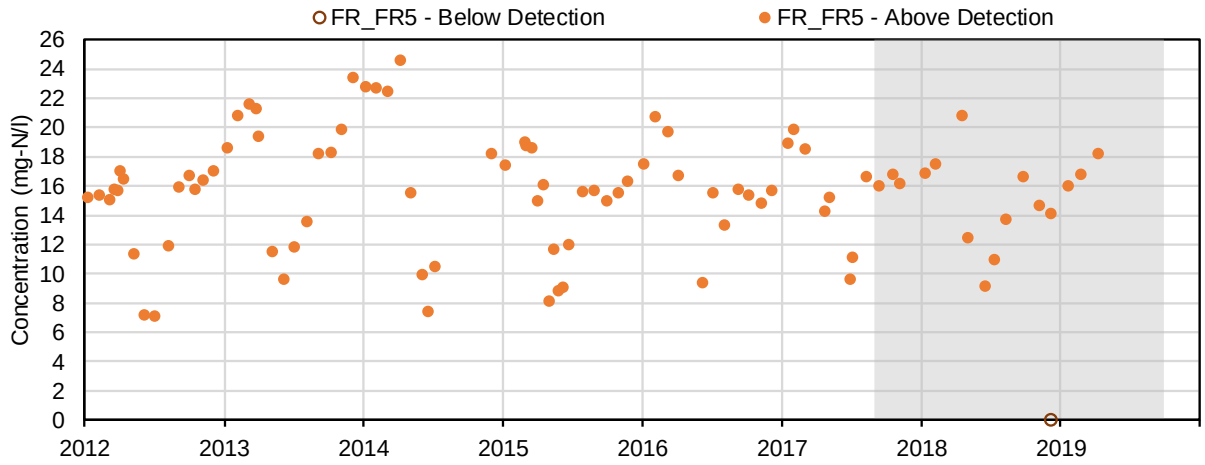
(29) Sulphide (mg/L); Major Ions



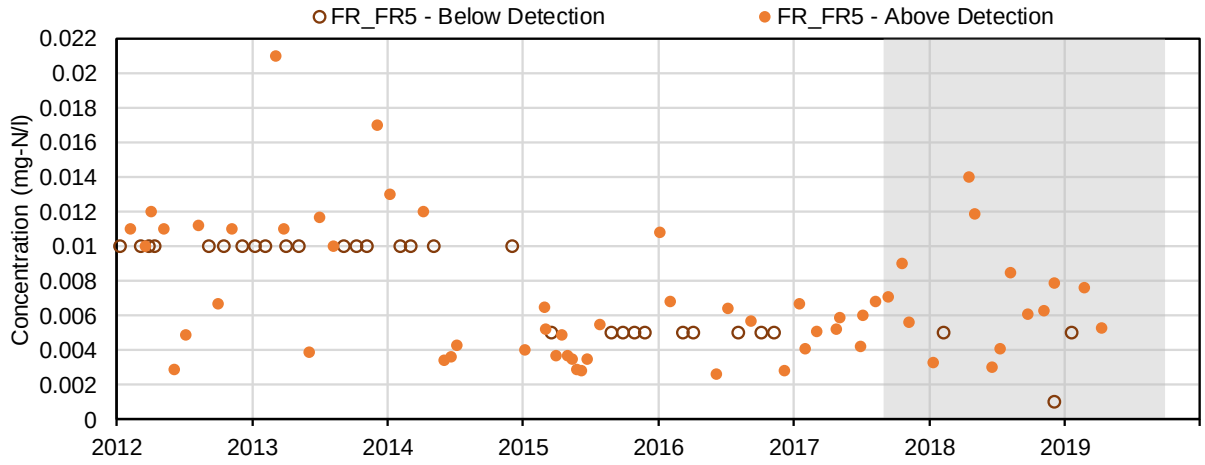
(30) Hydrogen Sulphide (mg/L); Major Ions



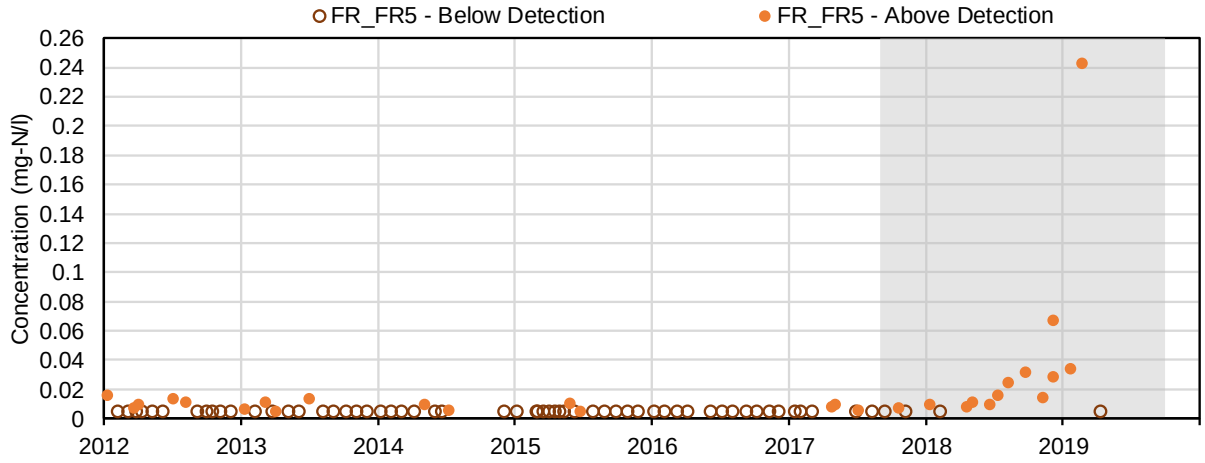
(31) Nitrate (mg-N/l); Nutrients and Biological Indicators



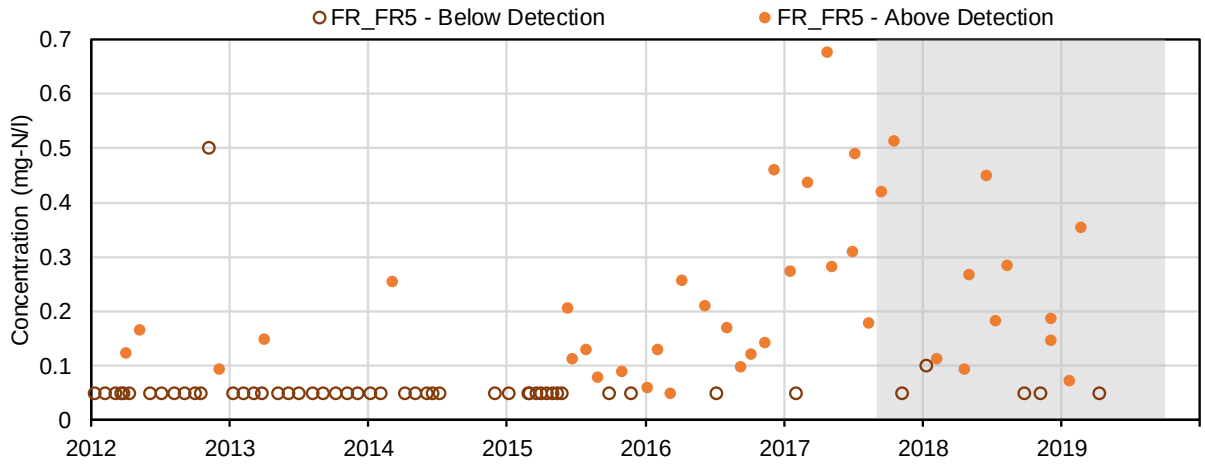
(32) Nitrite (mg-N/l); Nutrients and Biological Indicators



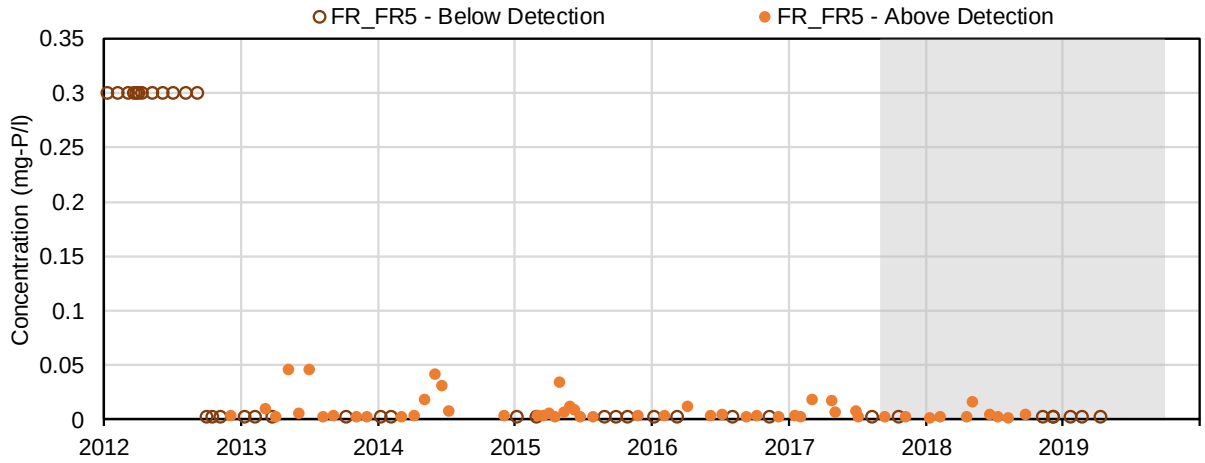
(33) Total ammonia (mg-N/l); Nutrients and Biological Indicators



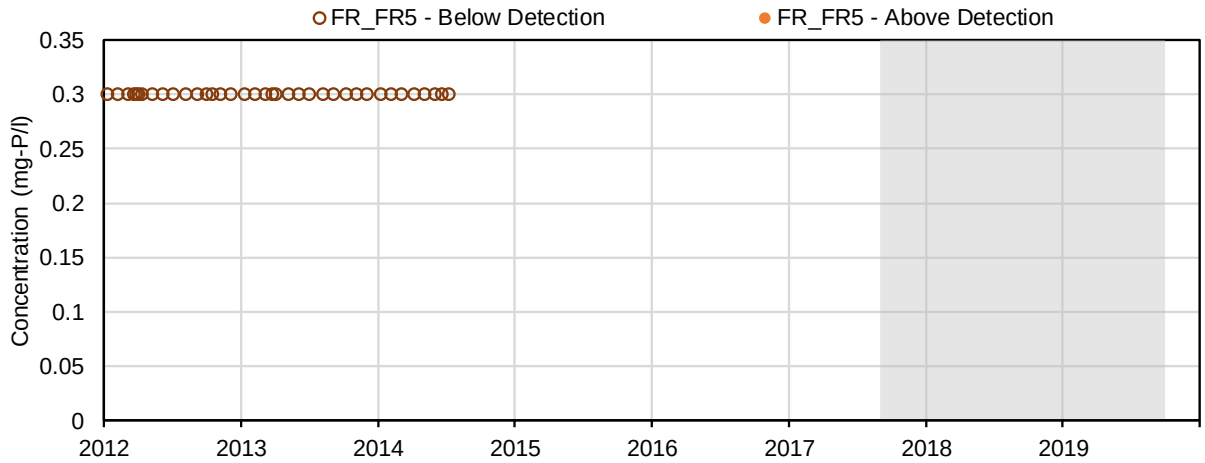
(34) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



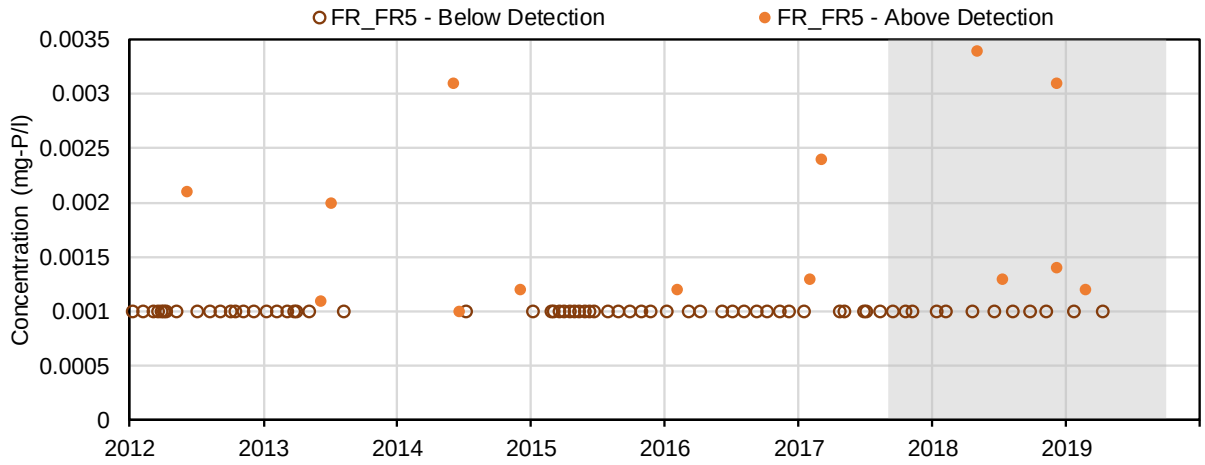
(35) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



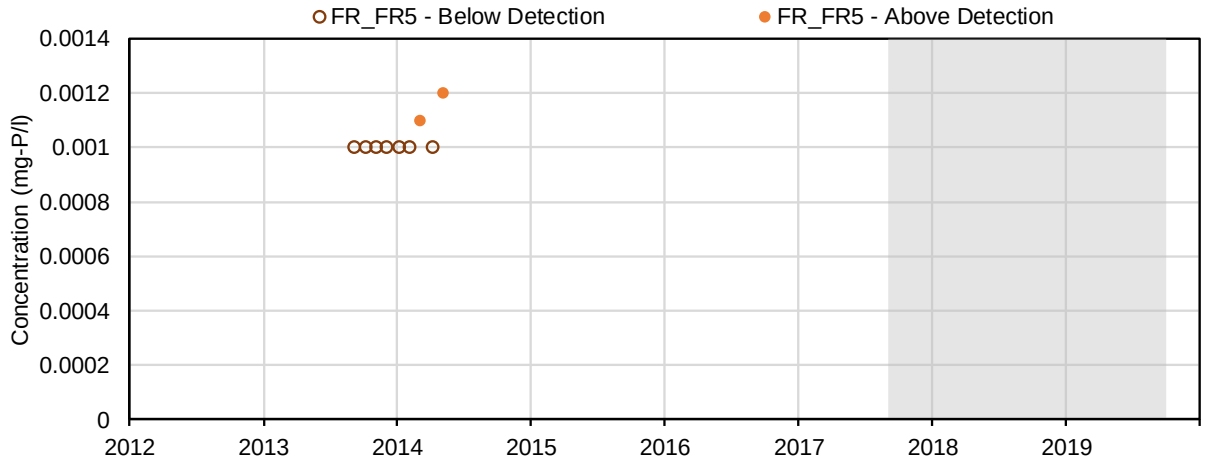
(36) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



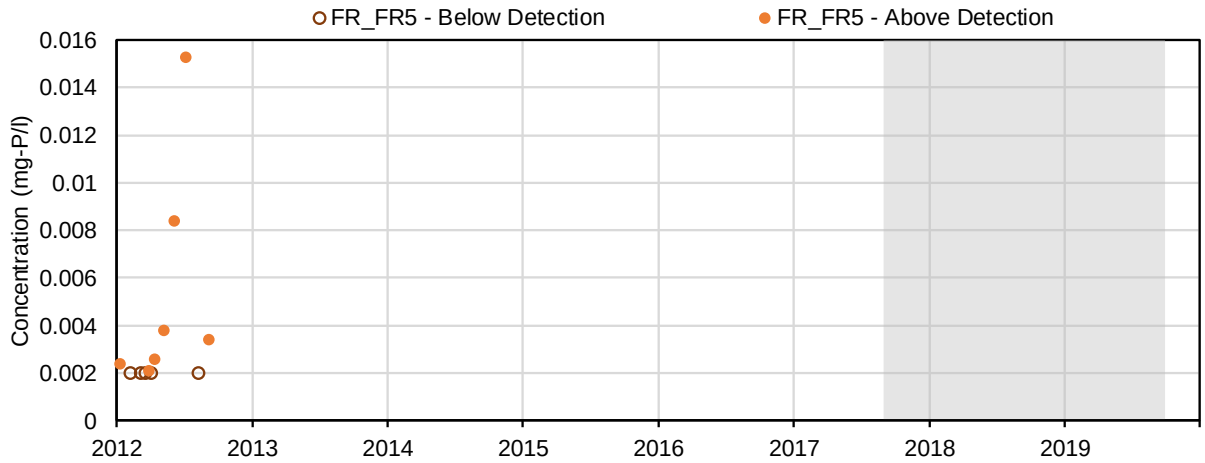
(37) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



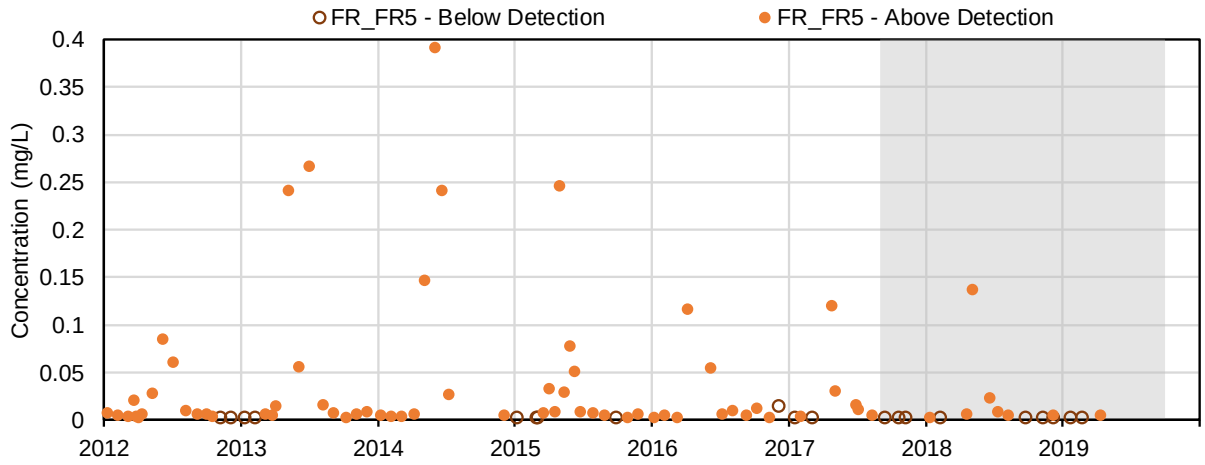
(38) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



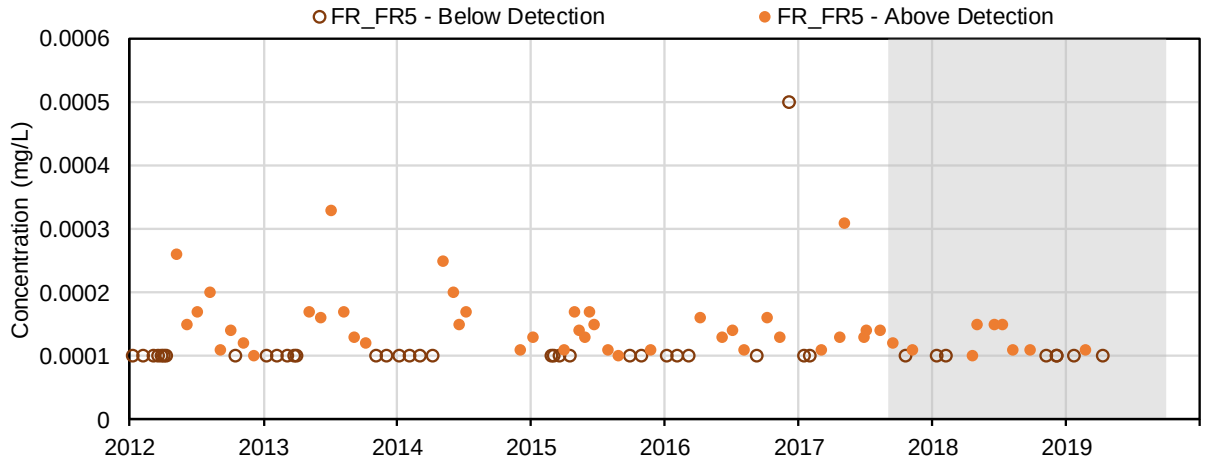
(39) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



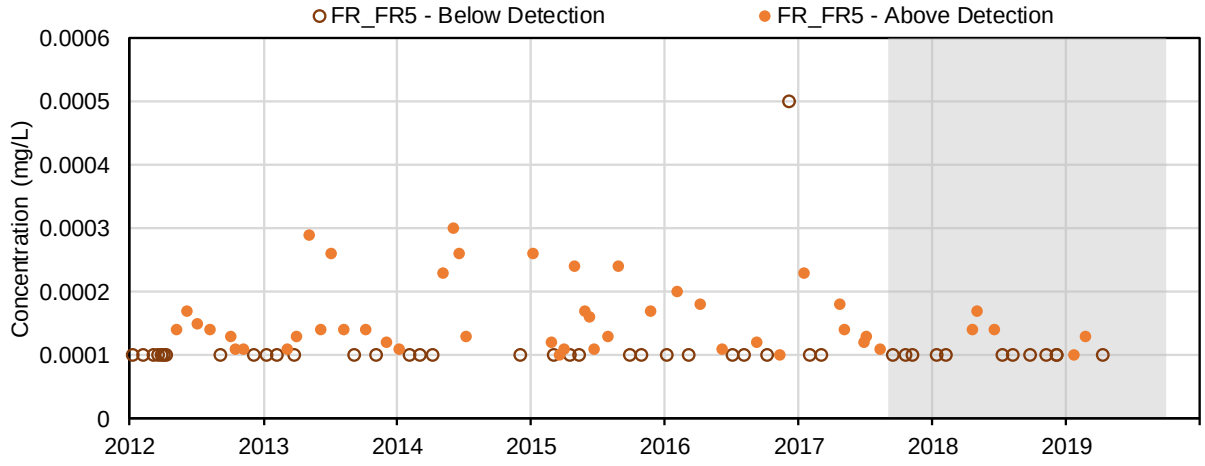
(40) Aluminum (mg/L); Total Metals



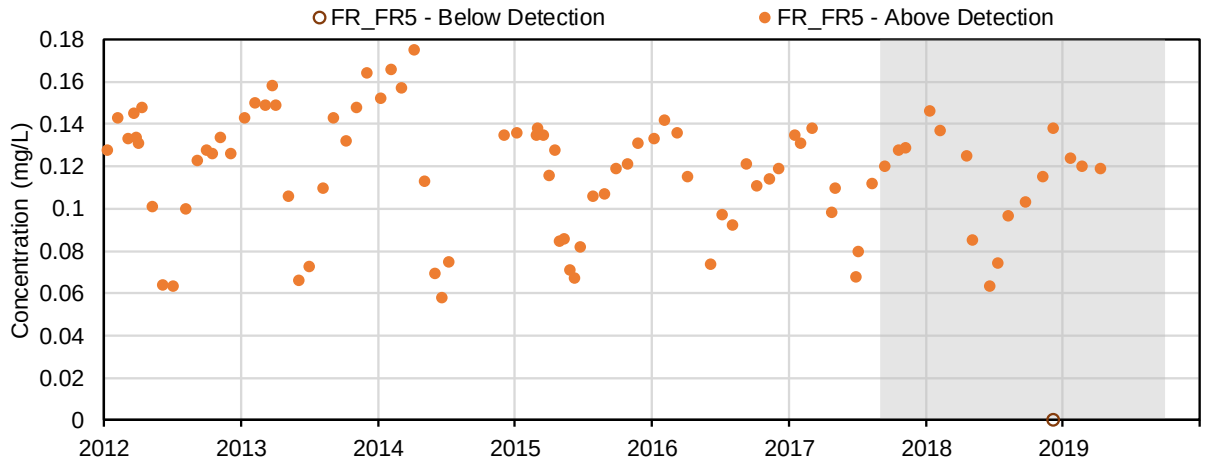
(41) Antimony (mg/L); Total Metals



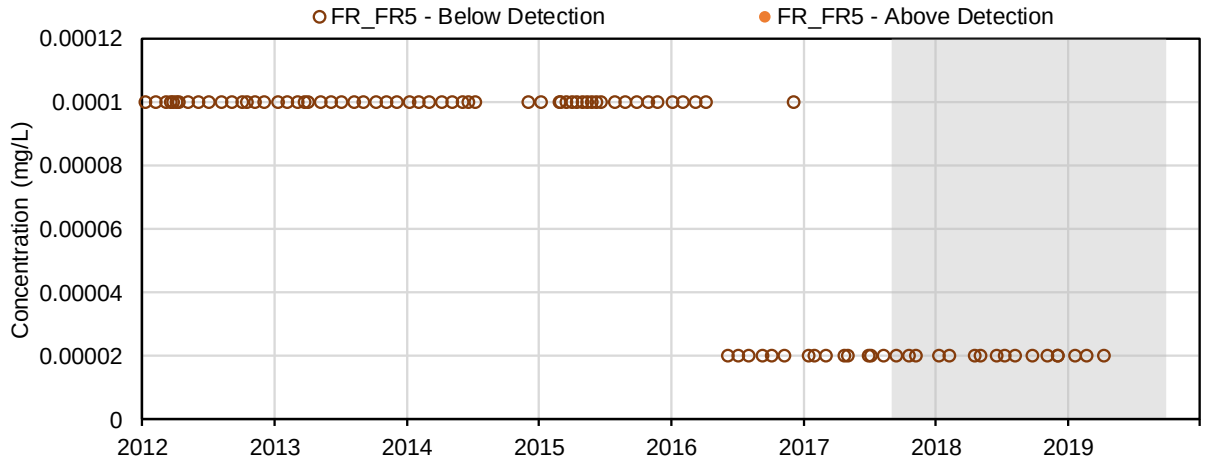
(42) Arsenic (mg/L); Total Metals



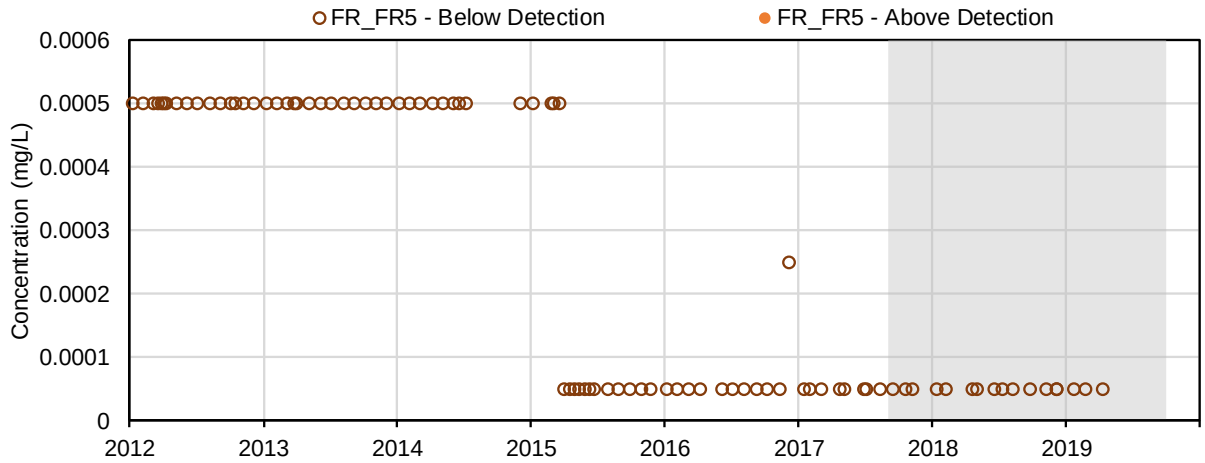
(43) Barium (mg/L); Total Metals



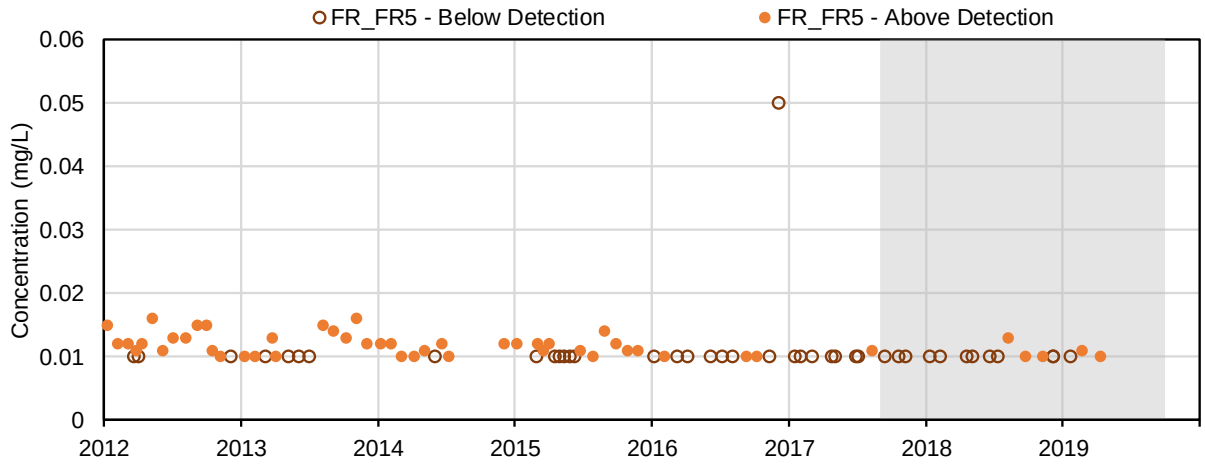
(44) Beryllium (mg/L); Total Metals



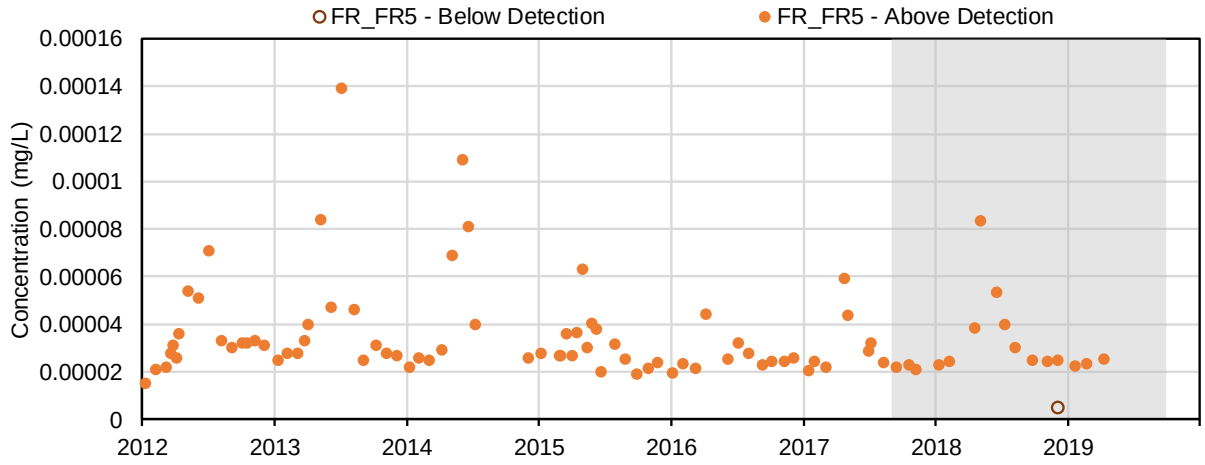
(45) Bismuth (mg/L); Total Metals



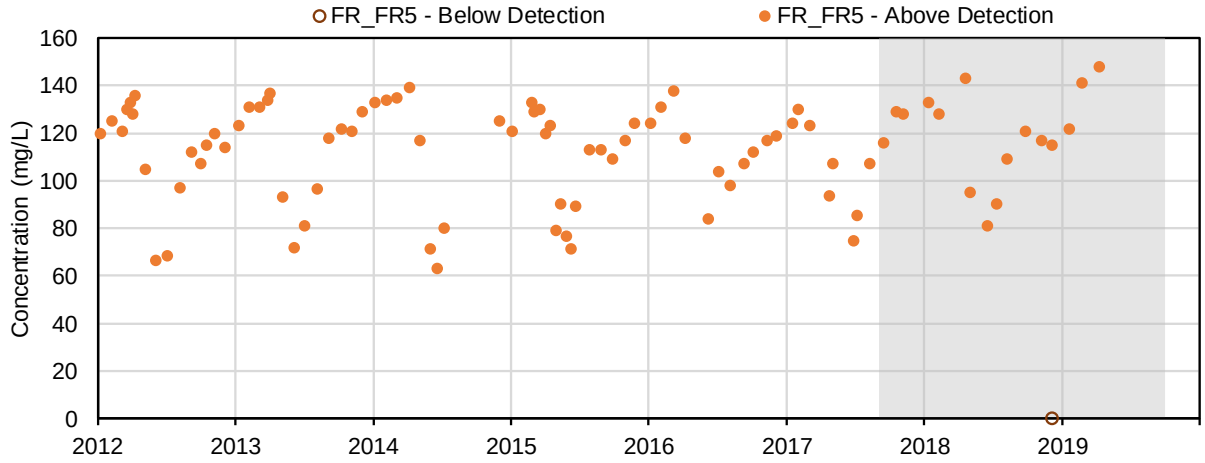
(46) Boron (mg/L); Total Metals



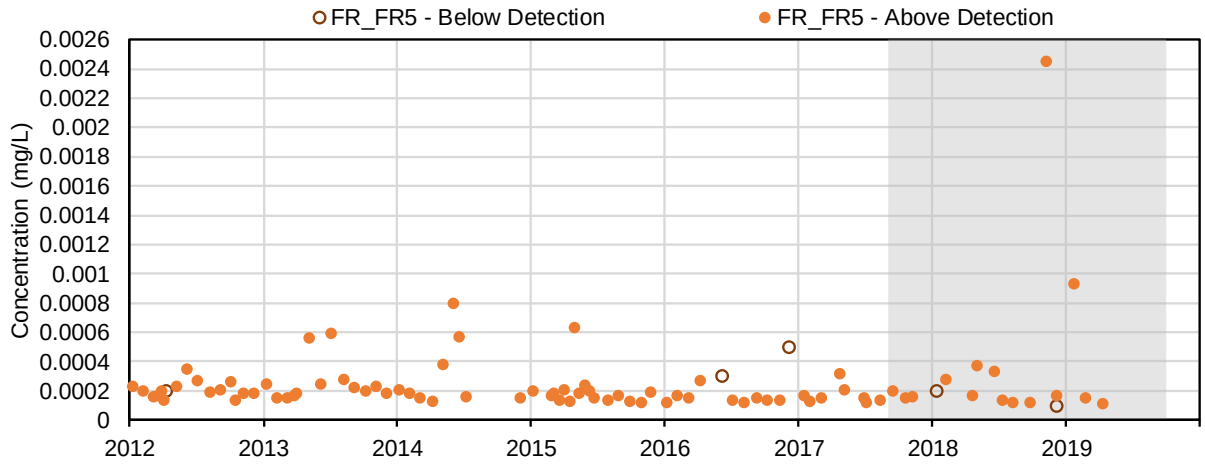
(47) Cadmium (mg/L); Total Metals



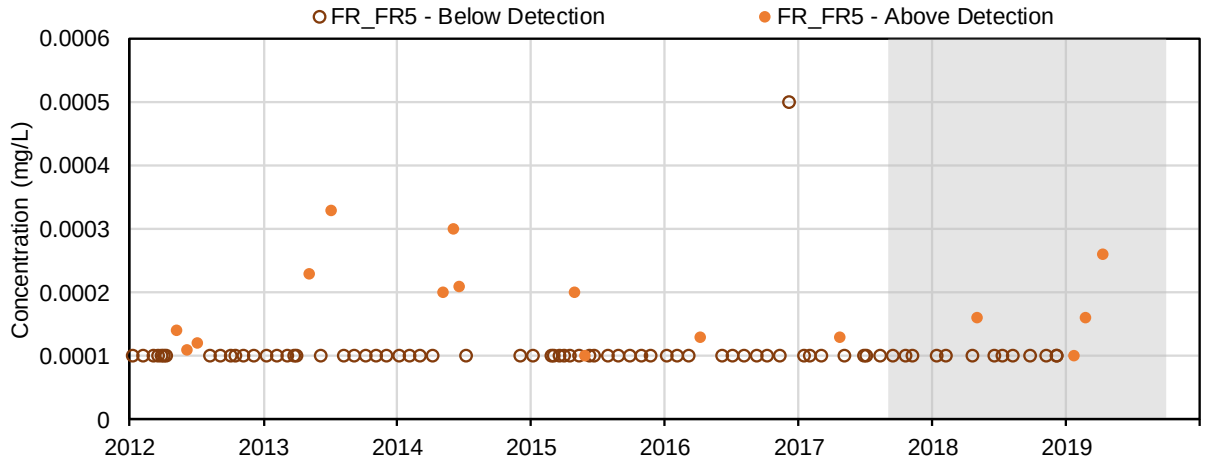
(48) Calcium (mg/L); Total Metals



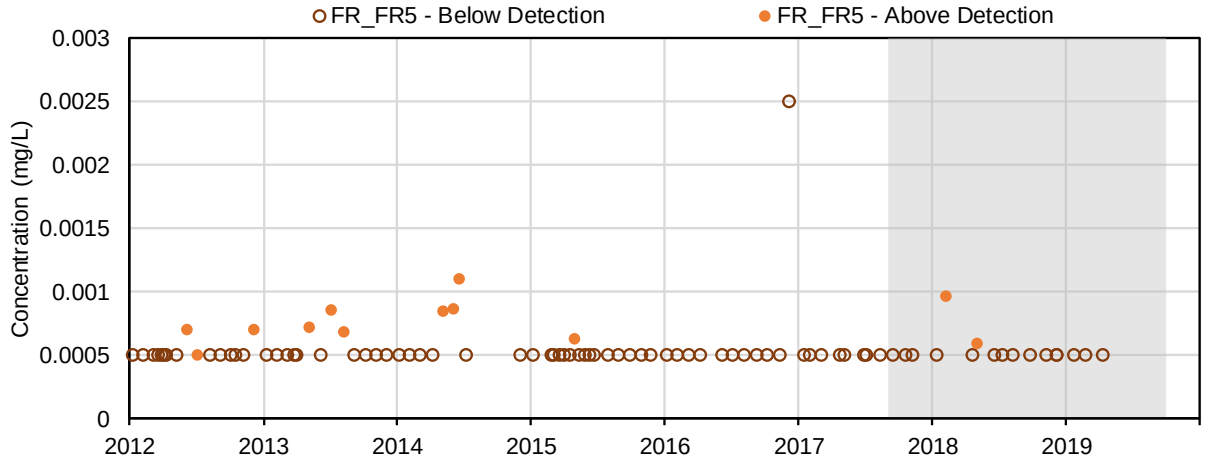
(49) Chromium (mg/L); Total Metals



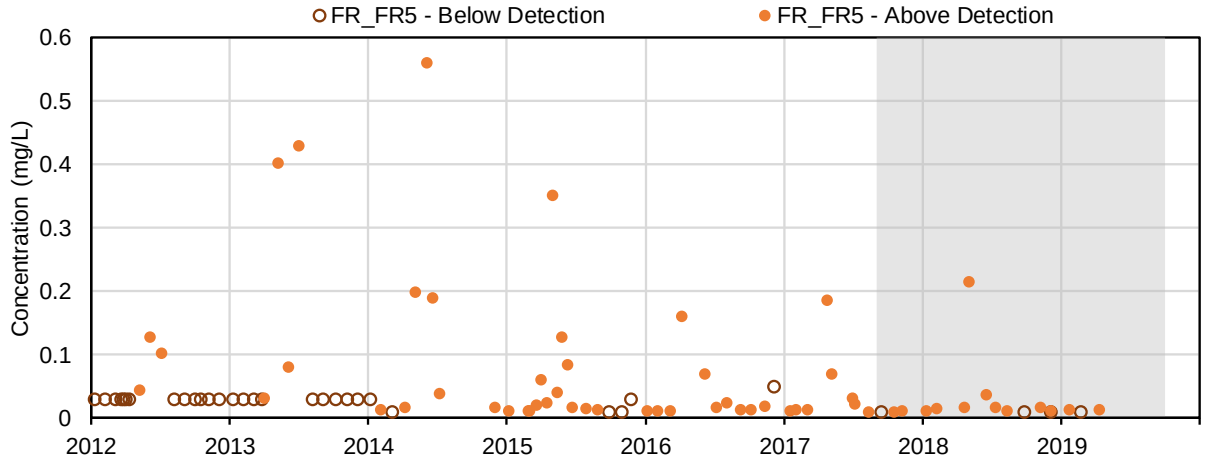
(50) Cobalt (mg/L); Total Metals



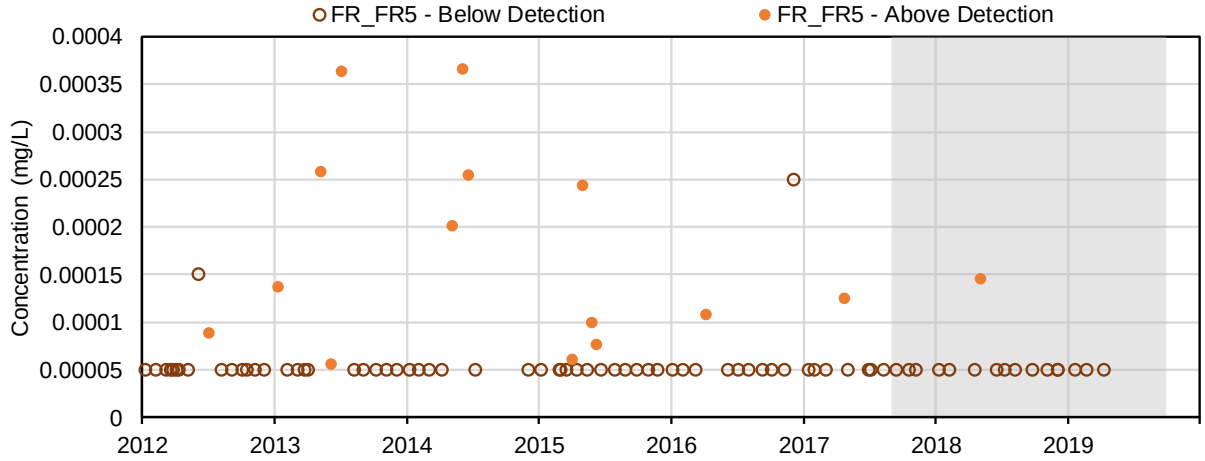
(51) Copper (mg/L); Total Metals



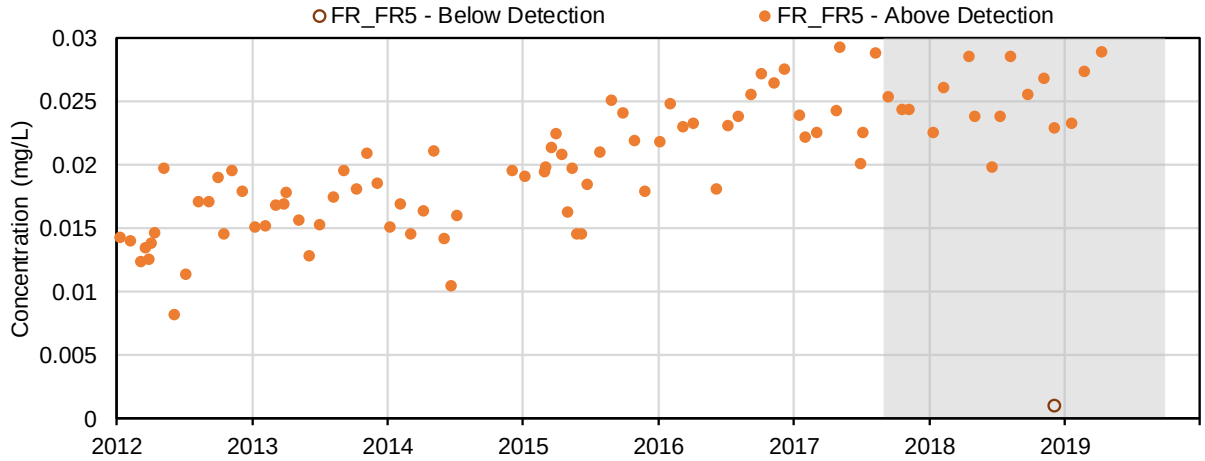
(52) Iron (mg/L); Total Metals



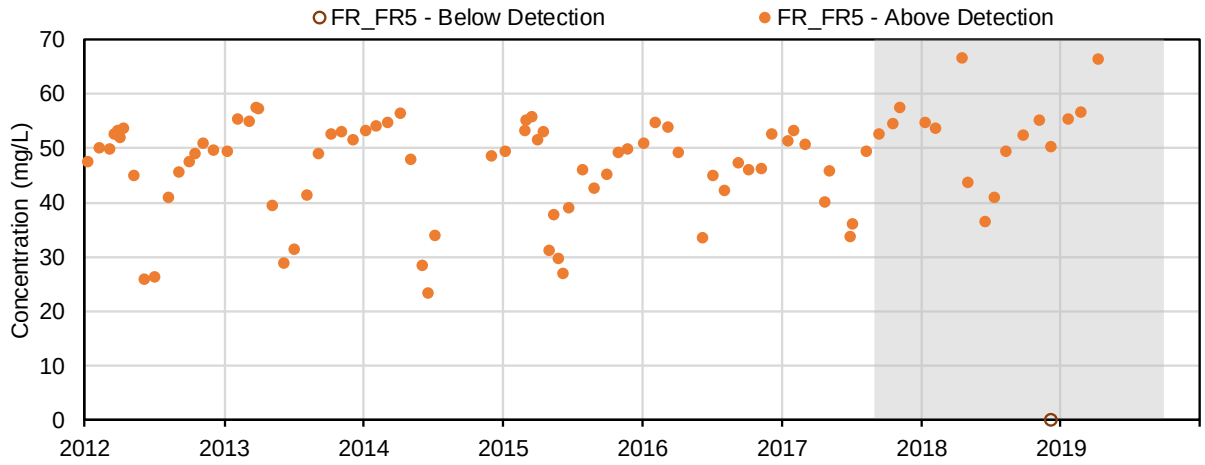
(53) Lead (mg/L); Total Metals



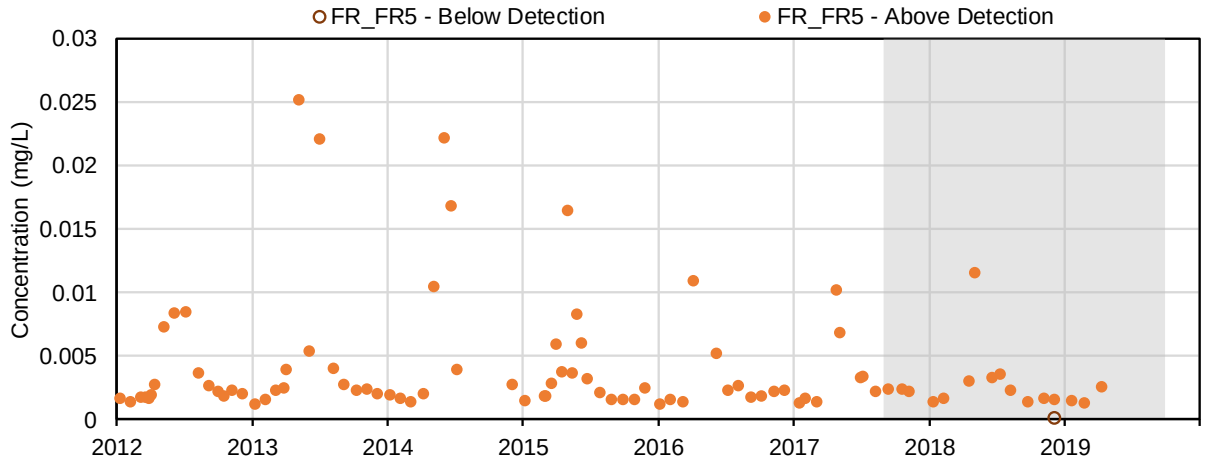
(54) Lithium (mg/L); Total Metals



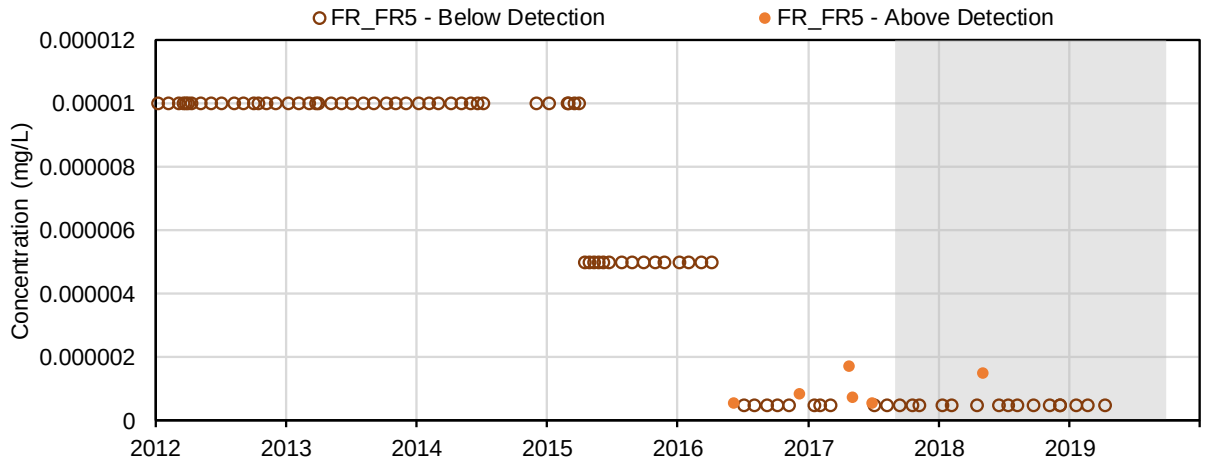
(55) Magnesium (mg/L); Total Metals



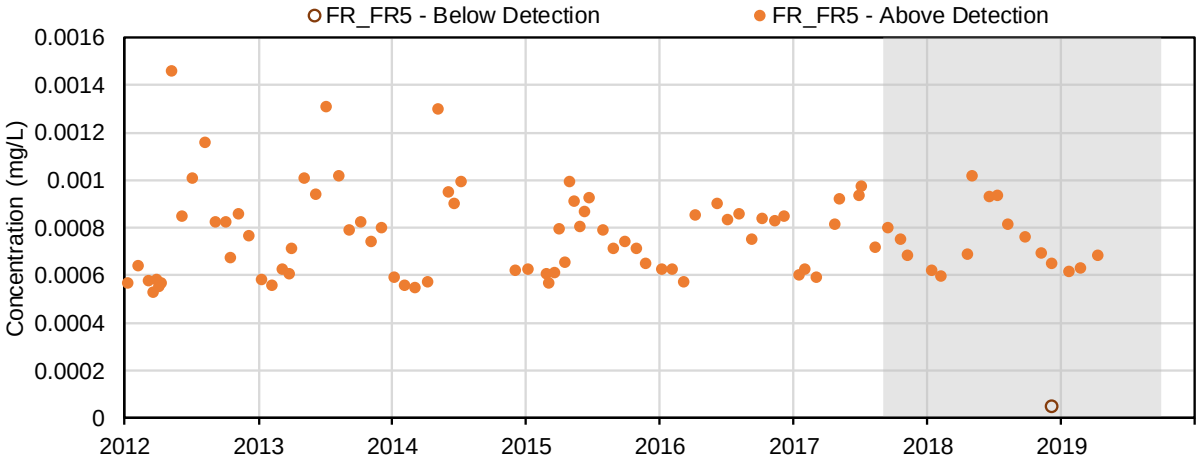
(56) Manganese (mg/L); Total Metals



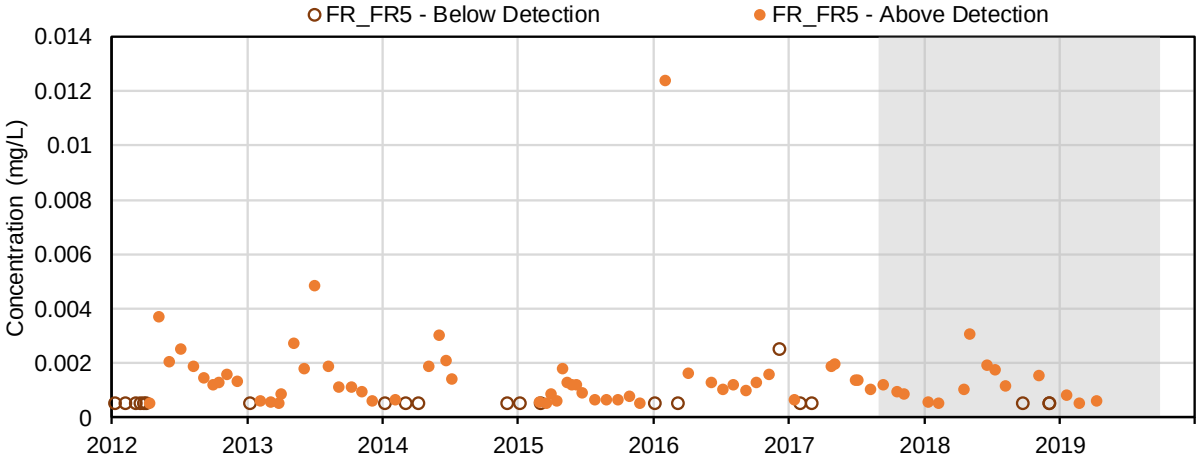
(57) Mercury (mg/L); Total Metals



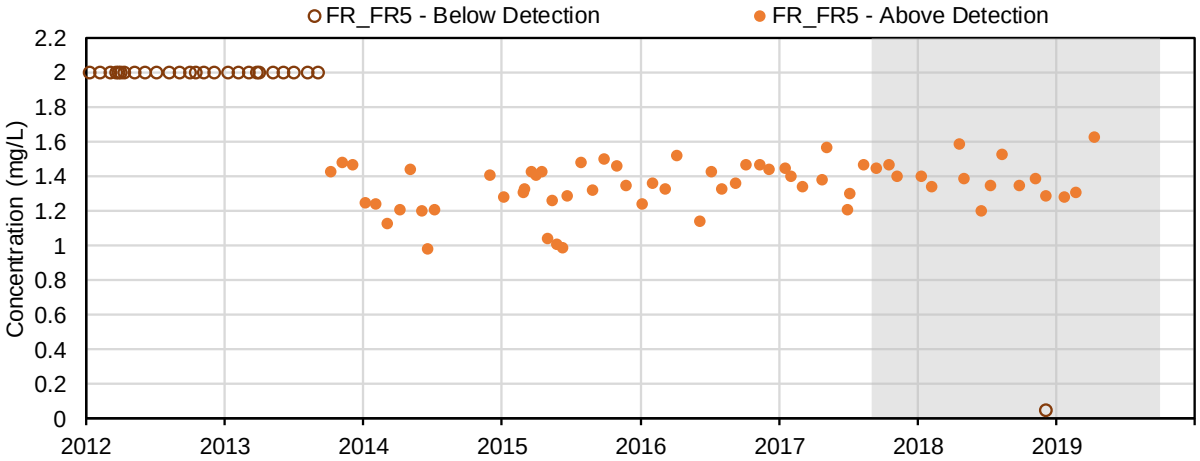
(58) Molybdenum (mg/L); Total Metals



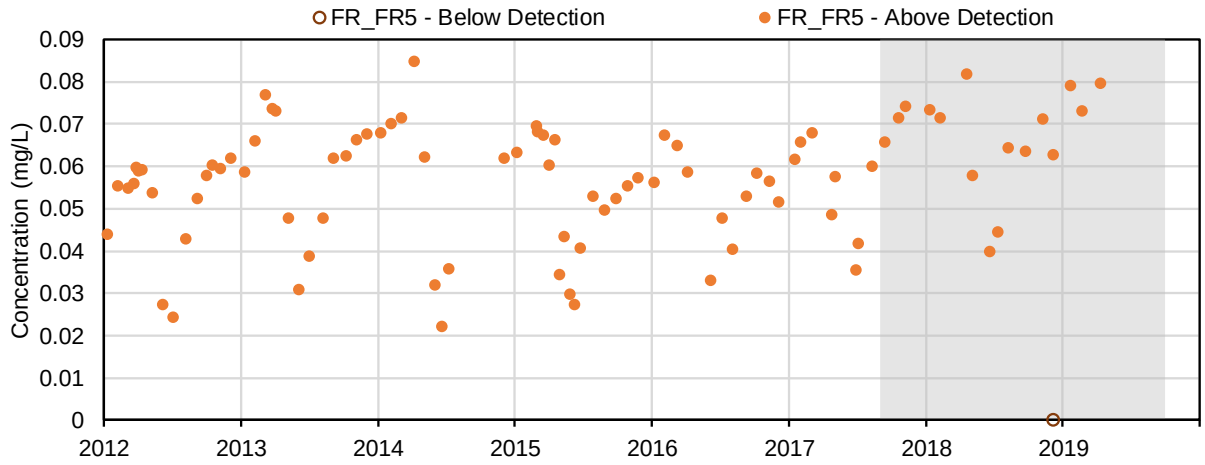
(59) Nickel (mg/L); Total Metals



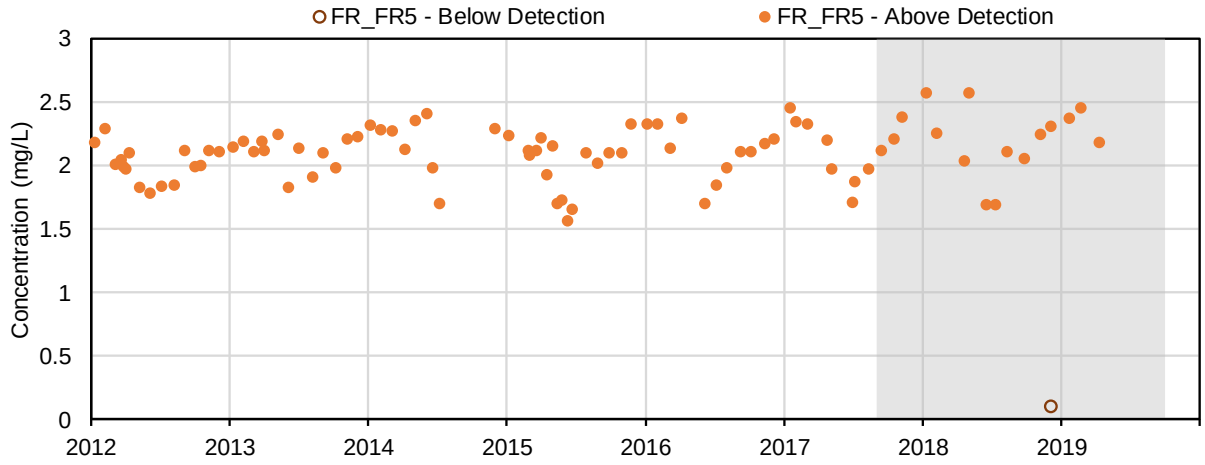
(60) Potassium (mg/L); Total Metals



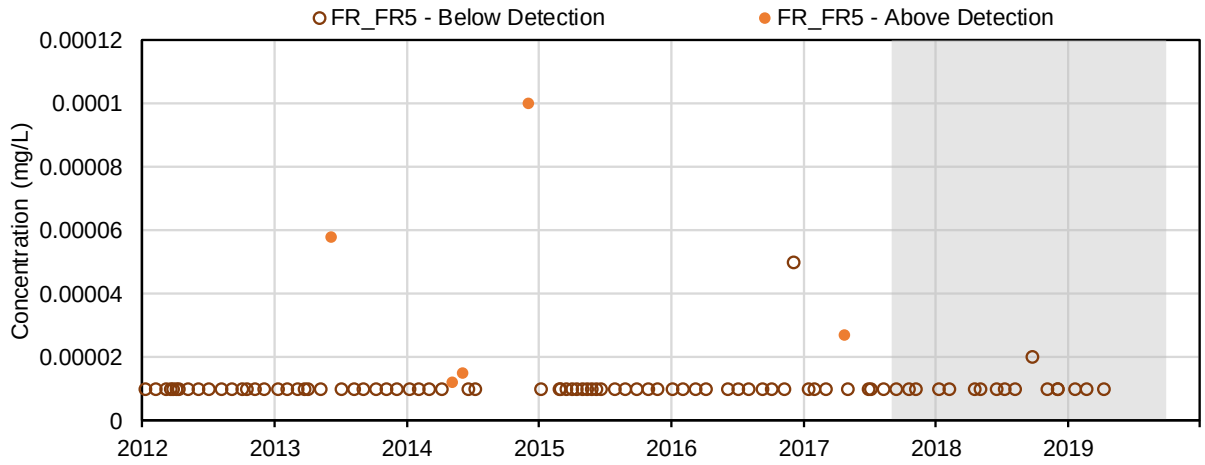
(61) Selenium (mg/L); Total Metals



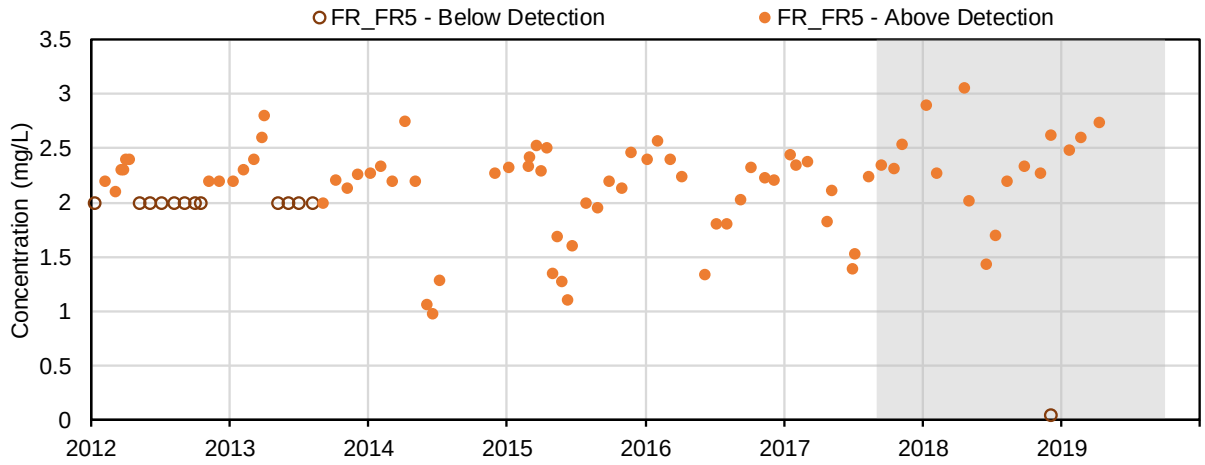
(62) Silicon (mg/L); Total Metals



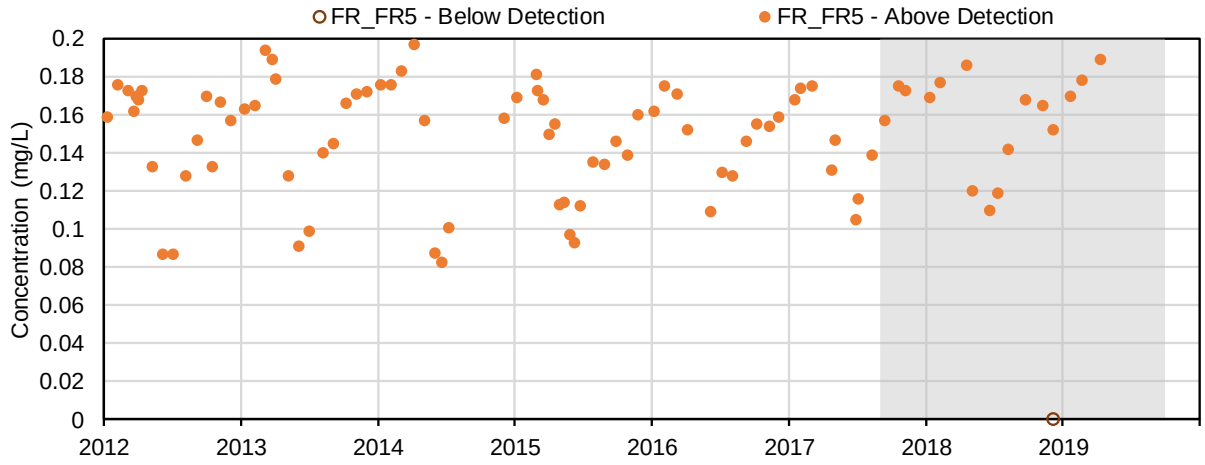
(63) Silver (mg/L); Total Metals



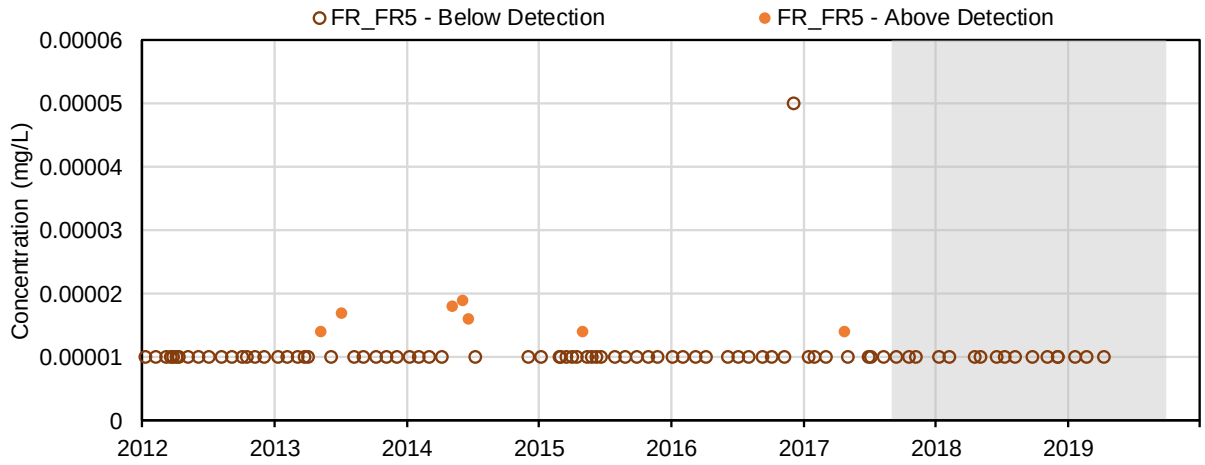
(64) Sodium (mg/L); Total Metals



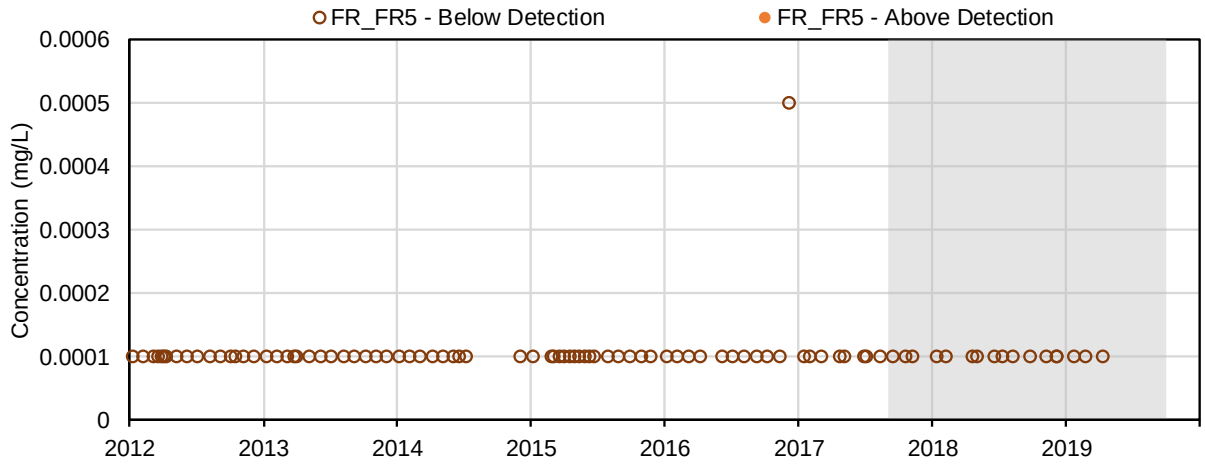
(65) Strontium (mg/L); Total Metals



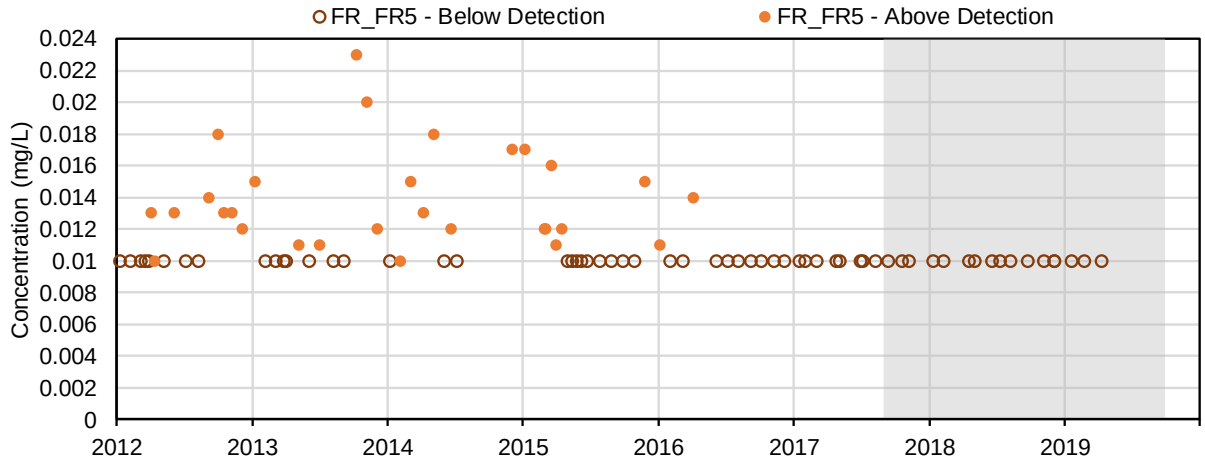
(66) Thallium (mg/L); Total Metals



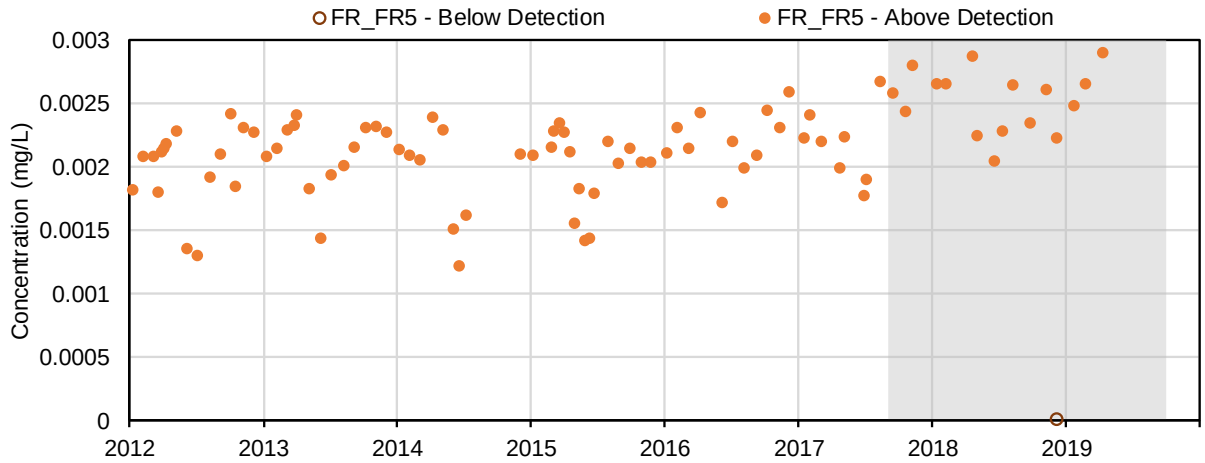
(67) Tin (mg/L); Total Metals



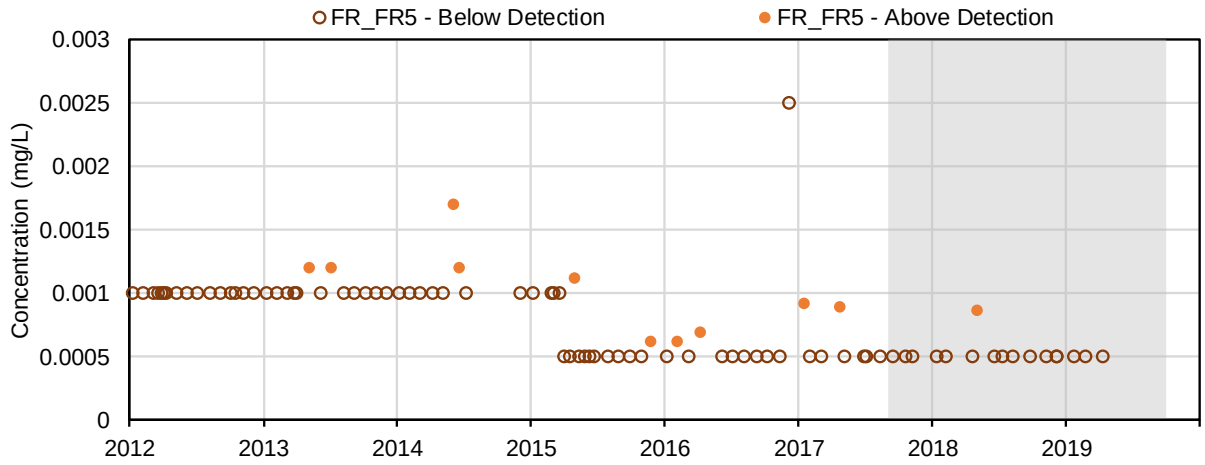
(68) Titanium (mg/L); Total Metals



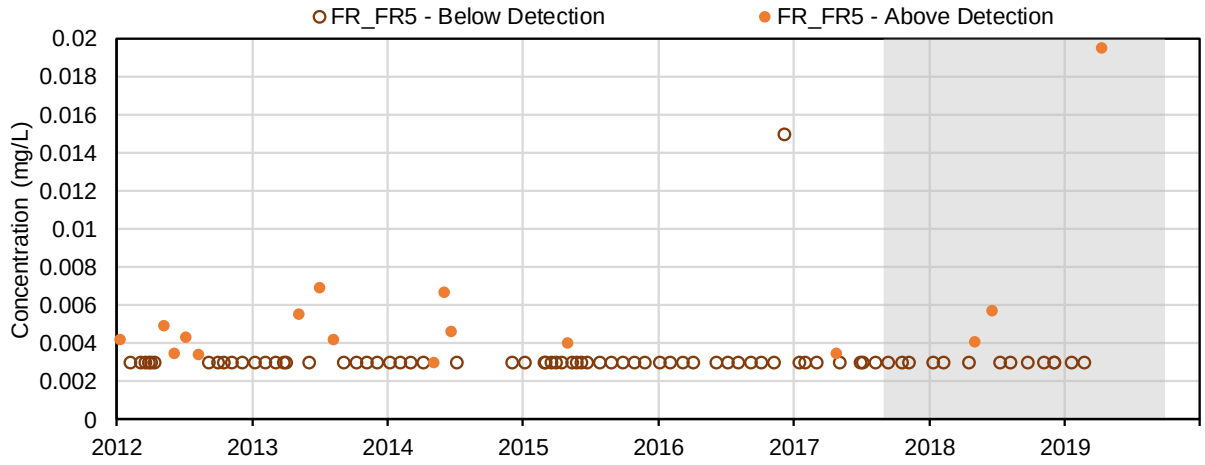
(69) Uranium (mg/L); Total Metals



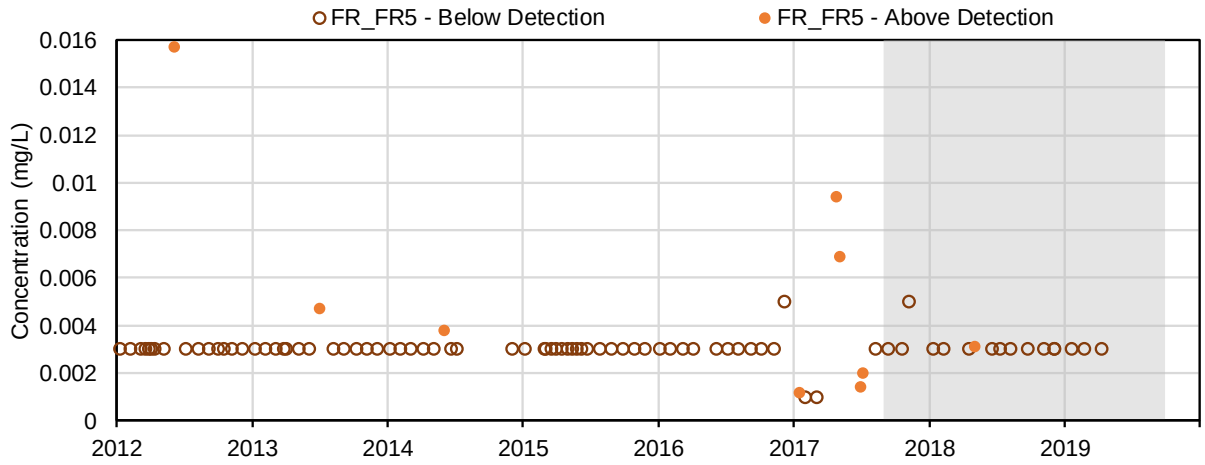
(70) Vanadium (mg/L); Total Metals



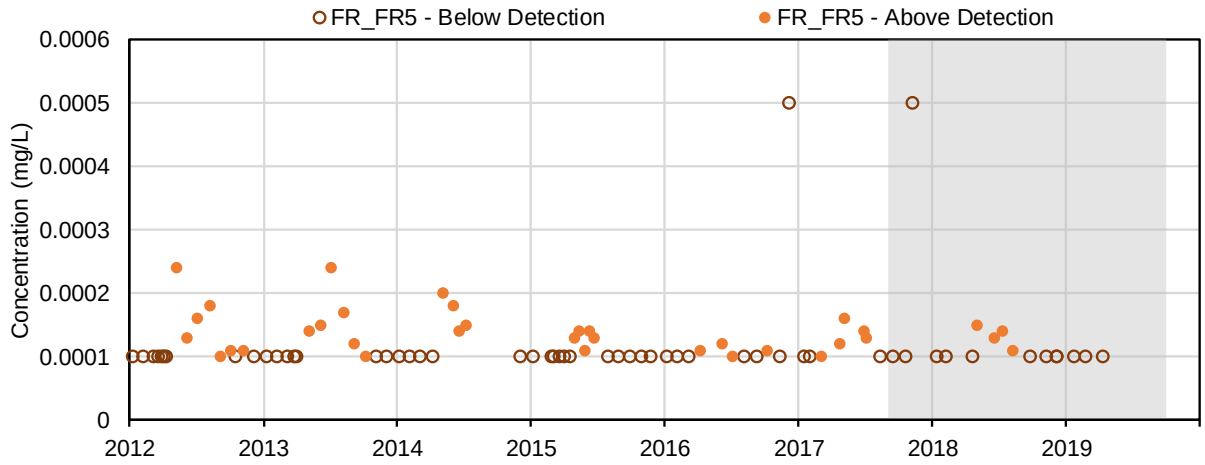
(71) Zinc (mg/L); Total Metals



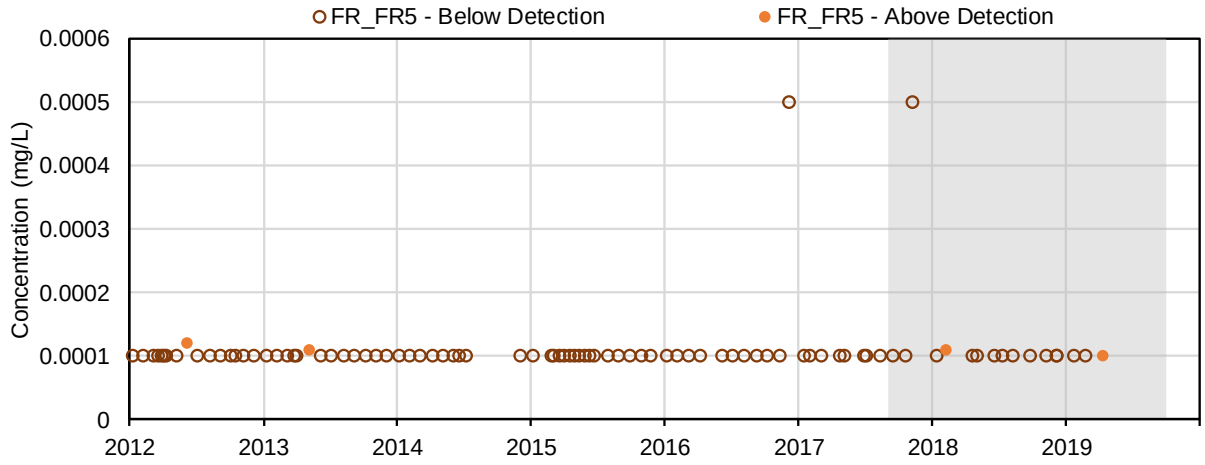
(72) Aluminum (mg/L); Dissolved Metals



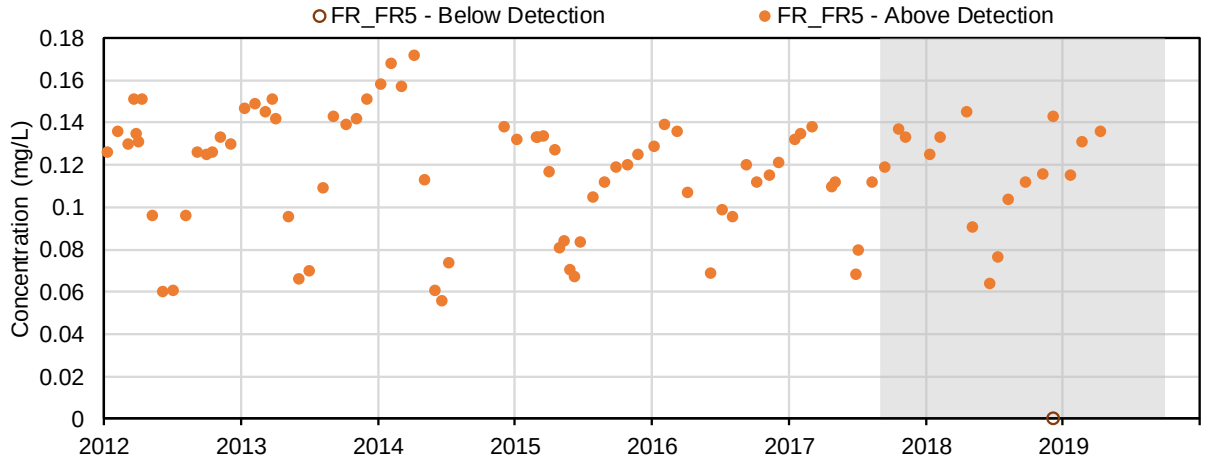
(73) Antimony (mg/L); Dissolved Metals



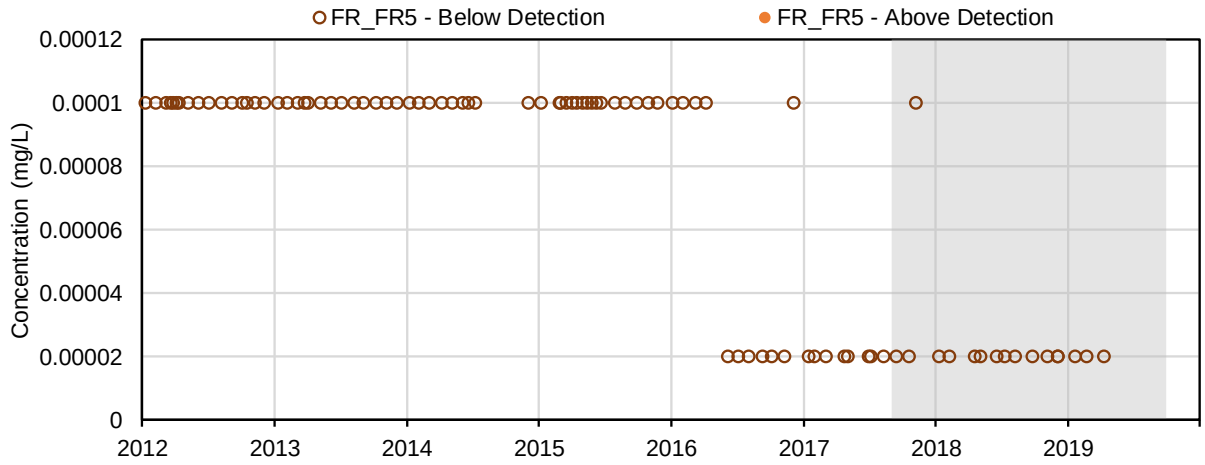
(74) Arsenic (mg/L); Dissolved Metals



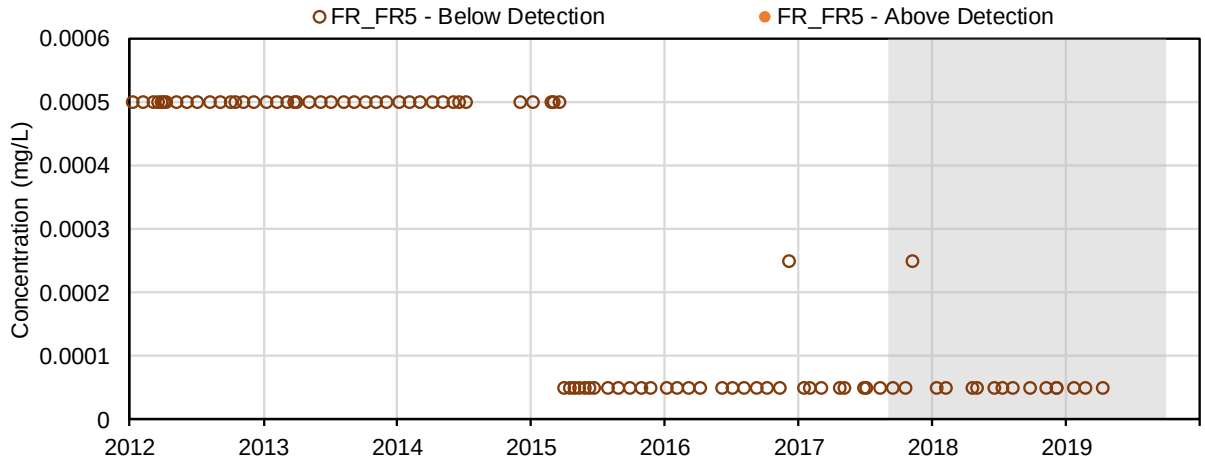
(75) Barium (mg/L); Dissolved Metals



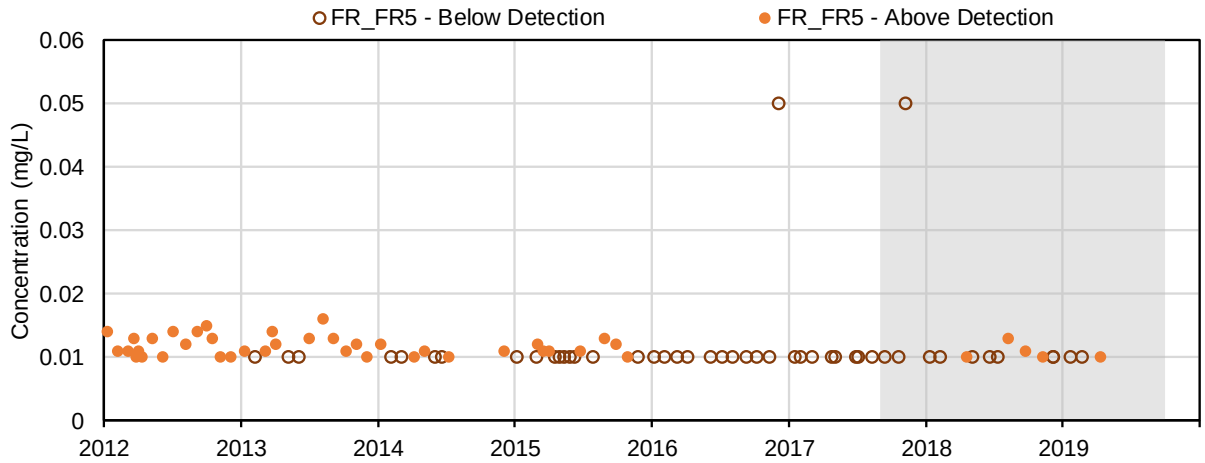
(76) Beryllium (mg/L); Dissolved Metals



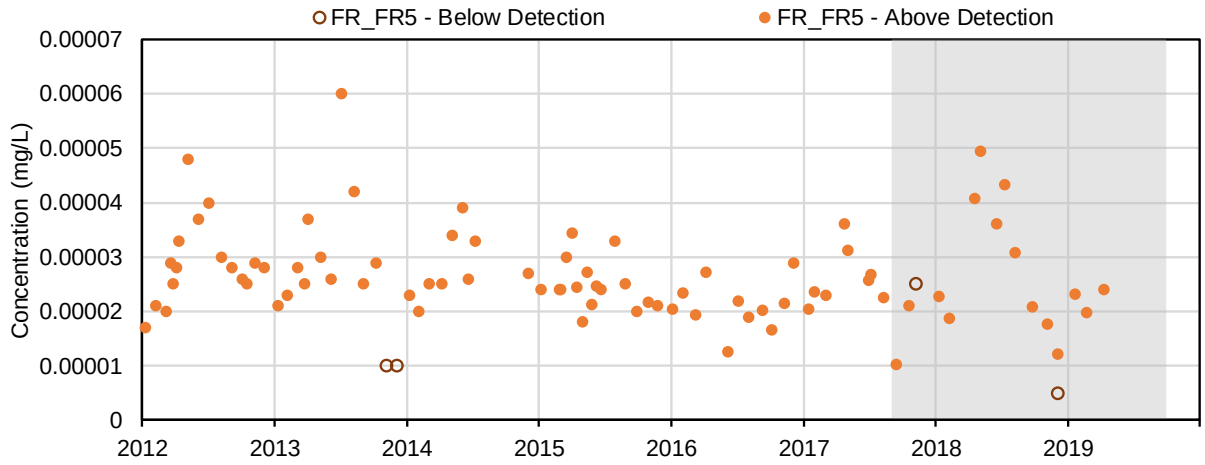
(77) Bismuth (mg/L); Dissolved Metals



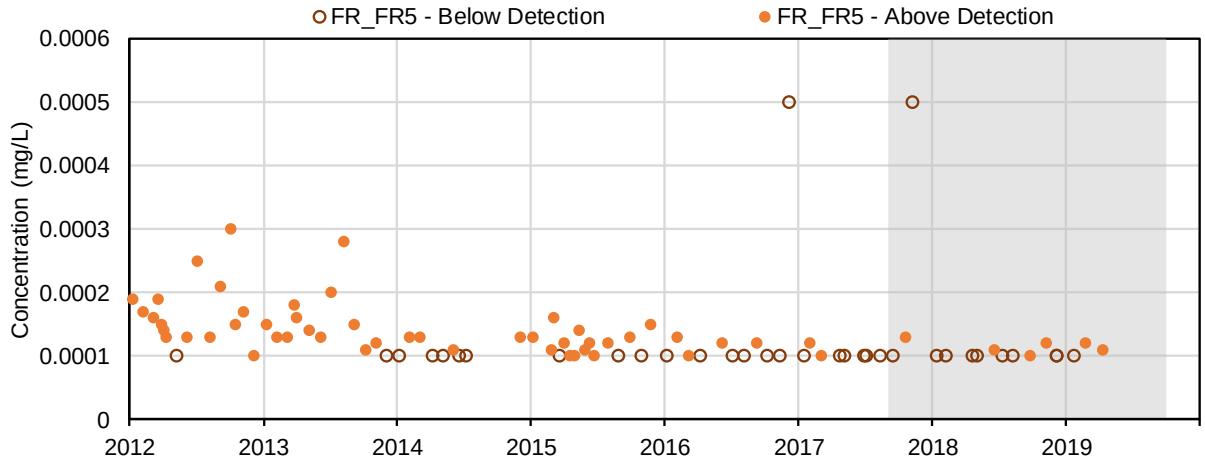
(78) Boron (mg/L); Dissolved Metals



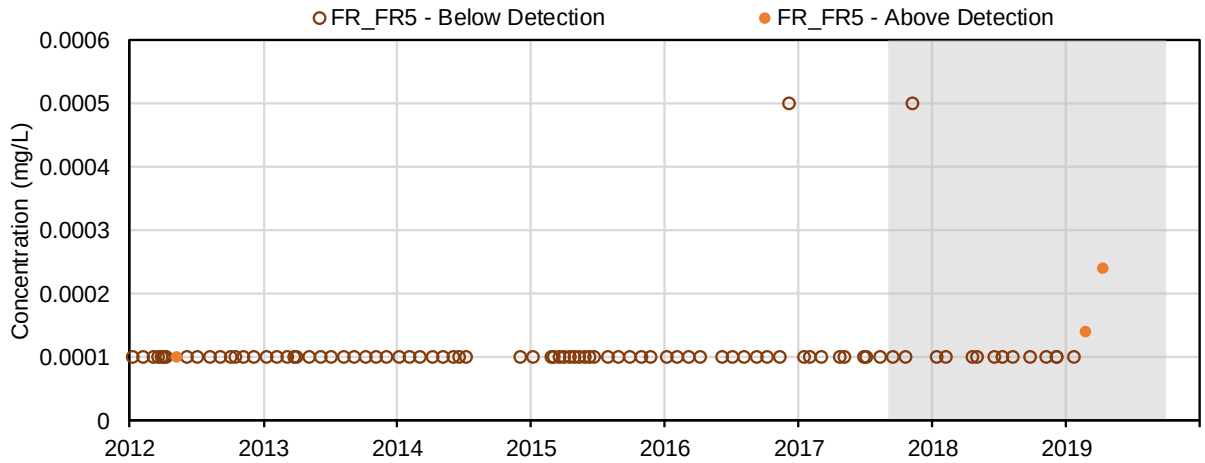
(79) Cadmium (mg/L); Dissolved Metals



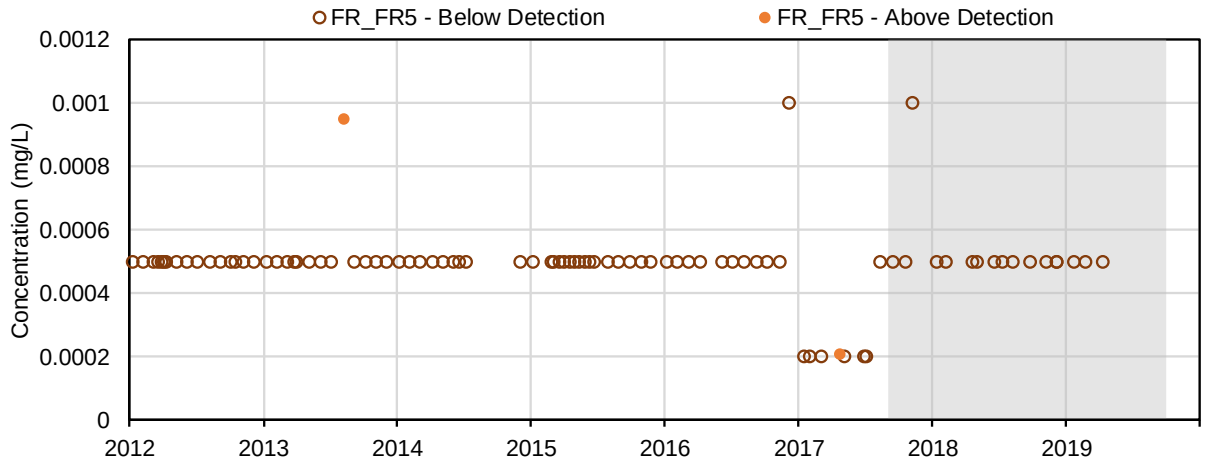
(80) Chromium (mg/L); Dissolved Metals



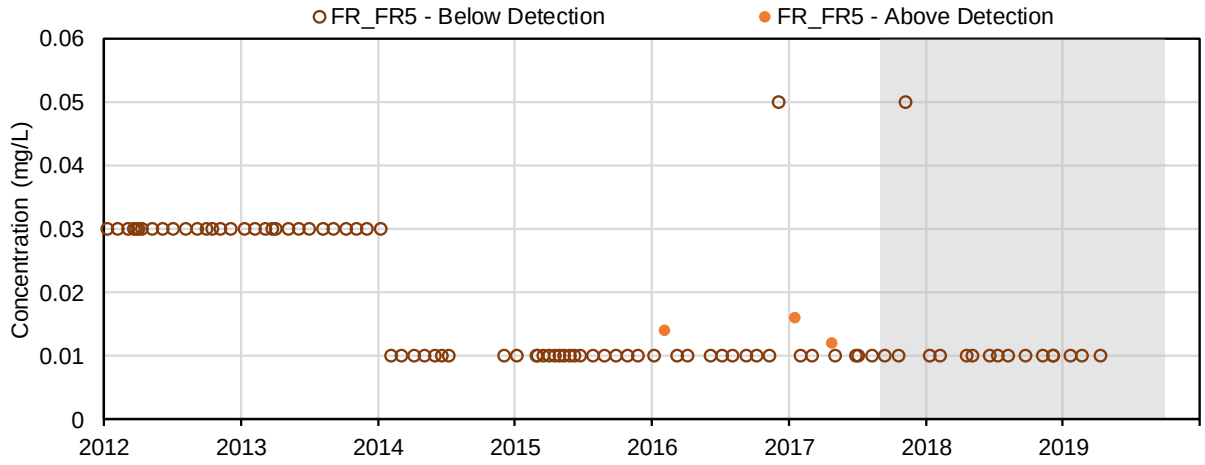
(81) Cobalt (mg/L); Dissolved Metals



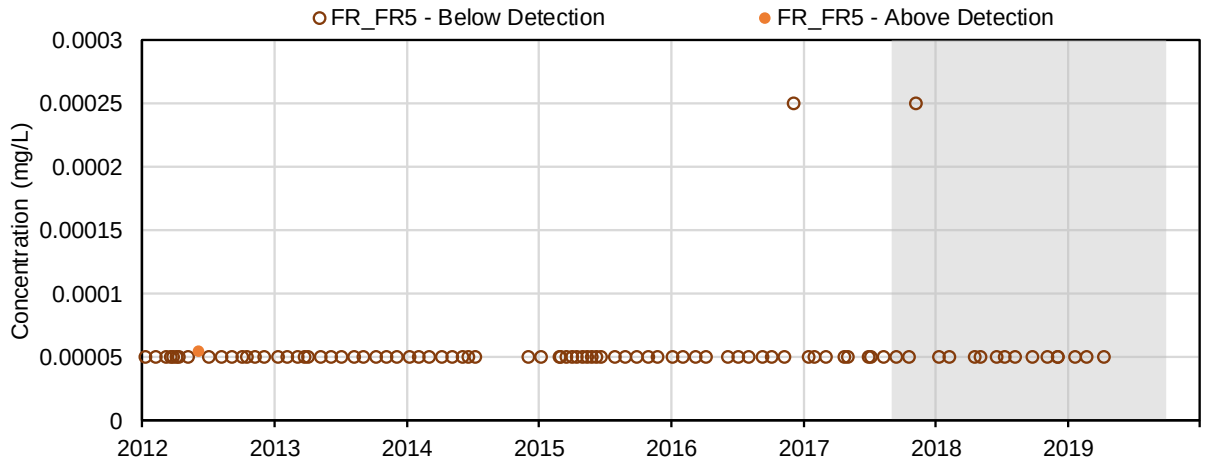
(82) Copper (mg/L); Dissolved Metals



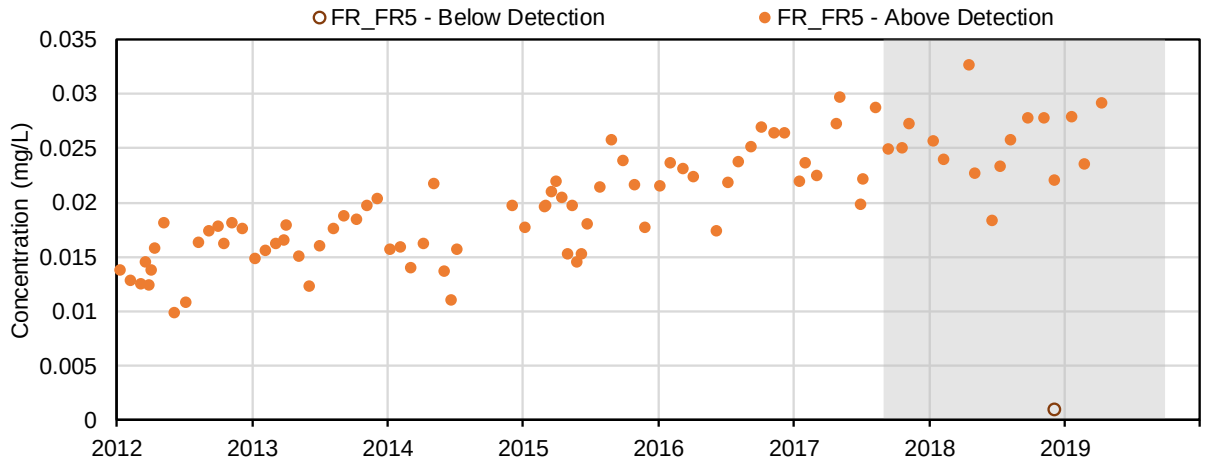
(83) Iron (mg/L); Dissolved Metals



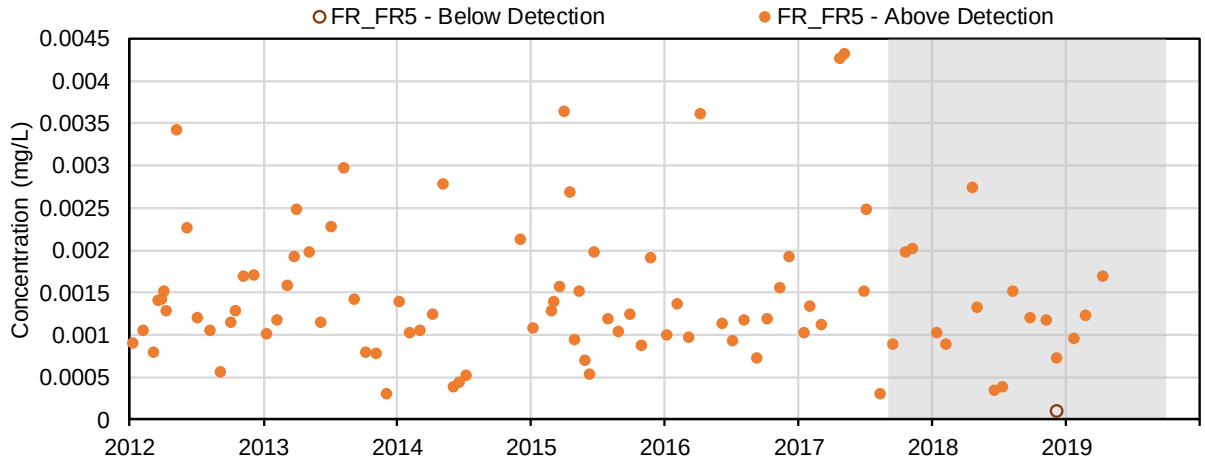
(84) Lead (mg/L); Dissolved Metals



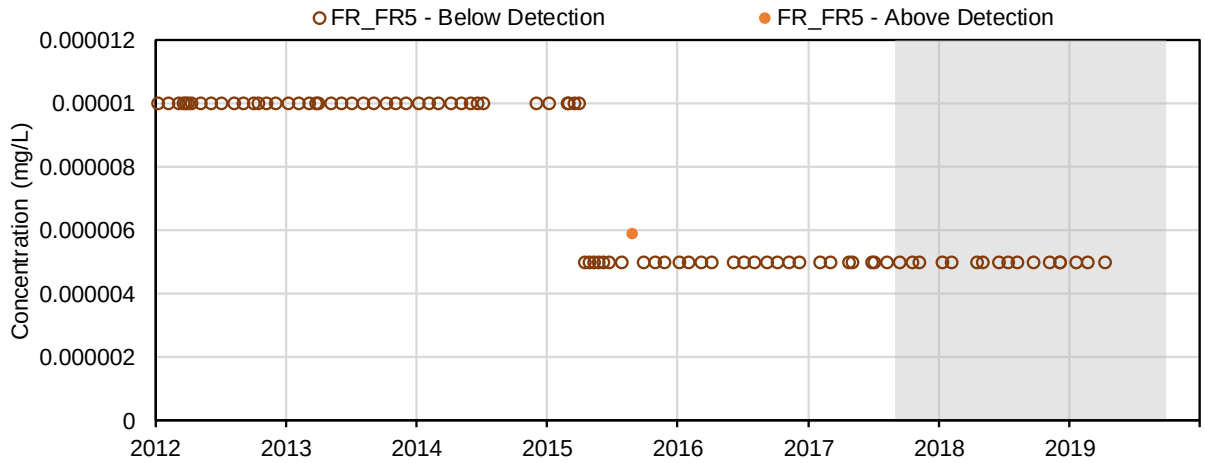
(85) Lithium (mg/L); Dissolved Metals



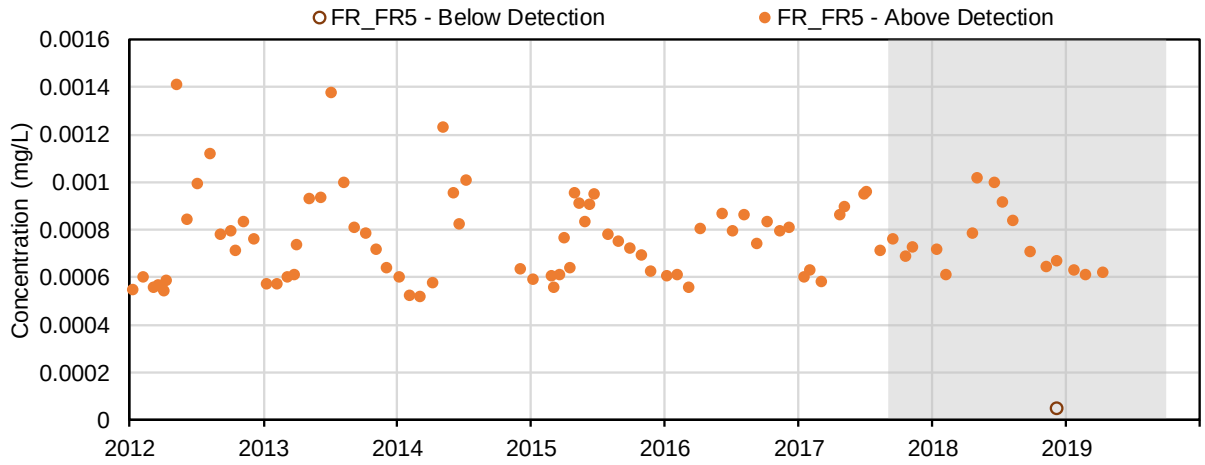
(86) Manganese (mg/L); Dissolved Metals



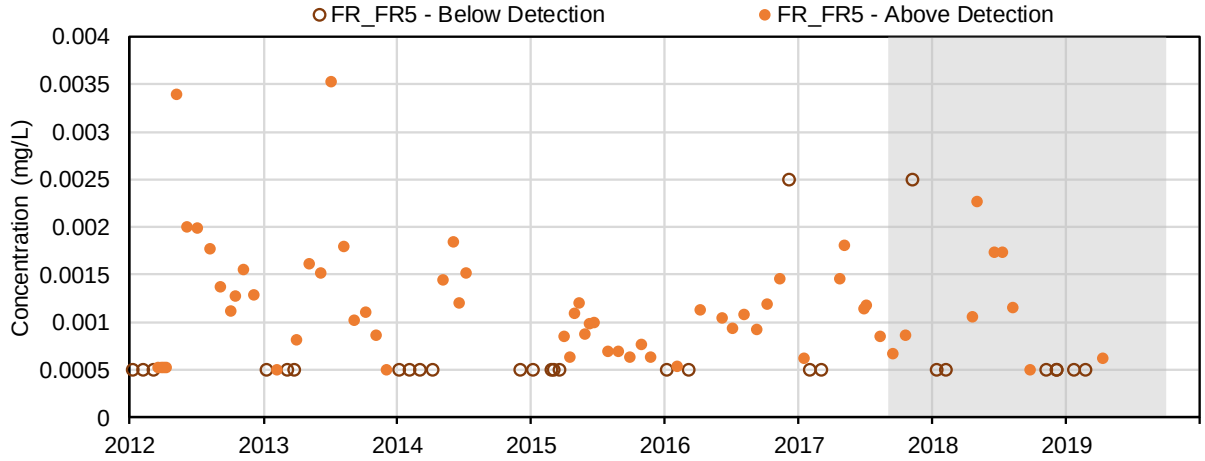
(87) Mercury (mg/L); Dissolved Metals



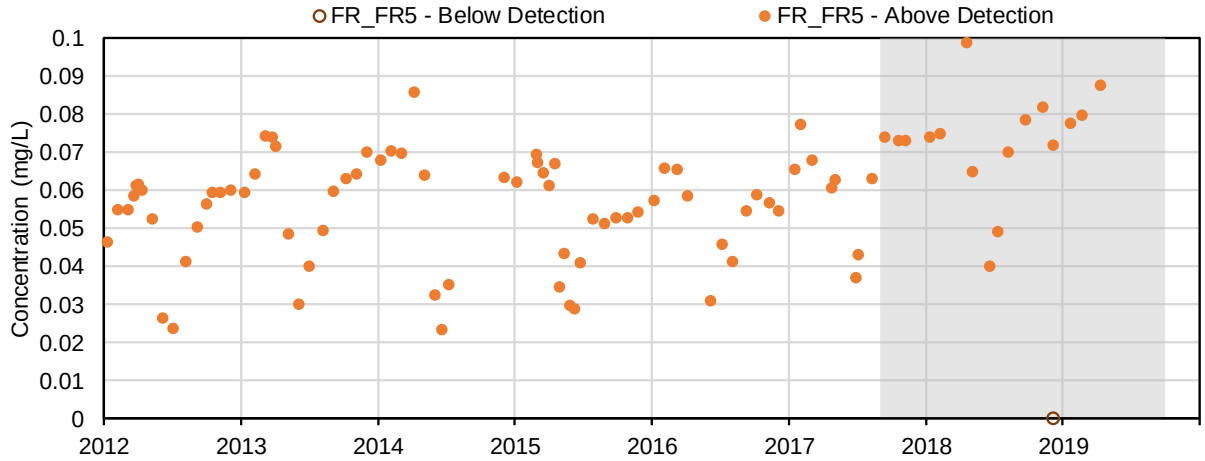
(88) Molybdenum (mg/L); Dissolved Metals



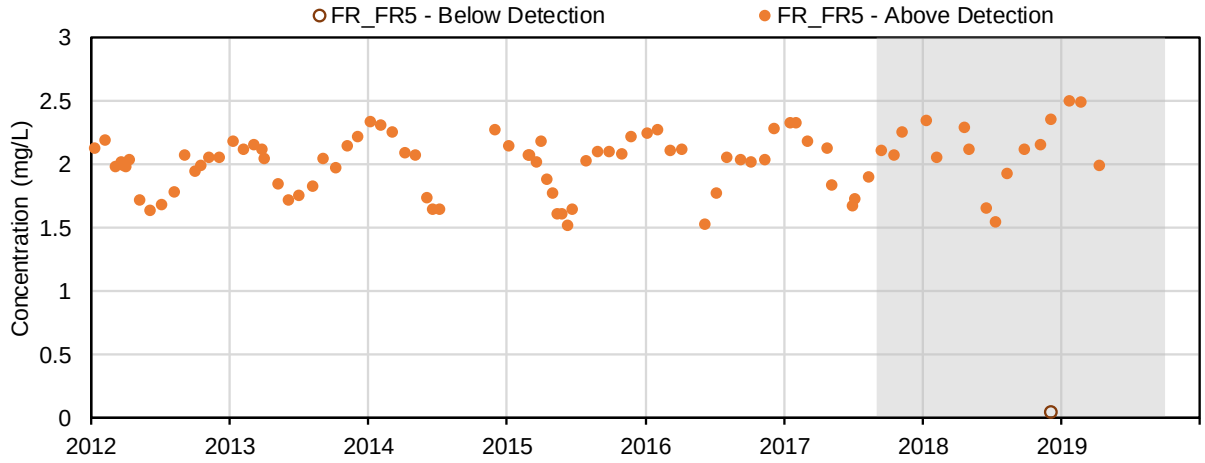
(89) Nickel (mg/L); Dissolved Metals



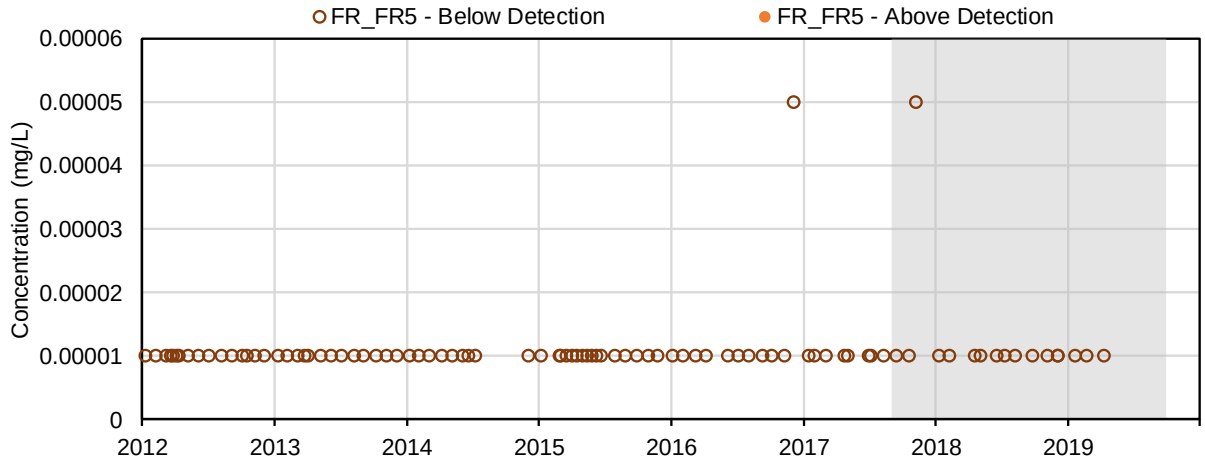
(90) Selenium (mg/L); Dissolved Metals



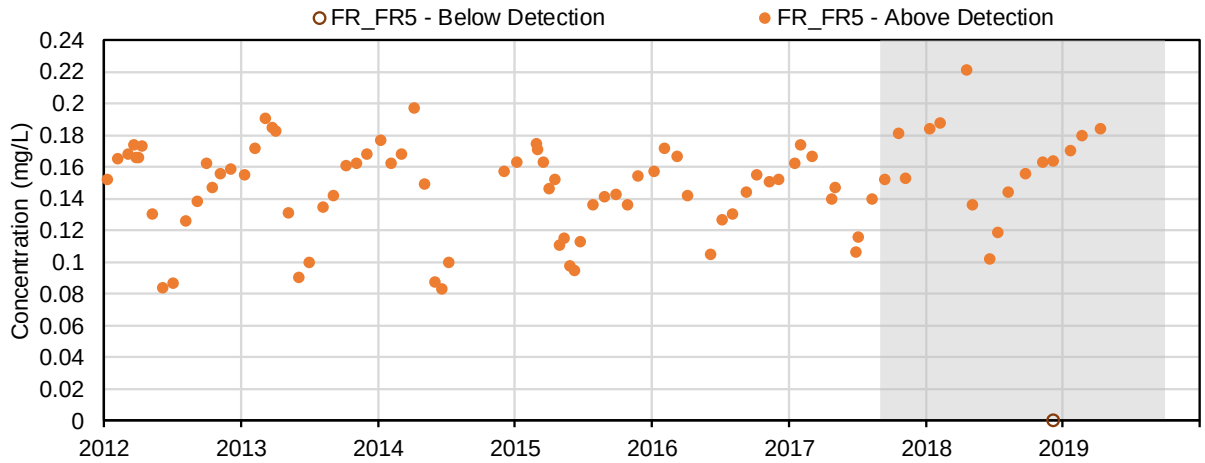
(91) Silicon (mg/L); Dissolved Metals



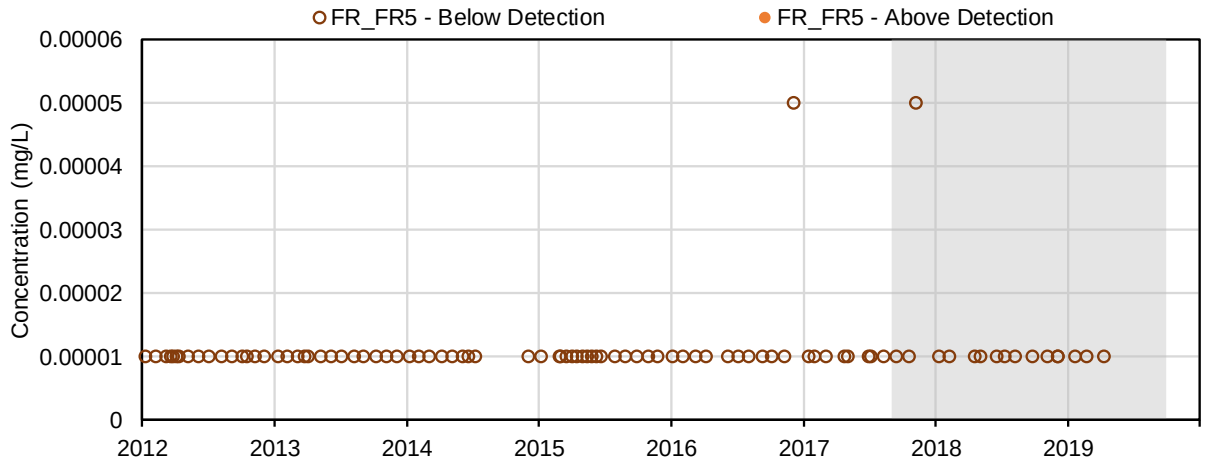
(92) Silver (mg/L); Dissolved Metals



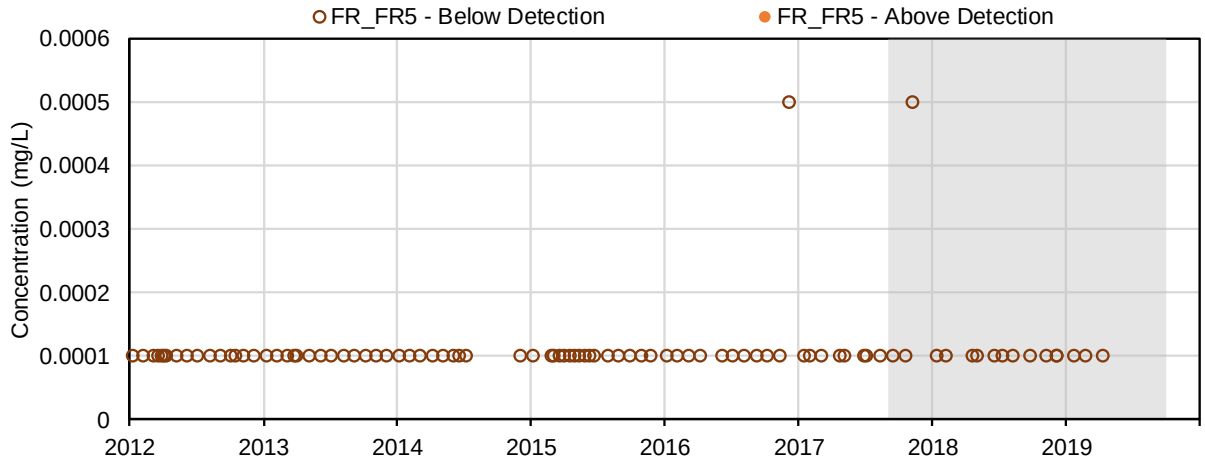
(93) Strontium (mg/L); Dissolved Metals



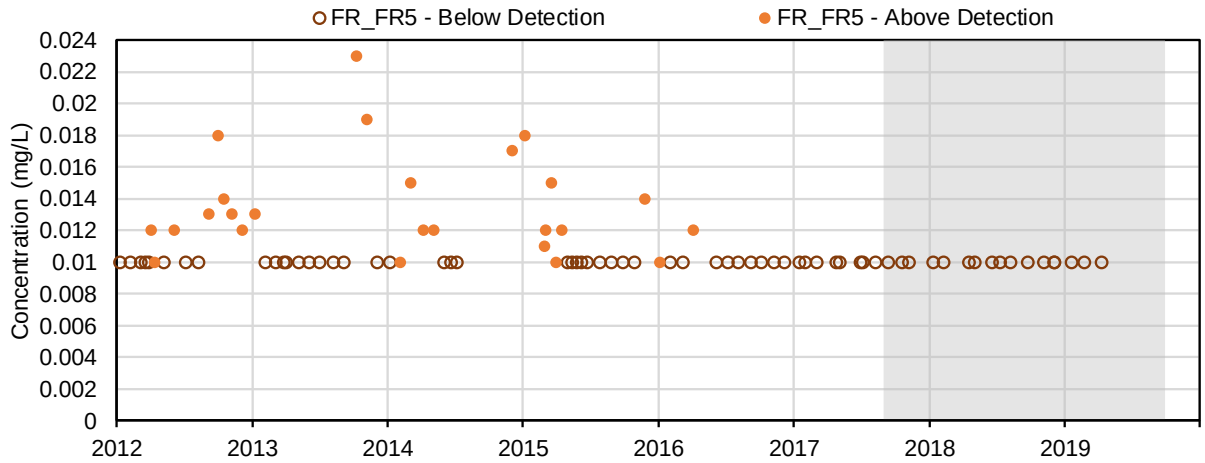
(94) Thallium (mg/L); Dissolved Metals



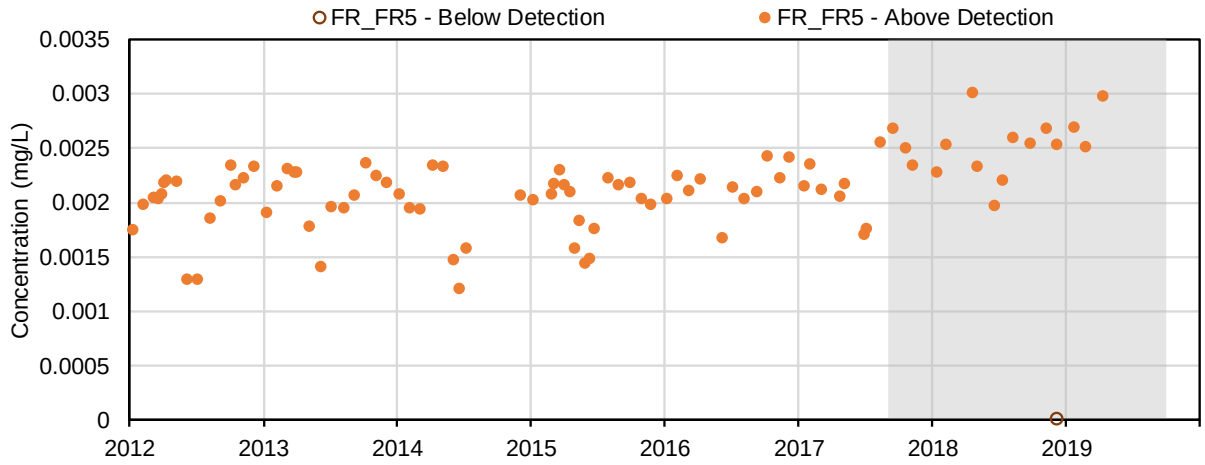
(95) Tin (mg/L); Dissolved Metals



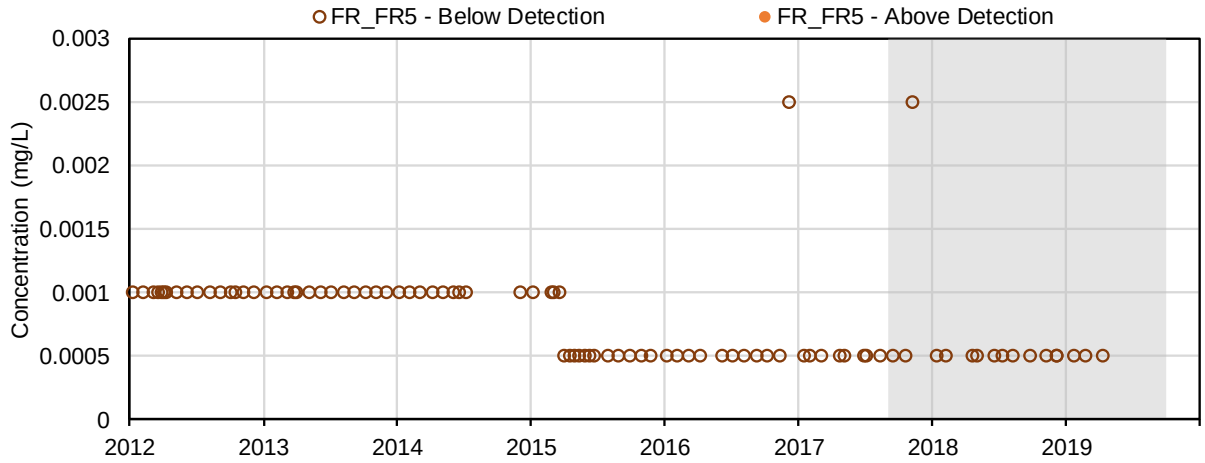
(96) Titanium (mg/L); Dissolved Metals



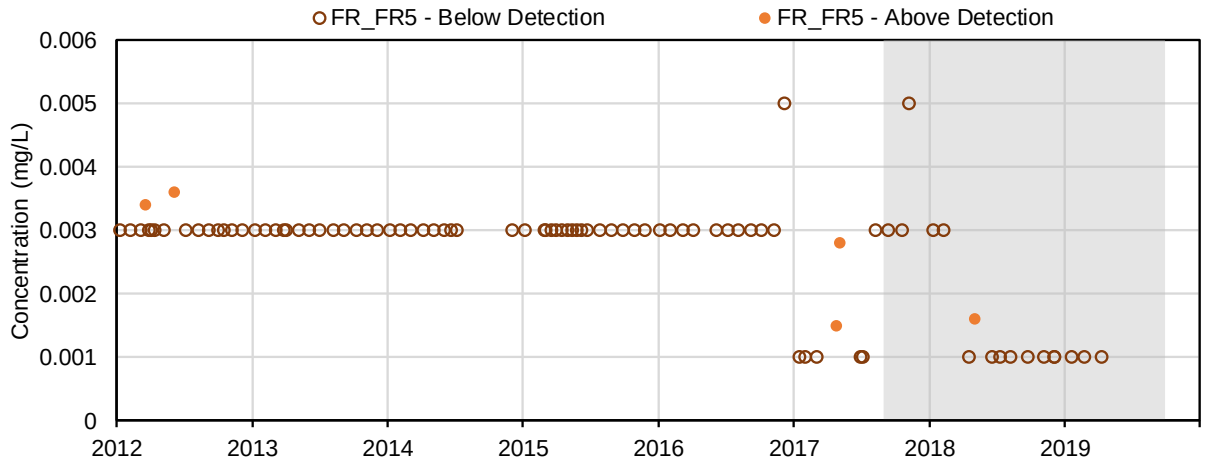
(97) Uranium (mg/L); Dissolved Metals



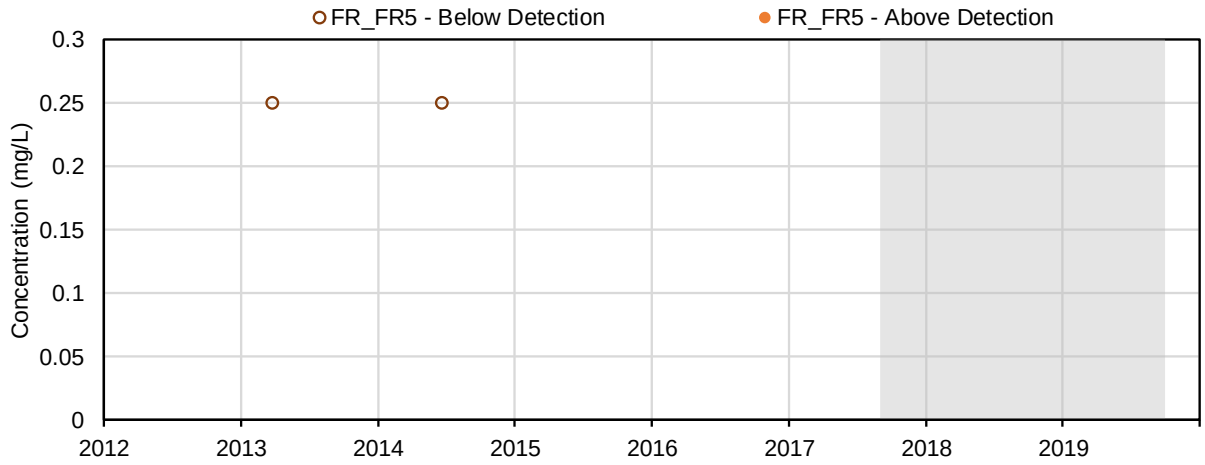
(98) Vanadium (mg/L); Dissolved Metals



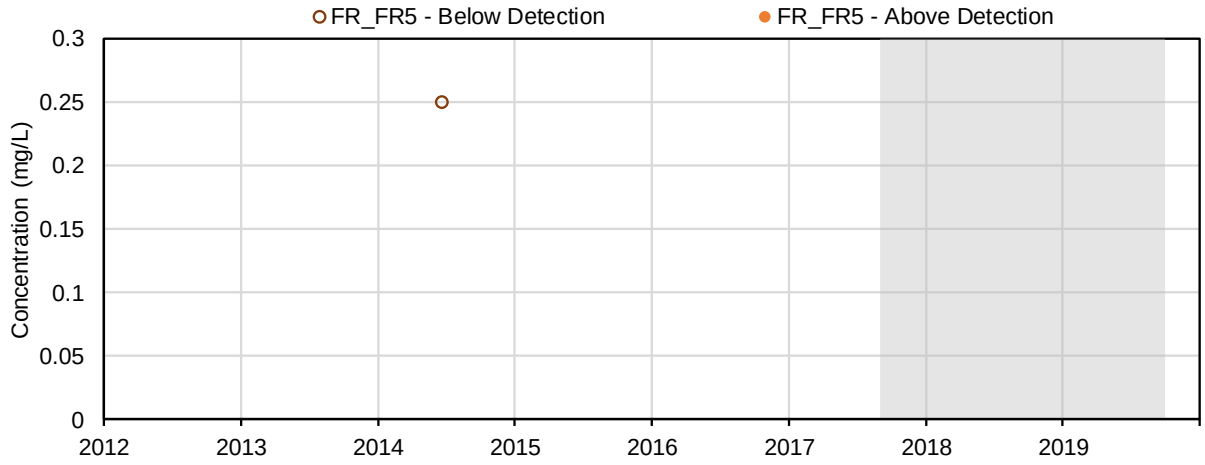
(99) Zinc (mg/L); Dissolved Metals



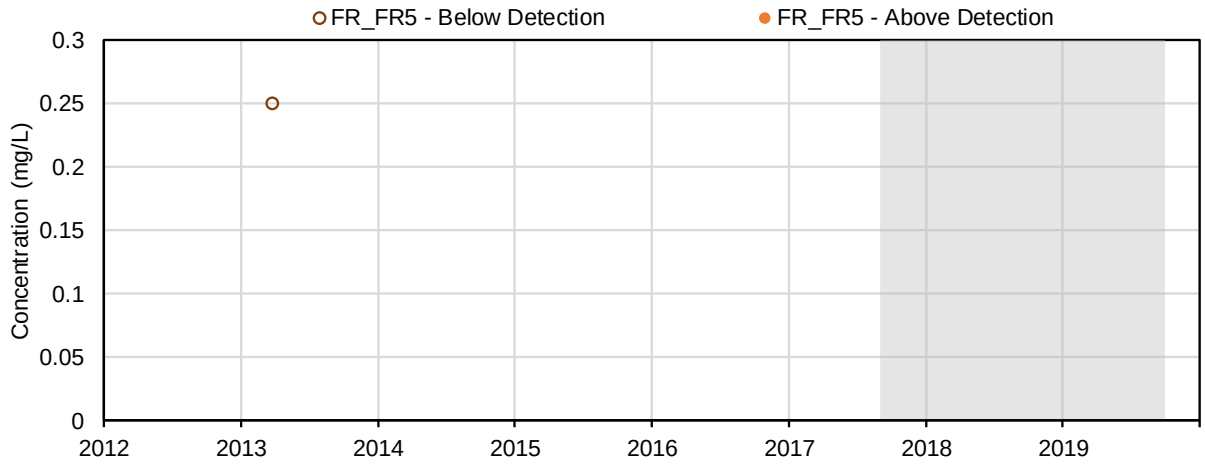
(100) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



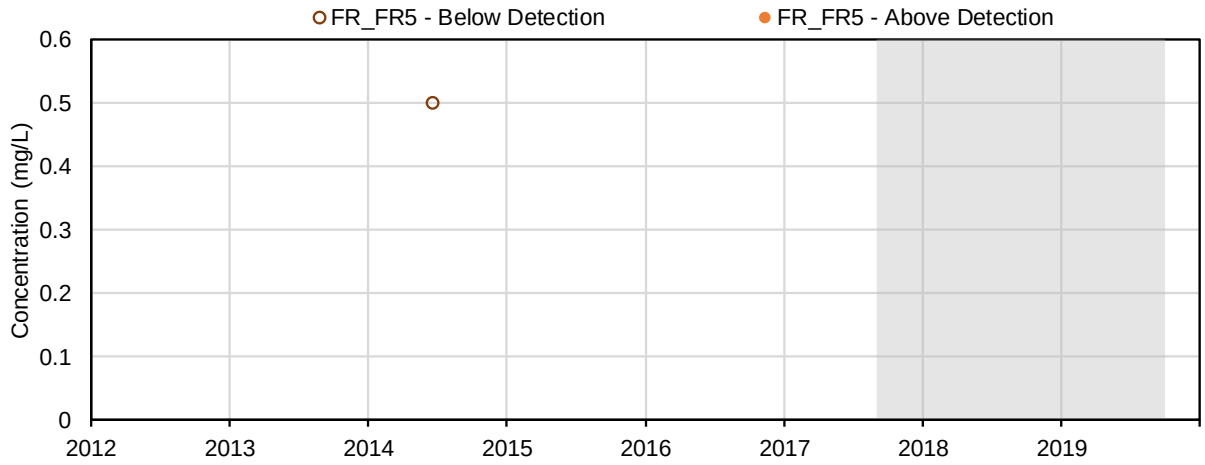
(101) Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



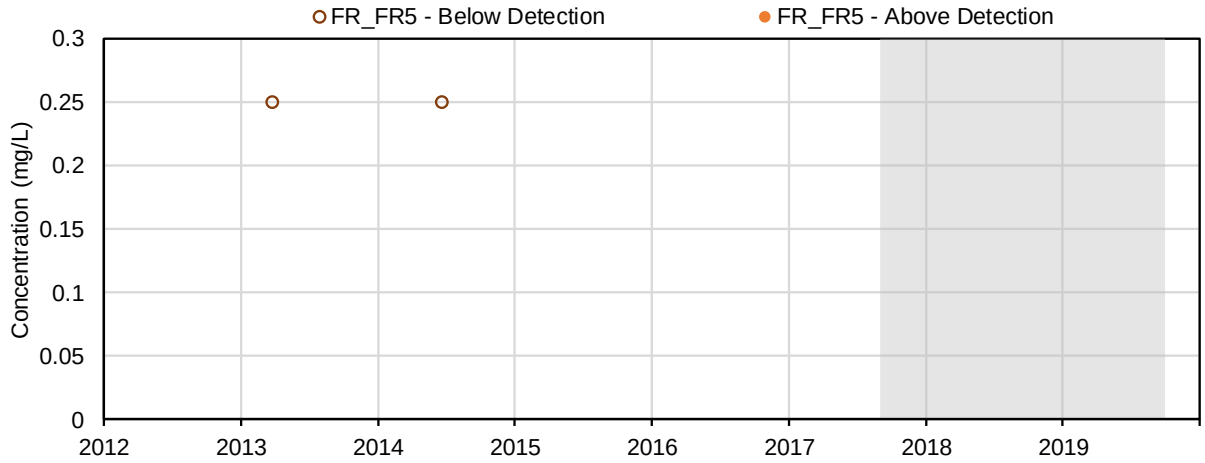
(102) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics

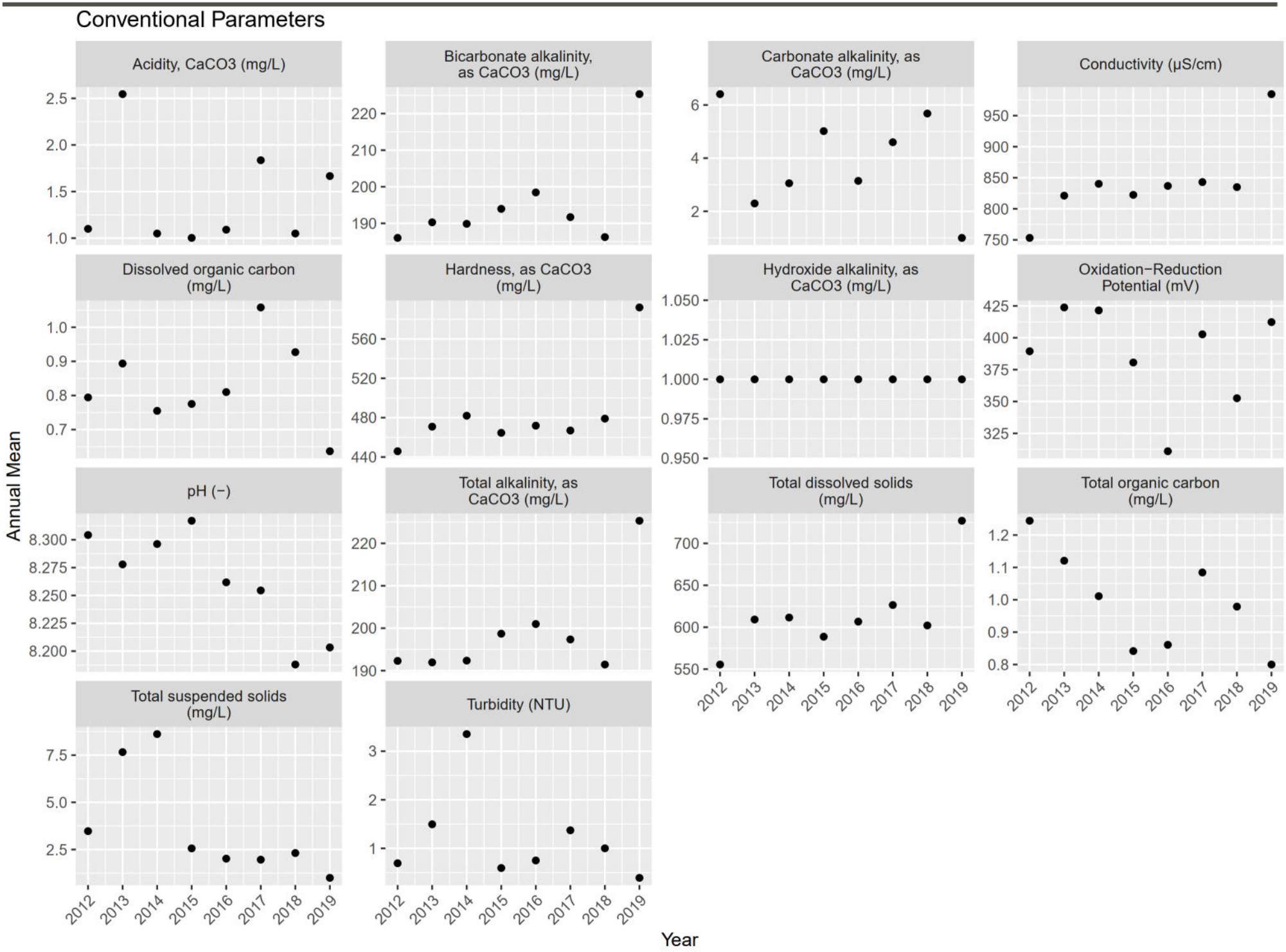


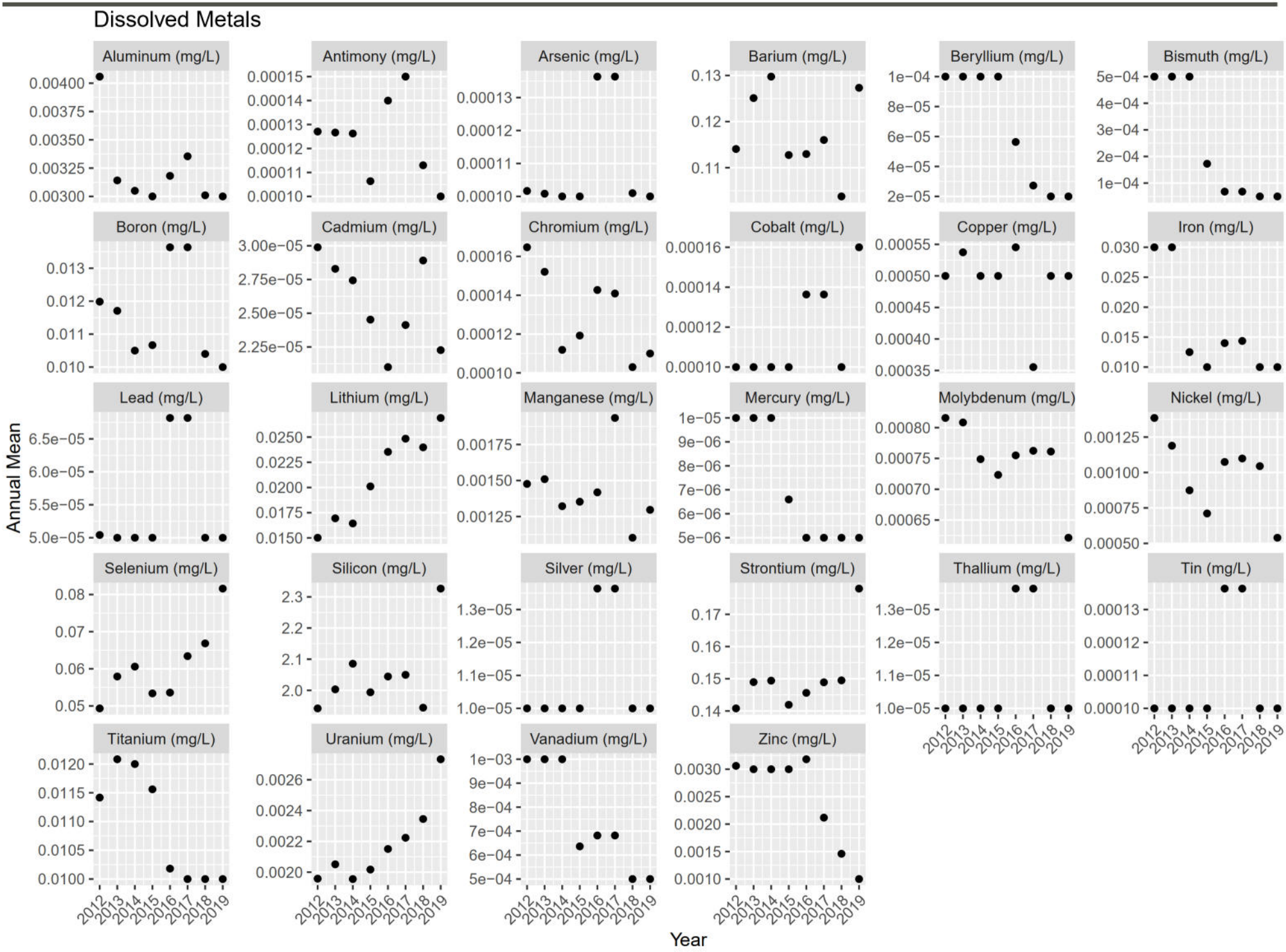
(103) Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L); Volatile Organics

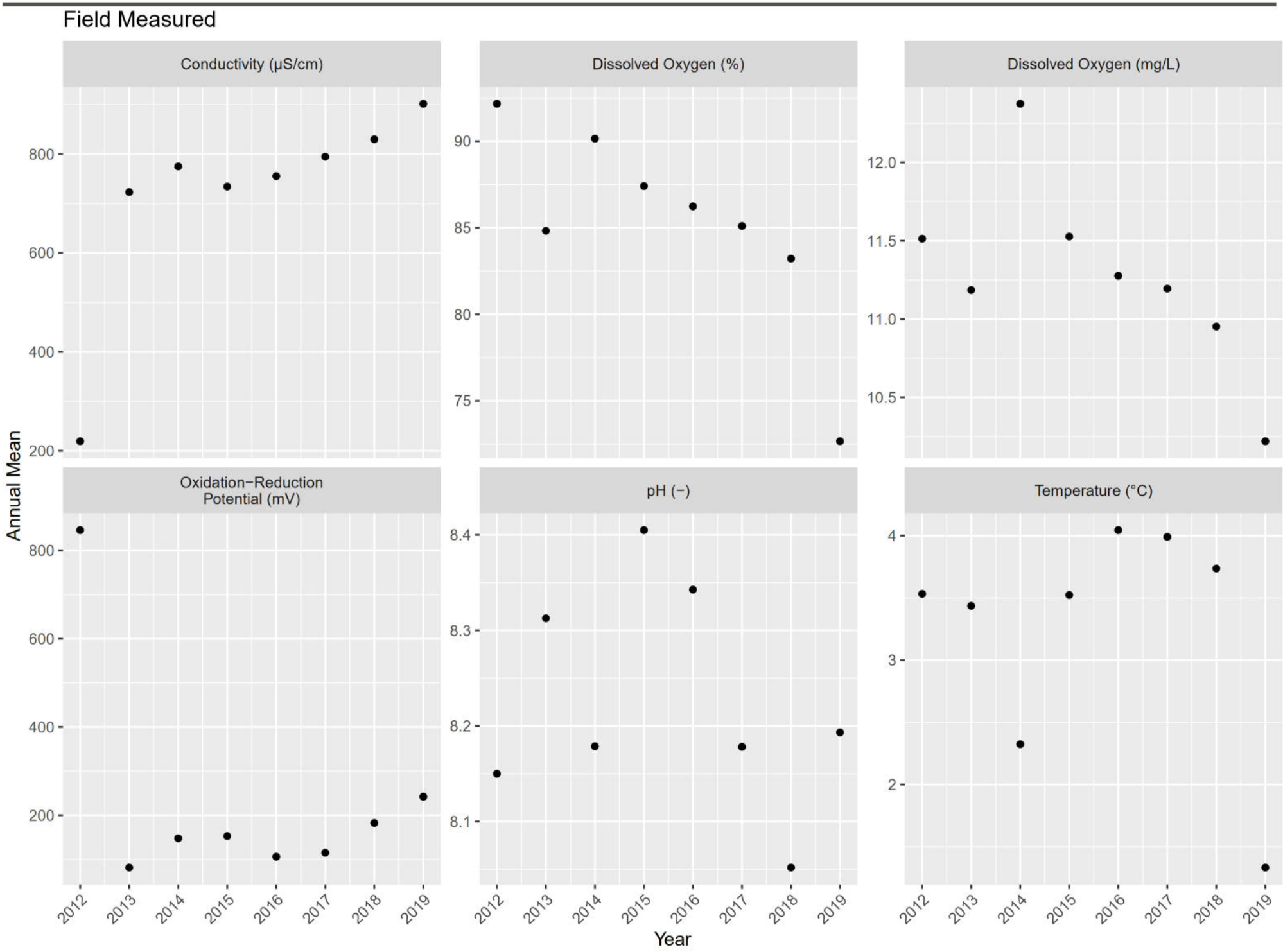


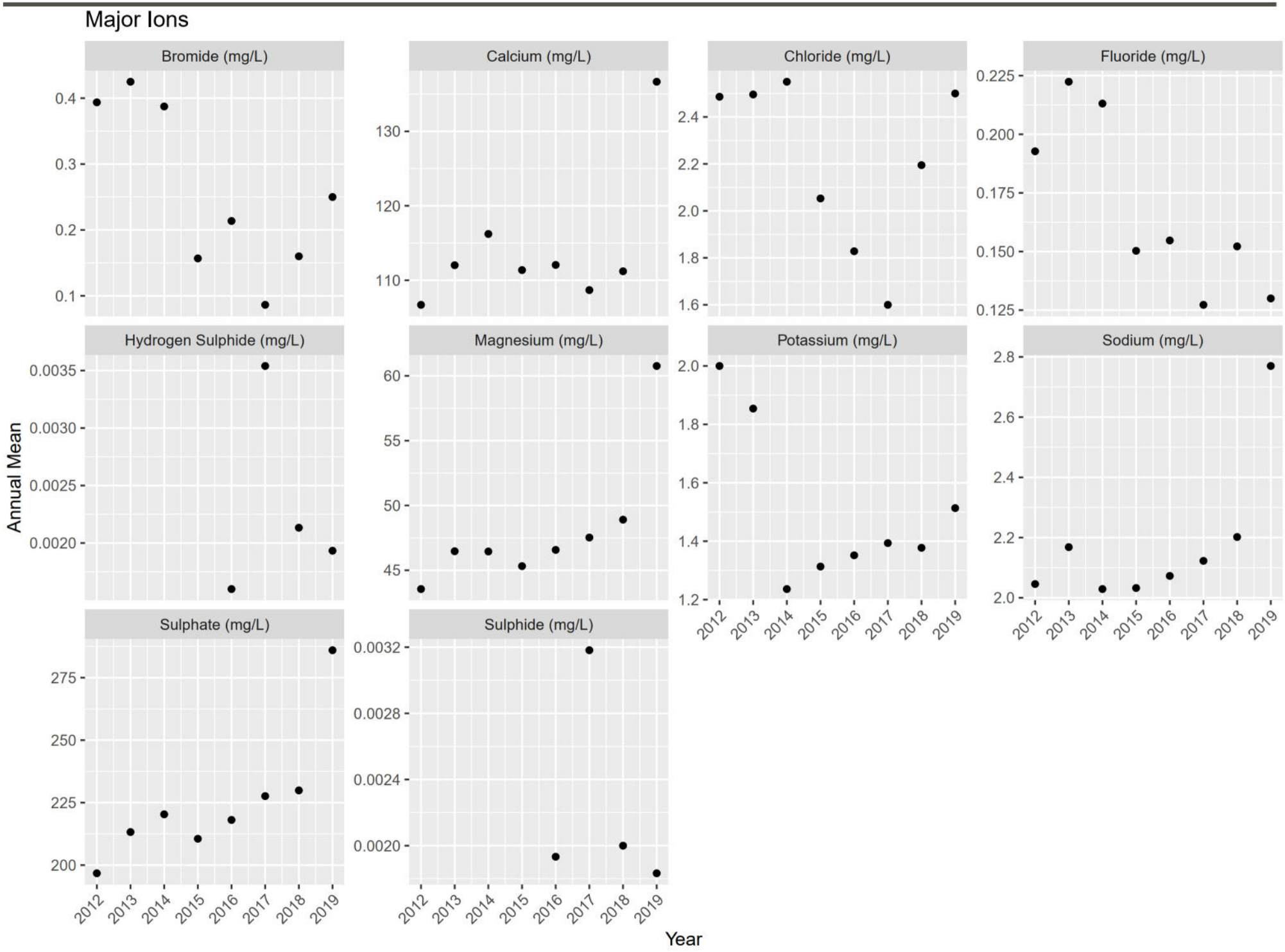
(104) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics

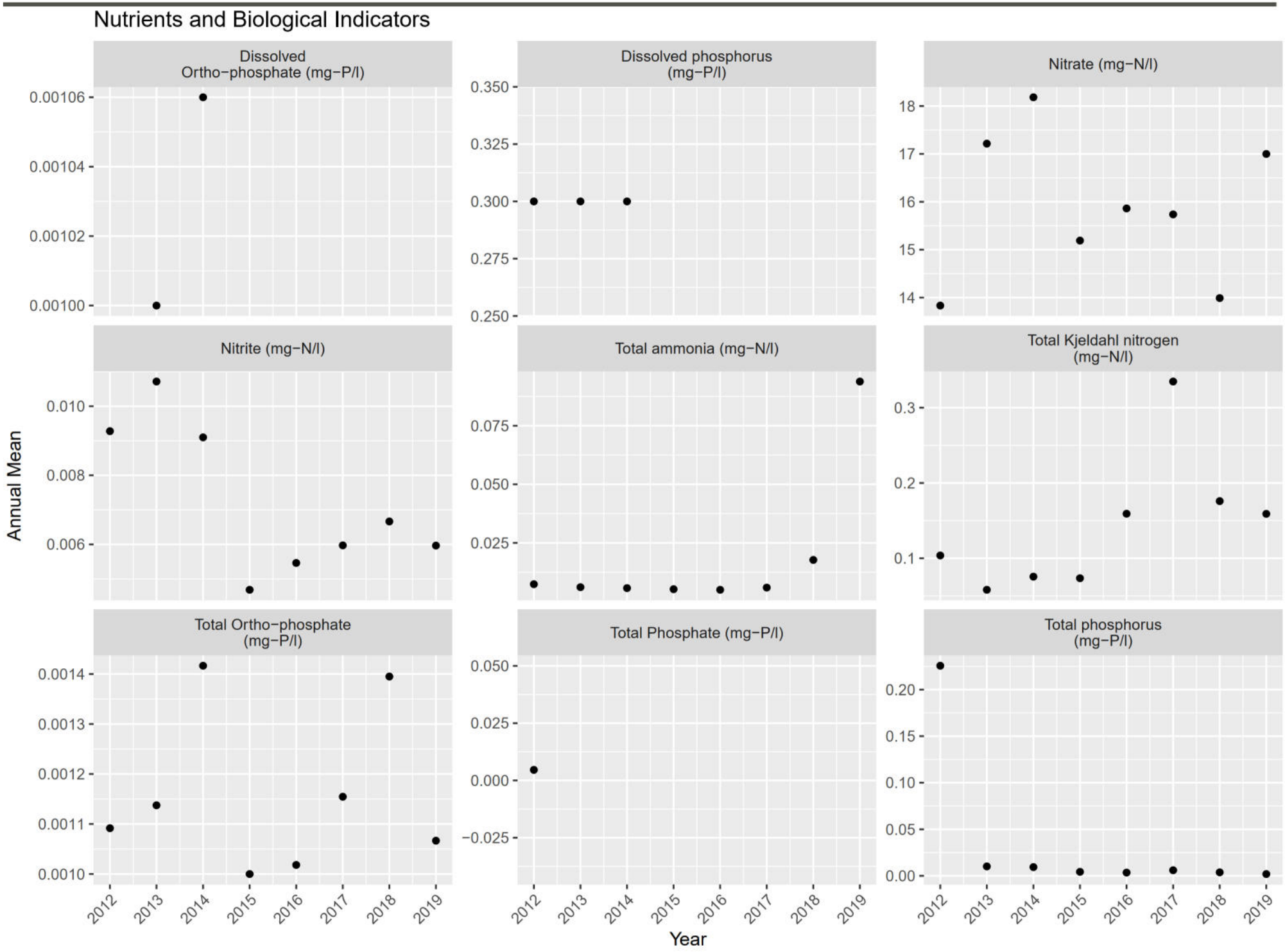


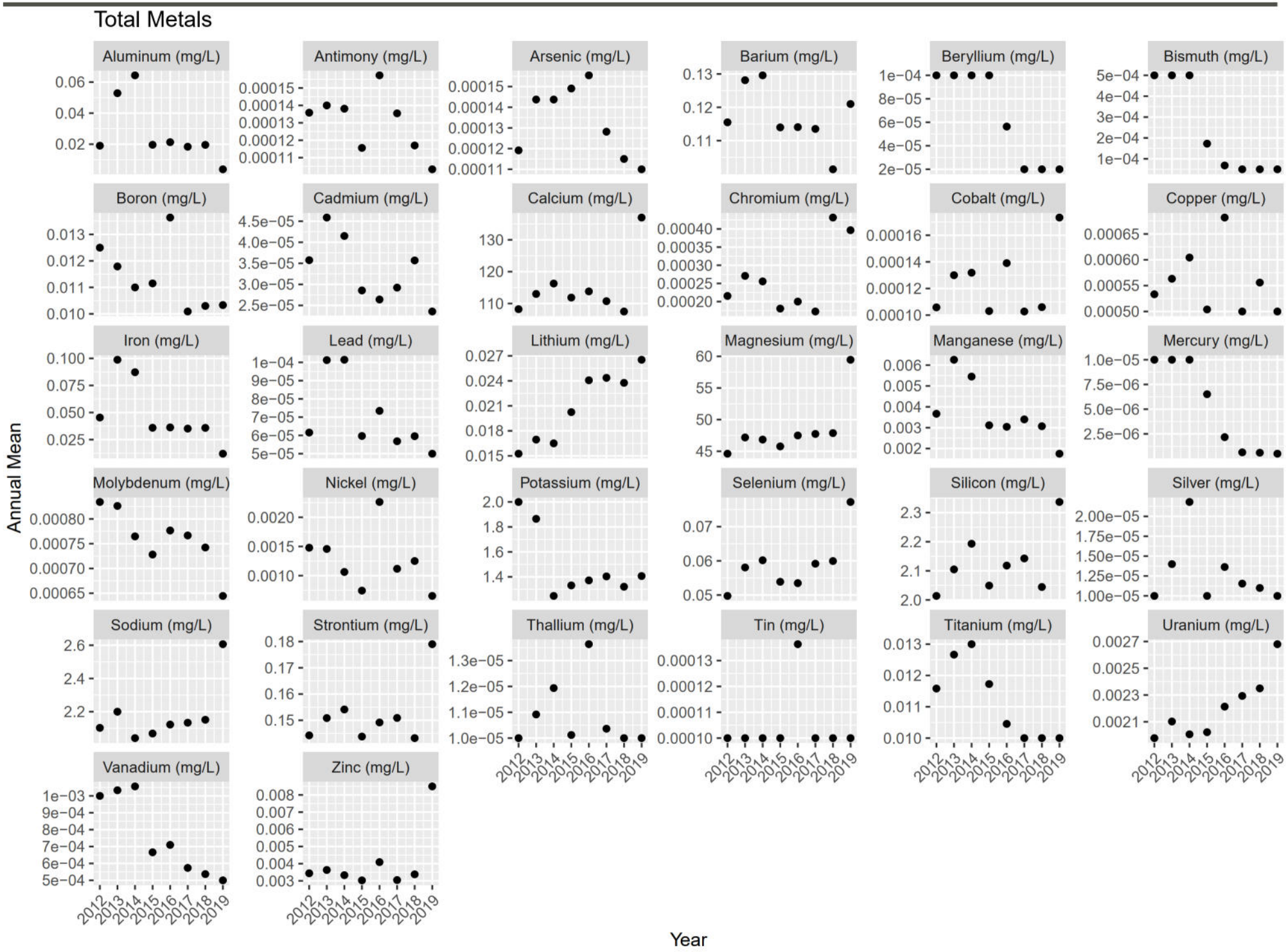

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

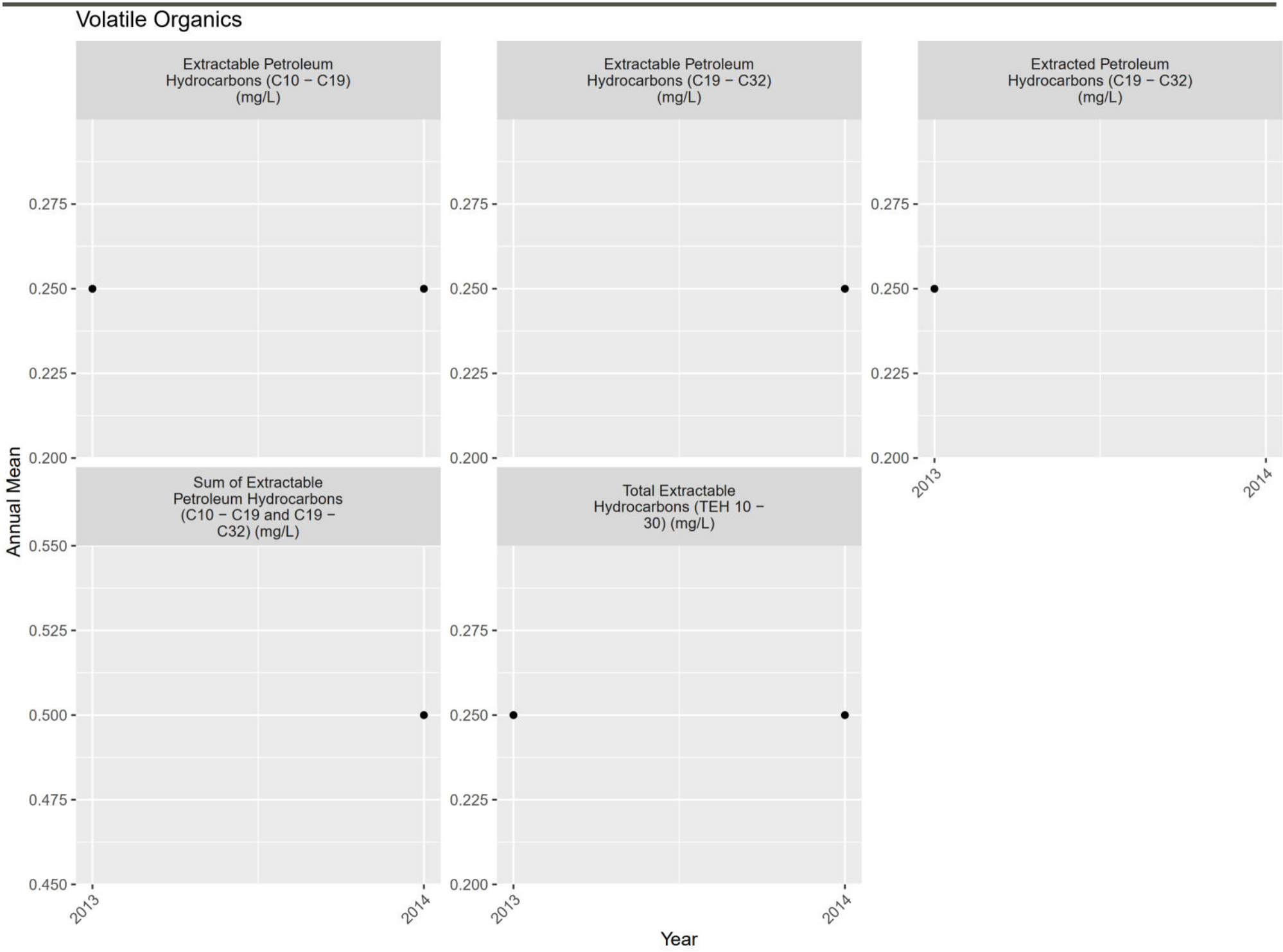

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year


Field Measured
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Temperature (°C)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Hydrogen Sulphide (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Sulphide (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Nutrients and Biological Indicators
Dissolved Ortho−phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

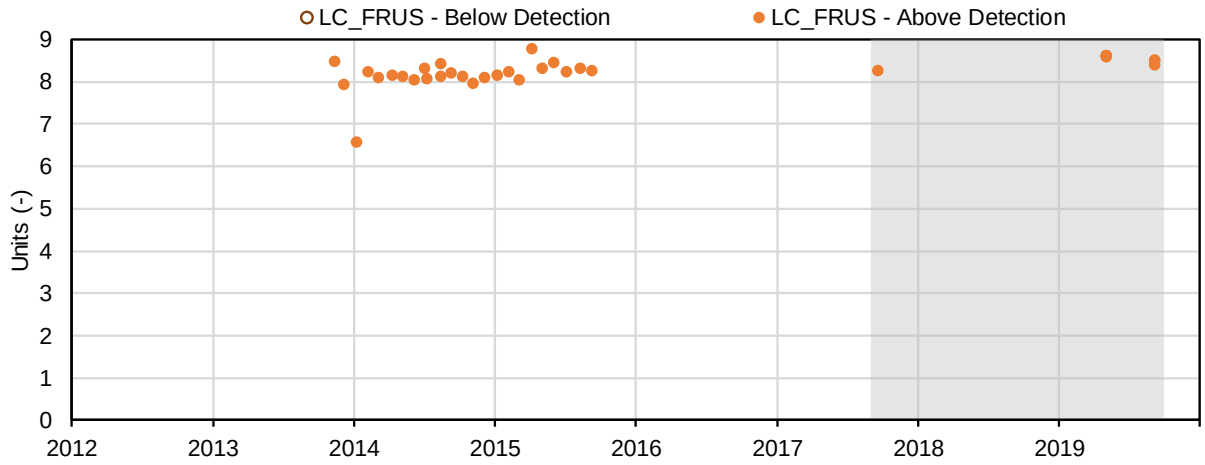

Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extractable Petroleum Hydrocarbons (C19 − C32) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Sum of Extractable Petroleum Hydrocarbons (C10 − C19 and C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
Year
0.275
0.250
0.225
0.200
0.550
0.525
0.500
0.475
0.450
2013
2014

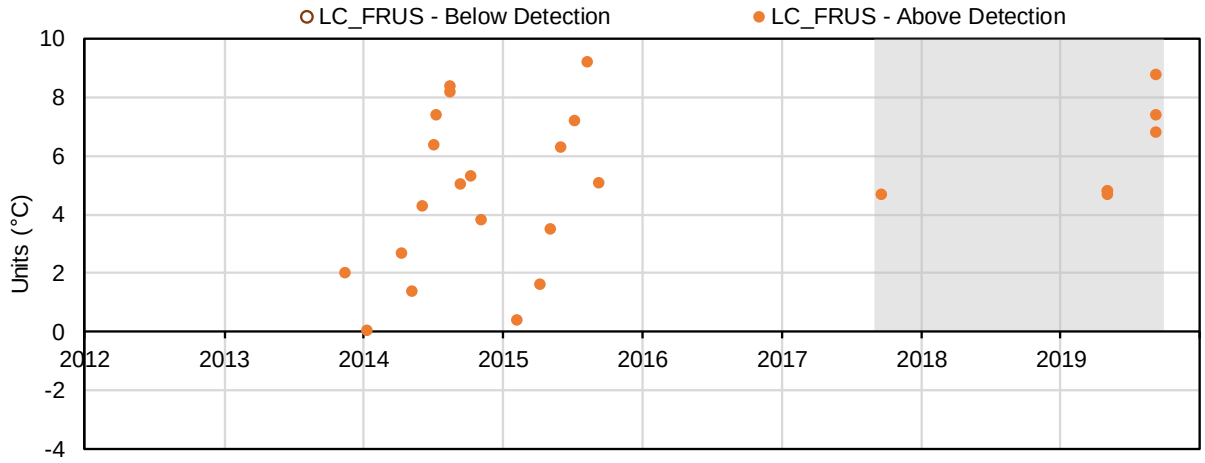
ATTACHMENT F14

LC_FRUS Plots

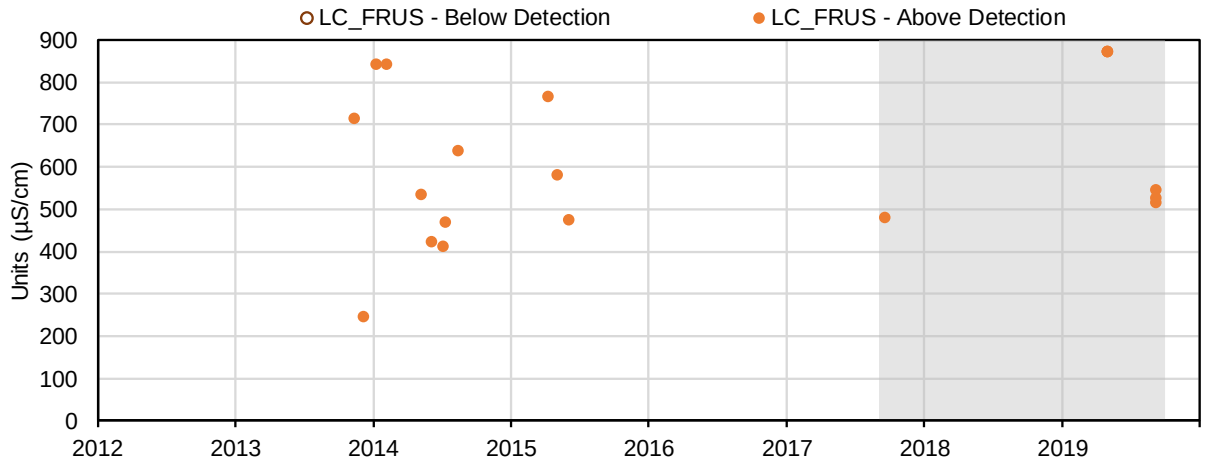
(1) pH (-); Field Measured



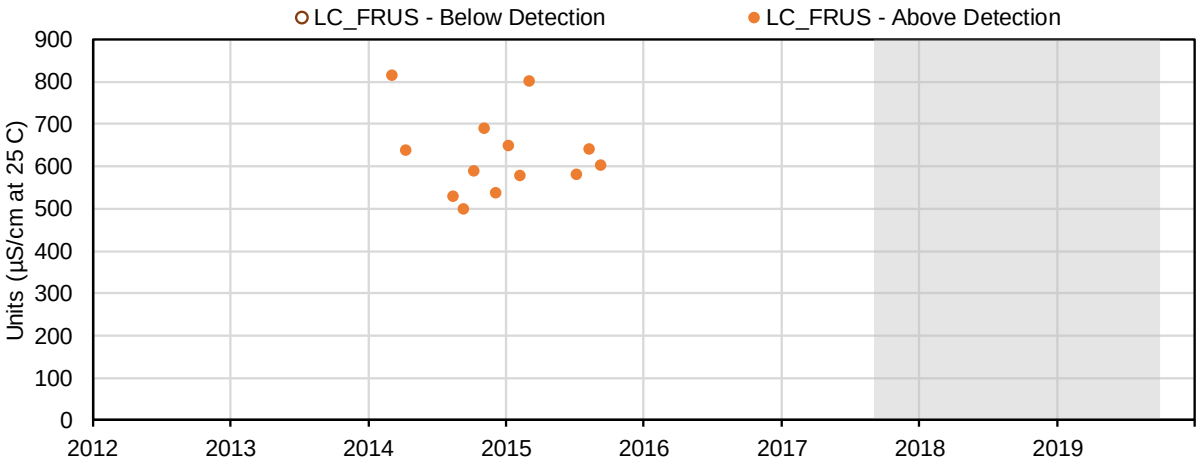
(2) Temperature (°C); Field Measured



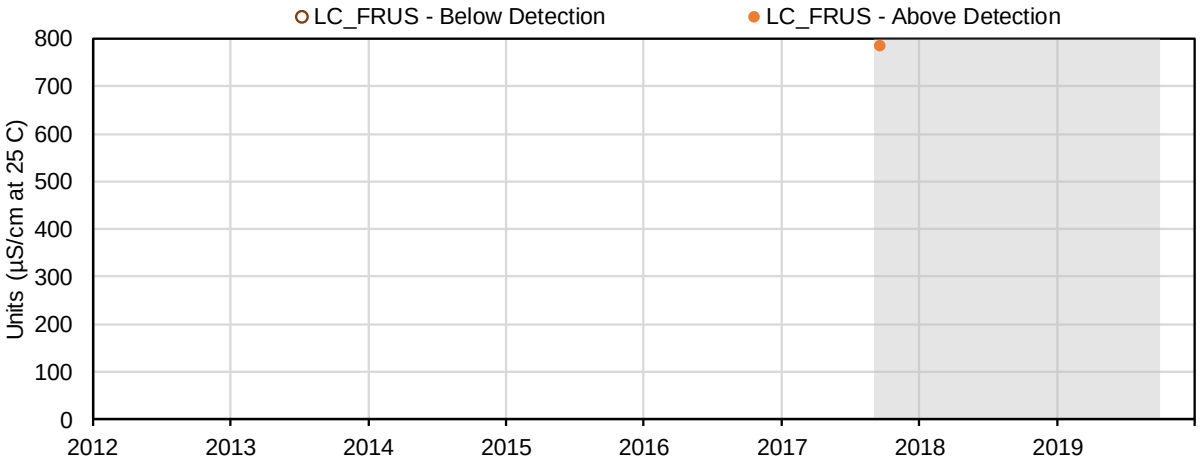
(3) Conductivity (µS/cm); Field Measured



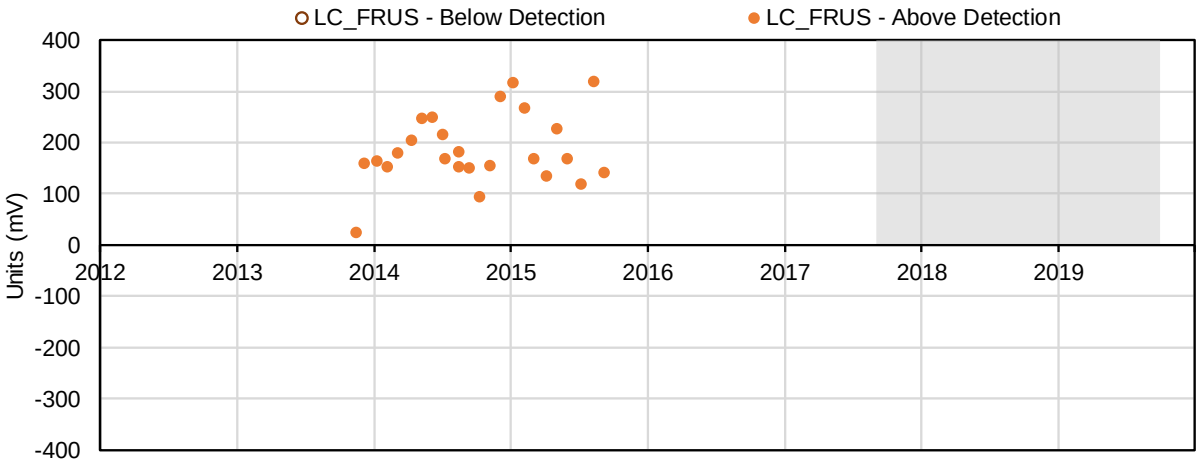
(4) Conductivity (µS/cm at 25 C); Field Measured



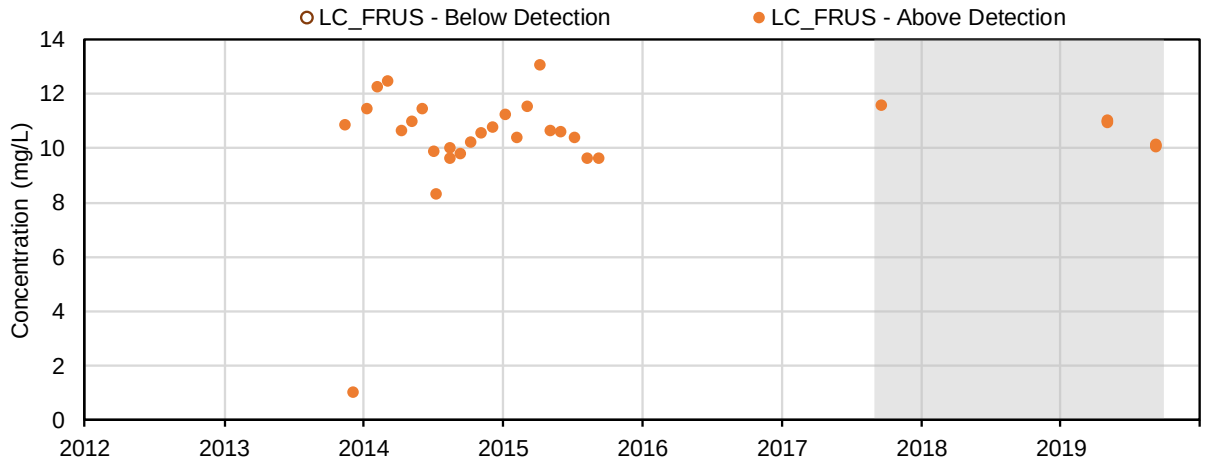
(5) Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C); Field Measured



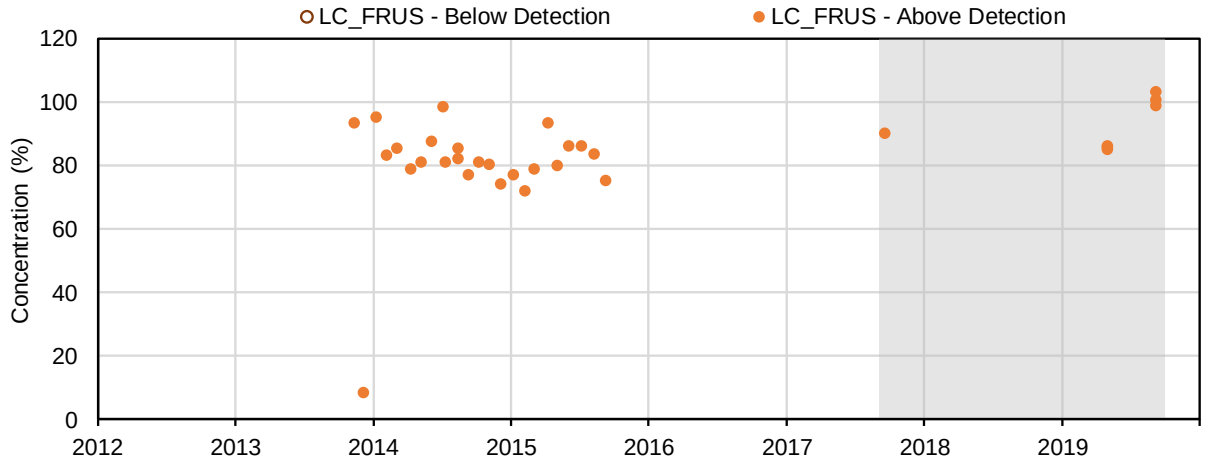
(6) Oxidation-Reduction Potential (mV); Field Measured



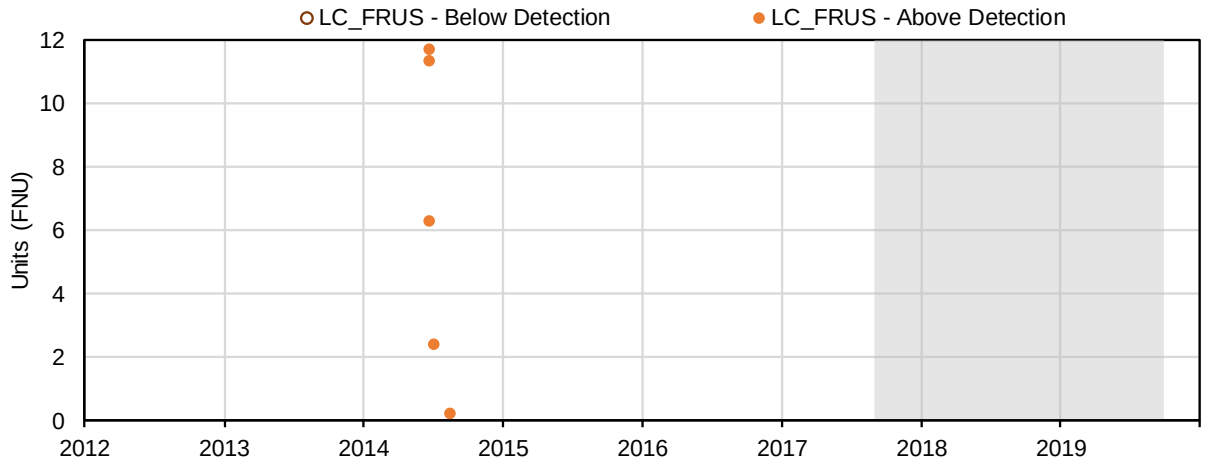
(7) Dissolved Oxygen (mg/L); Field Measured



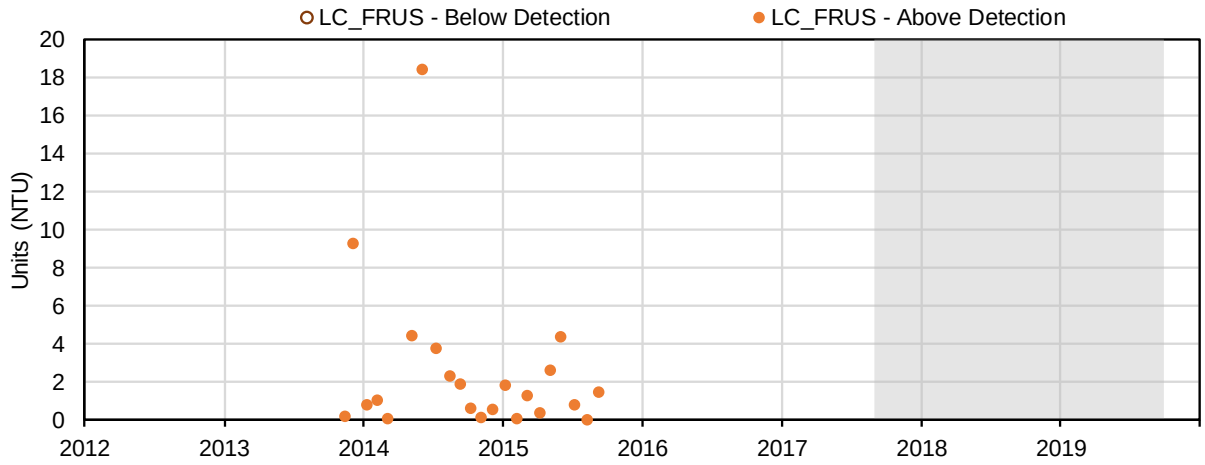
(8) Dissolved Oxygen (%); Field Measured



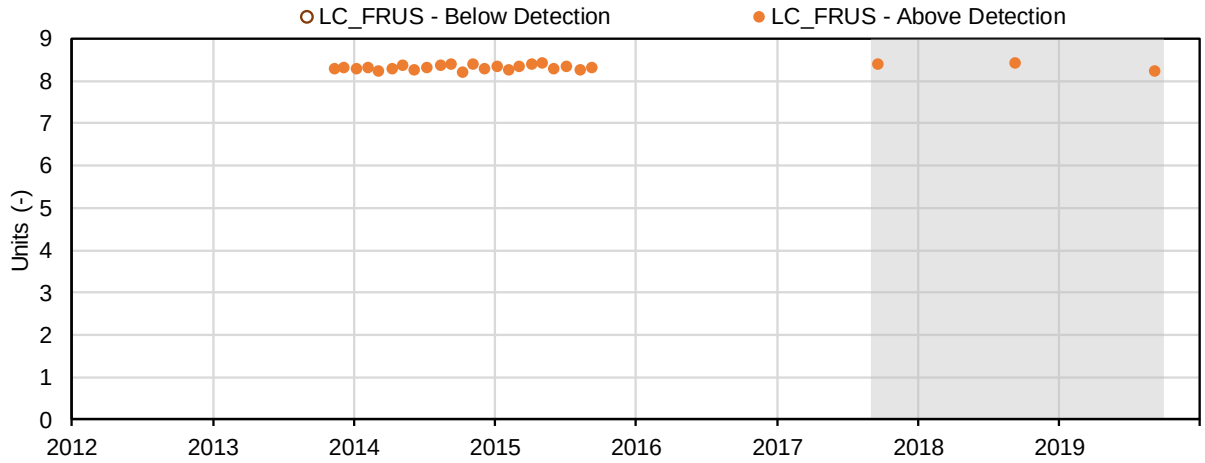
(9) Turbidity (FNU); Field Measured



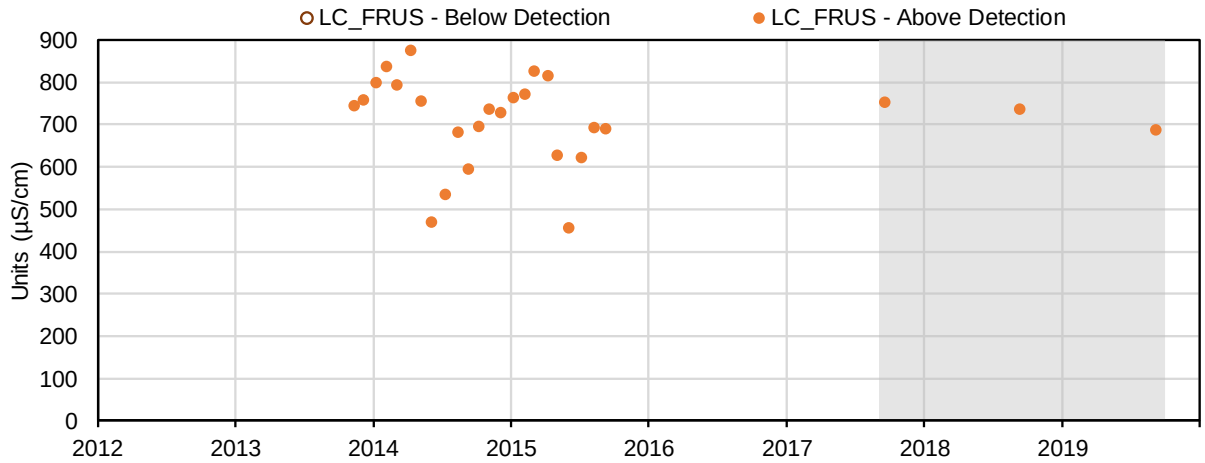
(10) Turbidity (NTU); Field Measured



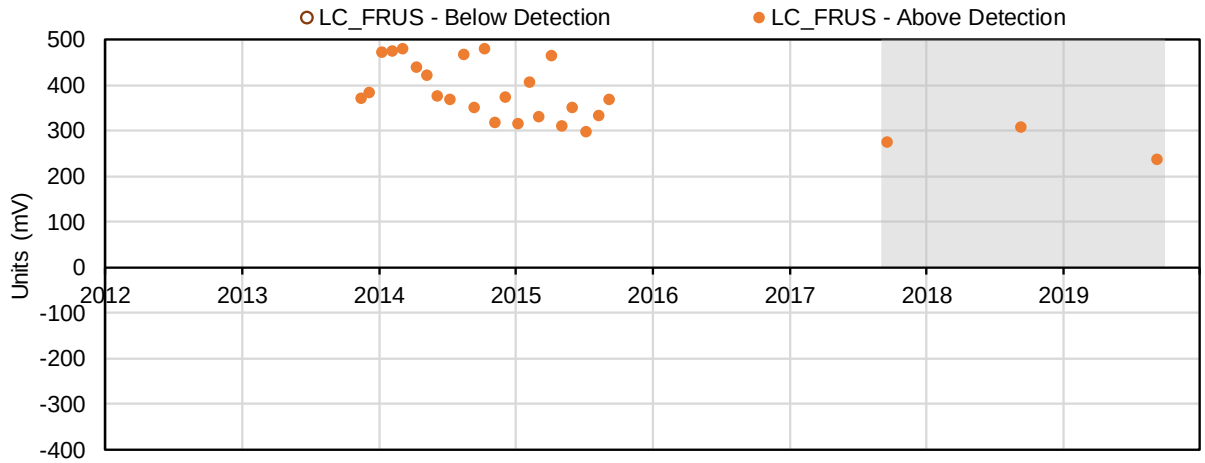
(11) pH (-); Conventional Parameters



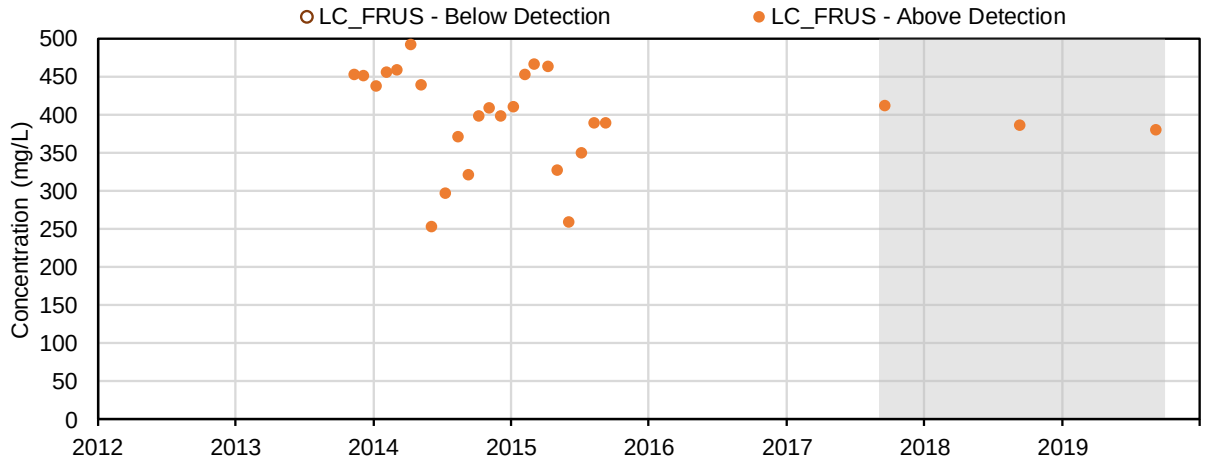
(12) Conductivity (µS/cm); Conventional Parameters



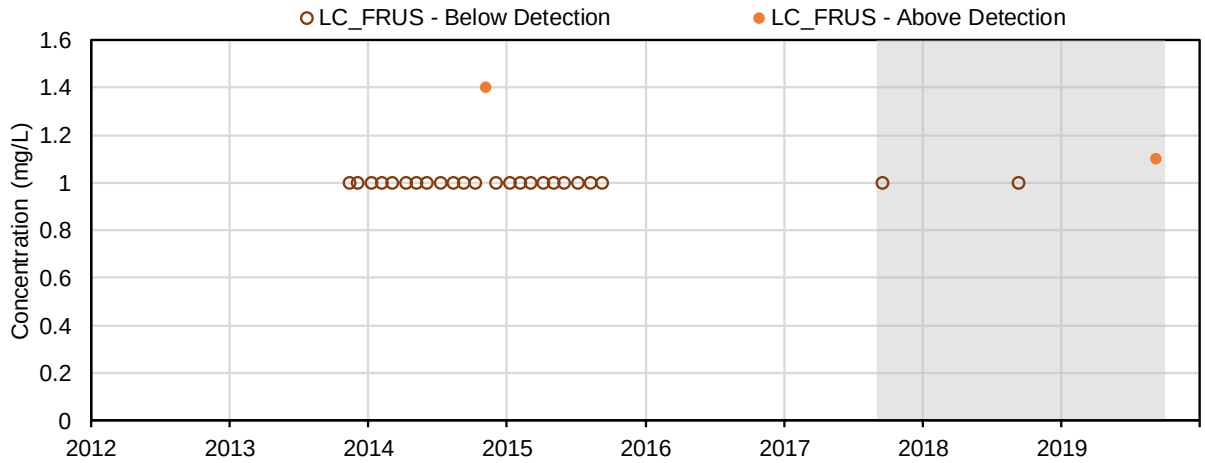
(13) Oxidation-Reduction Potential (mV); Conventional Parameters



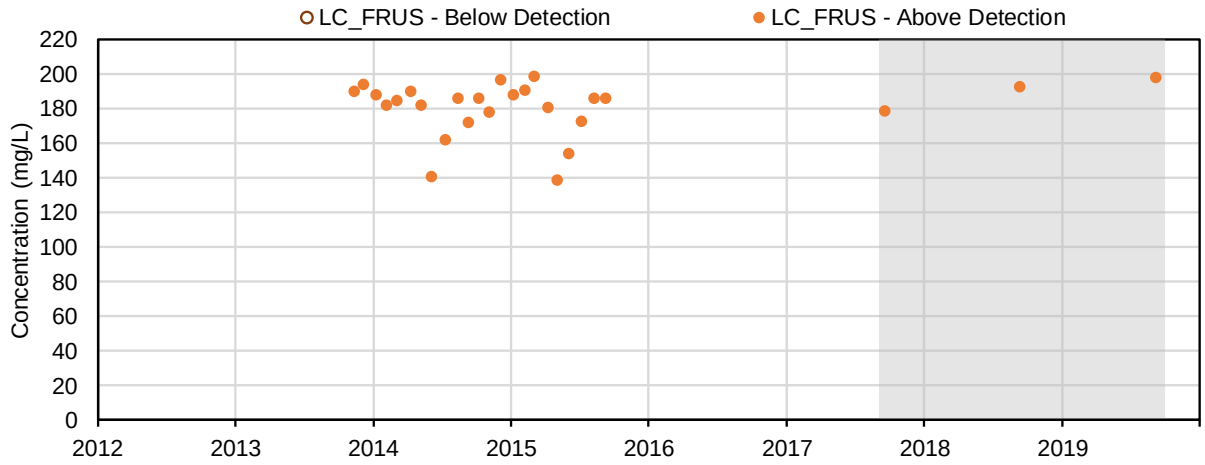
(14) Hardness, as CaCO3 (mg/L); Conventional Parameters



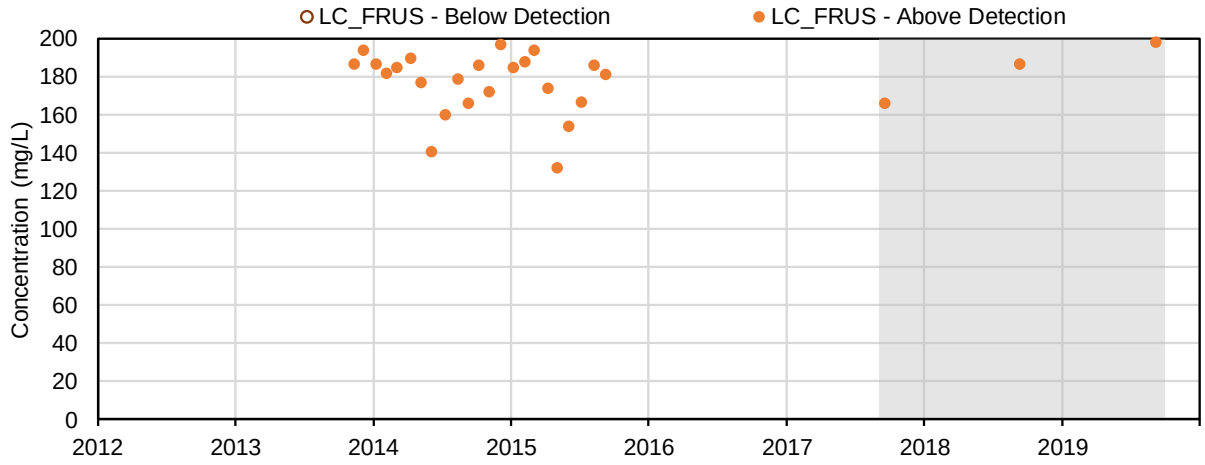
(15) Acidity, CaCO3 (mg/L); Conventional Parameters



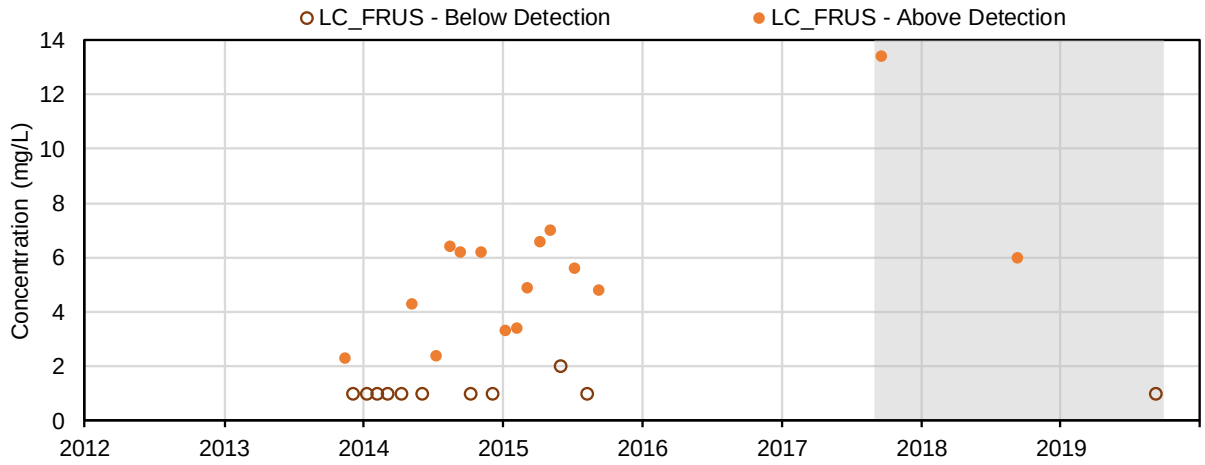
(16) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



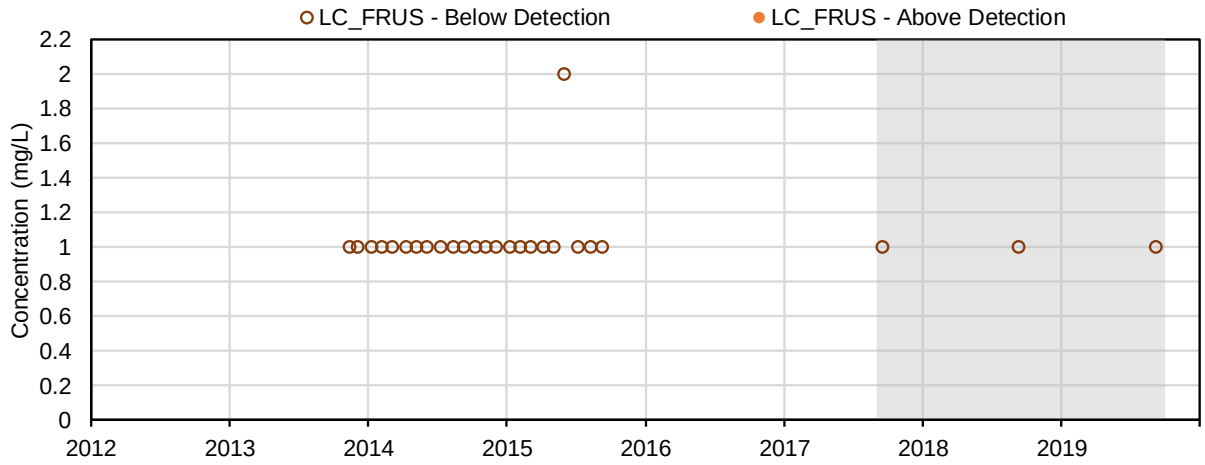
(17) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



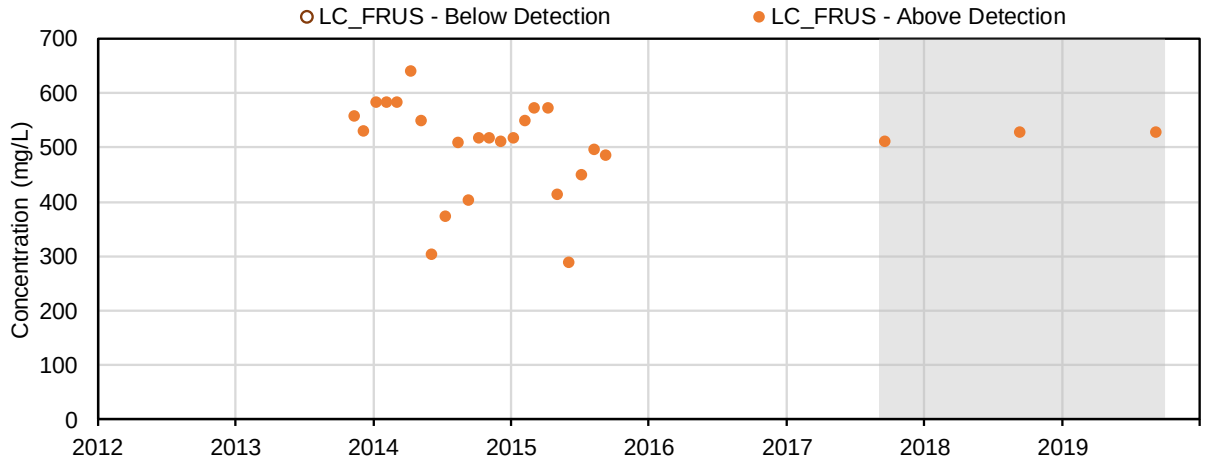
(18) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



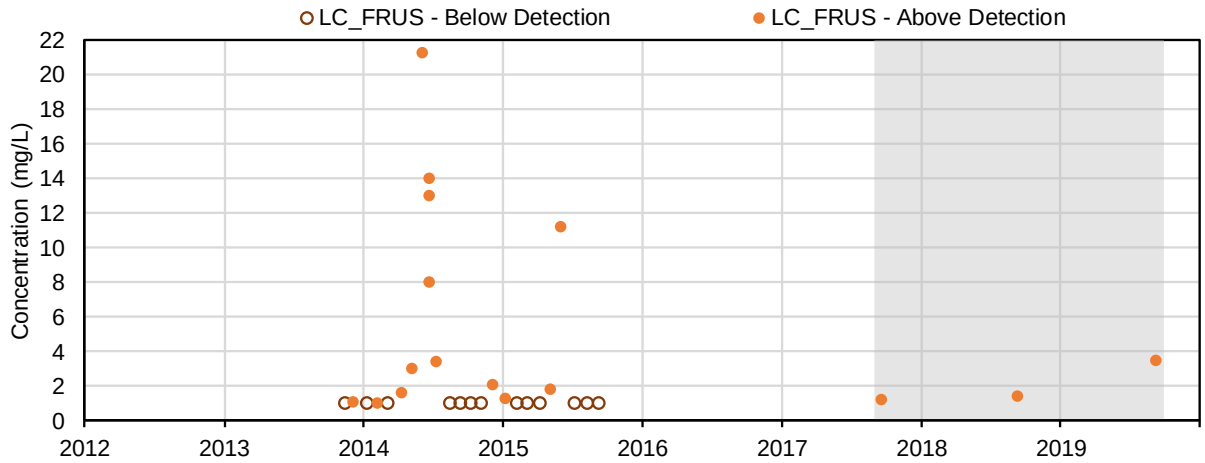
(19) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



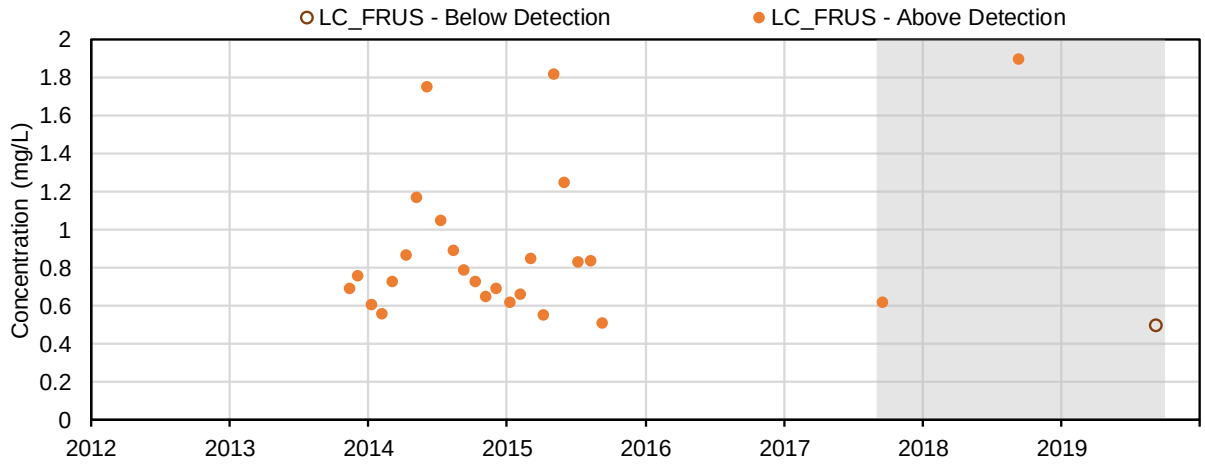
(20) Total dissolved solids (mg/L); Conventional Parameters



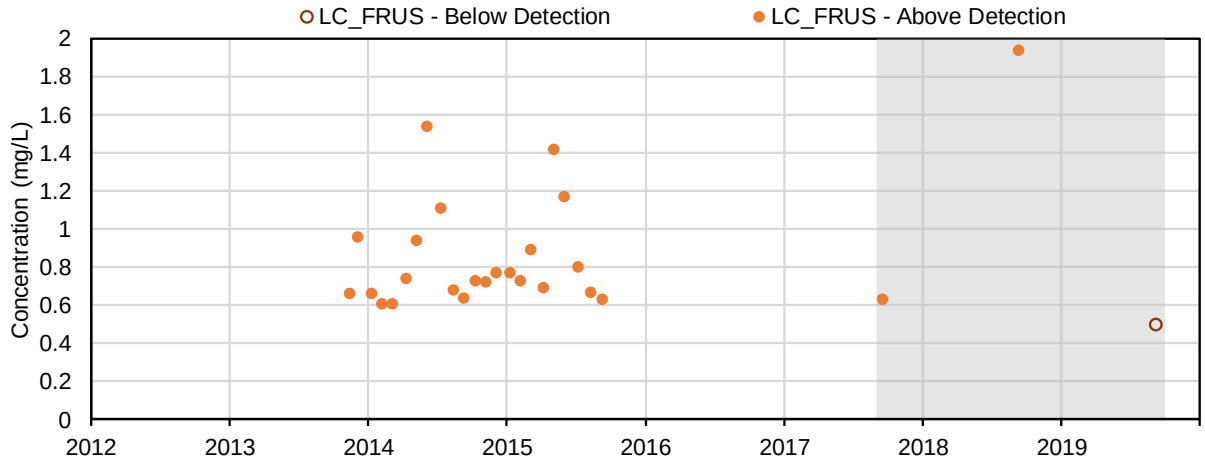
(21) Total suspended solids (mg/L); Conventional Parameters



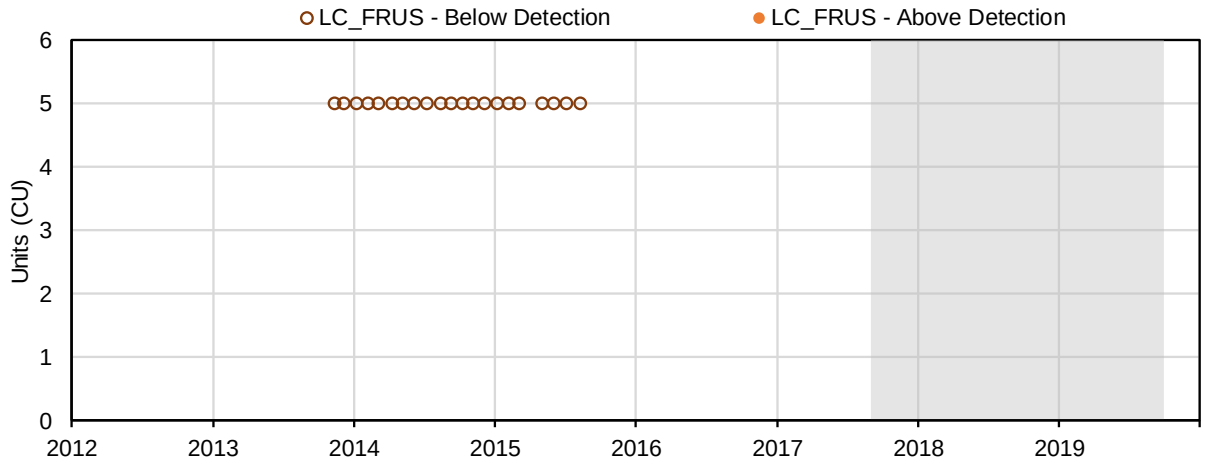
(22) Total organic carbon (mg/L); Conventional Parameters



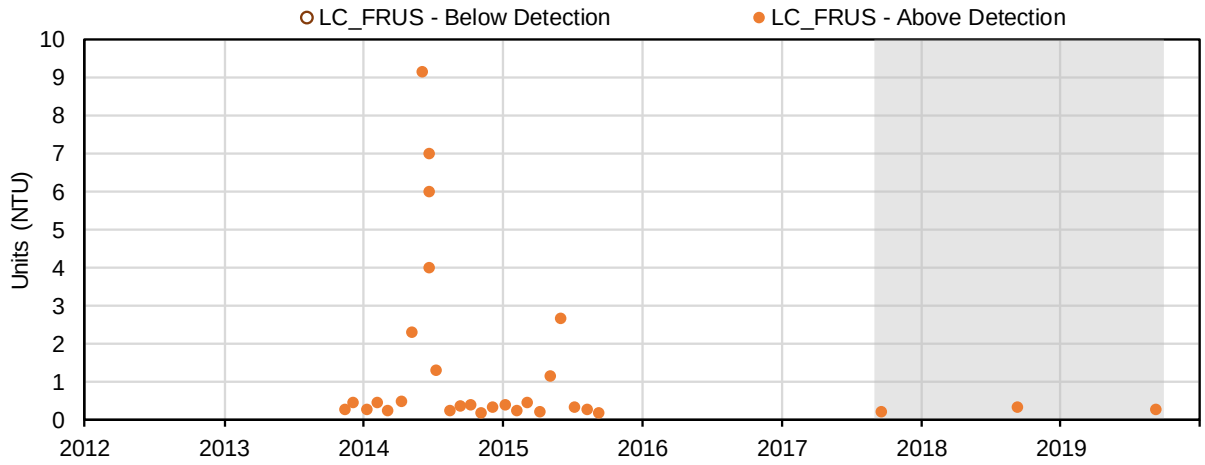
(23) Dissolved organic carbon (mg/L); Conventional Parameters



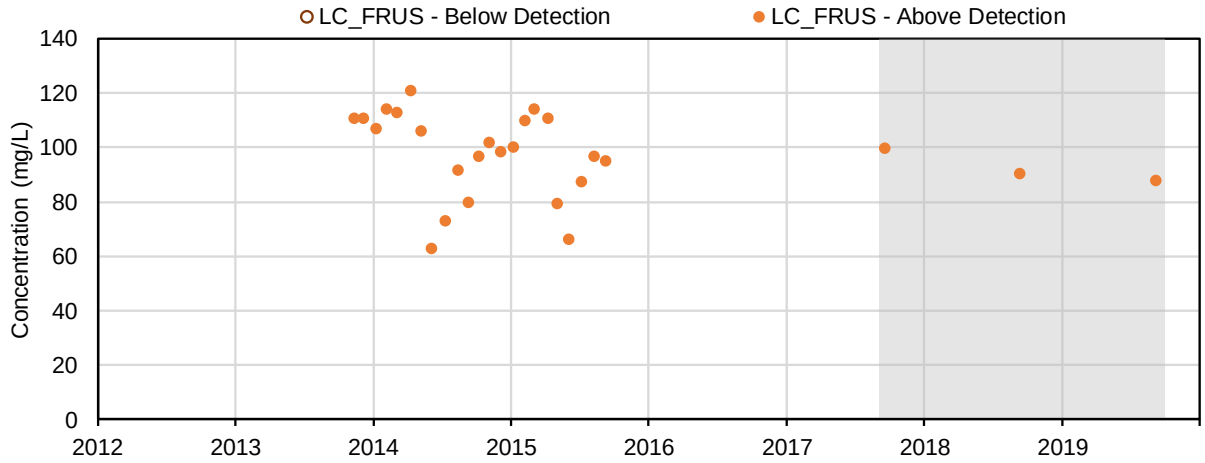
(24) Colour (CU); Conventional Parameters



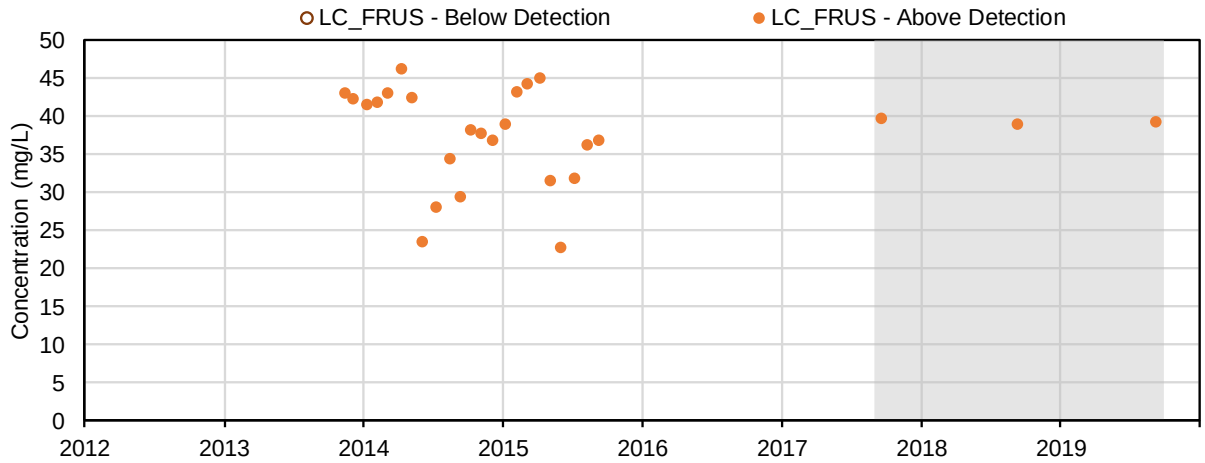
(25) Turbidity (NTU); Conventional Parameters



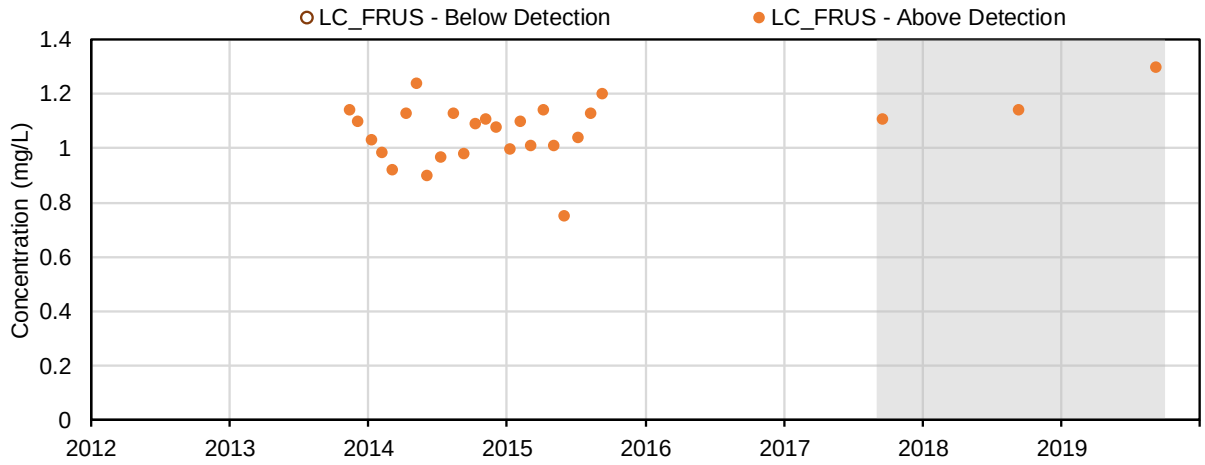
(26) Calcium (mg/L); Major Ions



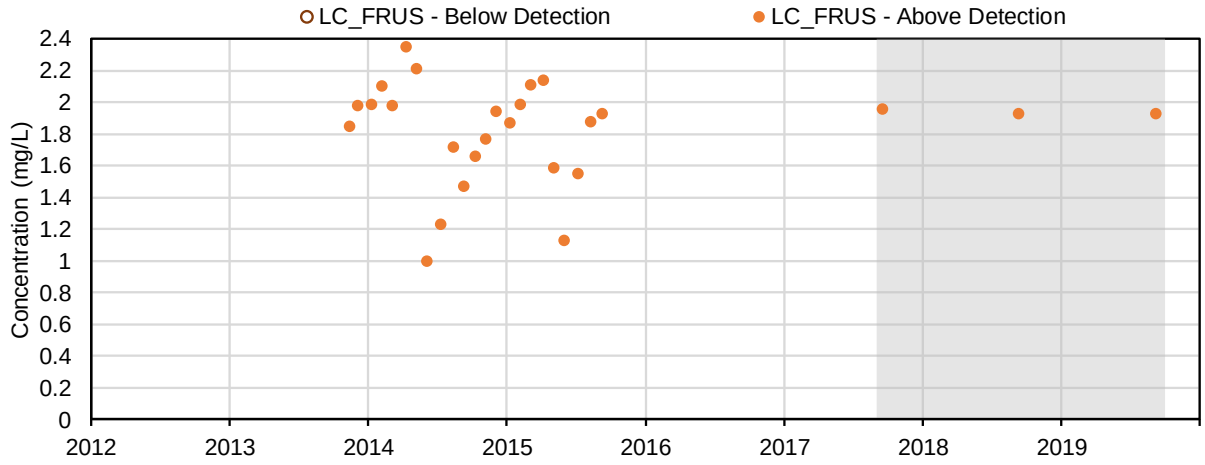
(27) Magnesium (mg/L); Major Ions



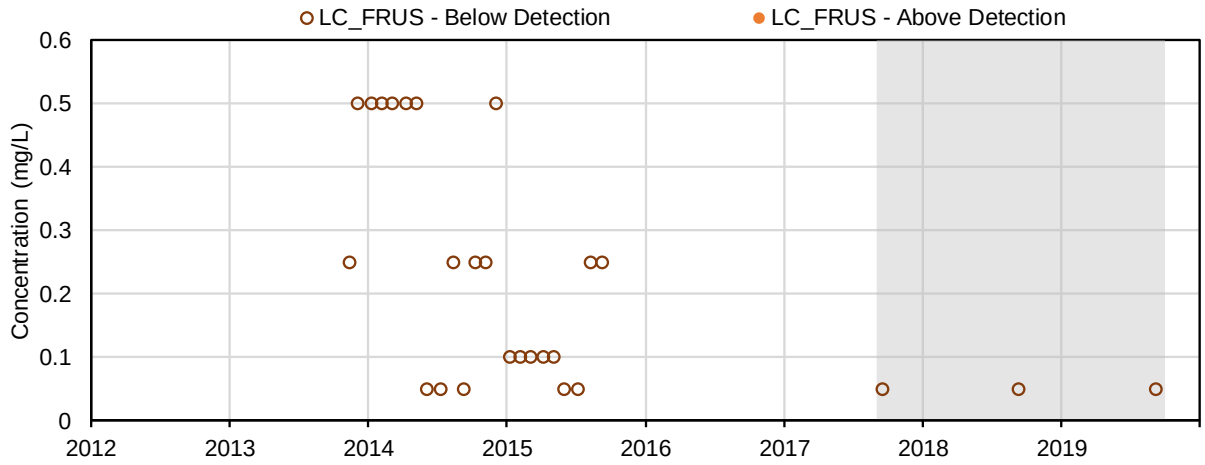
(28) Potassium (mg/L); Major Ions



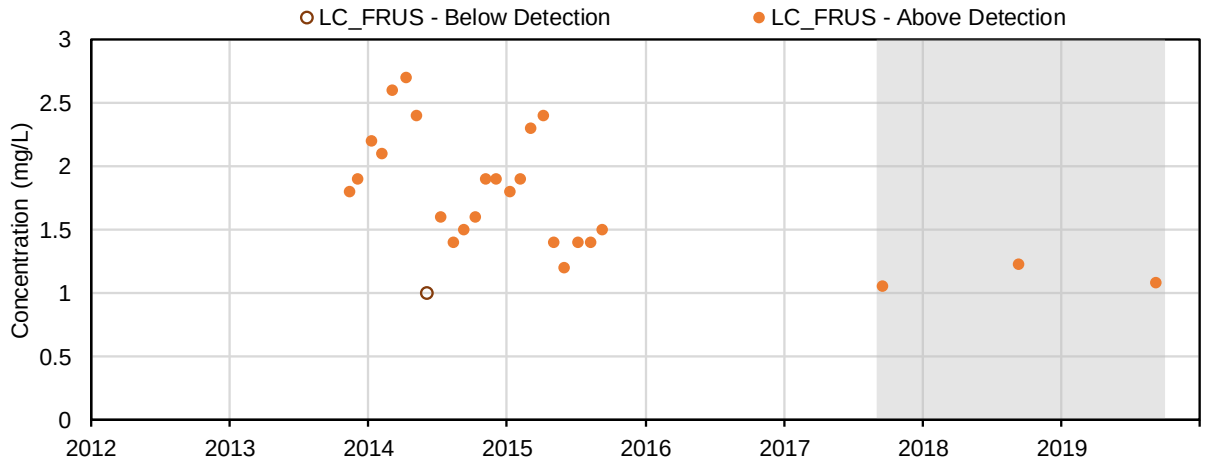
(29) Sodium (mg/L); Major Ions



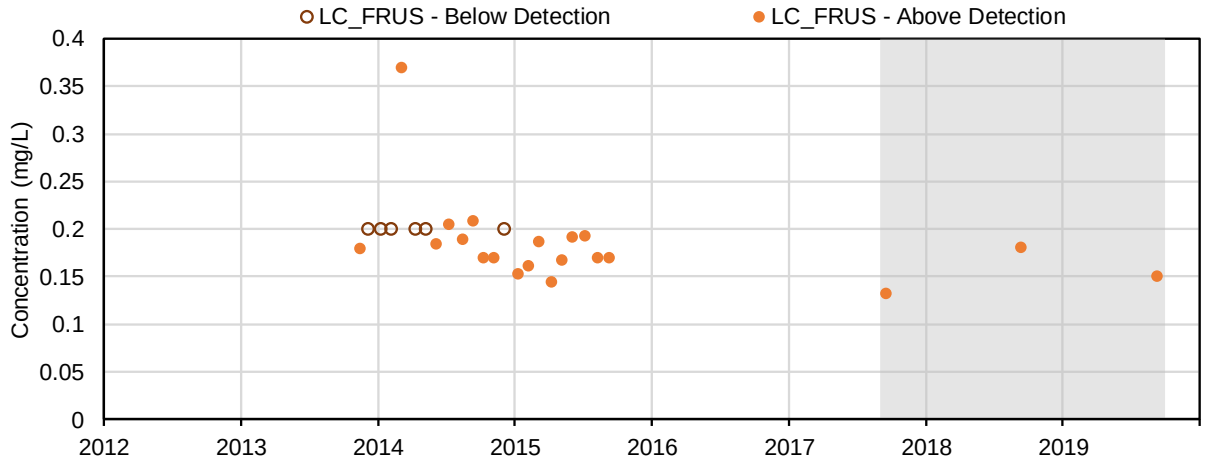
(30) Bromide (mg/L); Major Ions



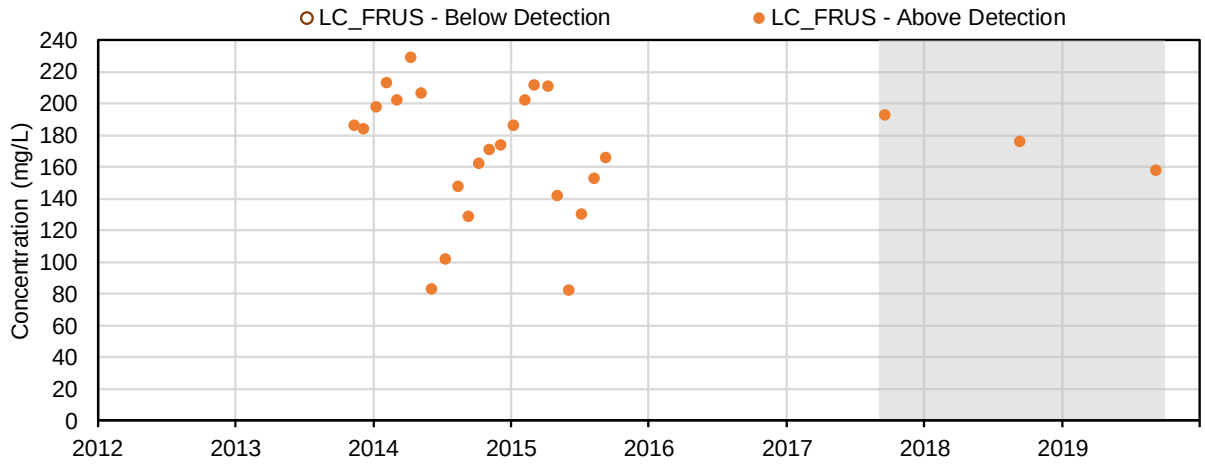
(31) Chloride (mg/L); Major Ions



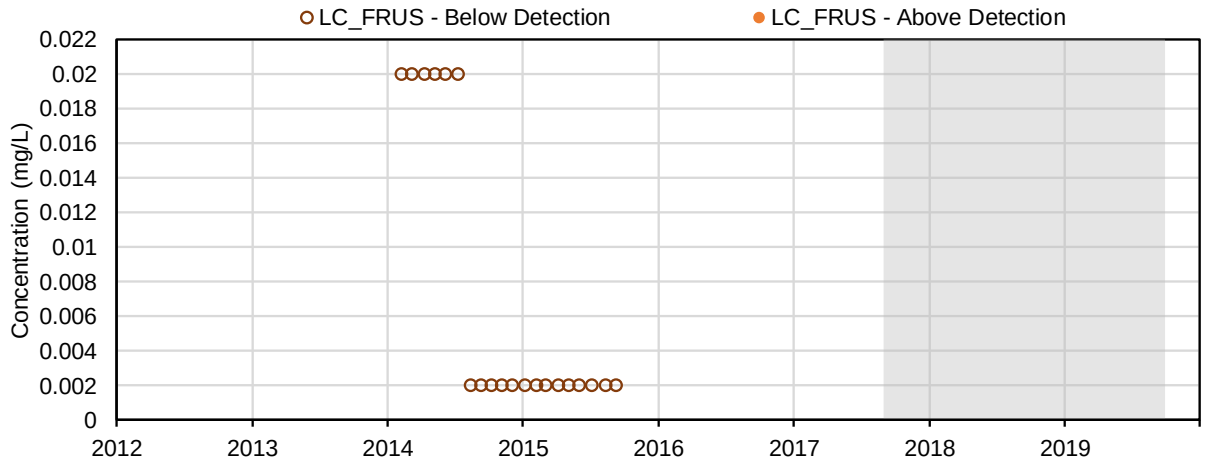
(32) Fluoride (mg/L); Major Ions



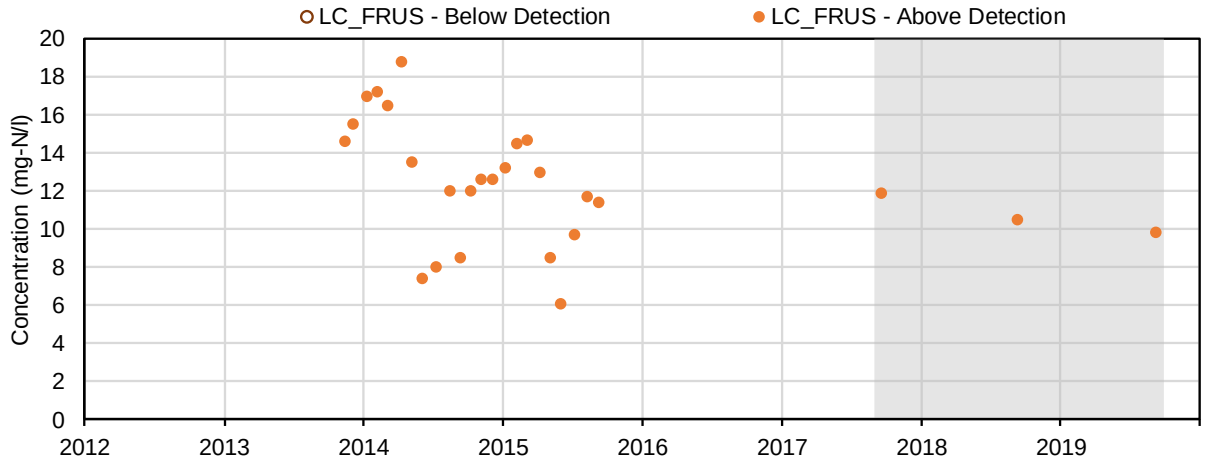
(33) Sulphate (mg/L); Major Ions



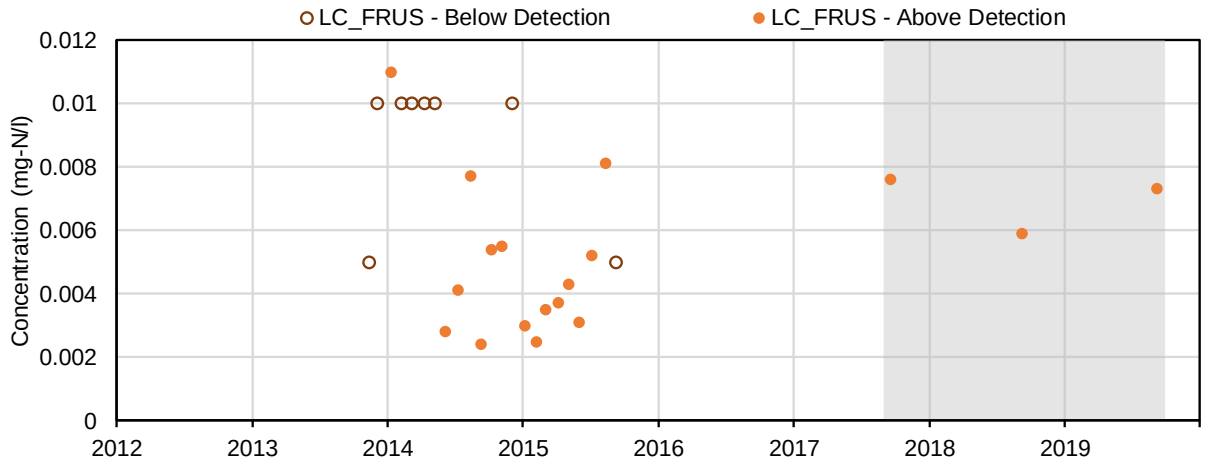
(34) Sulphide (mg/L); Major Ions



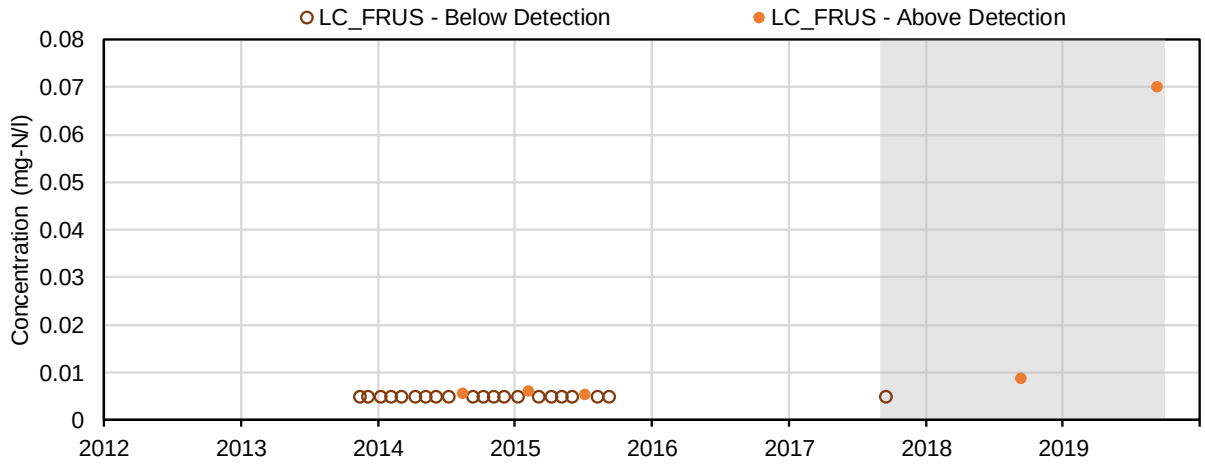
(35) Nitrate (mg-N/l); Nutrients and Biological Indicators



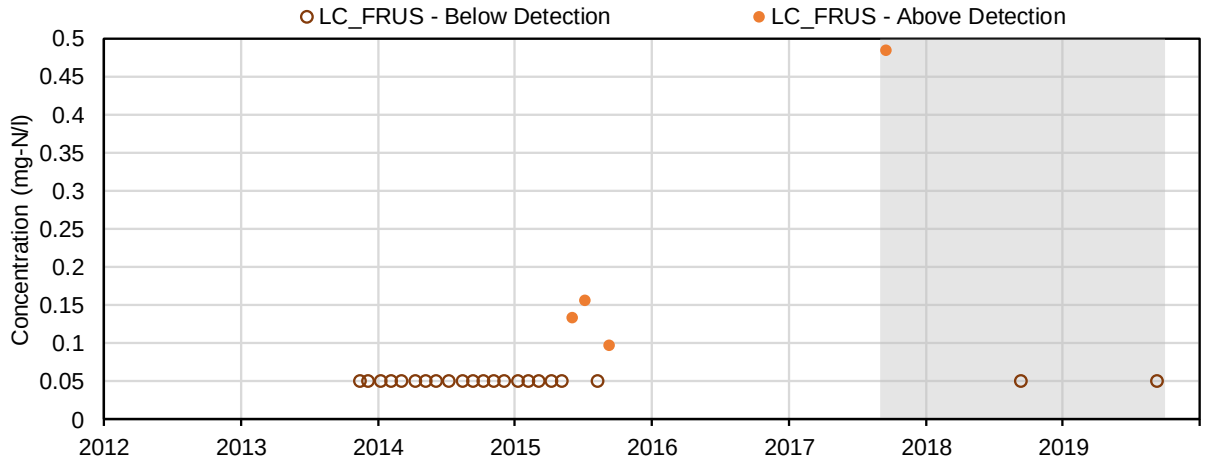
(36) Nitrite (mg-N/l); Nutrients and Biological Indicators



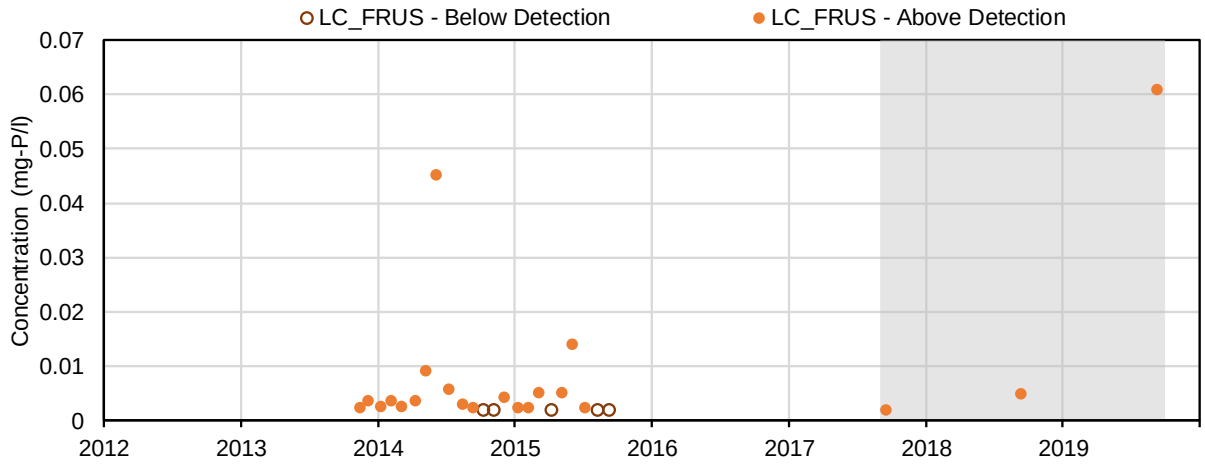
(37) Total ammonia (mg-N/l); Nutrients and Biological Indicators



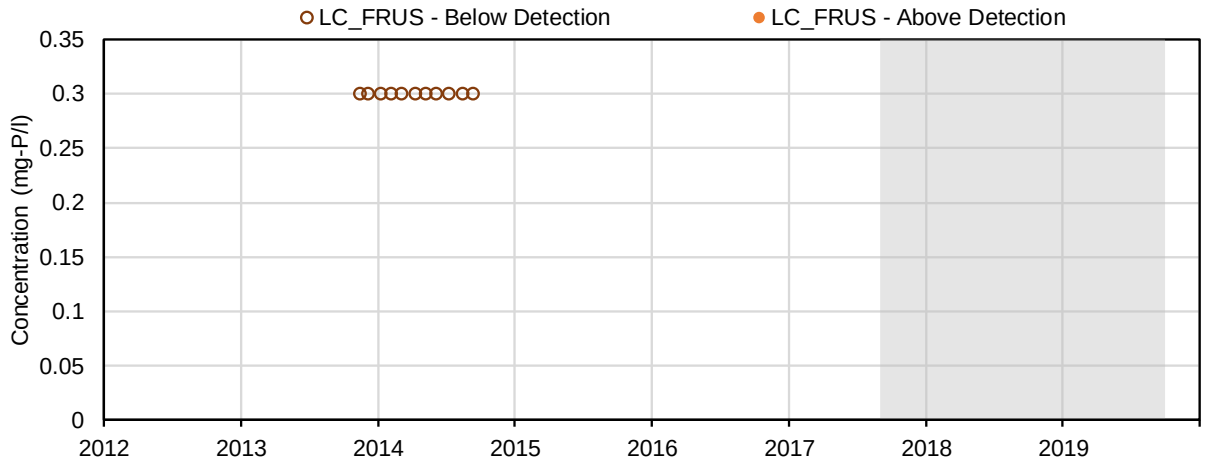
(38) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



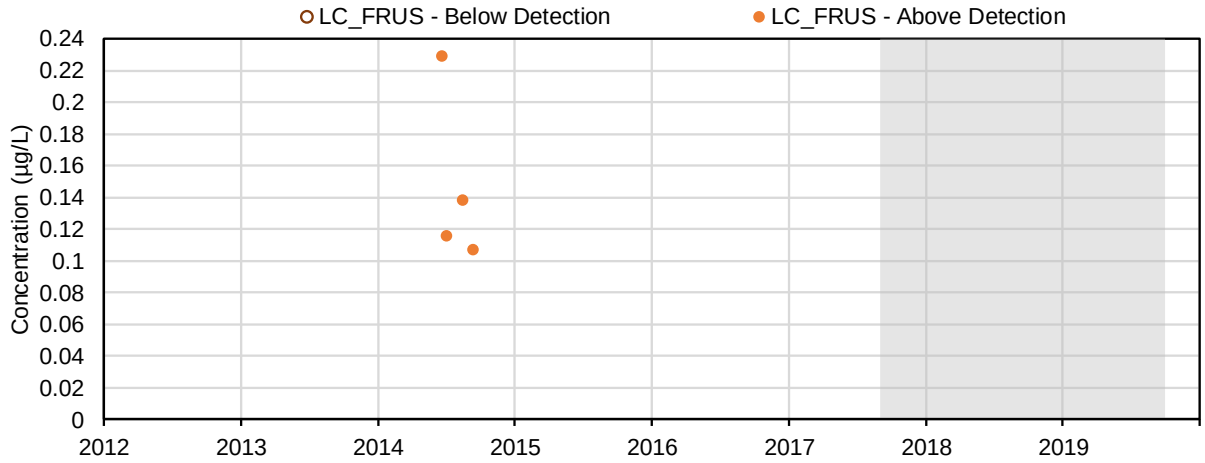
(39) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



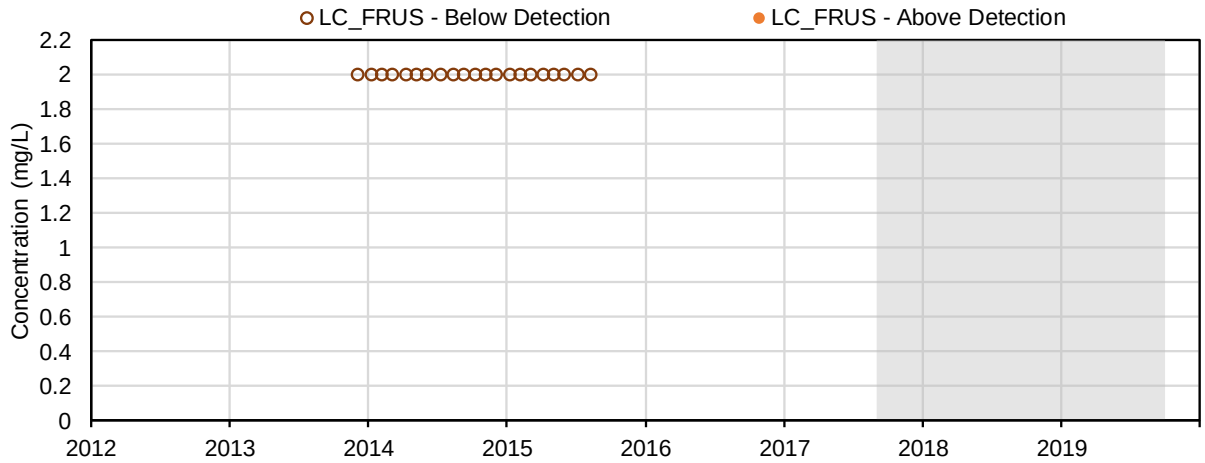
(40) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



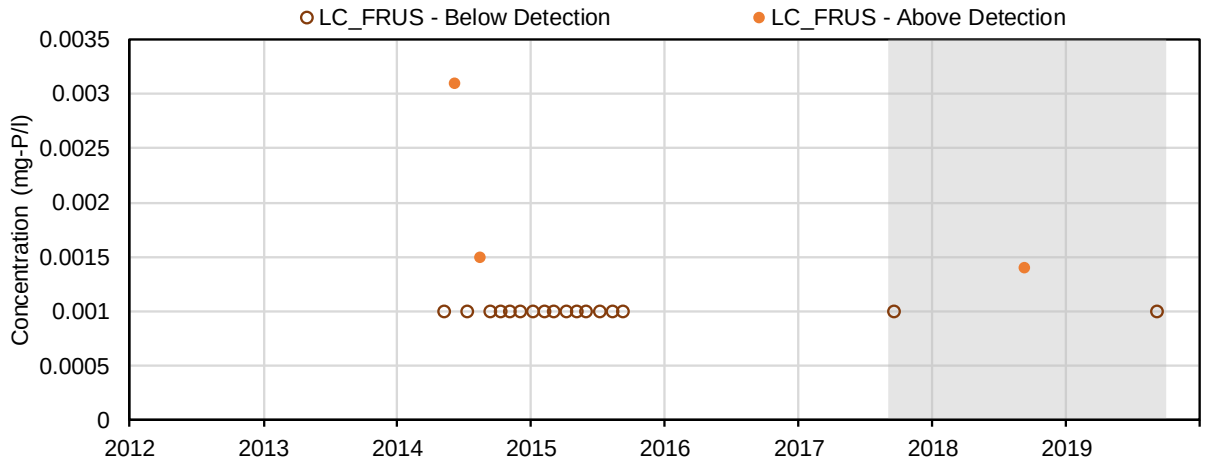
(41) Chlorophyll a (µg/L); Nutrients and Biological Indicators



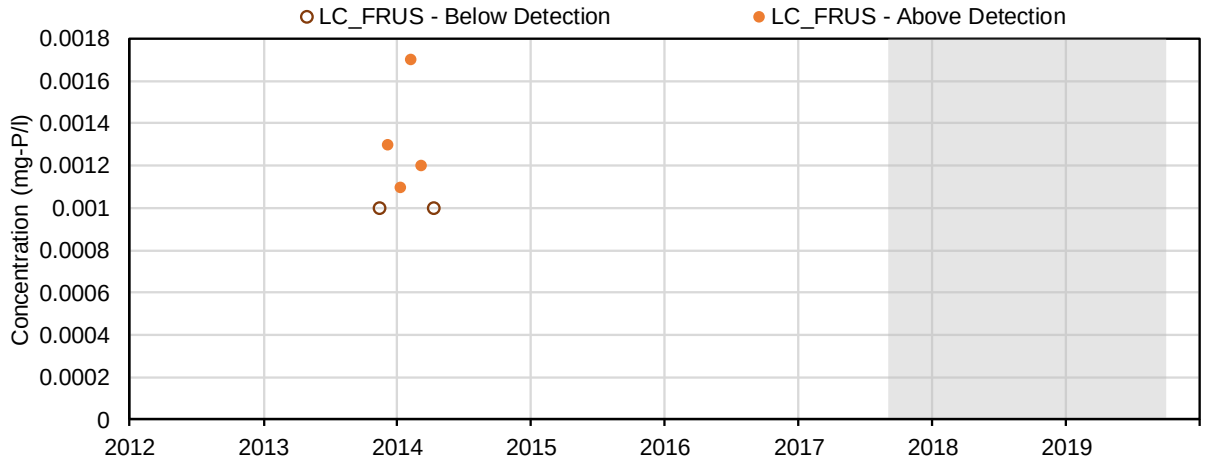
(42) Biochemical oxygen demand (mg/L); Nutrients and Biological Indicators



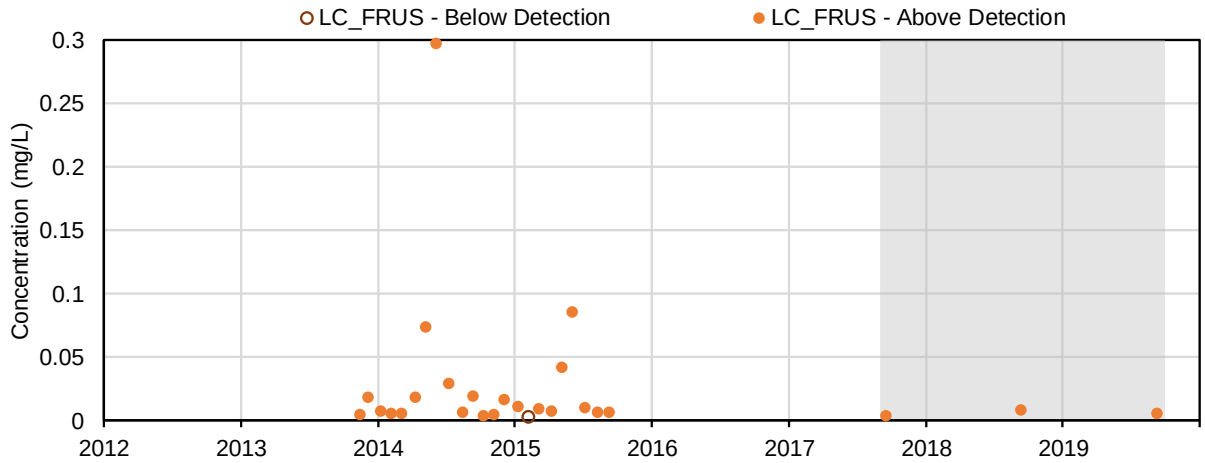
(43) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



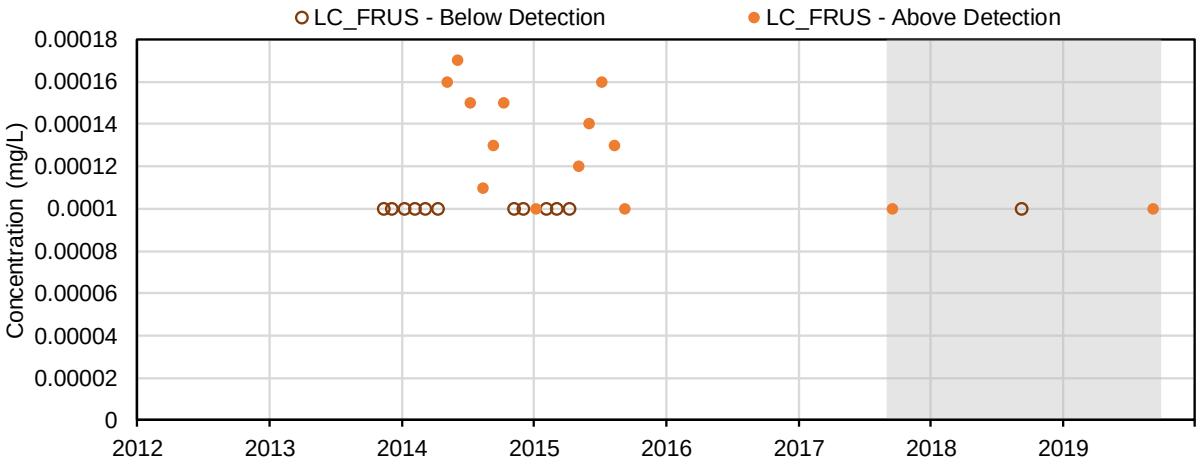
(44) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



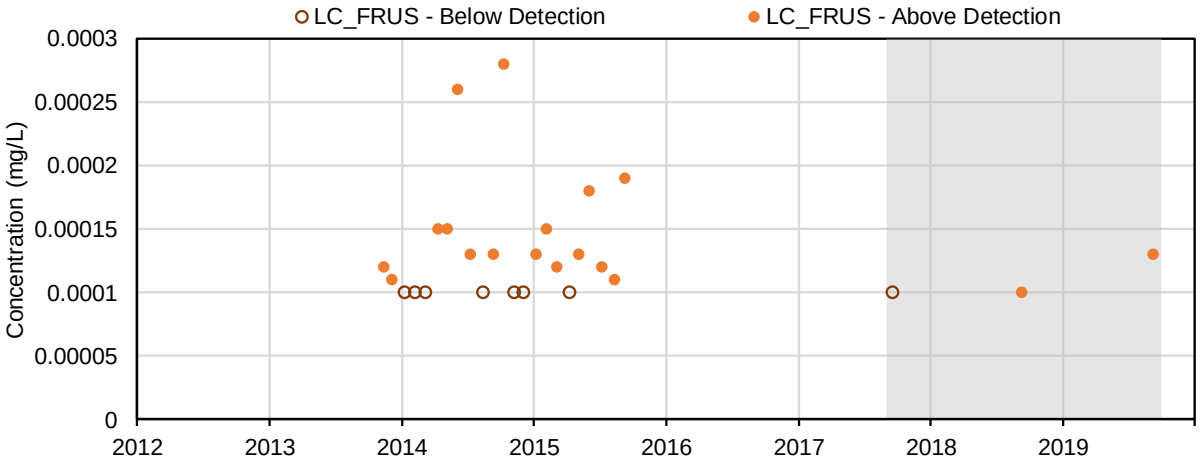
(45) Aluminum (mg/L); Total Metals



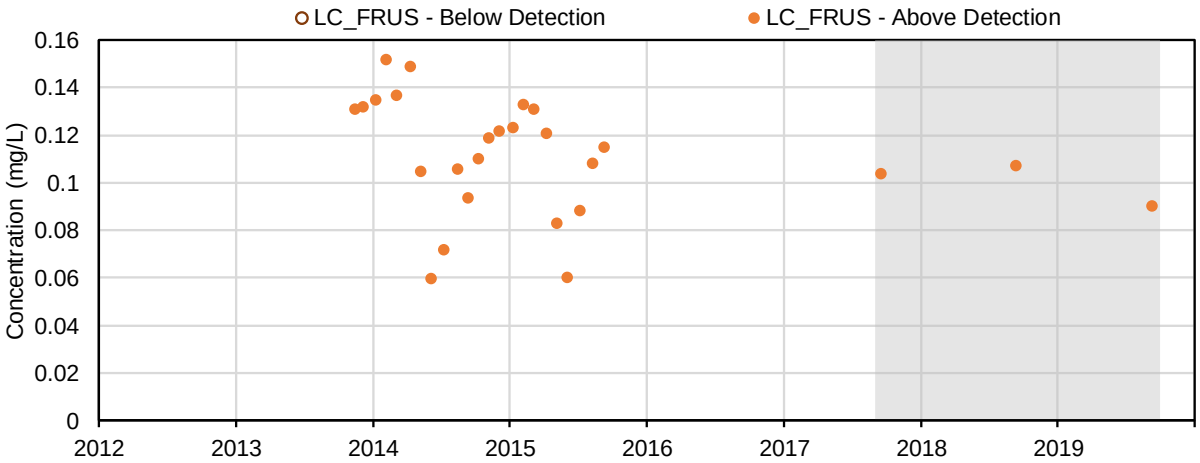
(46) Antimony (mg/L); Total Metals



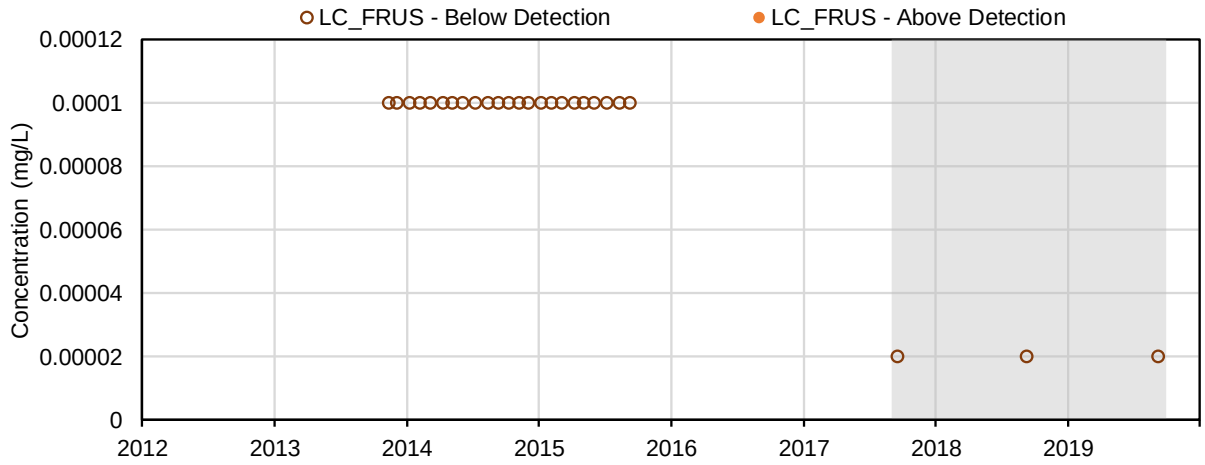
(47) Arsenic (mg/L); Total Metals



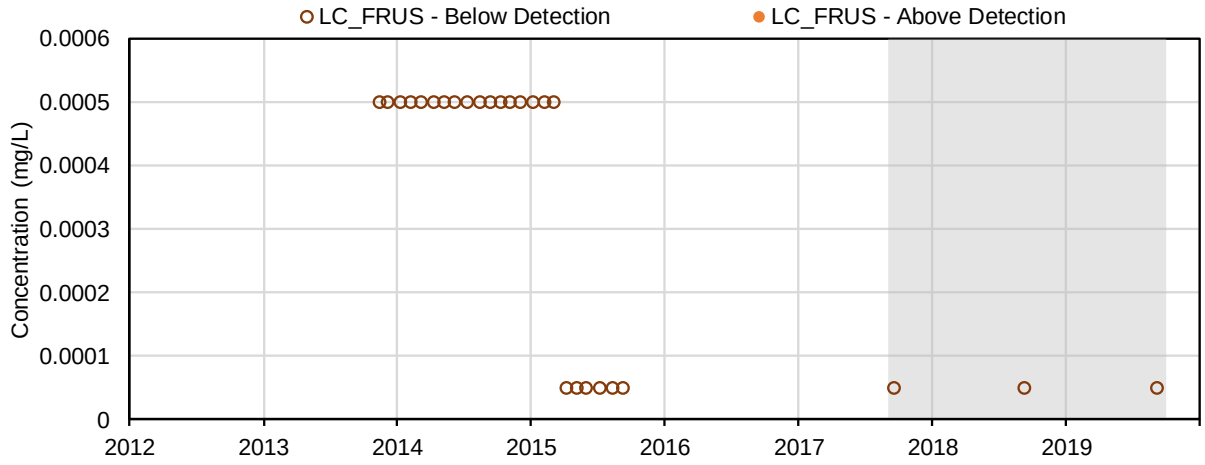
(48) Barium (mg/L); Total Metals



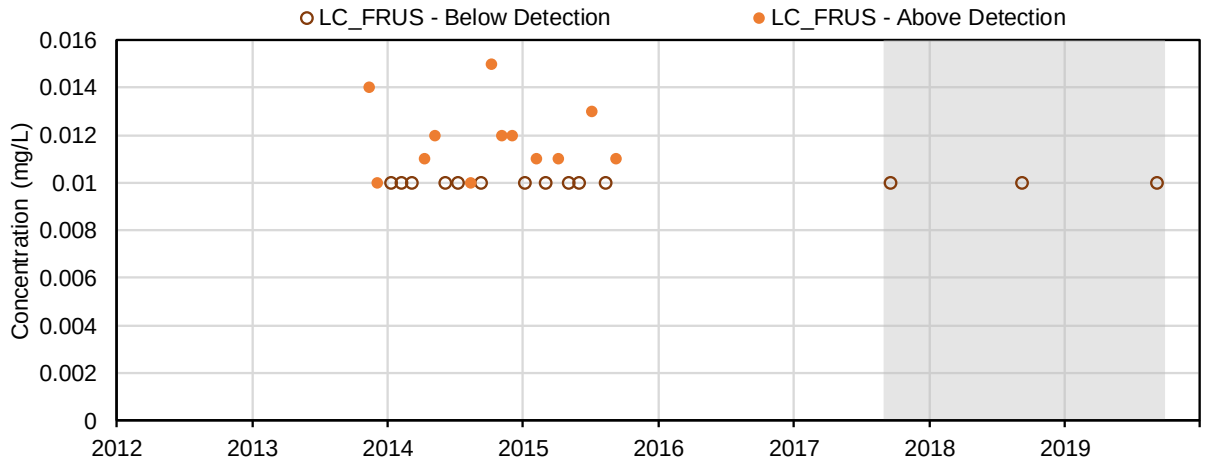
(49) Beryllium (mg/L); Total Metals



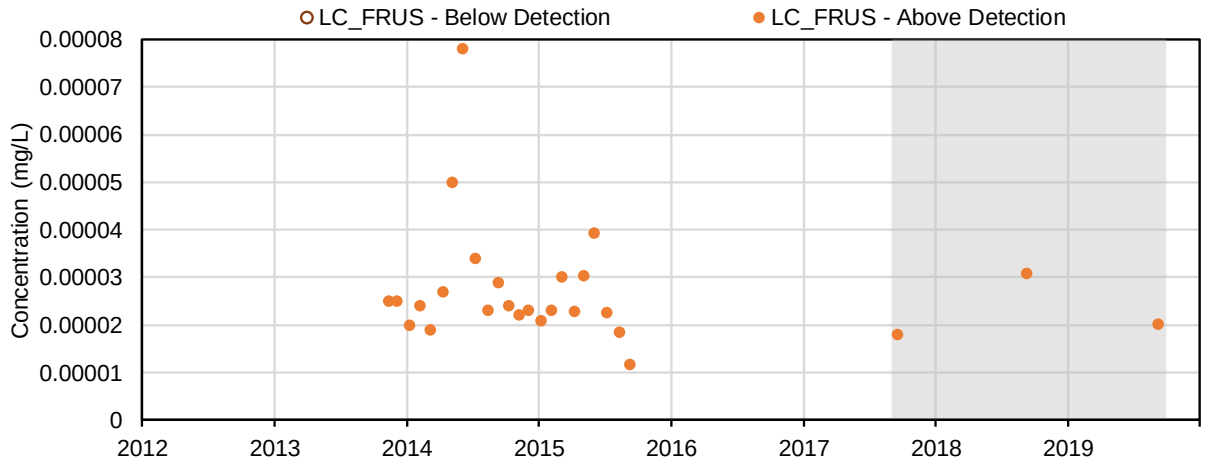
(50) Bismuth (mg/L); Total Metals



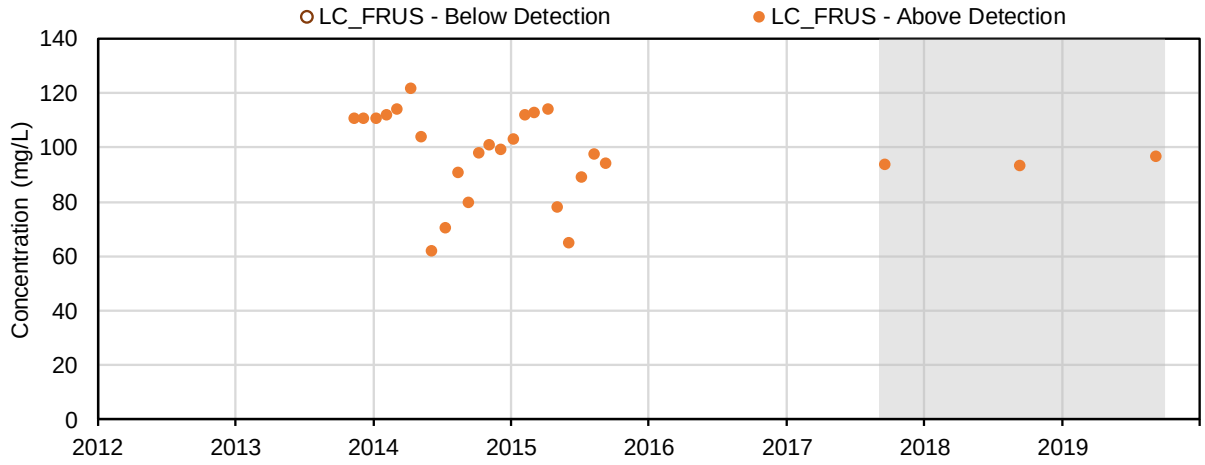
(51) Boron (mg/L); Total Metals



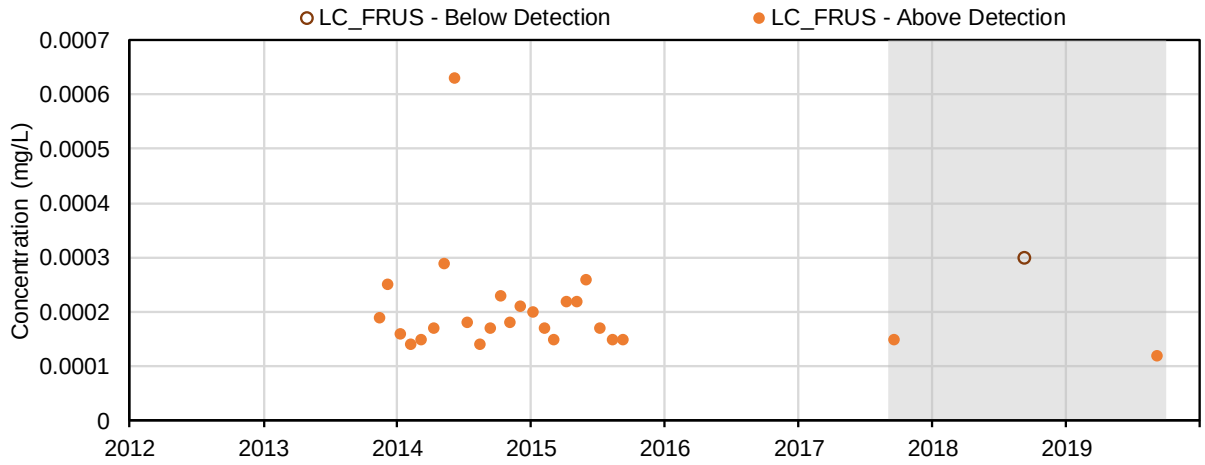
(52) Cadmium (mg/L); Total Metals



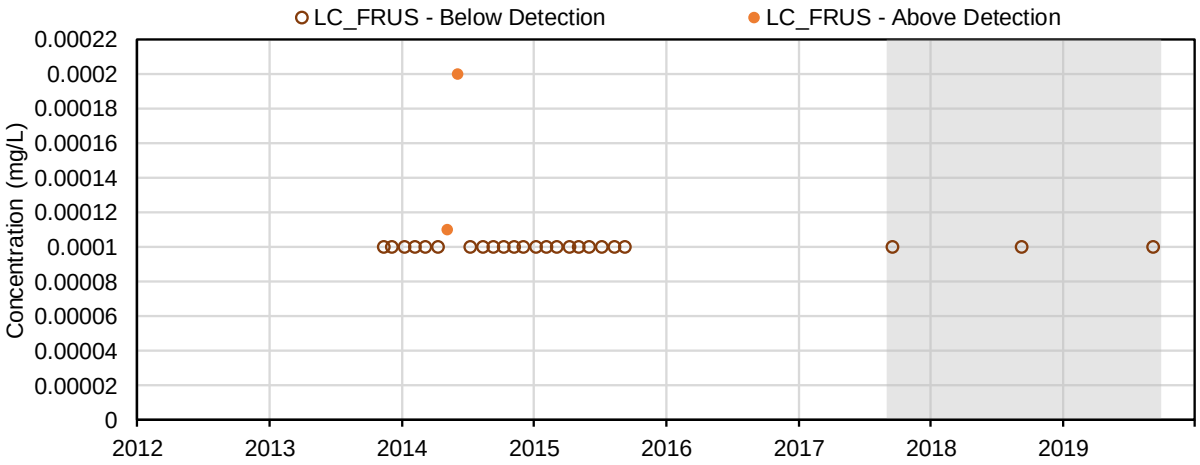
(53) Calcium (mg/L); Total Metals



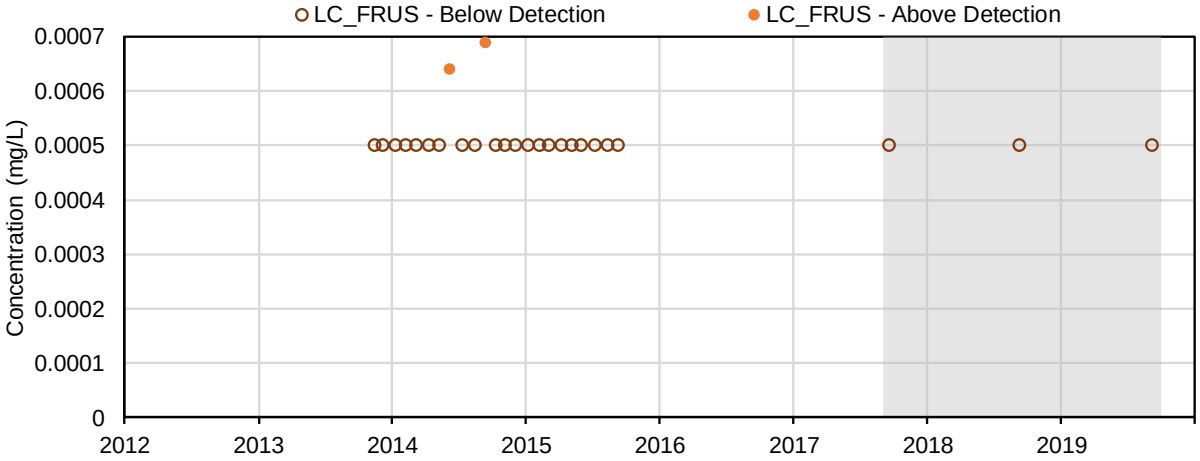
(54) Chromium (mg/L); Total Metals



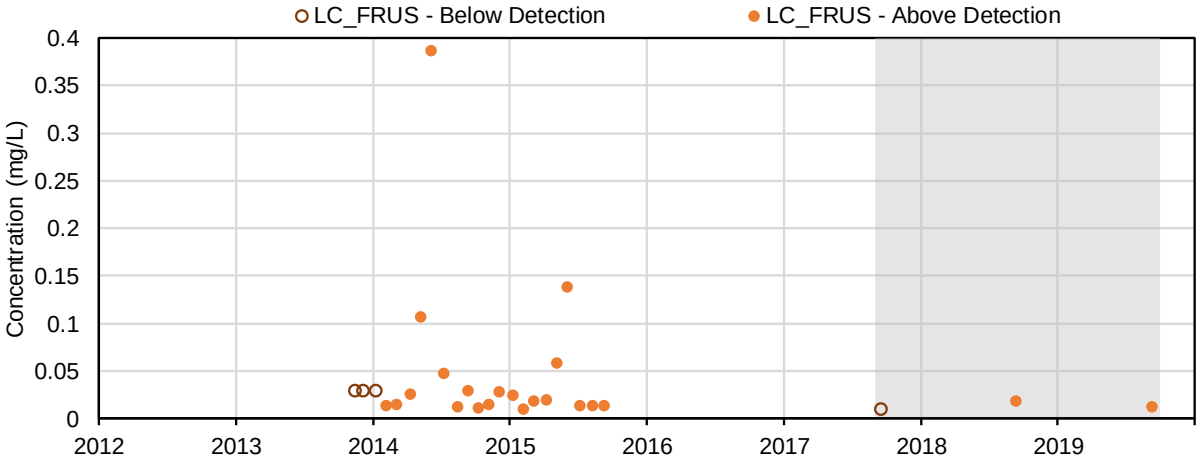
(55) Cobalt (mg/L); Total Metals



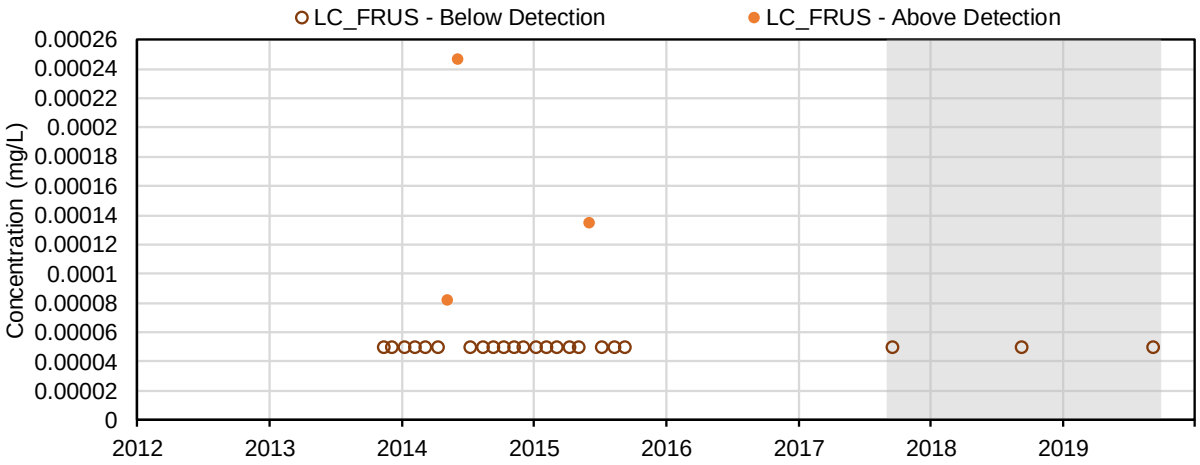
(56) Copper (mg/L); Total Metals



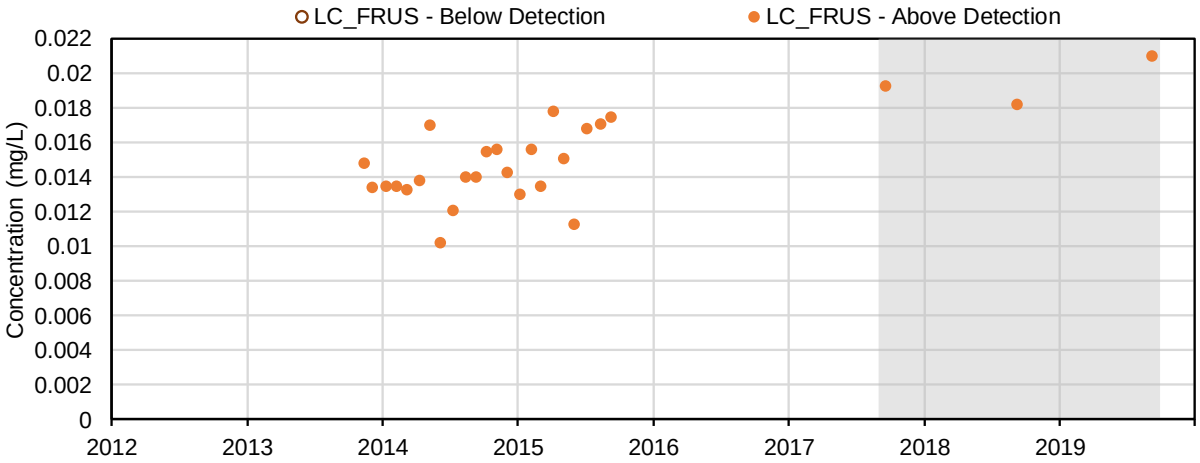
(57) Iron (mg/L); Total Metals



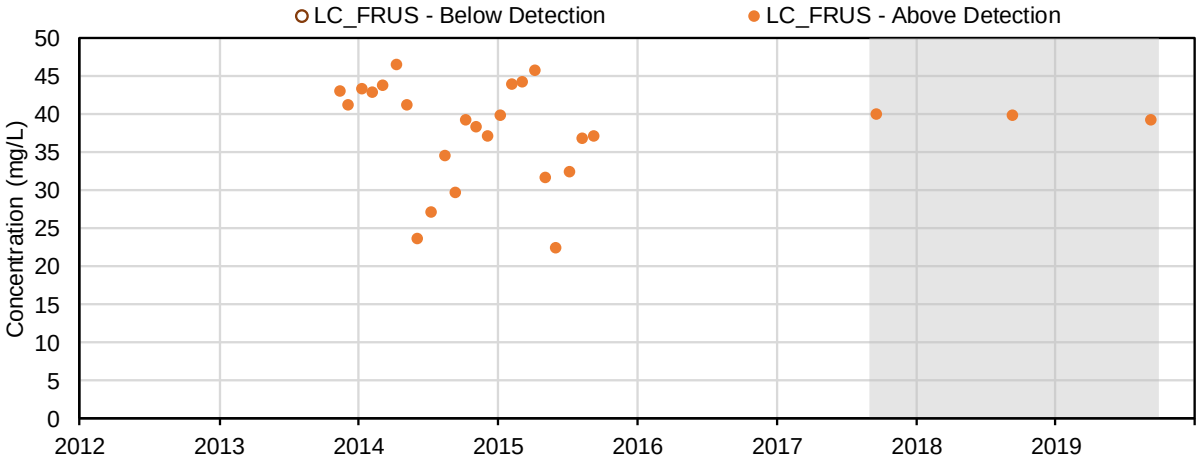
(58) Lead (mg/L); Total Metals



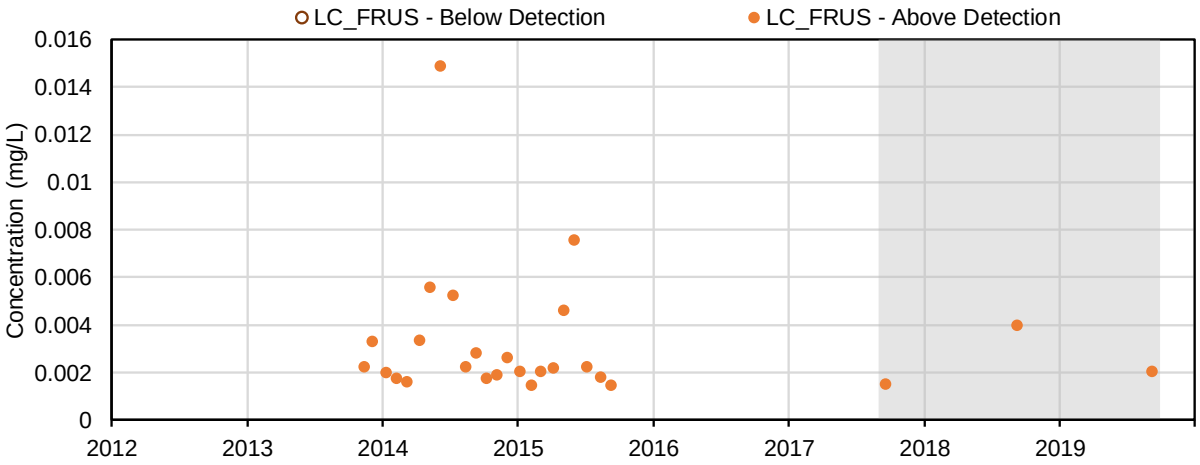
(59) Lithium (mg/L); Total Metals



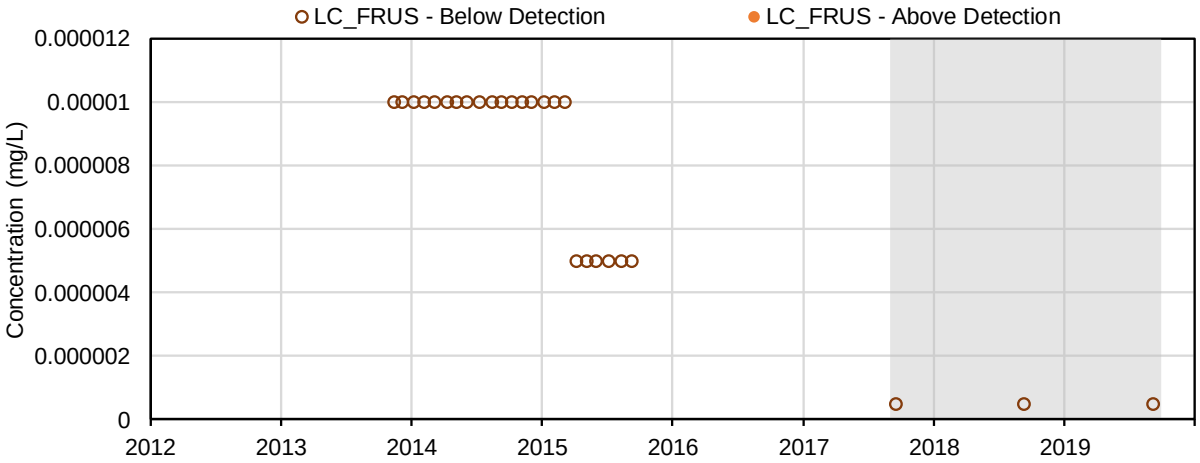
(60) Magnesium (mg/L); Total Metals



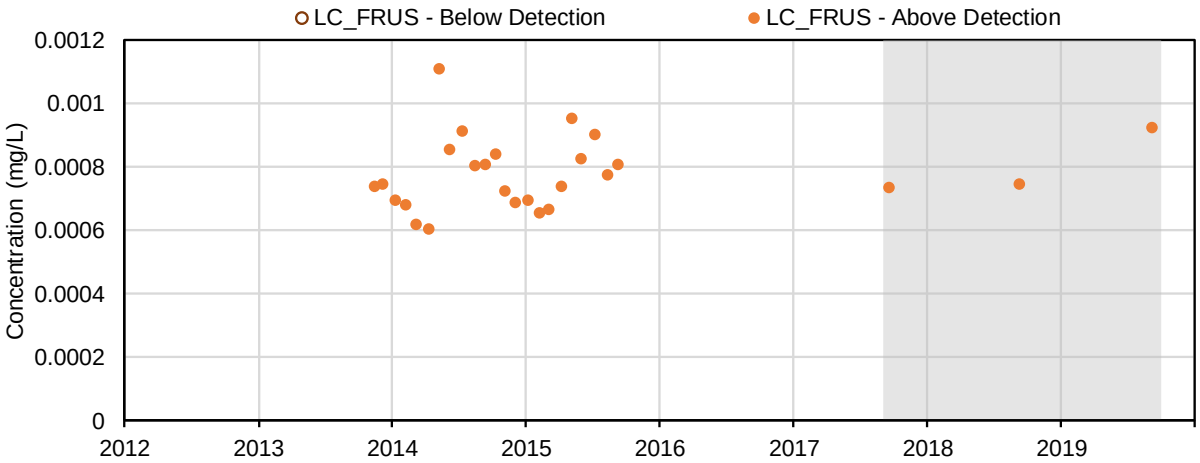
(61) Manganese (mg/L); Total Metals



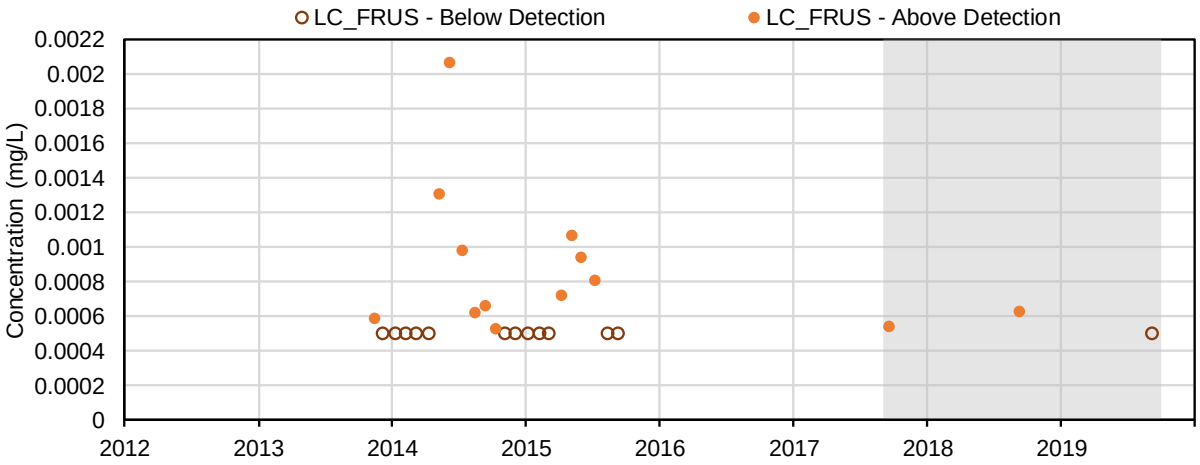
(62) Mercury (mg/L); Total Metals



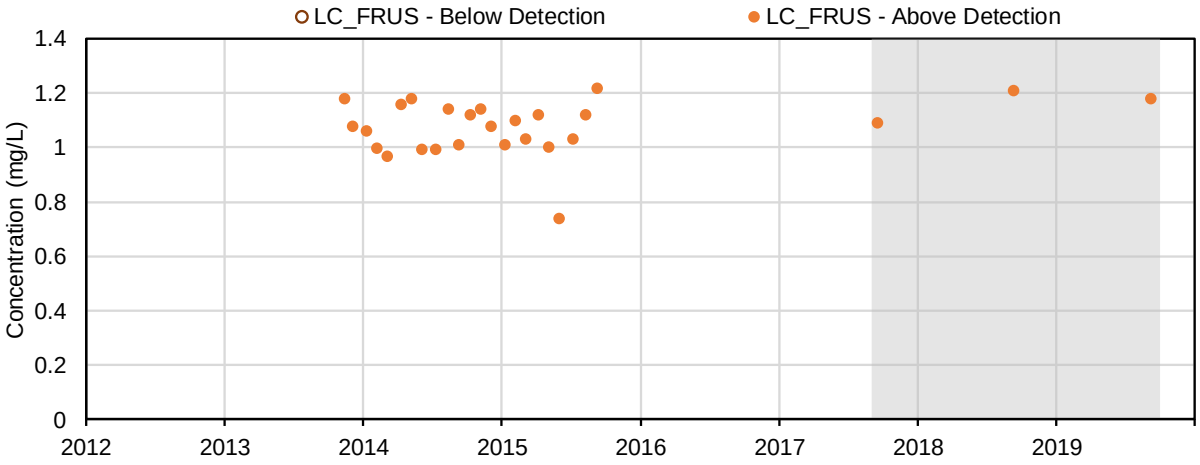
(63) Molybdenum (mg/L); Total Metals



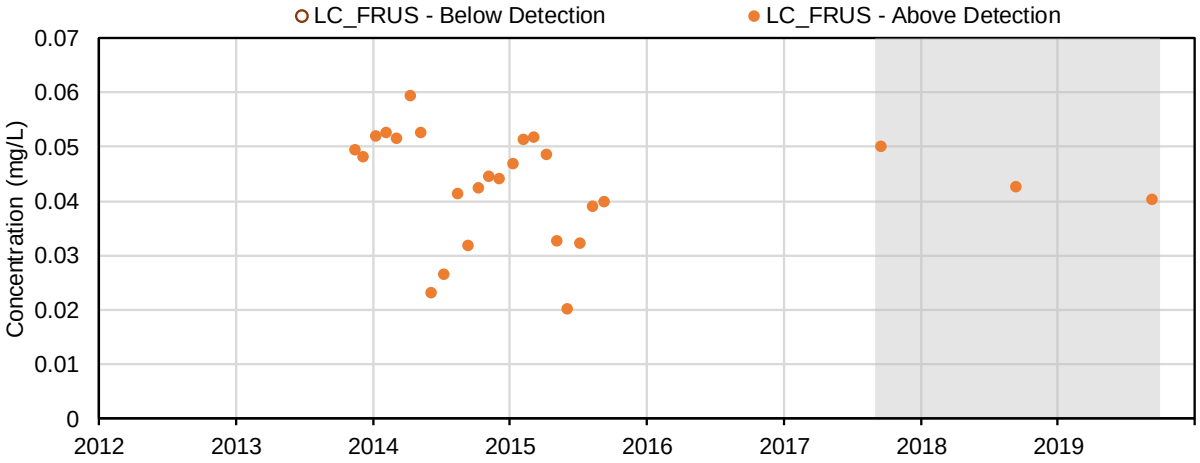
(64) Nickel (mg/L); Total Metals



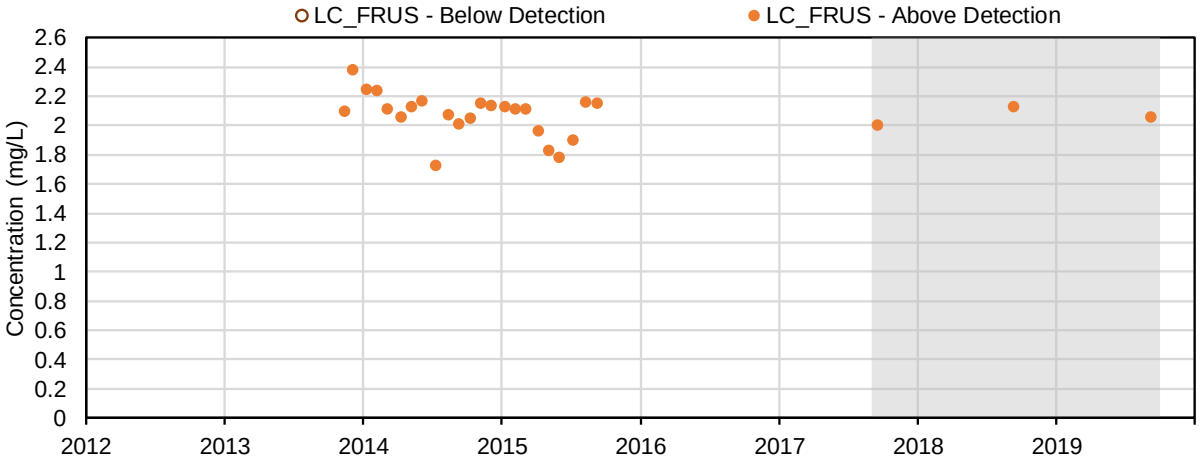
(65) Potassium (mg/L); Total Metals



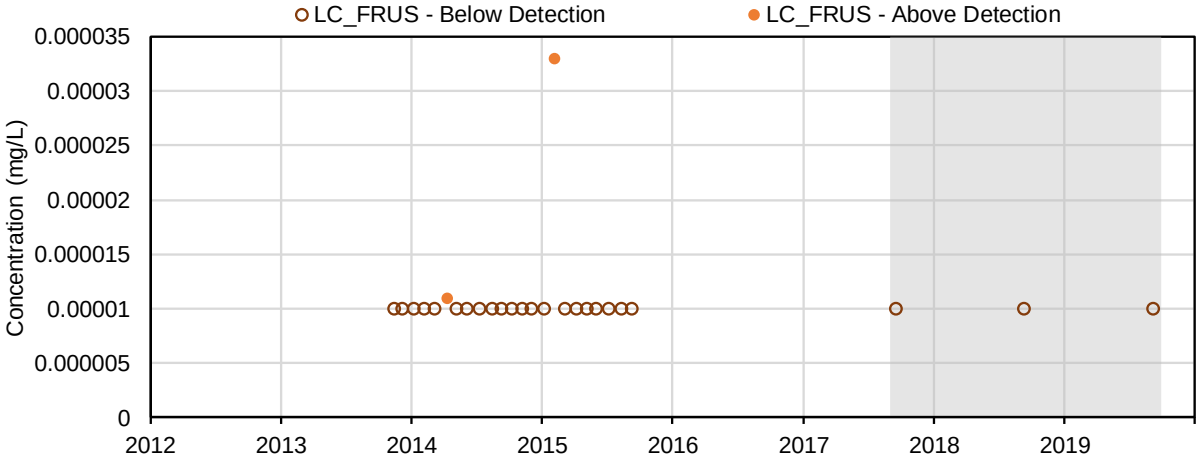
(66) Selenium (mg/L); Total Metals



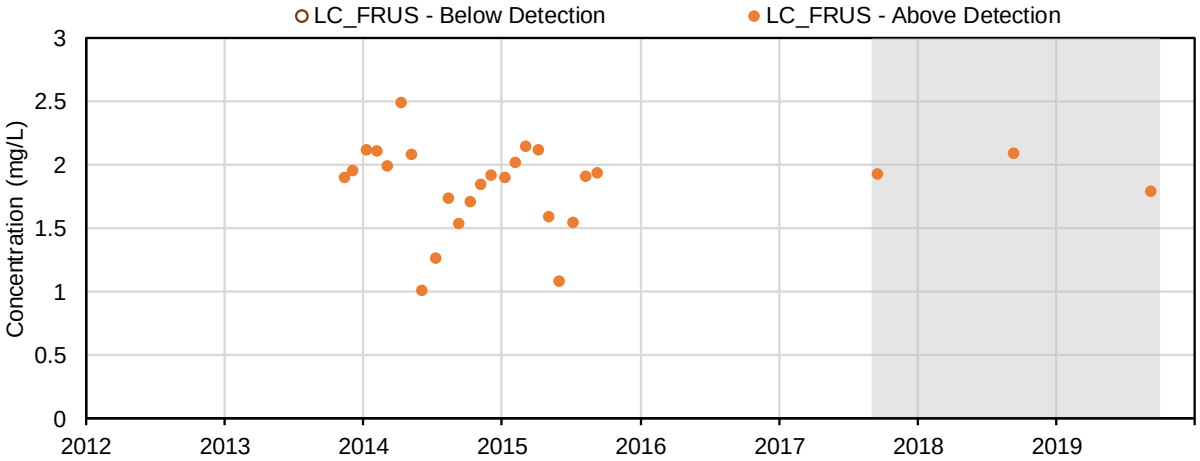
(67) Silicon (mg/L); Total Metals



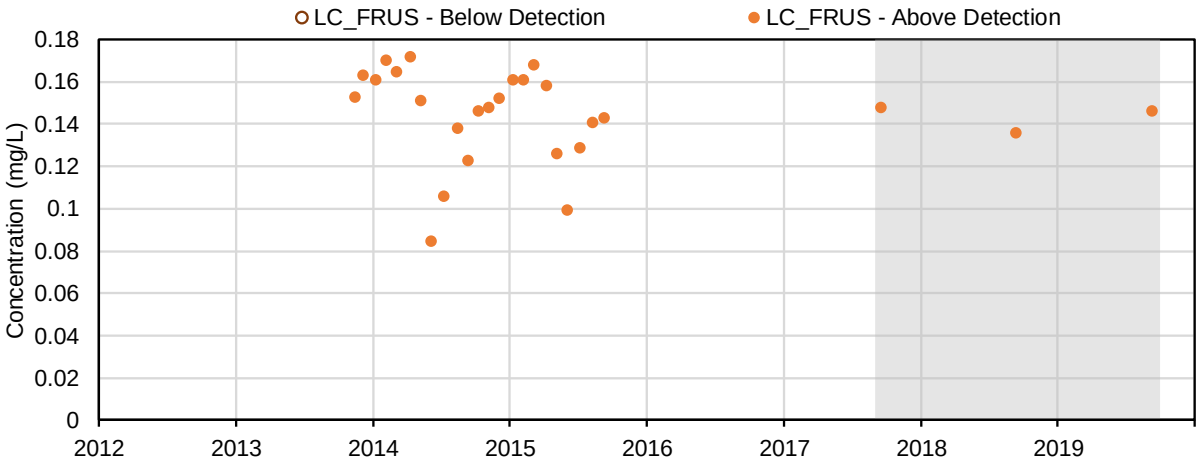
(68) Silver (mg/L); Total Metals



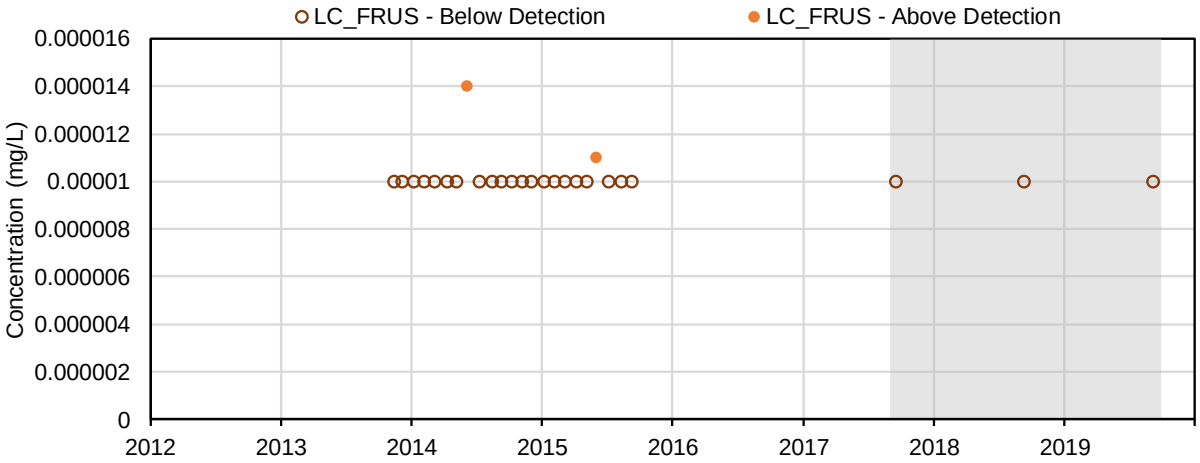
(69) Sodium (mg/L); Total Metals



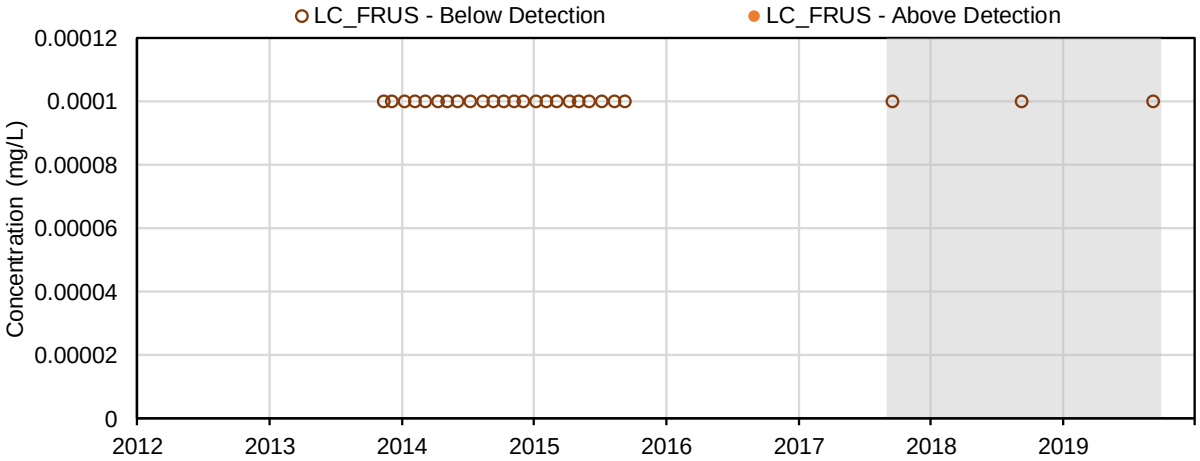
(70) Strontium (mg/L); Total Metals



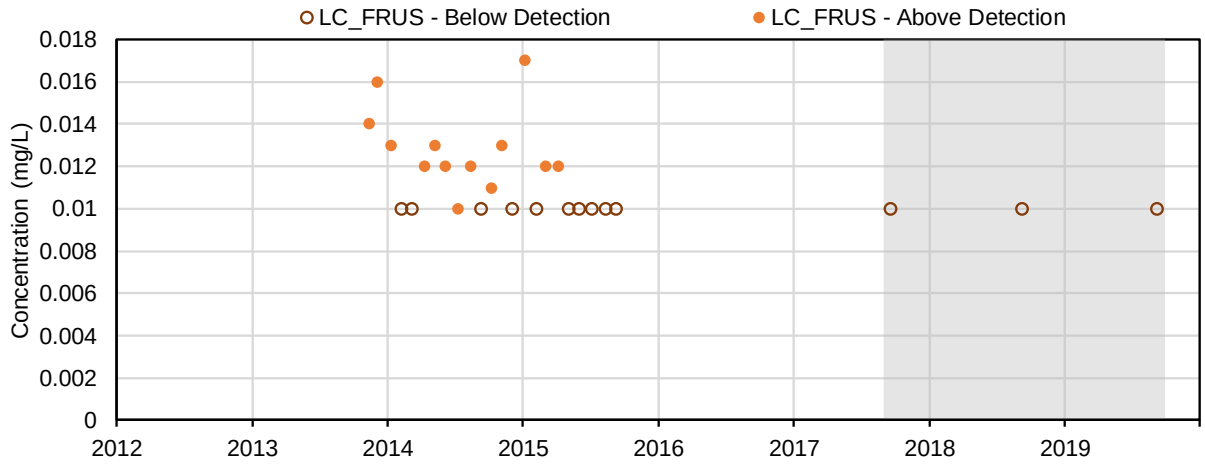
(71) Thallium (mg/L); Total Metals



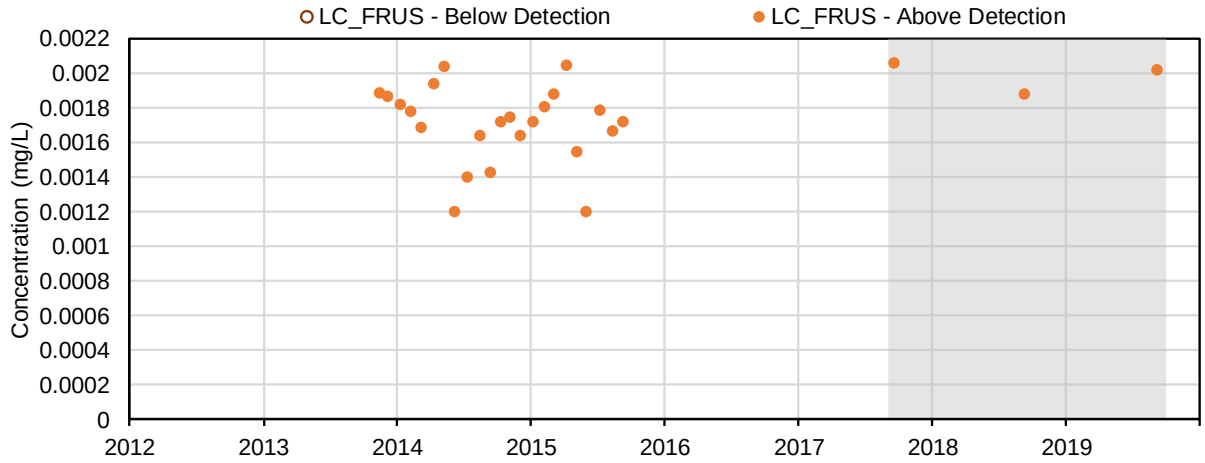
(72) Tin (mg/L); Total Metals



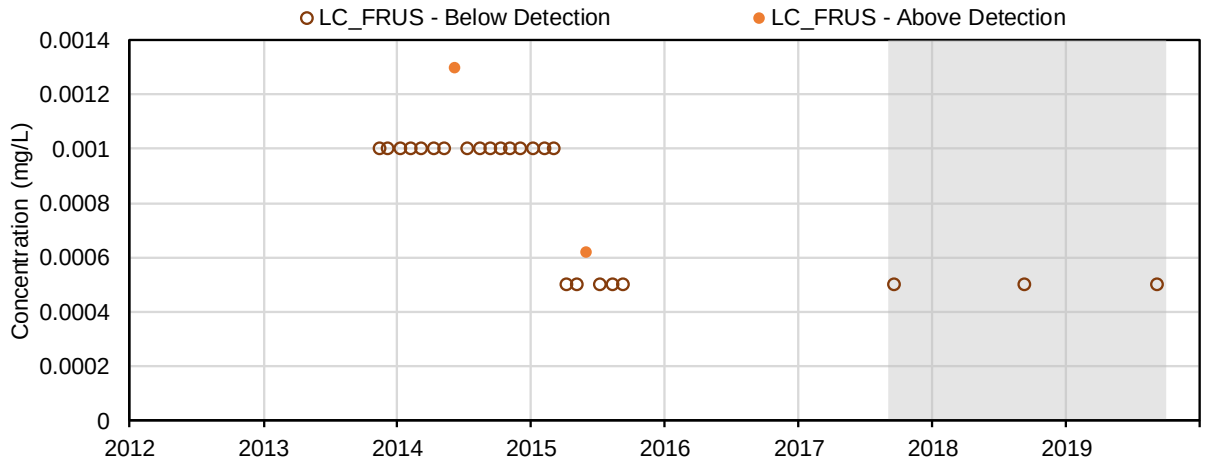
(73) Titanium (mg/L); Total Metals



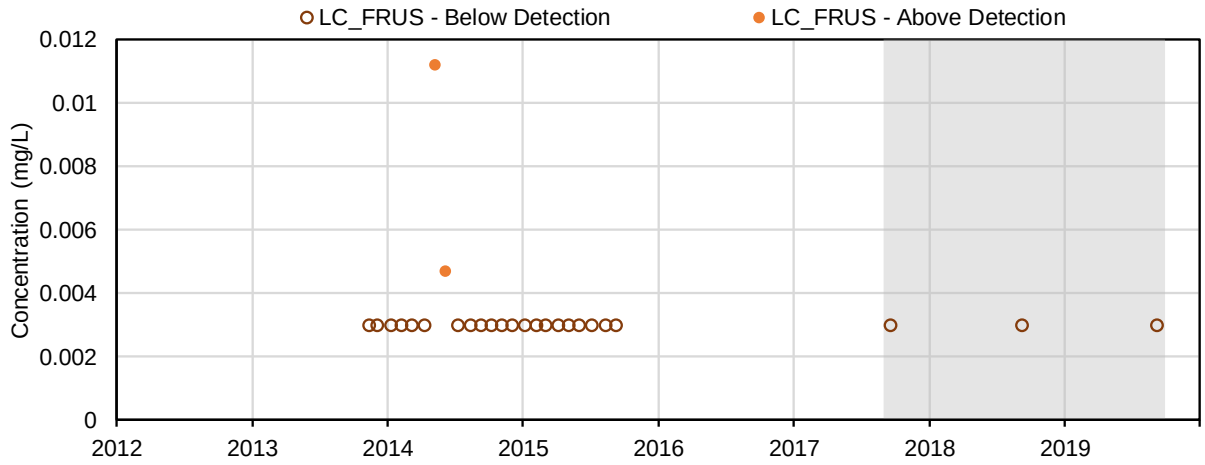
(74) Uranium (mg/L); Total Metals



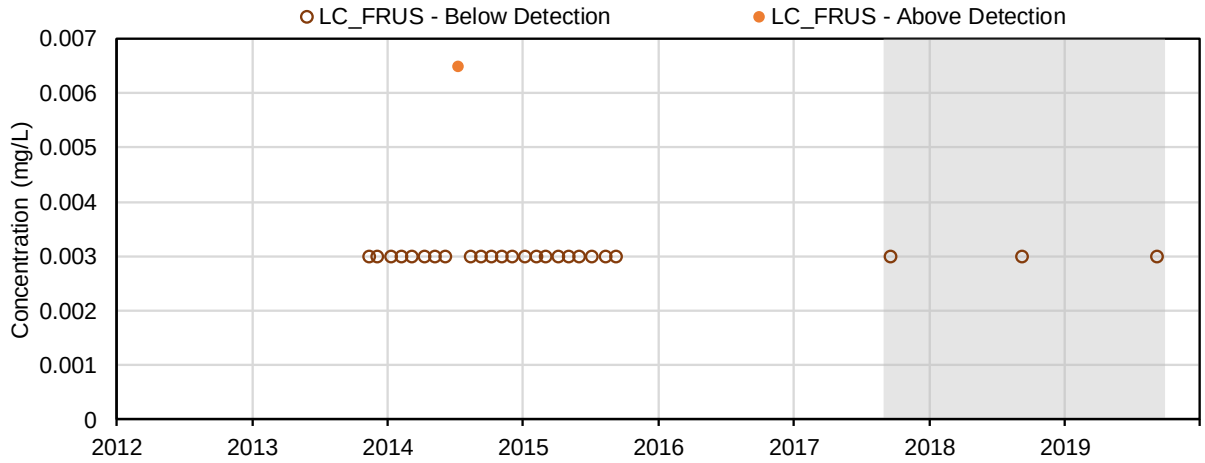
(75) Vanadium (mg/L); Total Metals



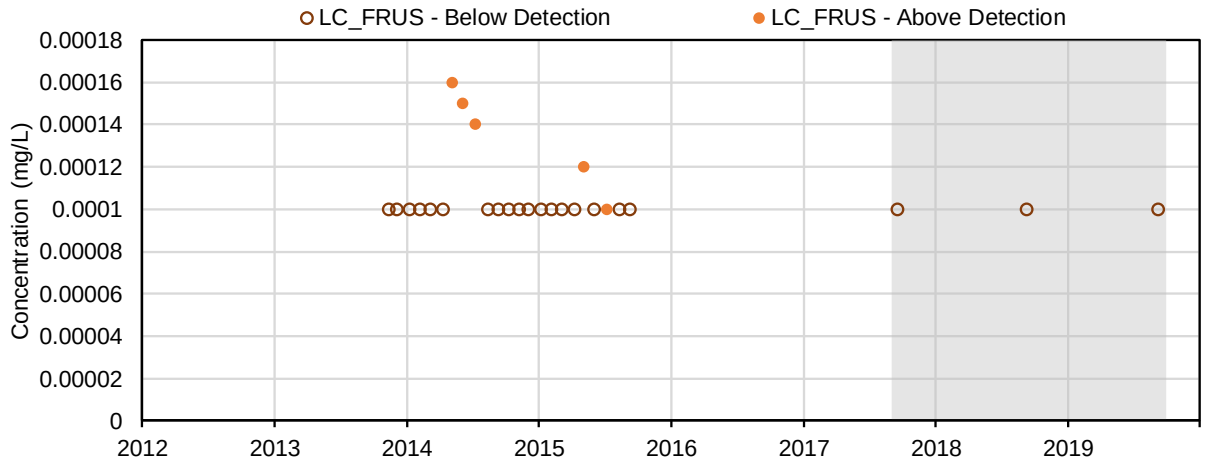
(76) Zinc (mg/L); Total Metals



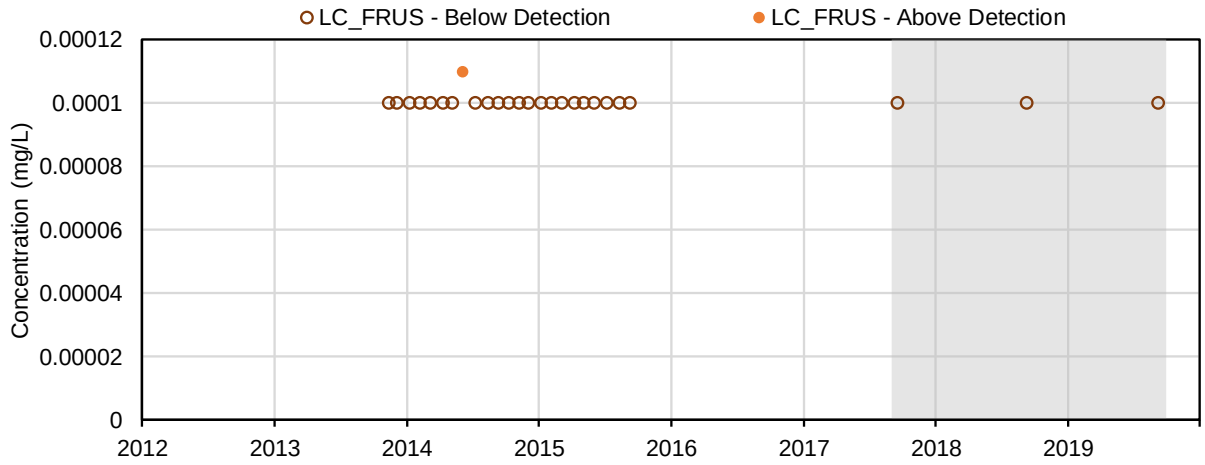
(77) Aluminum (mg/L); Dissolved Metals



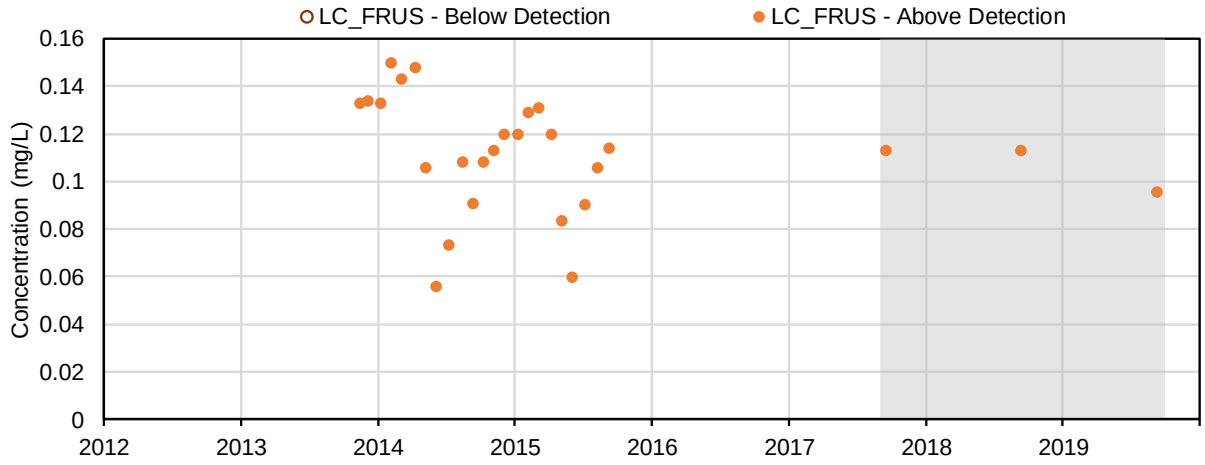
(78) Antimony (mg/L); Dissolved Metals



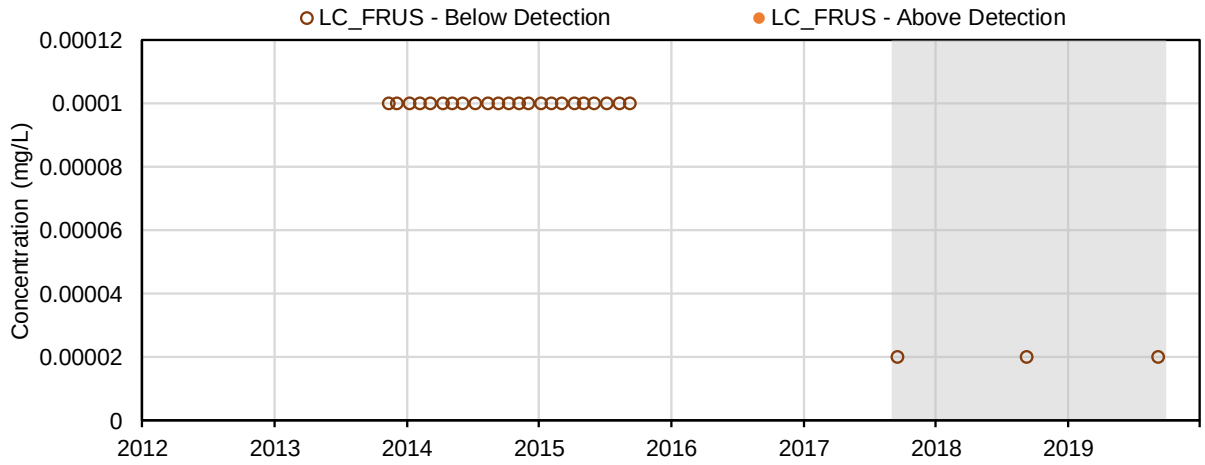
(79) Arsenic (mg/L); Dissolved Metals



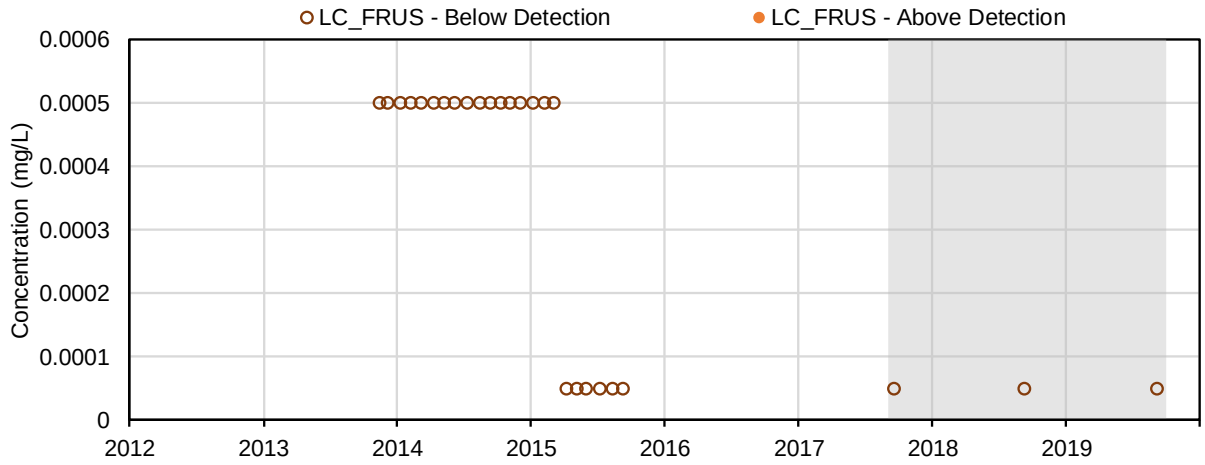
(80) Barium (mg/L); Dissolved Metals



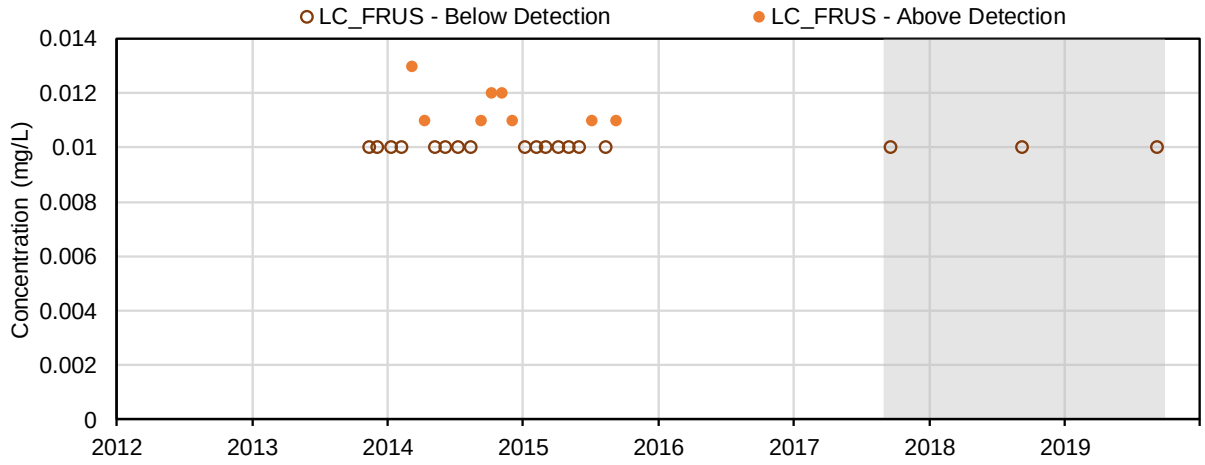
(81) Beryllium (mg/L); Dissolved Metals



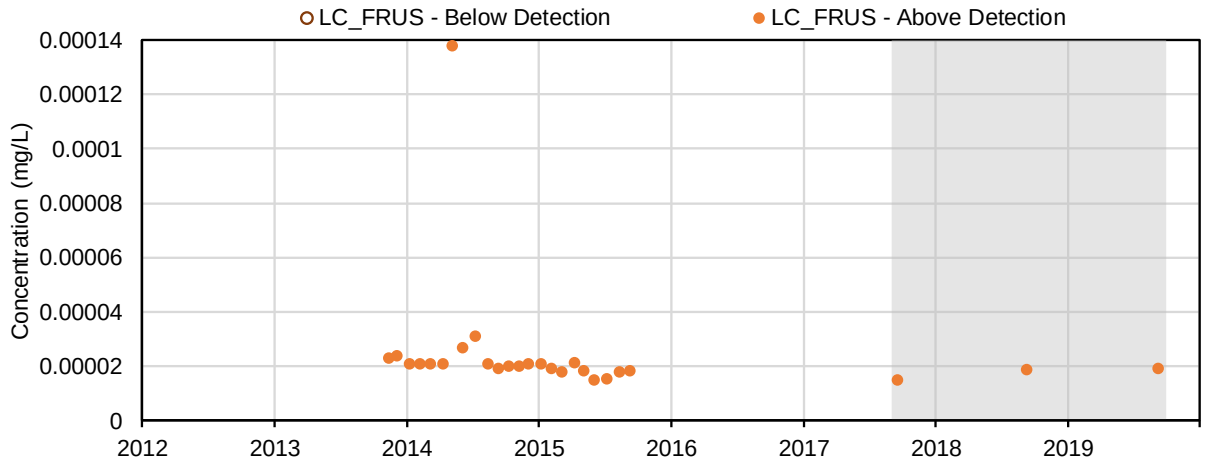
(82) Bismuth (mg/L); Dissolved Metals



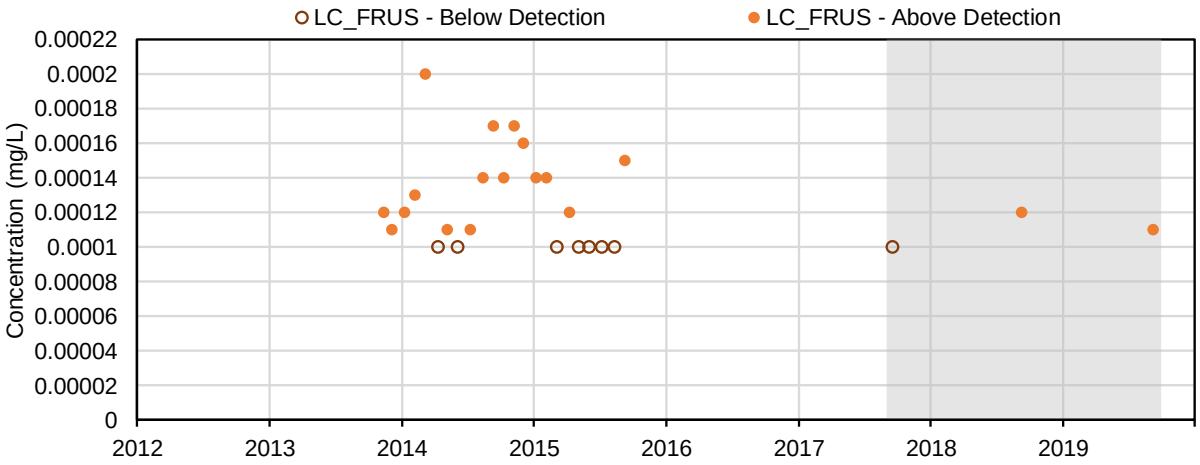
(83) Boron (mg/L); Dissolved Metals



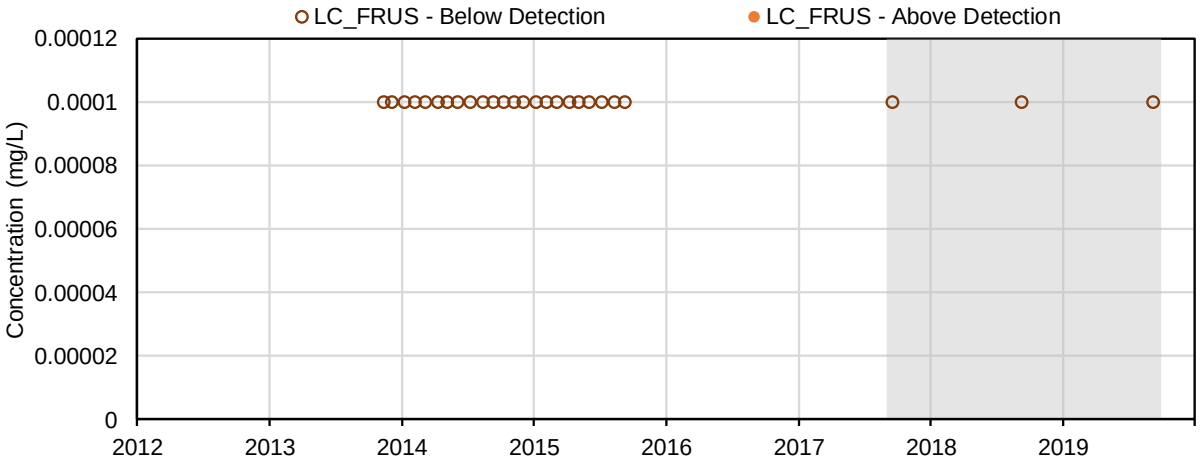
(84) Cadmium (mg/L); Dissolved Metals



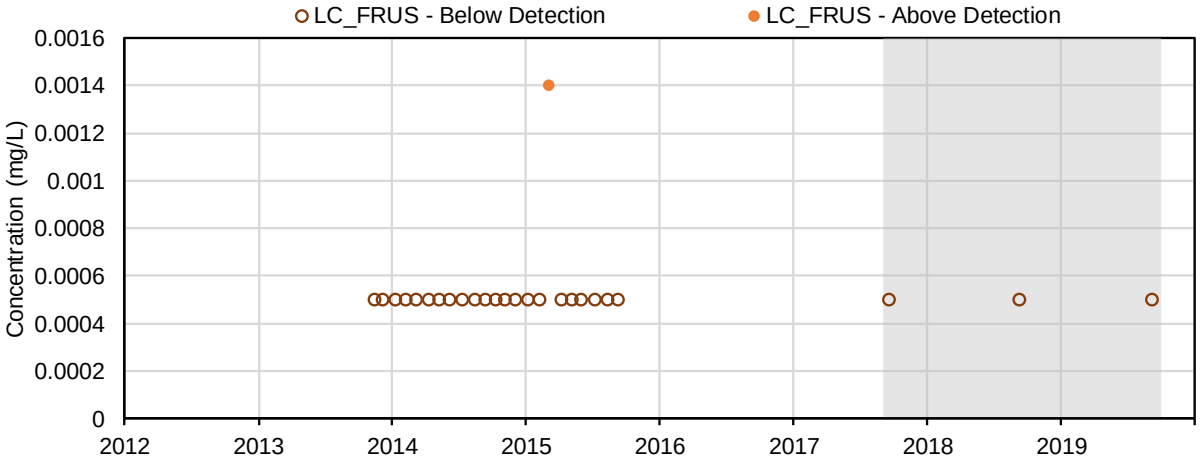
(85) Chromium (mg/L); Dissolved Metals



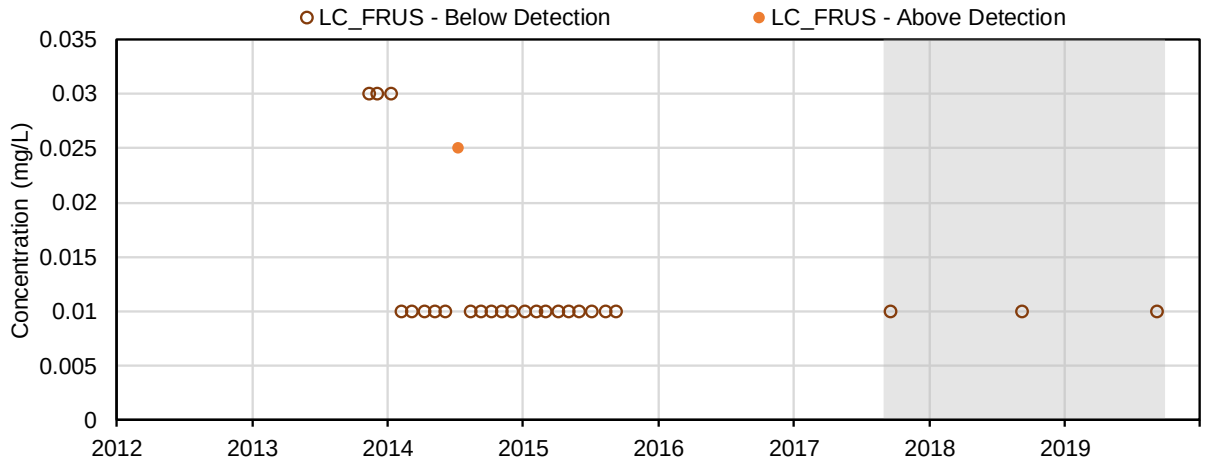
(86) Cobalt (mg/L); Dissolved Metals



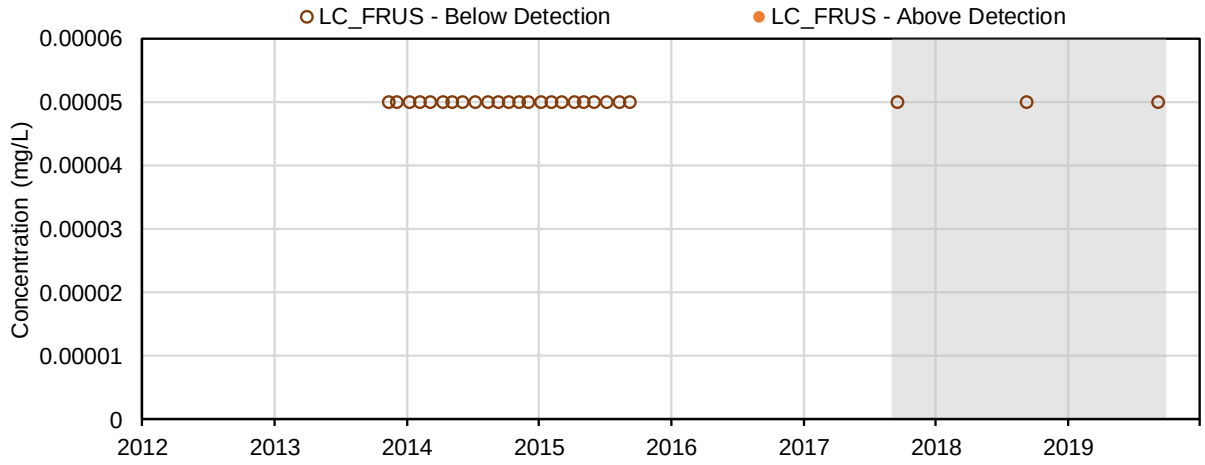
(87) Copper (mg/L); Dissolved Metals



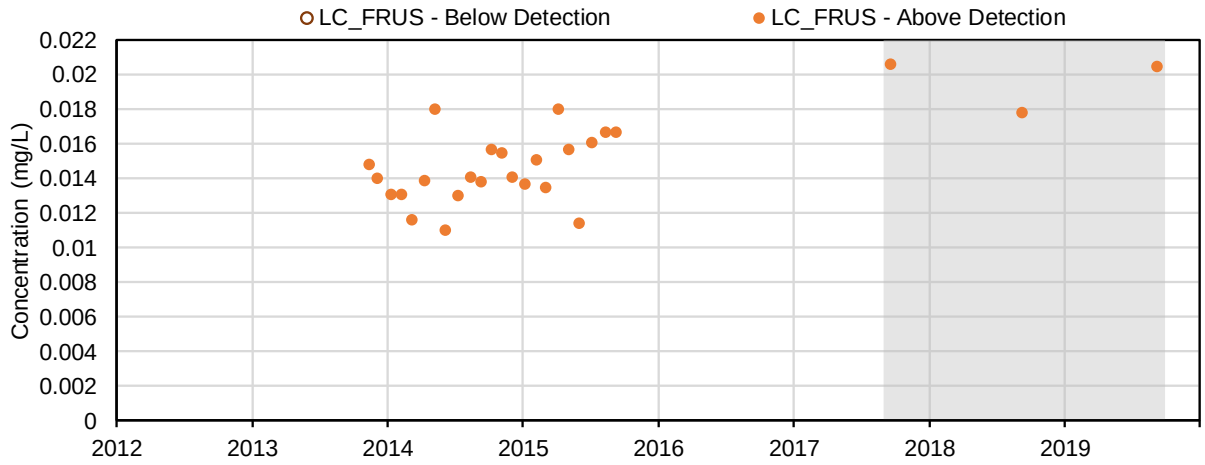
(88) Iron (mg/L); Dissolved Metals



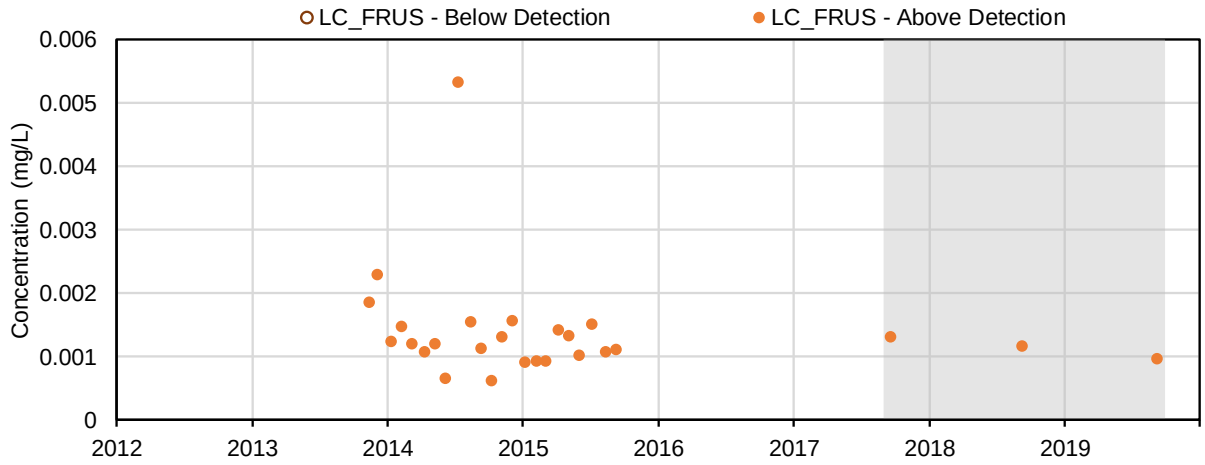
(89) Lead (mg/L); Dissolved Metals



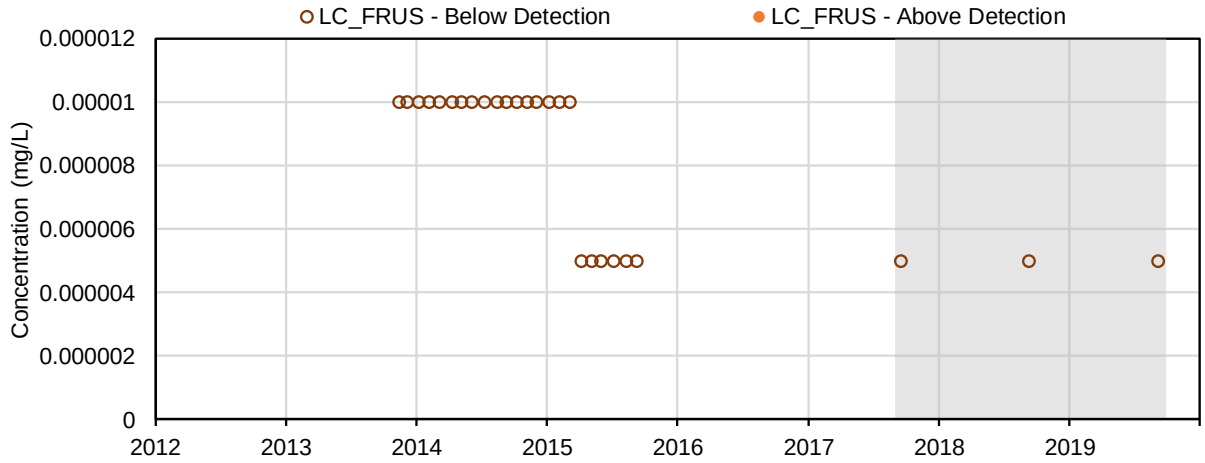
(90) Lithium (mg/L); Dissolved Metals



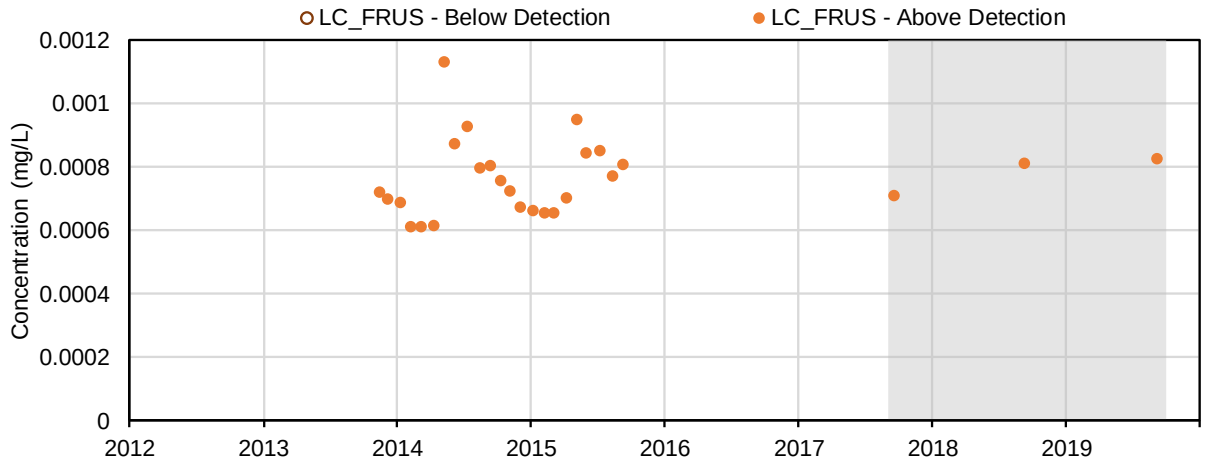
(91) Manganese (mg/L); Dissolved Metals



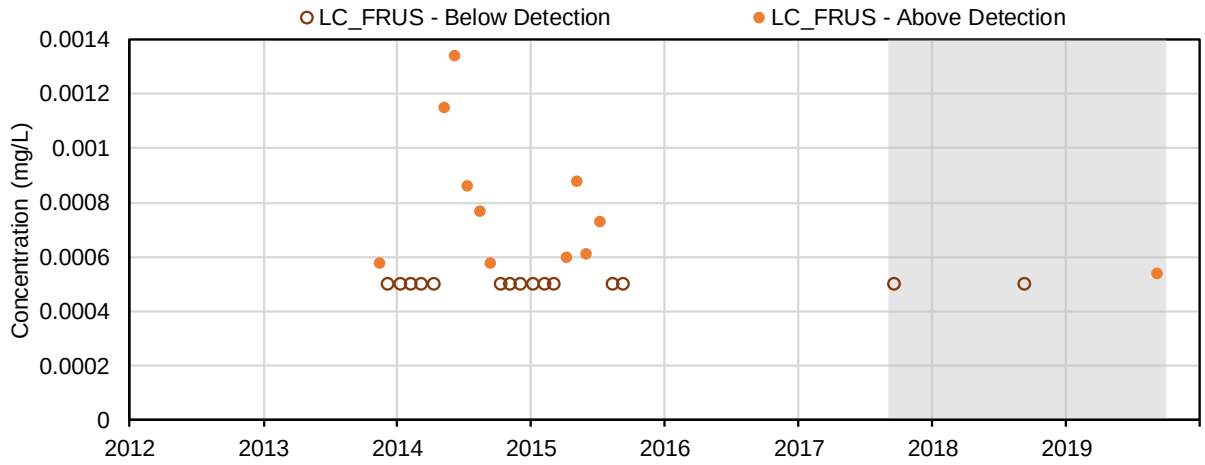
(92) Mercury (mg/L); Dissolved Metals



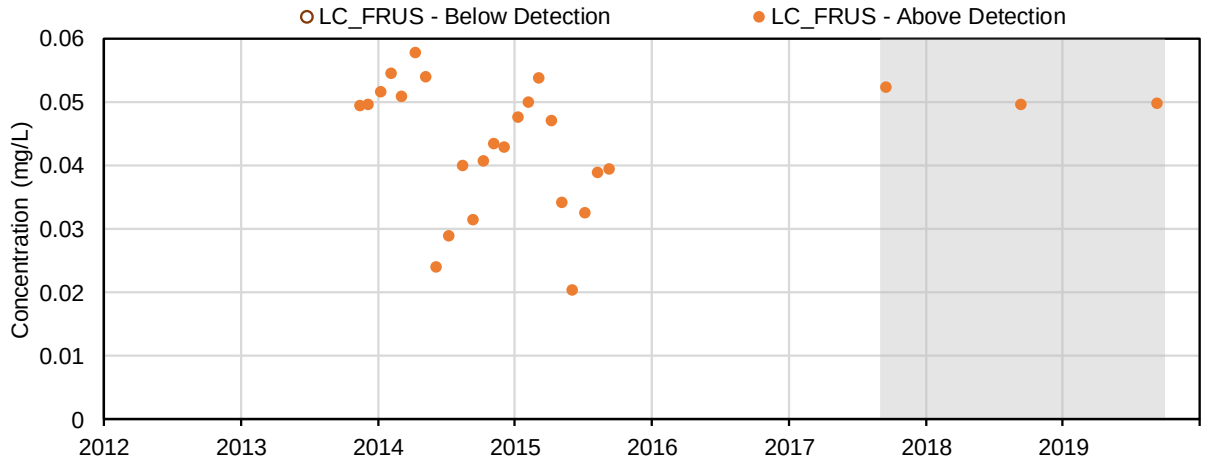
(93) Molybdenum (mg/L); Dissolved Metals



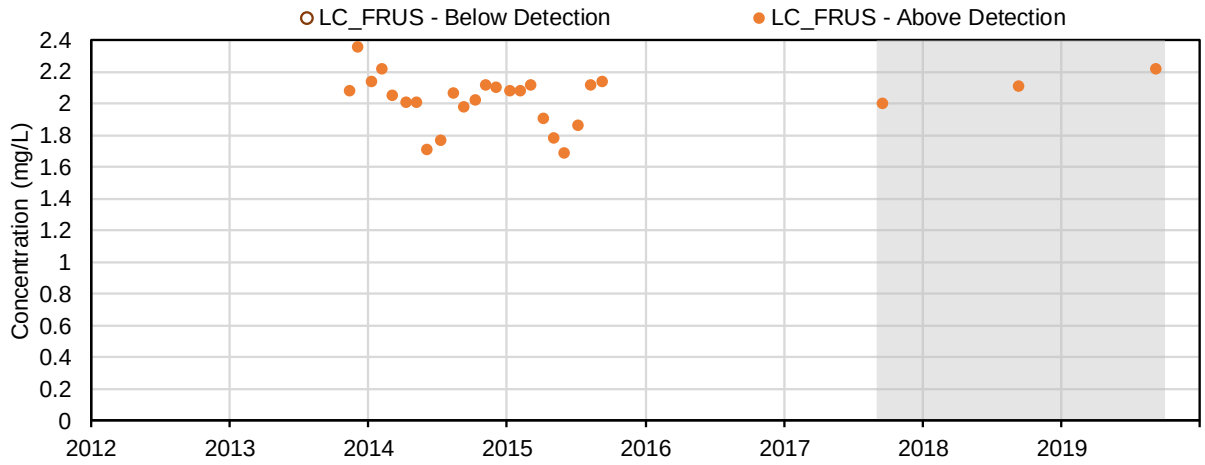
(94) Nickel (mg/L); Dissolved Metals



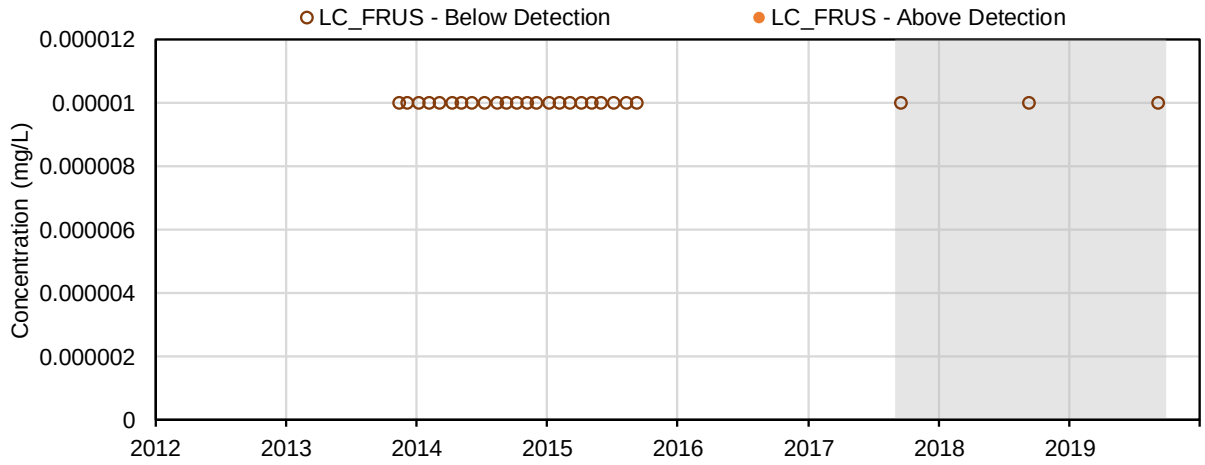
(95) Selenium (mg/L); Dissolved Metals



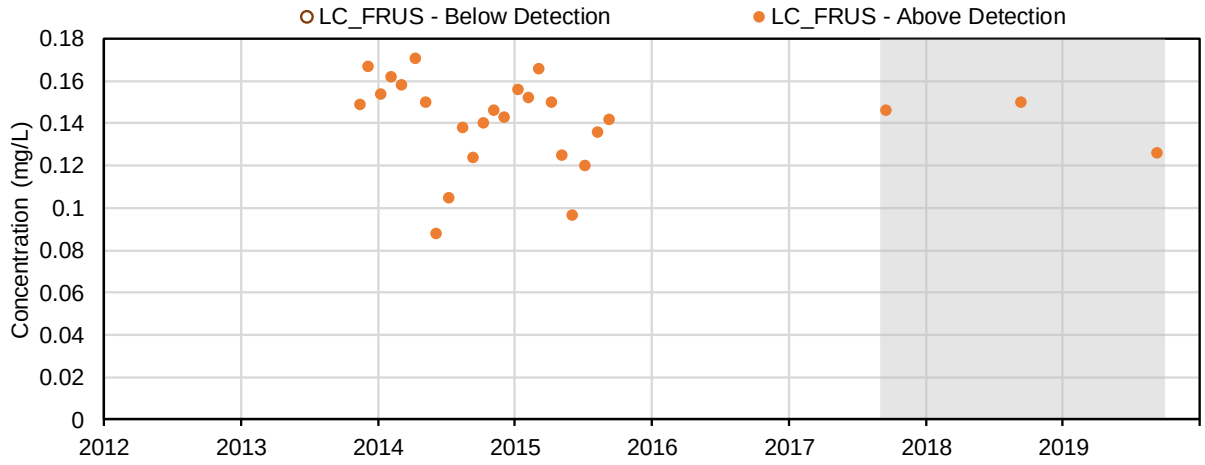
(96) Silicon (mg/L); Dissolved Metals



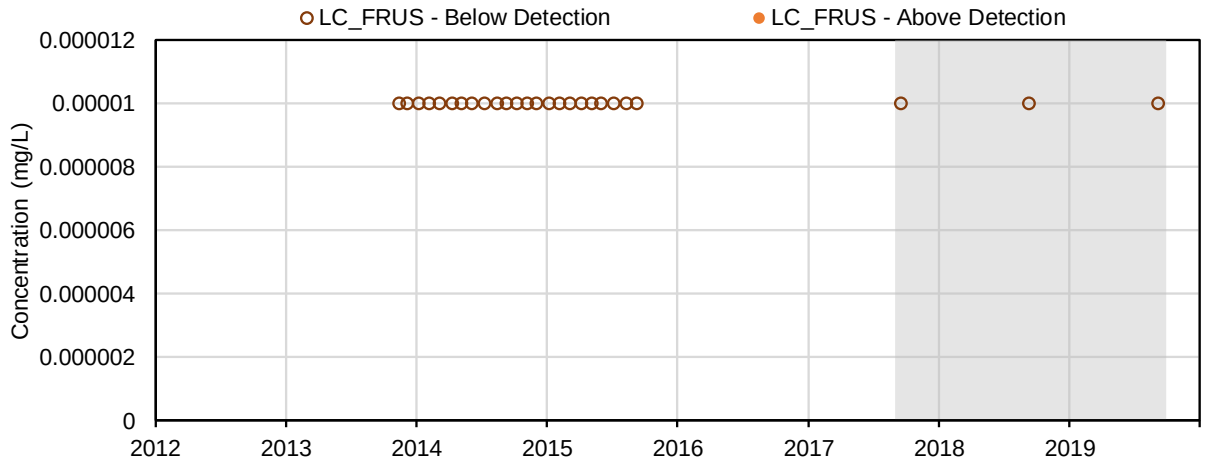
(97) Silver (mg/L); Dissolved Metals



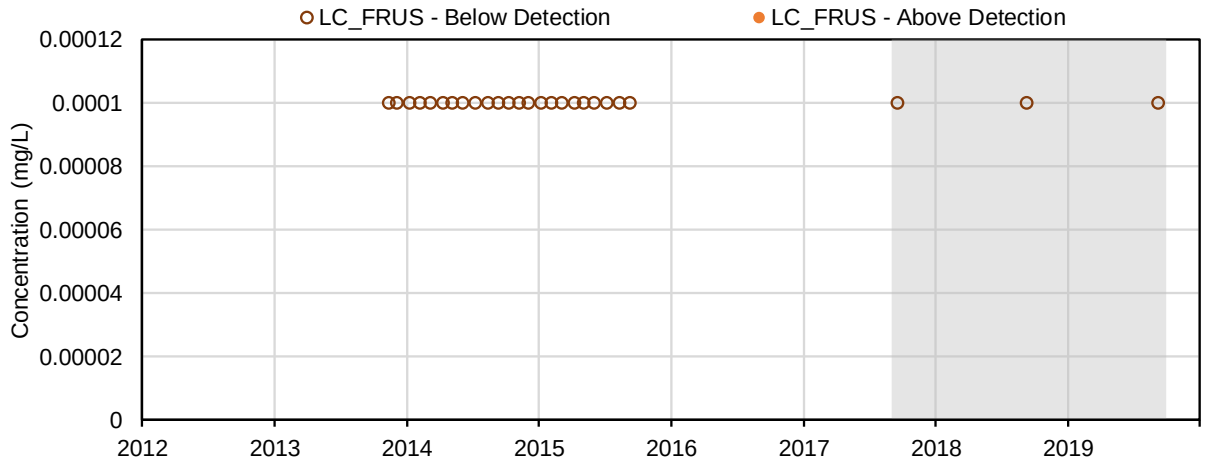
(98) Strontium (mg/L); Dissolved Metals



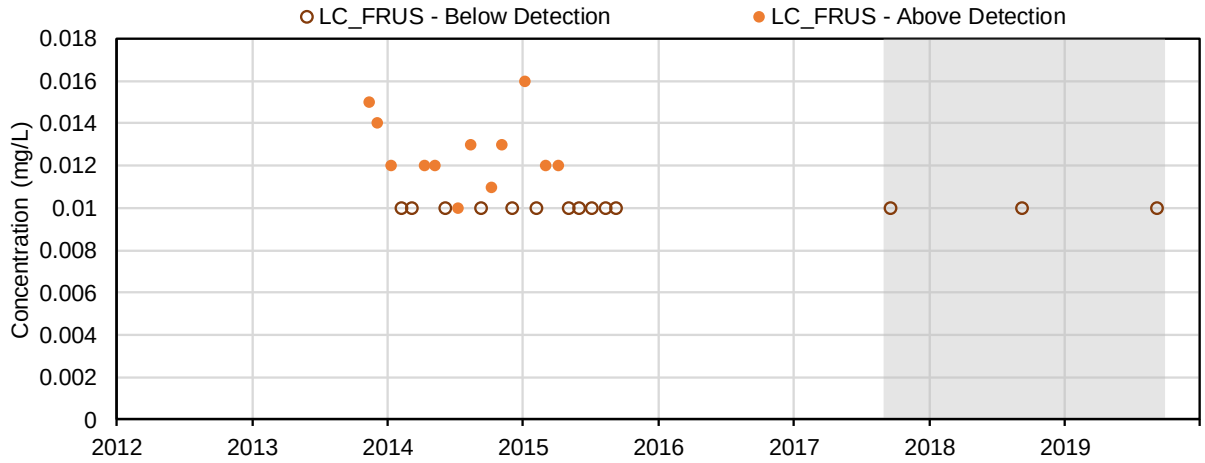
(99) Thallium (mg/L); Dissolved Metals



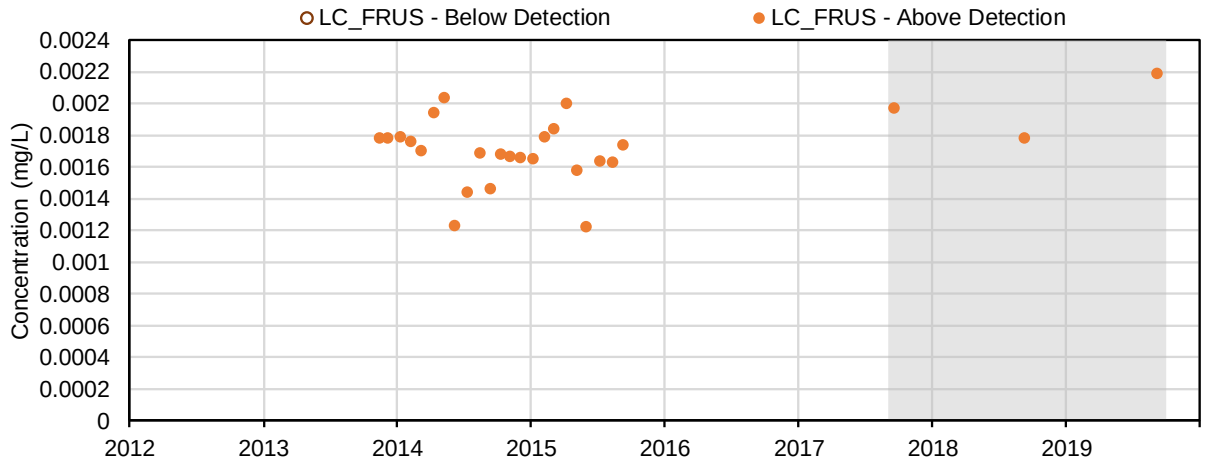
(100) Tin (mg/L); Dissolved Metals



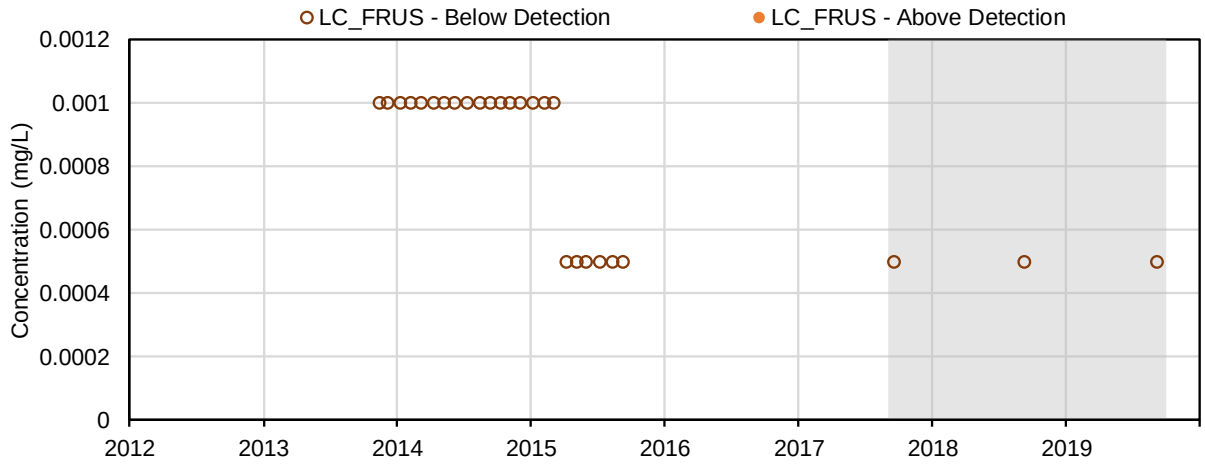
(101) Titanium (mg/L); Dissolved Metals



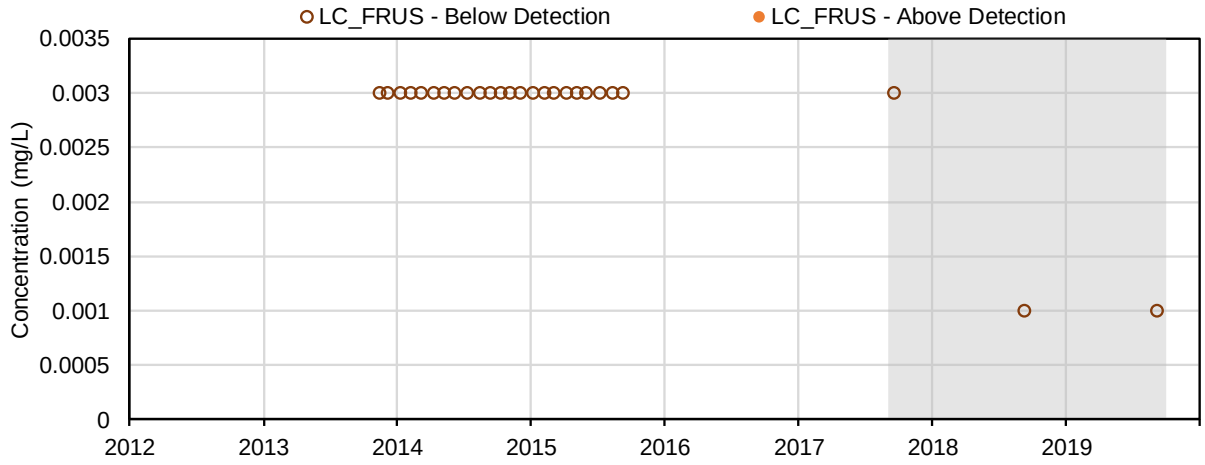
(102) Uranium (mg/L); Dissolved Metals

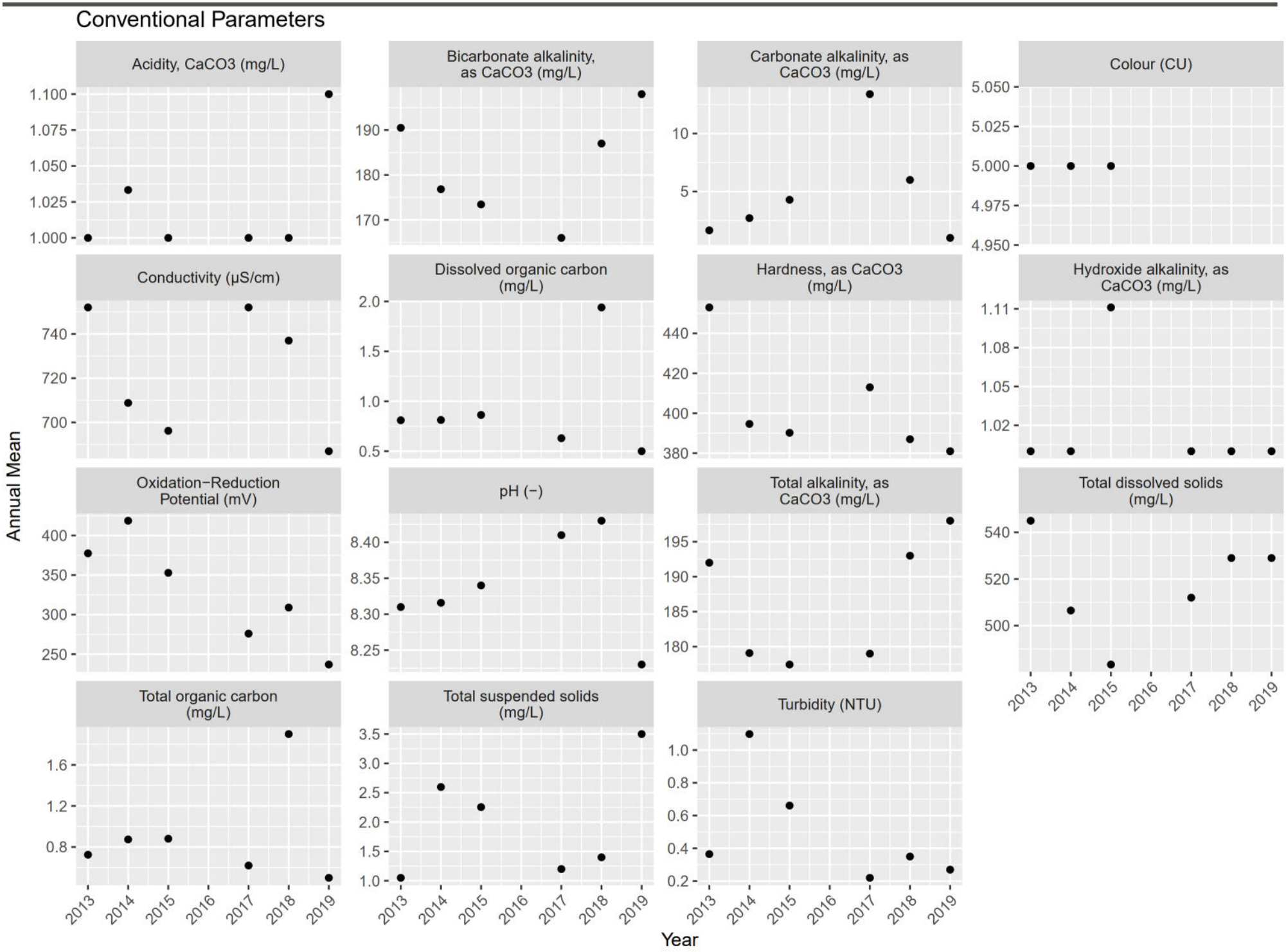


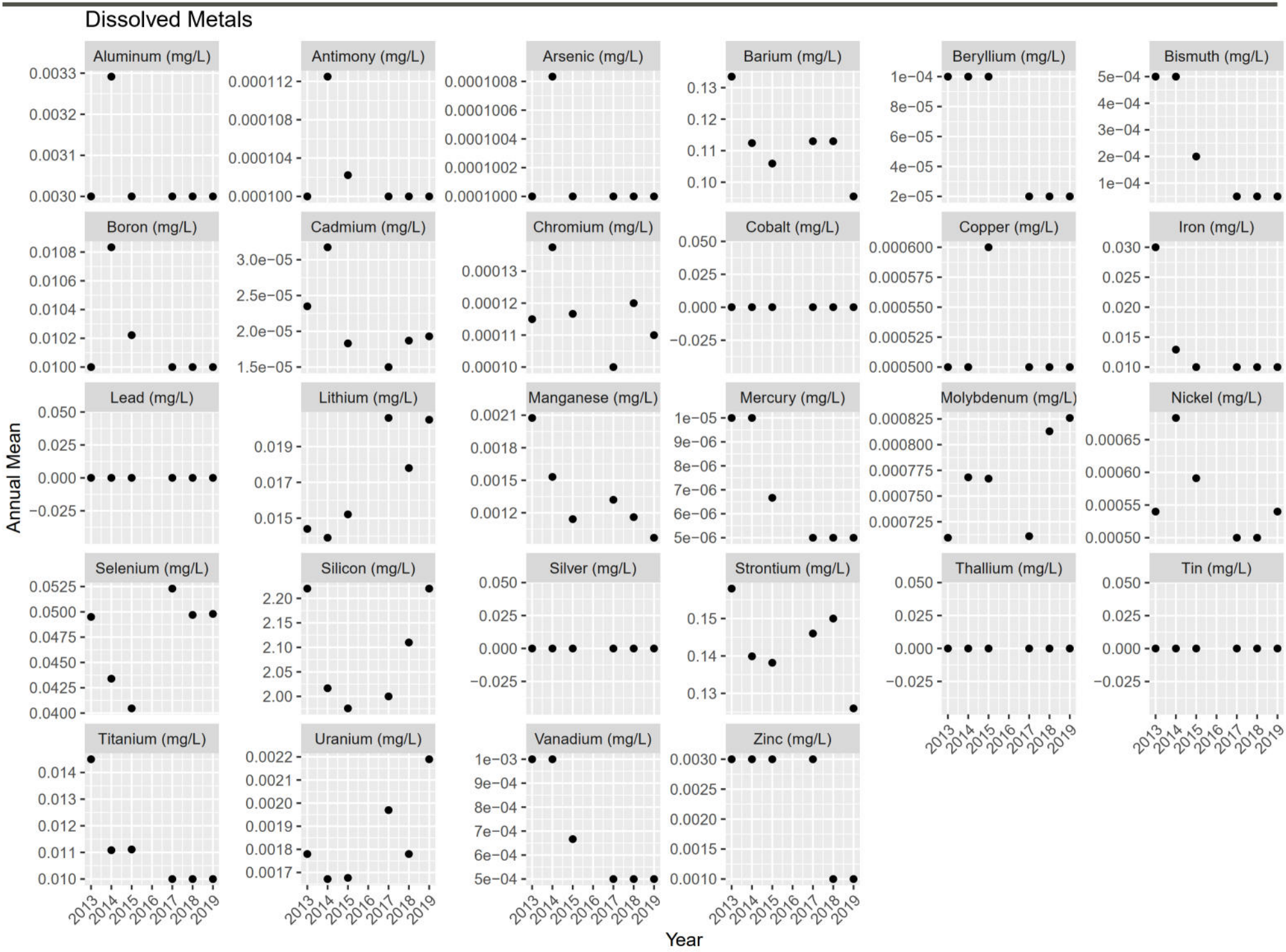
(103) Vanadium (mg/L); Dissolved Metals

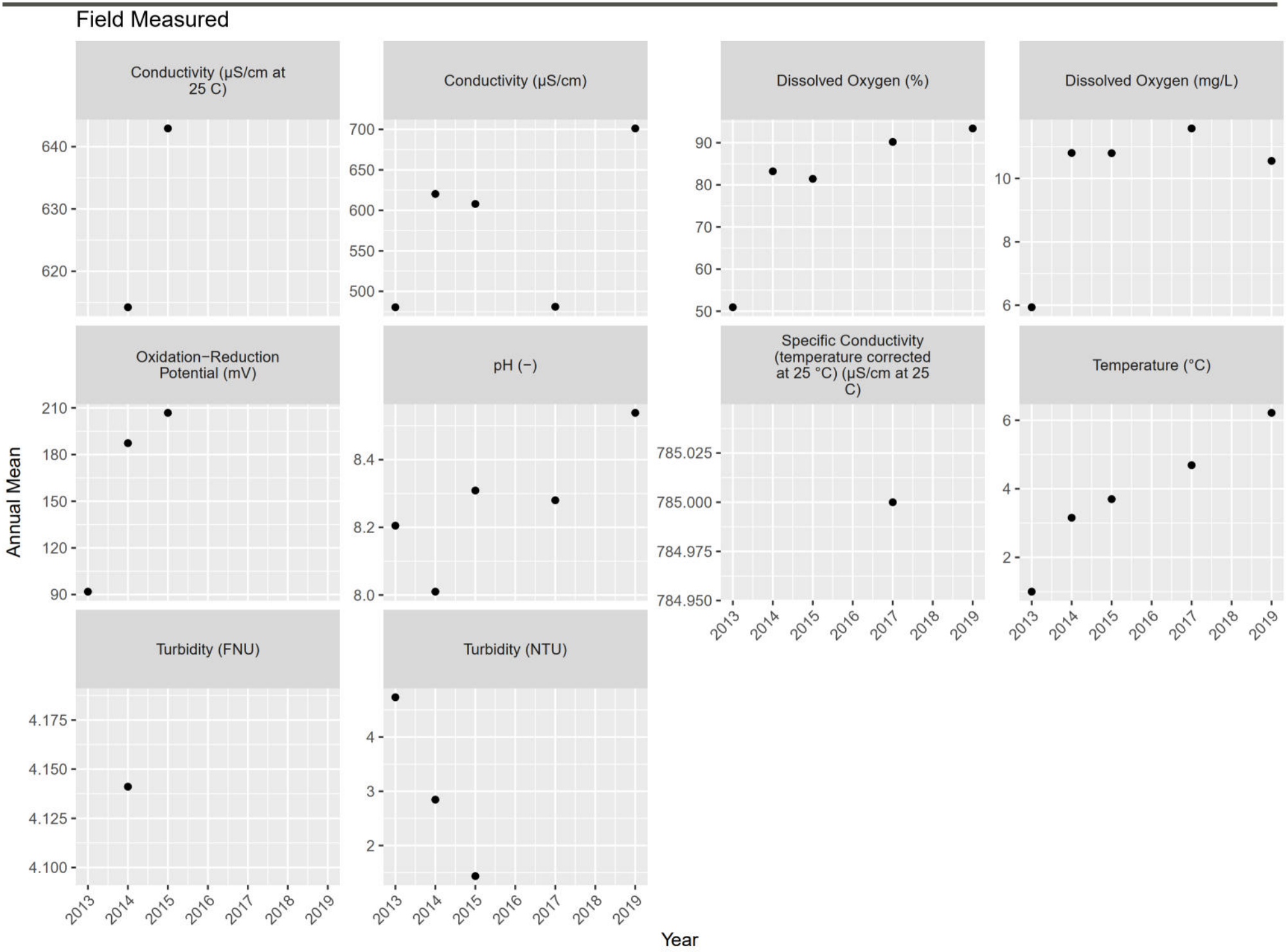


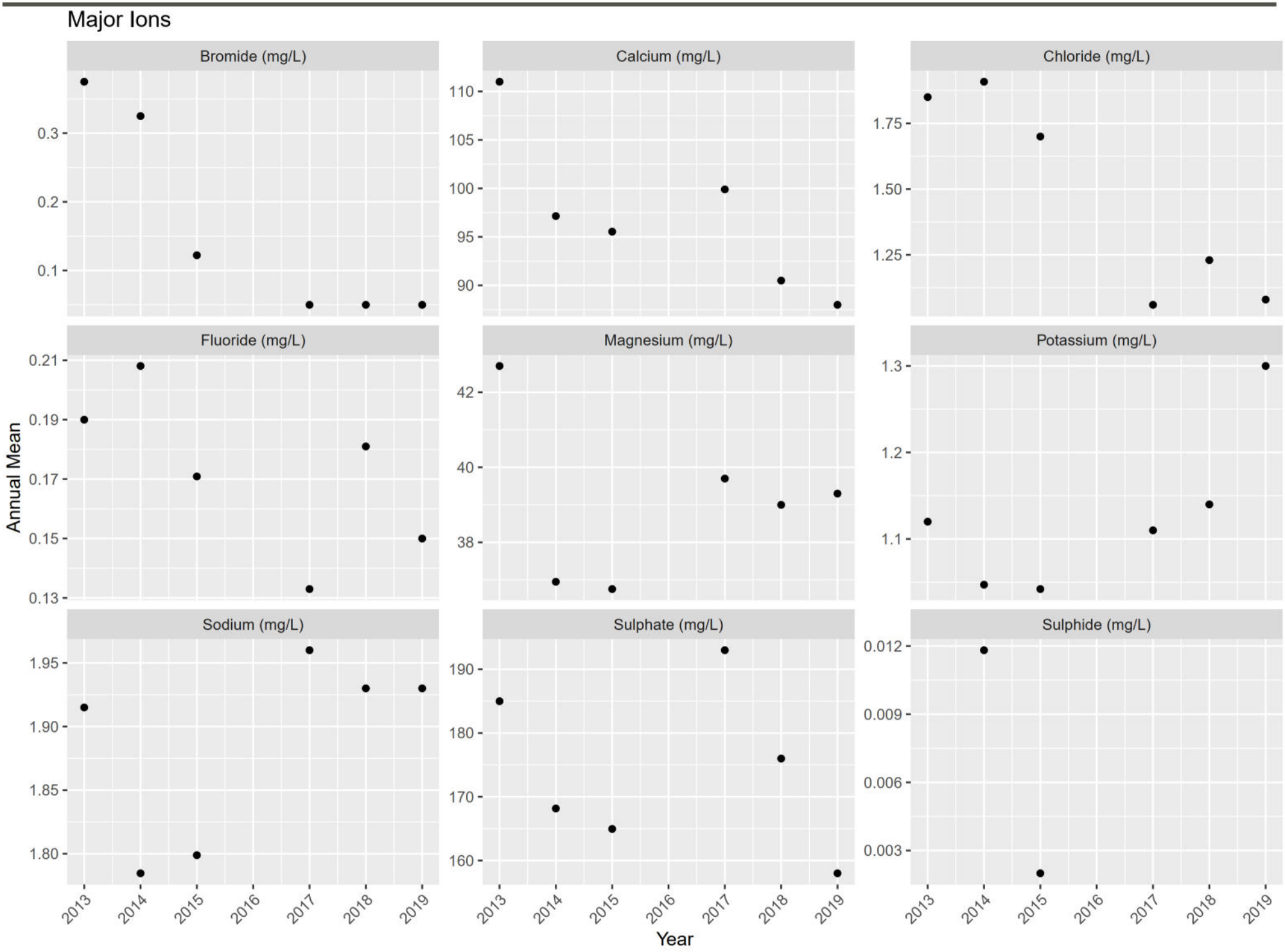
(104) Zinc (mg/L); Dissolved Metals

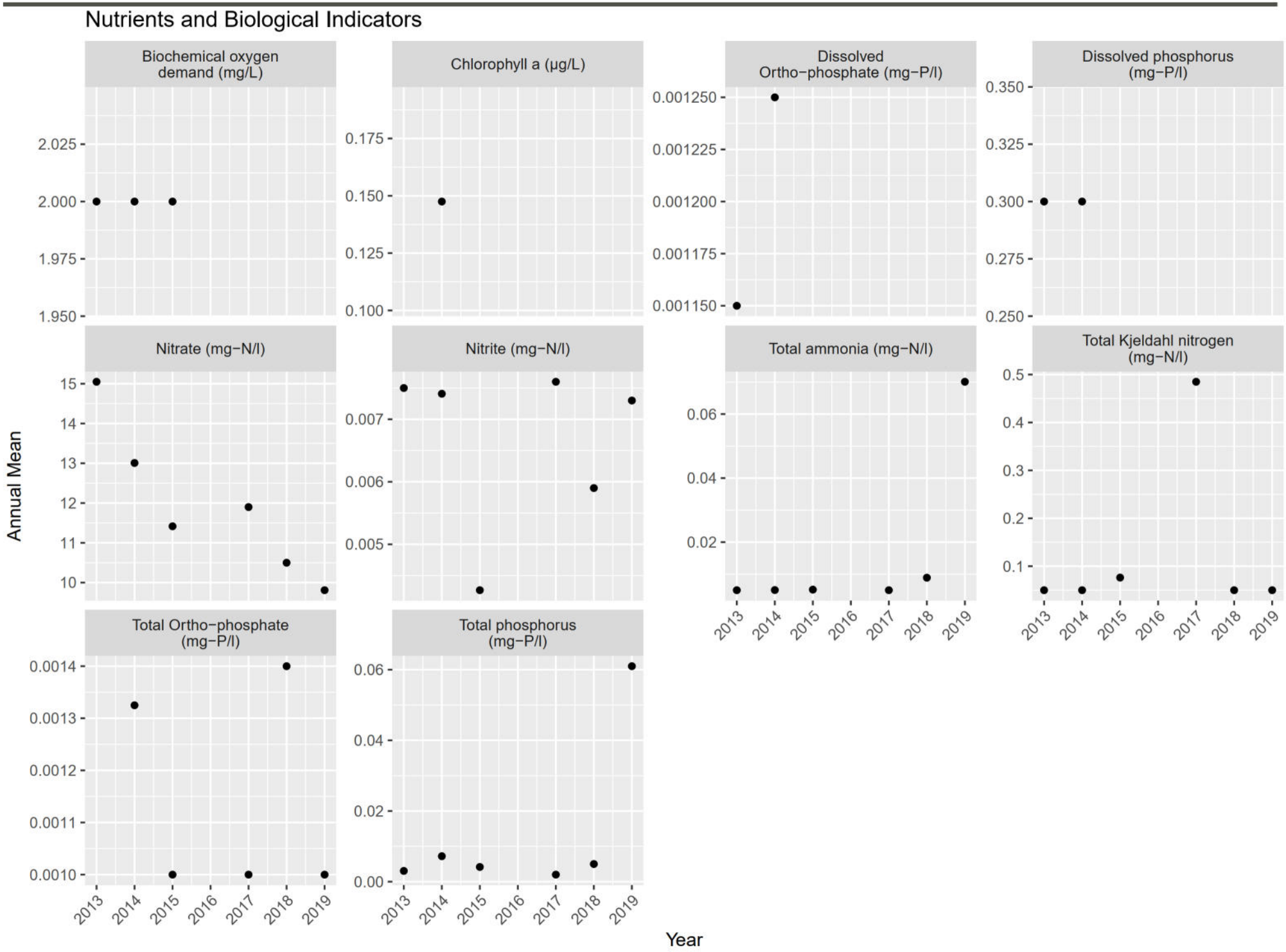


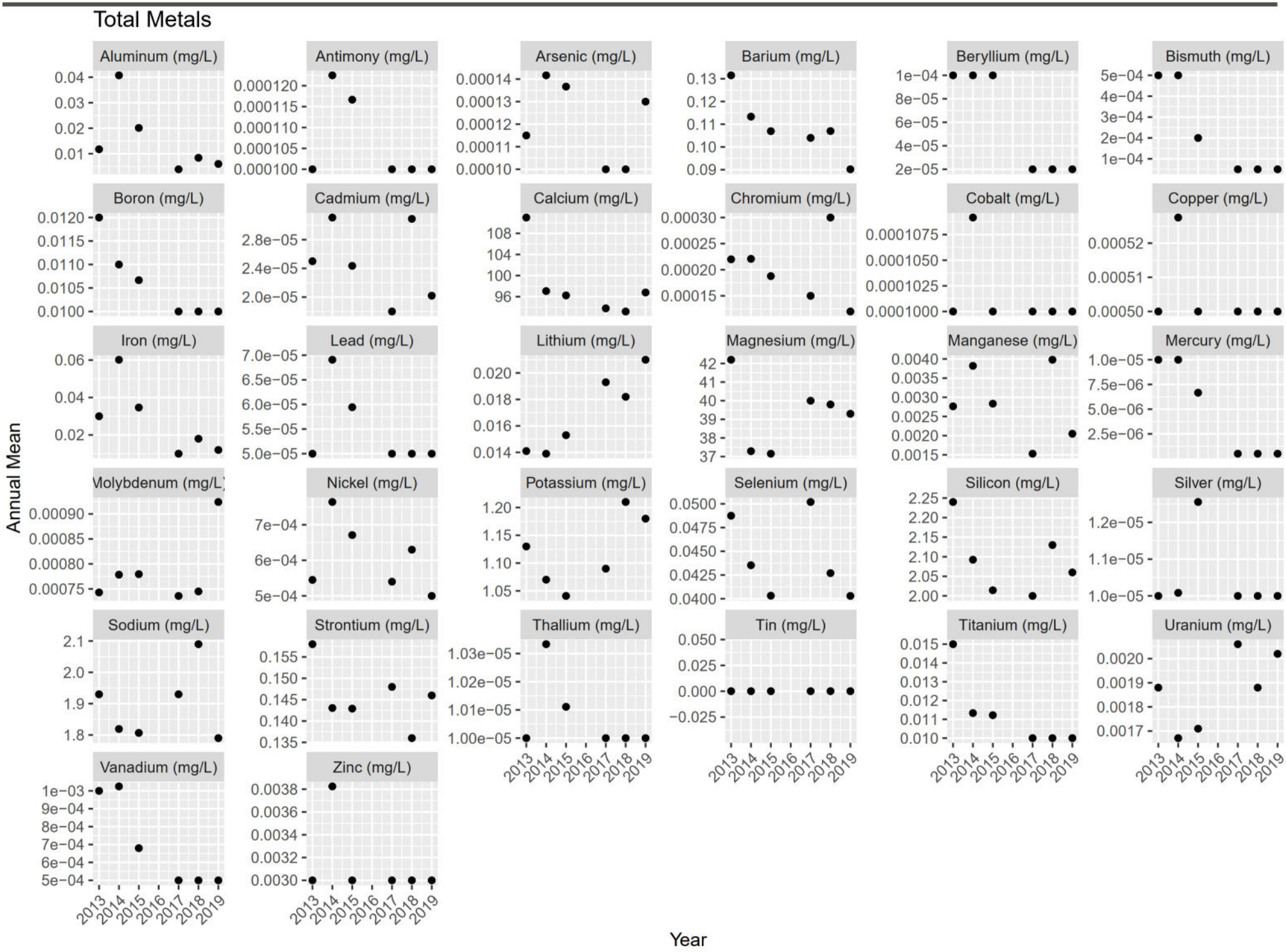

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Colour (CU)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2013
2014
2015
2016
2017
2018
2019


Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2013
2014
2015
2016
2017
2018
2019


Field Measured
Conductivity (µS/cm at 25 C)
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)
Temperature (°C)
Turbidity (FNU)
Turbidity (NTU)
Annual Mean
Year


Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Sulphide (mg/L)
Annual Mean
Year
2013
2014
2015
2016
2017
2018
2019

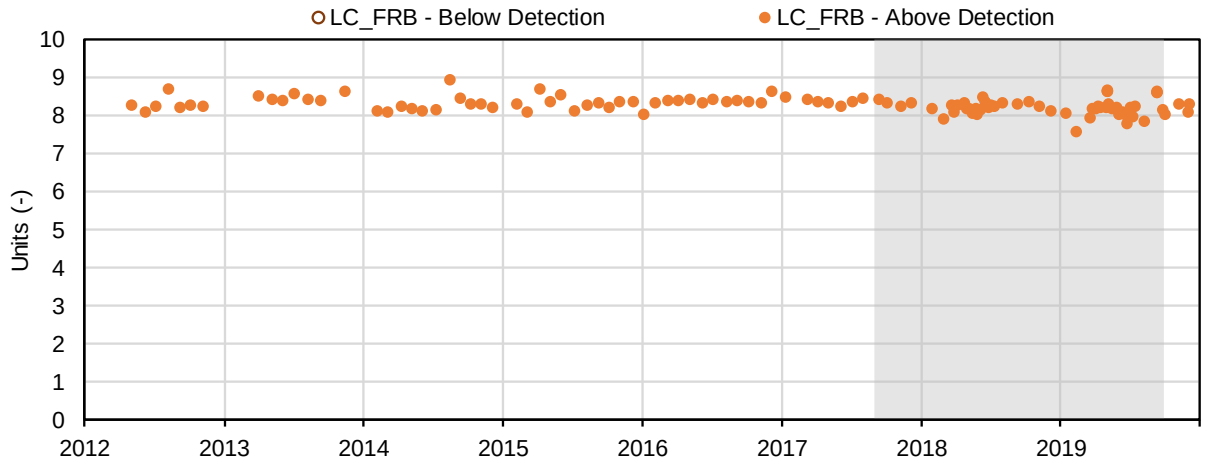

Nutrients and Biological Indicators
Biochemical oxygen demand (mg/L)
Chlorophyll a (µg/L)
Dissolved Ortho−phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2013
2014
2015
2016
2017
2018
2019


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2013
2014
2015
2016
2017
2018
2019

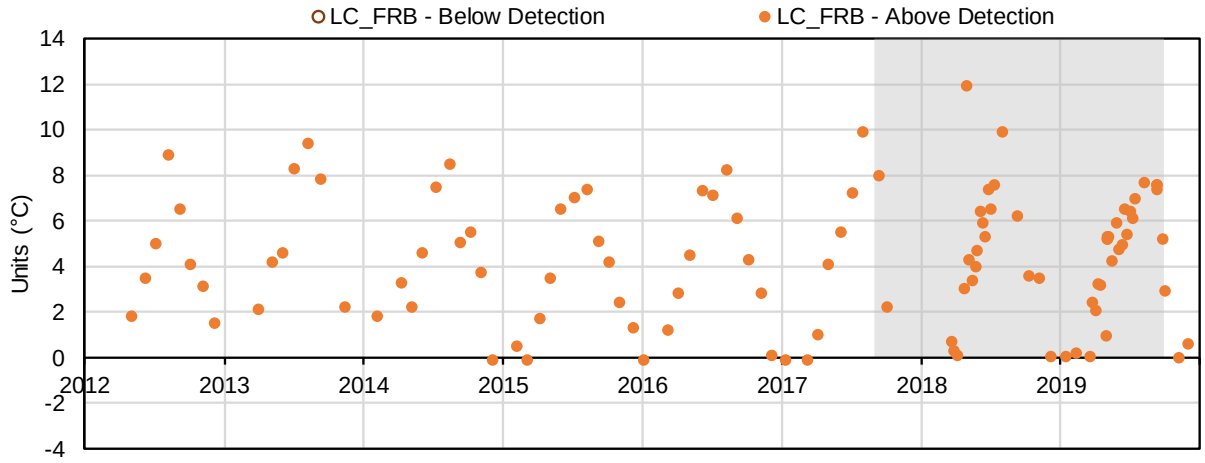
ATTACHMENT F15

LC_FRB Plots

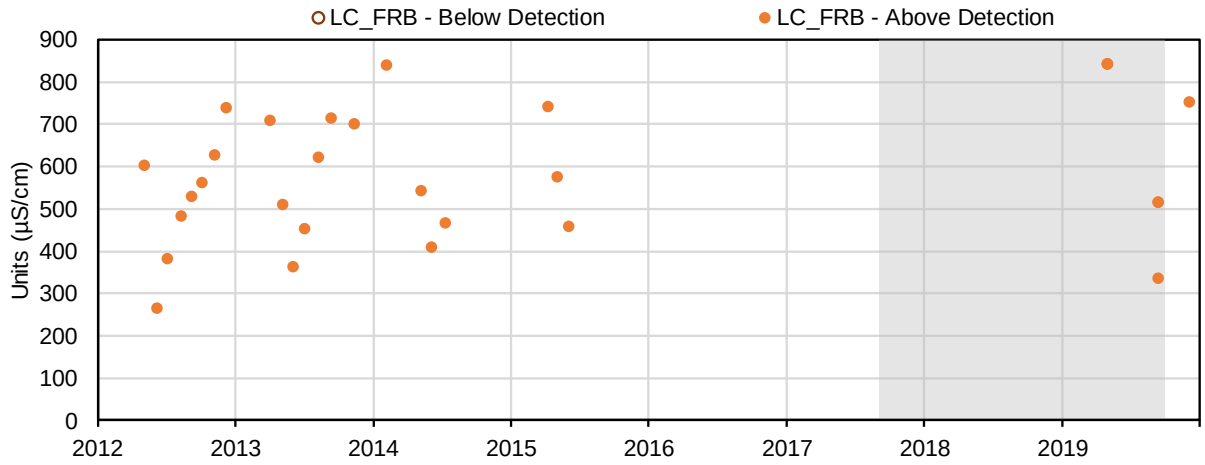
(1) pH (-); Field Measured



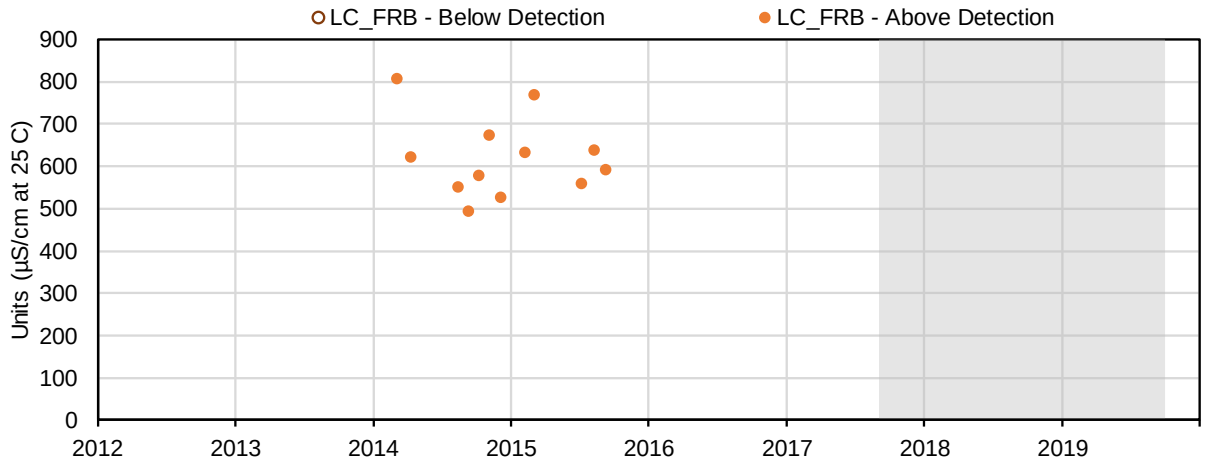
(2) Temperature (°C); Field Measured



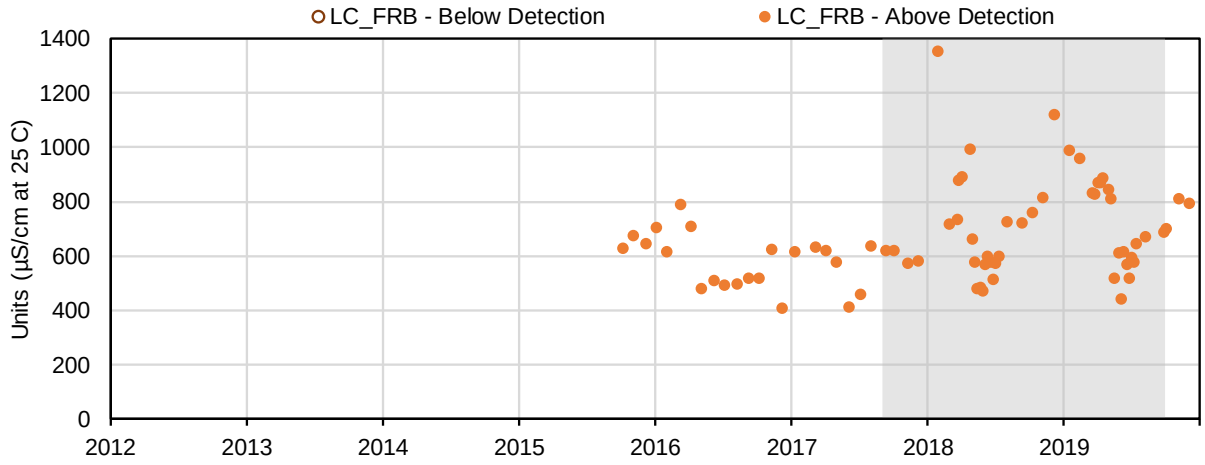
(3) Conductivity (µS/cm); Field Measured



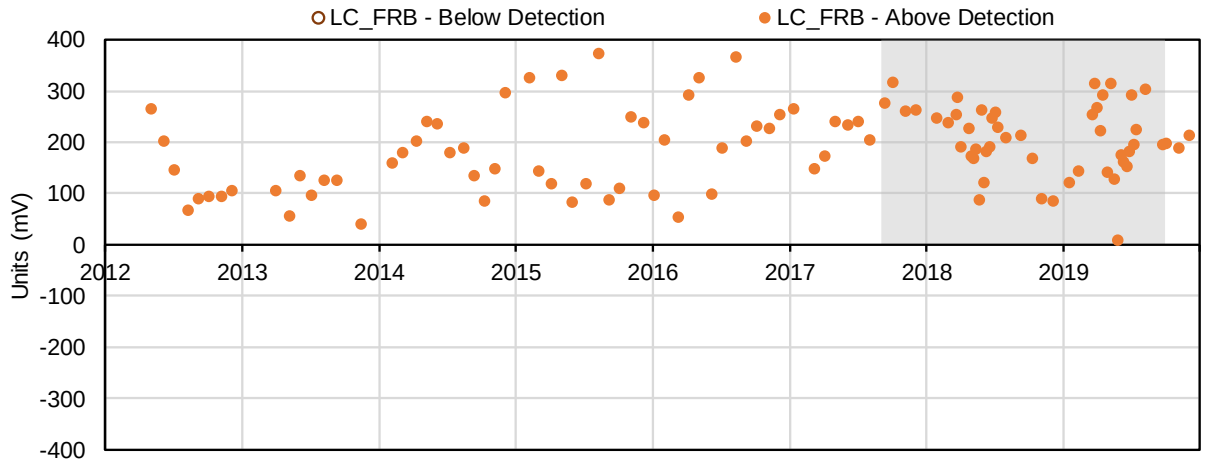
(4) Conductivity (µS/cm at 25 C); Field Measured



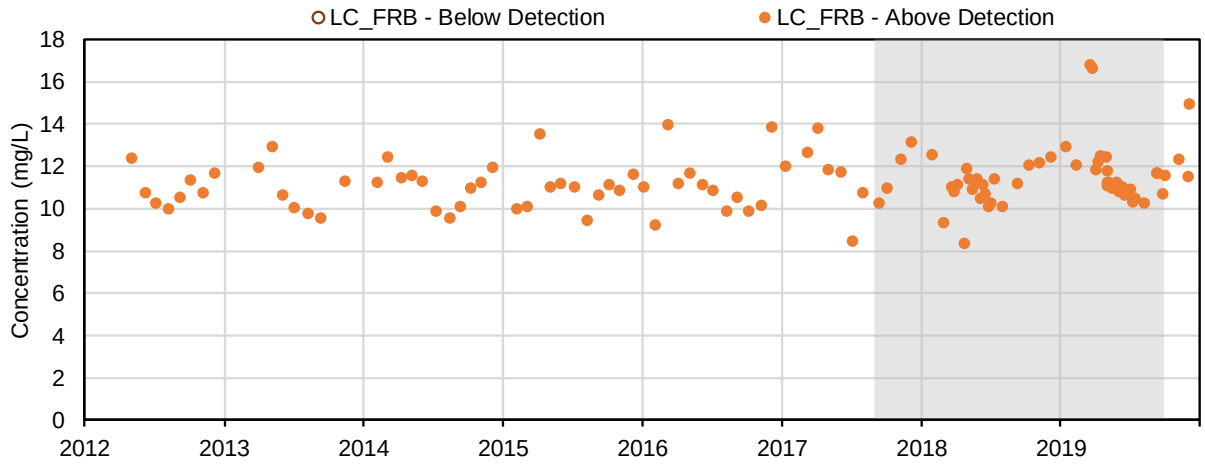
(5) Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C); Field Measured



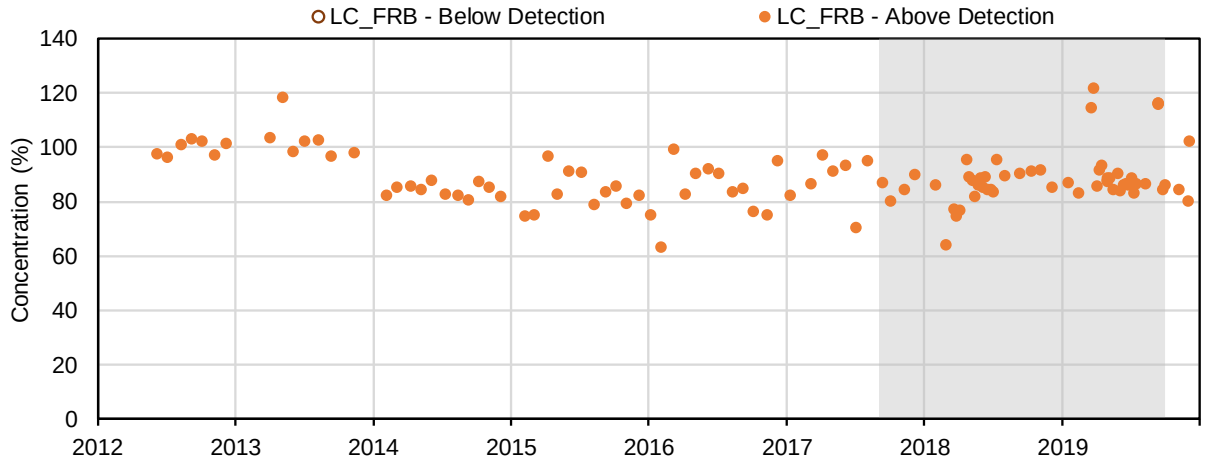
(6) Oxidation-Reduction Potential (mV); Field Measured



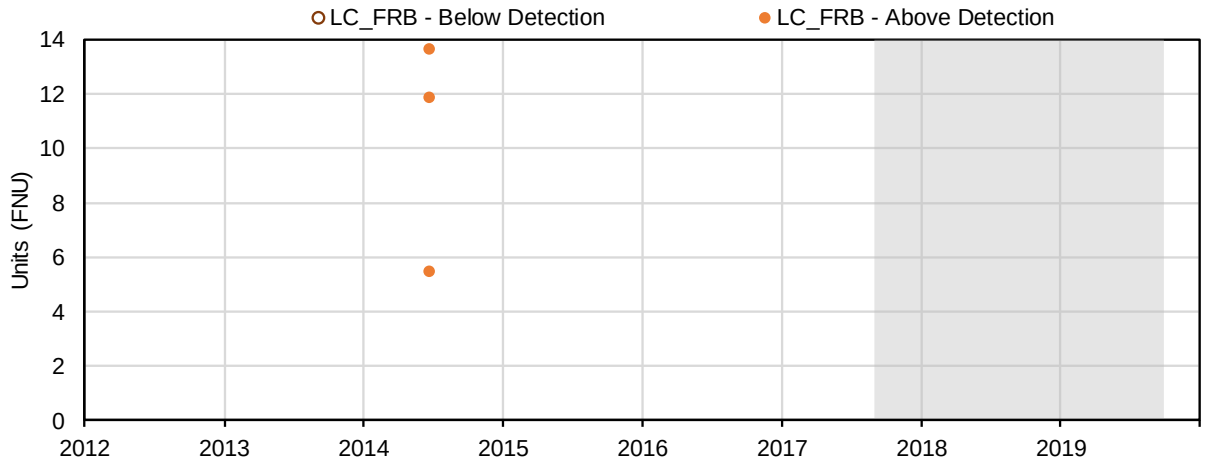
(7) Dissolved Oxygen (mg/L); Field Measured



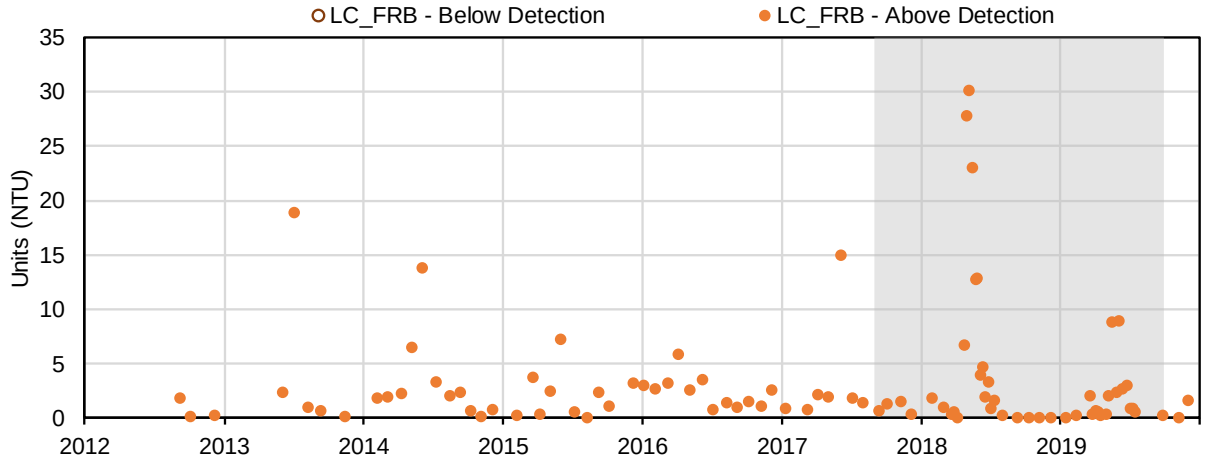
(8) Dissolved Oxygen (%); Field Measured



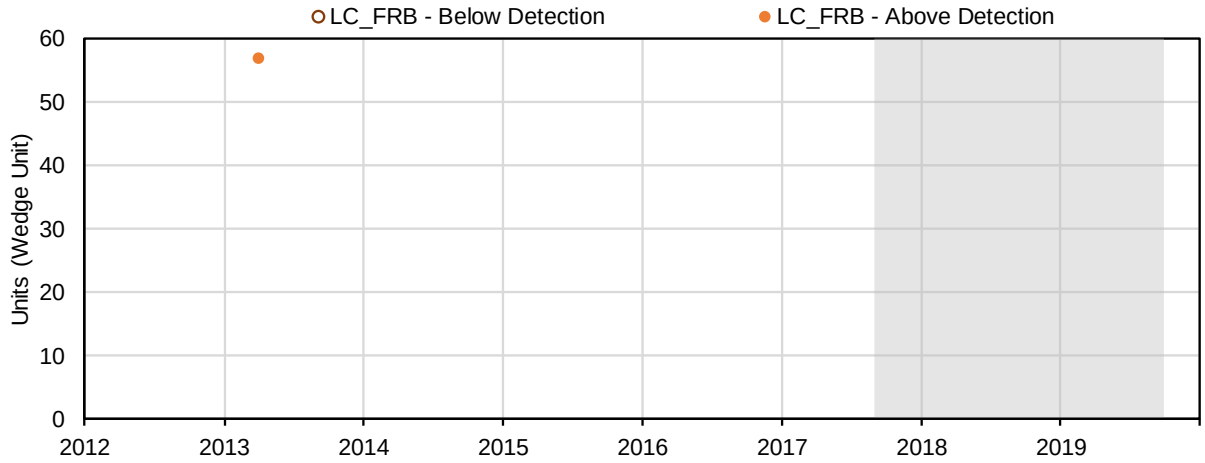
(9) Turbidity (FNU); Field Measured



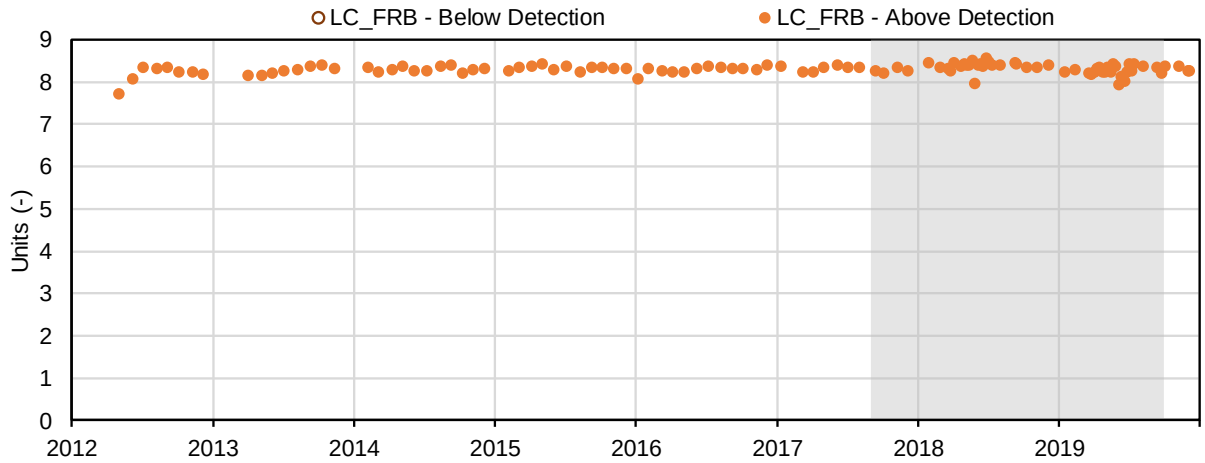
(10) Turbidity (NTU); Field Measured



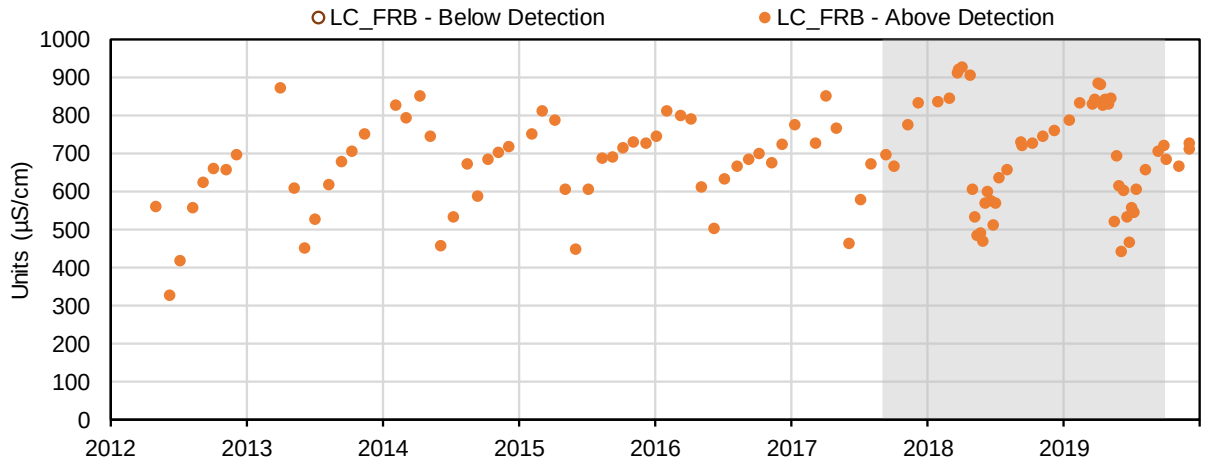
(11) Turbidity (Wedge Unit); Field Measured



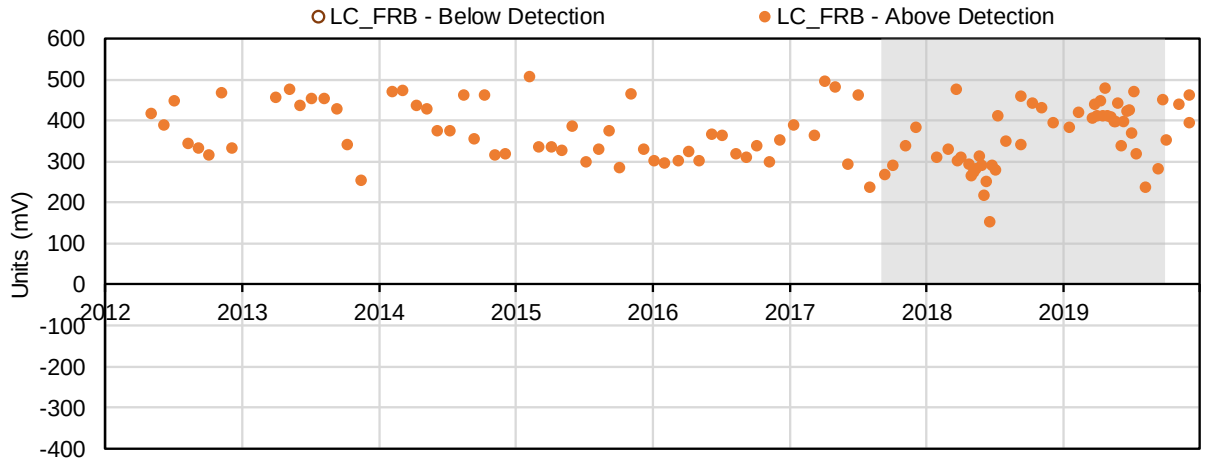
(12) pH (-); Conventional Parameters



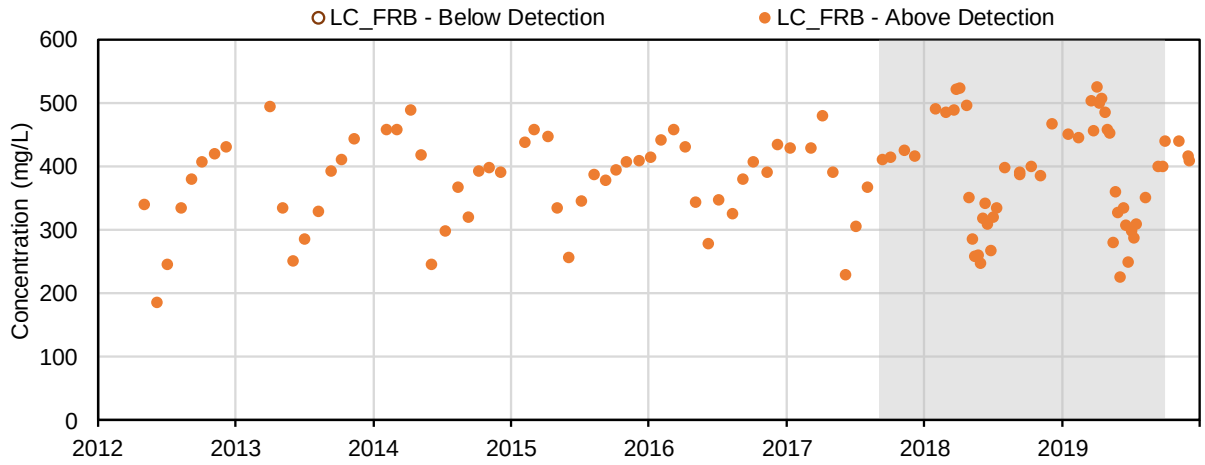
(13) Conductivity (µS/cm); Conventional Parameters



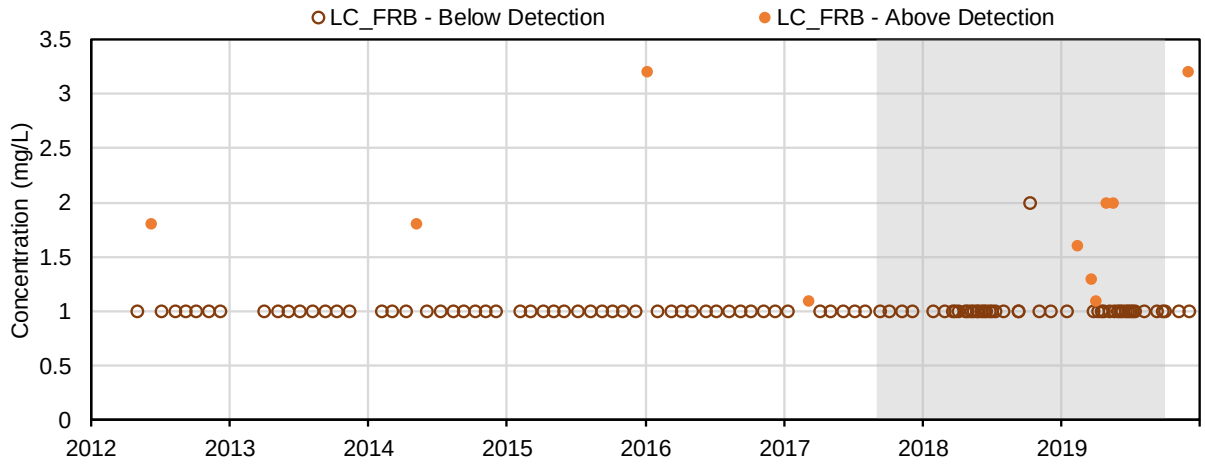
(14) Oxidation-Reduction Potential (mV); Conventional Parameters



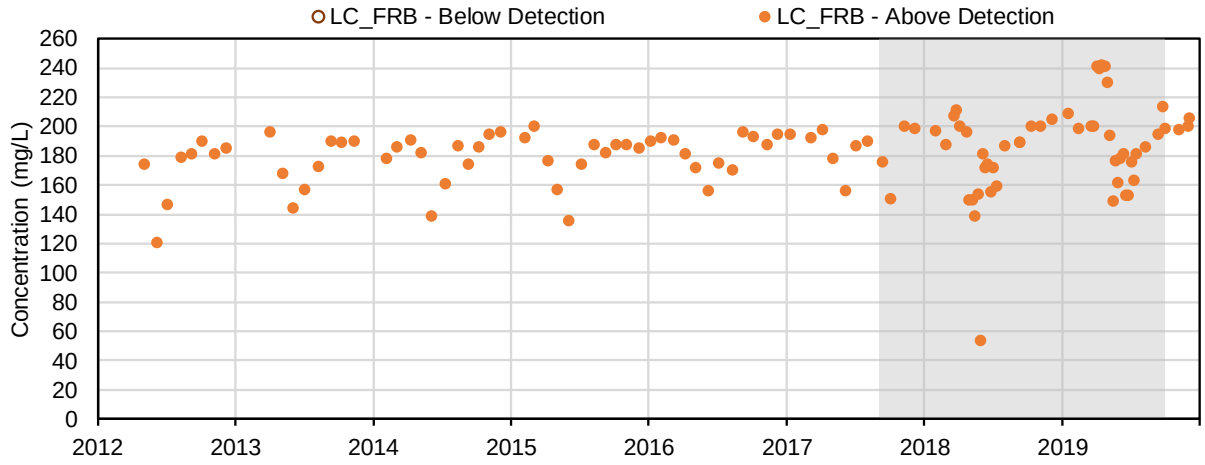
(15) Hardness, as CaCO3 (mg/L); Conventional Parameters



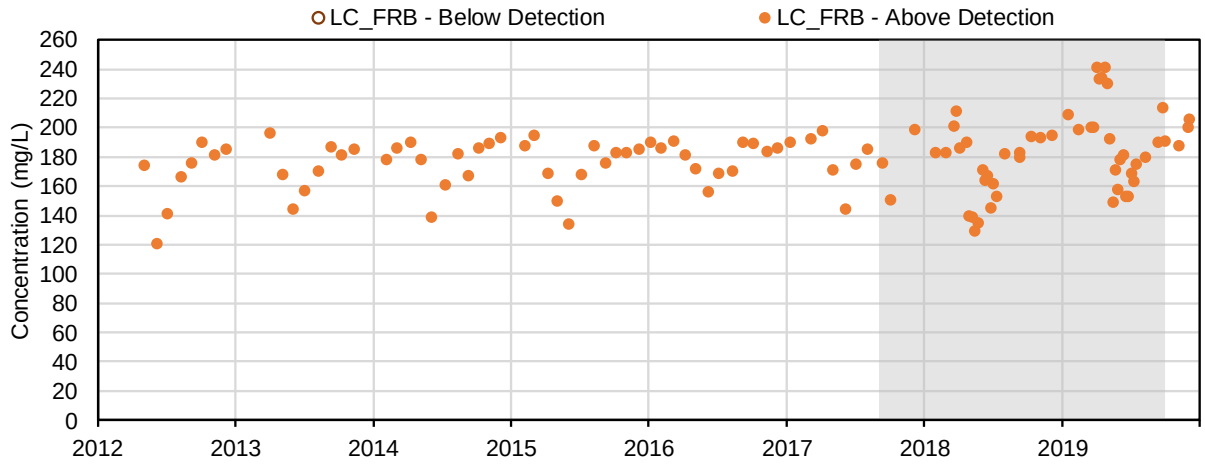
(16) Acidity, CaCO3 (mg/L); Conventional Parameters



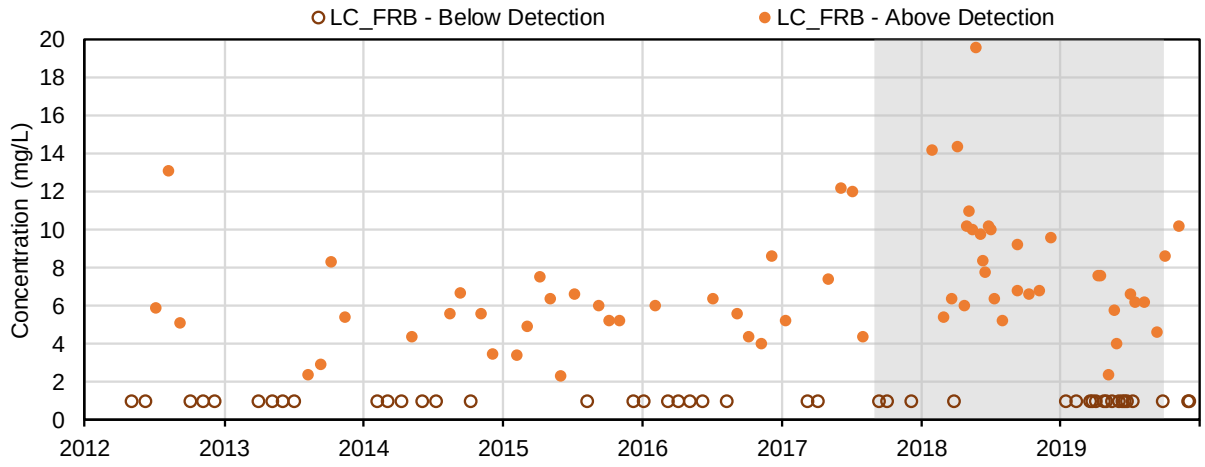
(17) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



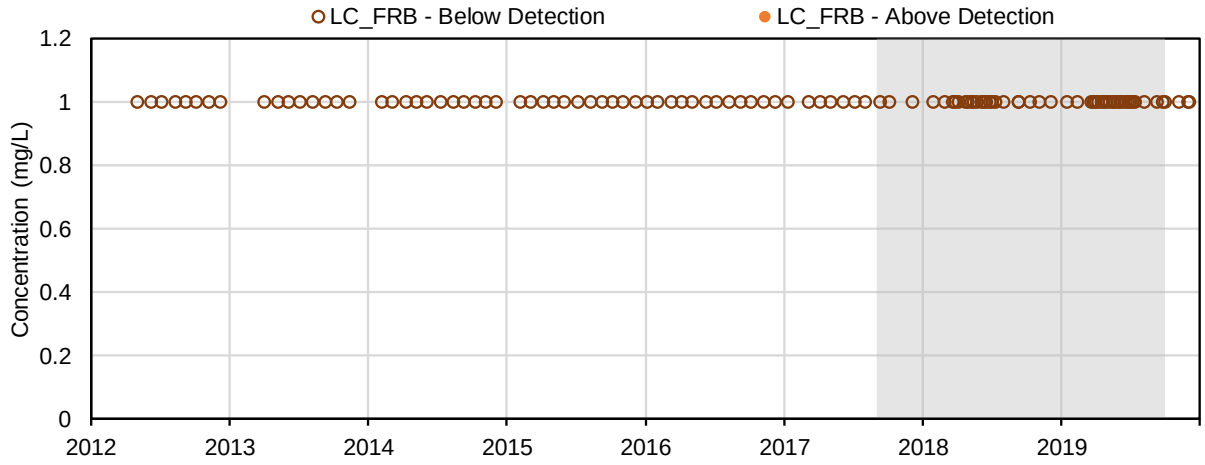
(18) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



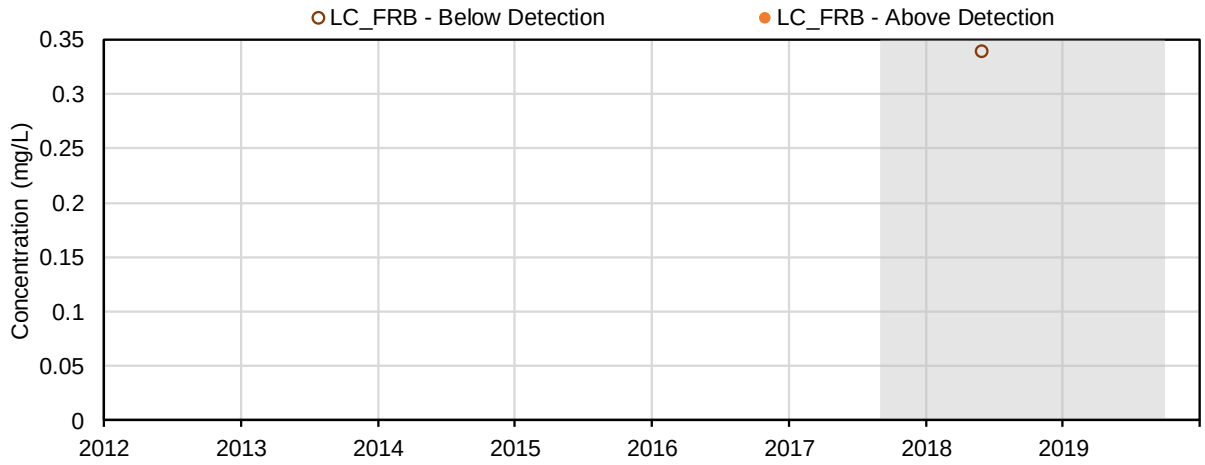
(19) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



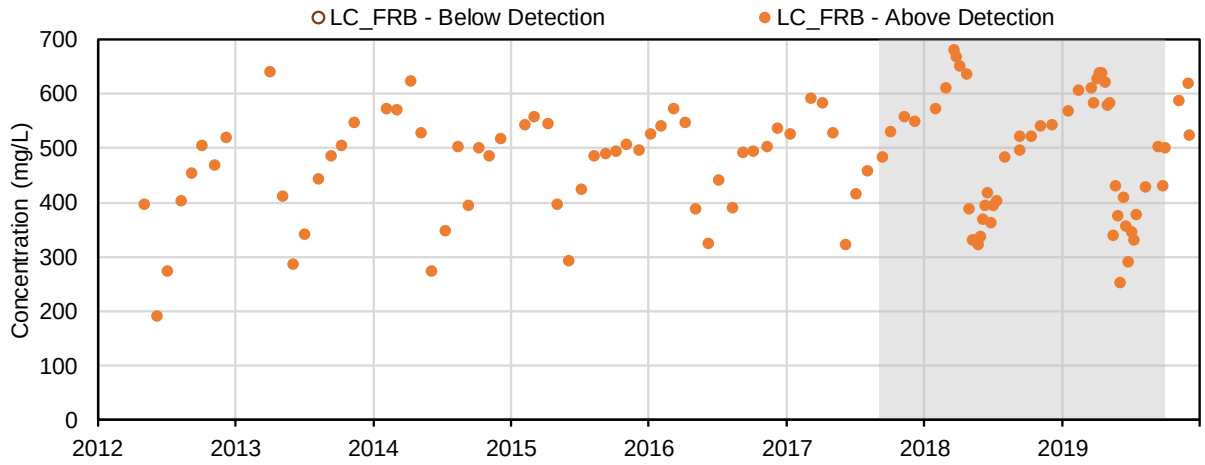
(20) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



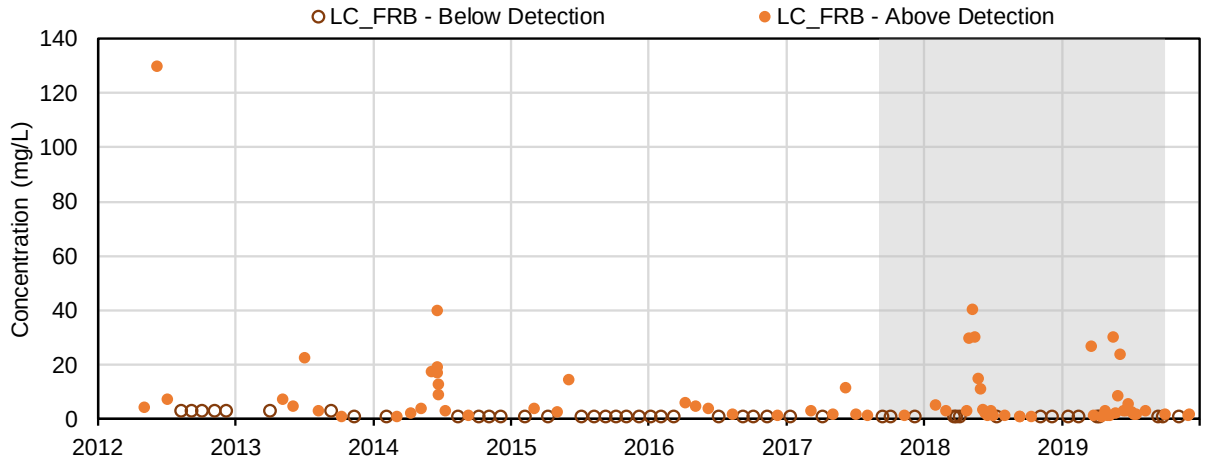
(21) Hydroxide (mg/L); Conventional Parameters



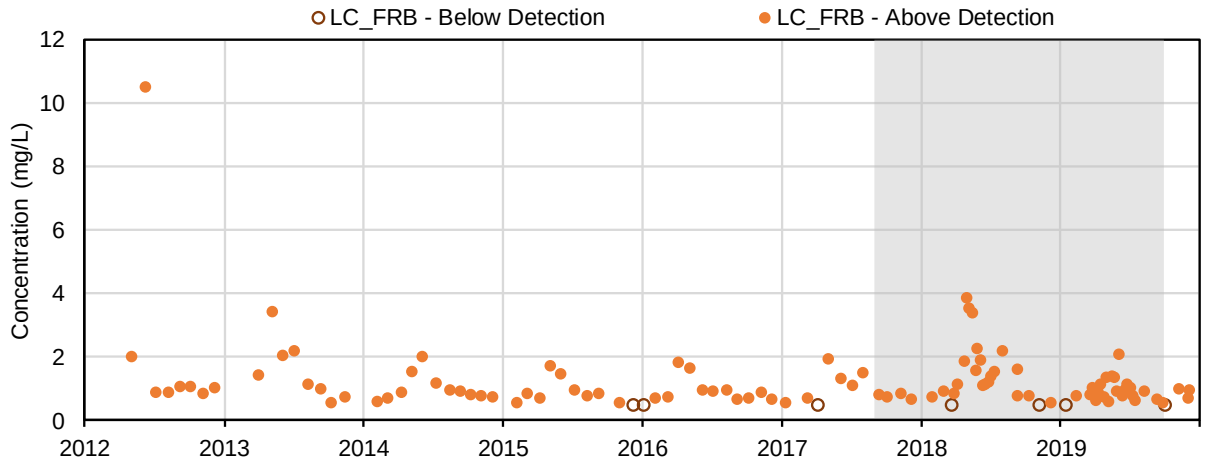
(22) Total dissolved solids (mg/L); Conventional Parameters



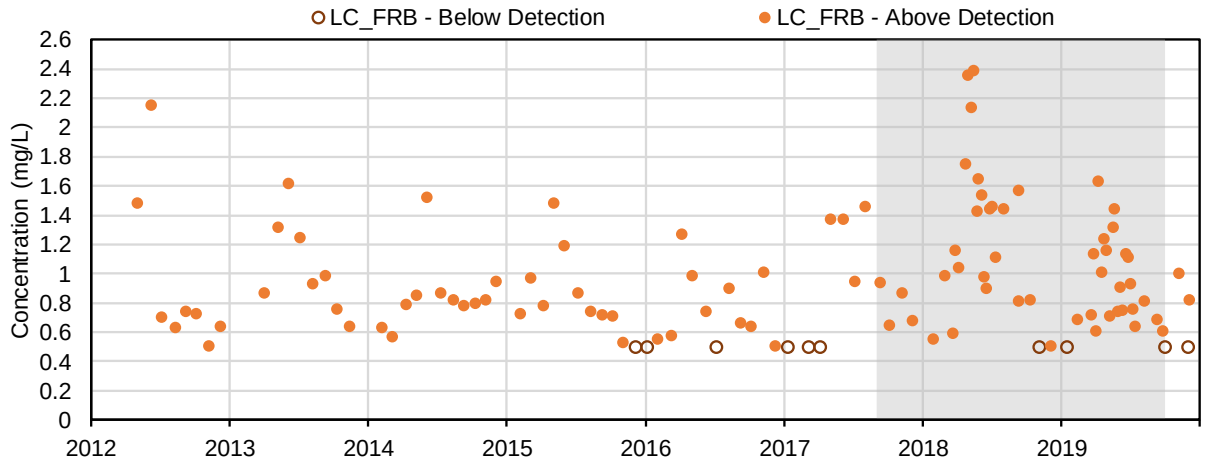
(23) Total suspended solids (mg/L); Conventional Parameters



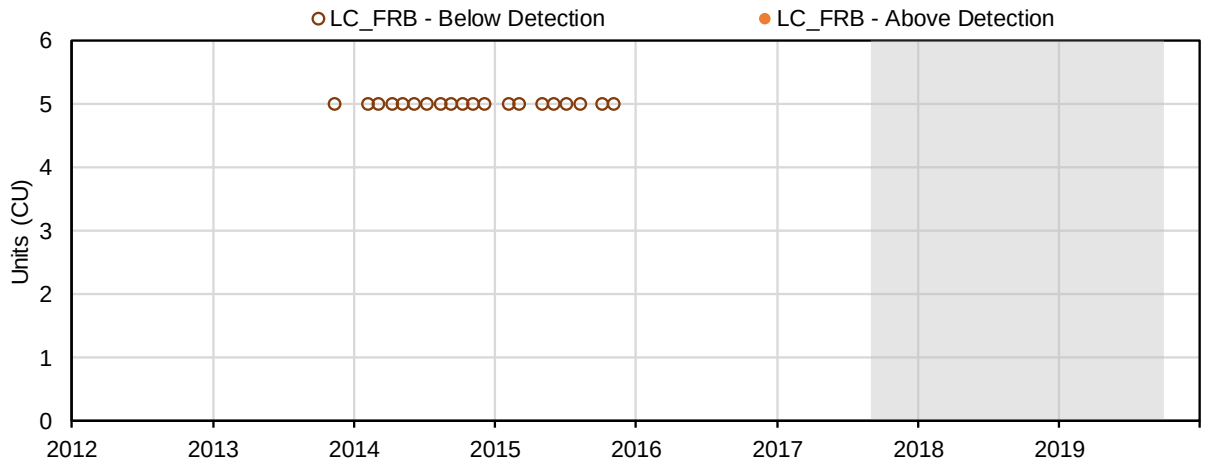
(24) Total organic carbon (mg/L); Conventional Parameters



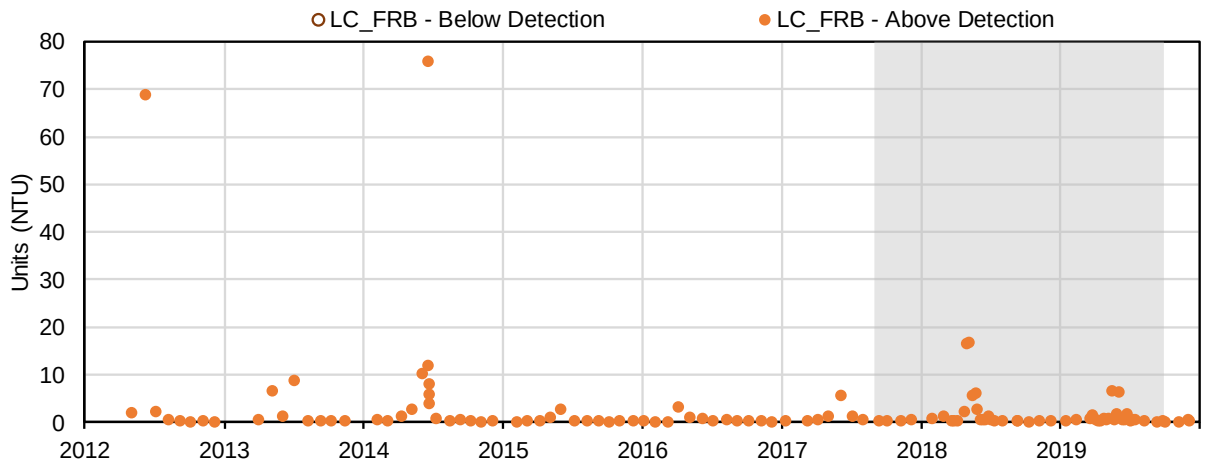
(25) Dissolved organic carbon (mg/L); Conventional Parameters



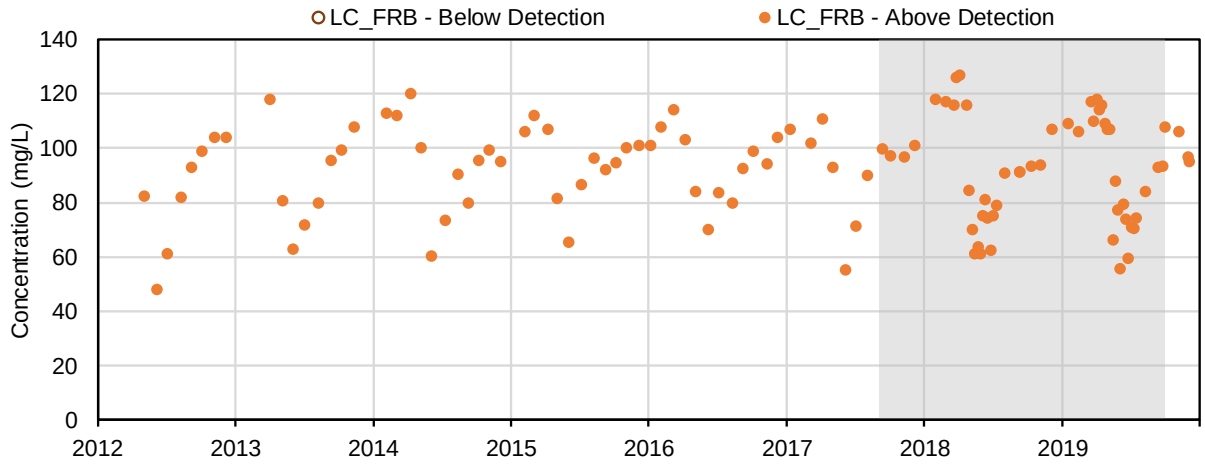
(26) Colour (CU); Conventional Parameters



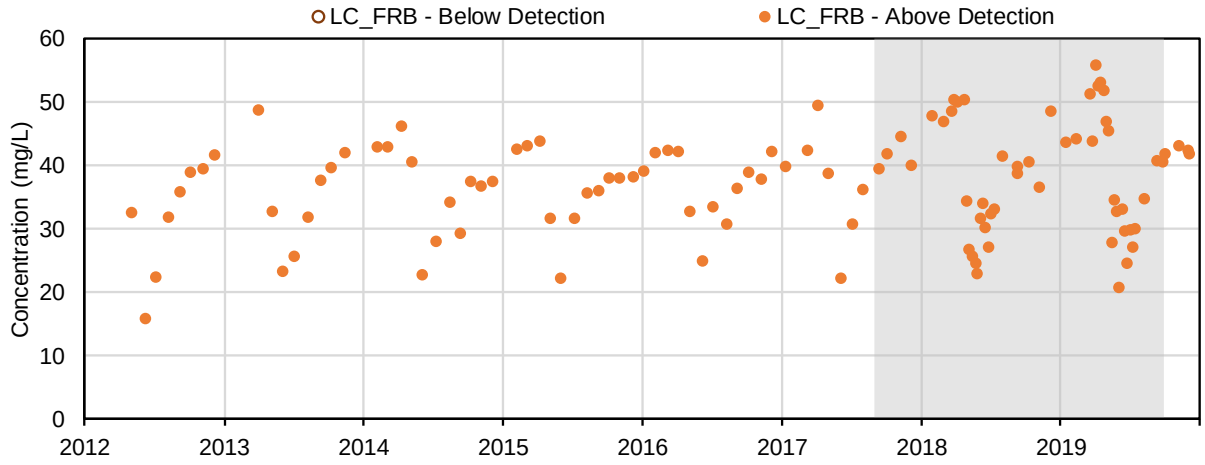
(27) Turbidity (NTU); Conventional Parameters



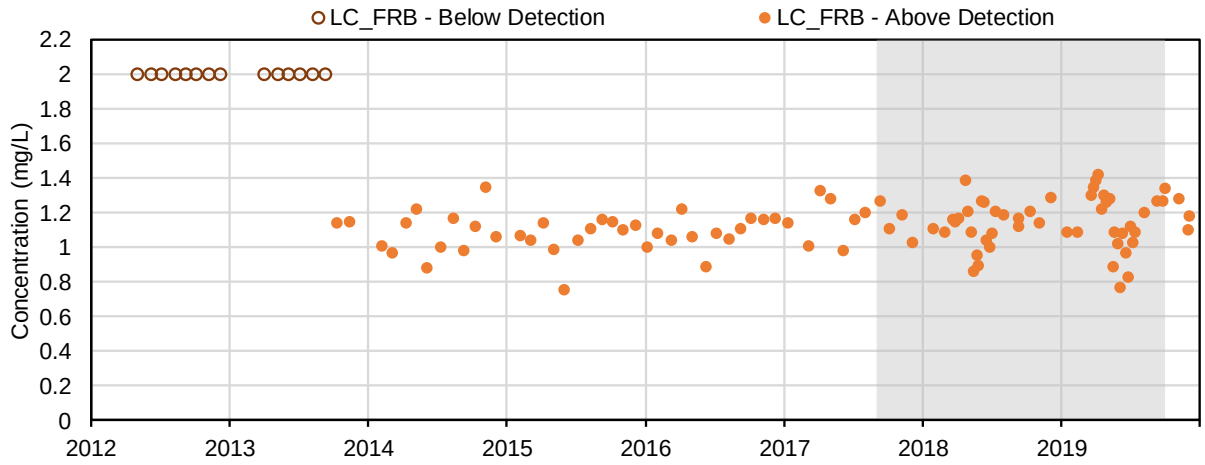
(28) Calcium (mg/L); Major Ions



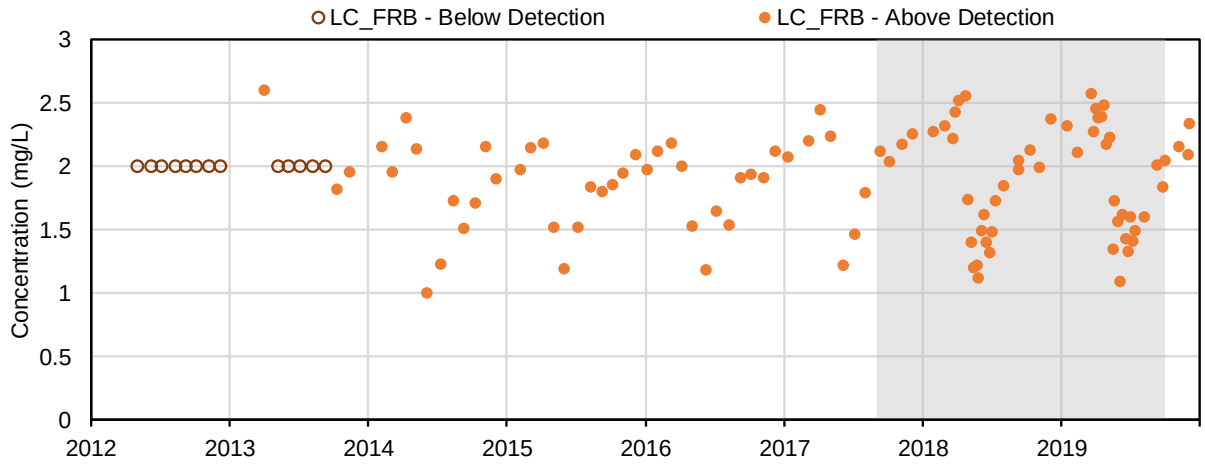
(29) Magnesium (mg/L); Major Ions



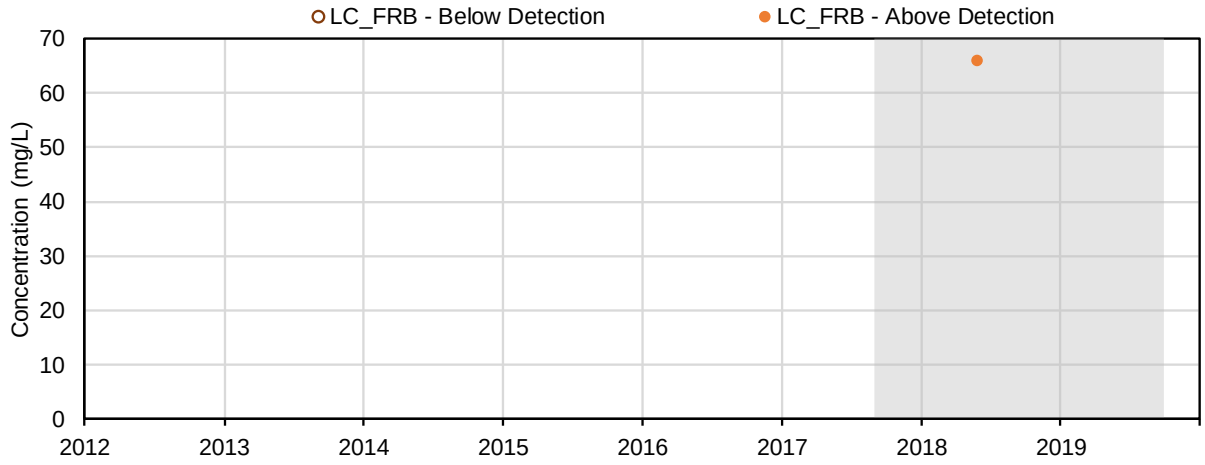
(30) Potassium (mg/L); Major Ions



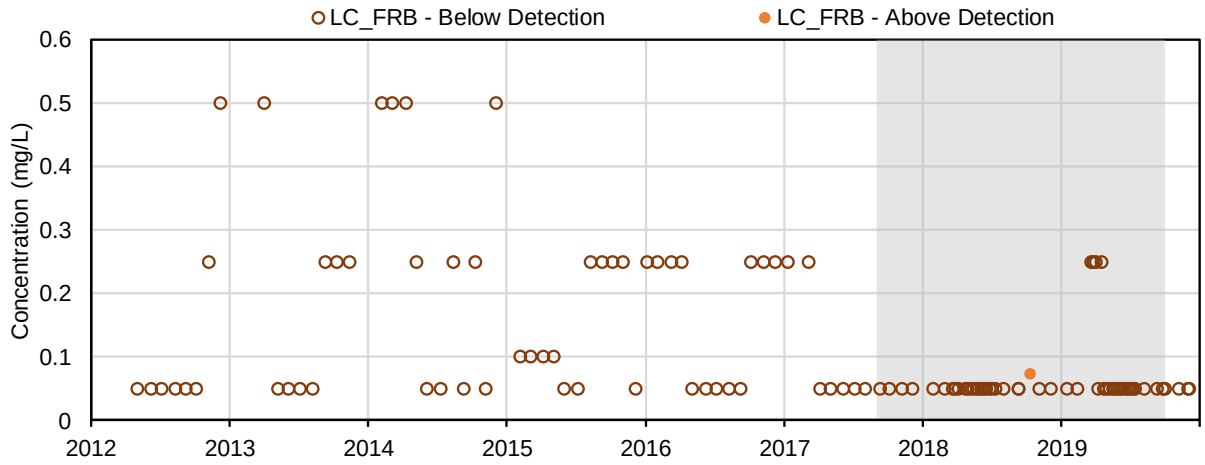
(31) Sodium (mg/L); Major Ions



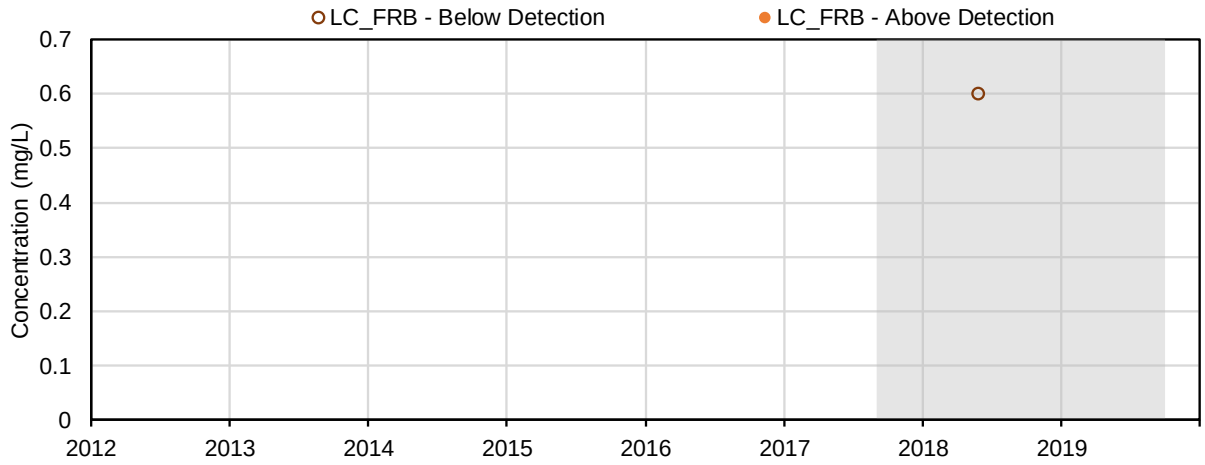
(32) Bicarbonate (mg/L); Major Ions



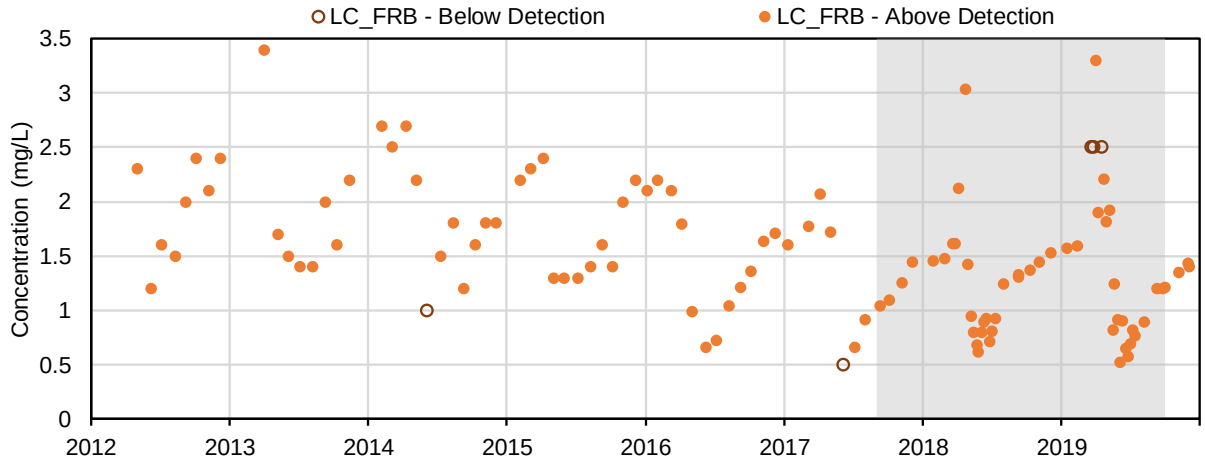
(33) Bromide (mg/L); Major Ions



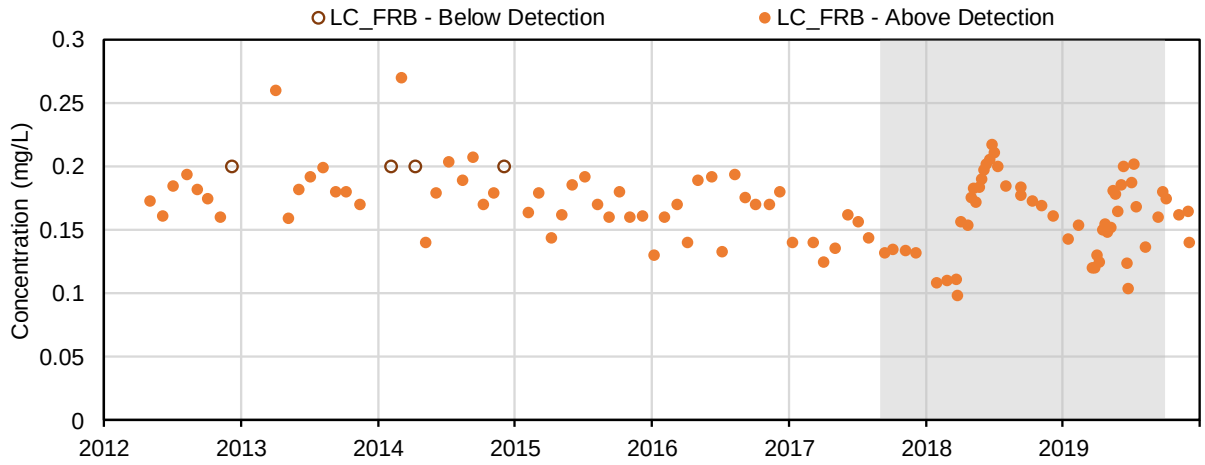
(34) Carbonate (mg/L); Major Ions



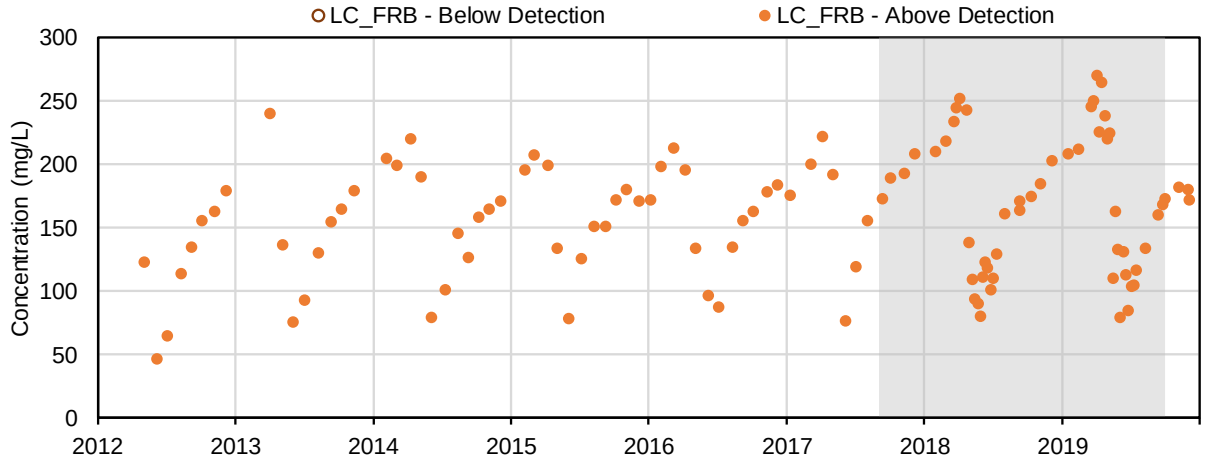
(35) Chloride (mg/L); Major Ions



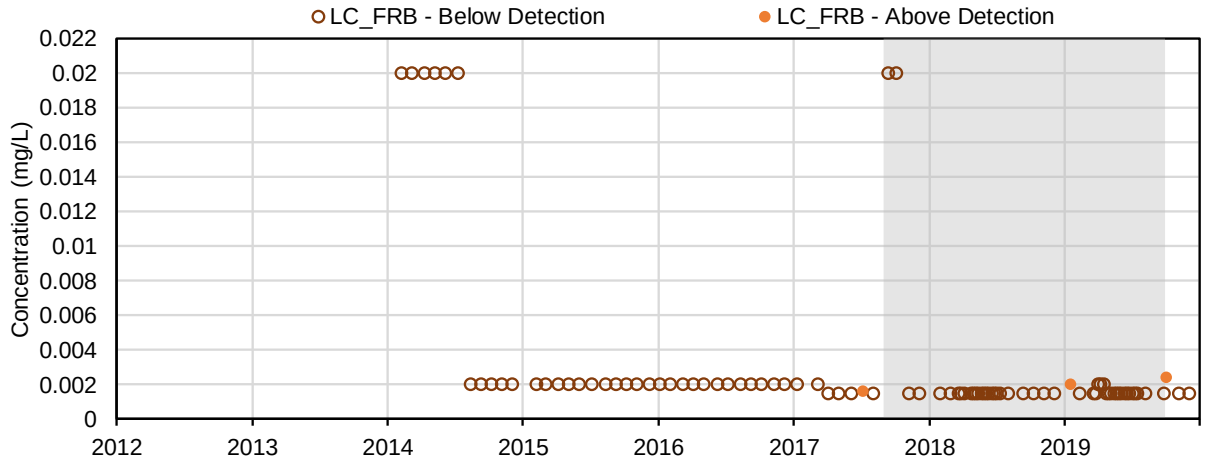
(36) Fluoride (mg/L); Major Ions



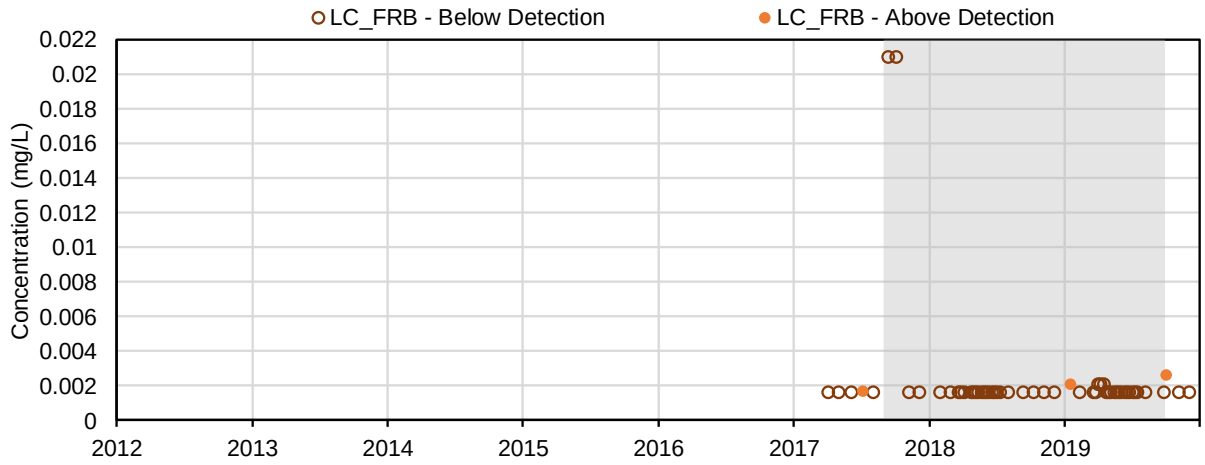
(37) Sulphate (mg/L); Major Ions



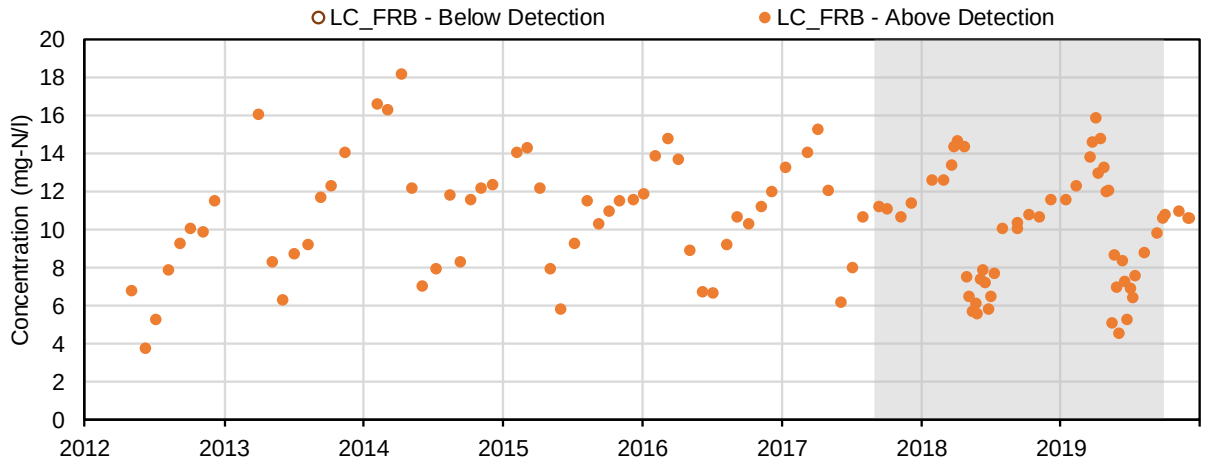
(38) Sulphide (mg/L); Major Ions



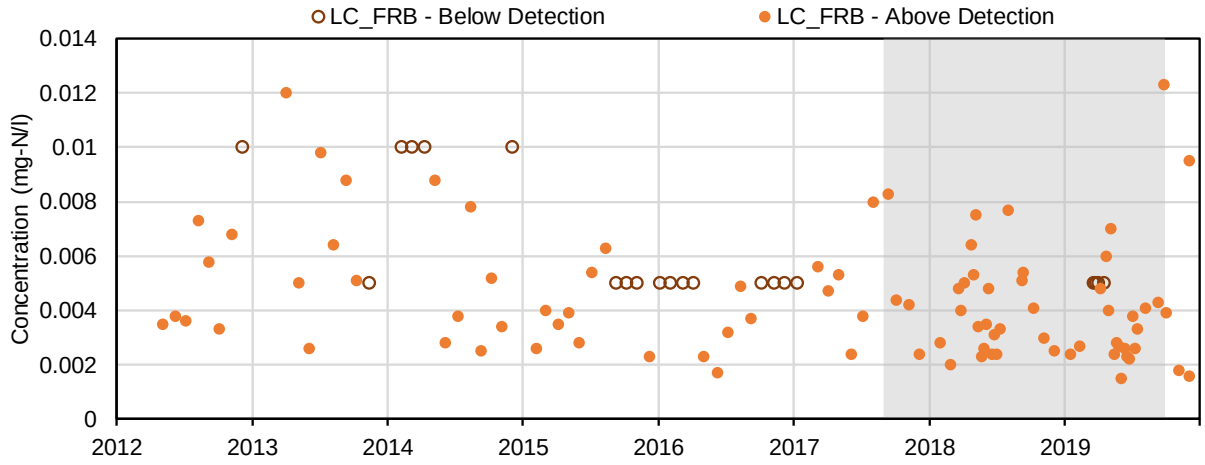
(39) Hydrogen Sulphide (mg/L); Major Ions



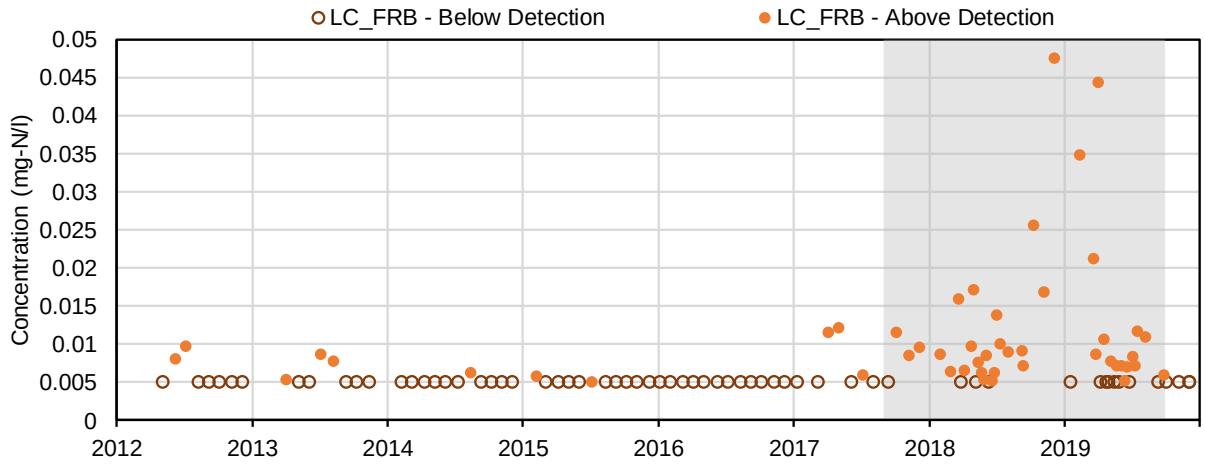
(40) Nitrate (mg-N/l); Nutrients and Biological Indicators



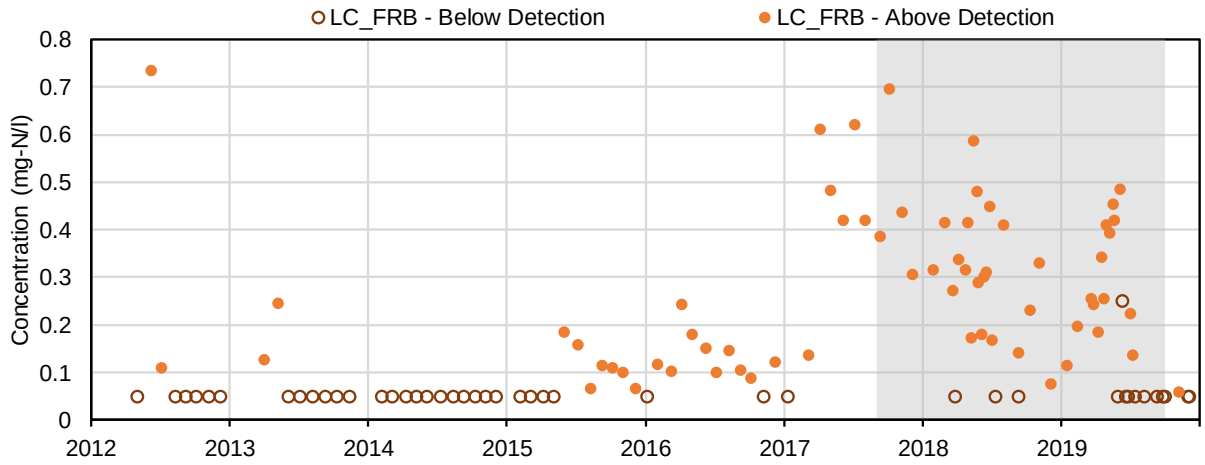
(41) Nitrite (mg-N/l); Nutrients and Biological Indicators



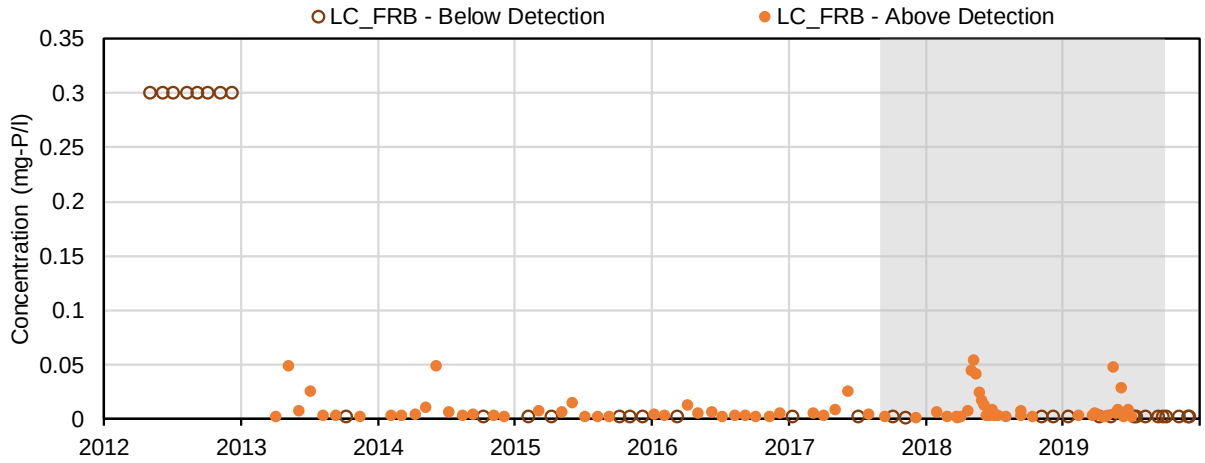
(42) Total ammonia (mg-N/l); Nutrients and Biological Indicators



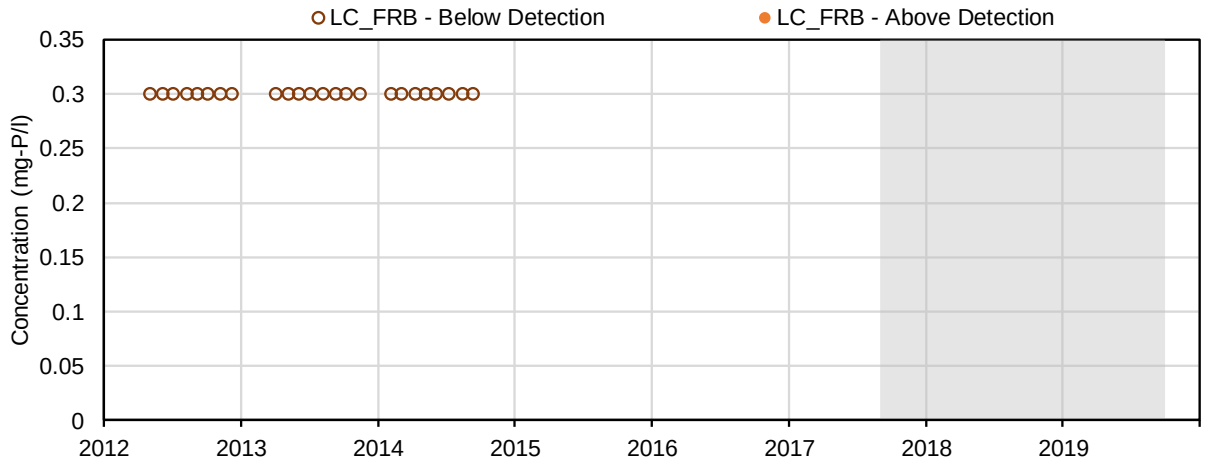
(43) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



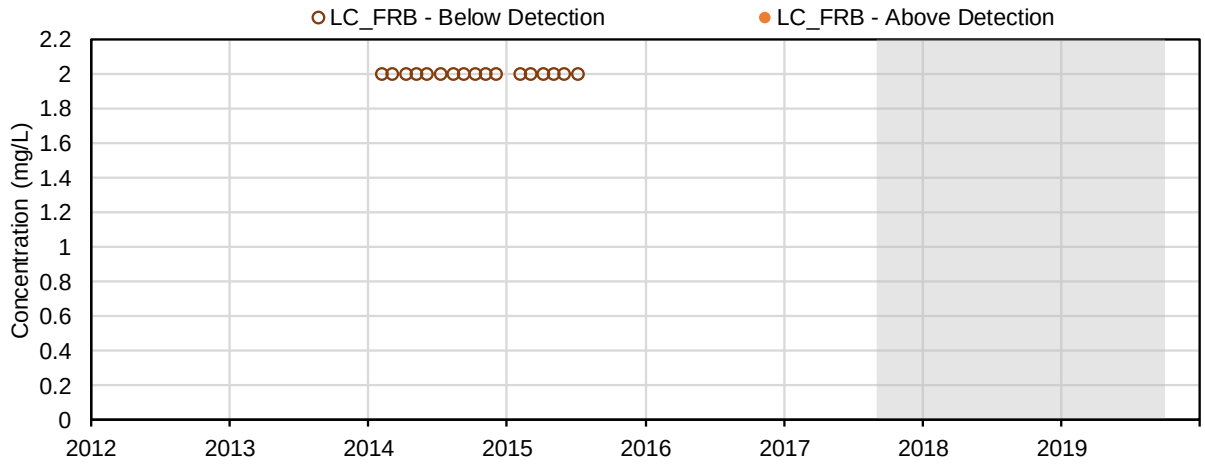
(44) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



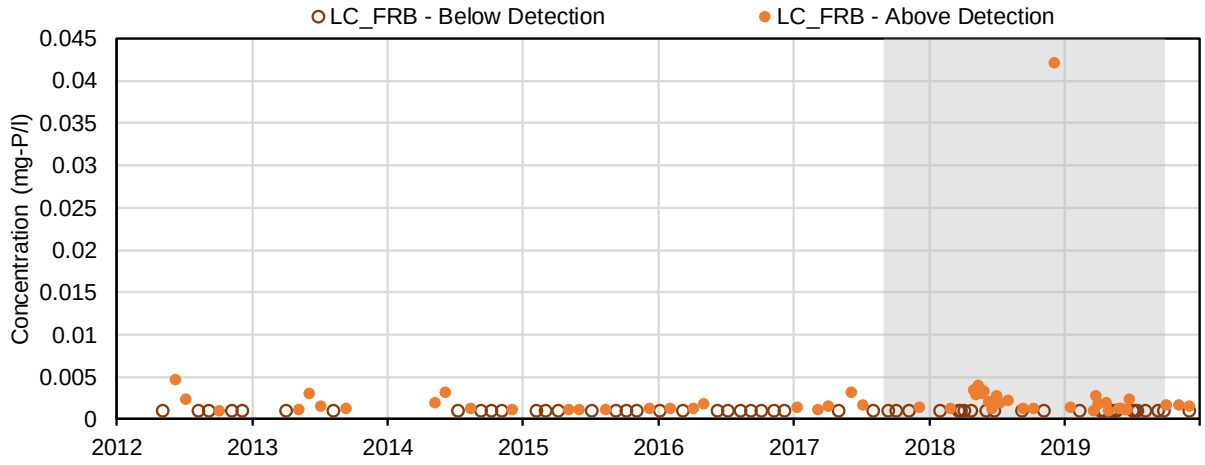
(45) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



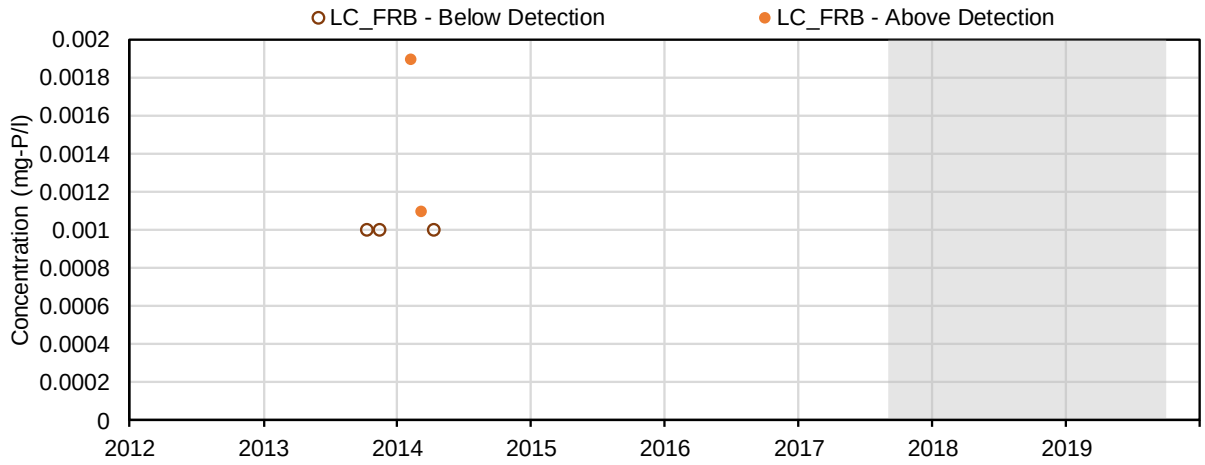
(46) Biochemical oxygen demand (mg/L); Nutrients and Biological Indicators



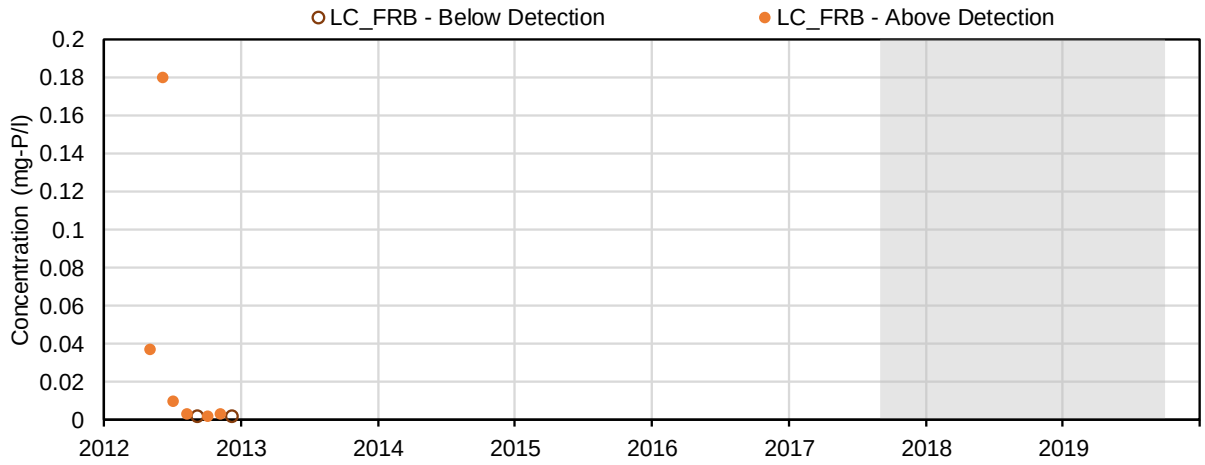
(47) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



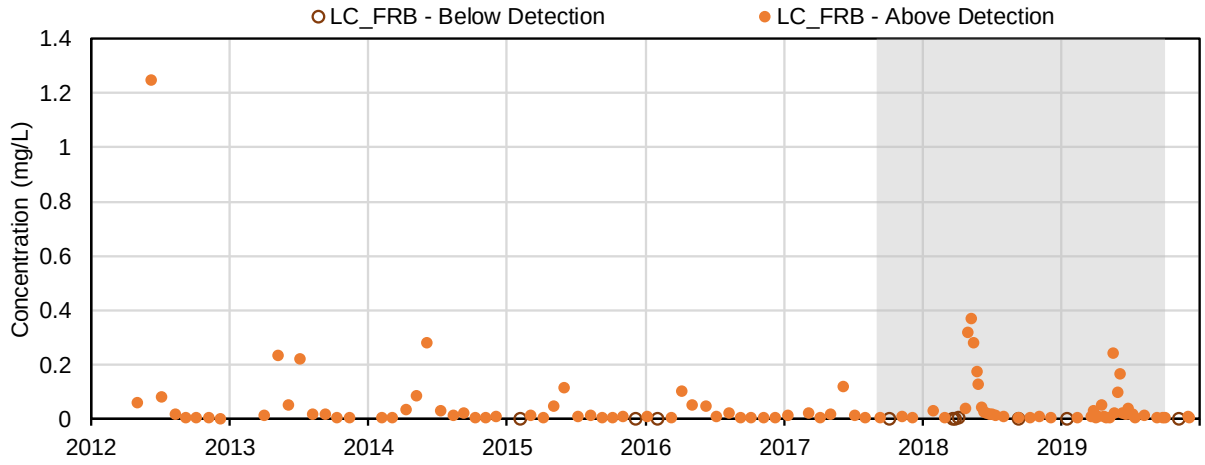
(48) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



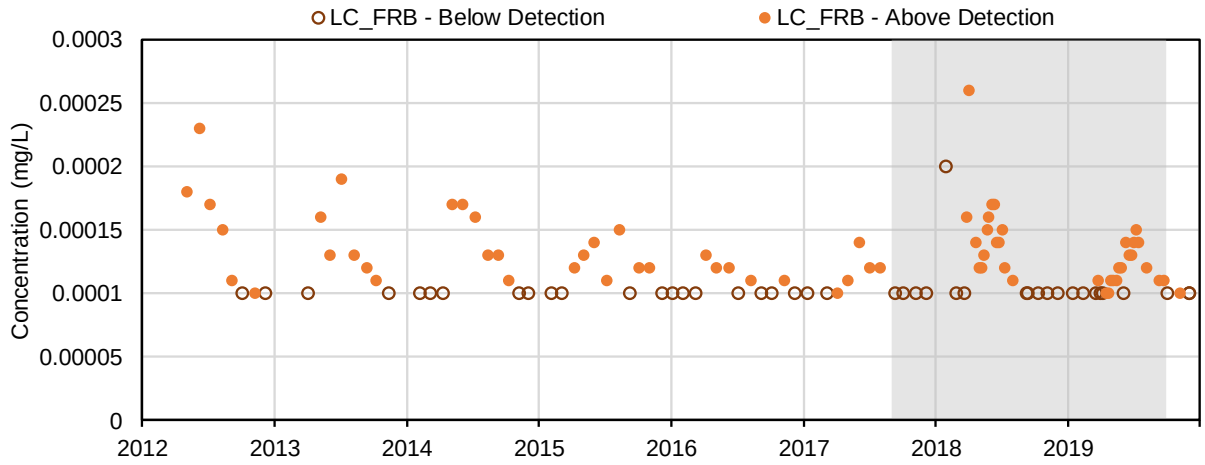
(49) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



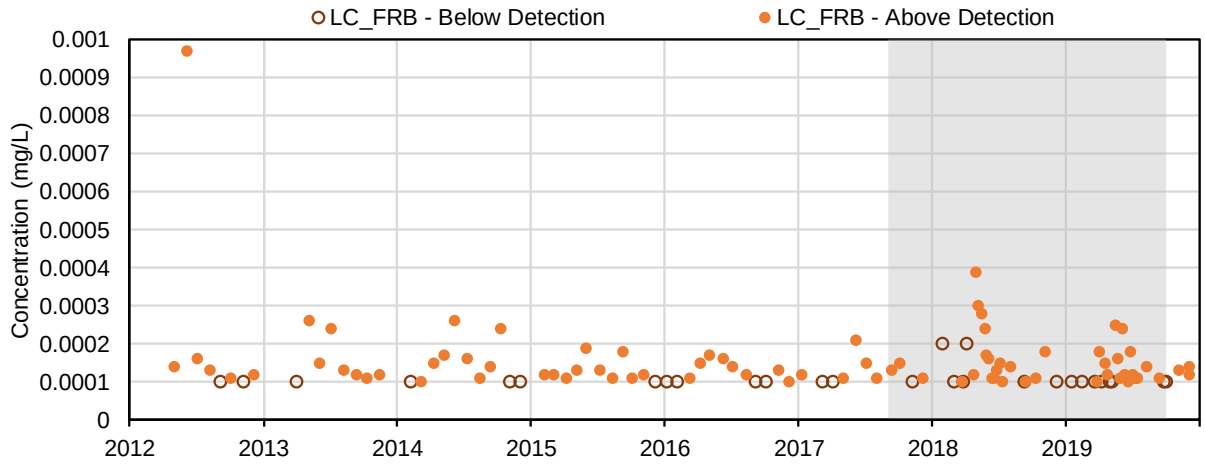
(50) Aluminum (mg/L); Total Metals



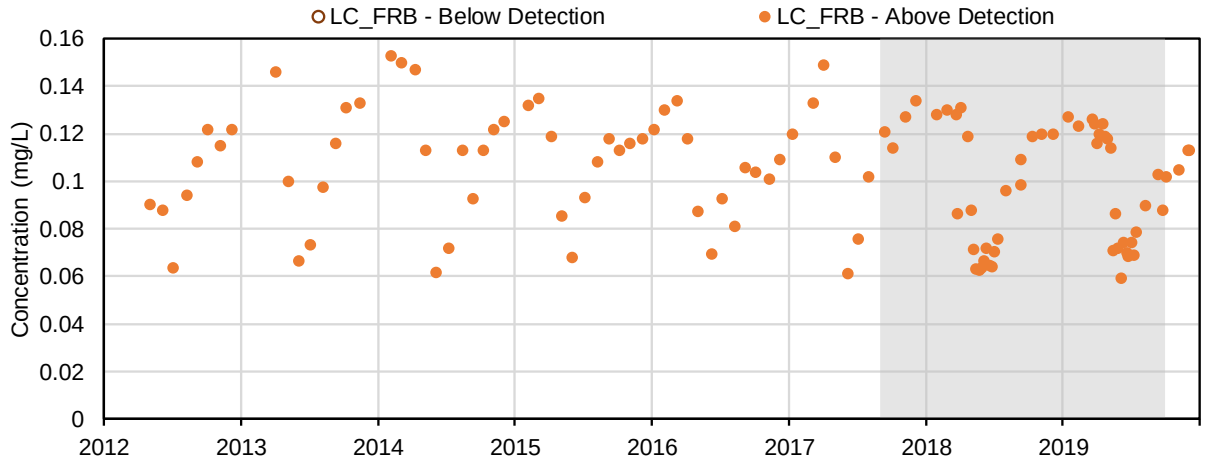
(51) Antimony (mg/L); Total Metals



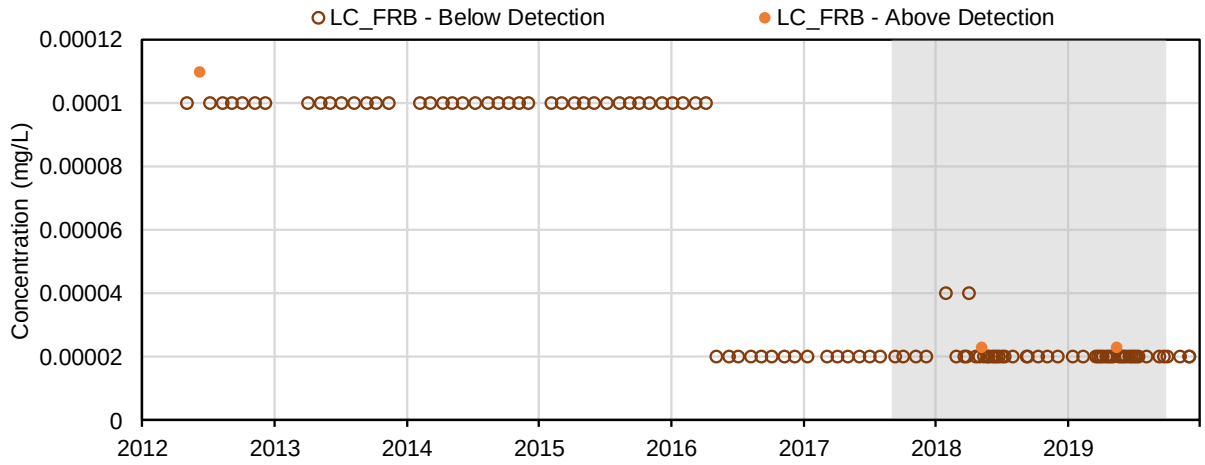
(52) Arsenic (mg/L); Total Metals



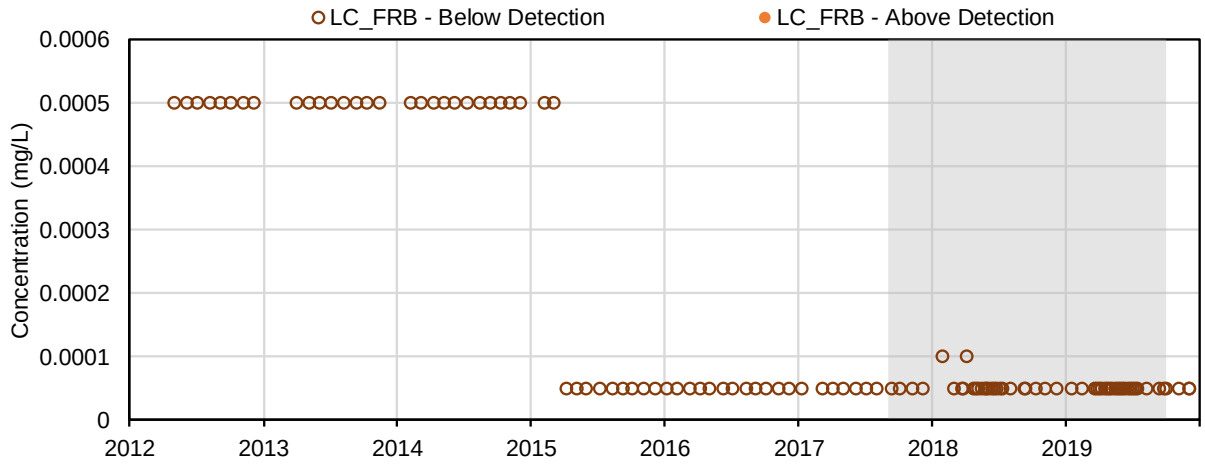
(53) Barium (mg/L); Total Metals



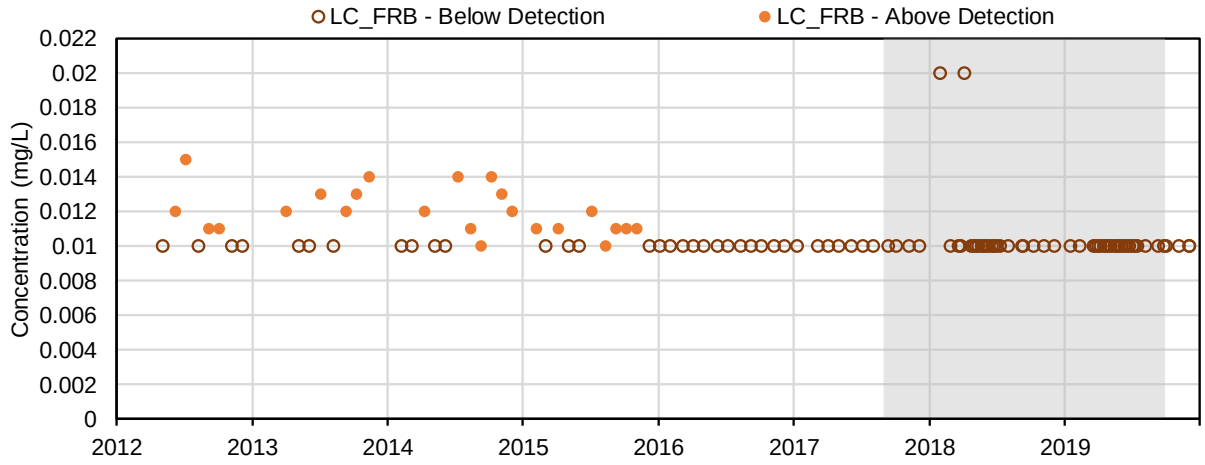
(54) Beryllium (mg/L); Total Metals



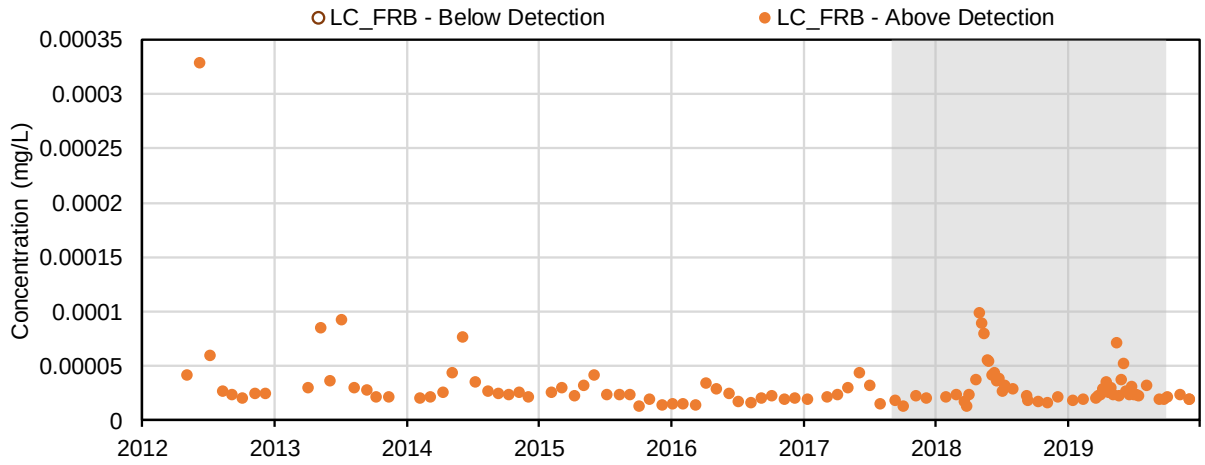
(55) Bismuth (mg/L); Total Metals



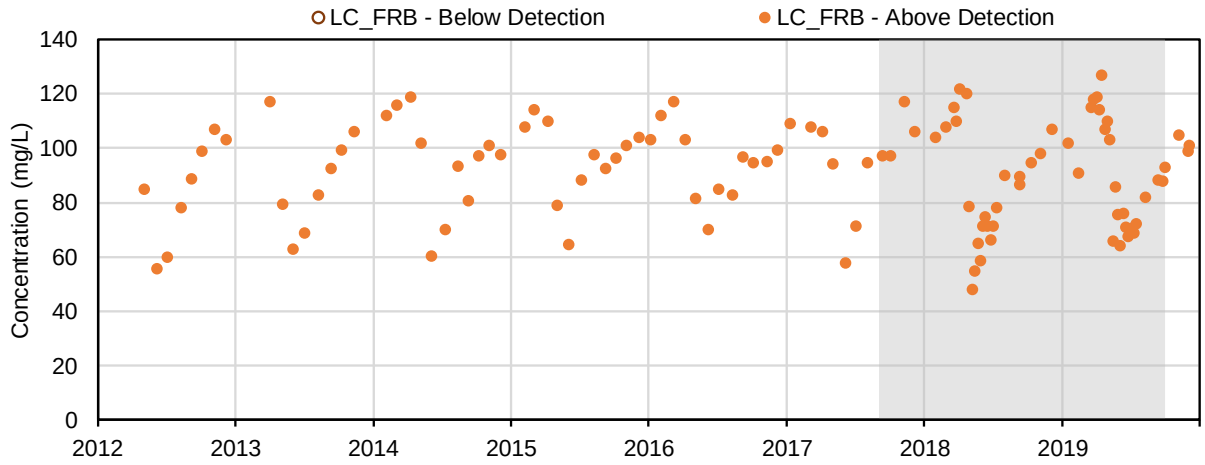
(56) Boron (mg/L); Total Metals



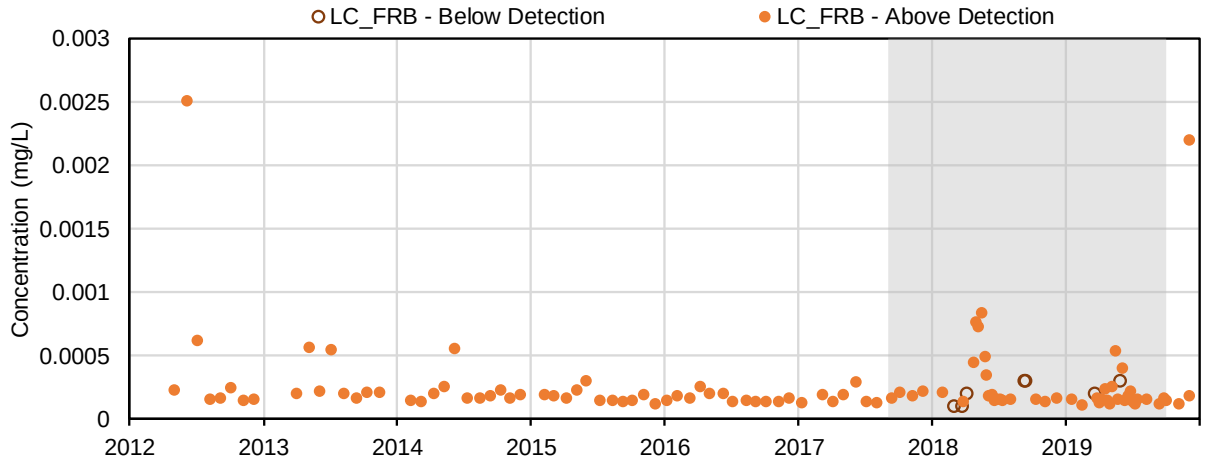
(57) Cadmium (mg/L); Total Metals



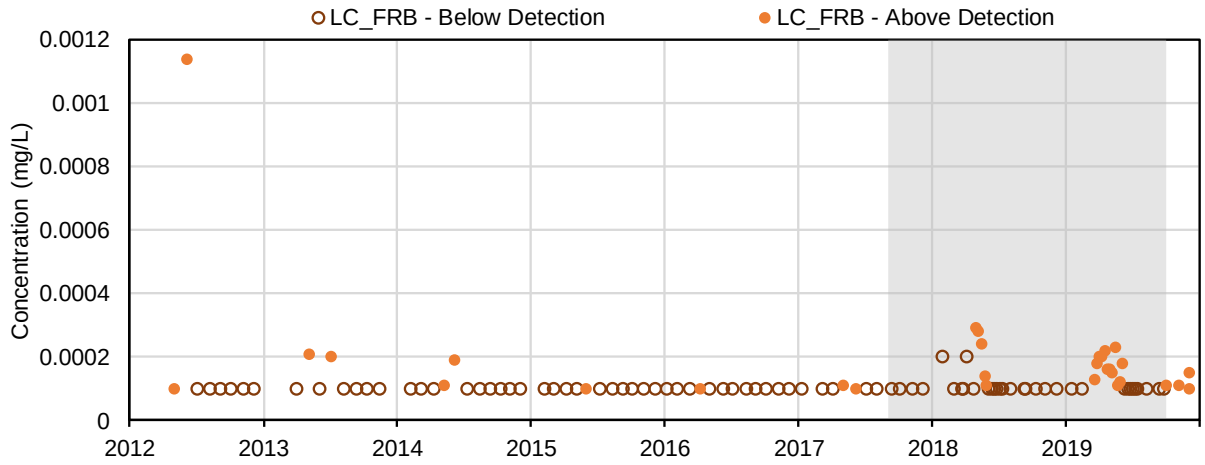
(58) Calcium (mg/L); Total Metals



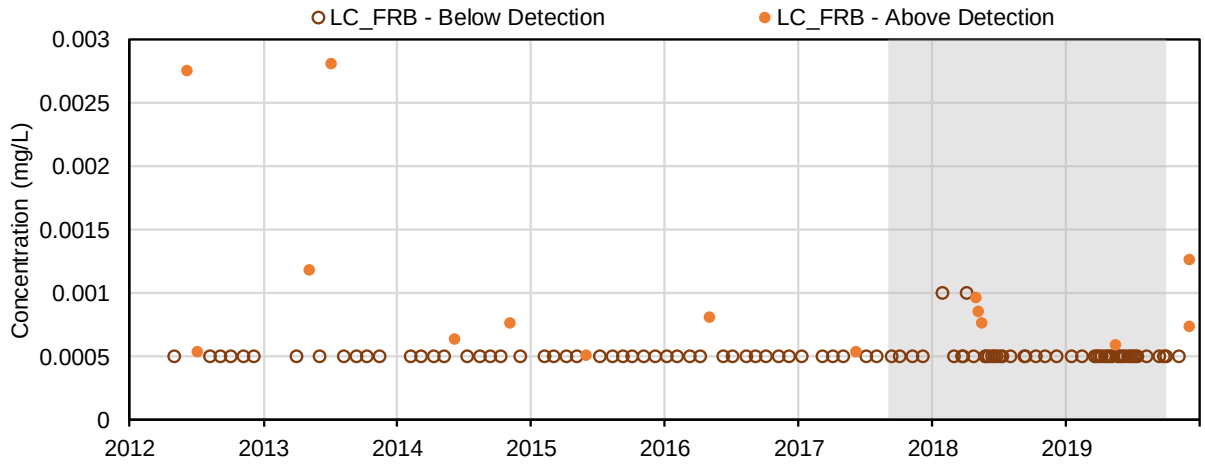
(59) Chromium (mg/L); Total Metals



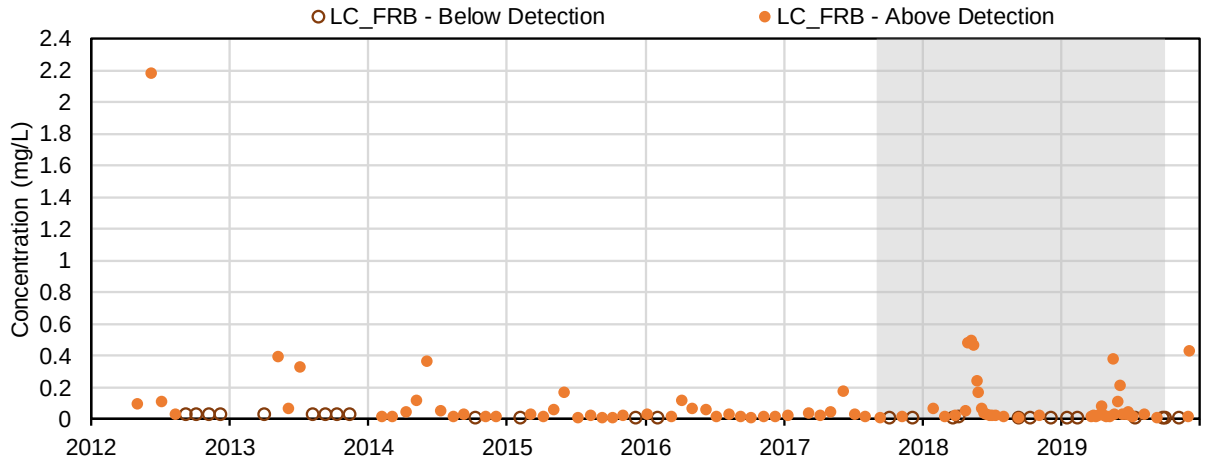
(60) Cobalt (mg/L); Total Metals



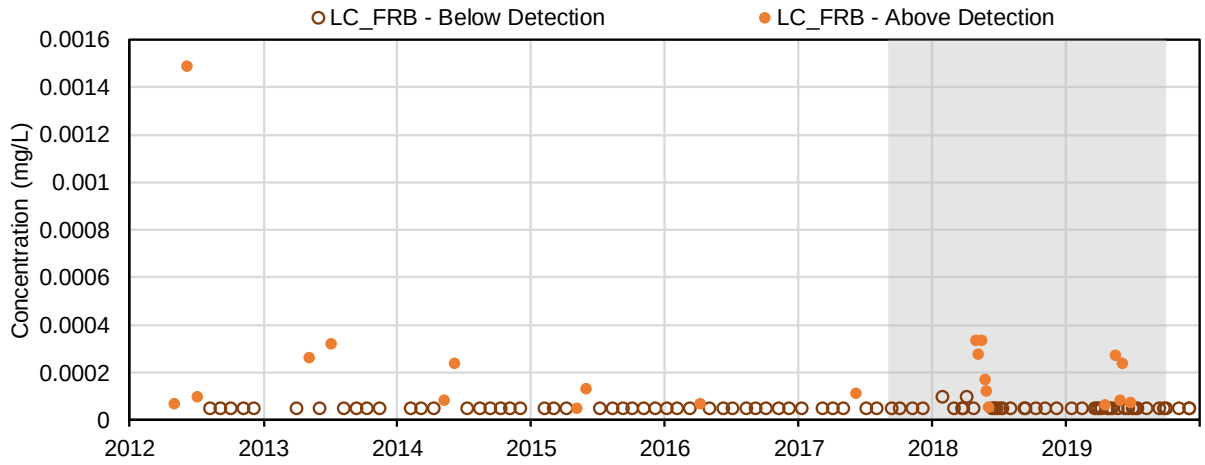
(61) Copper (mg/L); Total Metals



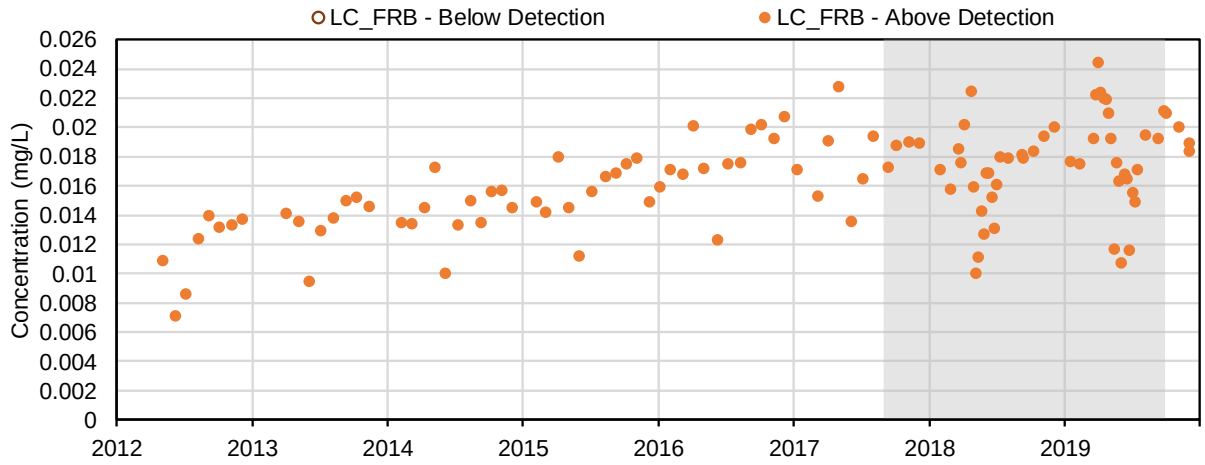
(62) Iron (mg/L); Total Metals



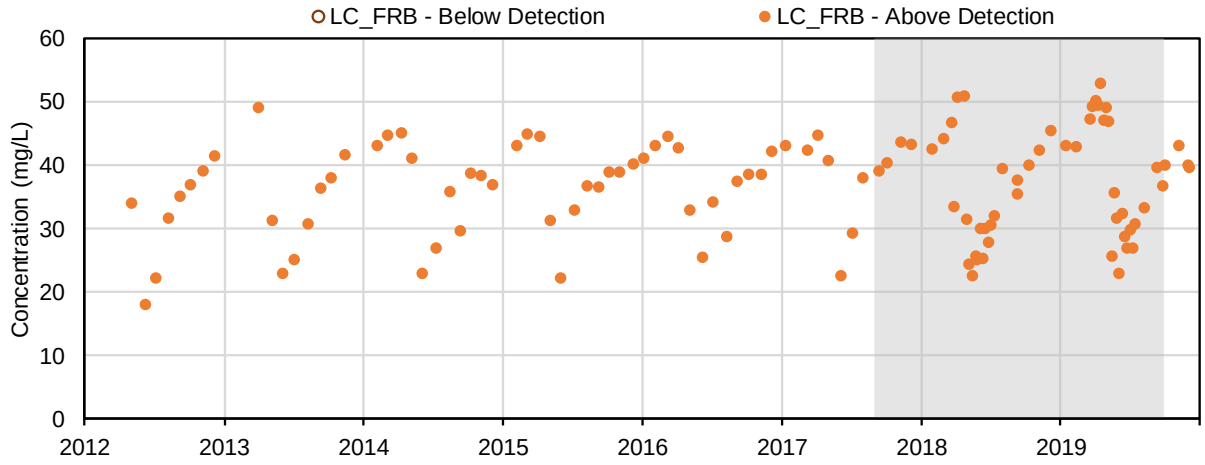
(63) Lead (mg/L); Total Metals



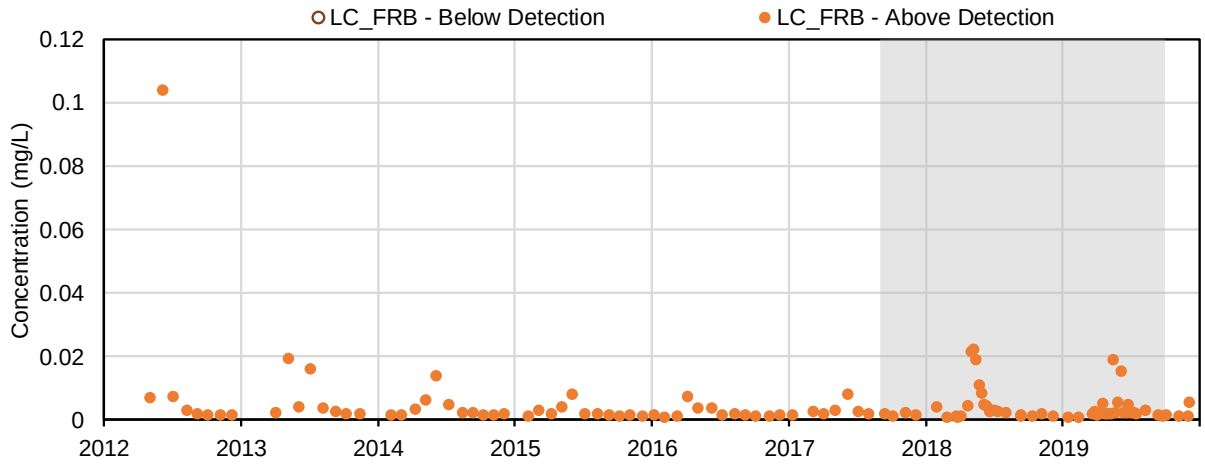
(64) Lithium (mg/L); Total Metals



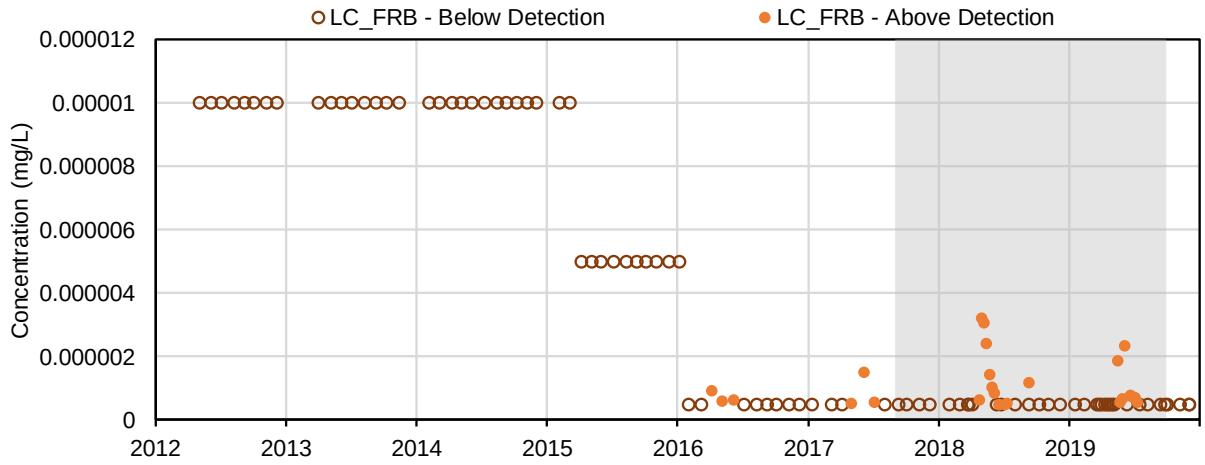
(65) Magnesium (mg/L); Total Metals



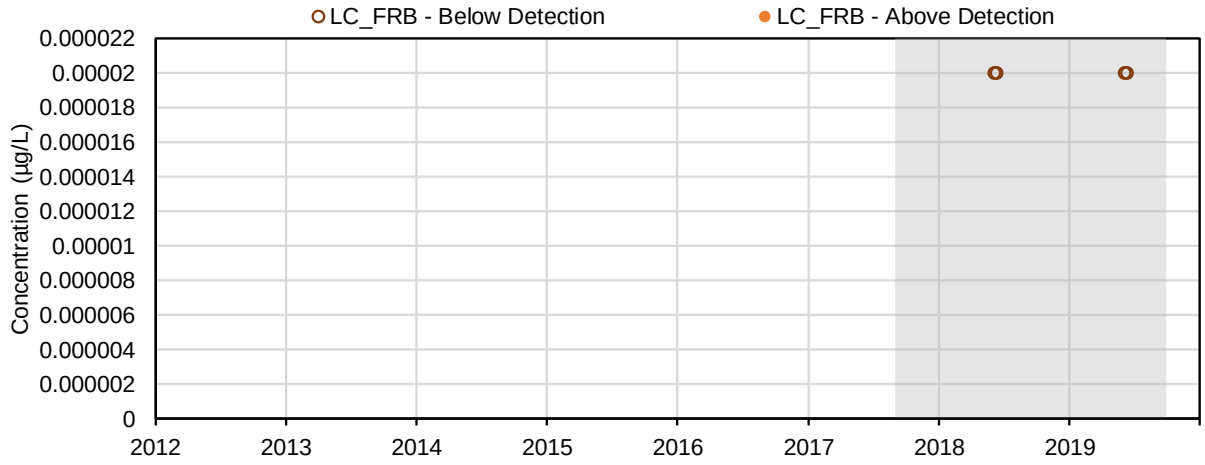
(66) Manganese (mg/L); Total Metals



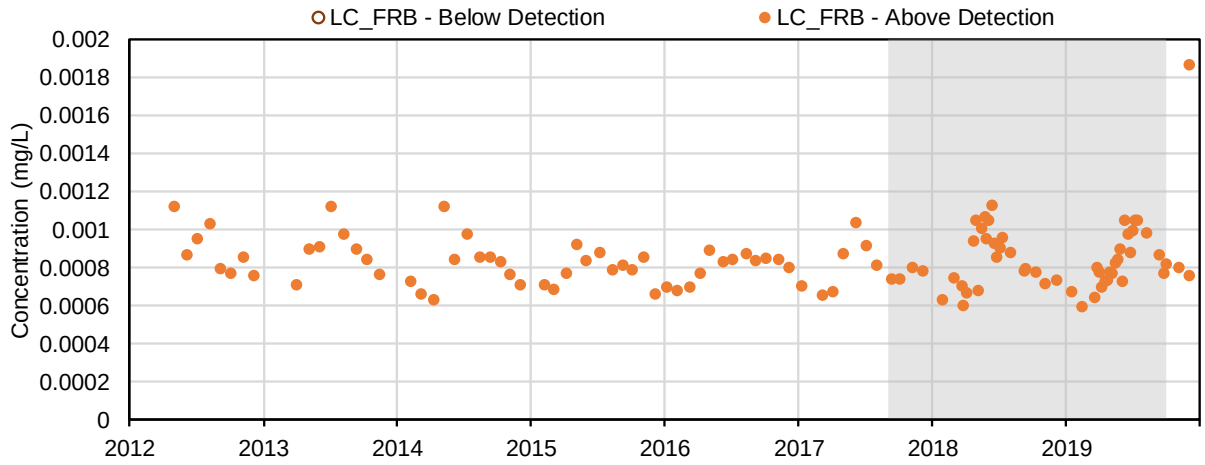
(67) Mercury (mg/L); Total Metals



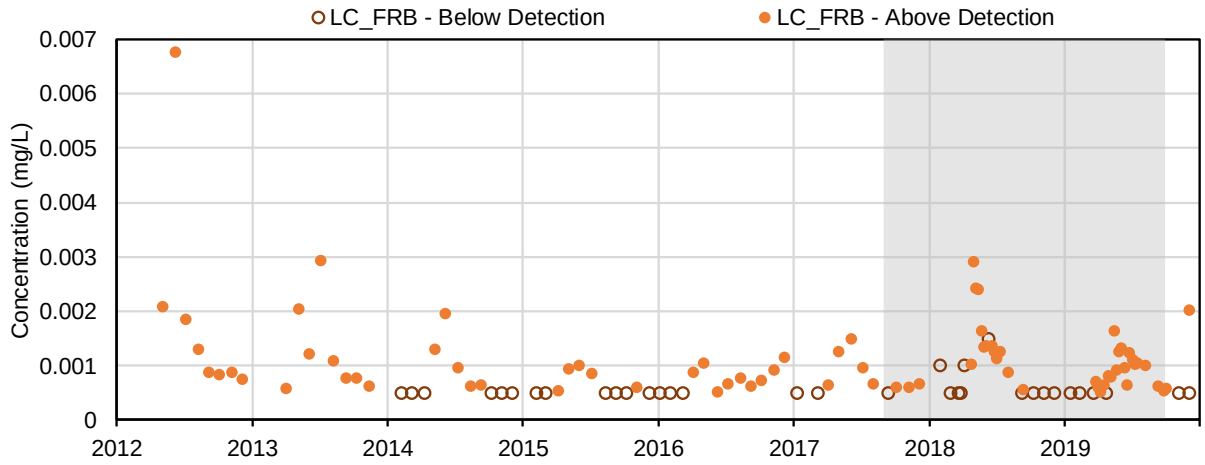
(68) Methyl mercury (µg/L); Total Metals



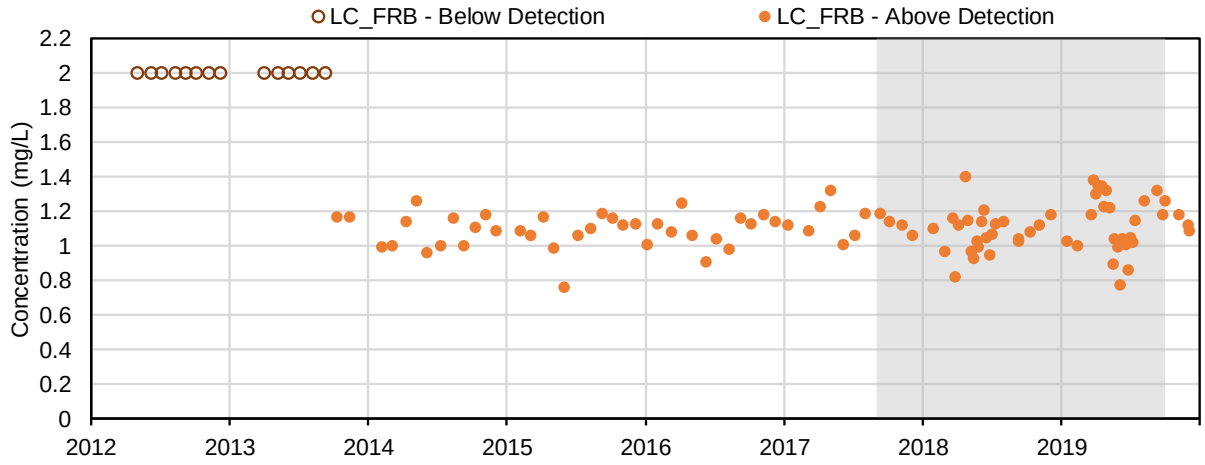
(69) Molybdenum (mg/L); Total Metals



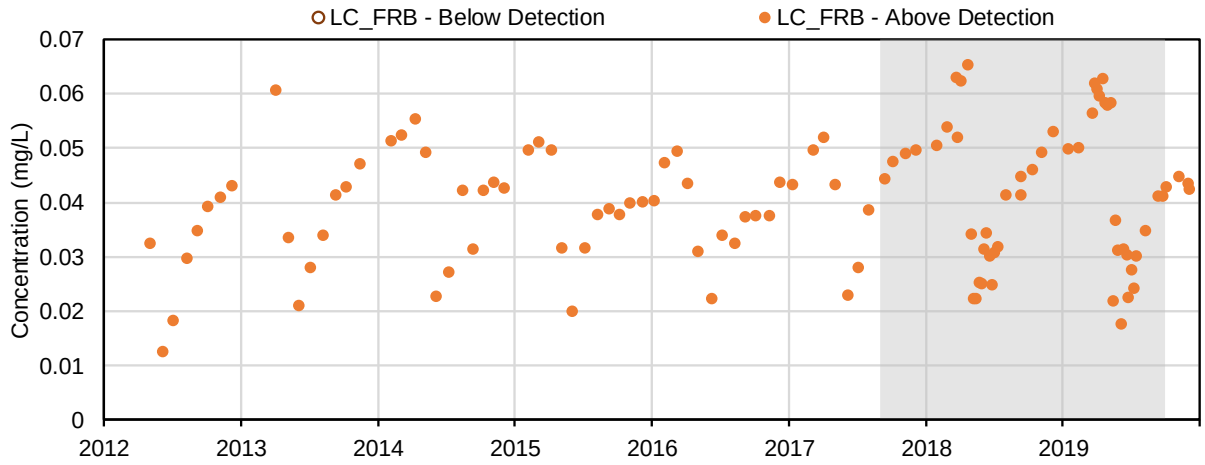
(70) Nickel (mg/L); Total Metals



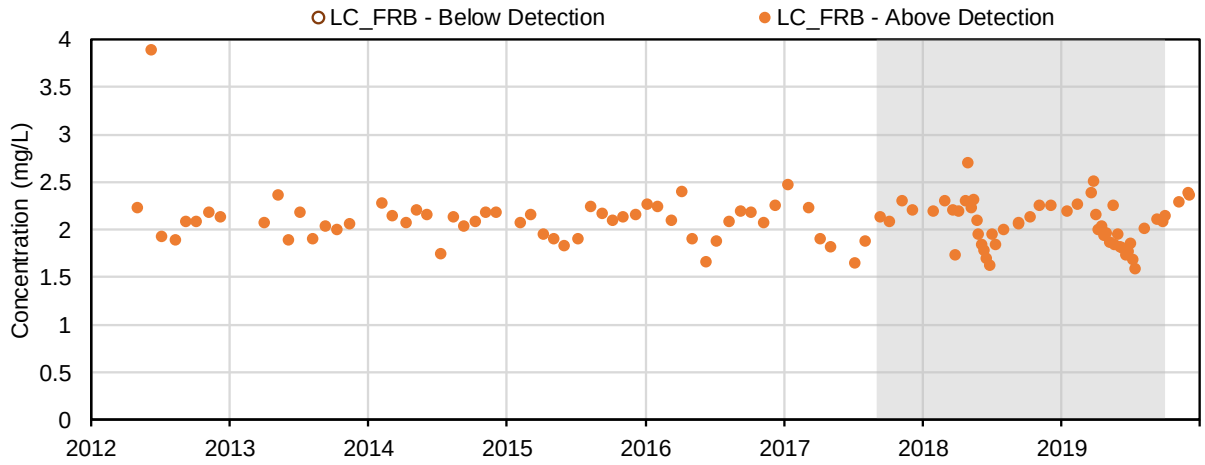
(71) Potassium (mg/L); Total Metals



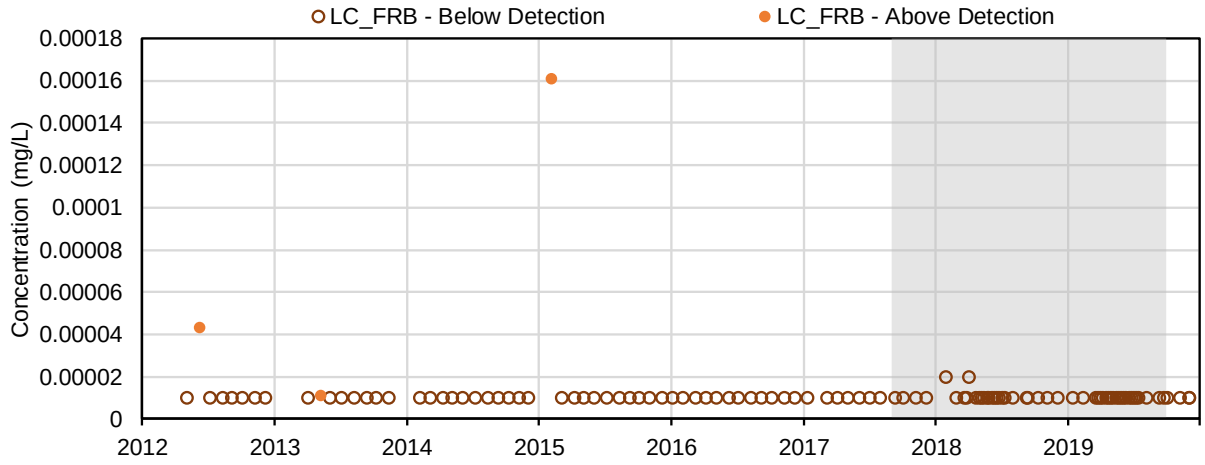
(72) Selenium (mg/L); Total Metals



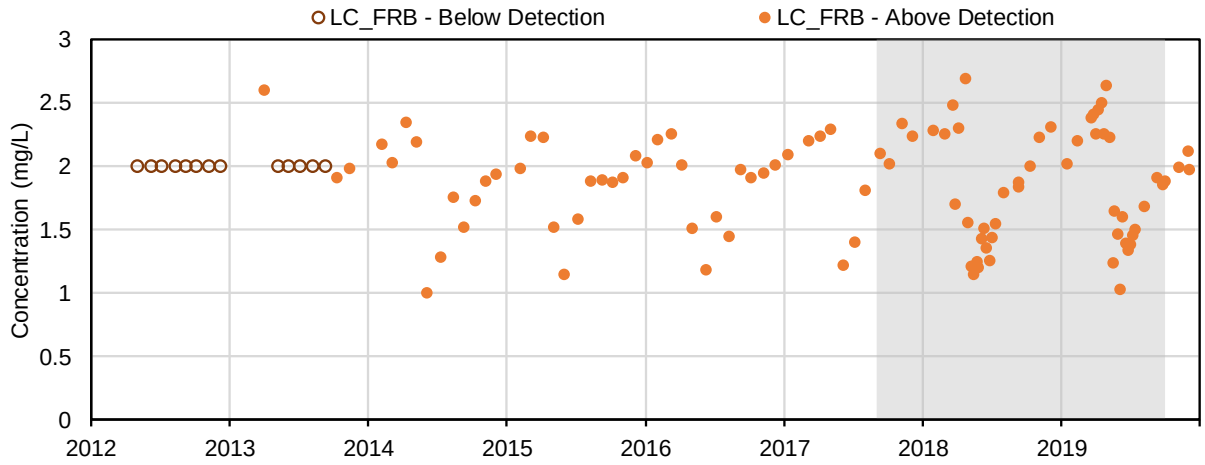
(73) Silicon (mg/L); Total Metals



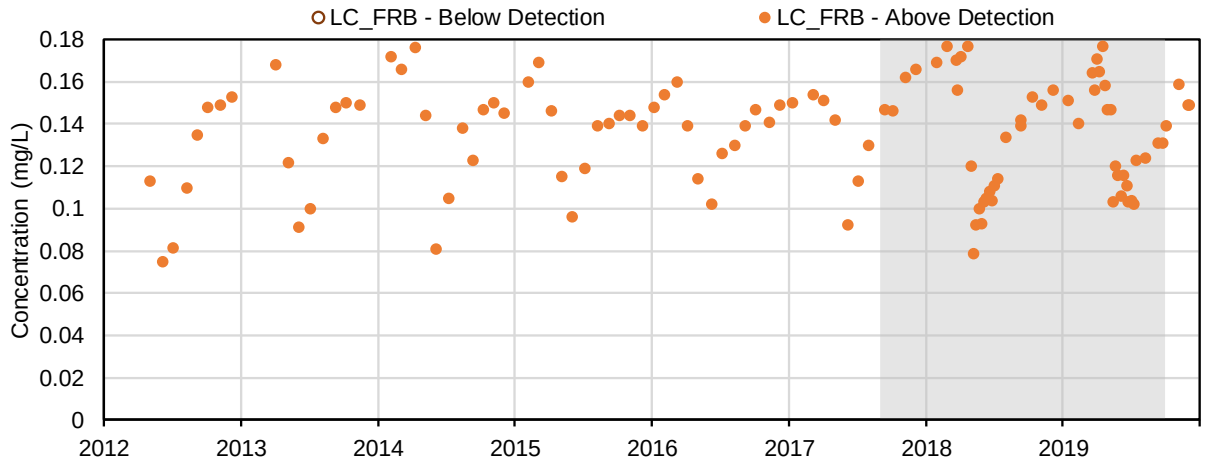
(74) Silver (mg/L); Total Metals



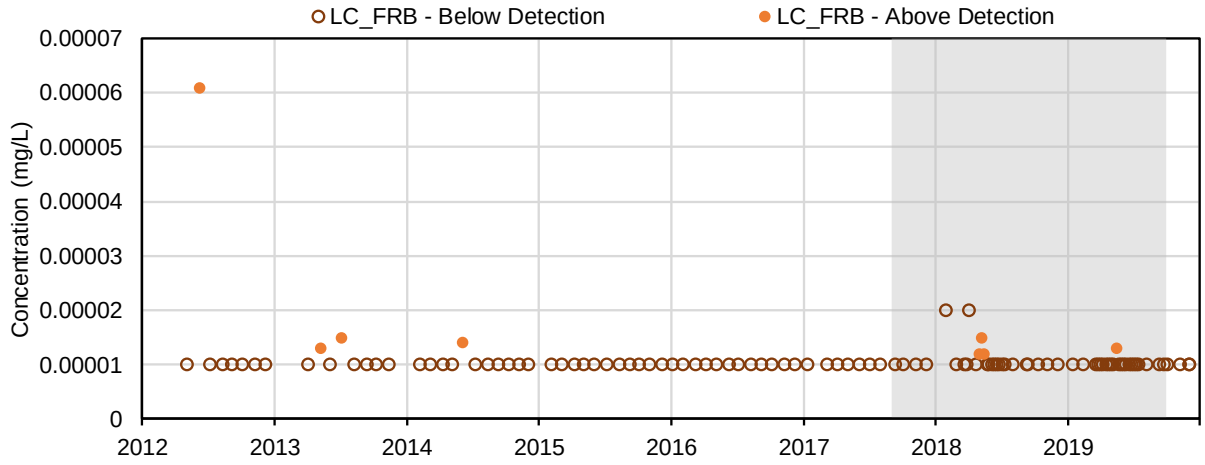
(75) Sodium (mg/L); Total Metals



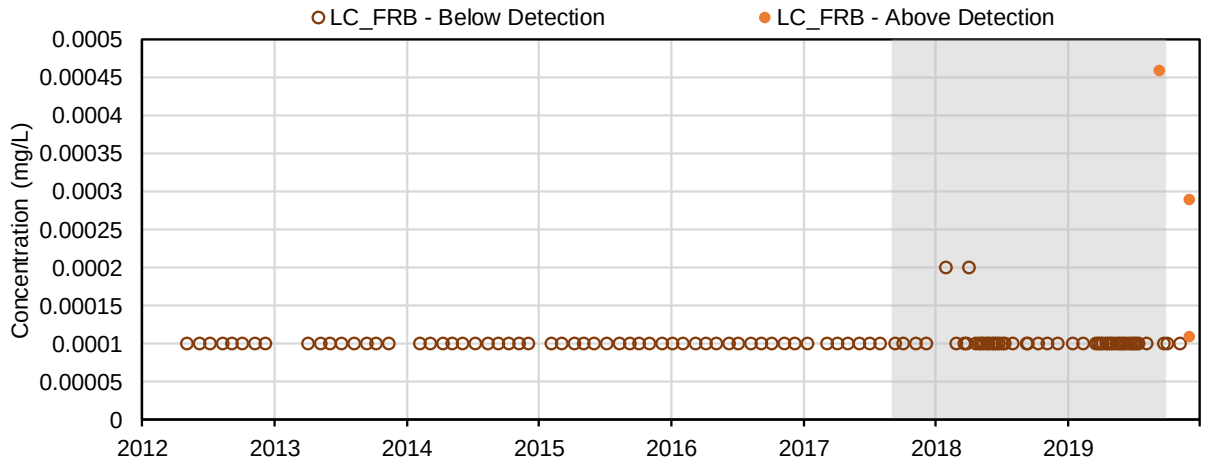
(76) Strontium (mg/L); Total Metals



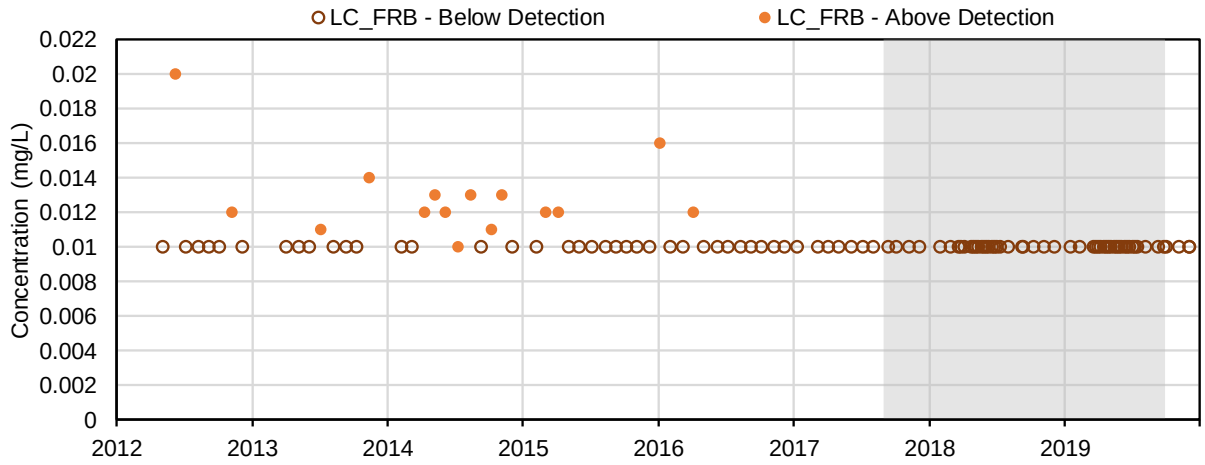
(77) Thallium (mg/L); Total Metals



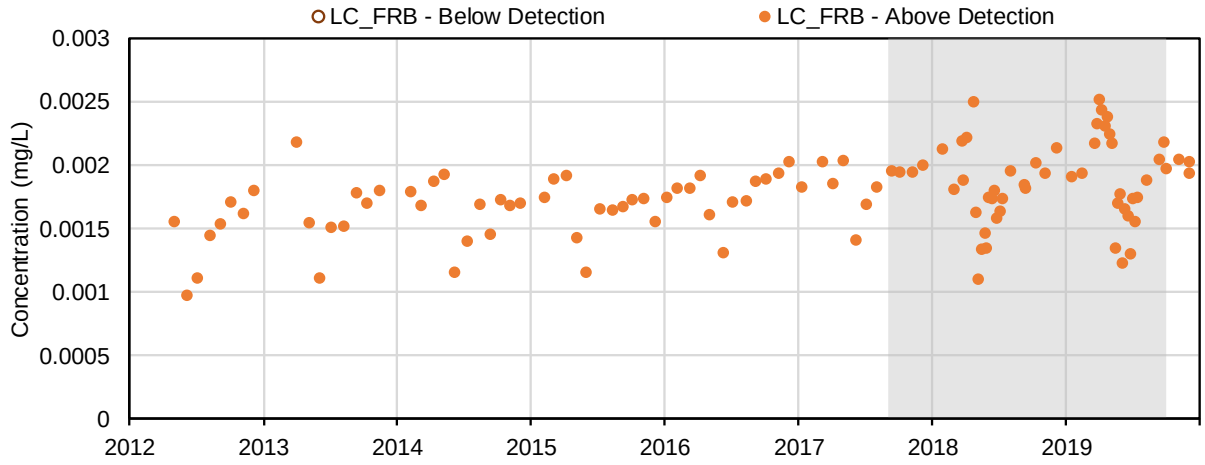
(78) Tin (mg/L); Total Metals



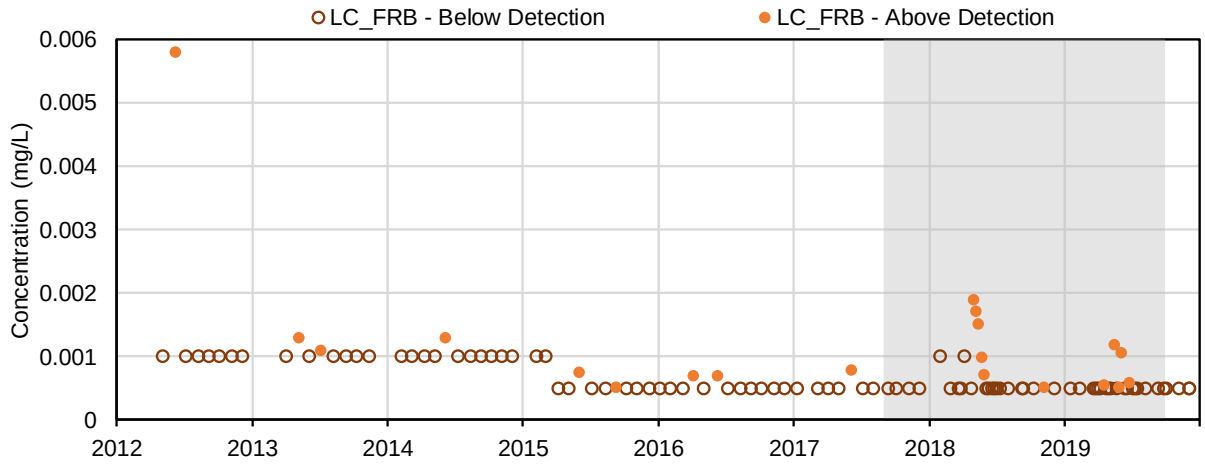
(79) Titanium (mg/L); Total Metals



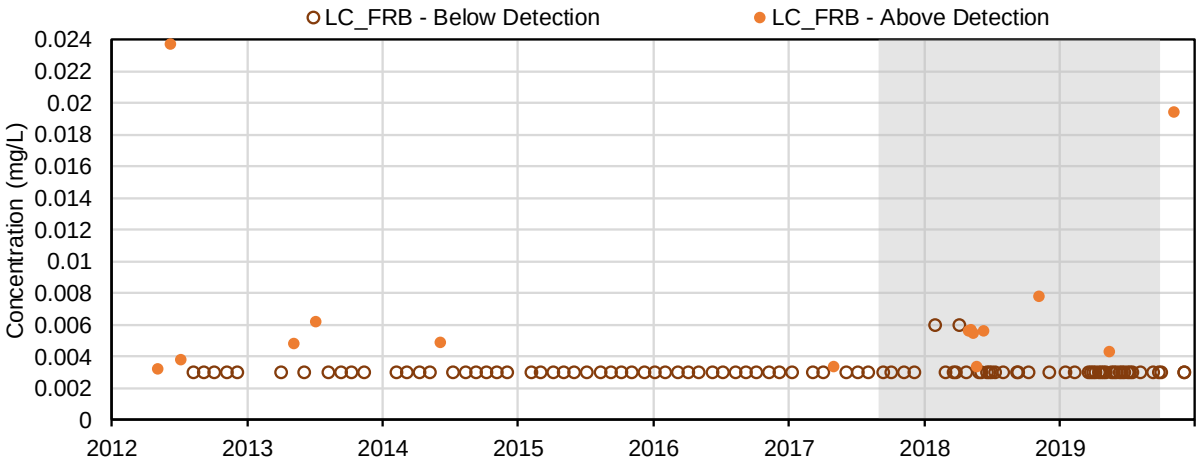
(80) Uranium (mg/L); Total Metals



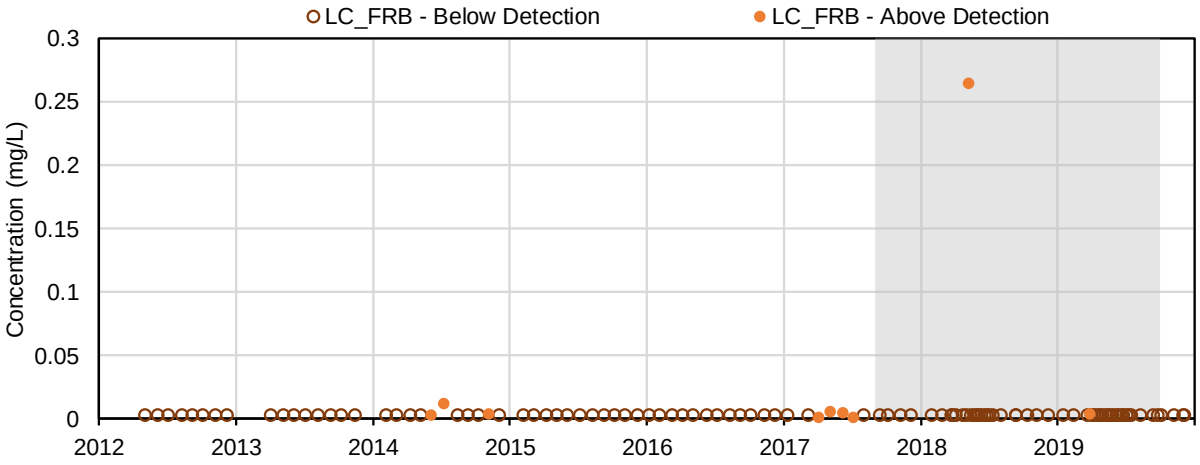
(81) Vanadium (mg/L); Total Metals



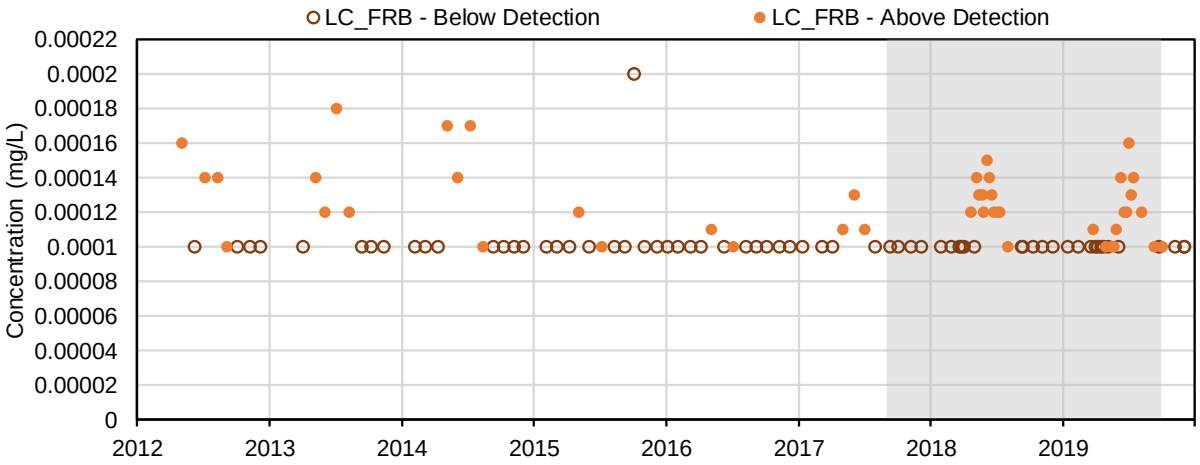
(82) Zinc (mg/L); Total Metals



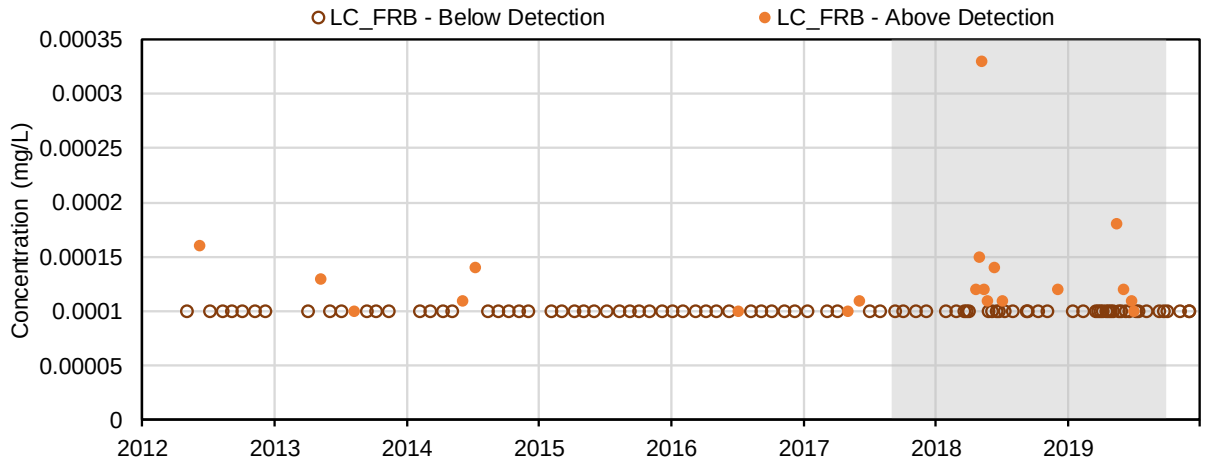
(83) Aluminum (mg/L); Dissolved Metals



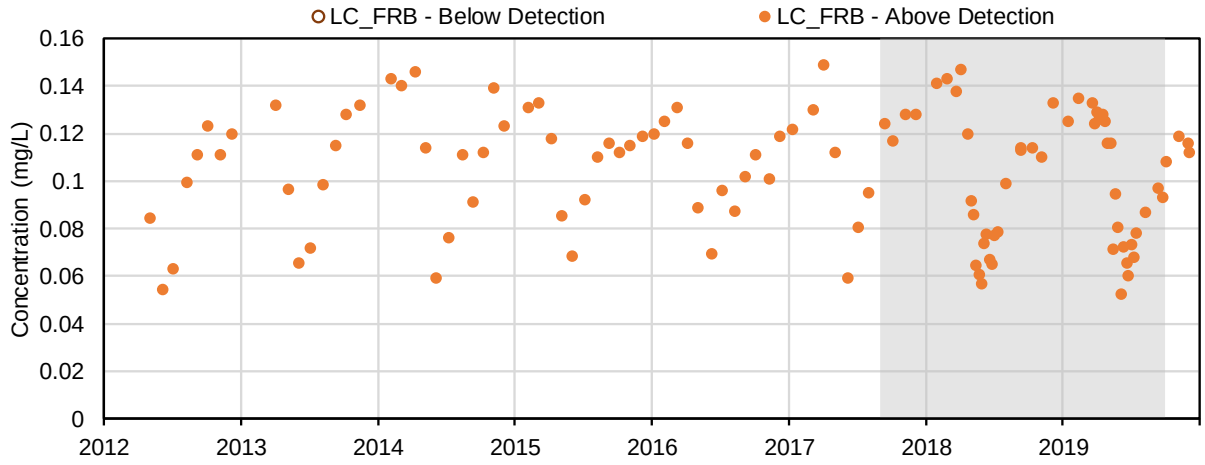
(84) Antimony (mg/L); Dissolved Metals



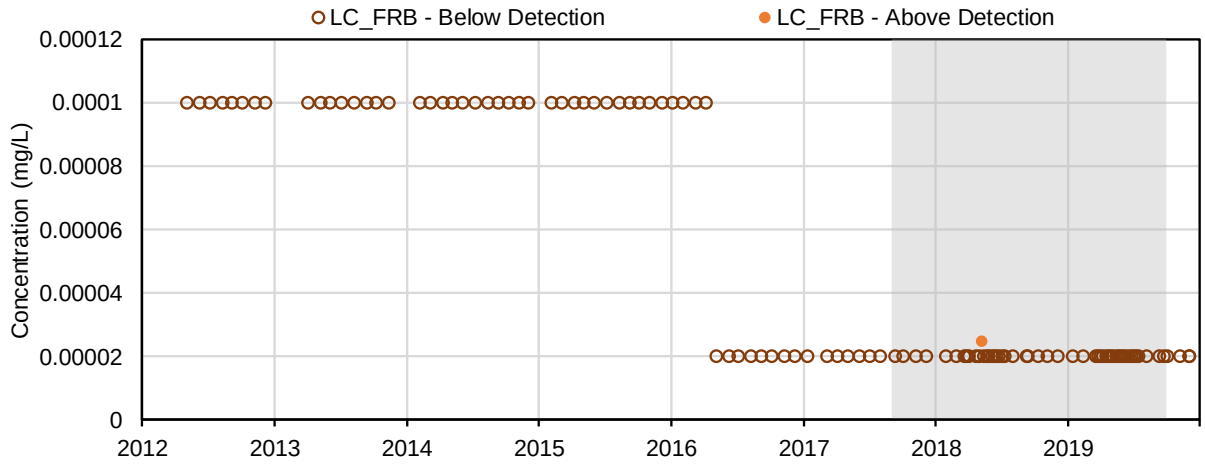
(85) Arsenic (mg/L); Dissolved Metals



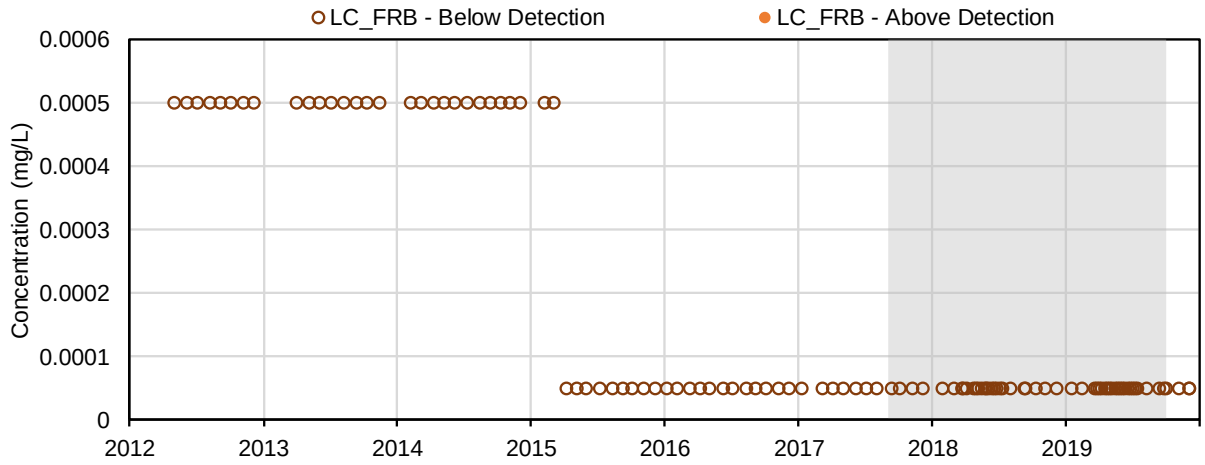
(86) Barium (mg/L); Dissolved Metals



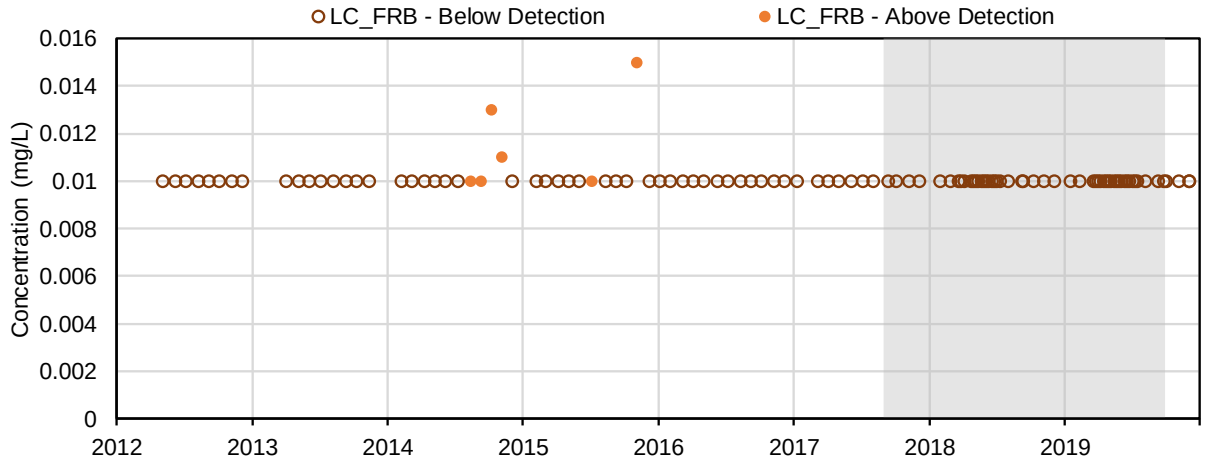
(87) Beryllium (mg/L); Dissolved Metals



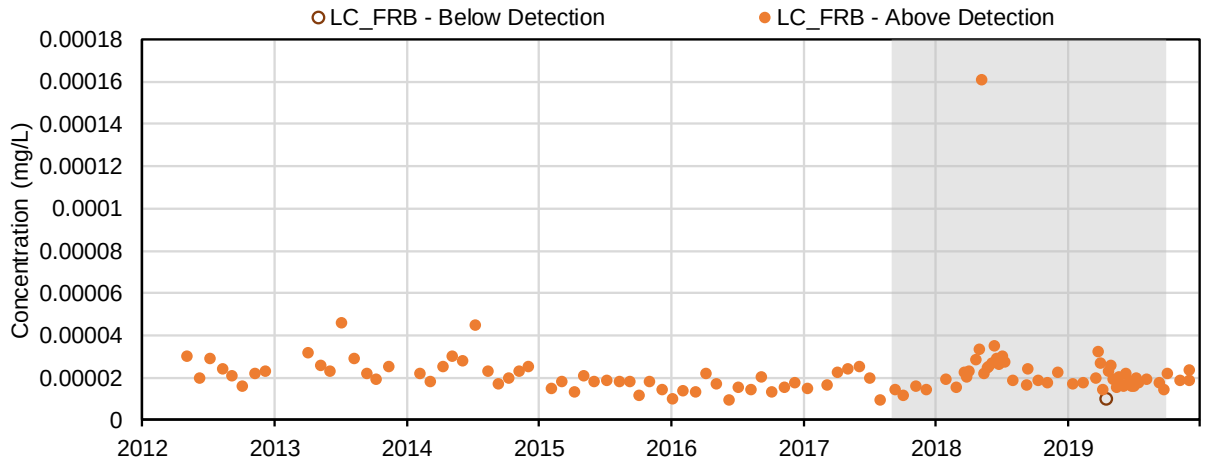
(88) Bismuth (mg/L); Dissolved Metals



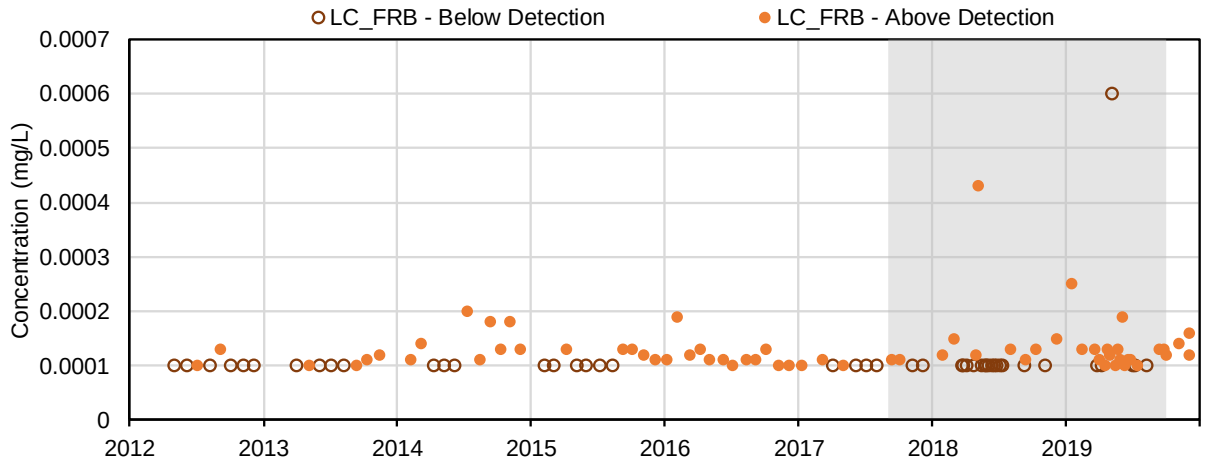
(89) Boron (mg/L); Dissolved Metals



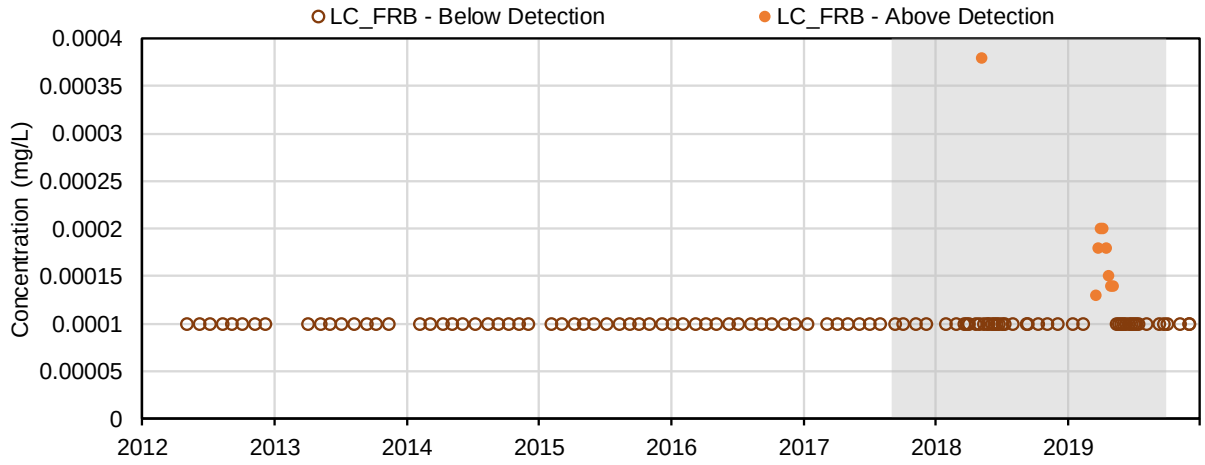
(90) Cadmium (mg/L); Dissolved Metals



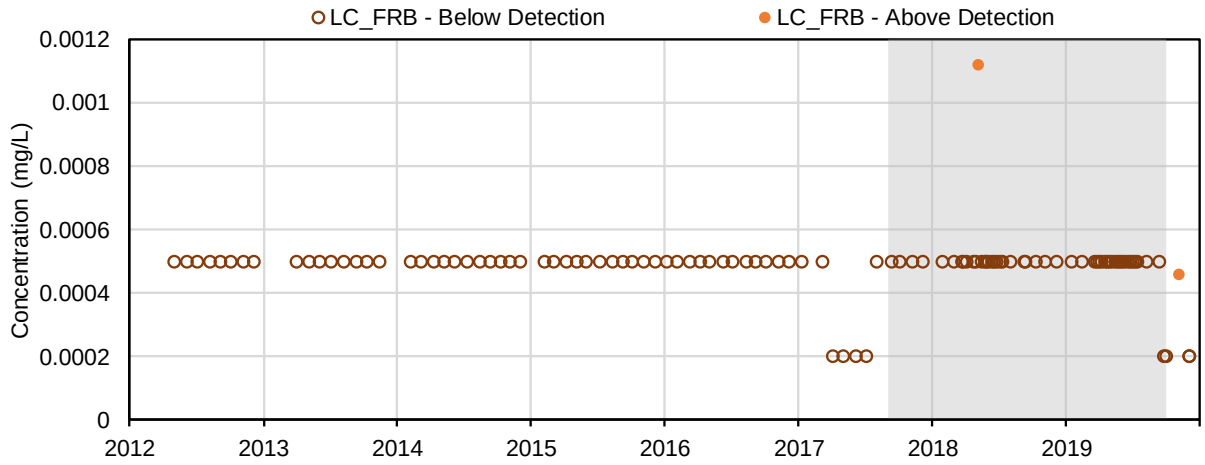
(91) Chromium (mg/L); Dissolved Metals



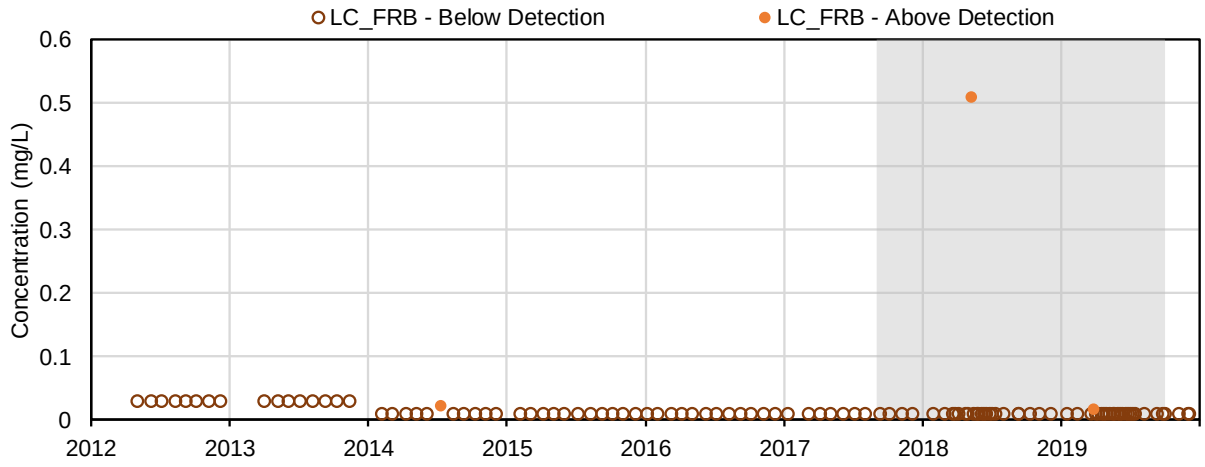
(92) Cobalt (mg/L); Dissolved Metals



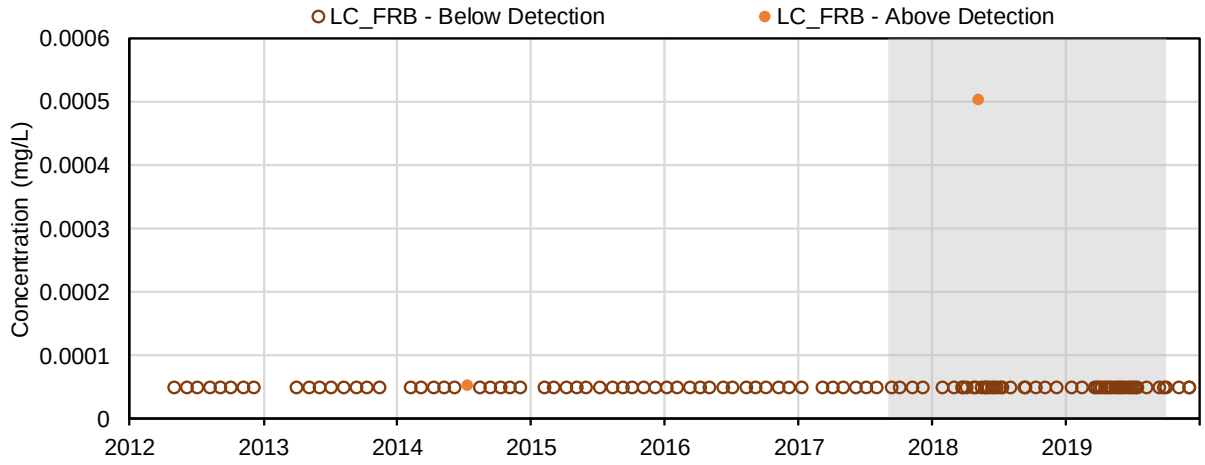
(93) Copper (mg/L); Dissolved Metals



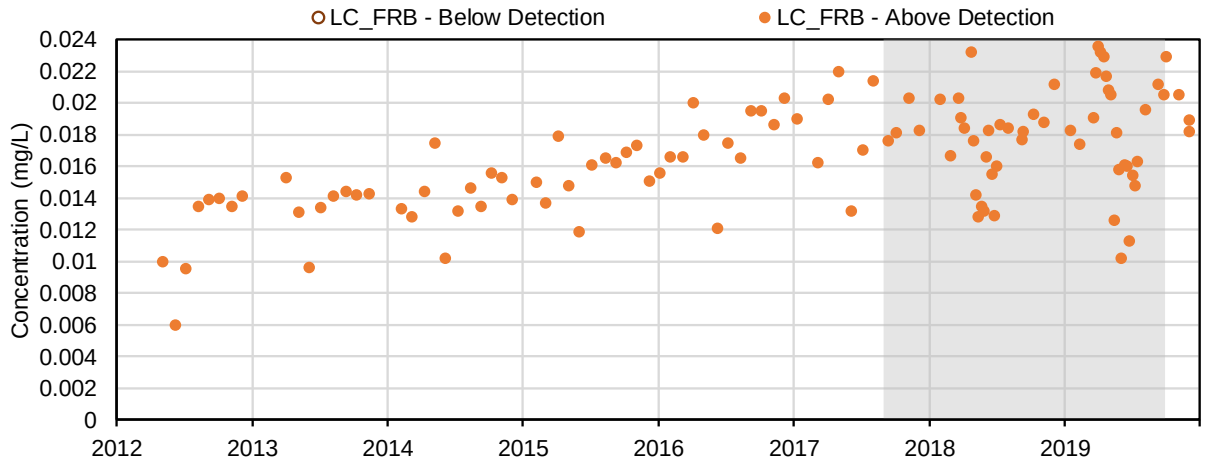
(94) Iron (mg/L); Dissolved Metals



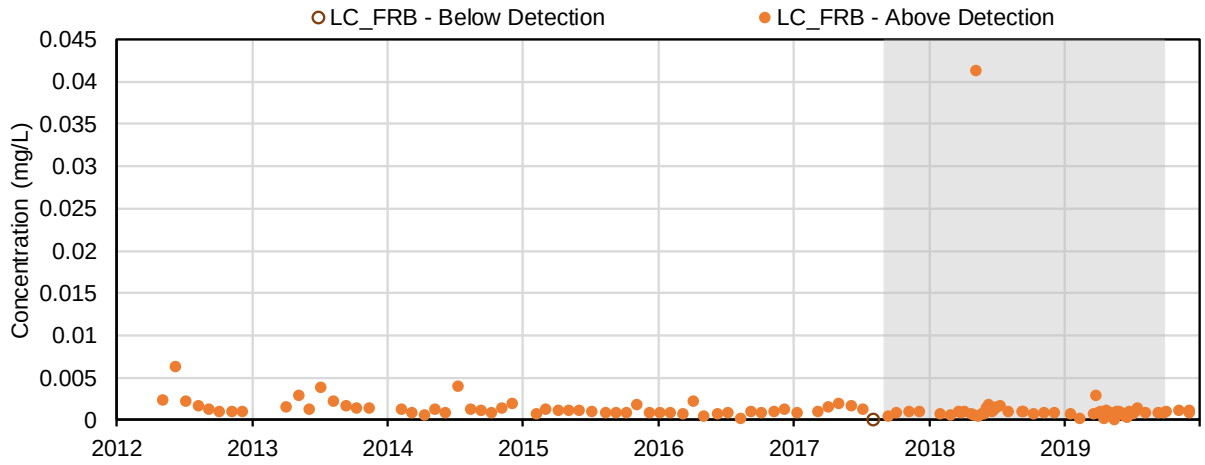
(95) Lead (mg/L); Dissolved Metals



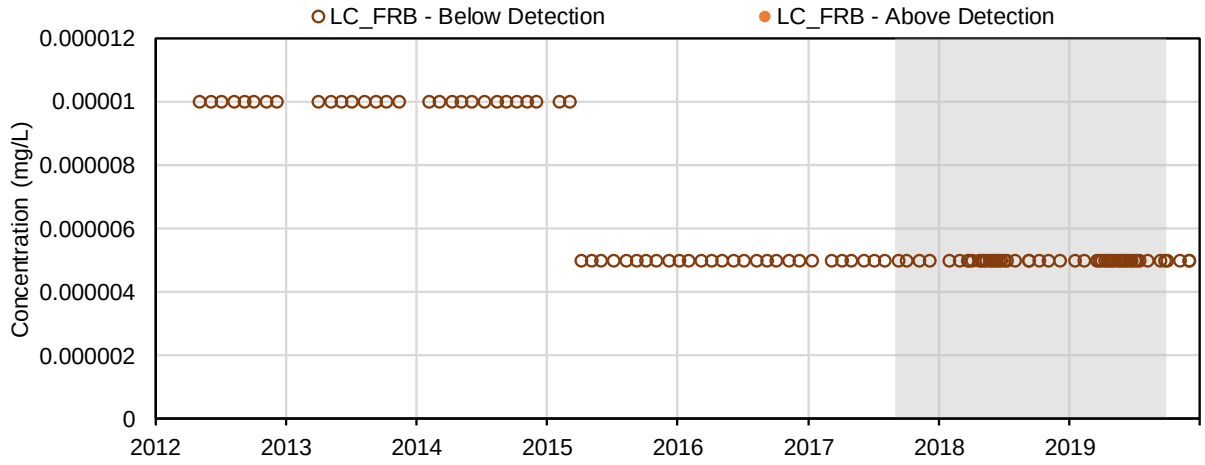
(96) Lithium (mg/L); Dissolved Metals



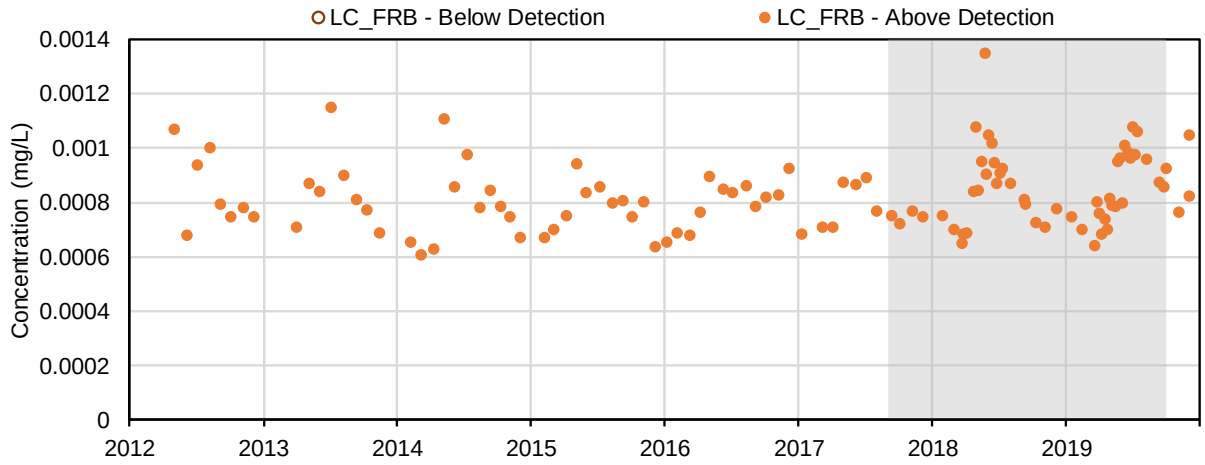
(97) Manganese (mg/L); Dissolved Metals



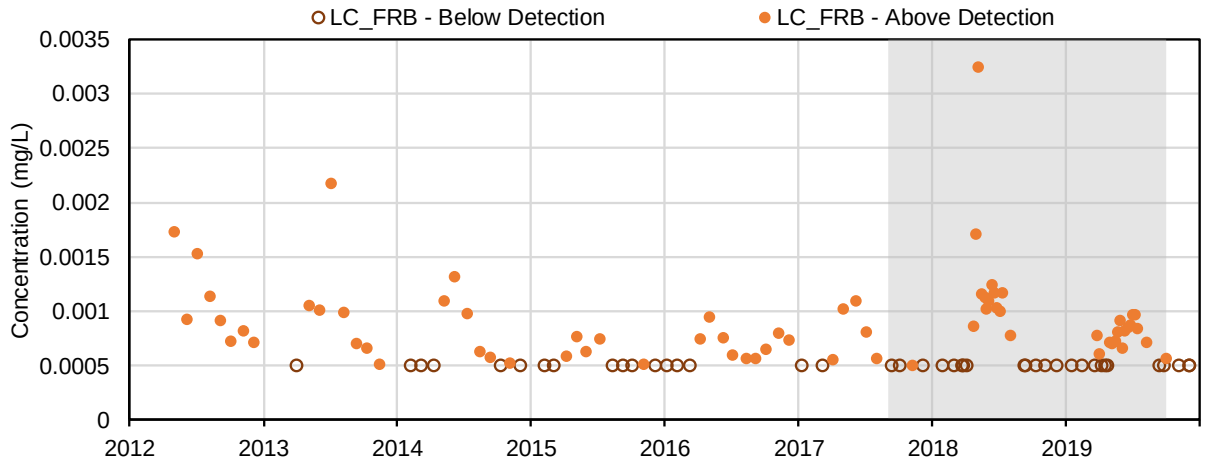
(98) Mercury (mg/L); Dissolved Metals



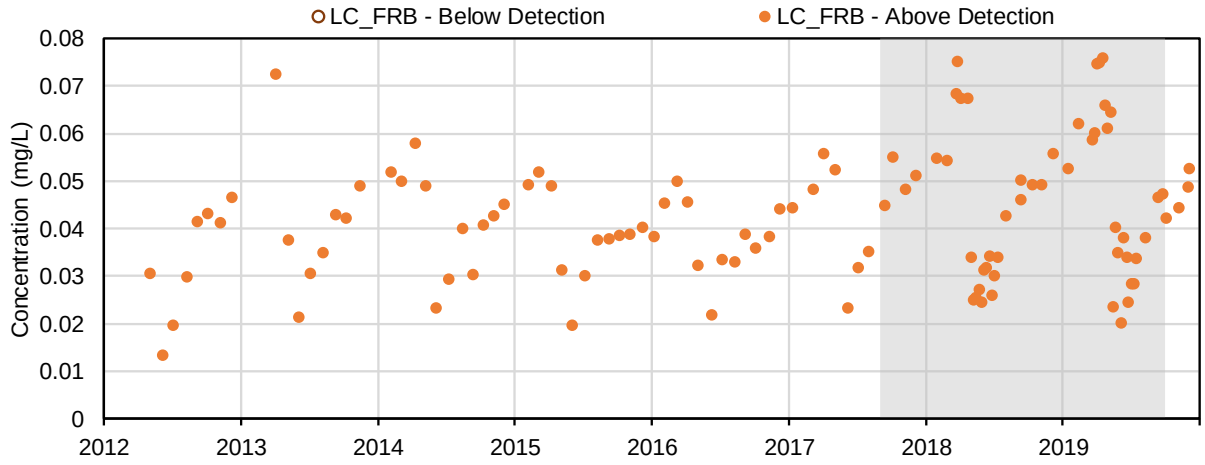
(99) Molybdenum (mg/L); Dissolved Metals



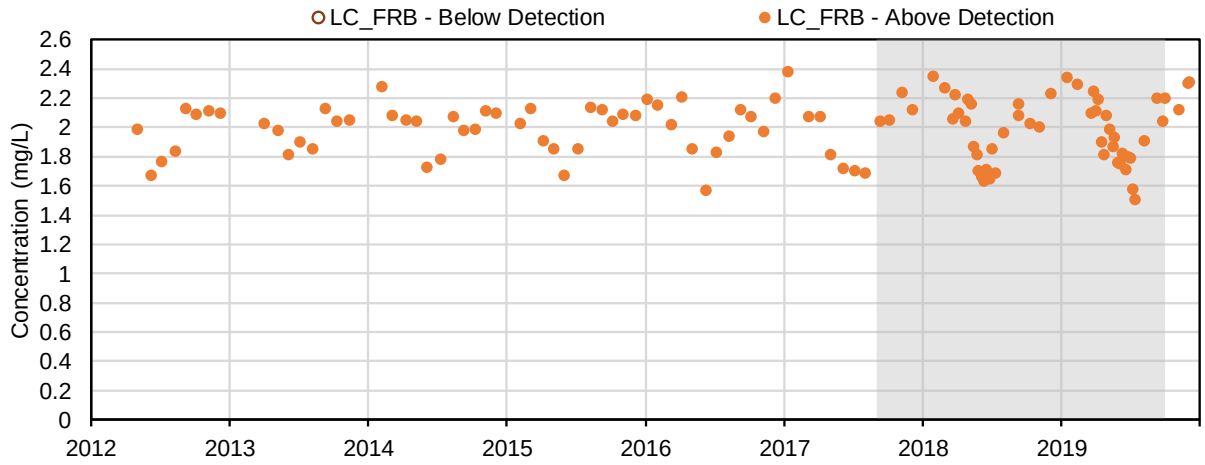
(100) Nickel (mg/L); Dissolved Metals



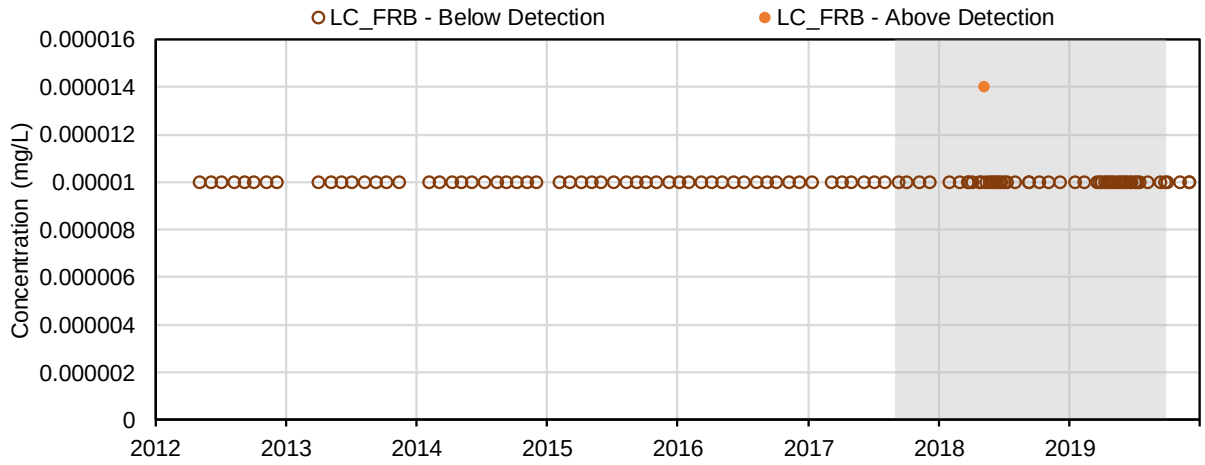
(101) Selenium (mg/L); Dissolved Metals



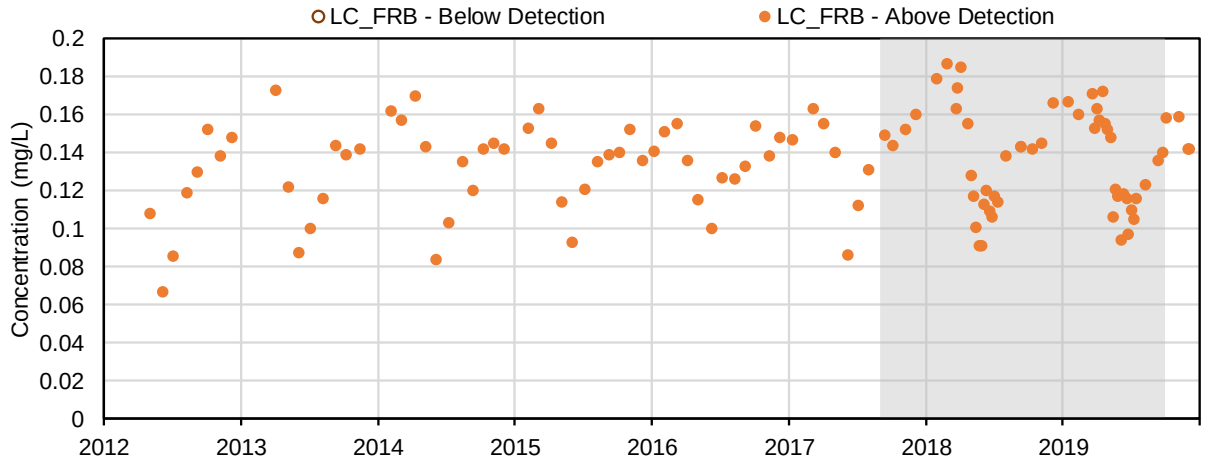
(102) Silicon (mg/L); Dissolved Metals



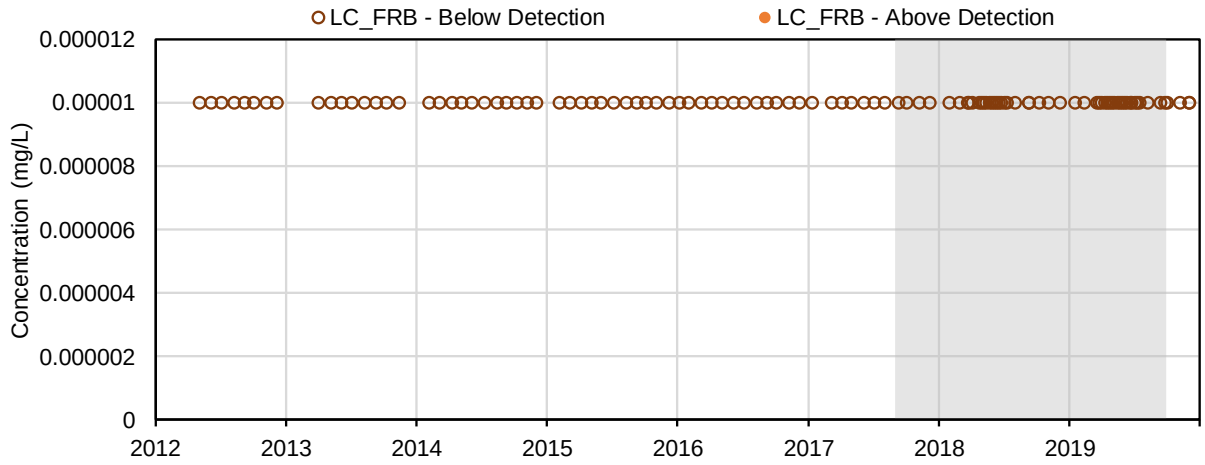
(103) Silver (mg/L); Dissolved Metals



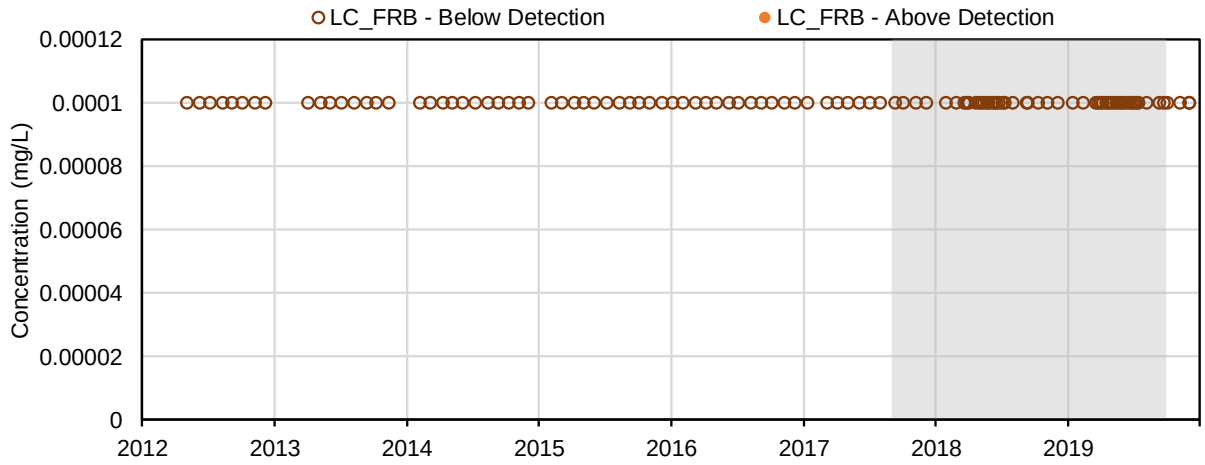
(104) Strontium (mg/L); Dissolved Metals



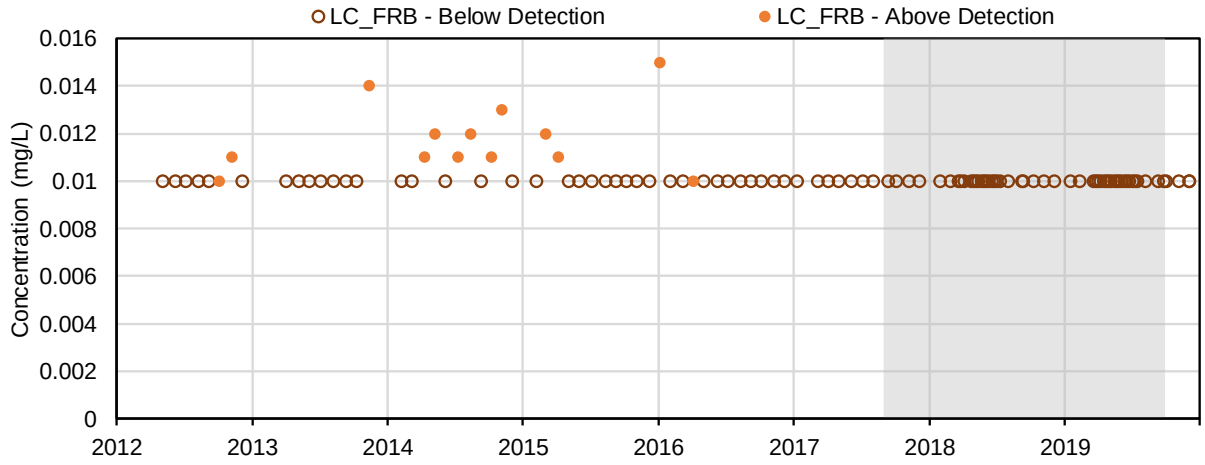
(105) Thallium (mg/L); Dissolved Metals



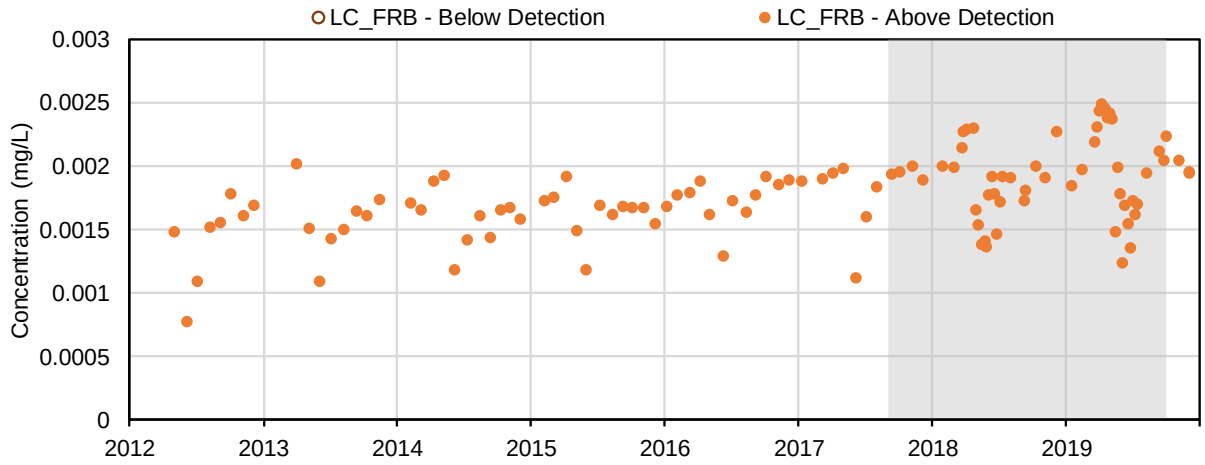
(106) Tin (mg/L); Dissolved Metals



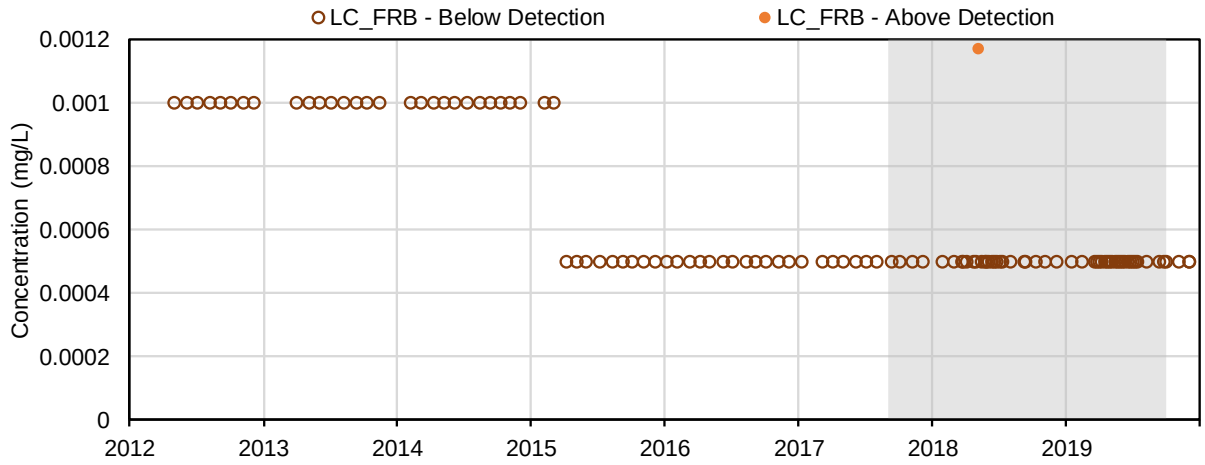
(107) Titanium (mg/L); Dissolved Metals



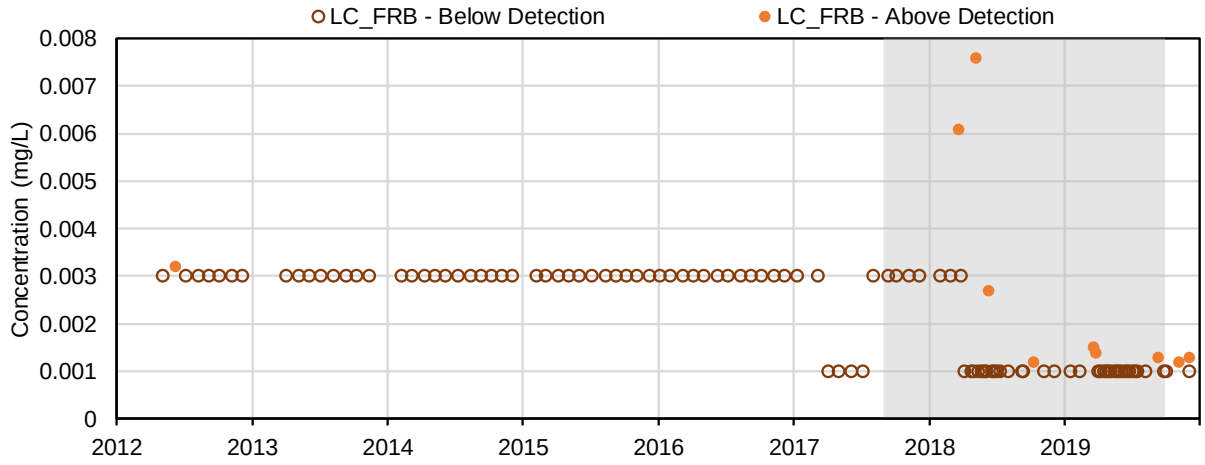
(108) Uranium (mg/L); Dissolved Metals

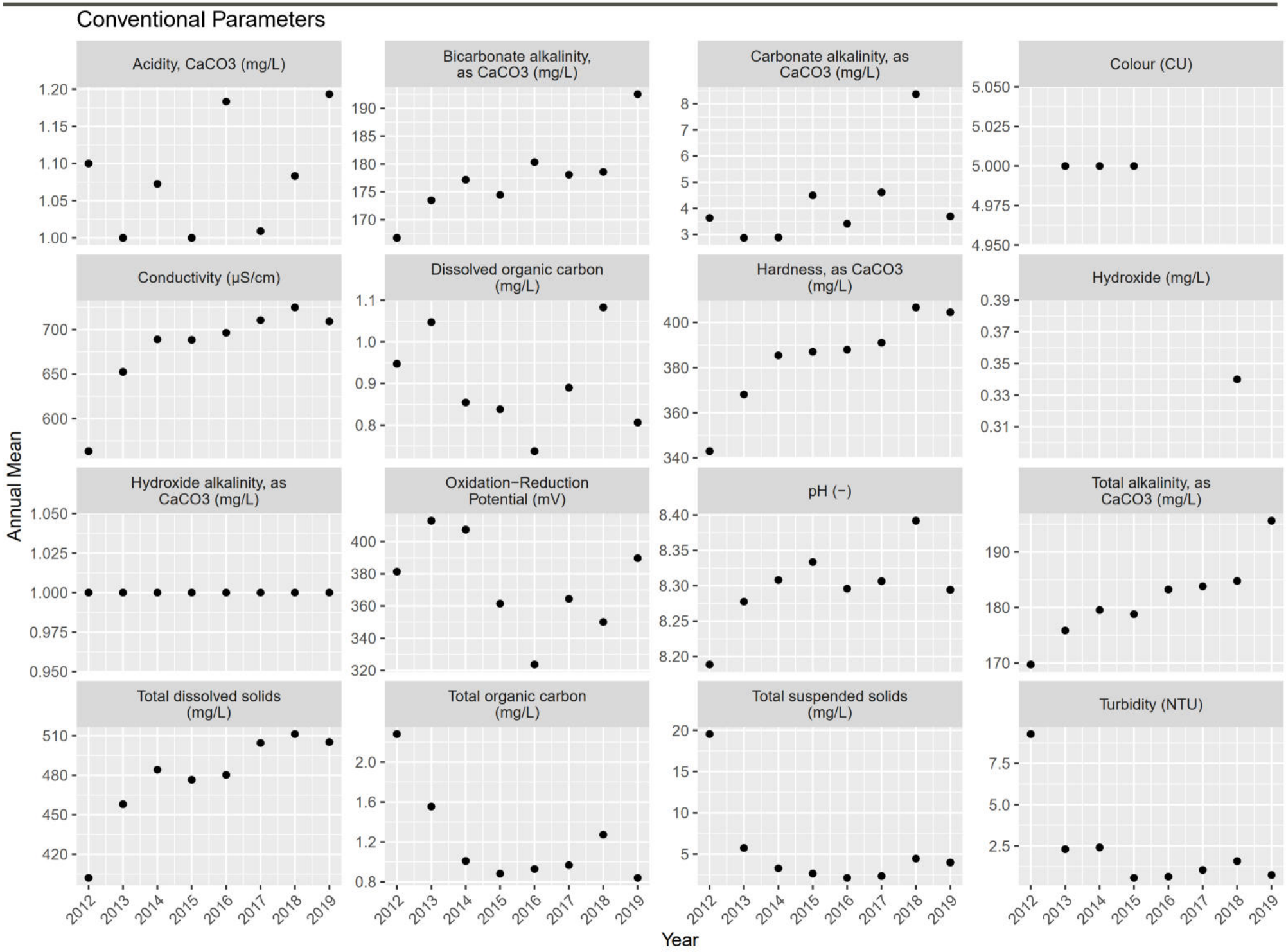


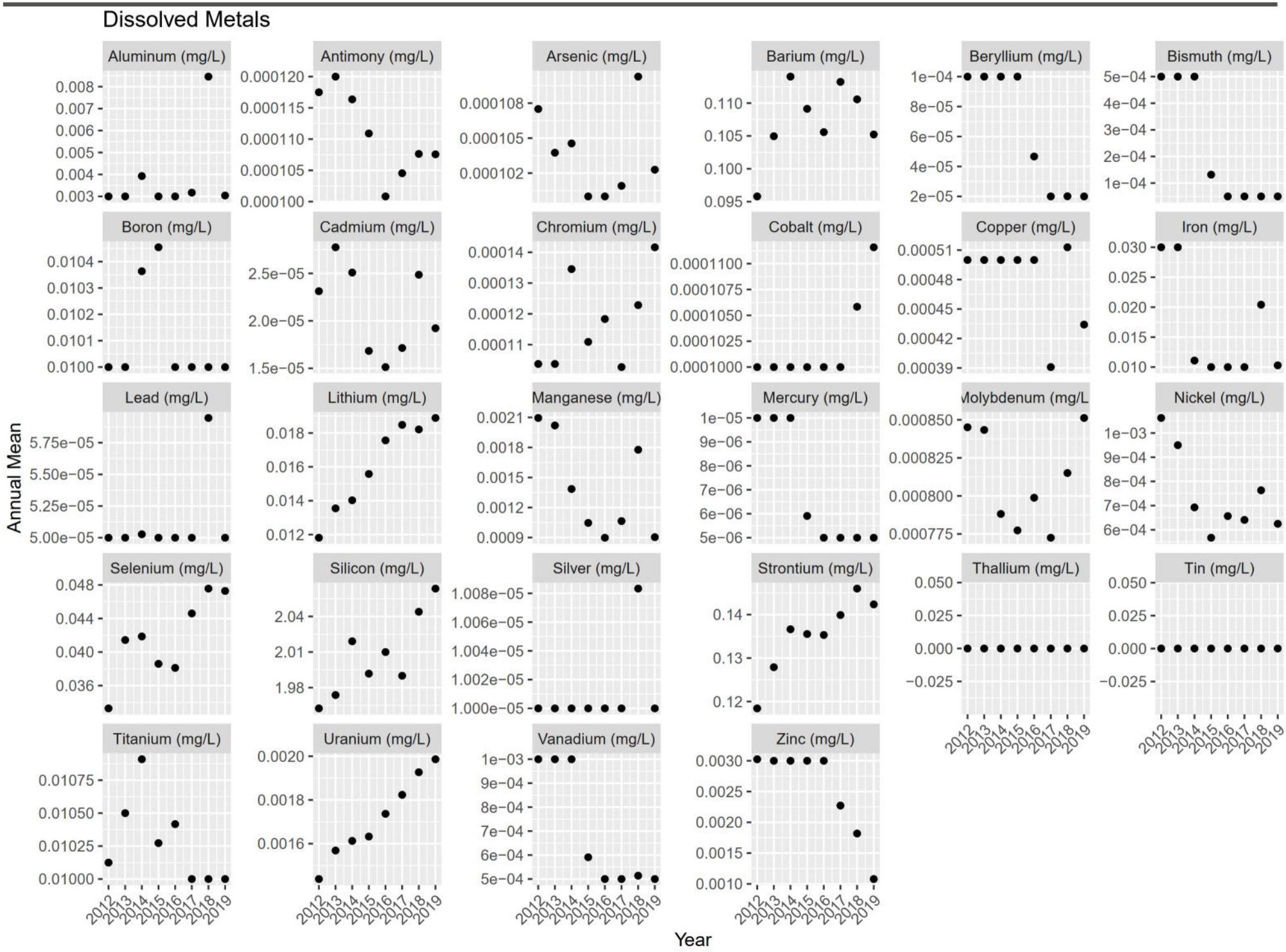
(109) Vanadium (mg/L); Dissolved Metals

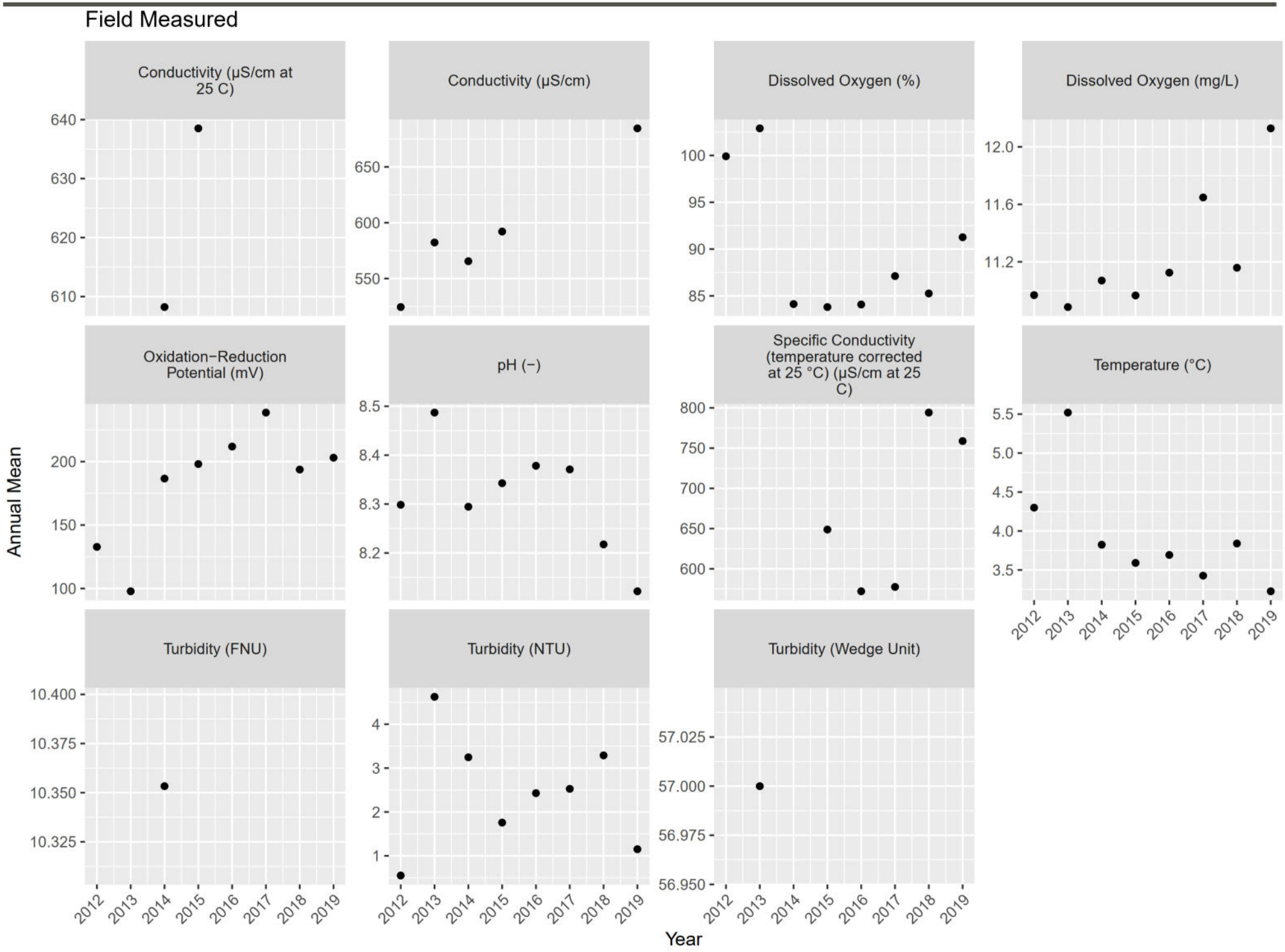


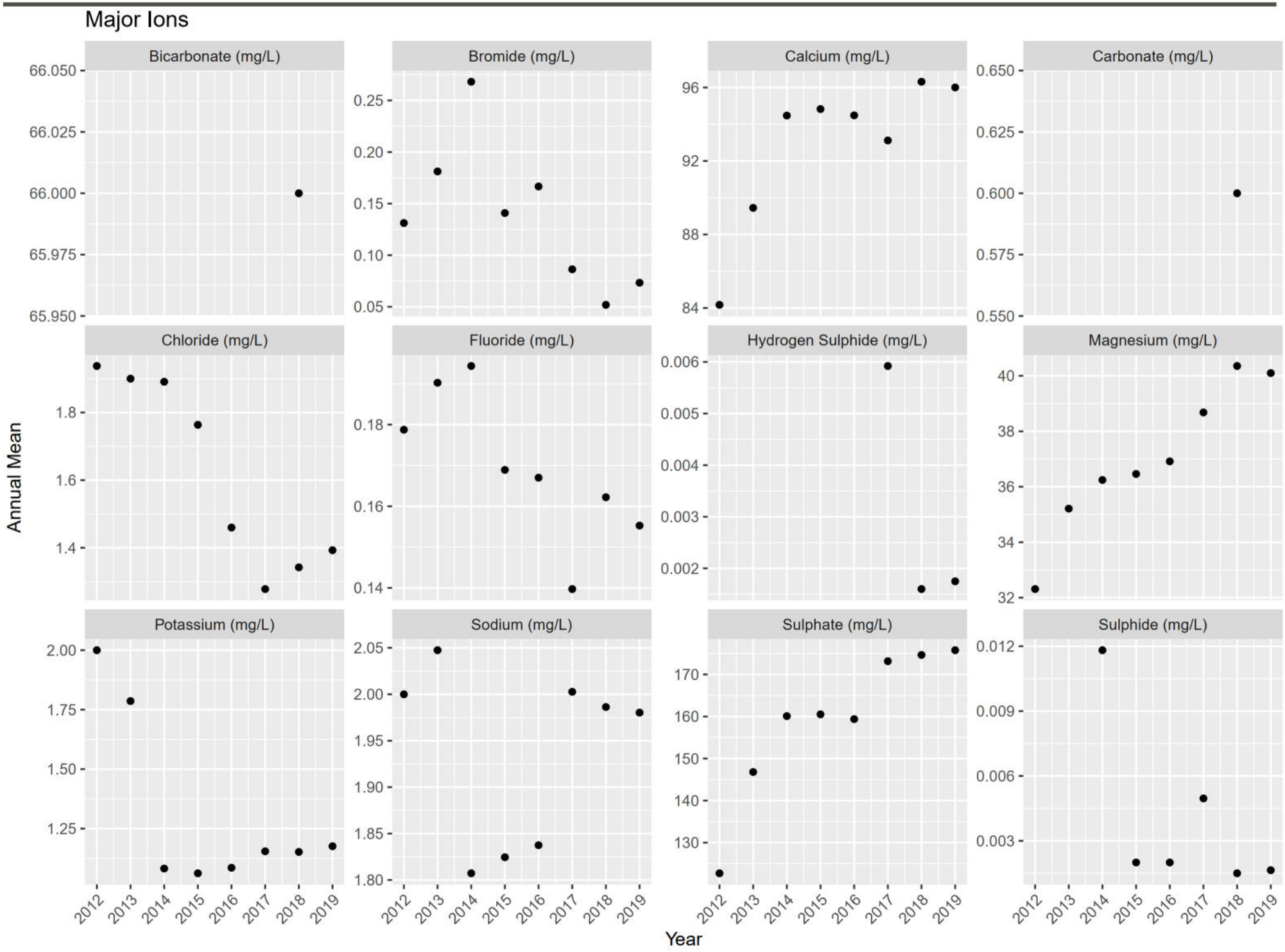
(110) Zinc (mg/L); Dissolved Metals

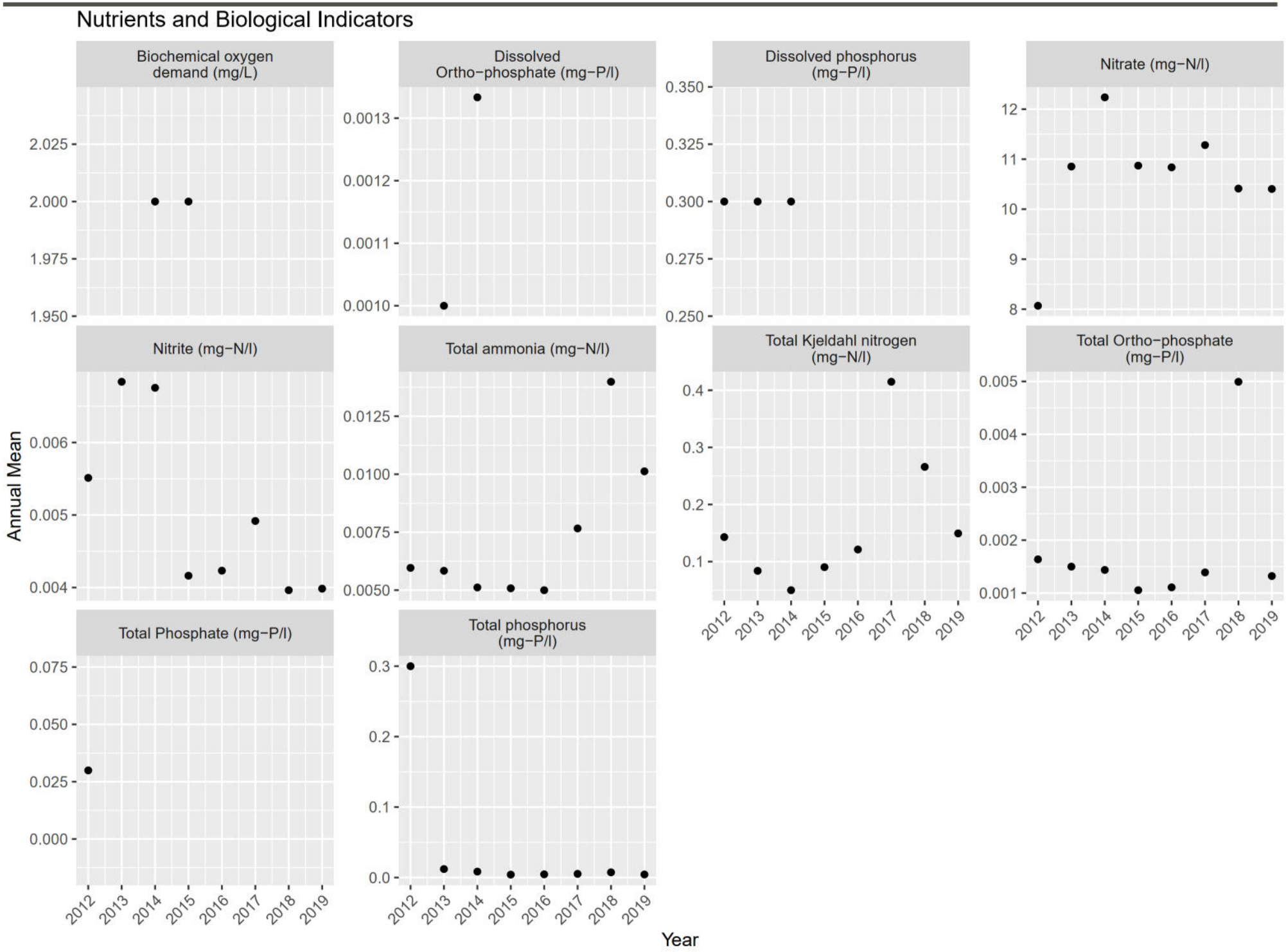


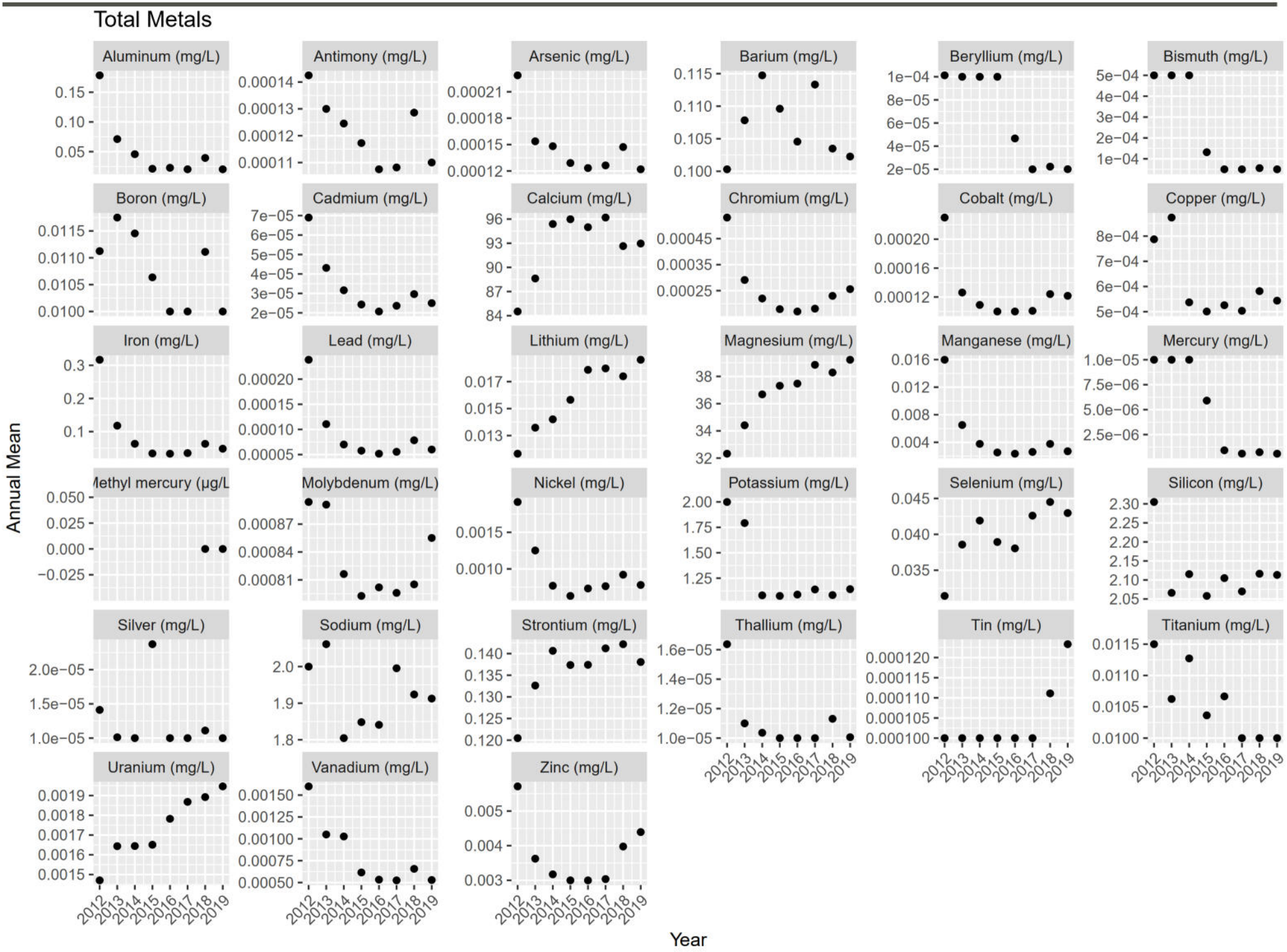

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Colour (CU)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year


Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Field Measured
Conductivity (µS/cm at 25 C)
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)
Temperature (°C)
Turbidity (FNU)
Turbidity (NTU)
Turbidity (Wedge Unit)
Annual Mean
Year


Major Ions
Bicarbonate (mg/L)
Bromide (mg/L)
Calcium (mg/L)
Carbonate (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Hydrogen Sulphide (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Sulphide (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

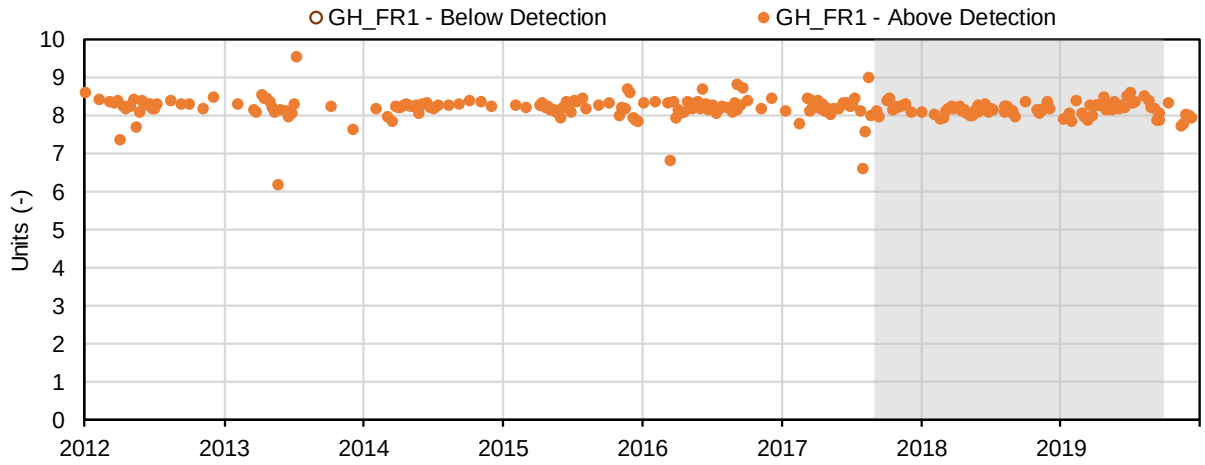

Nutrients and Biological Indicators
Biochemical oxygen demand (mg/L)
Dissolved Ortho−phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Methyl mercury (µg/L
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year

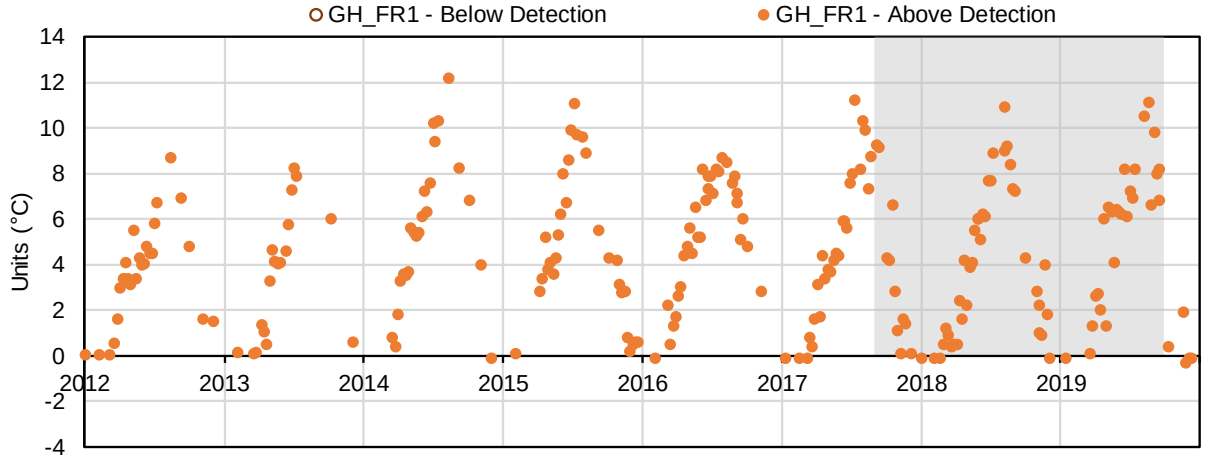
ATTACHMENT F16

GH_FR1 Plots

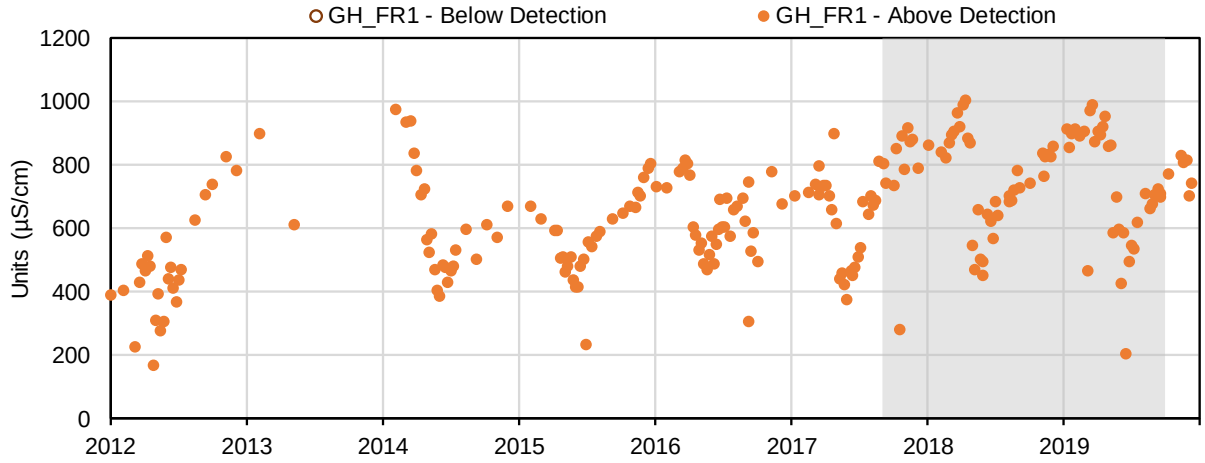
(1) pH (-); Field Measured



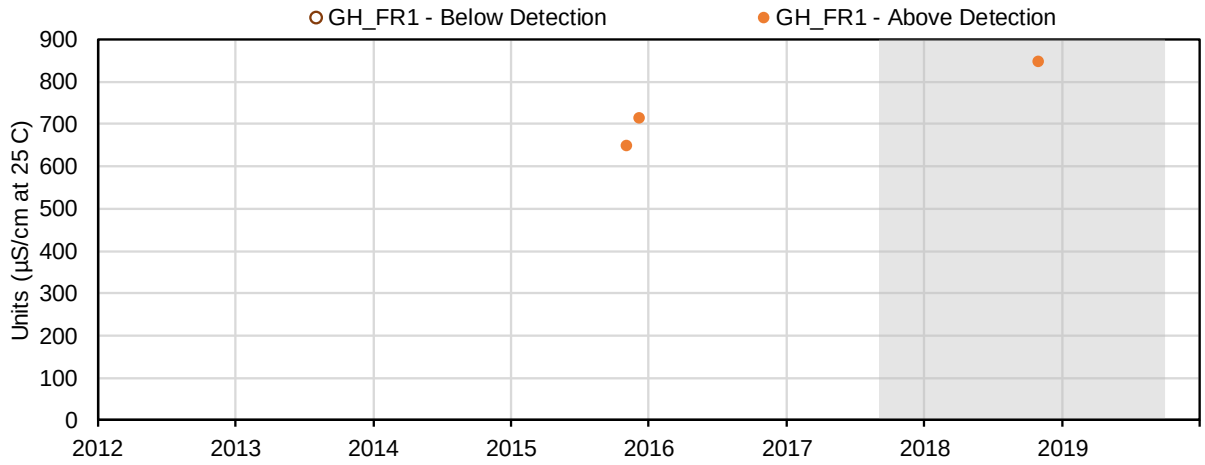
(2) Temperature (°C); Field Measured



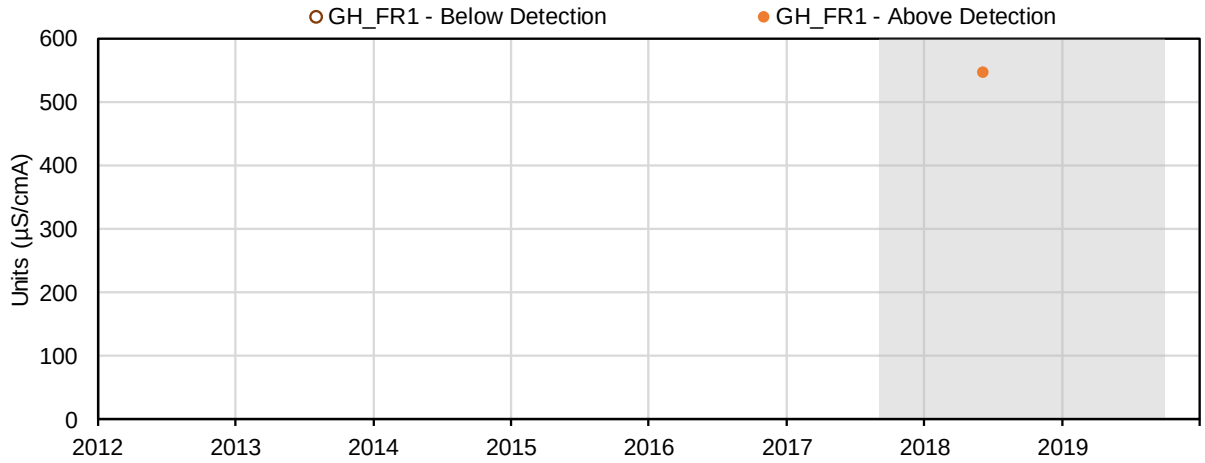
(3) Conductivity (µS/cm); Field Measured



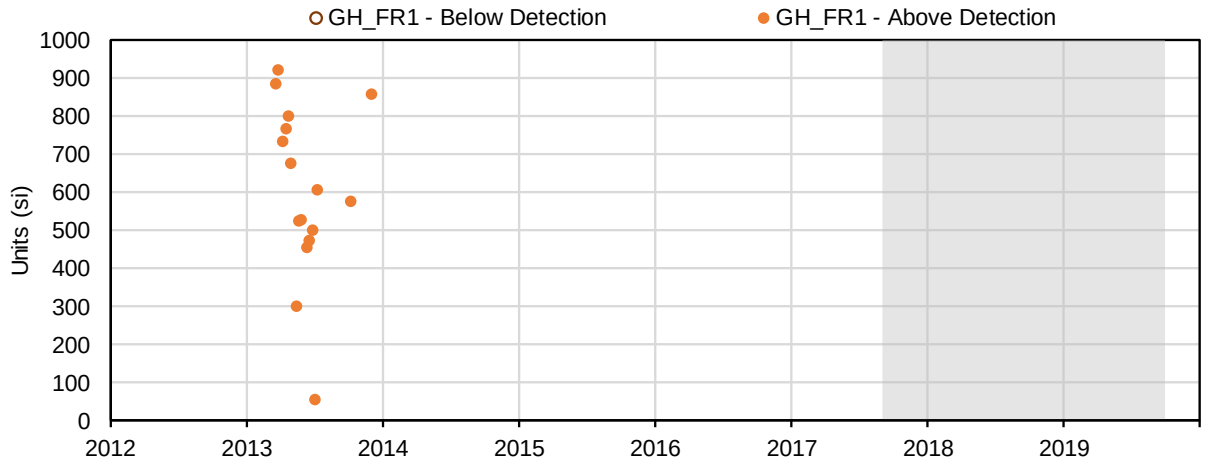
(4) Conductivity (µS/cm at 25 C); Field Measured



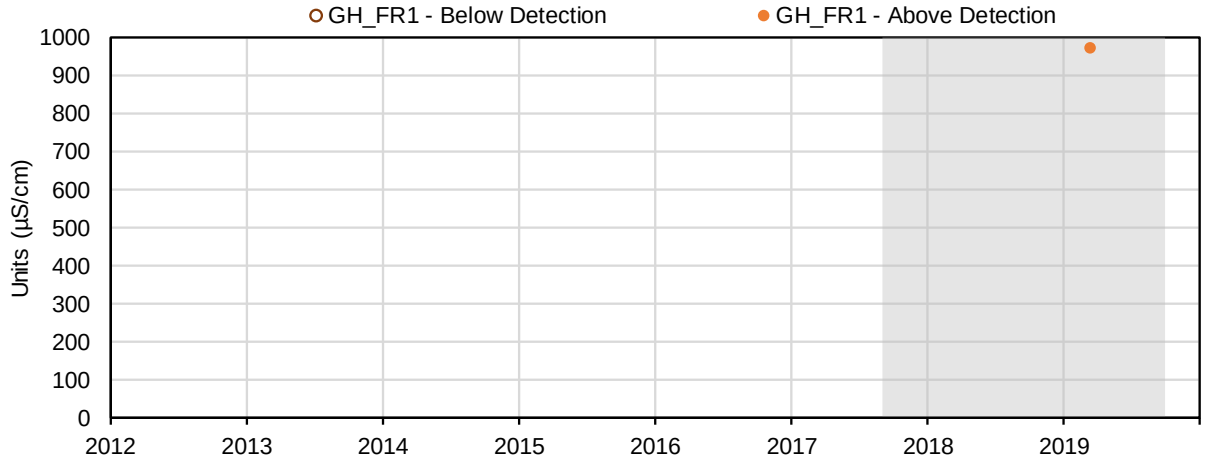
(5) Conductivity (µS/cmA); Field Measured



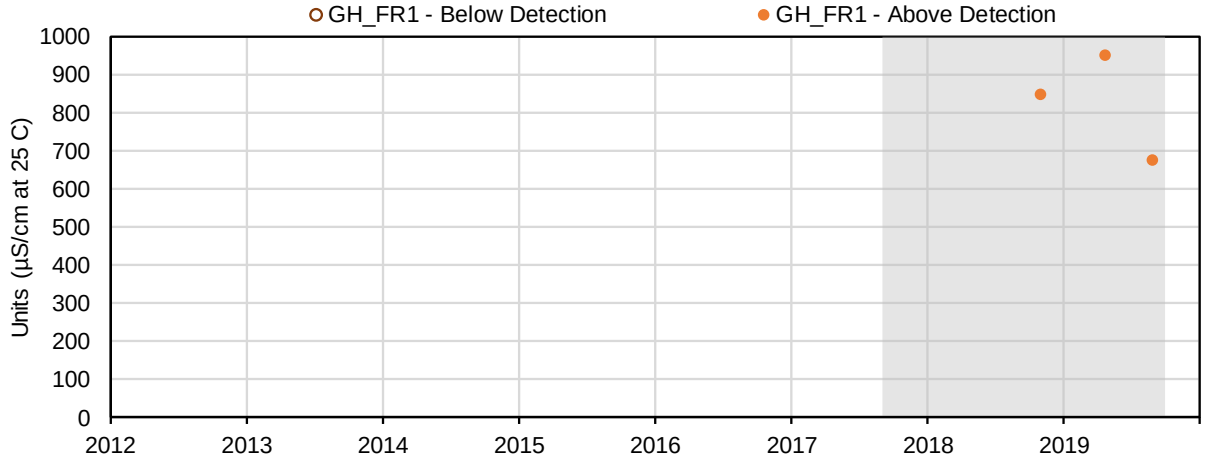
(6) Conductivity (si); Field Measured



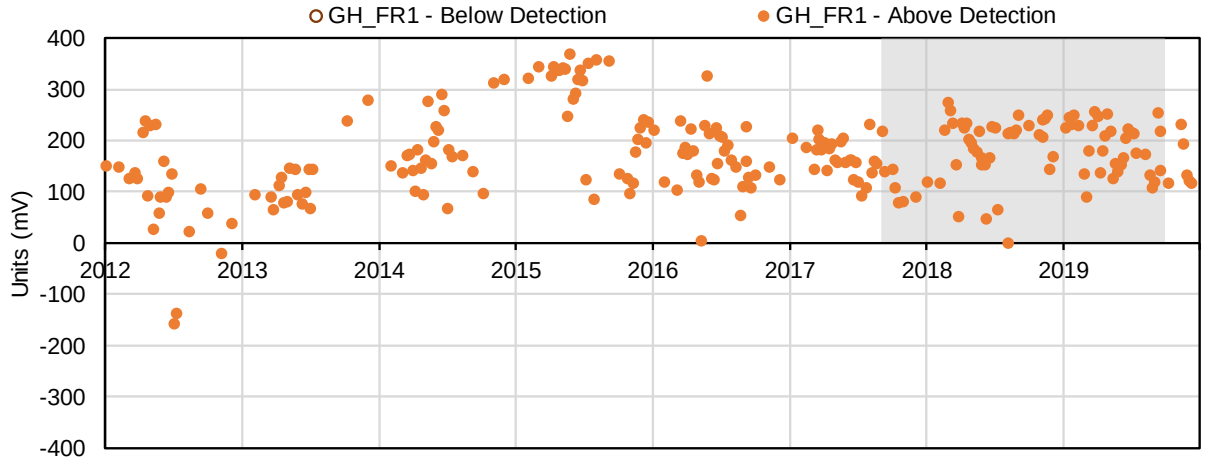
(7) Specific Conductivity (temperature corrected at 25 °C) (µS/cm); Field Measured



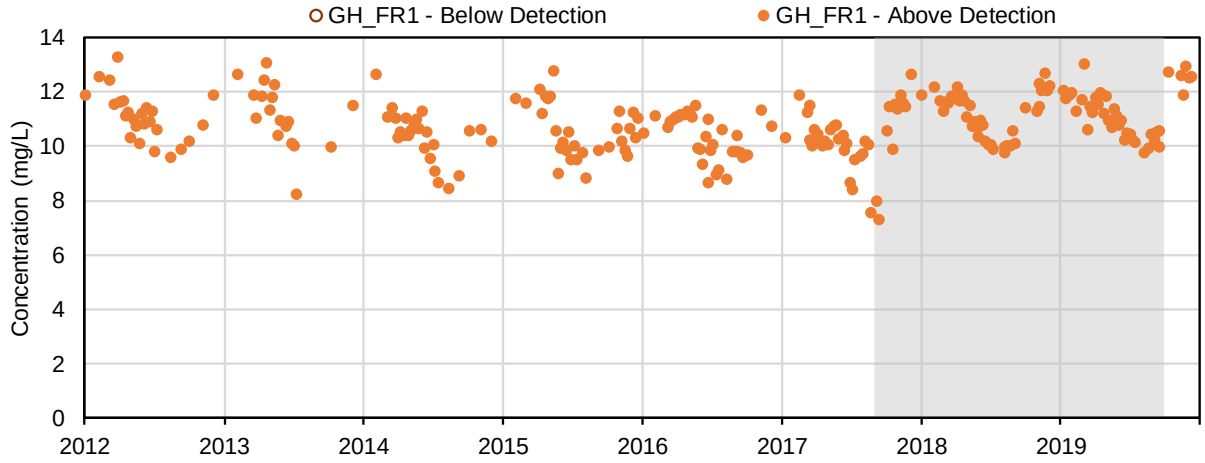
(8) Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C); Field Measured



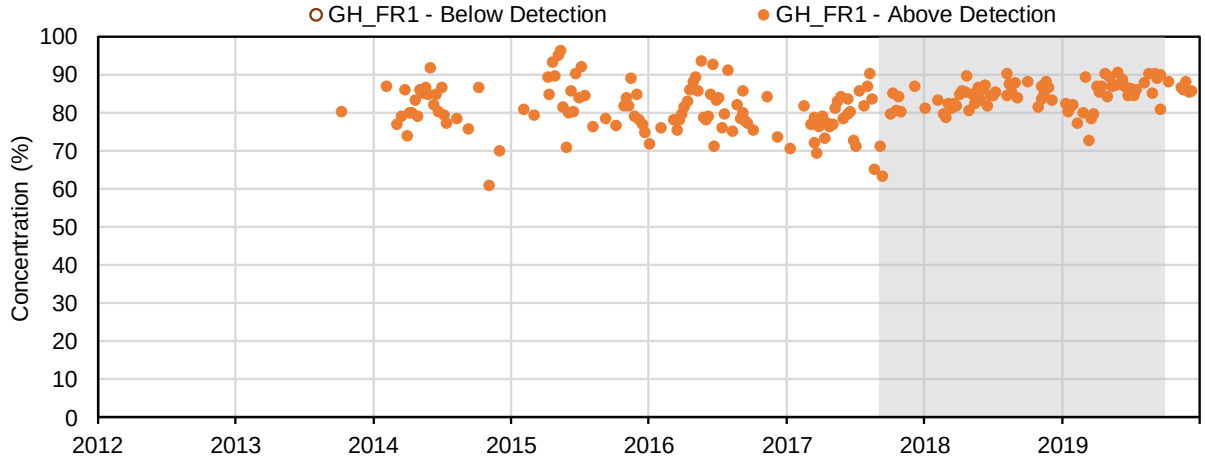
(9) Oxidation-Reduction Potential (mV); Field Measured



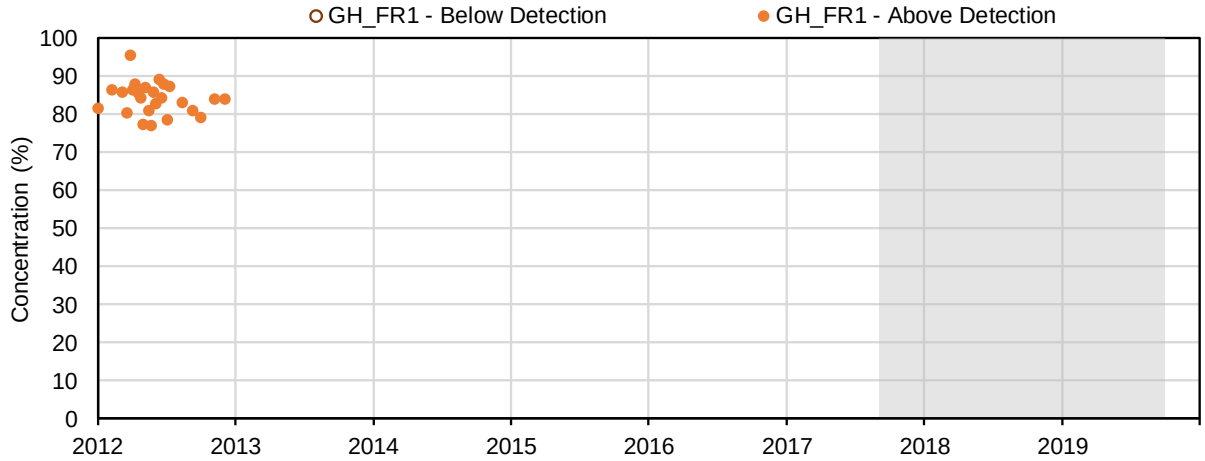
(10) Dissolved Oxygen (mg/L); Field Measured



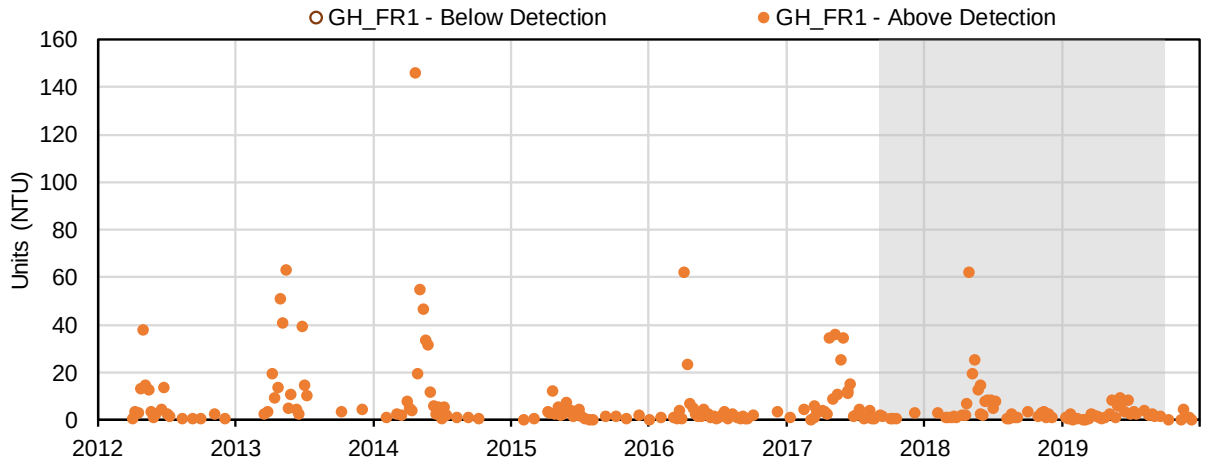
(11) Dissolved Oxygen (%); Field Measured



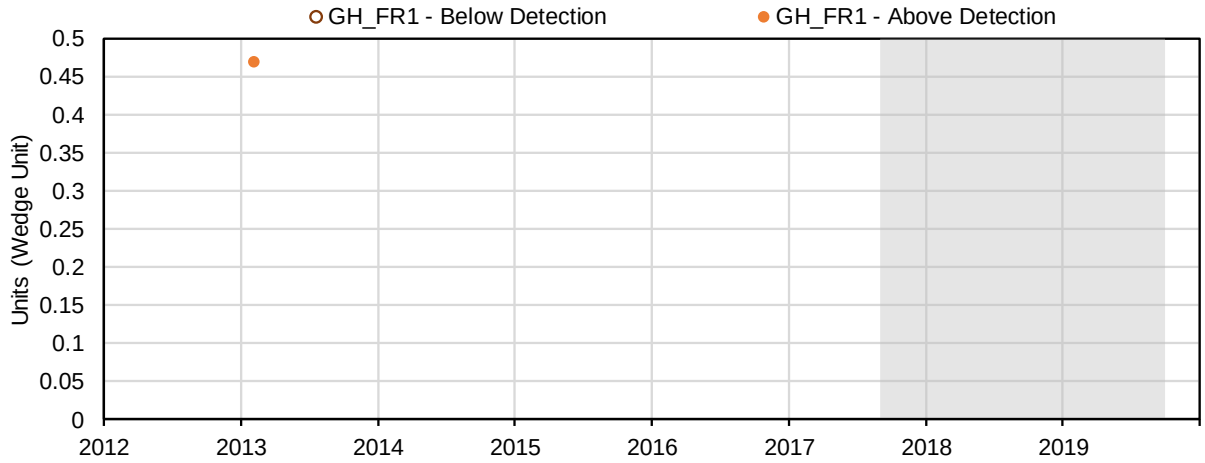
(12) Oxygen Saturation (%); Field Measured



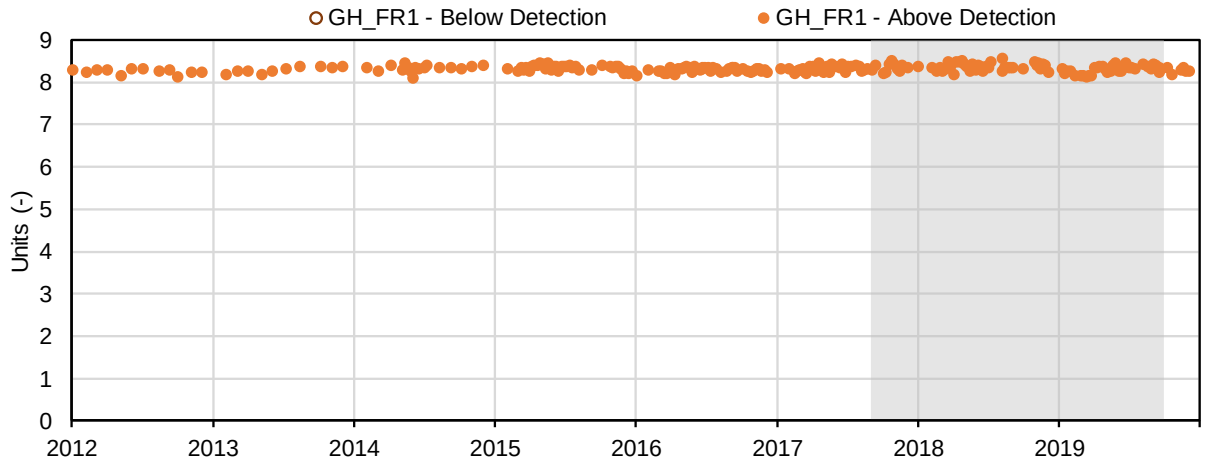
(13) Turbidity (NTU); Field Measured



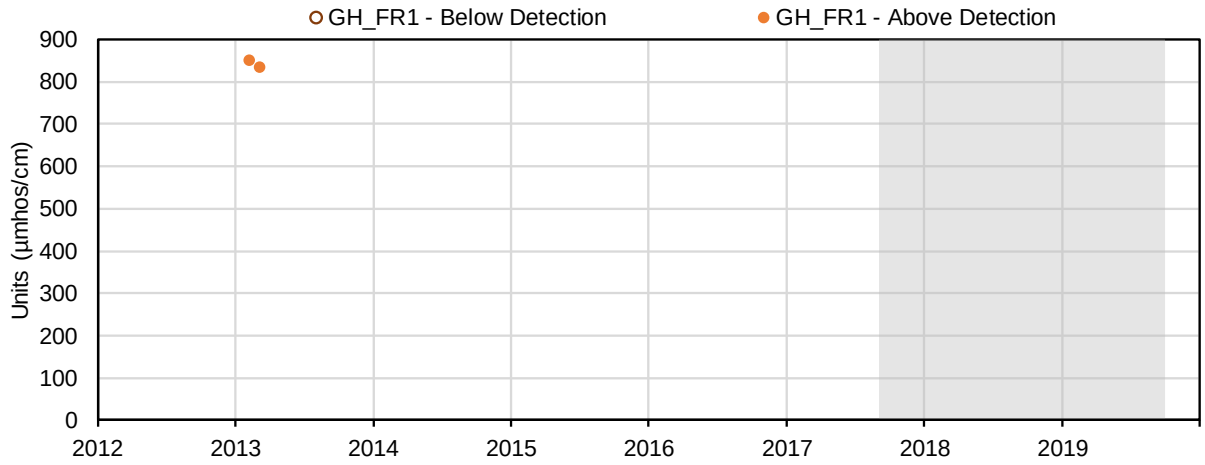
(14) Turbidity (Wedge Unit); Field Measured



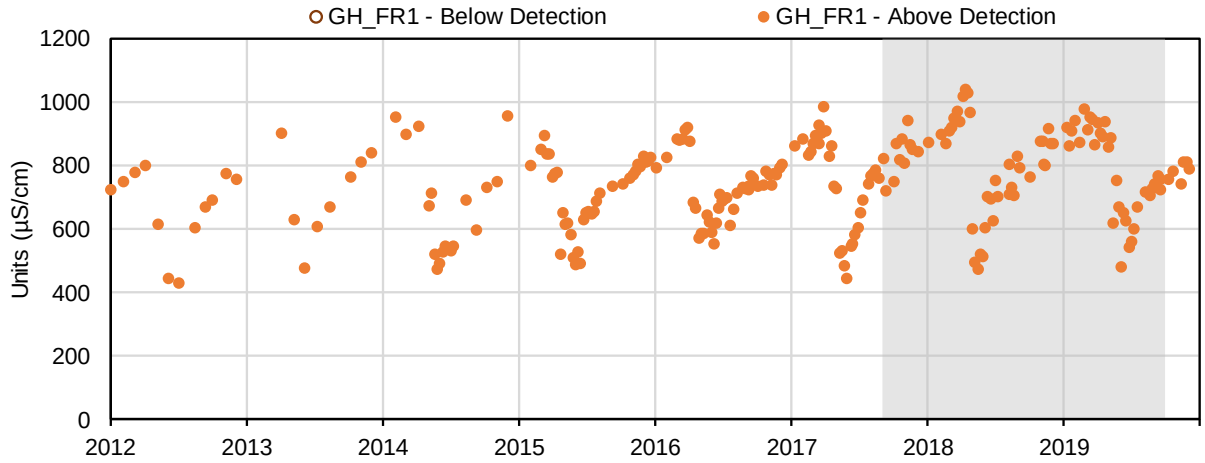
(15) pH (-); Conventional Parameters



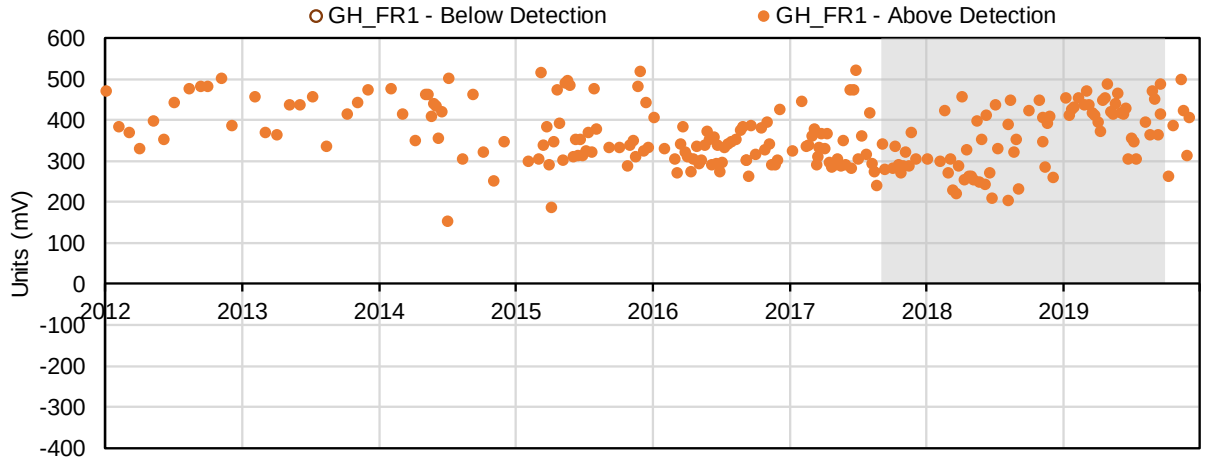
(16) Conductivity (µmhos/cm); Conventional Parameters



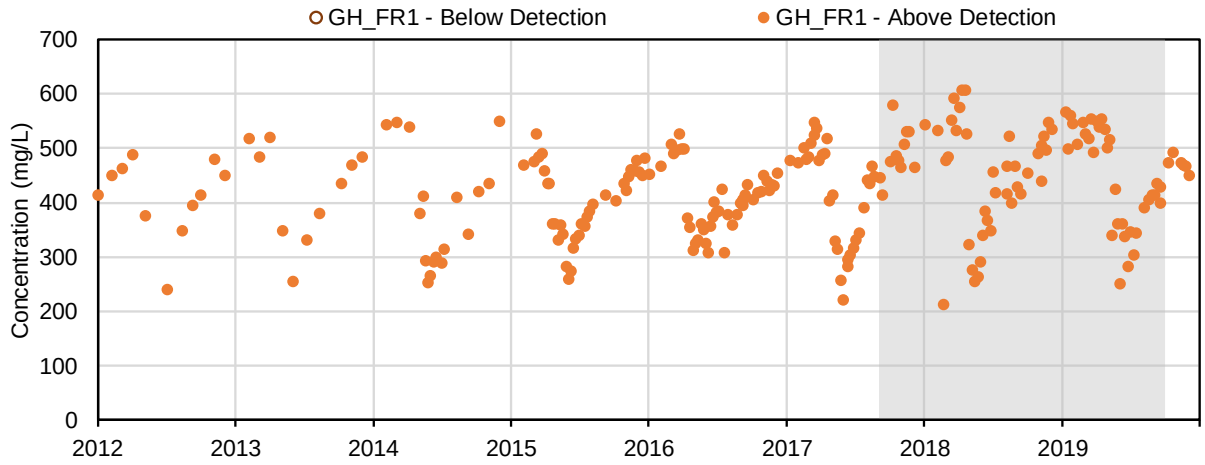
(17) Conductivity (µS/cm); Conventional Parameters



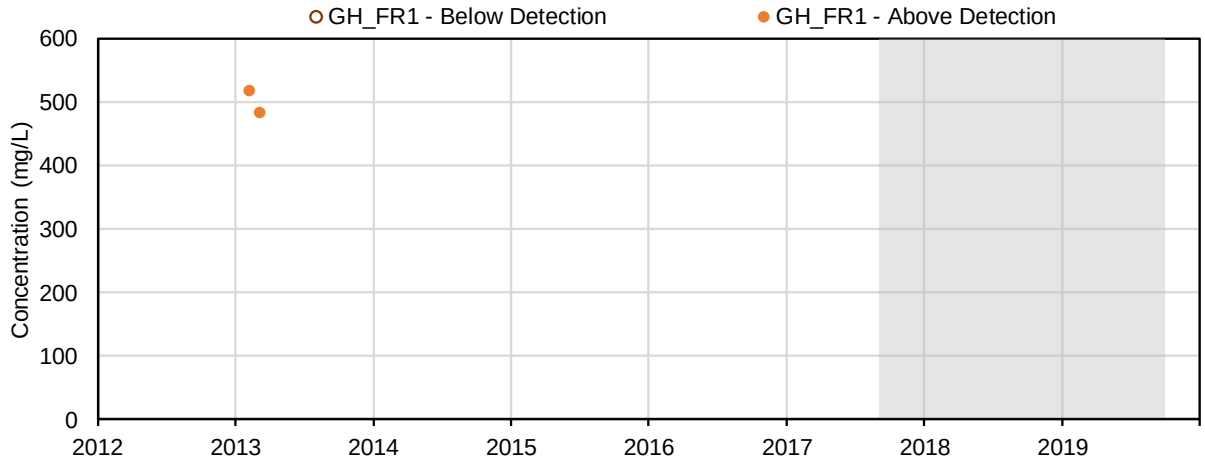
(18) Oxidation-Reduction Potential (mV); Conventional Parameters



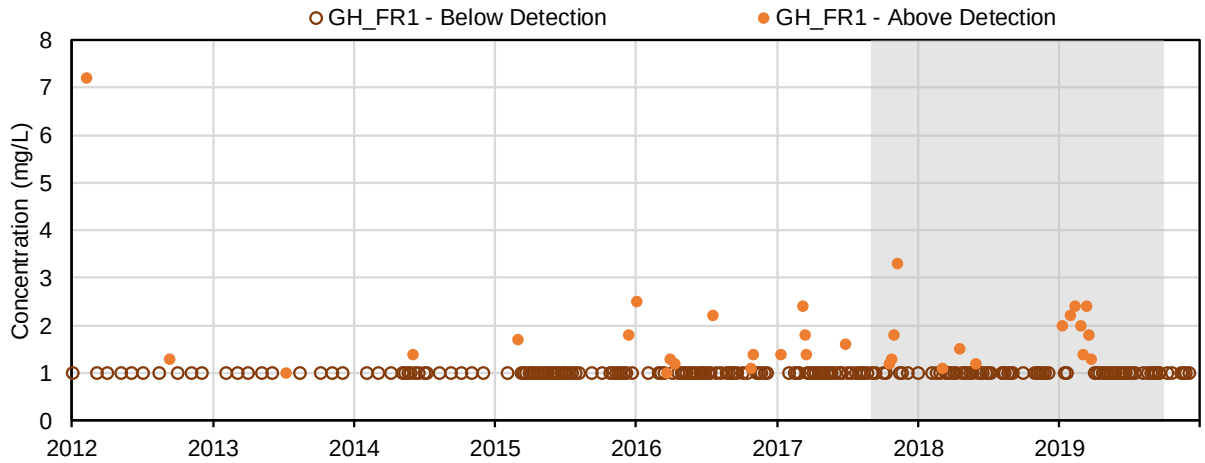
(19) Hardness, as CaCO3 (mg/L); Conventional Parameters



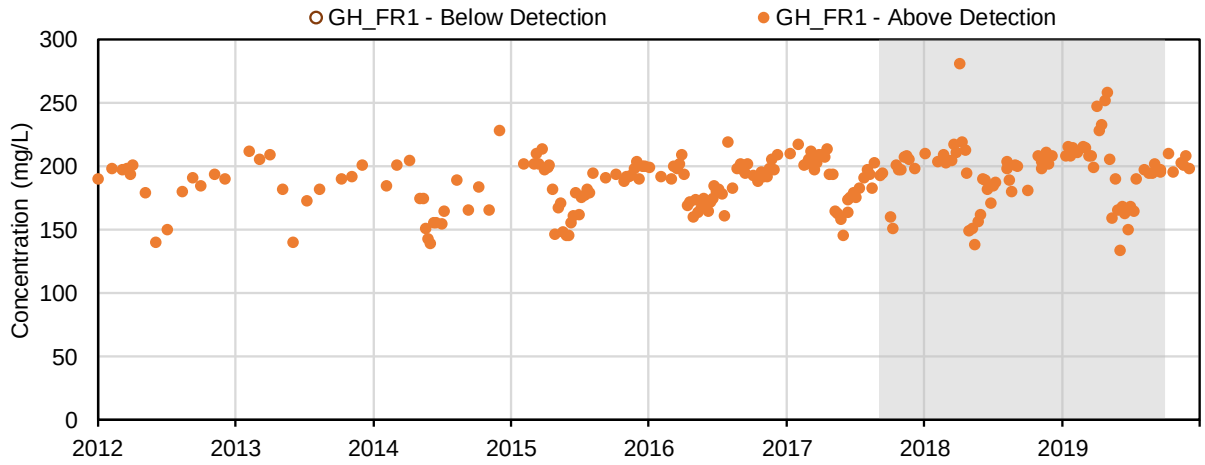
(20) Hardness, as CaCO3 (Calculated) (mg/L); Conventional Parameters



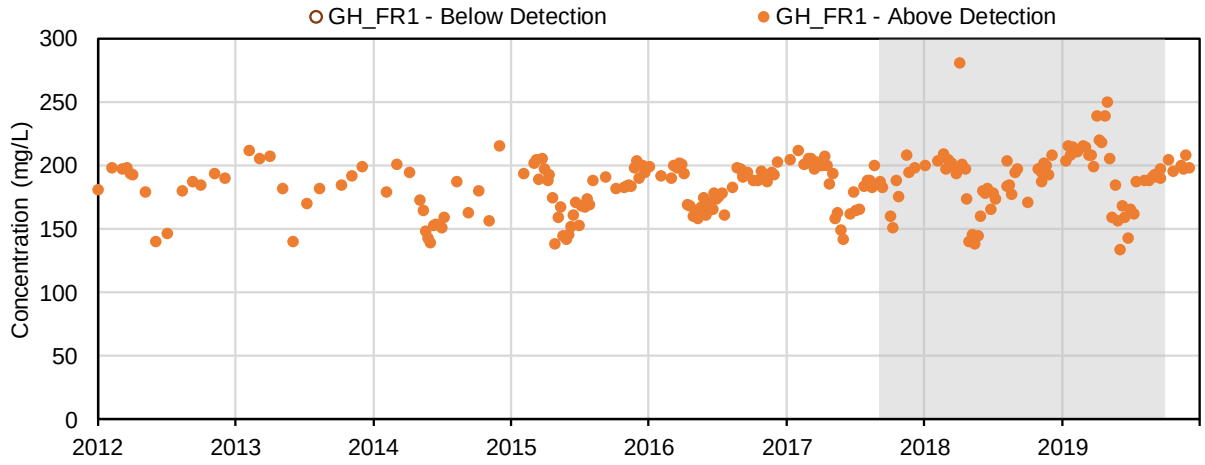
(21) Acidity, CaCO3 (mg/L); Conventional Parameters



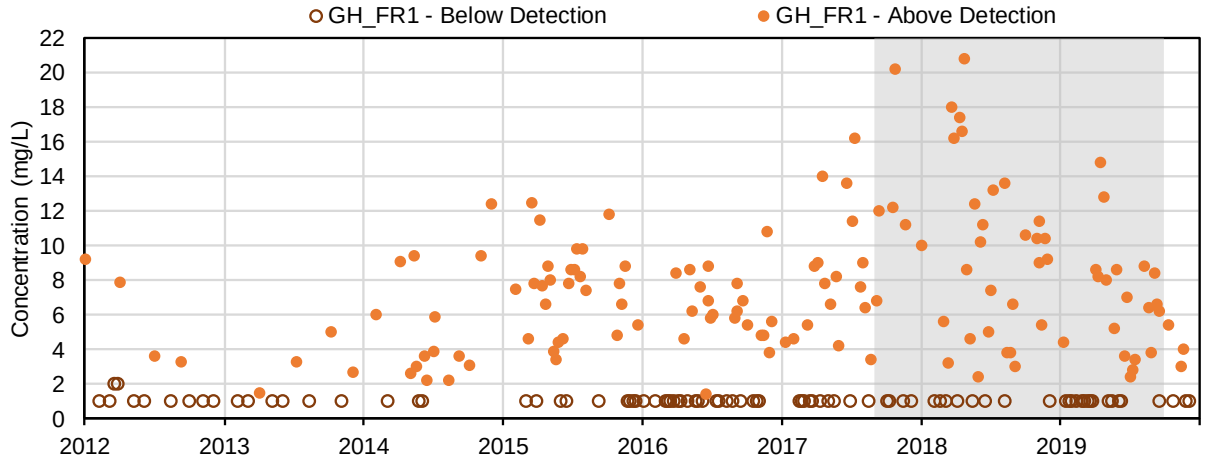
(22) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



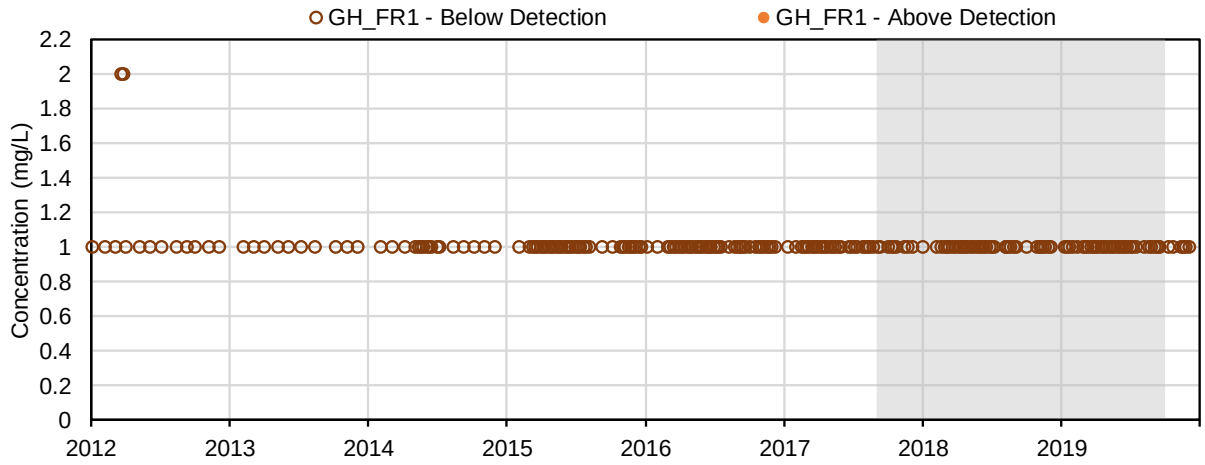
(23) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



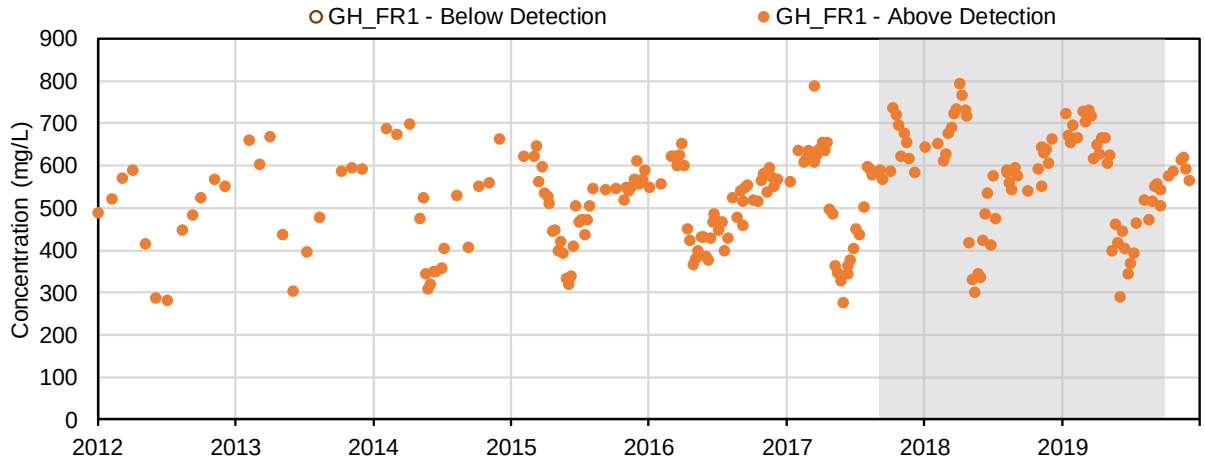
(24) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



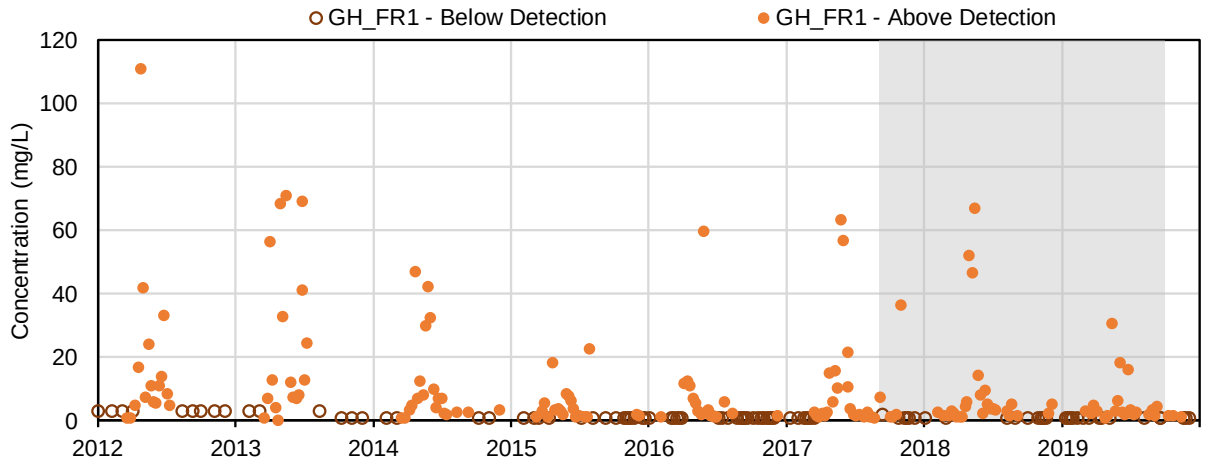
(25) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



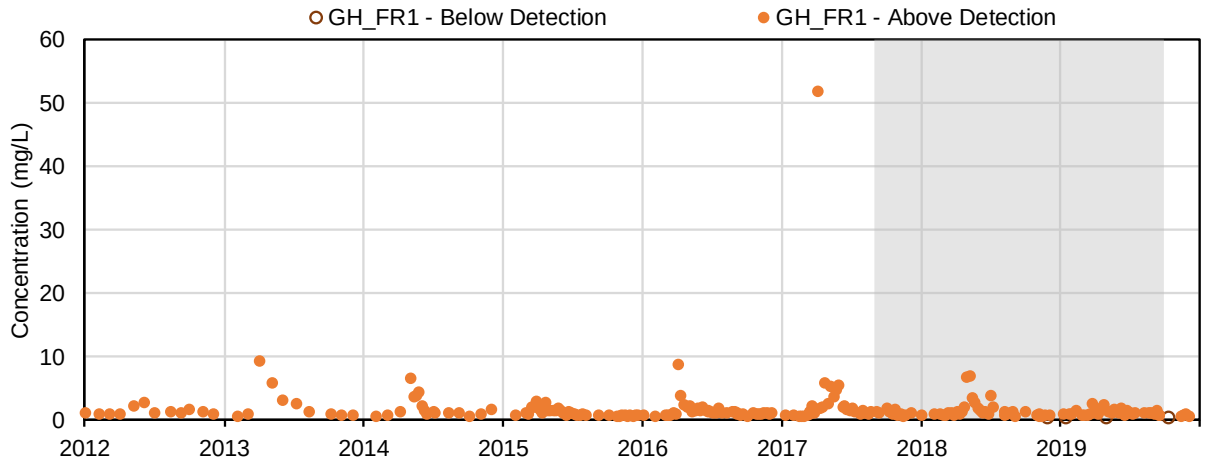
(26) Total dissolved solids (mg/L); Conventional Parameters



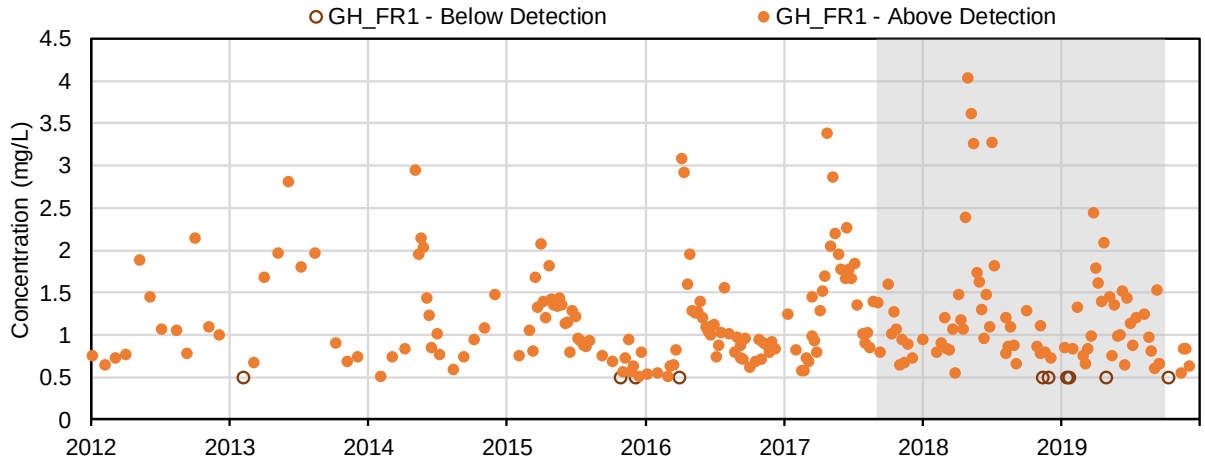
(27) Total suspended solids (mg/L); Conventional Parameters



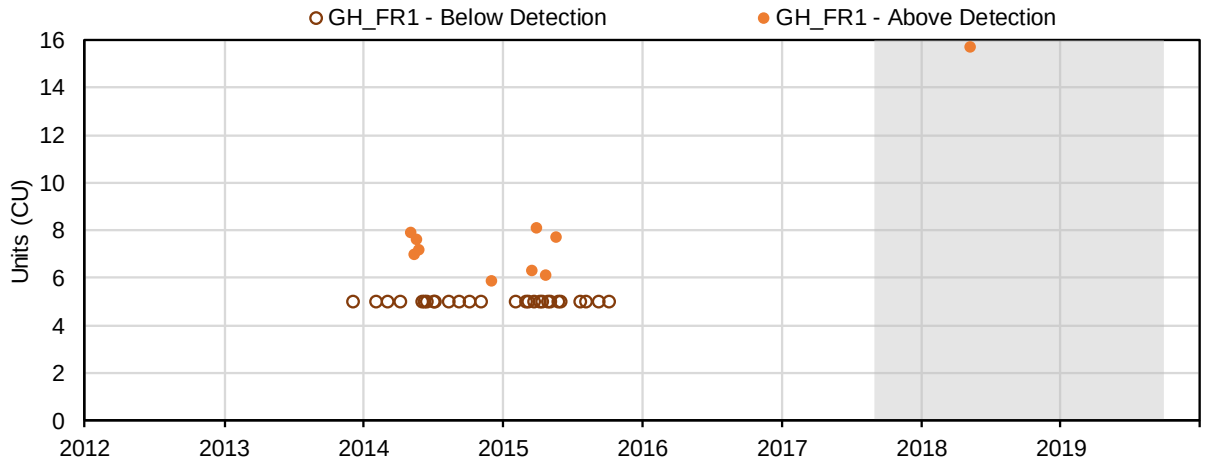
(28) Total organic carbon (mg/L); Conventional Parameters



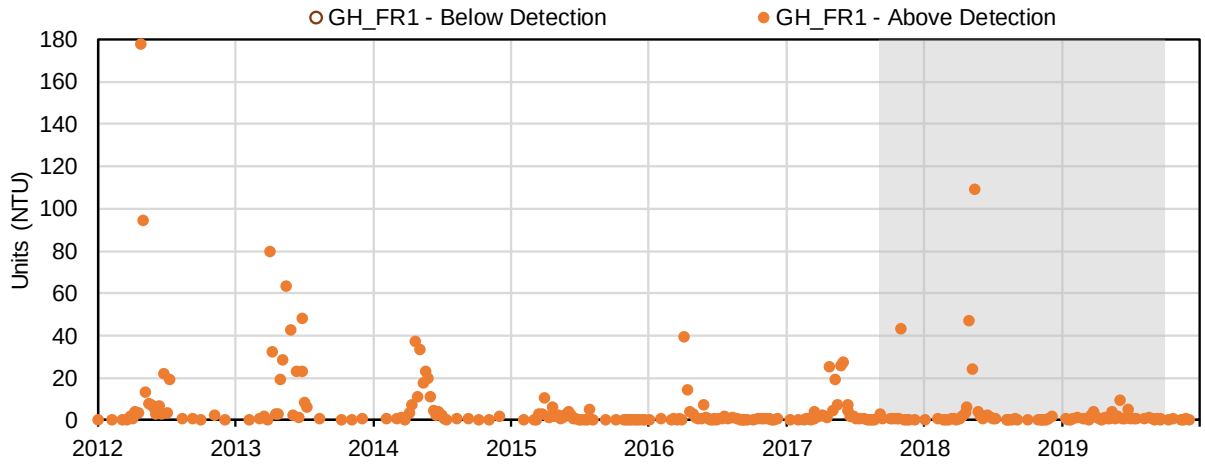
(29) Dissolved organic carbon (mg/L); Conventional Parameters



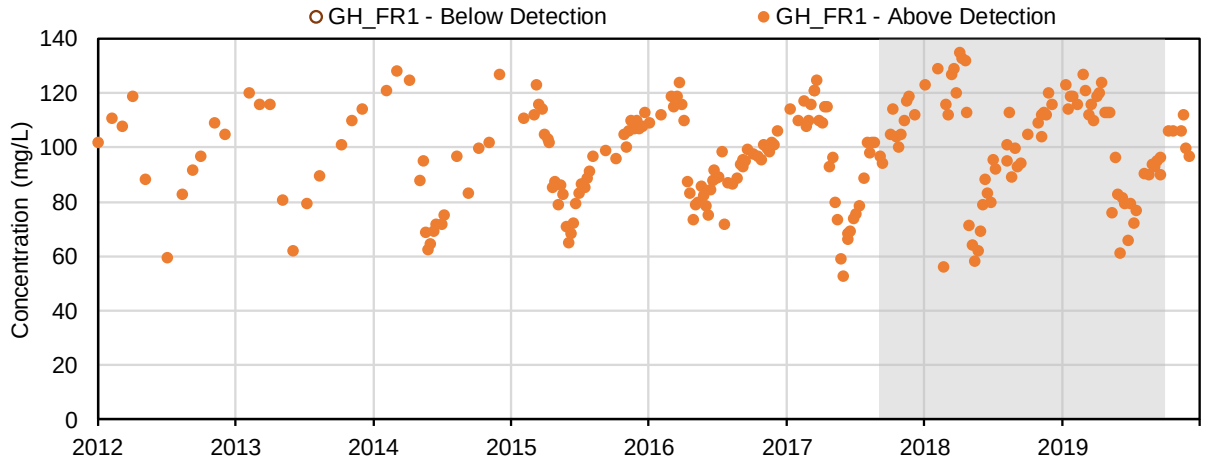
(30) Colour (CU); Conventional Parameters



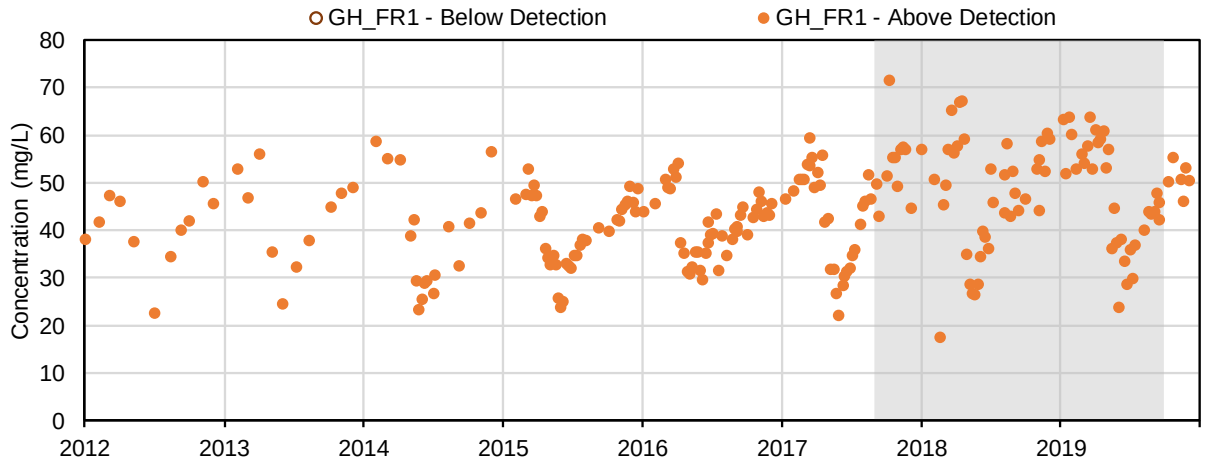
(31) Turbidity (NTU); Conventional Parameters



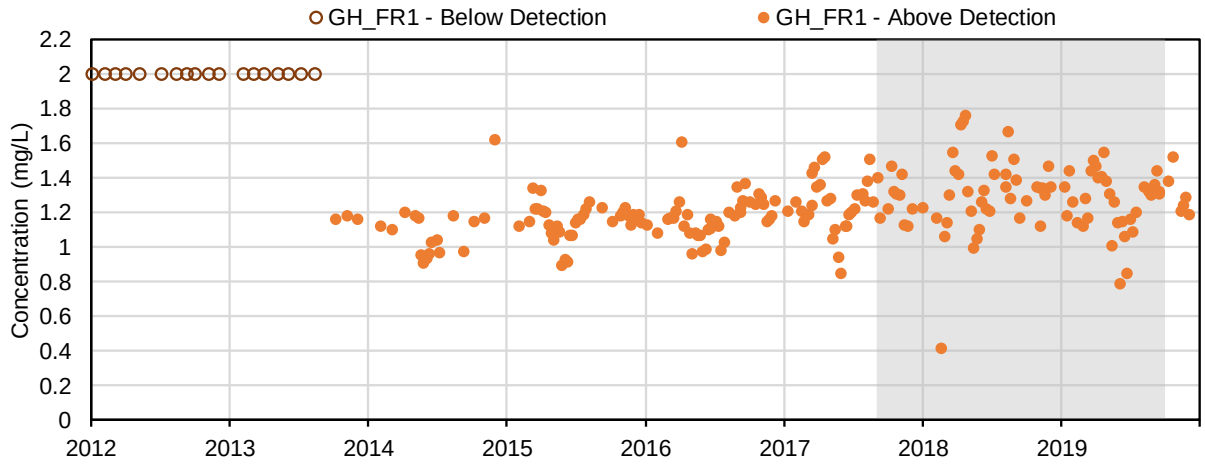
(32) Calcium (mg/L); Major Ions



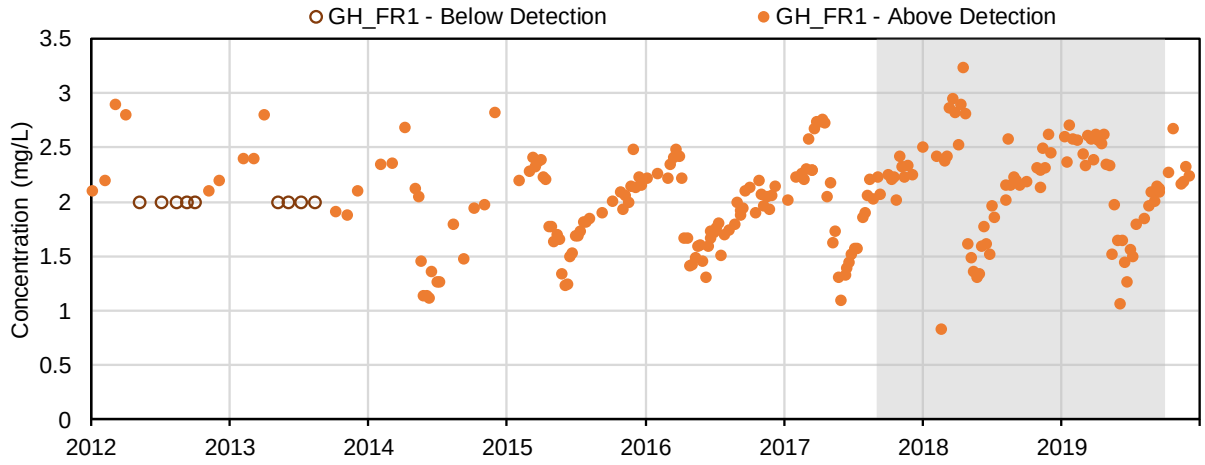
(33) Magnesium (mg/L); Major Ions



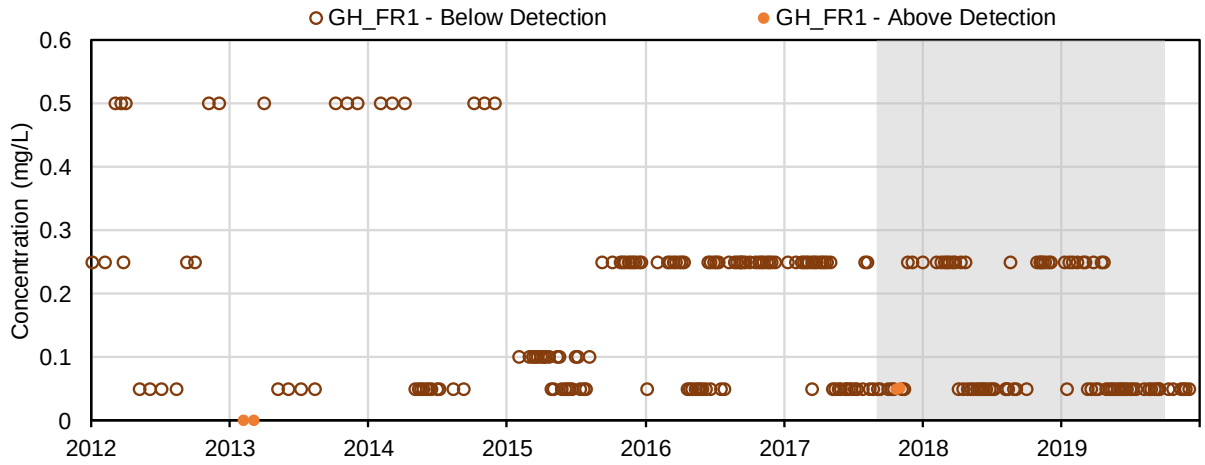
(34) Potassium (mg/L); Major Ions



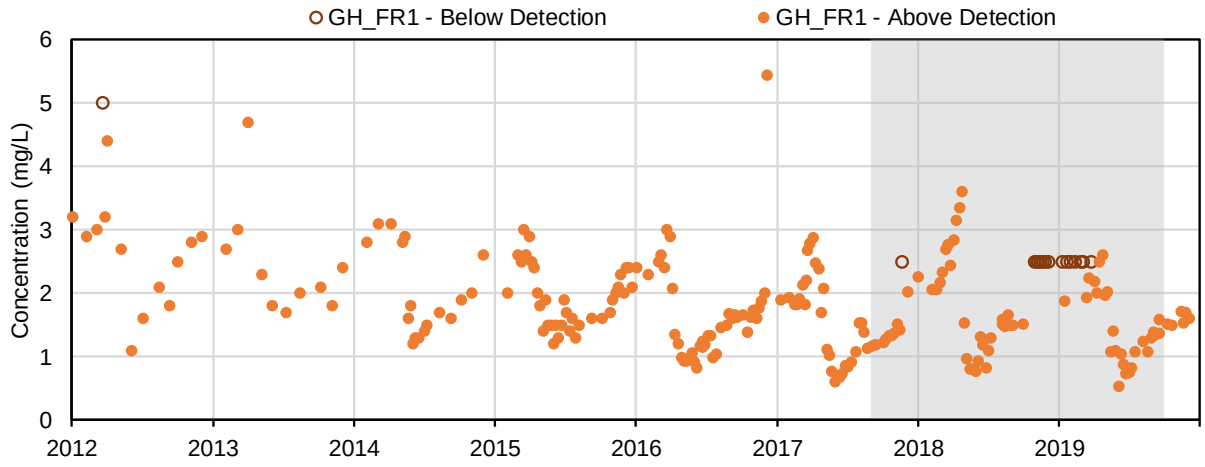
(35) Sodium (mg/L); Major Ions



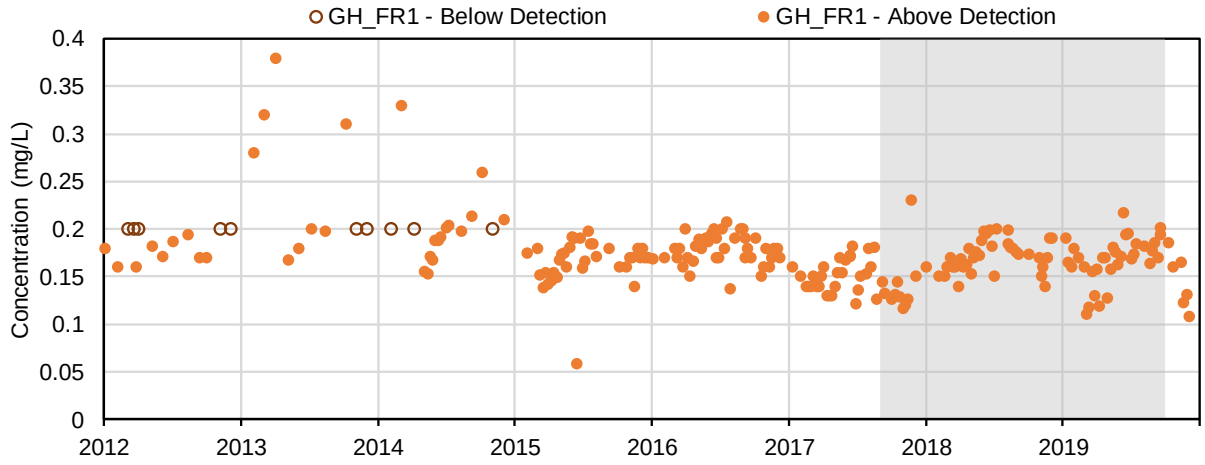
(36) Bromide (mg/L); Major Ions



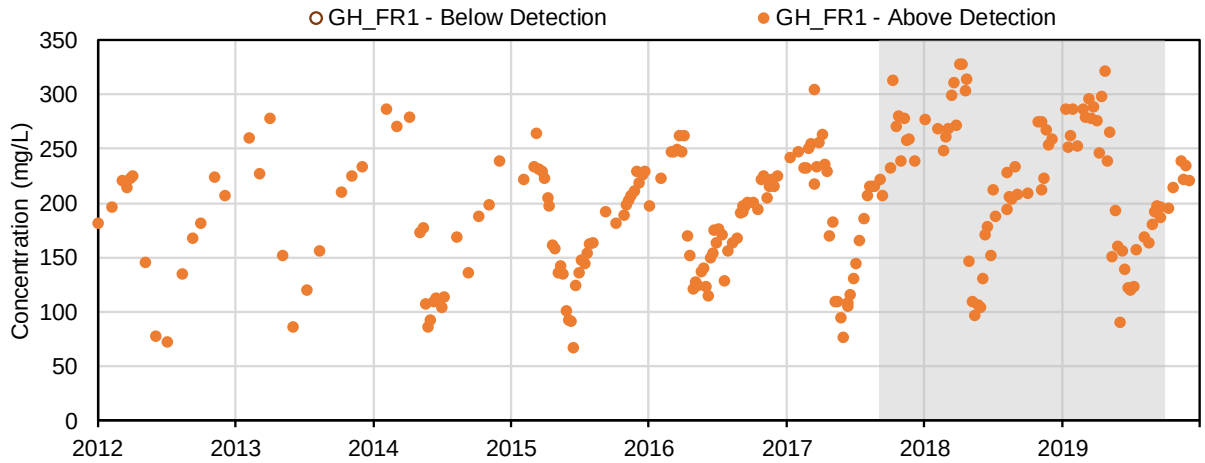
(37) Chloride (mg/L); Major Ions



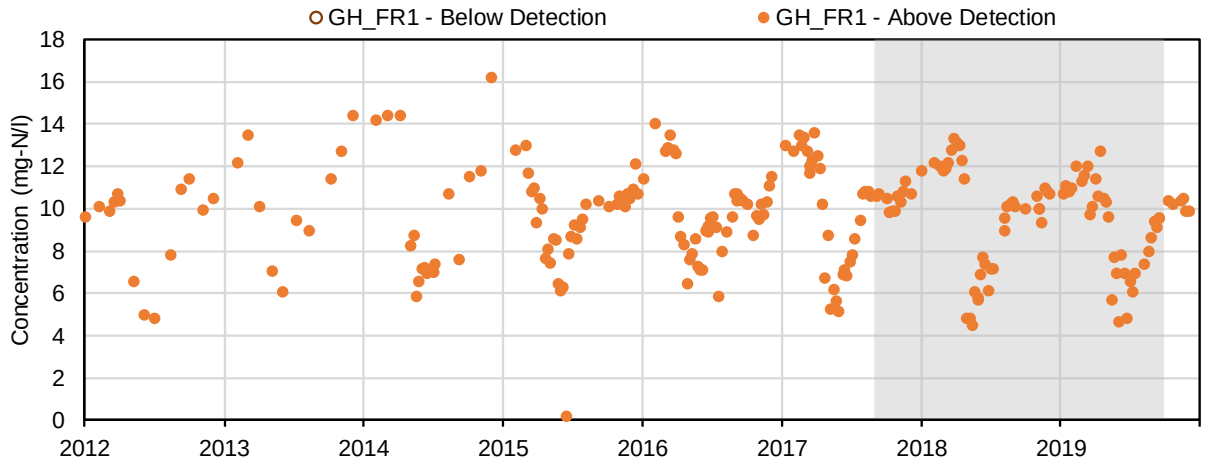
(38) Fluoride (mg/L); Major Ions



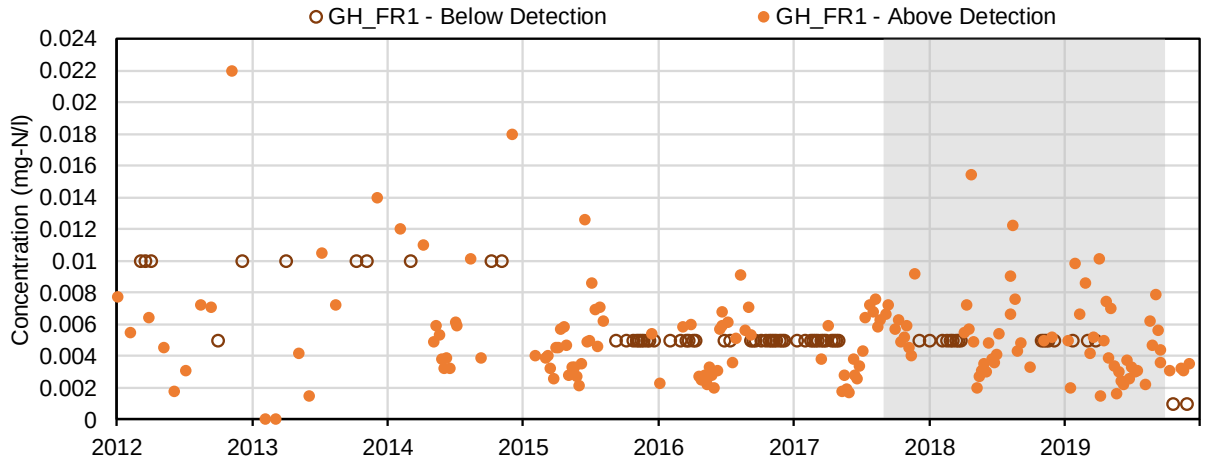
(39) Sulphate (mg/L); Major Ions



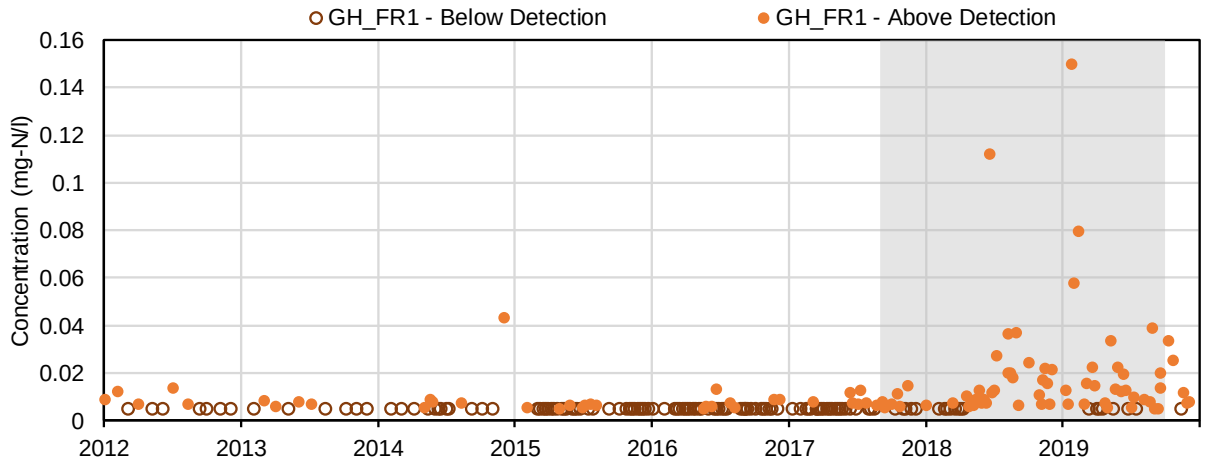
(40) Nitrate (mg-N/l); Nutrients and Biological Indicators



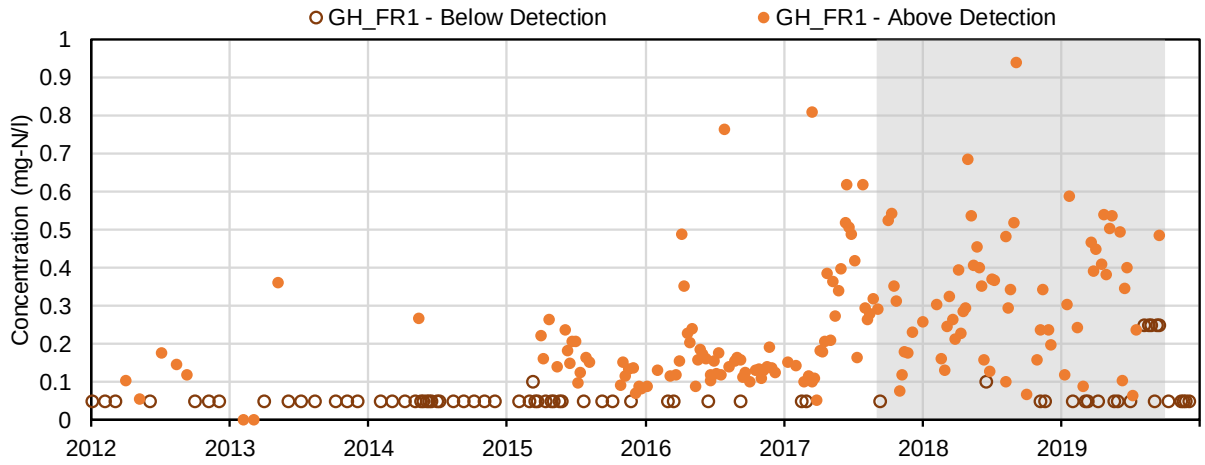
(41) Nitrite (mg-N/l); Nutrients and Biological Indicators



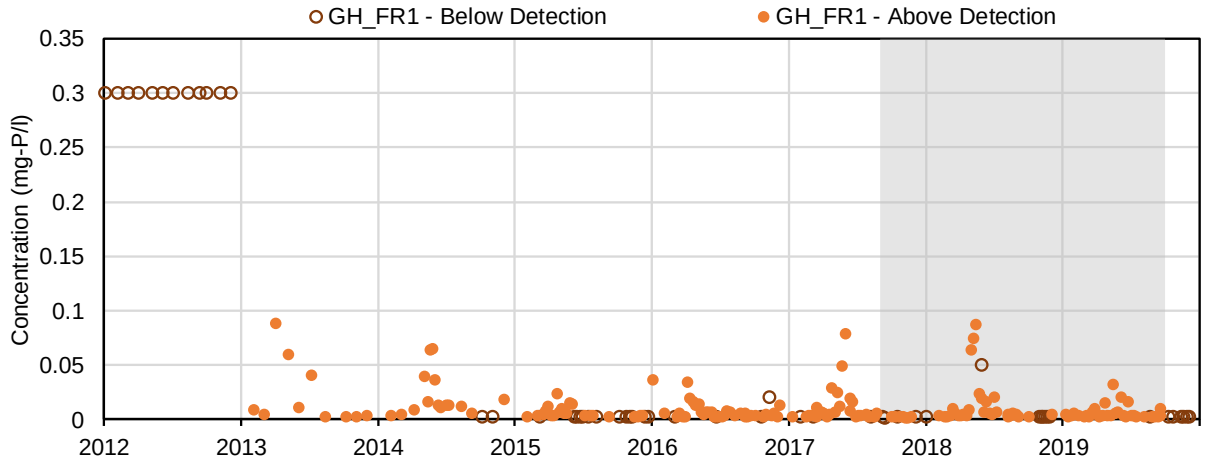
(42) Total ammonia (mg-N/l); Nutrients and Biological Indicators



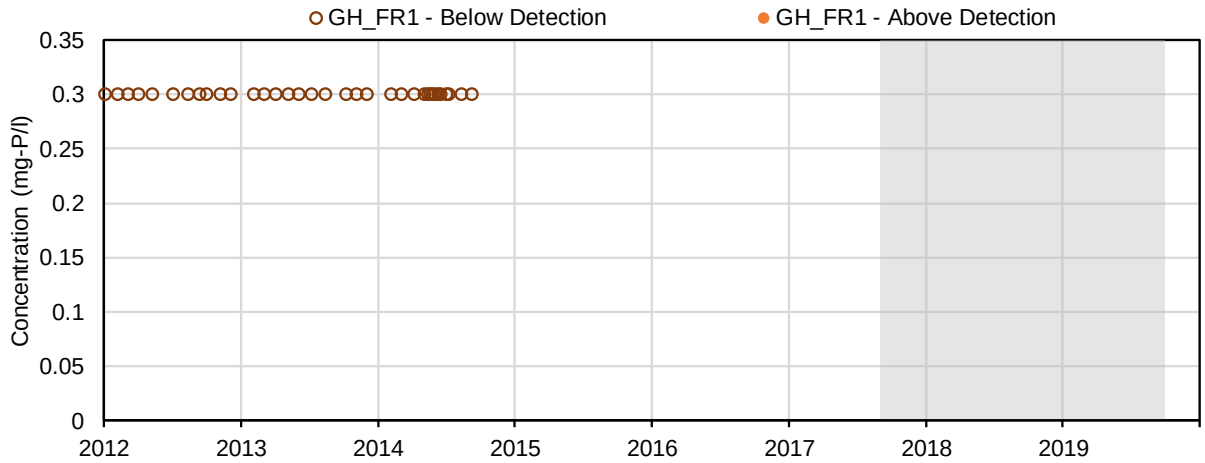
(43) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



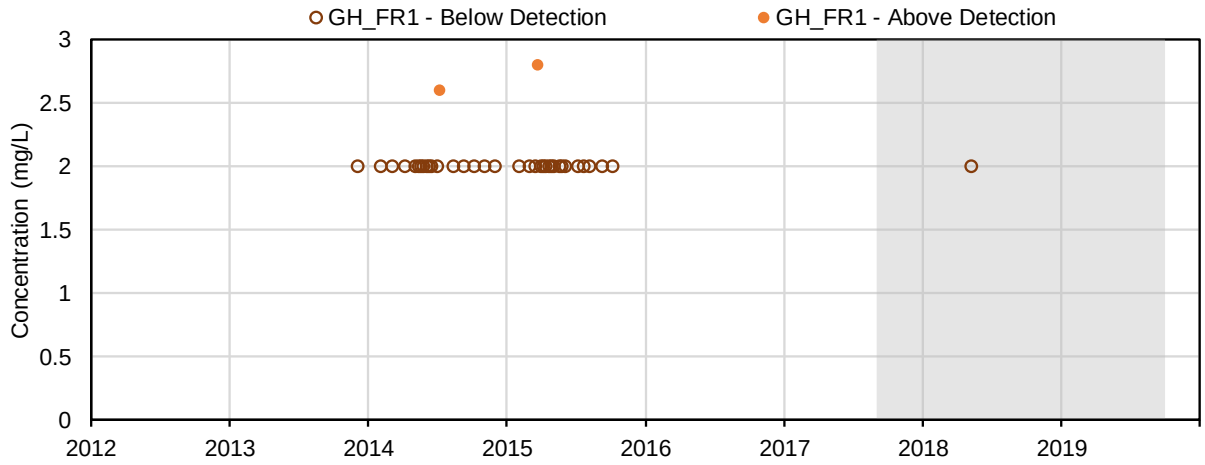
(44) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



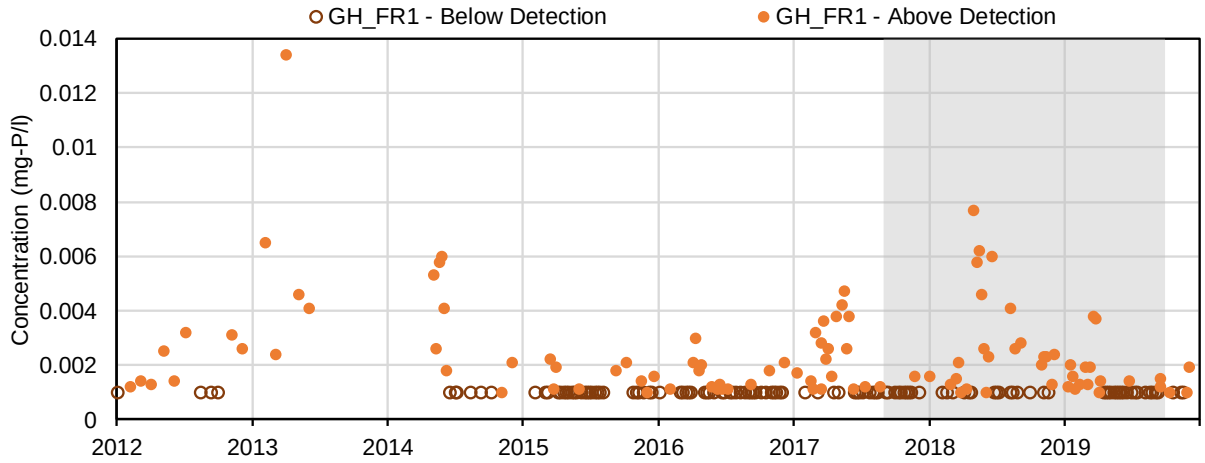
(45) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



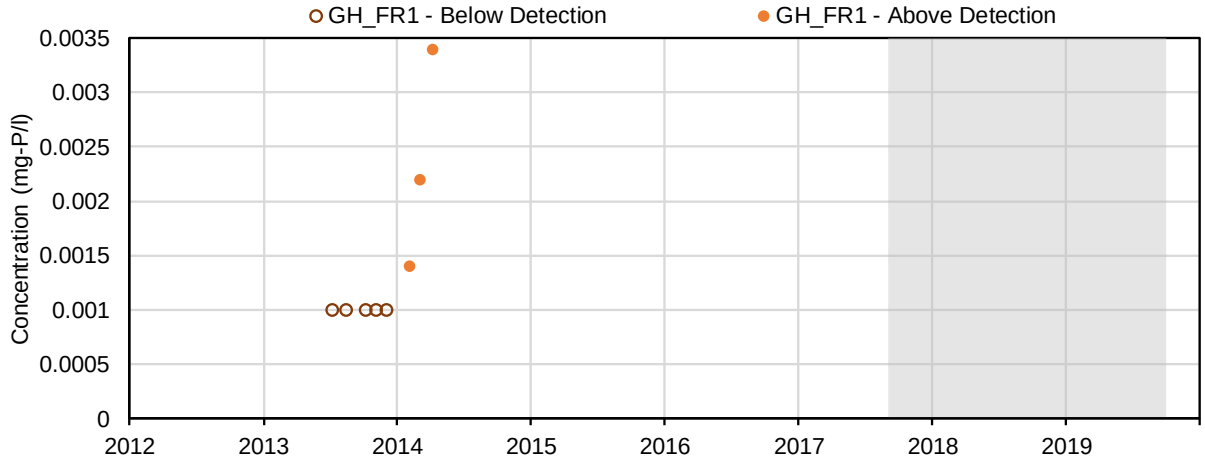
(46) Biochemical oxygen demand (mg/L); Nutrients and Biological Indicators



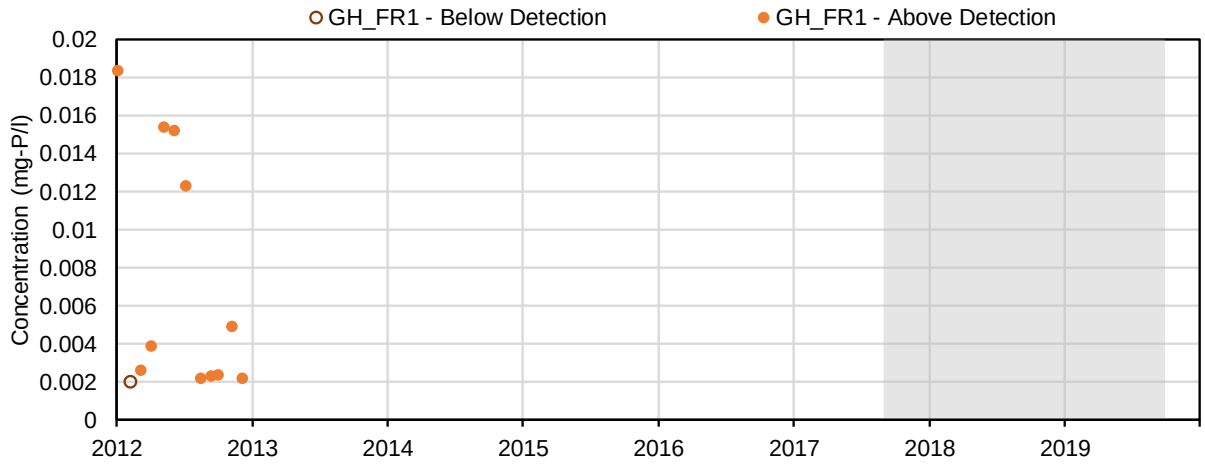
(47) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



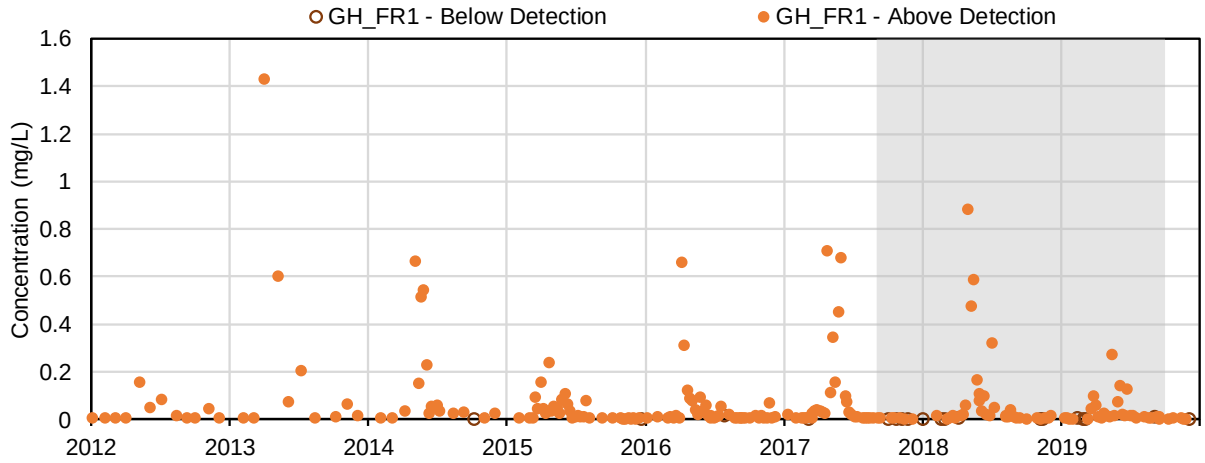
(48) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



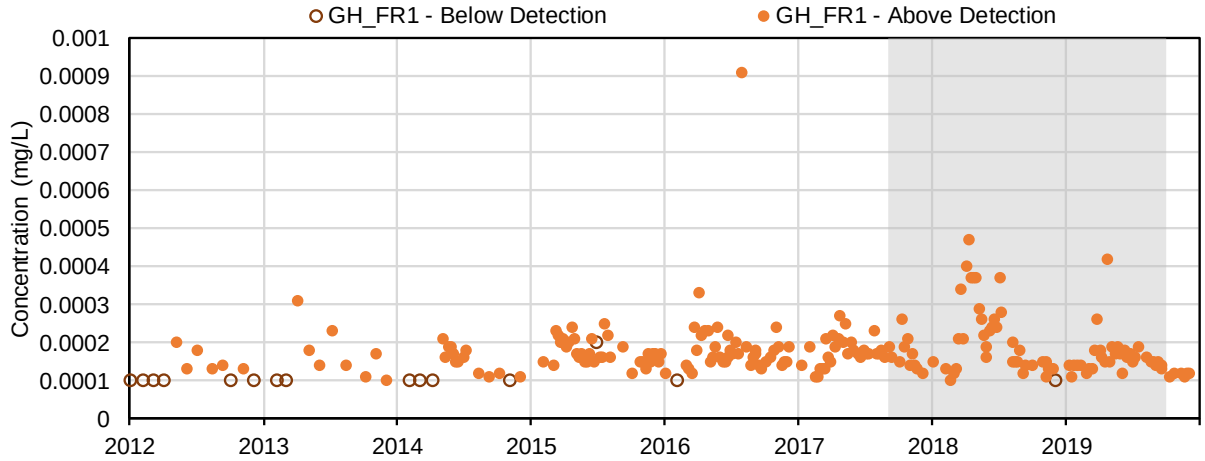
(49) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



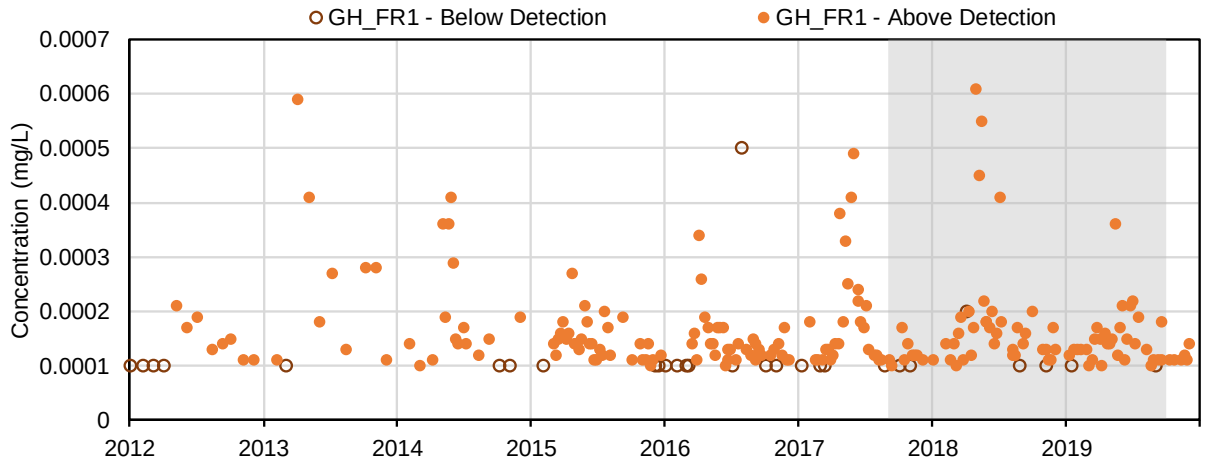
(50) Aluminum (mg/L); Total Metals



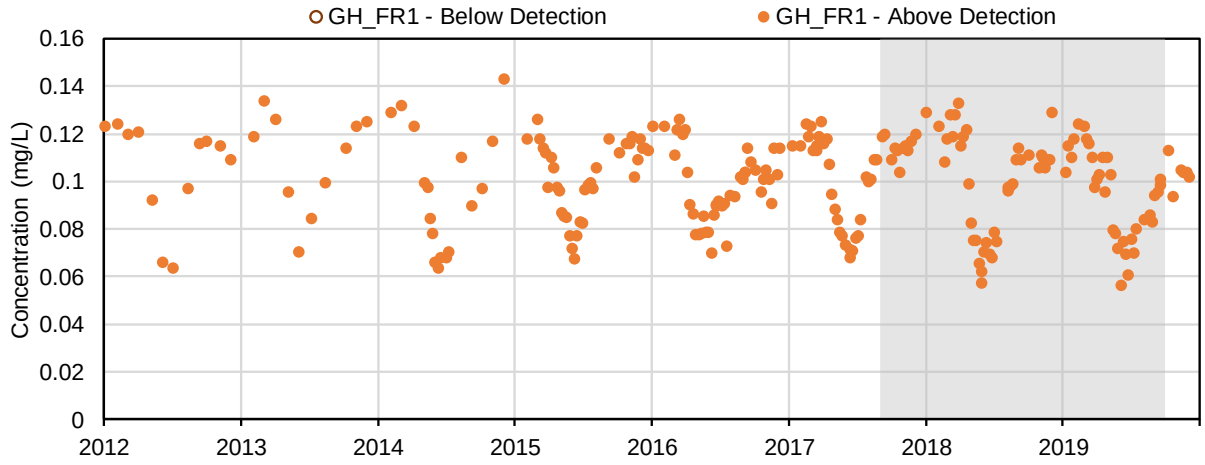
(51) Antimony (mg/L); Total Metals



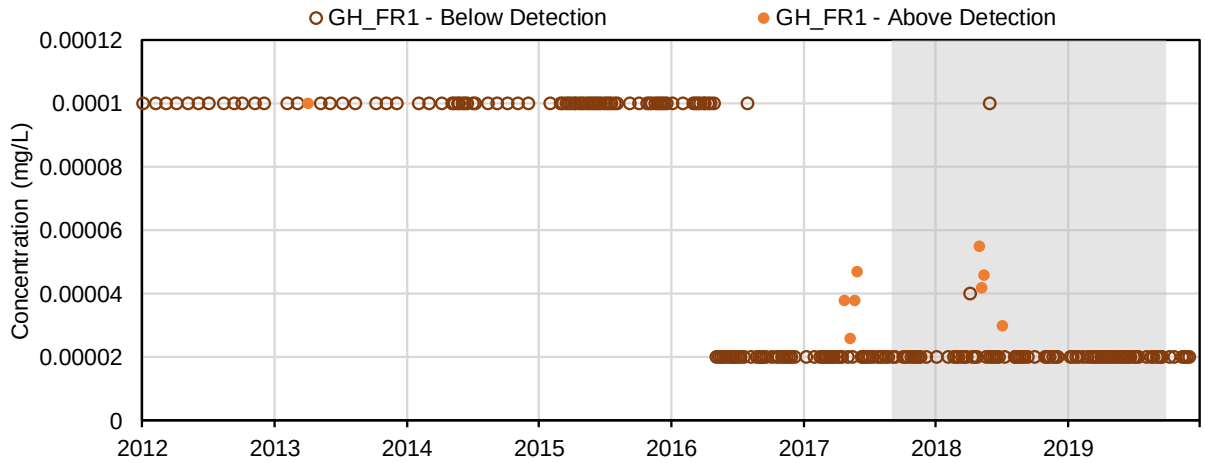
(52) Arsenic (mg/L); Total Metals



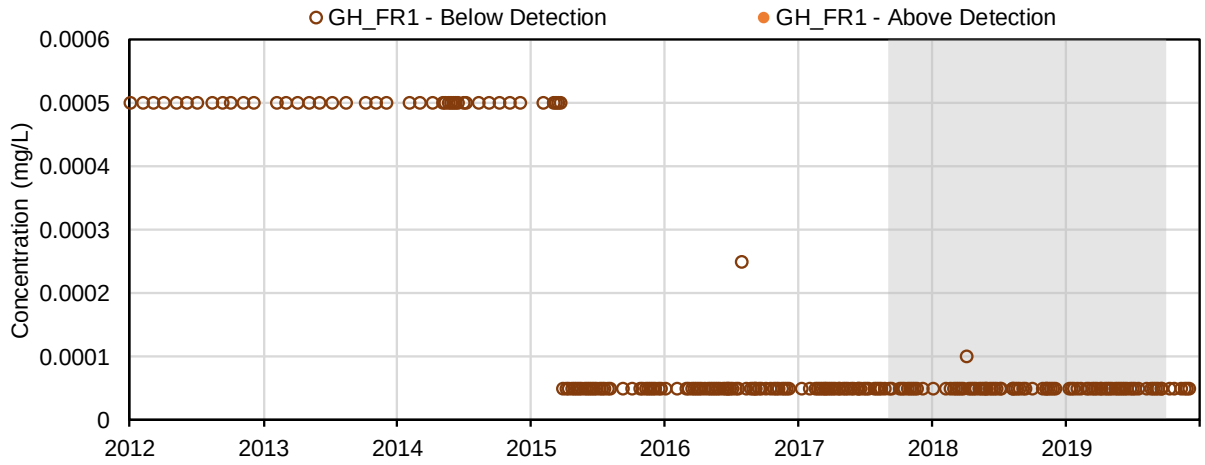
(53) Barium (mg/L); Total Metals



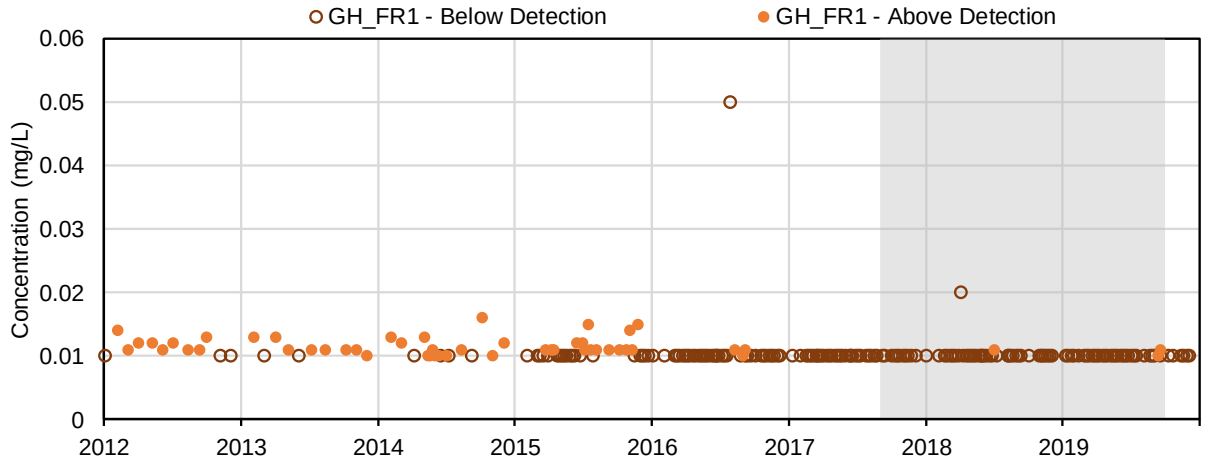
(54) Beryllium (mg/L); Total Metals



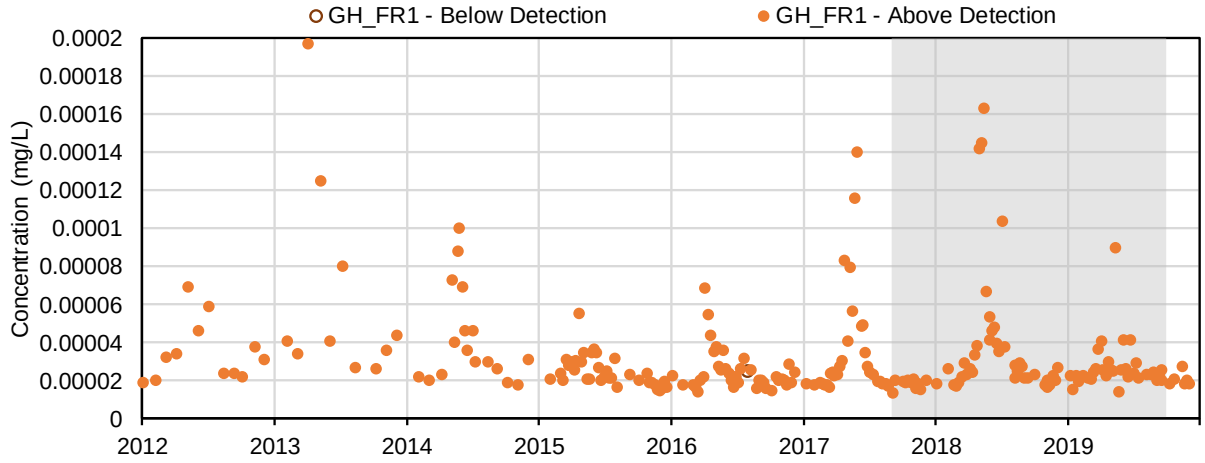
(55) Bismuth (mg/L); Total Metals



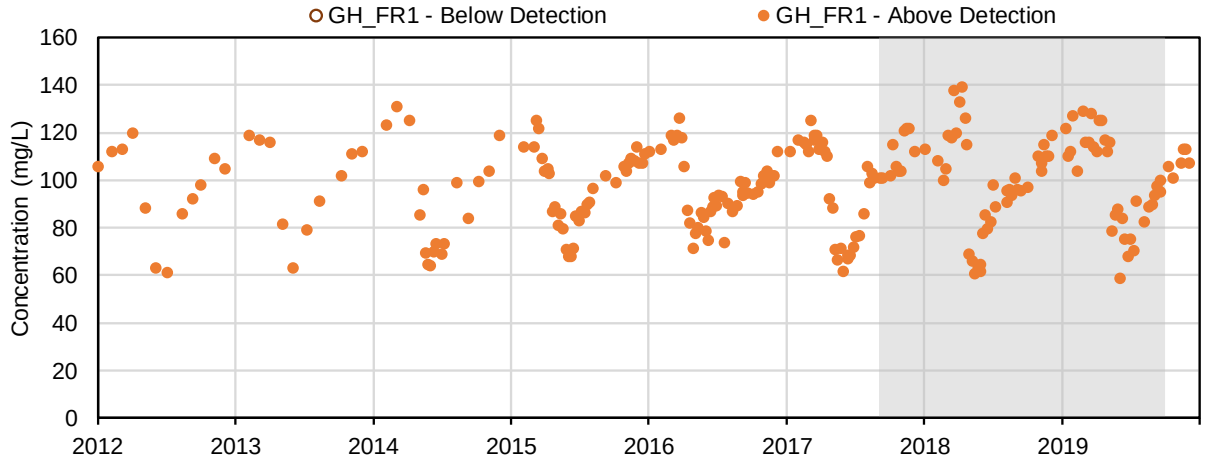
(56) Boron (mg/L); Total Metals



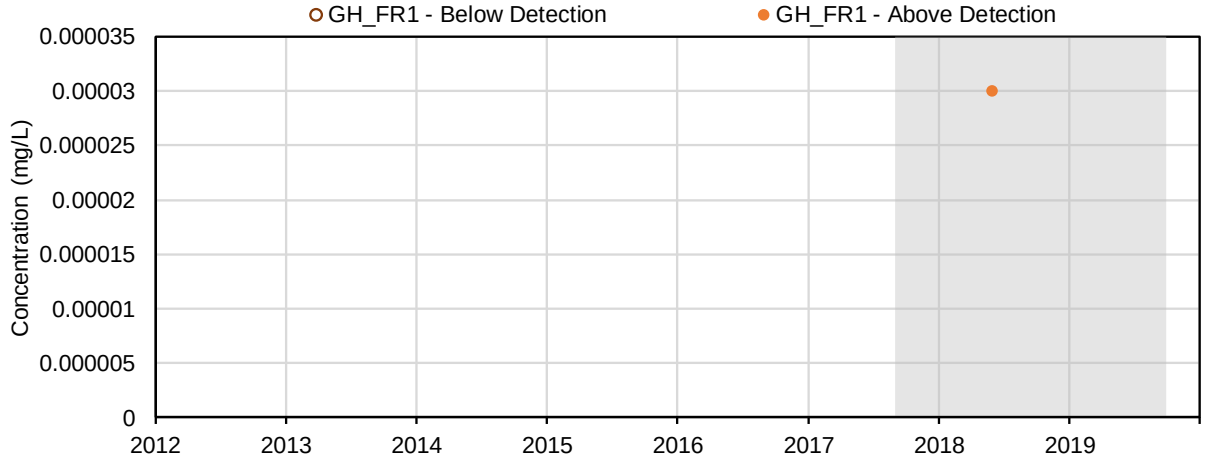
(57) Cadmium (mg/L); Total Metals



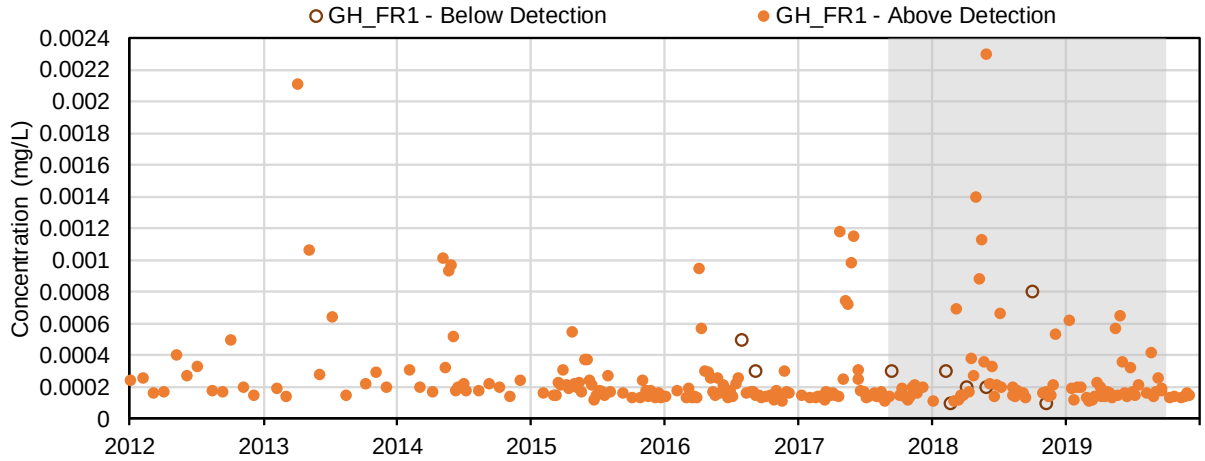
(58) Calcium (mg/L); Total Metals



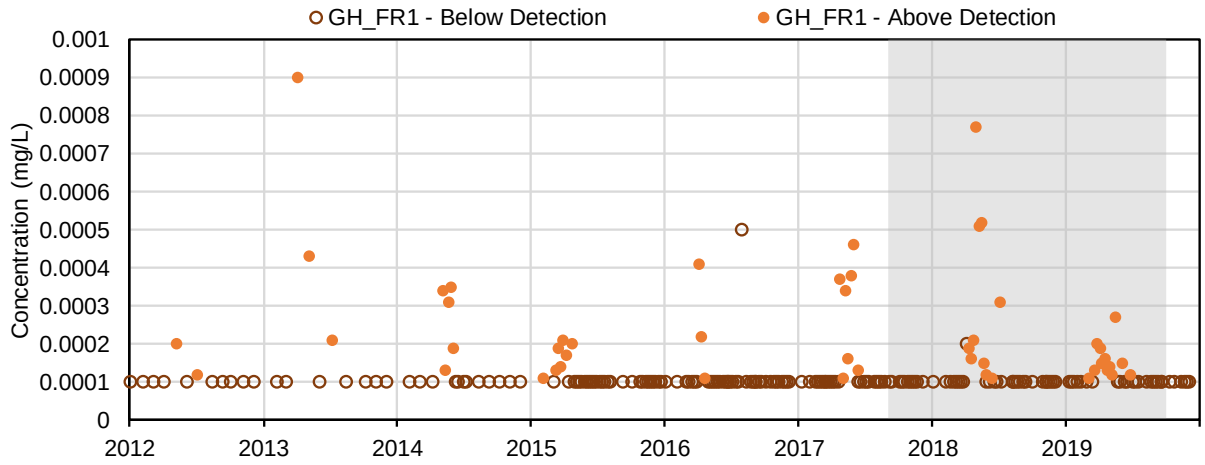
(59) Cesium (mg/L); Total Metals



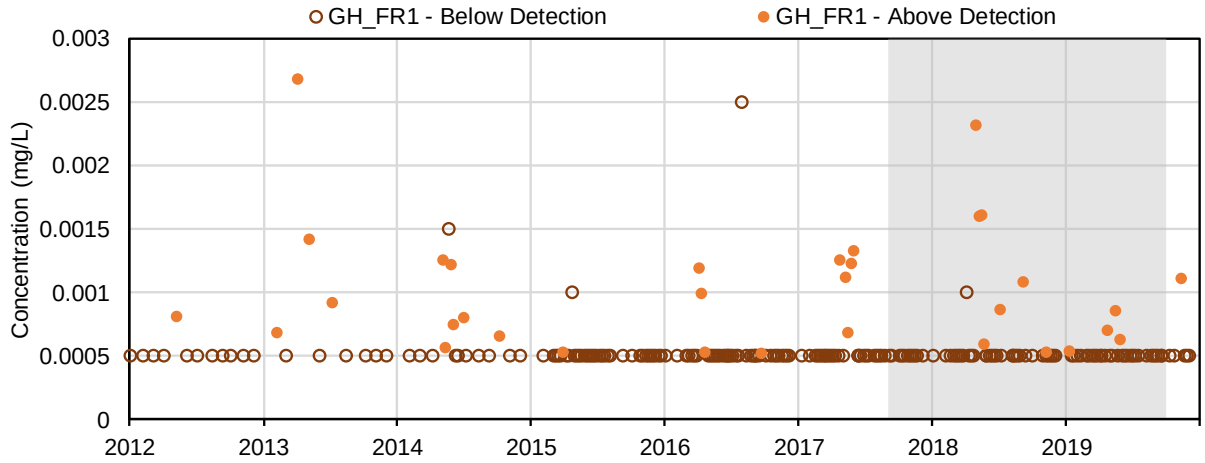
(60) Chromium (mg/L); Total Metals



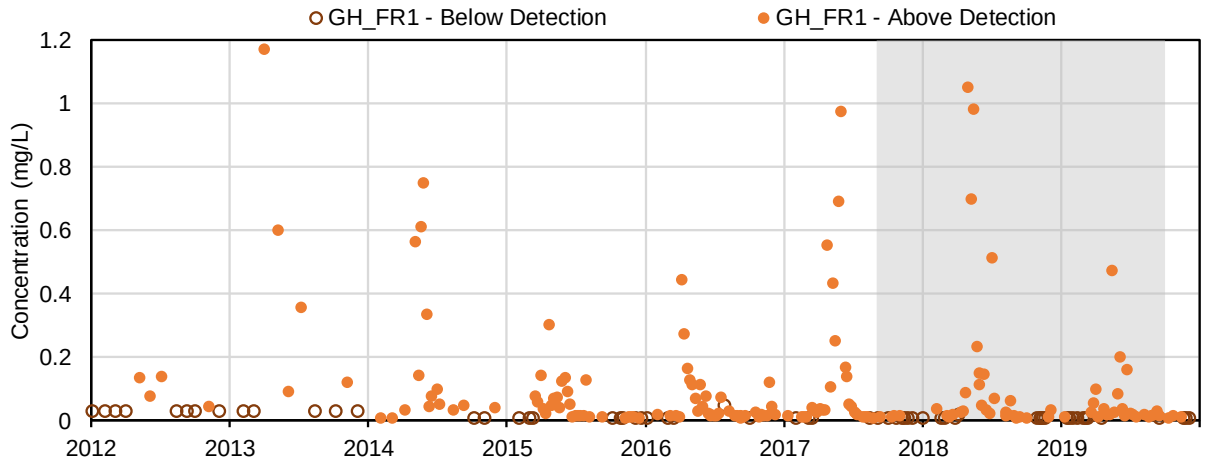
(61) Cobalt (mg/L); Total Metals



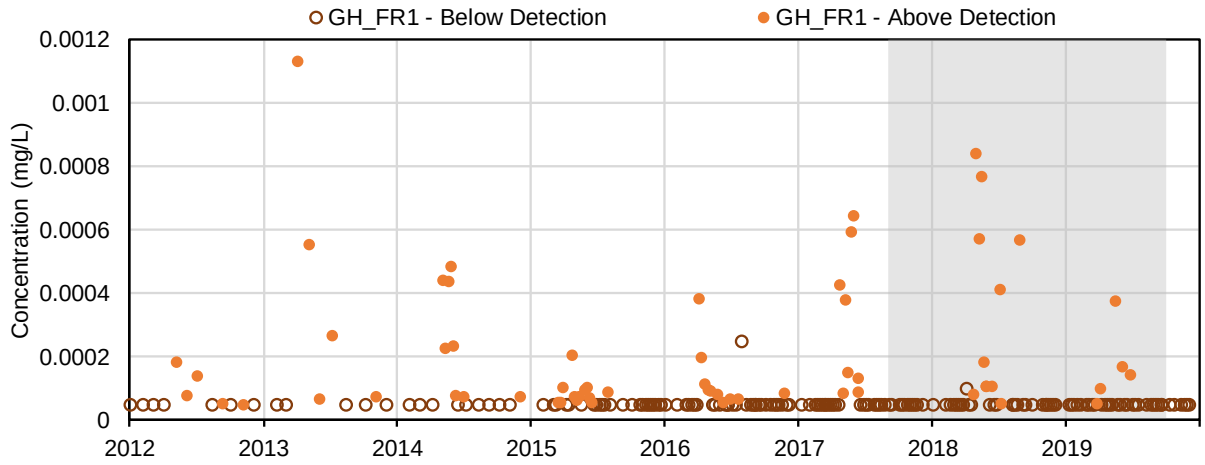
(62) Copper (mg/L); Total Metals



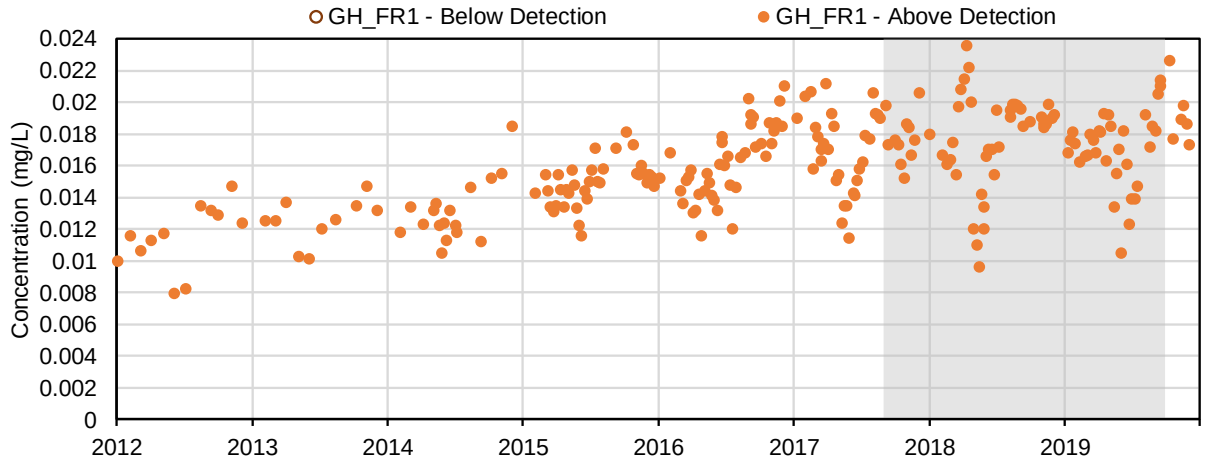
(63) Iron (mg/L); Total Metals



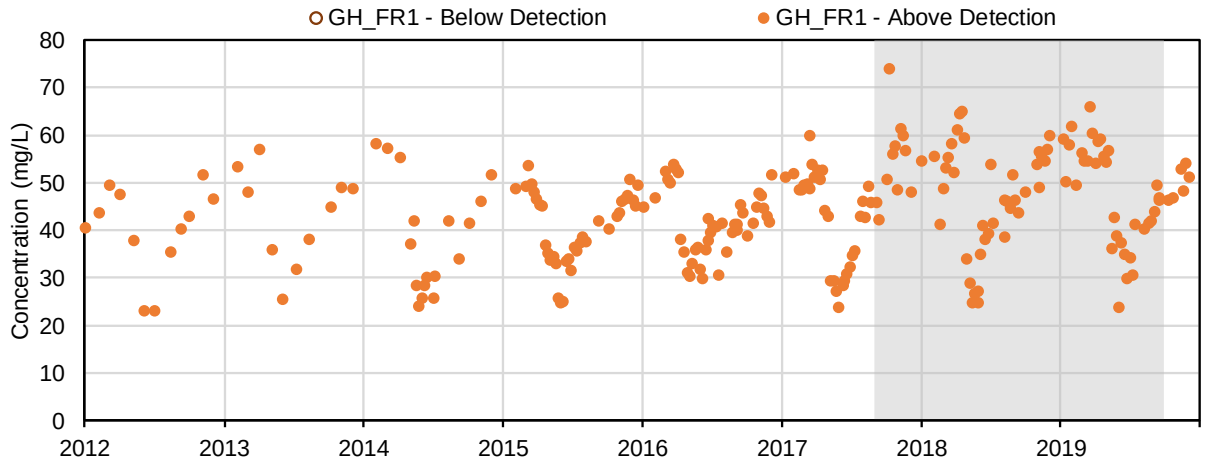
(64) Lead (mg/L); Total Metals



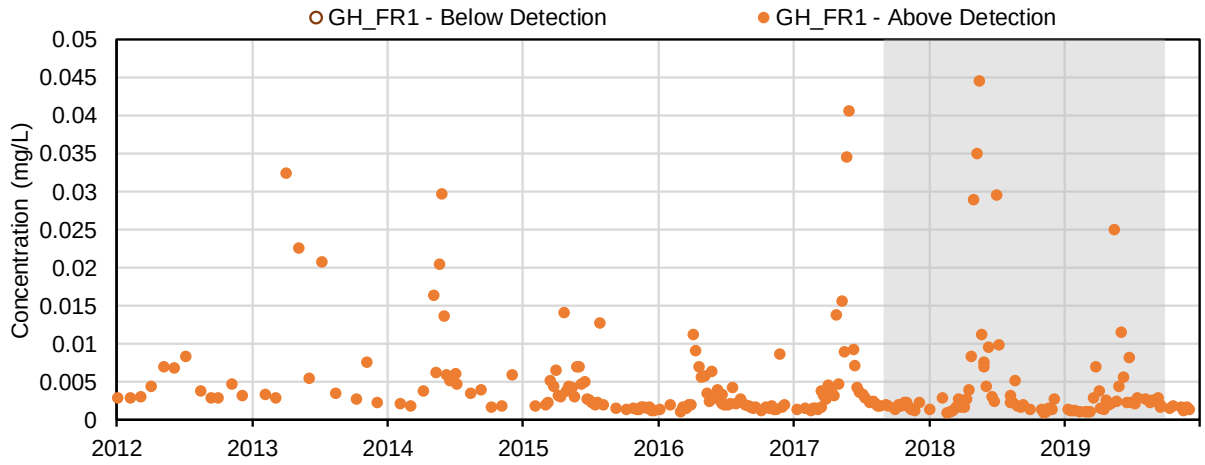
(65) Lithium (mg/L); Total Metals



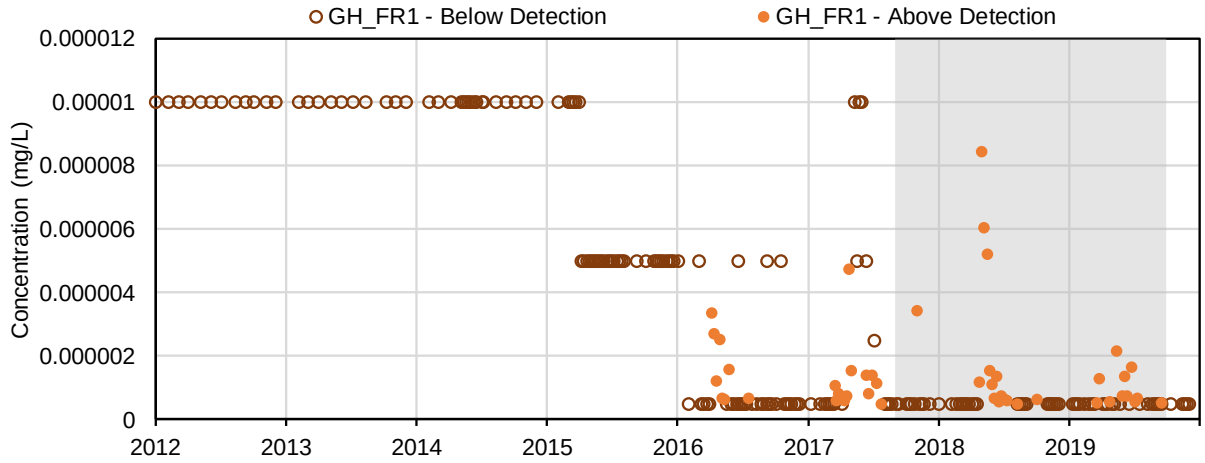
(66) Magnesium (mg/L); Total Metals



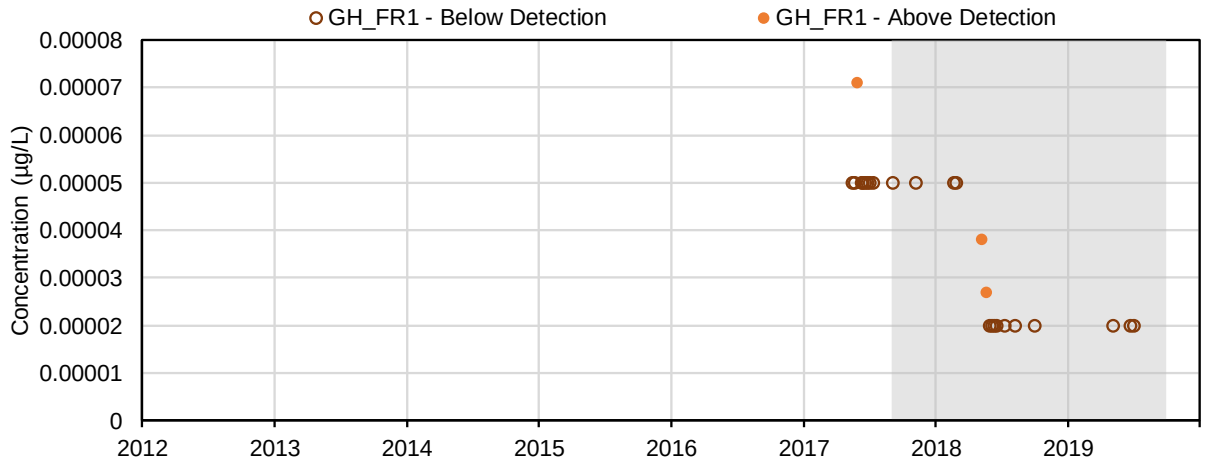
(67) Manganese (mg/L); Total Metals



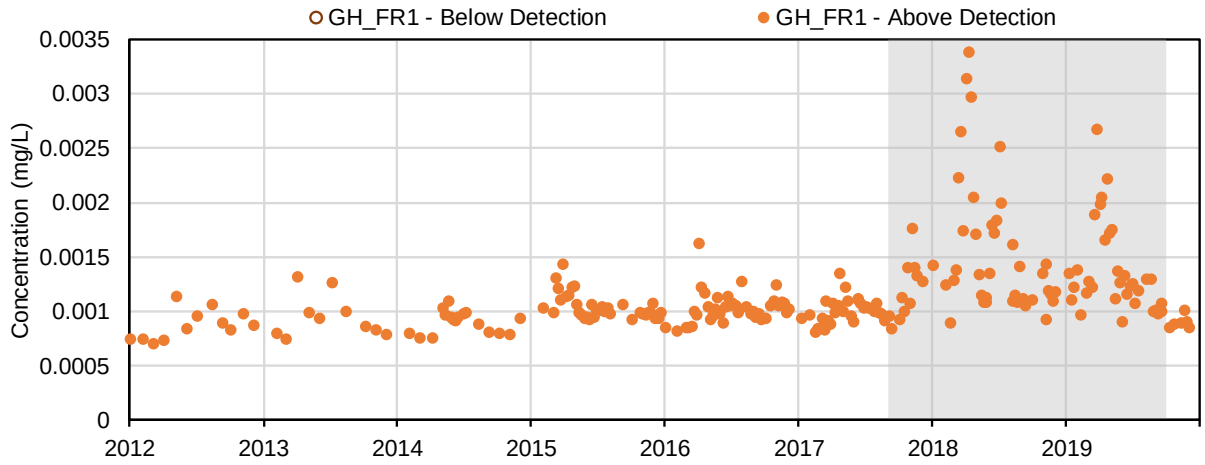
(68) Mercury (mg/L); Total Metals



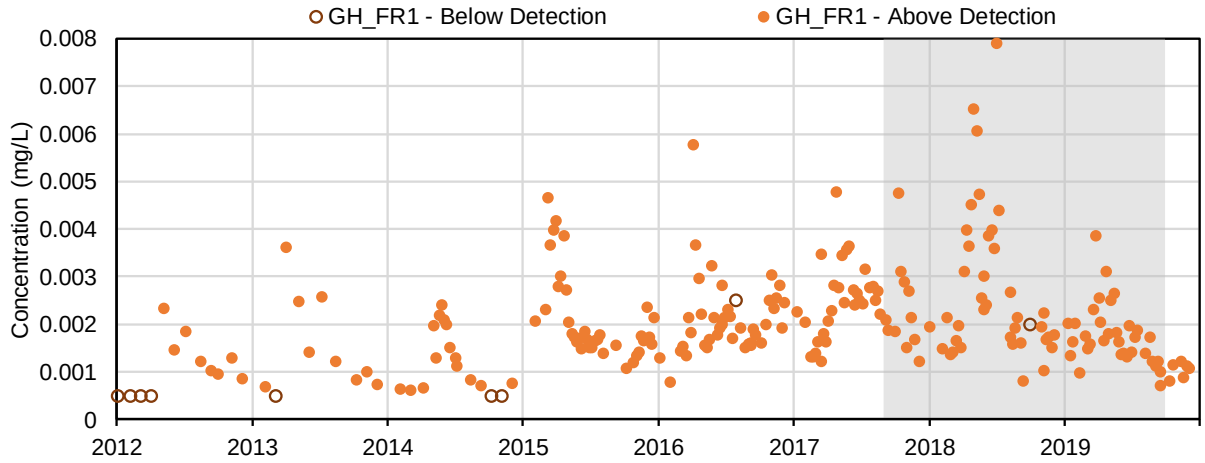
(69) Methyl mercury (µg/L); Total Metals



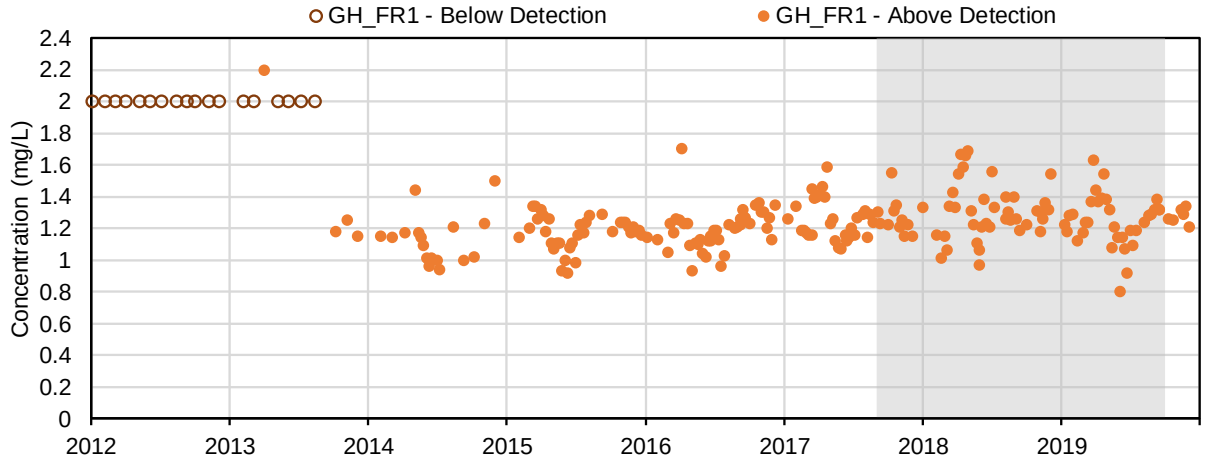
(70) Molybdenum (mg/L); Total Metals



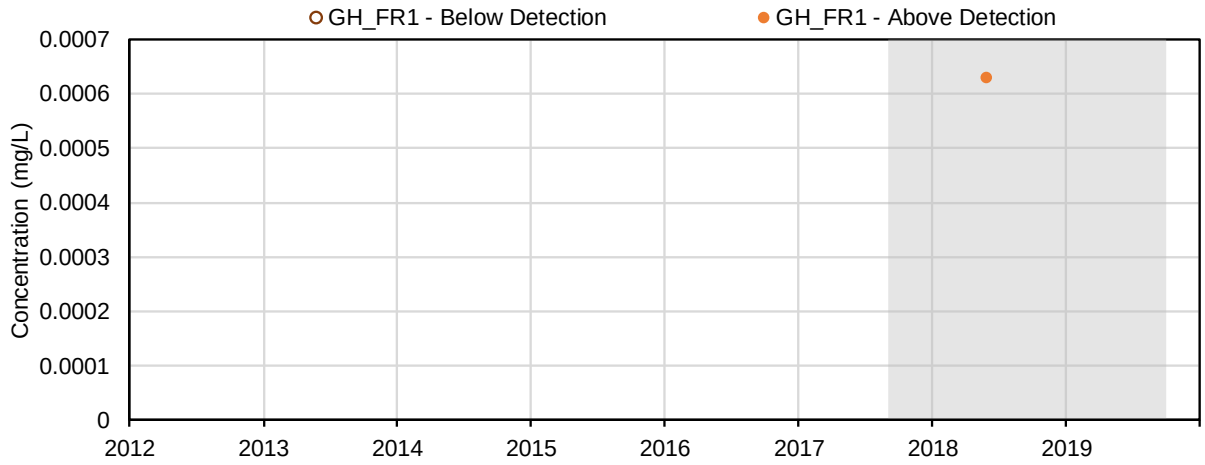
(71) Nickel (mg/L); Total Metals



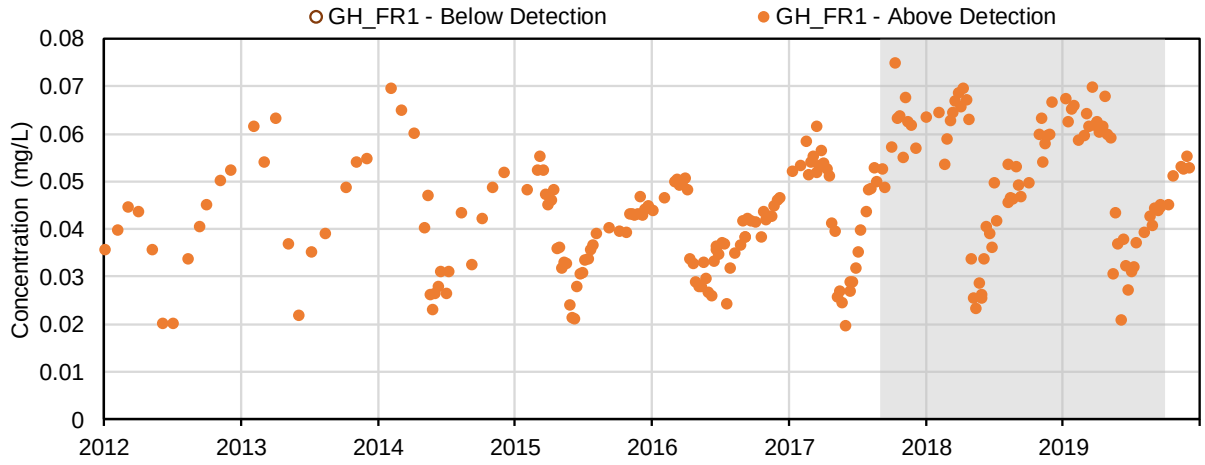
(72) Potassium (mg/L); Total Metals



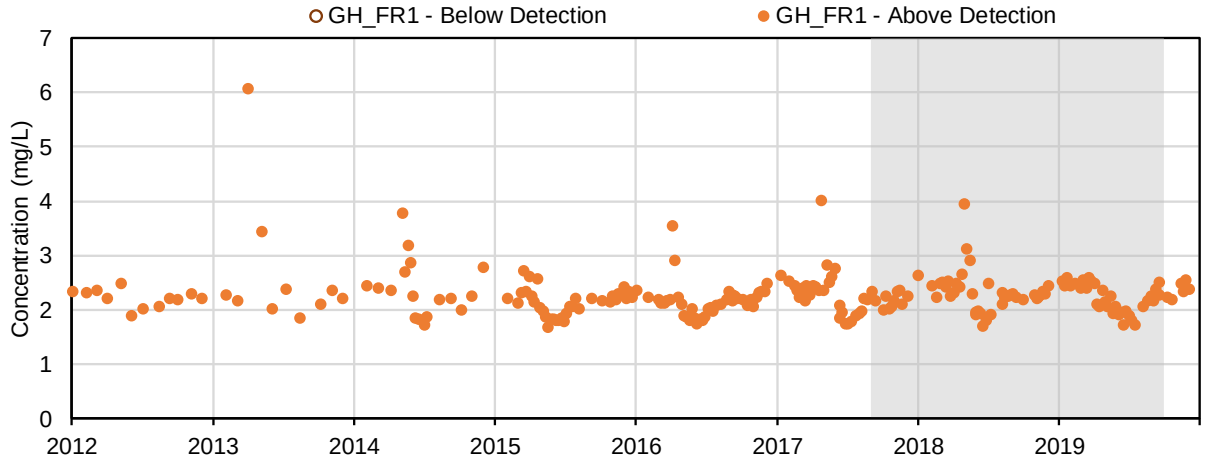
(73) Rubidium (mg/L); Total Metals



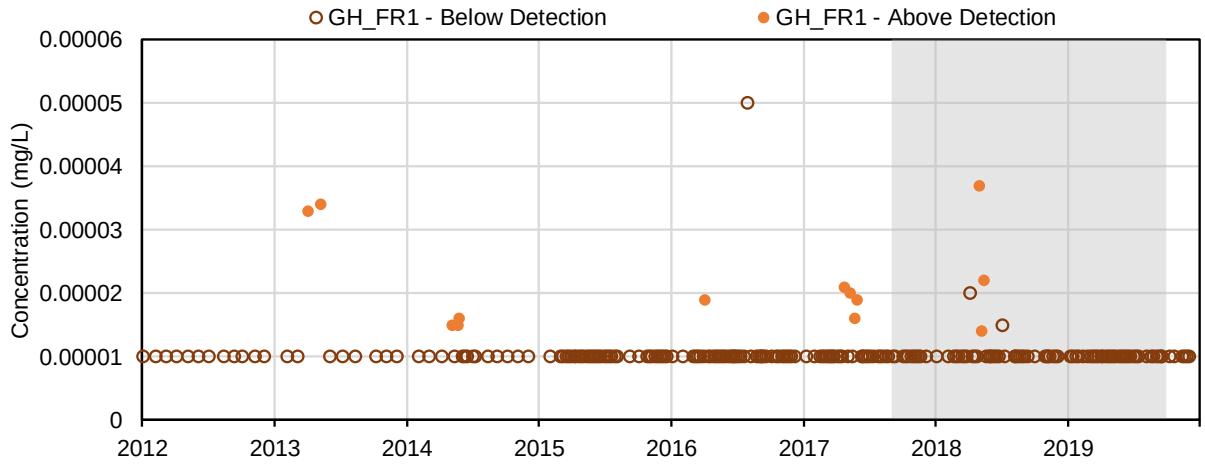
(74) Selenium (mg/L); Total Metals



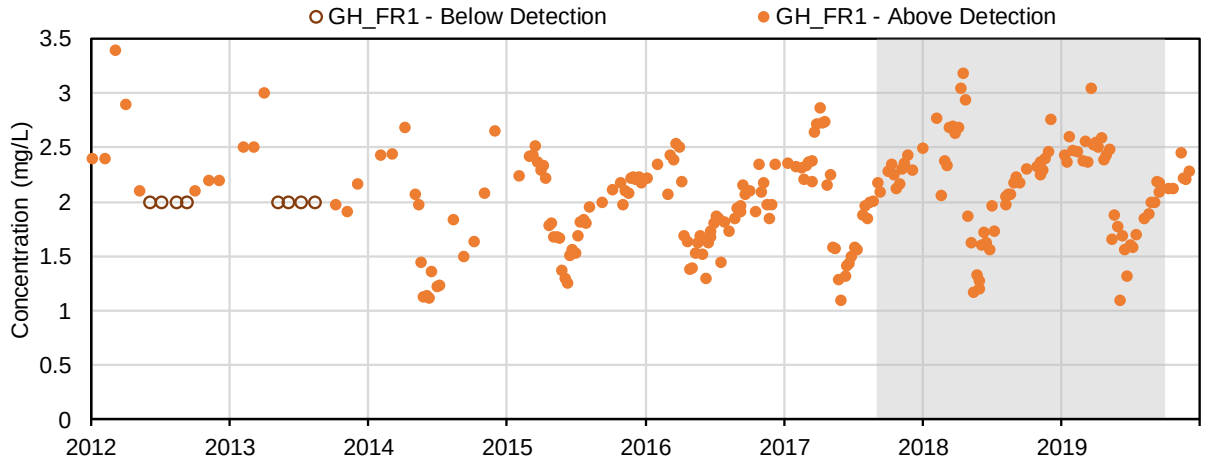
(75) Silicon (mg/L); Total Metals



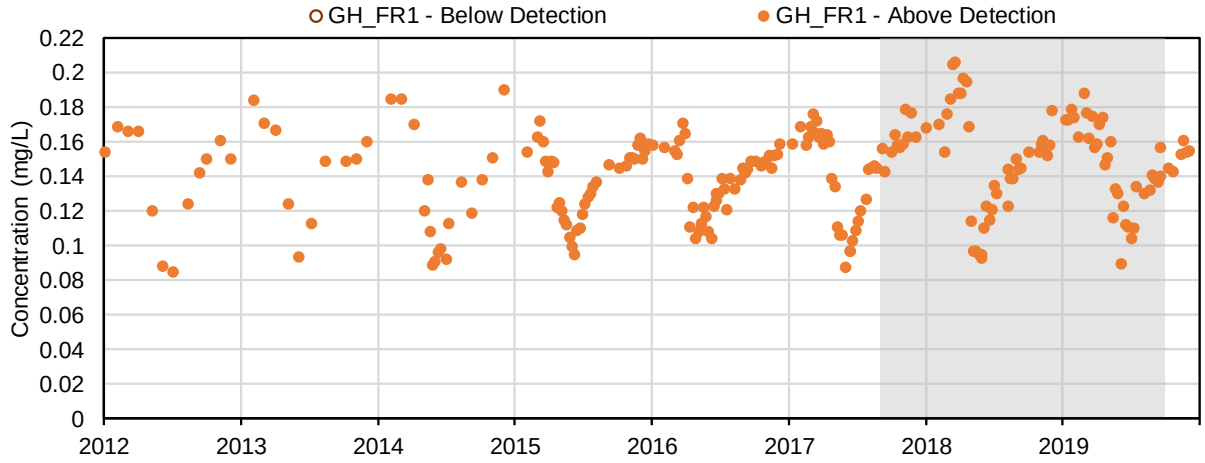
(76) Silver (mg/L); Total Metals



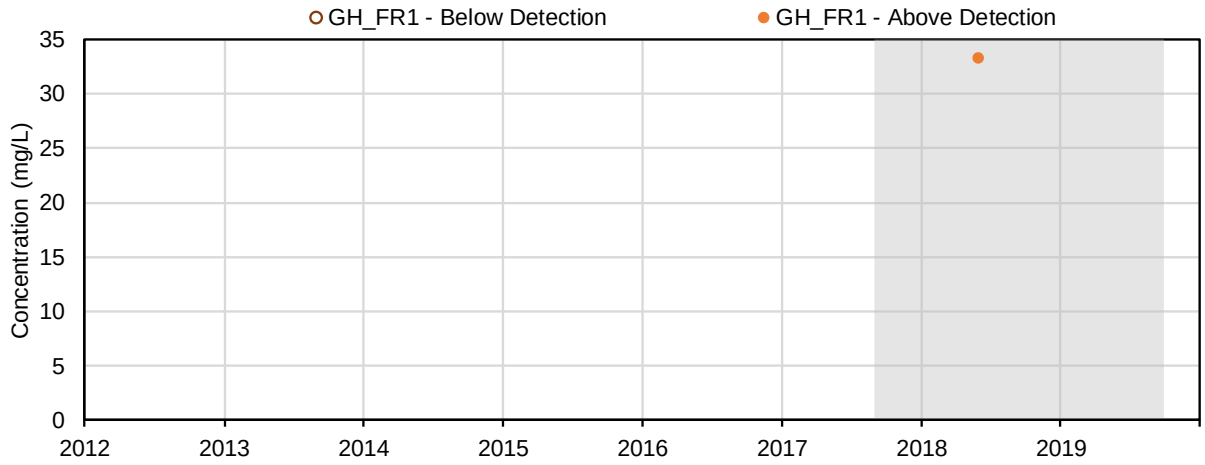
(77) Sodium (mg/L); Total Metals



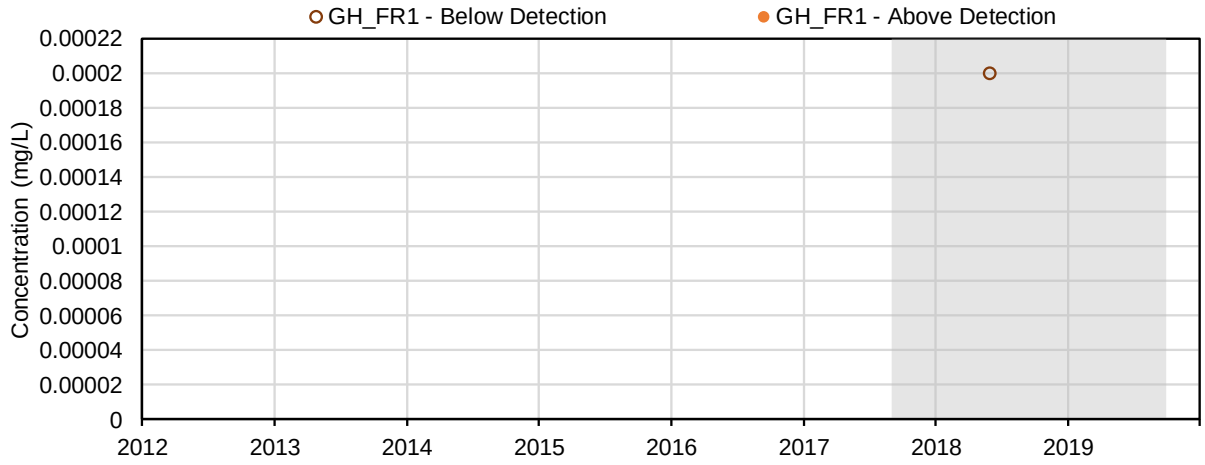
(78) Strontium (mg/L); Total Metals



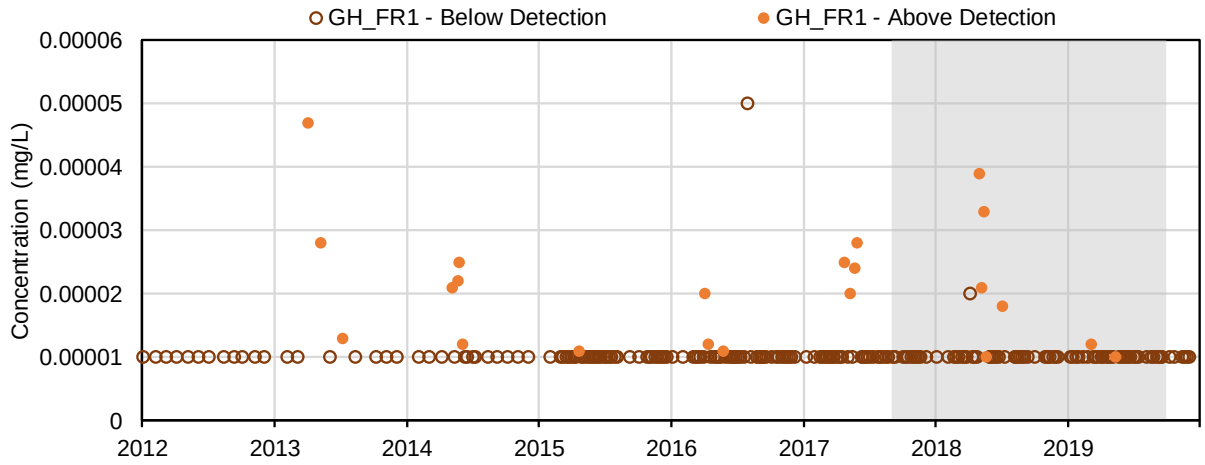
(79) Sulphur (mg/L); Total Metals



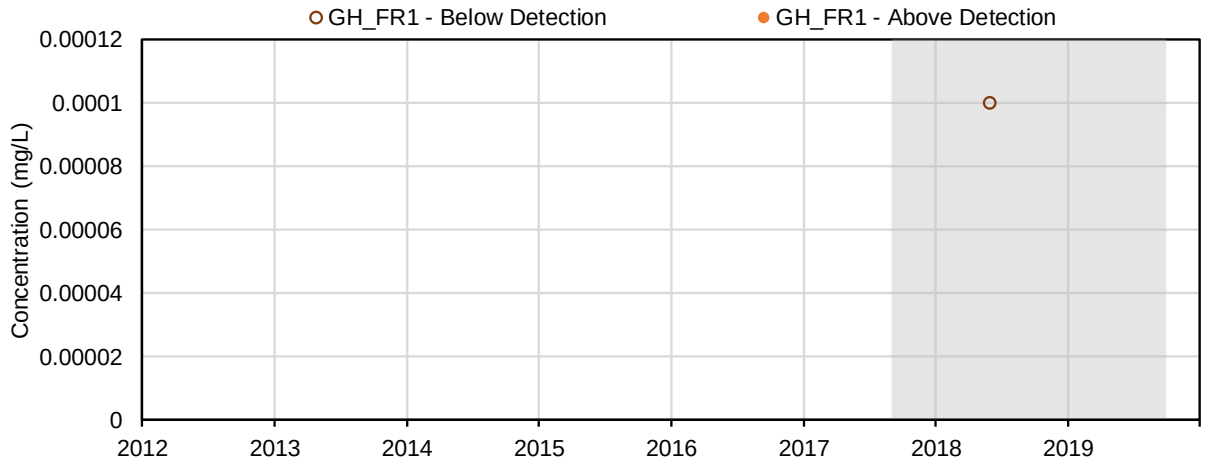
(80) Tellurium (mg/L); Total Metals



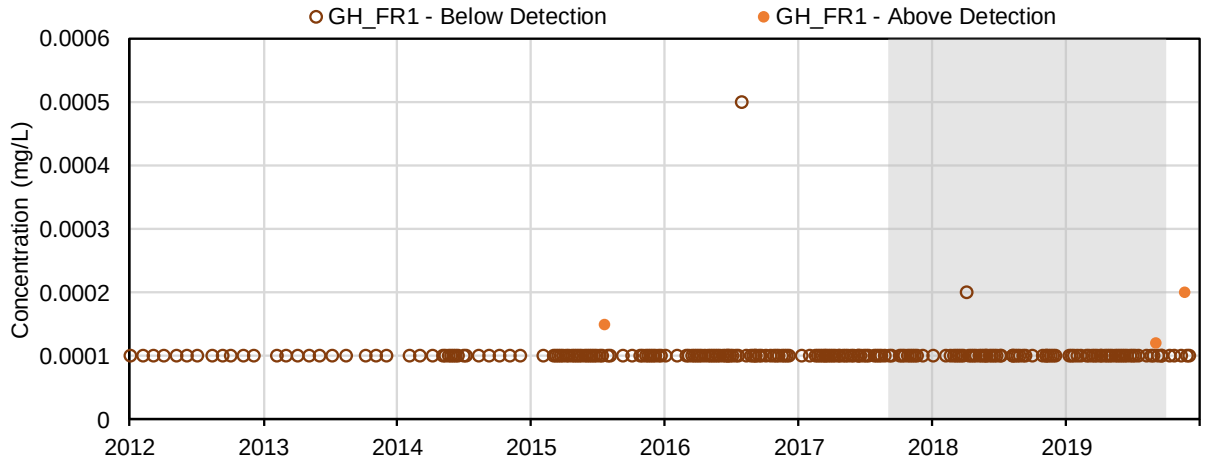
(81) Thallium (mg/L); Total Metals



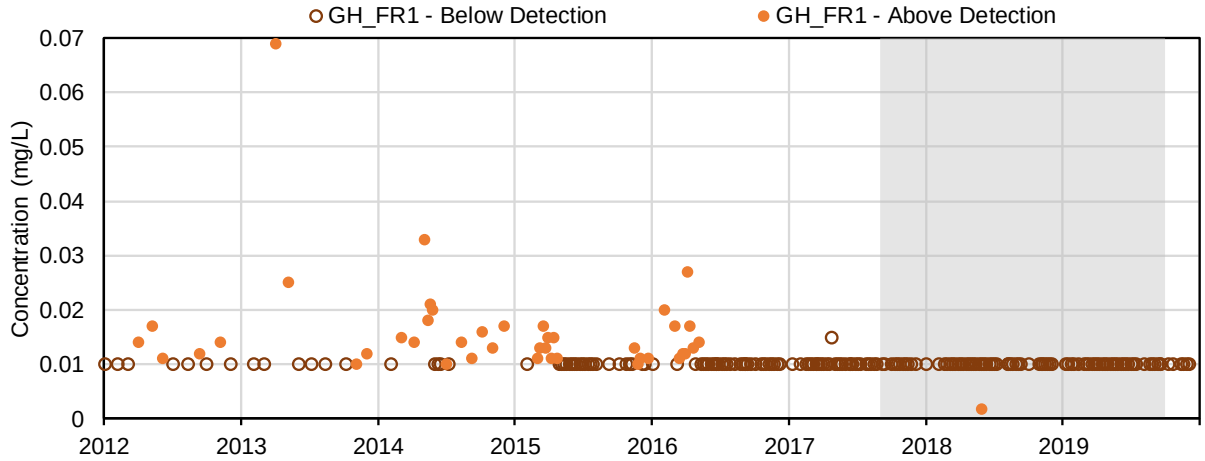
(82) Thorium (mg/L); Total Metals



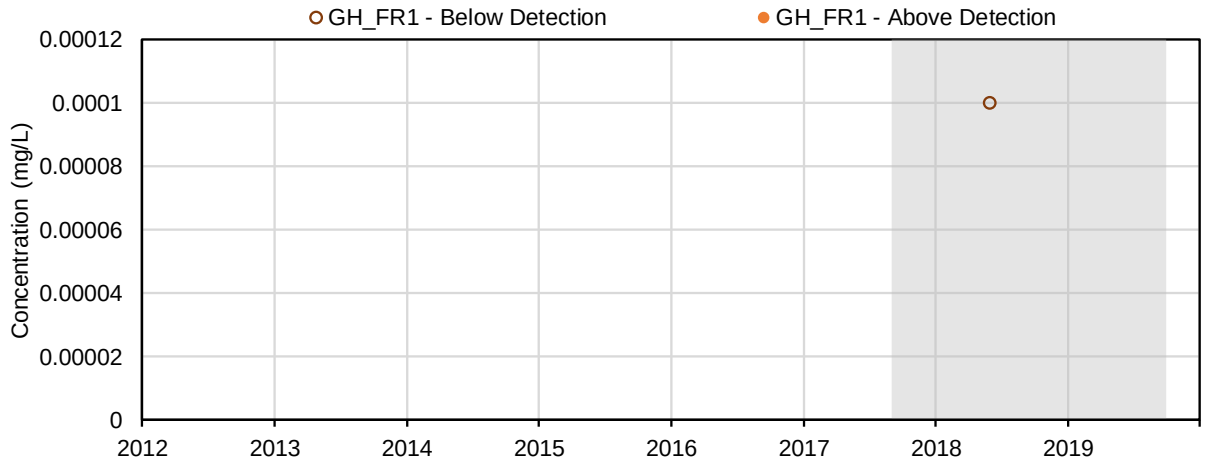
(83) Tin (mg/L); Total Metals



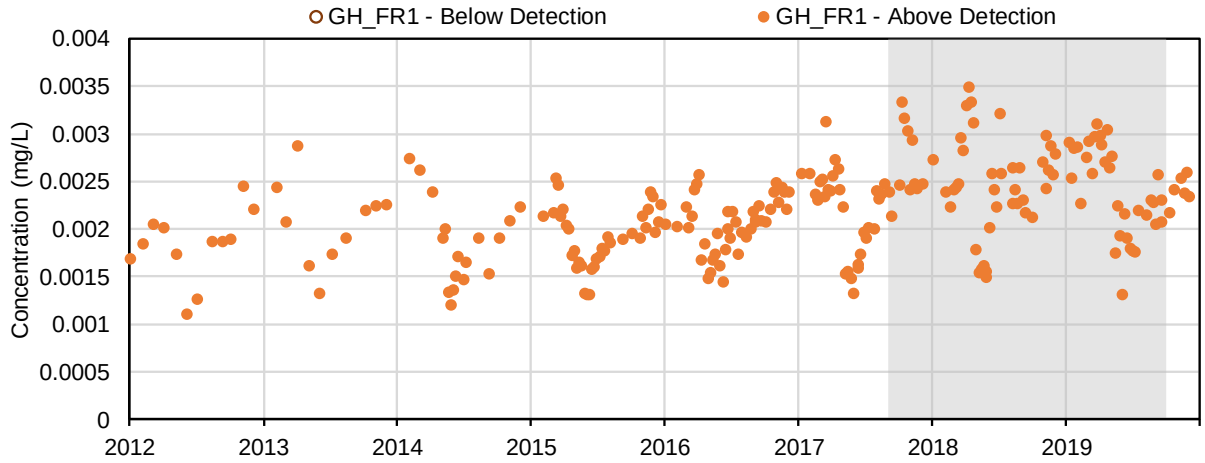
(84) Titanium (mg/L); Total Metals



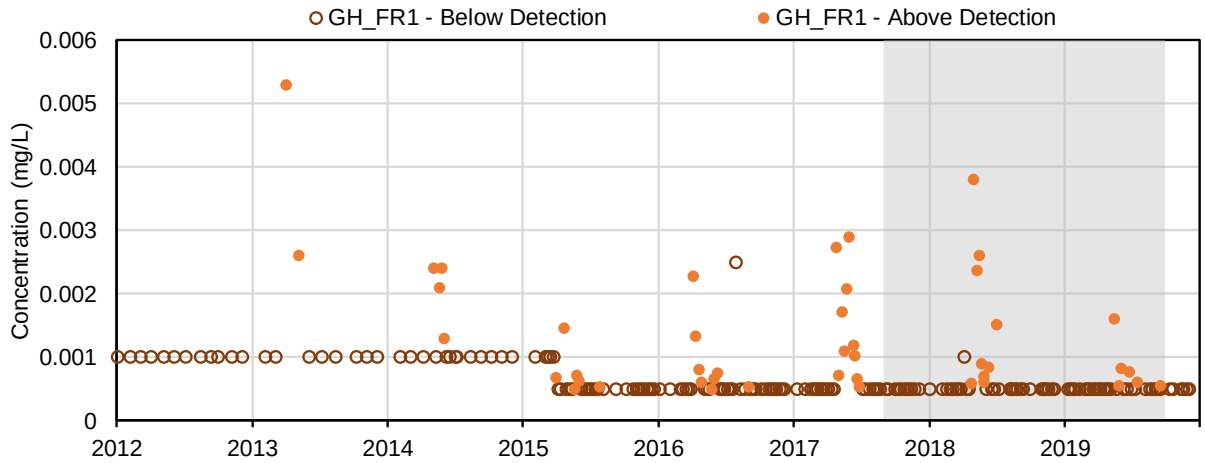
(85) Tungsten (mg/L); Total Metals



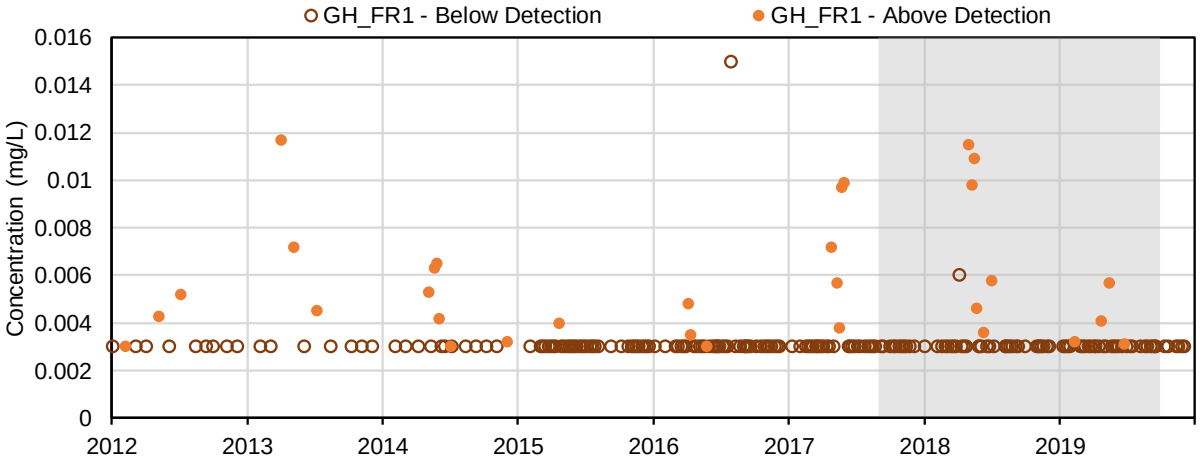
(86) Uranium (mg/L); Total Metals



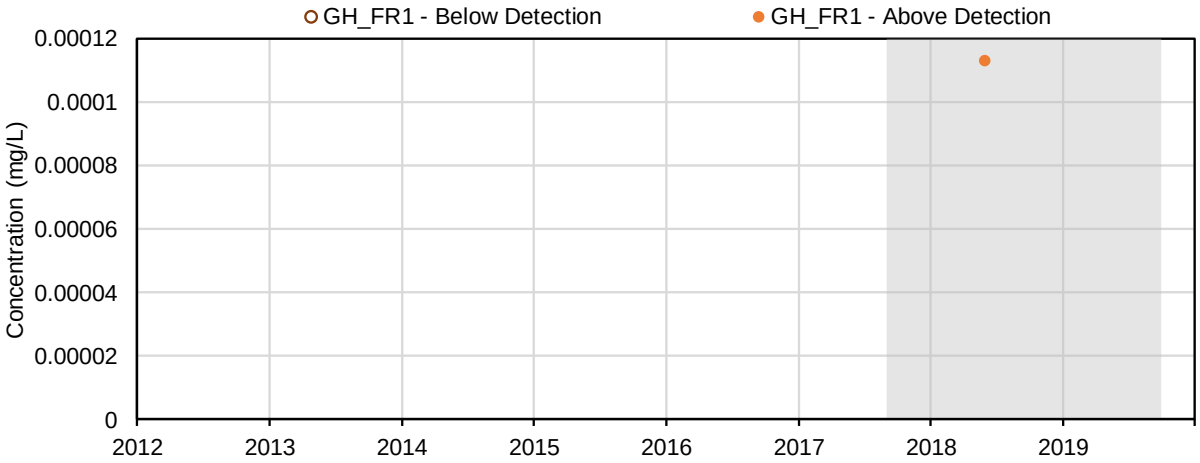
(87) Vanadium (mg/L); Total Metals



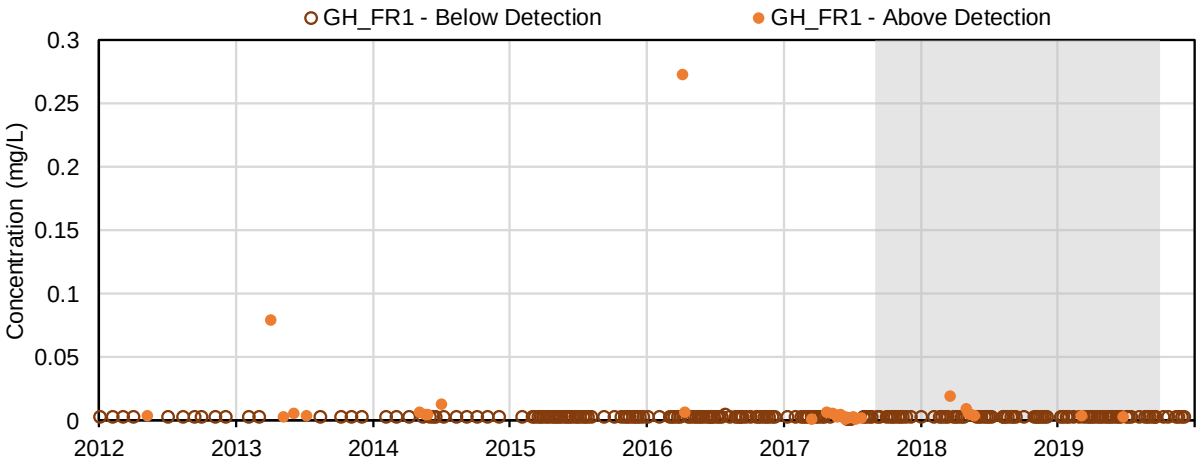
(88) Zinc (mg/L); Total Metals



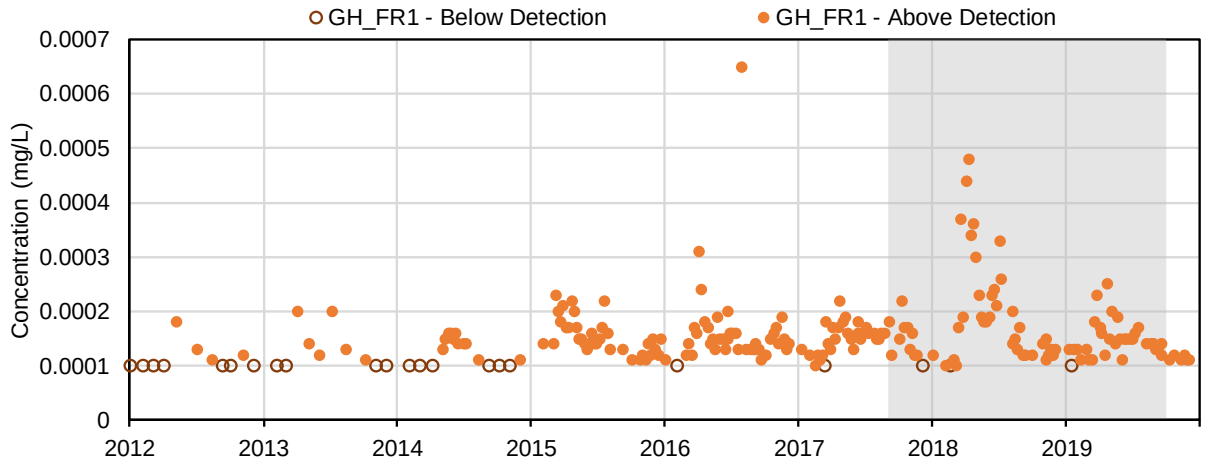
(89) Zirconium (mg/L); Total Metals



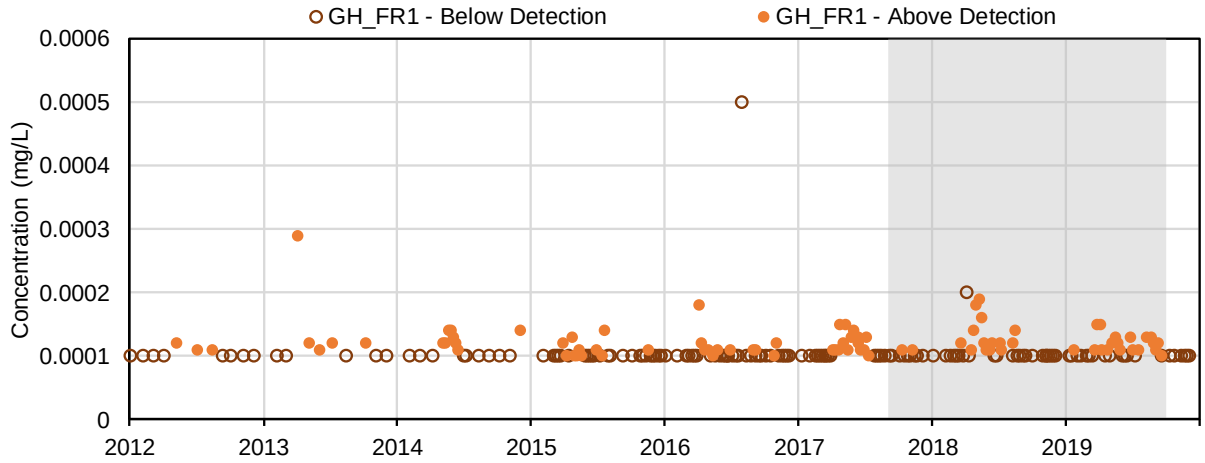
(90) Aluminum (mg/L); Dissolved Metals



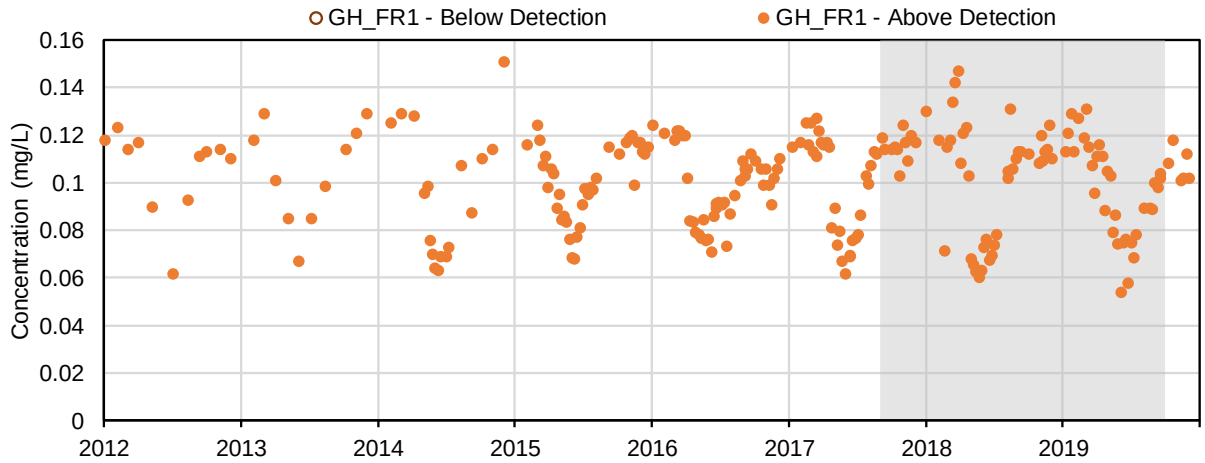
(91) Antimony (mg/L); Dissolved Metals



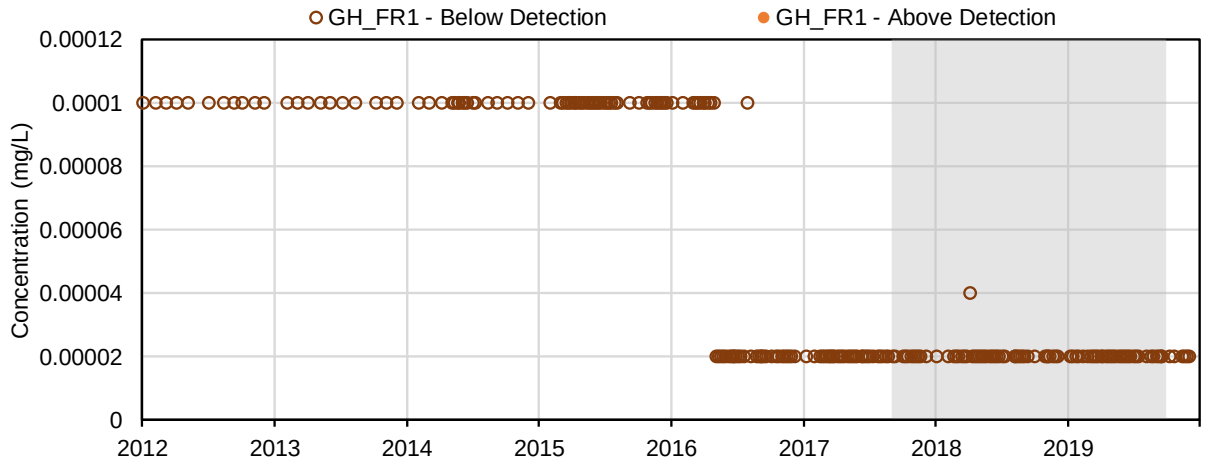
(92) Arsenic (mg/L); Dissolved Metals



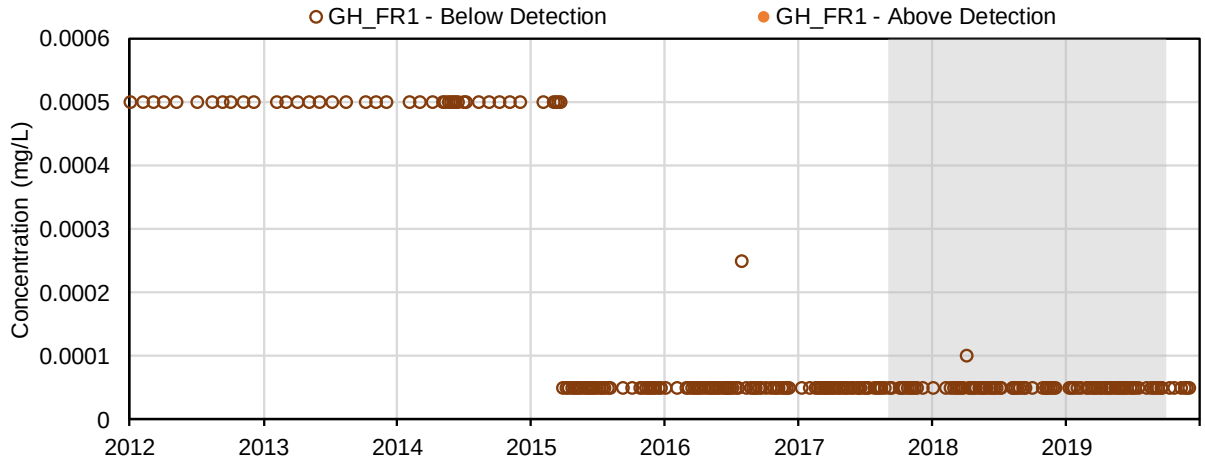
(93) Barium (mg/L); Dissolved Metals



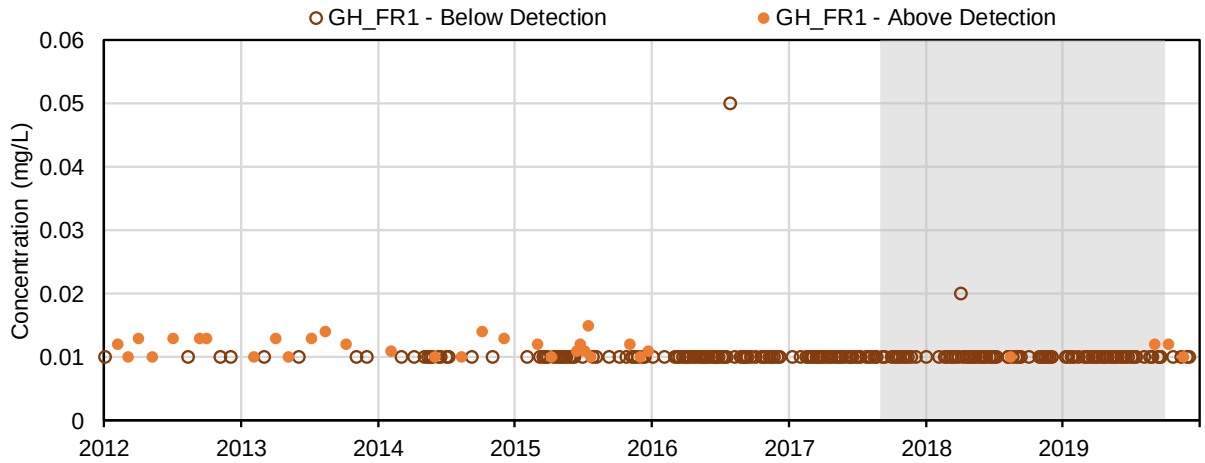
(94) Beryllium (mg/L); Dissolved Metals



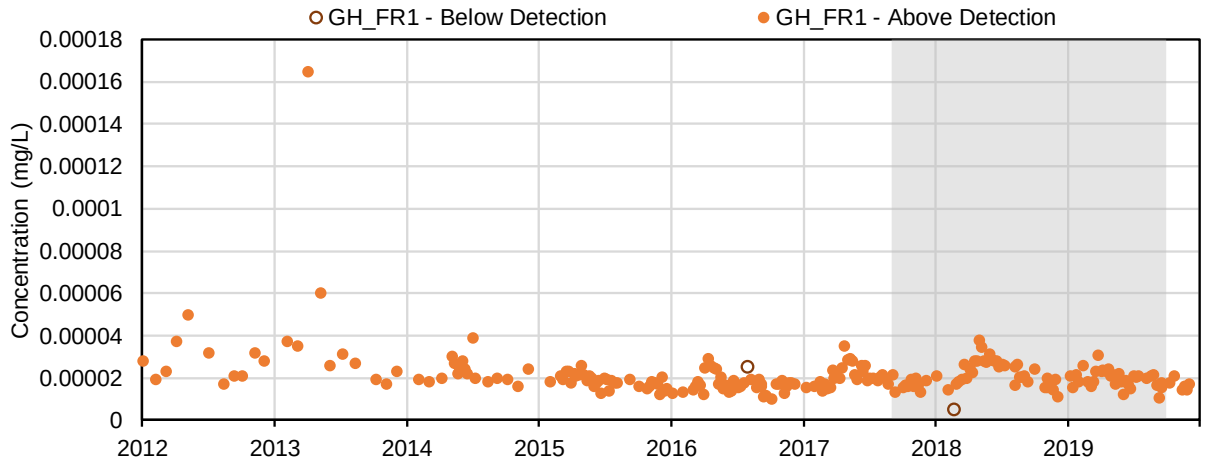
(95) Bismuth (mg/L); Dissolved Metals



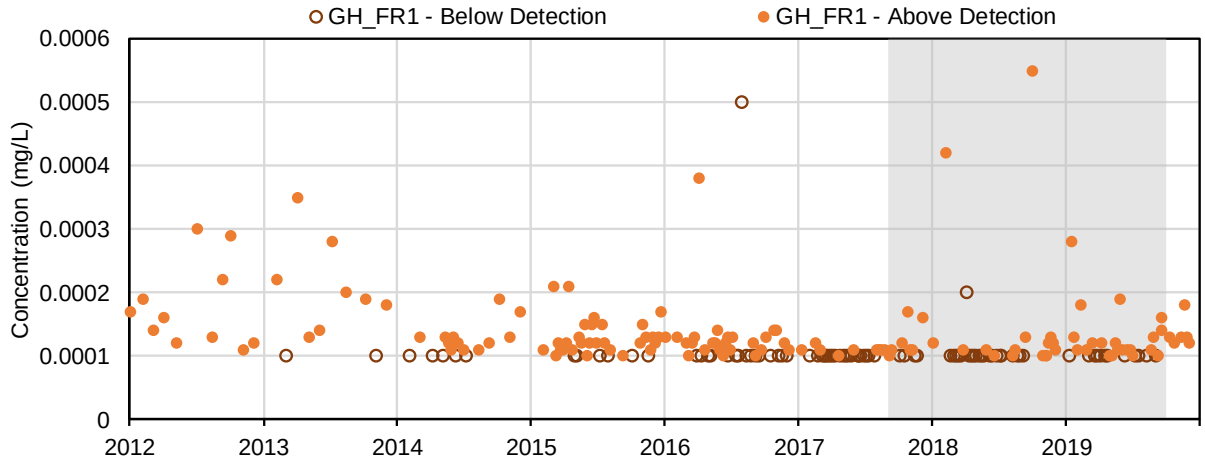
(96) Boron (mg/L); Dissolved Metals



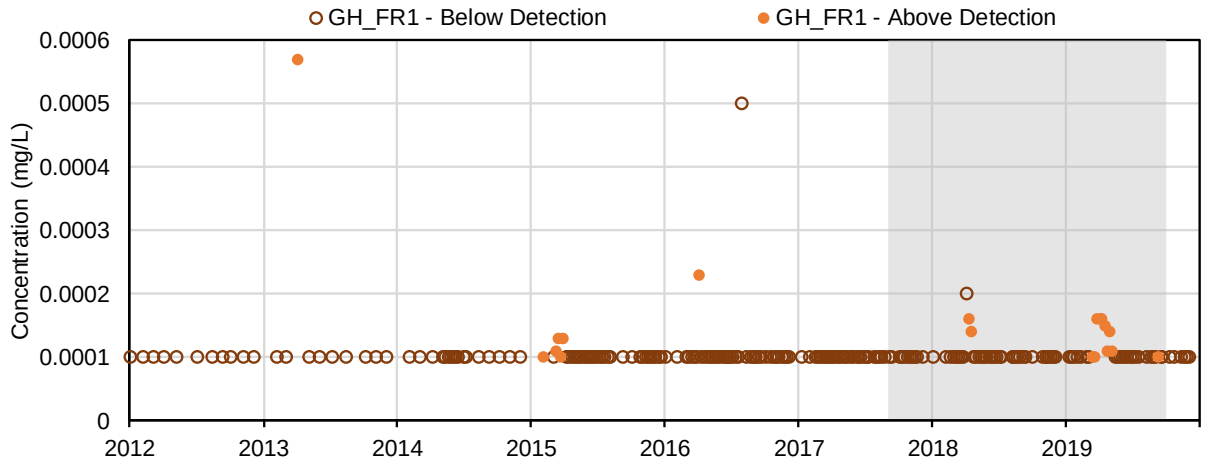
(97) Cadmium (mg/L); Dissolved Metals



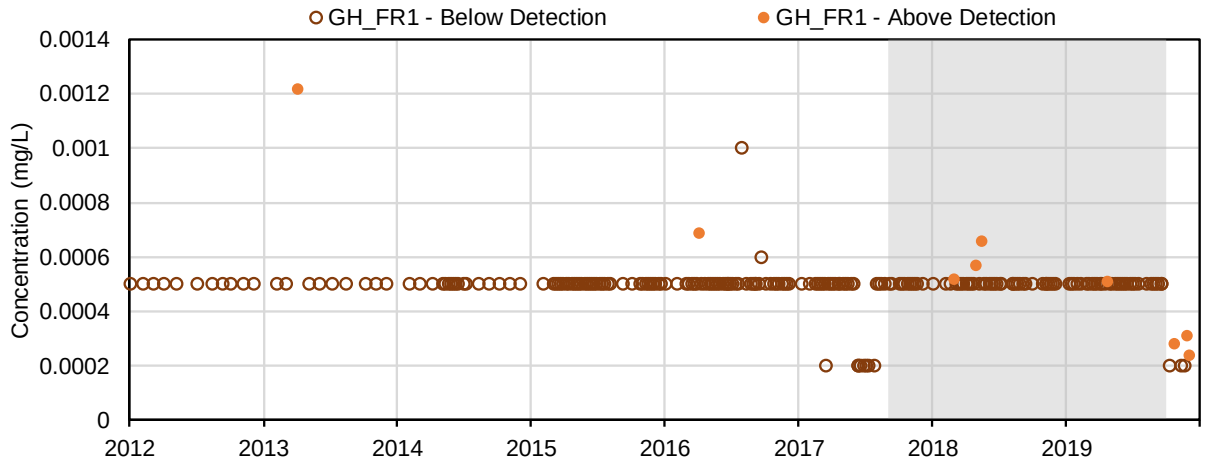
(98) Chromium (mg/L); Dissolved Metals



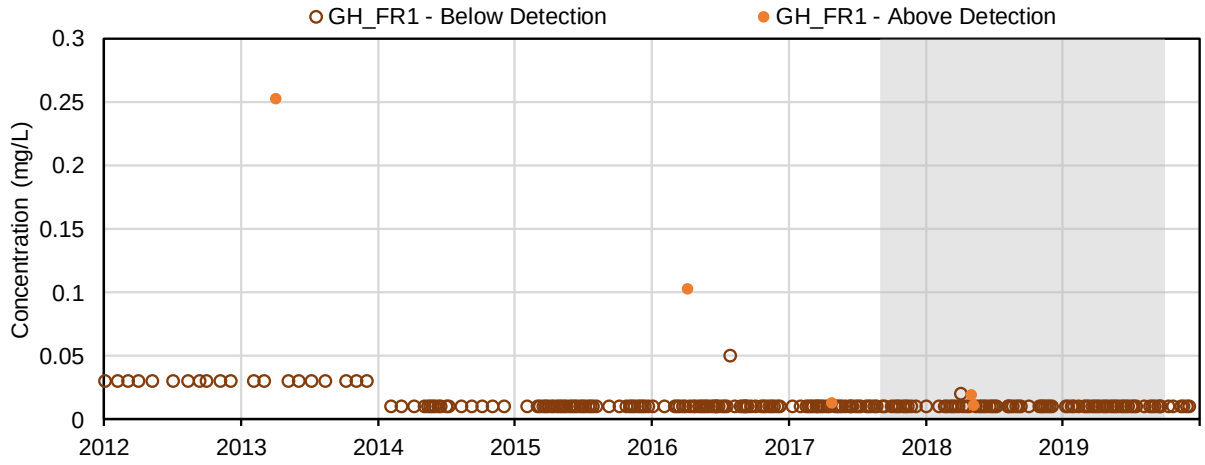
(99) Cobalt (mg/L); Dissolved Metals



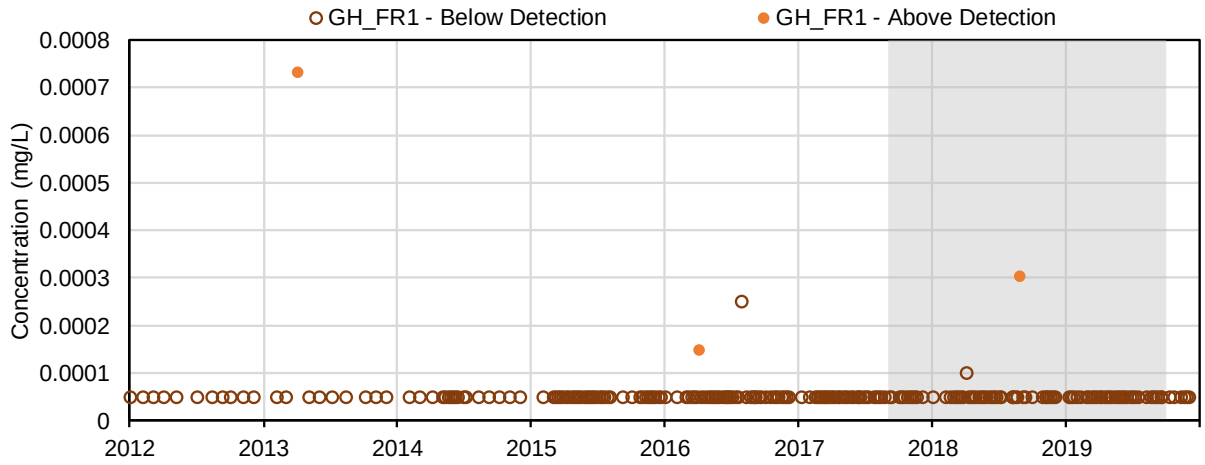
(100) Copper (mg/L); Dissolved Metals



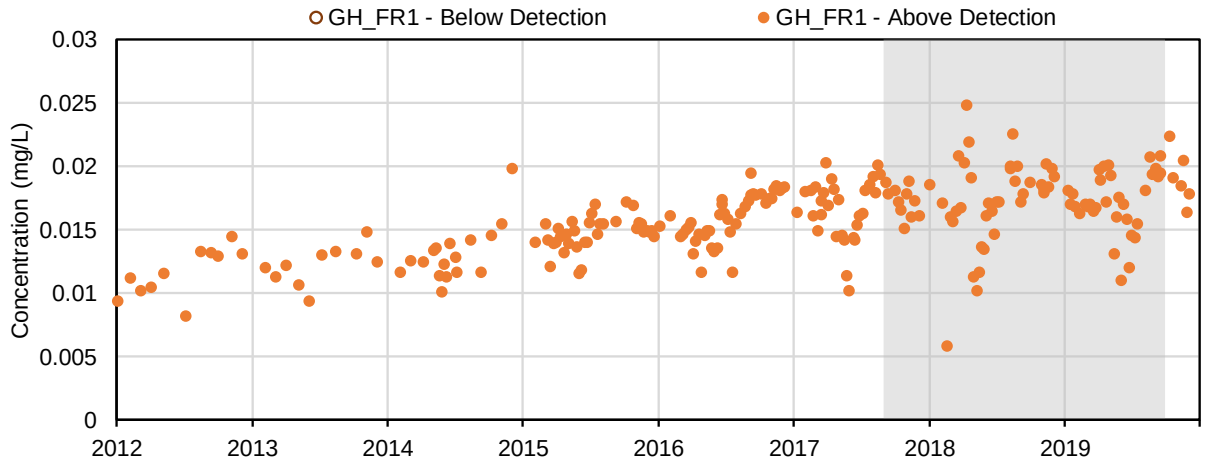
(101) Iron (mg/L); Dissolved Metals



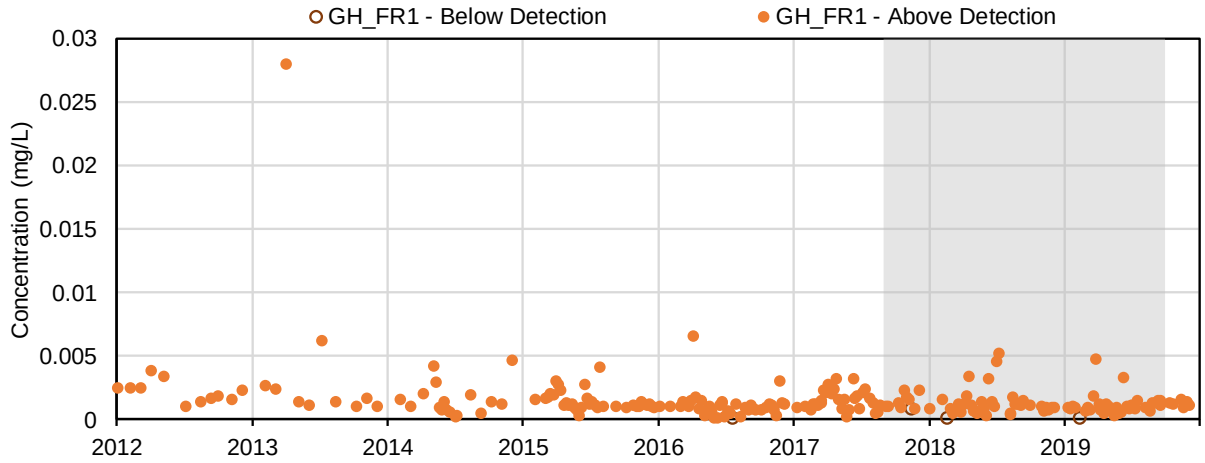
(102) Lead (mg/L); Dissolved Metals



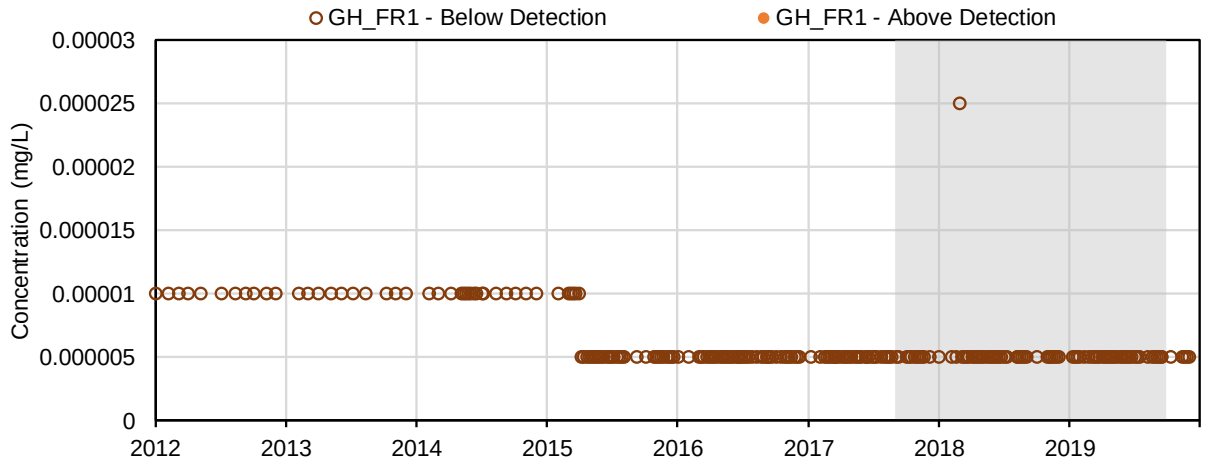
(103) Lithium (mg/L); Dissolved Metals



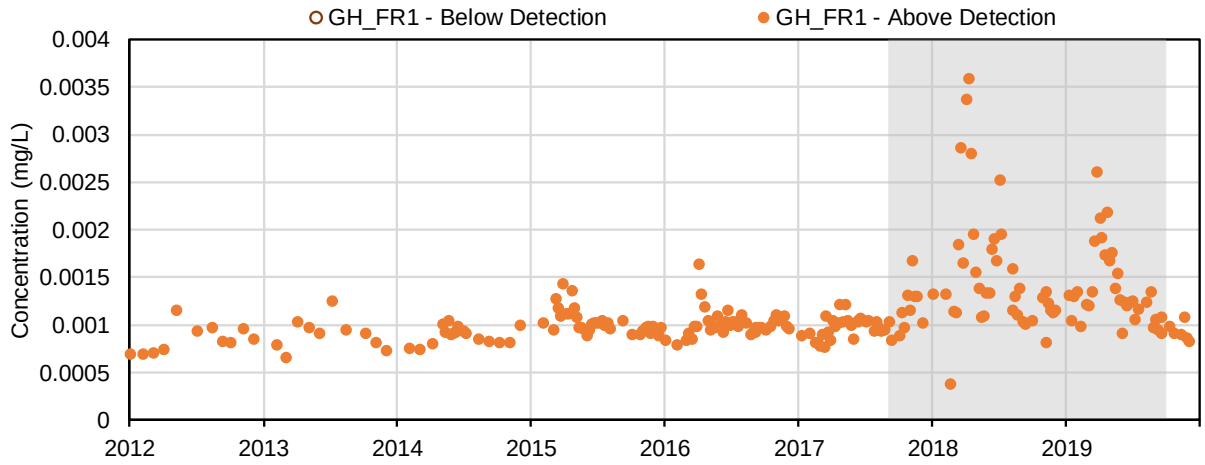
(104) Manganese (mg/L); Dissolved Metals



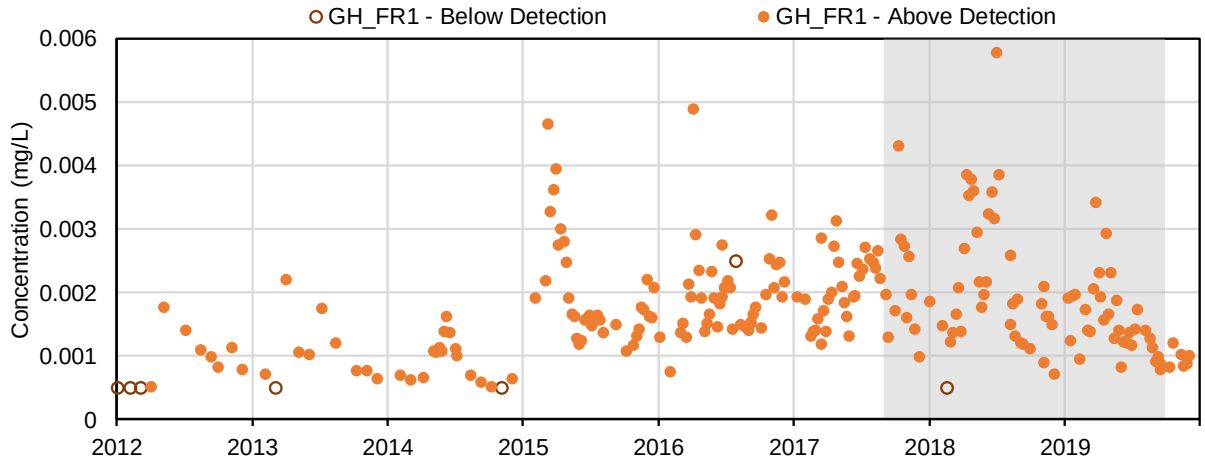
(105) Mercury (mg/L); Dissolved Metals



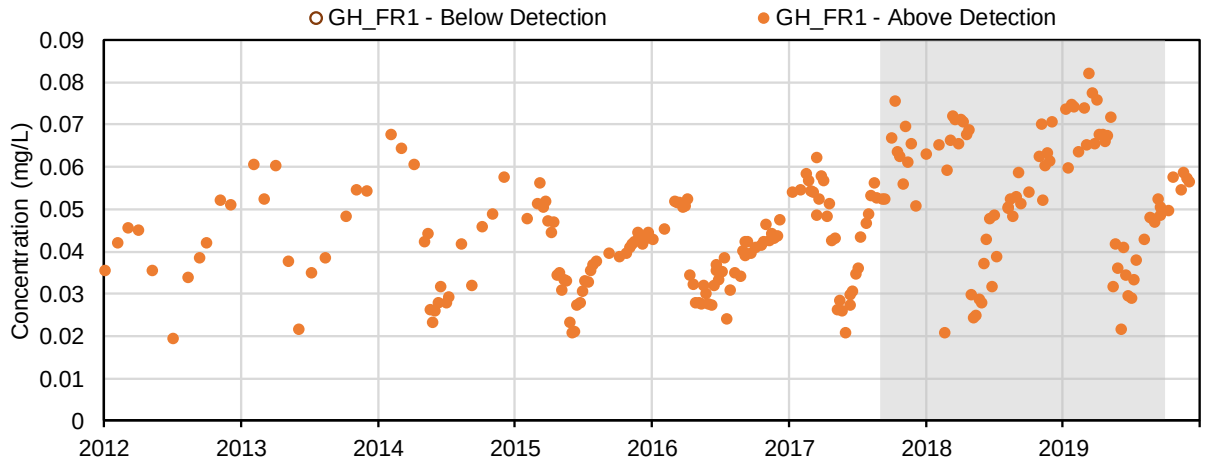
(106) Molybdenum (mg/L); Dissolved Metals



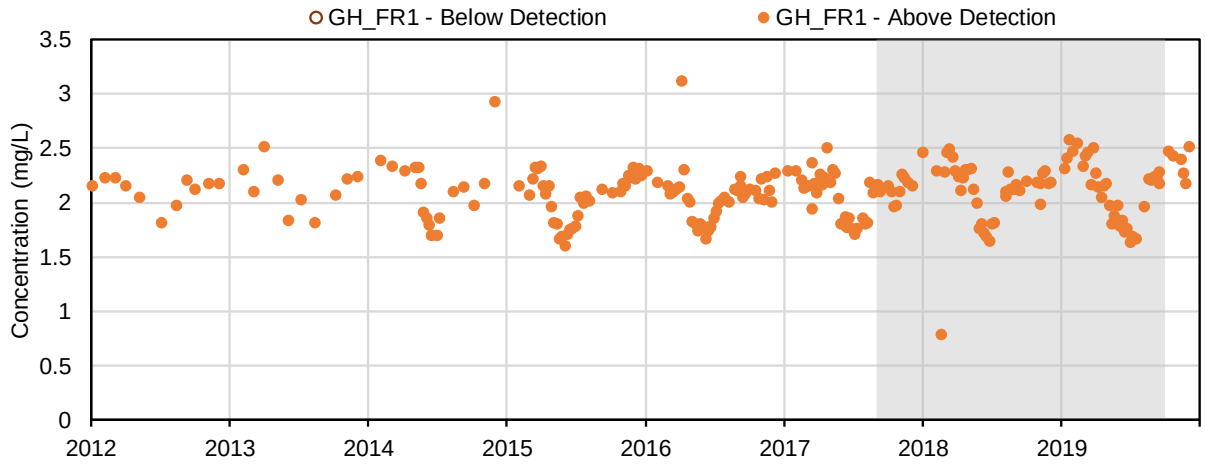
(107) Nickel (mg/L); Dissolved Metals



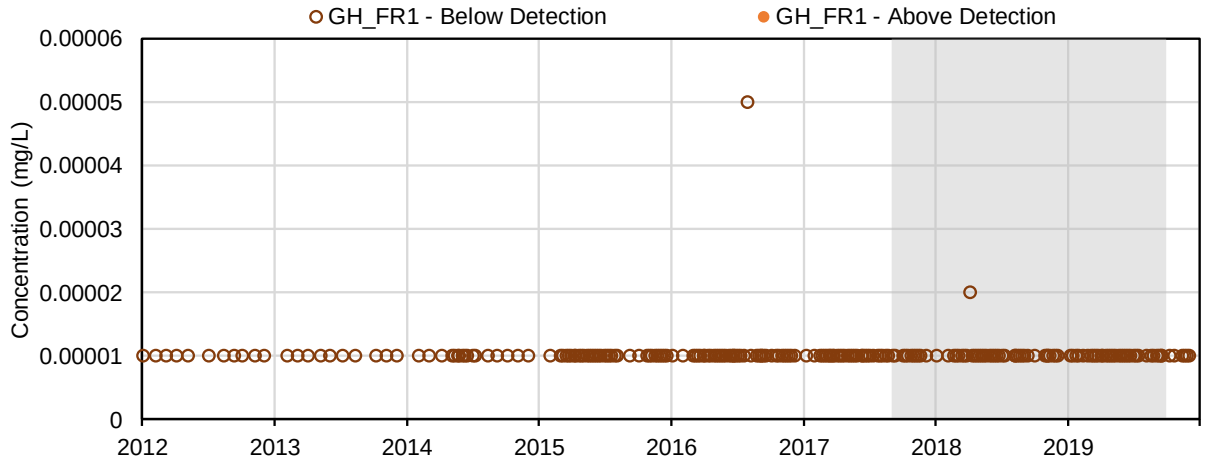
(108) Selenium (mg/L); Dissolved Metals



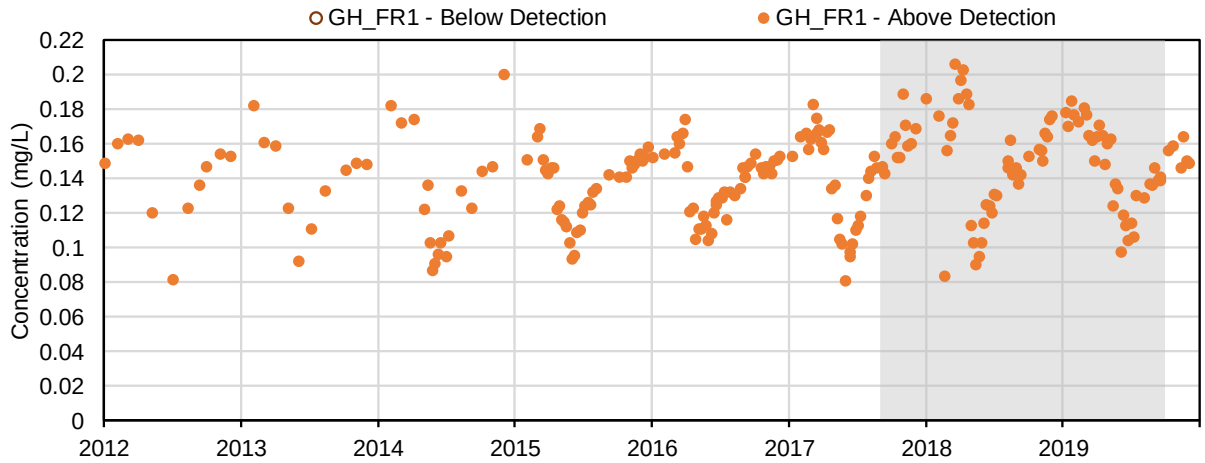
(109) Silicon (mg/L); Dissolved Metals



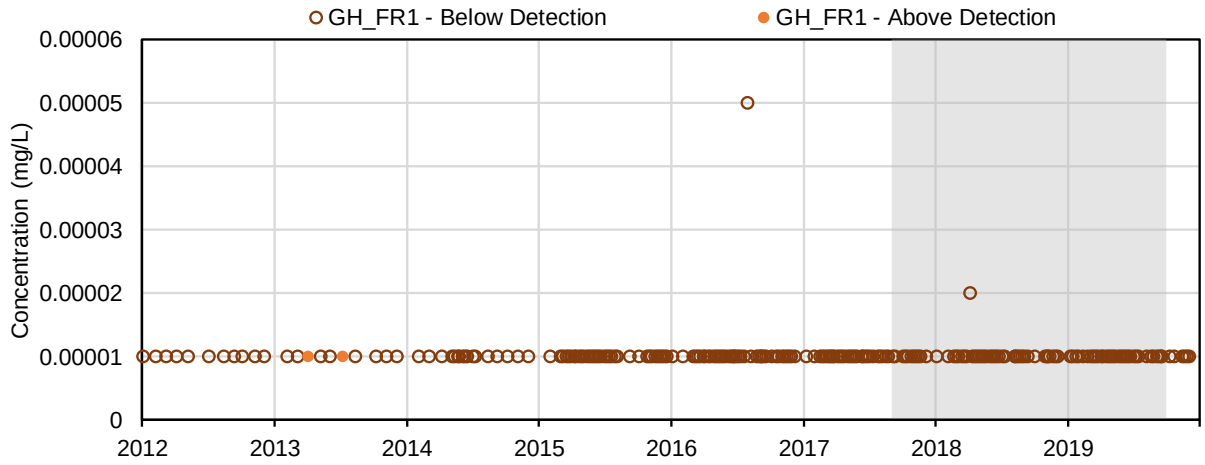
(110) Silver (mg/L); Dissolved Metals



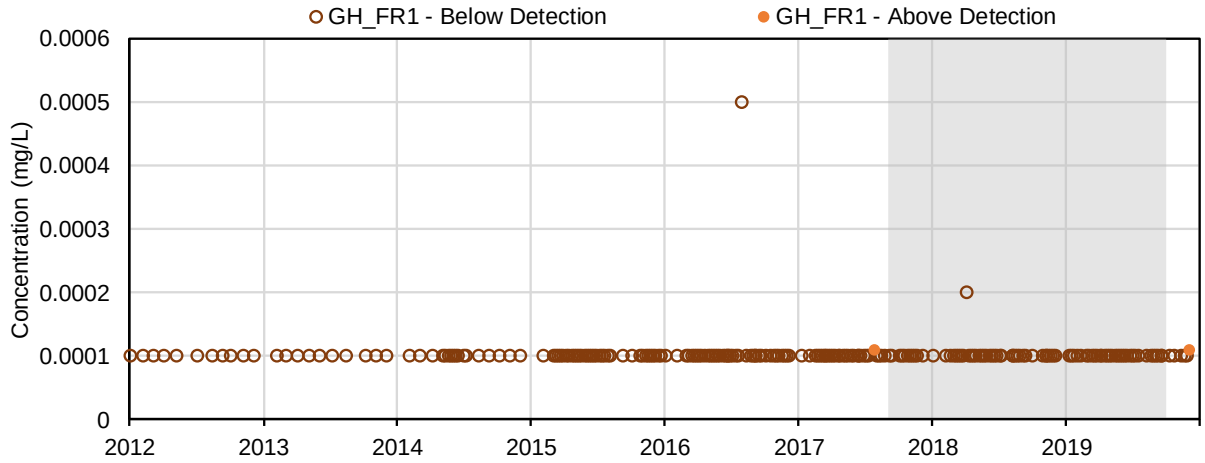
(111) Strontium (mg/L); Dissolved Metals



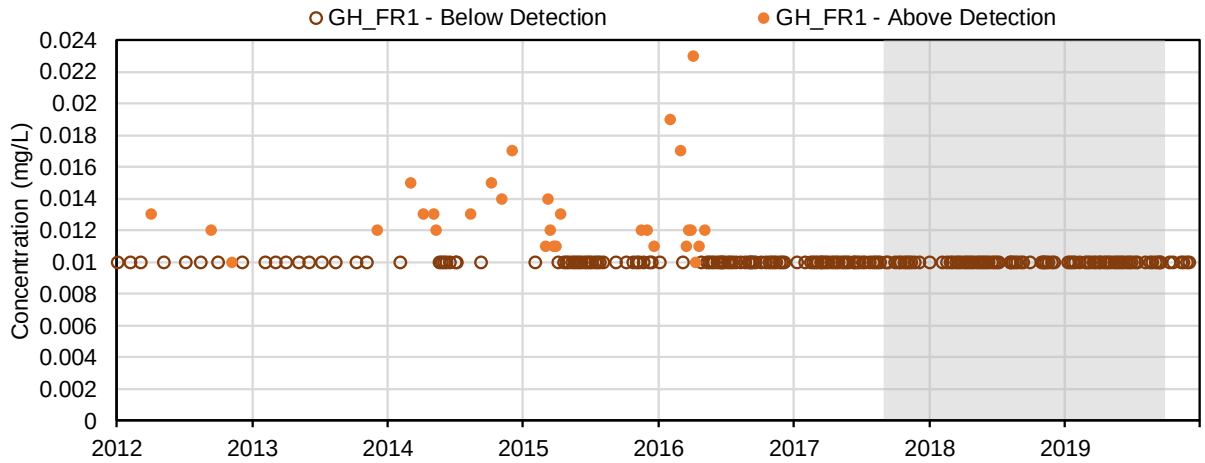
(112) Thallium (mg/L); Dissolved Metals



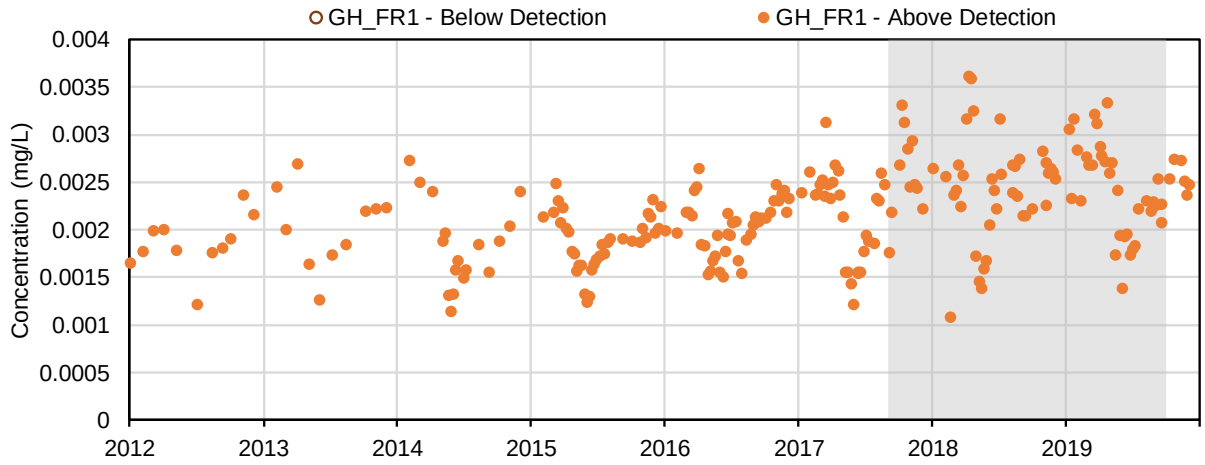
(113) Tin (mg/L); Dissolved Metals



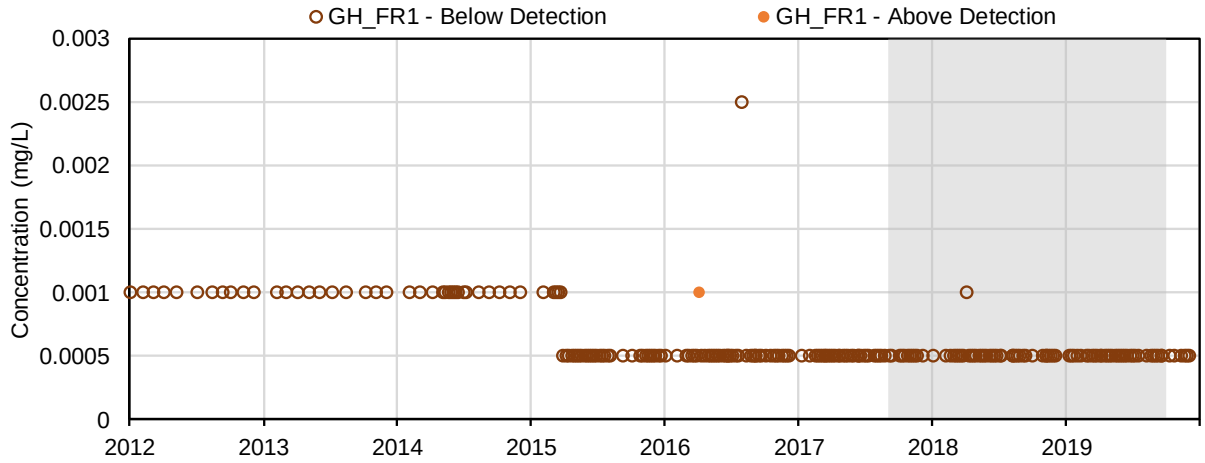
(114) Titanium (mg/L); Dissolved Metals



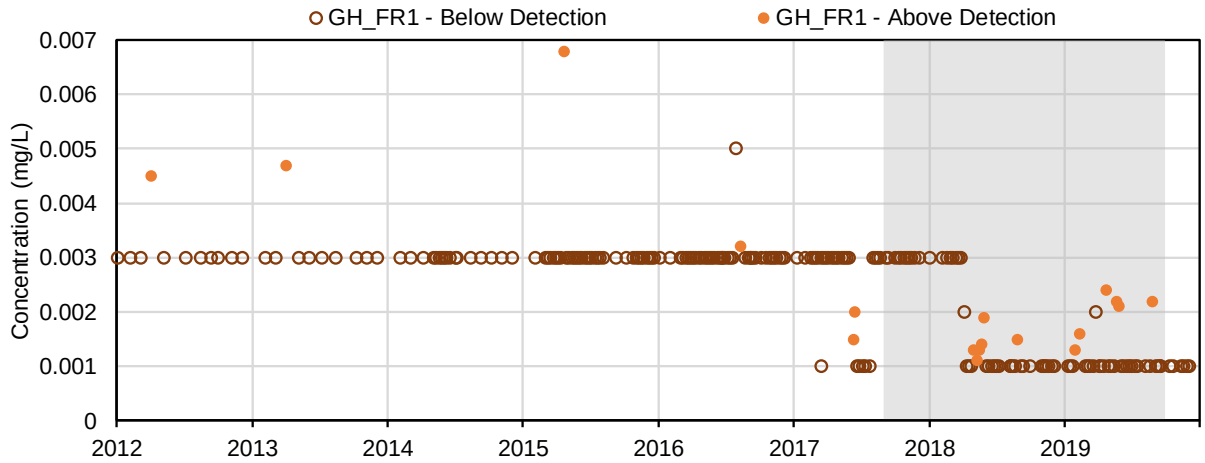
(115) Uranium (mg/L); Dissolved Metals



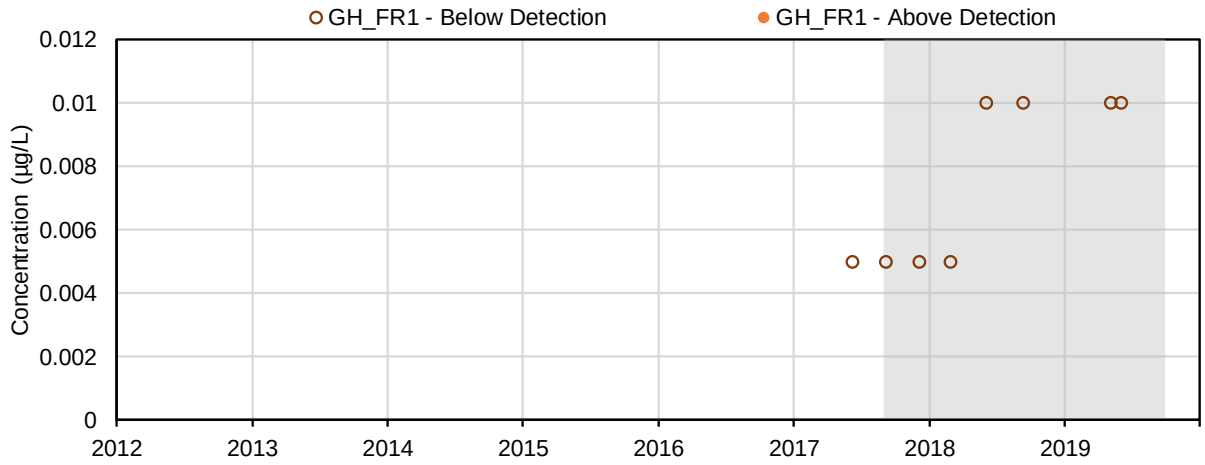
(116) Vanadium (mg/L); Dissolved Metals



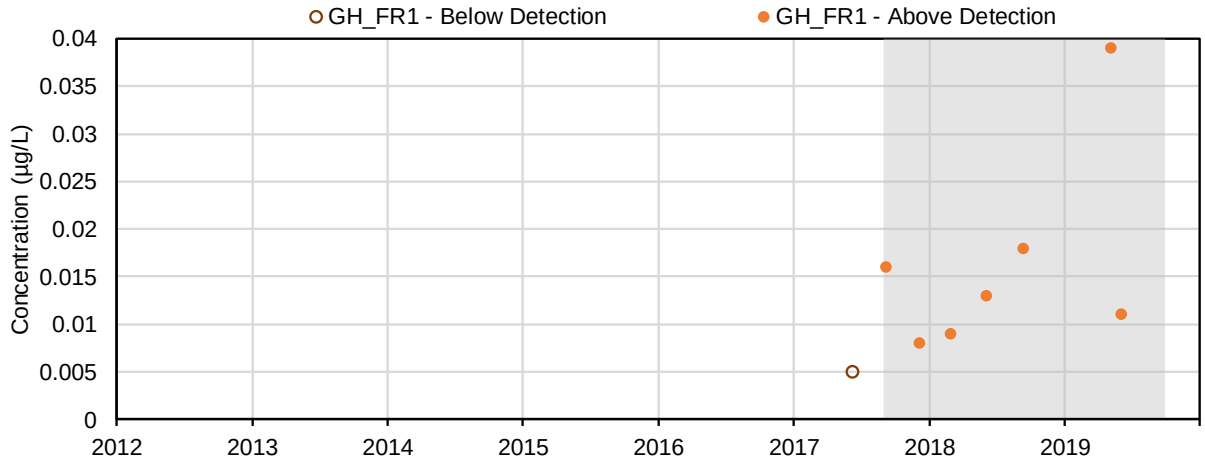
(117) Zinc (mg/L); Dissolved Metals



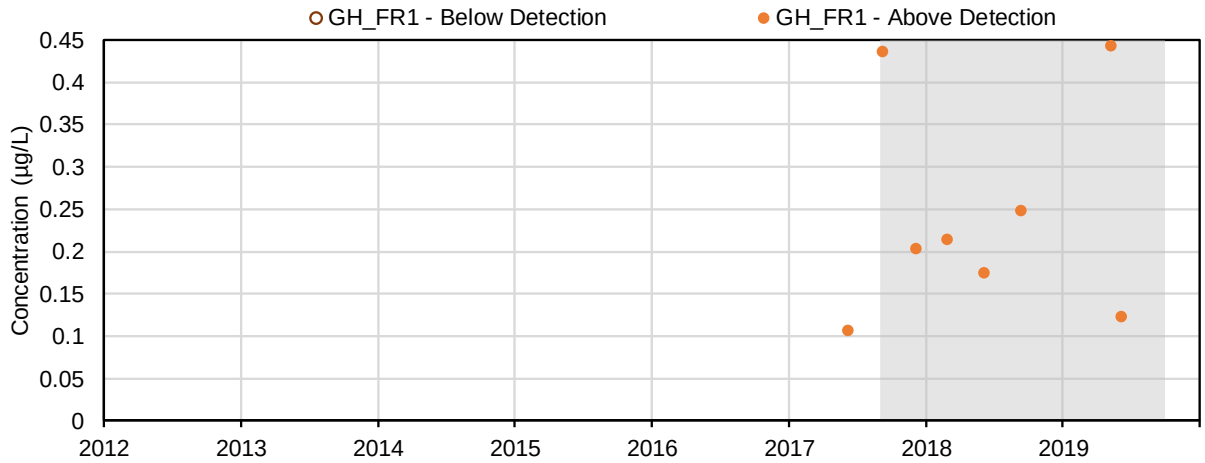
(118) Dissolved Dimethylseleneoxide (µg/L); Speciation of Selenium



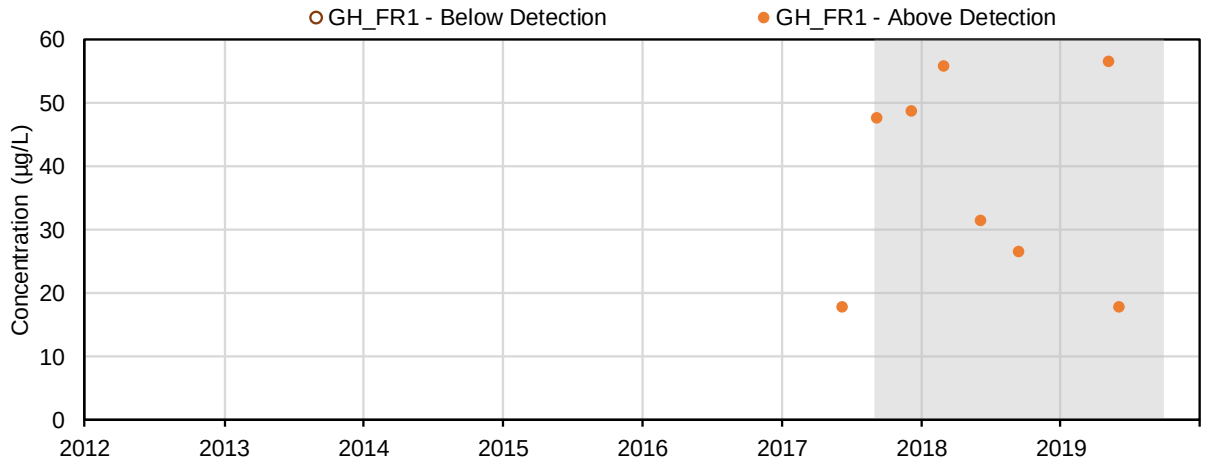
(119) Dissolved Methylseleninic Acid (µg/L); Speciation of Selenium



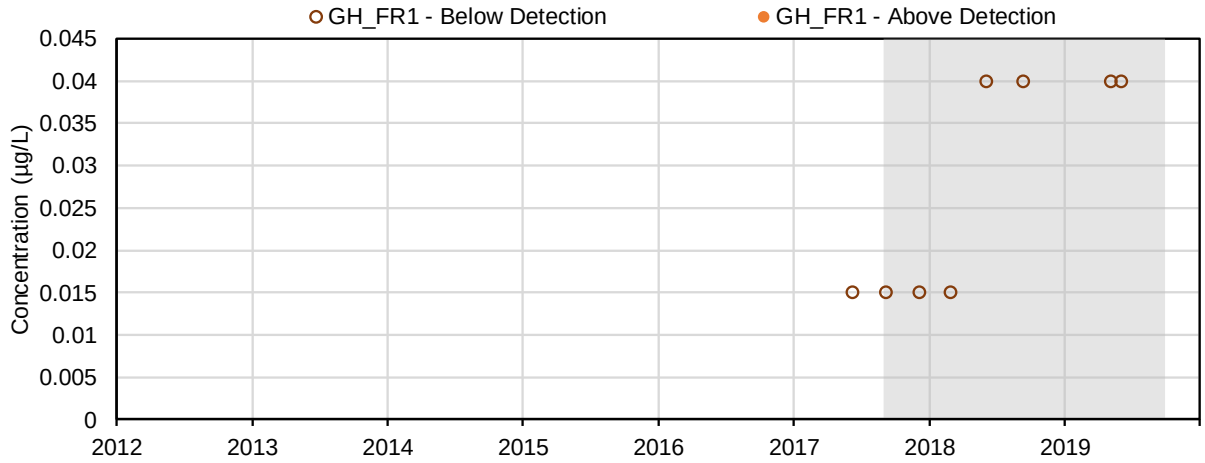
(120) Dissolved Selenite (µg/L); Speciation of Selenium



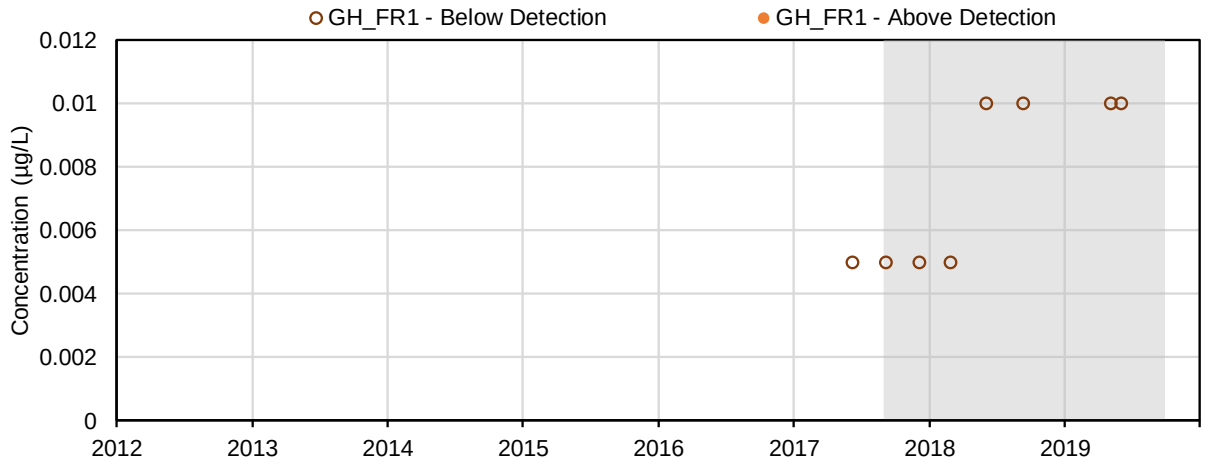
(121) Dissolved Selenate (µg/L); Speciation of Selenium



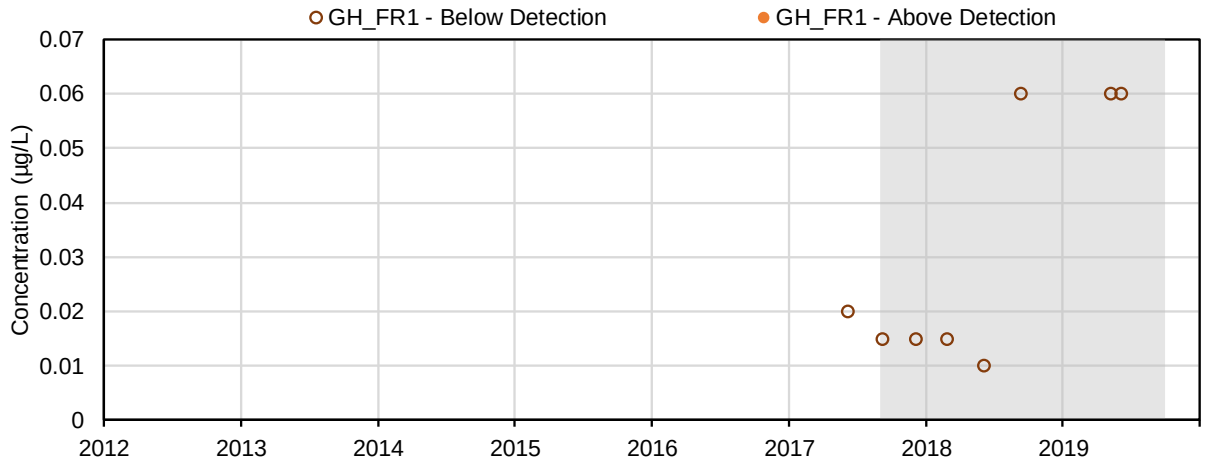
(122) Dissolved Selenocyanate (µg/L); Speciation of Selenium



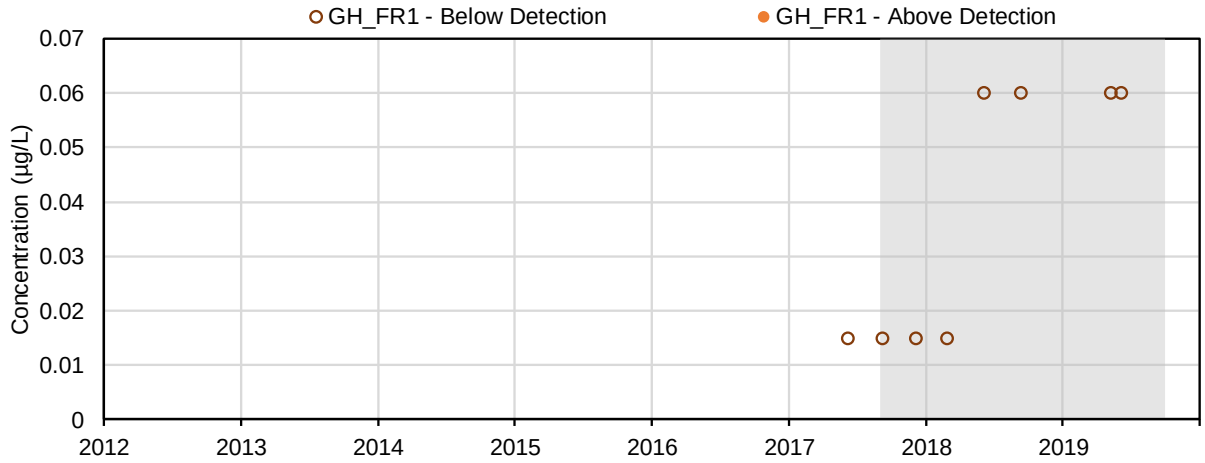
(123) Dissolved Selenomethionine (µg/L); Speciation of Selenium



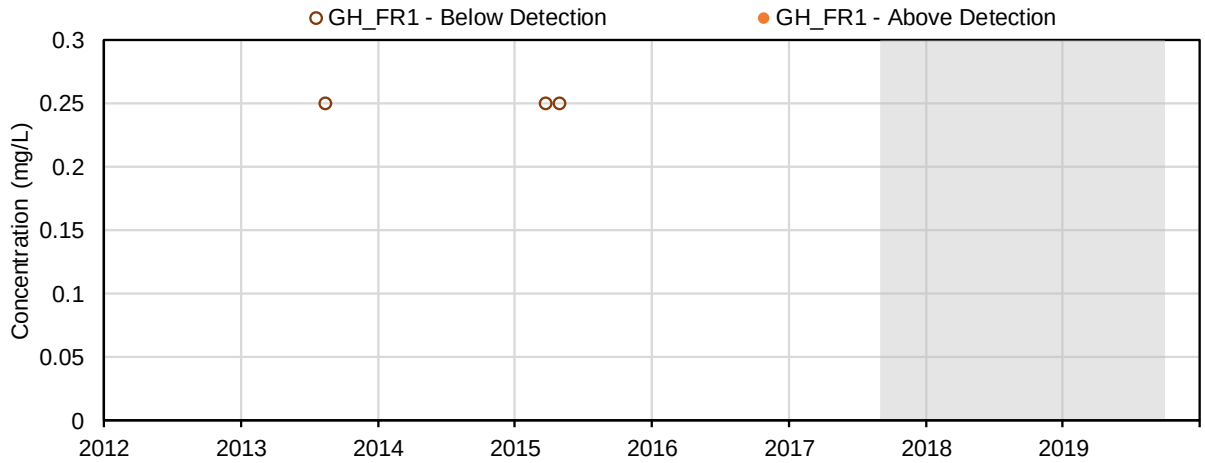
(124) Dissolved Selenosulphate (µg/L); Speciation of Selenium



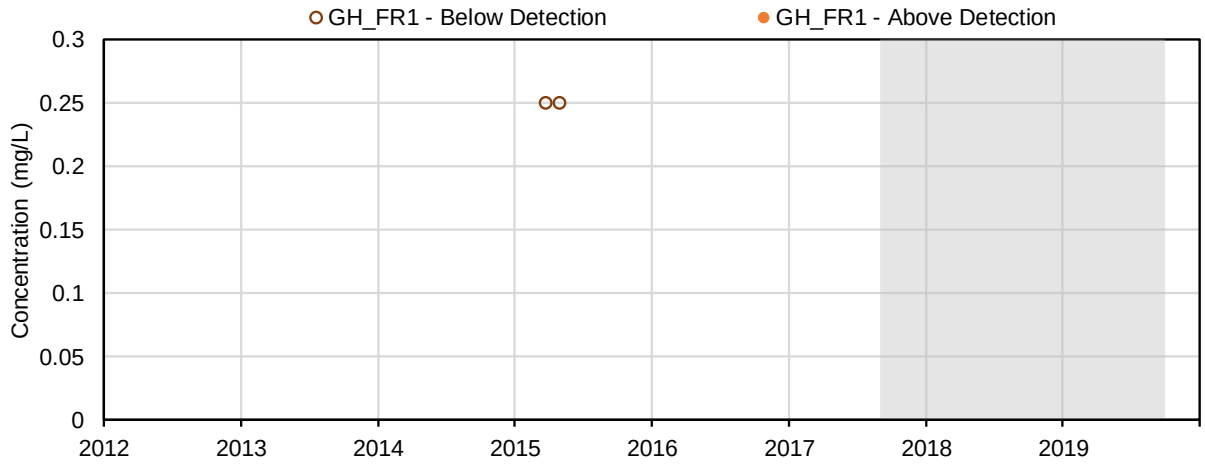
(125) Unknown Dissolved Selenium Species (µg/L); Speciation of Selenium



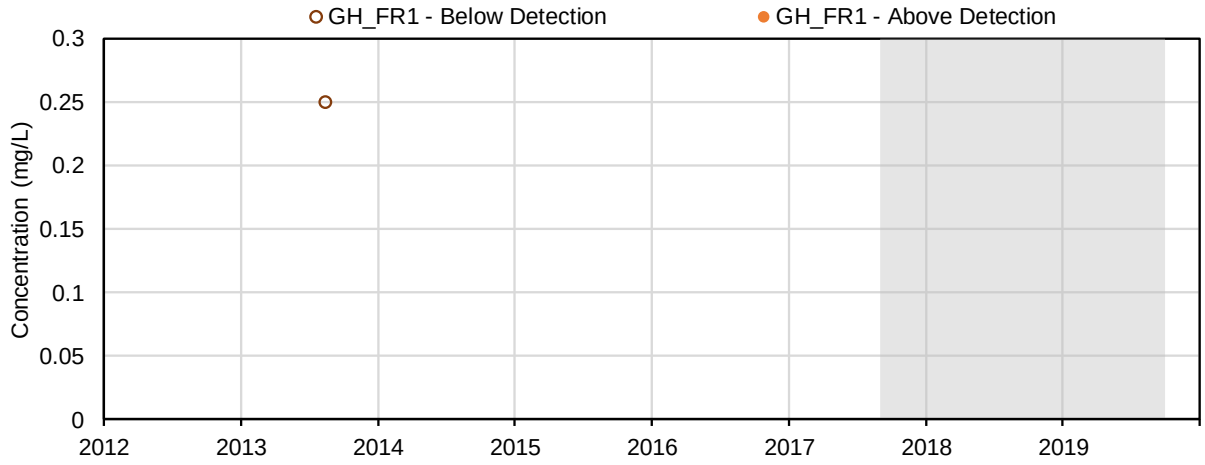
(126) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



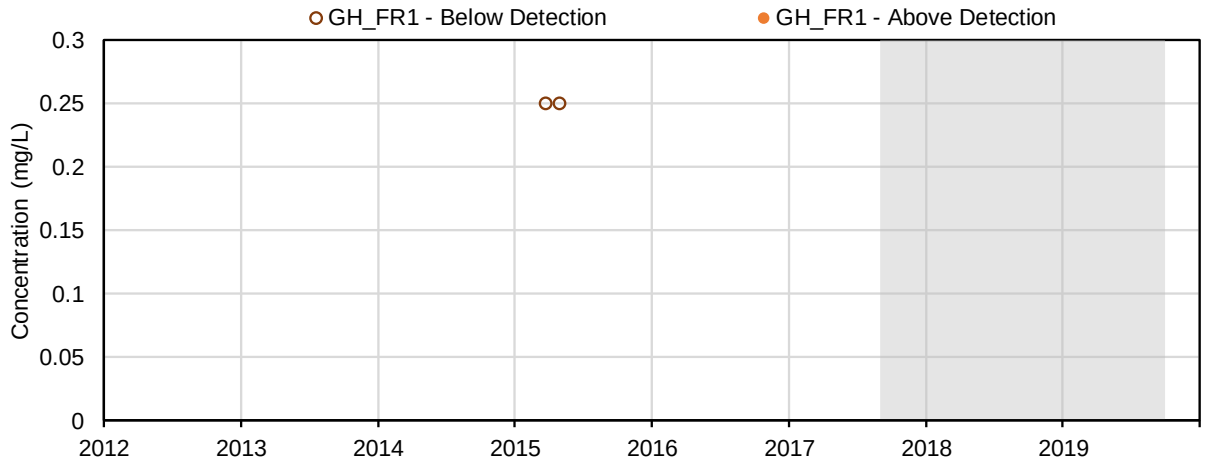
(127) Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



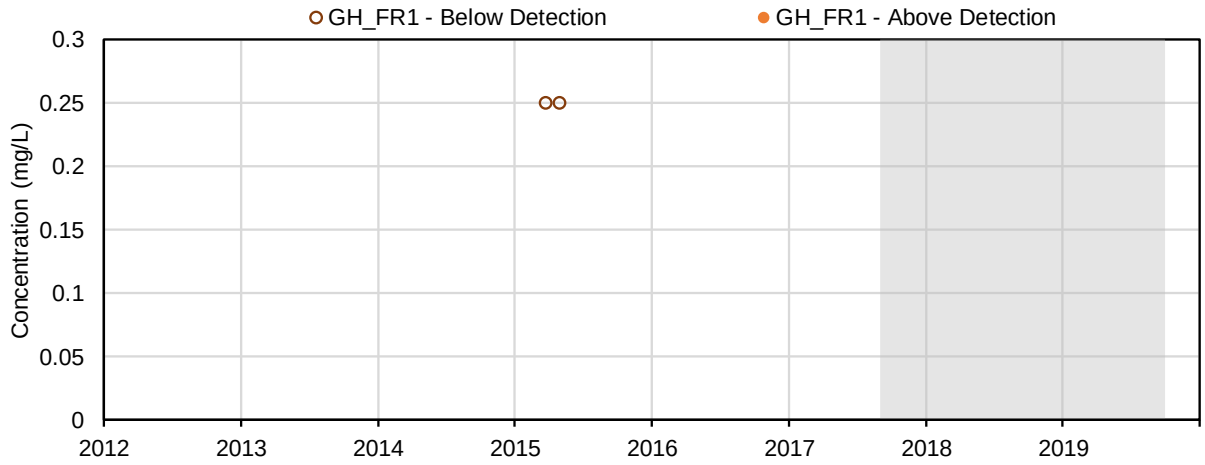
(128) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



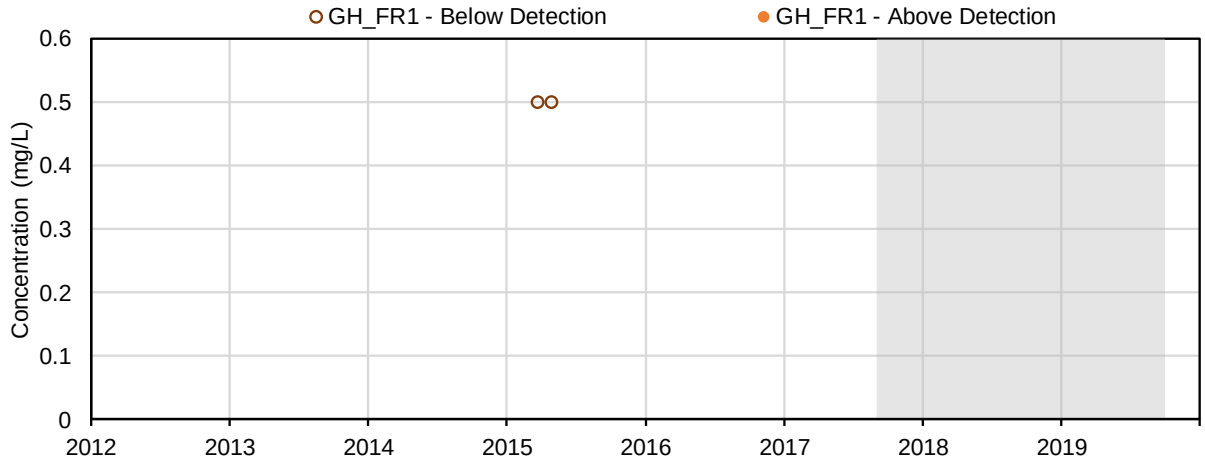
(129) Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L); Volatile Organics



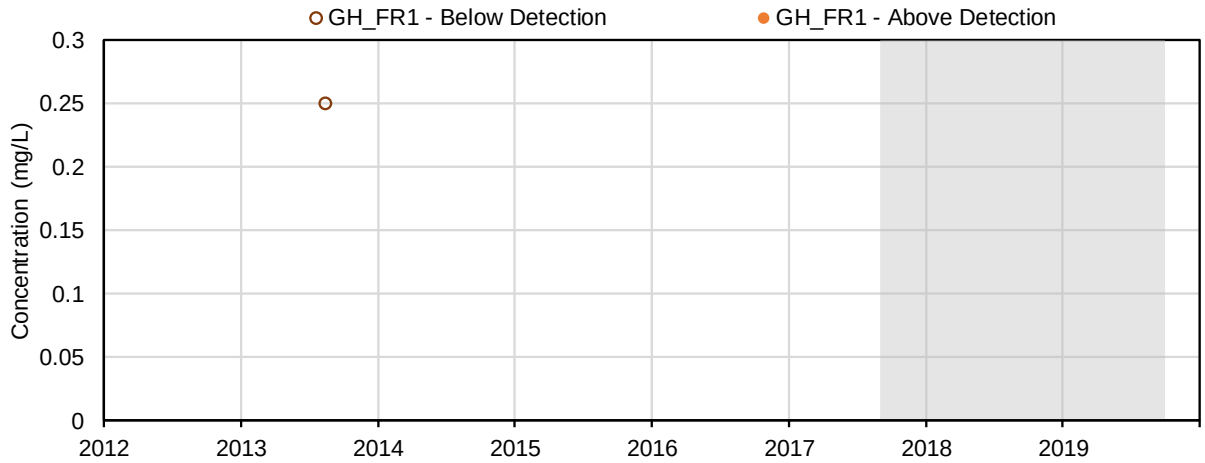
(130) Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L); Volatile Organics



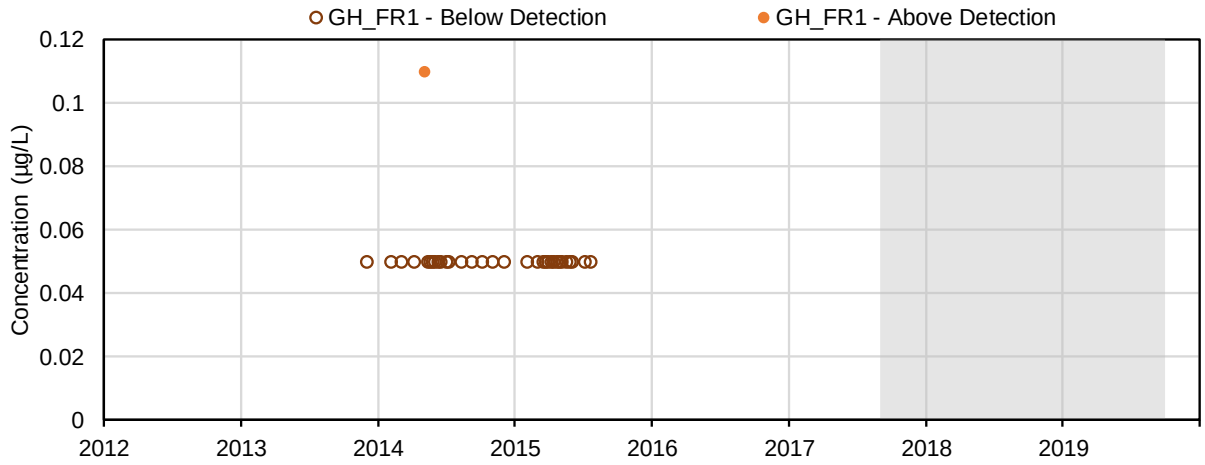
(131) Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L); Volatile Organics



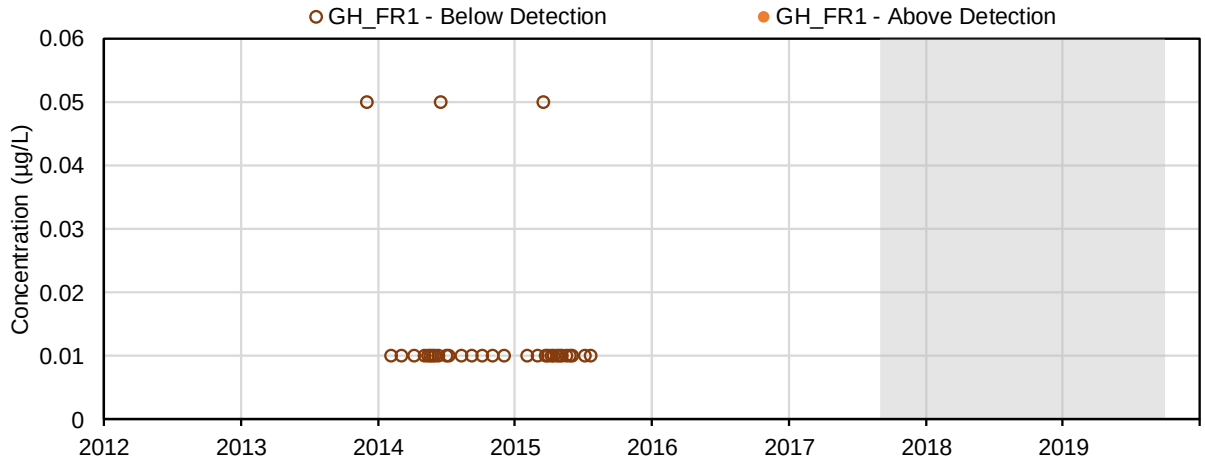
(132) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics



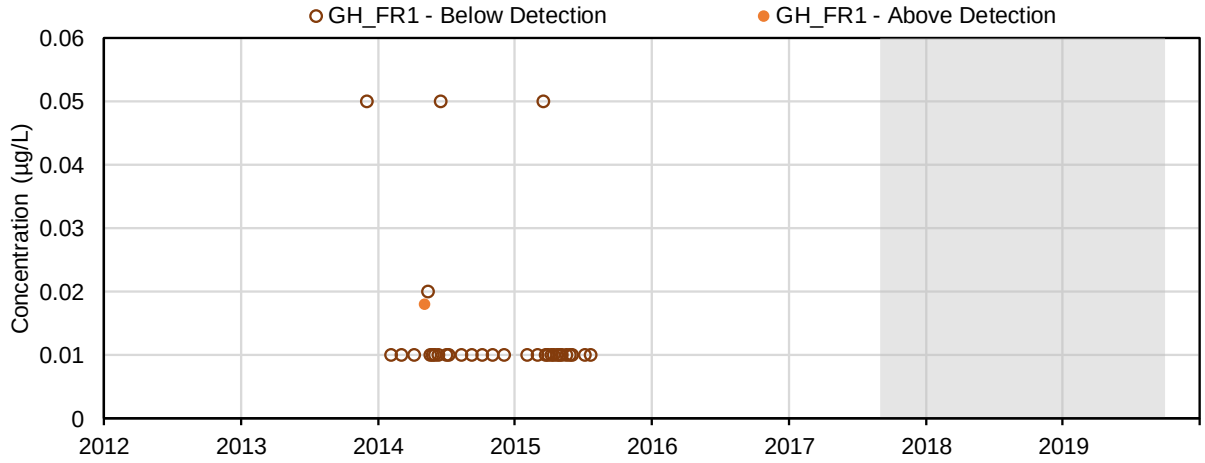
(133) Naphthalene (µg/L); Parent PAHs



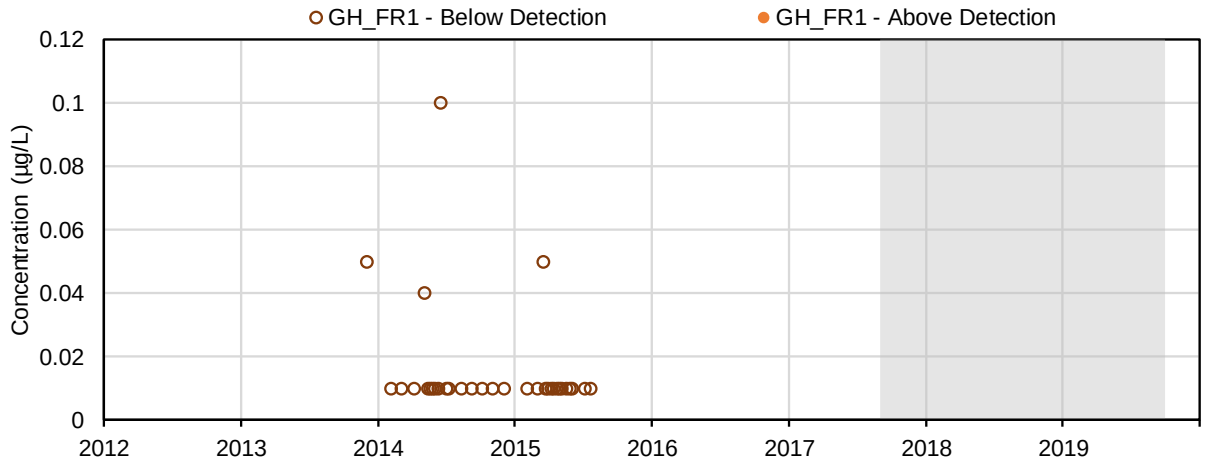
(134) Acenaphthylene (µg/L); Parent PAHs



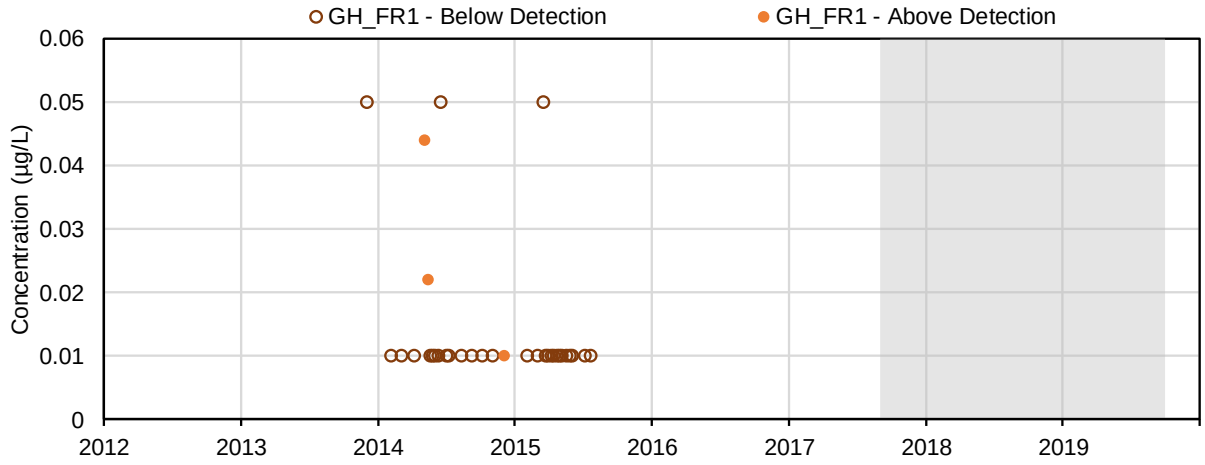
(135) Acenaphthene (µg/L); Parent PAHs



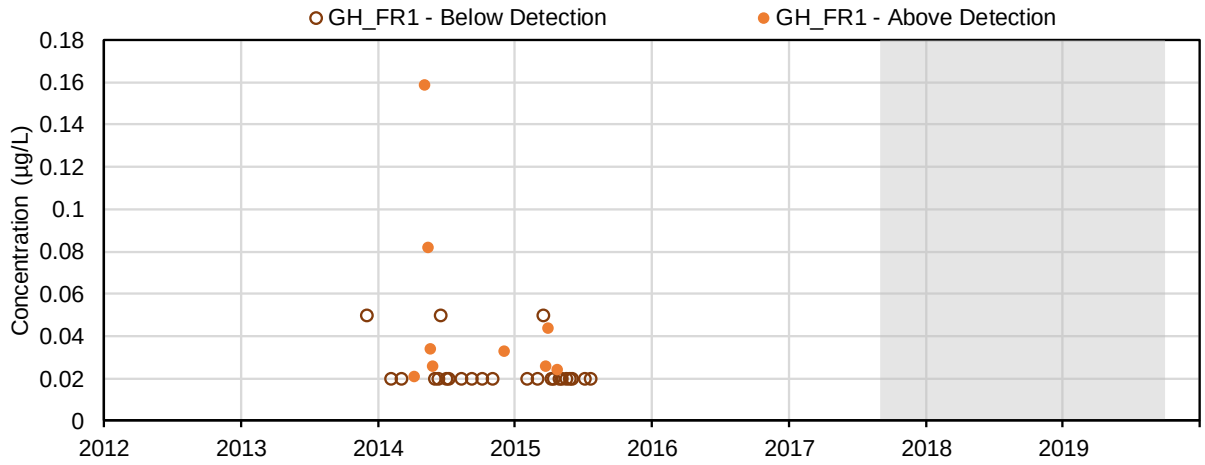
(136) Acridine (µg/L); Parent PAHs



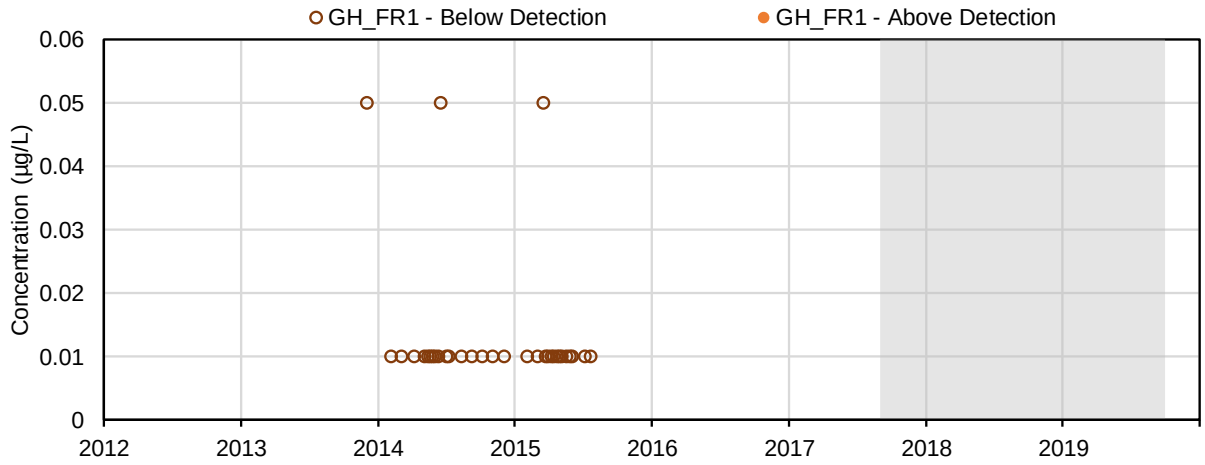
(137) Fluorene (µg/L); Parent PAHs



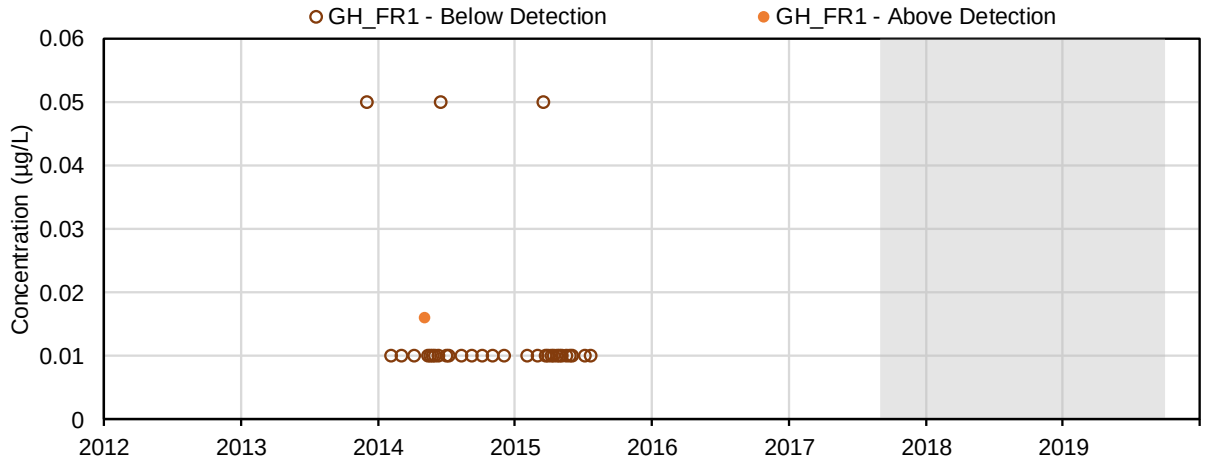
(138) Phenanthrene (µg/L); Parent PAHs



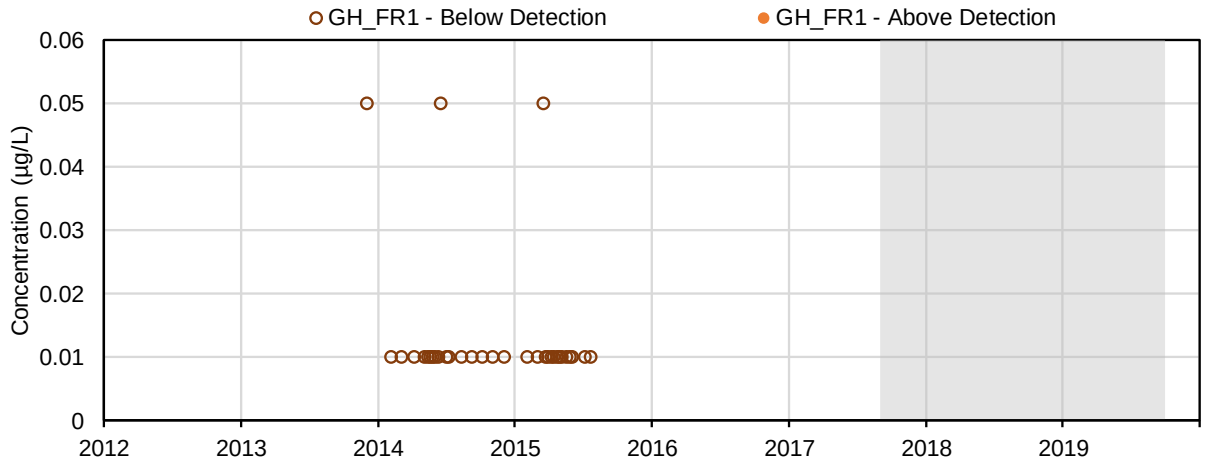
(1439) Anthracene (µg/L); Parent PAHs



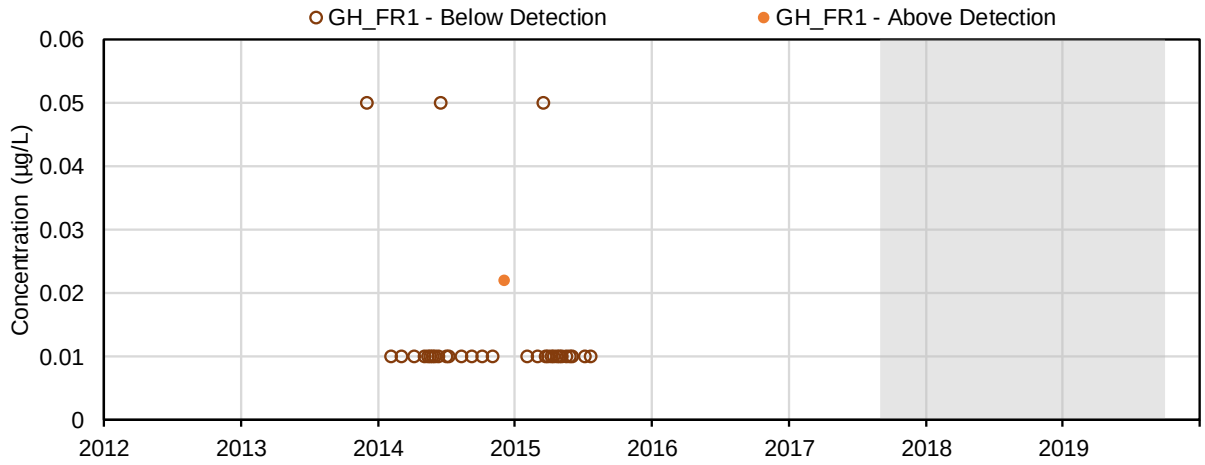
(140) Pyrene (µg/L); Parent PAHs



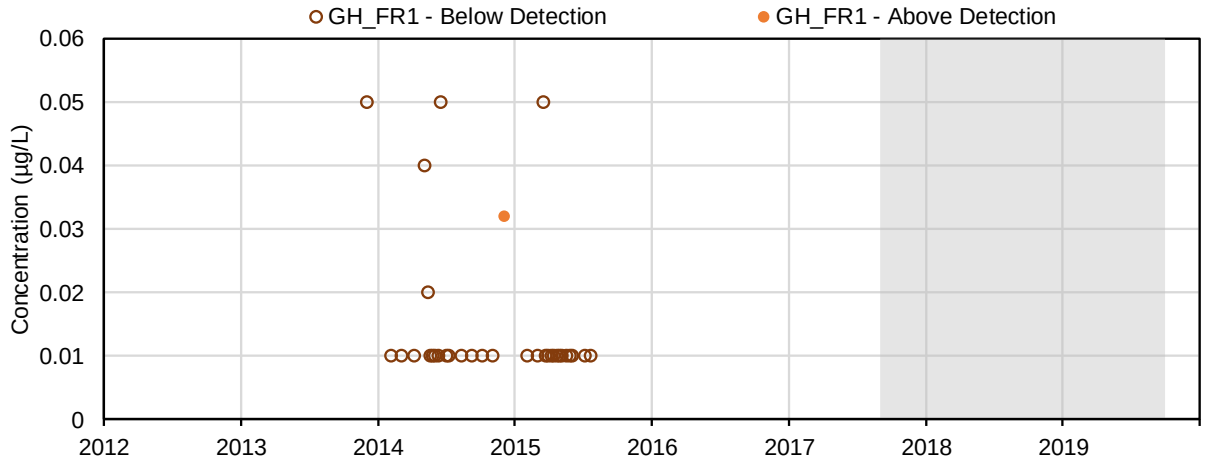
(141) Fluoranthene (µg/L); Parent PAHs



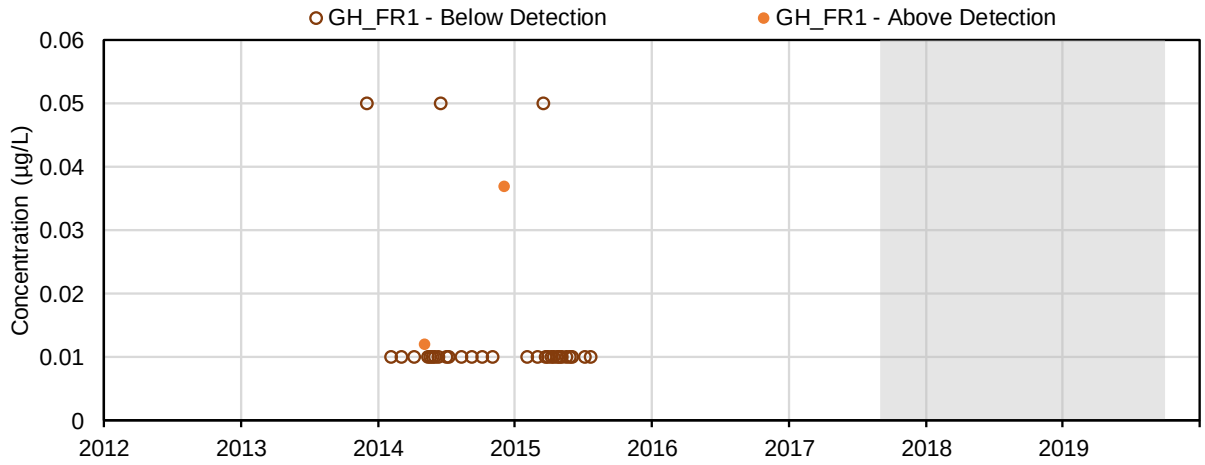
(142) Benzo(a)anthracene (µg/L); Parent PAHs



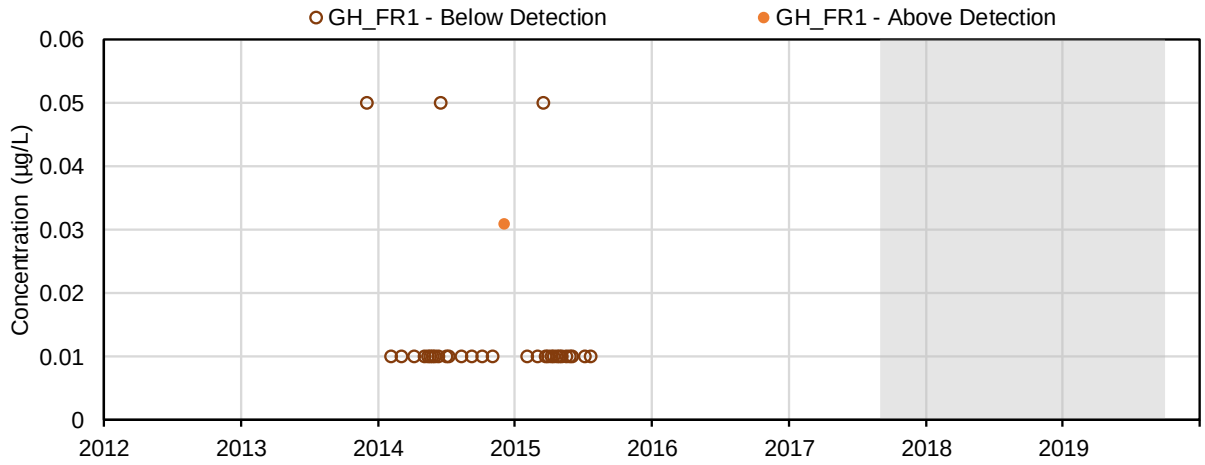
(143) Chrysene (µg/L); Parent PAHs



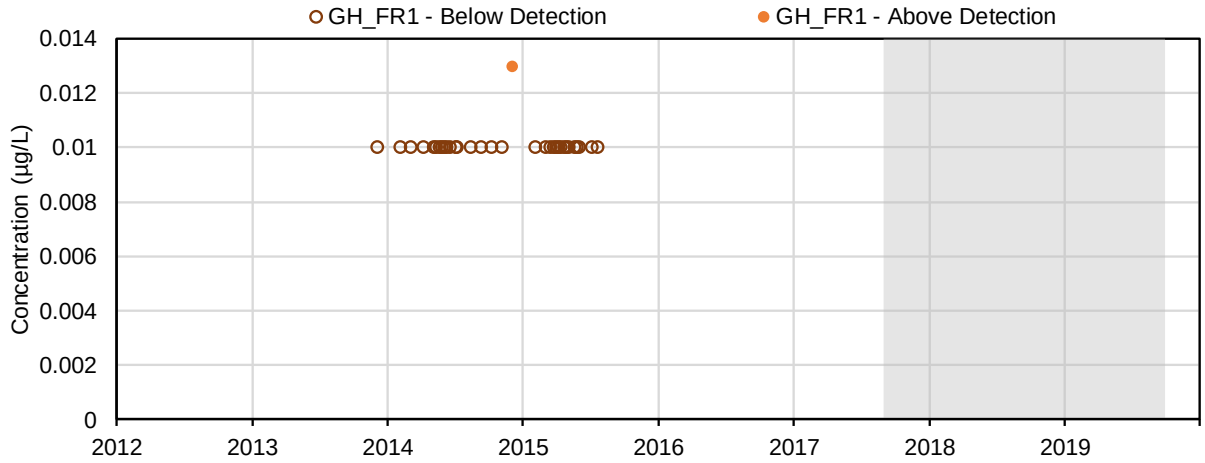
(144) Benzo(b)fluoranthene (µg/L); Parent PAHs



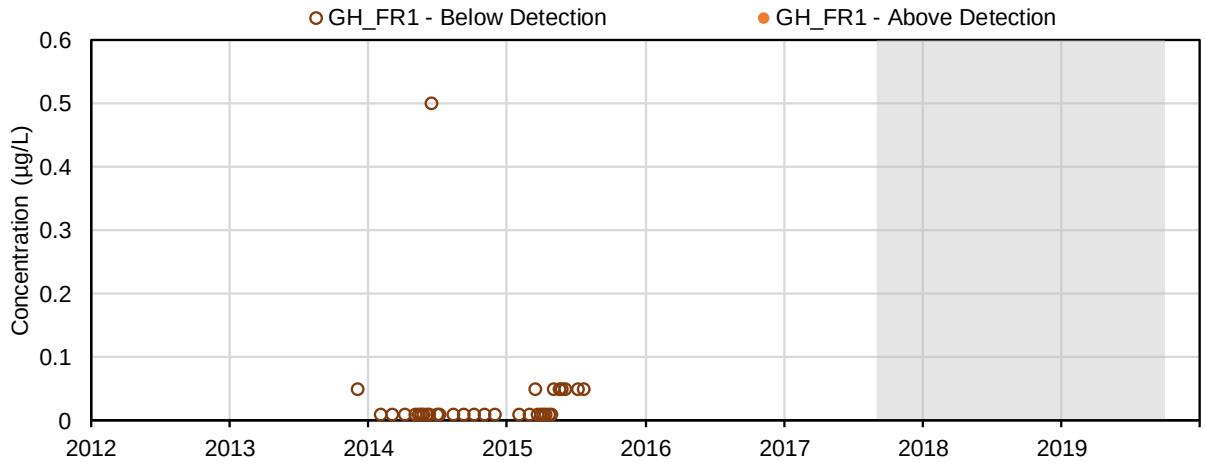
(145) Benzo(k)fluoranthene (µg/L); Parent PAHs



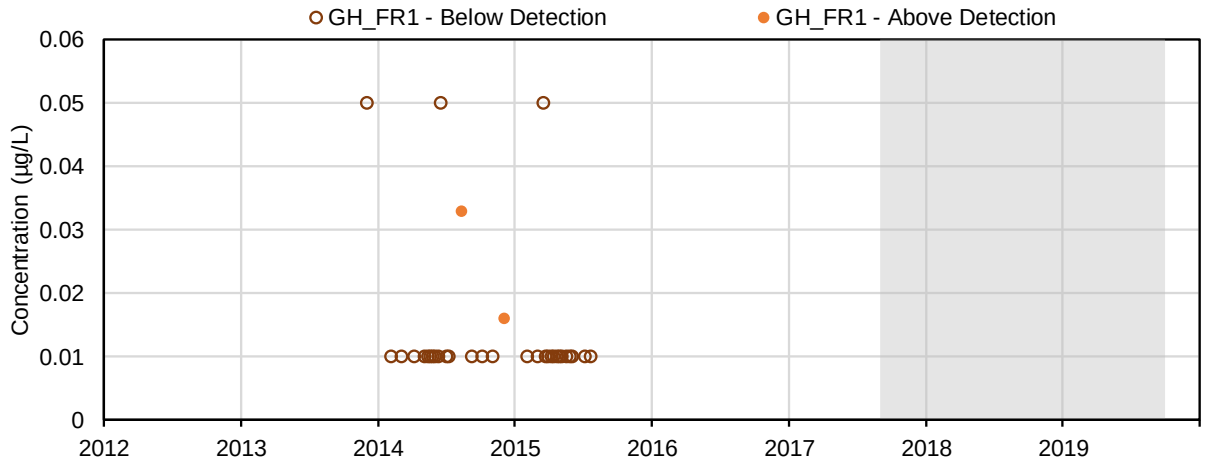
(146) Benzo(a)pyrene (µg/L); Parent PAHs



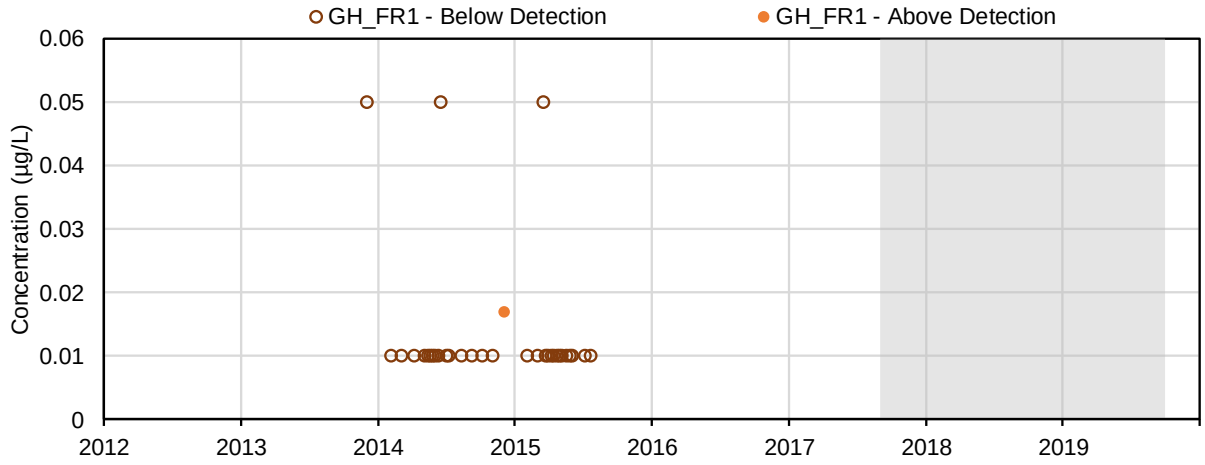
(147) Quinoline (µg/L); Parent PAHs



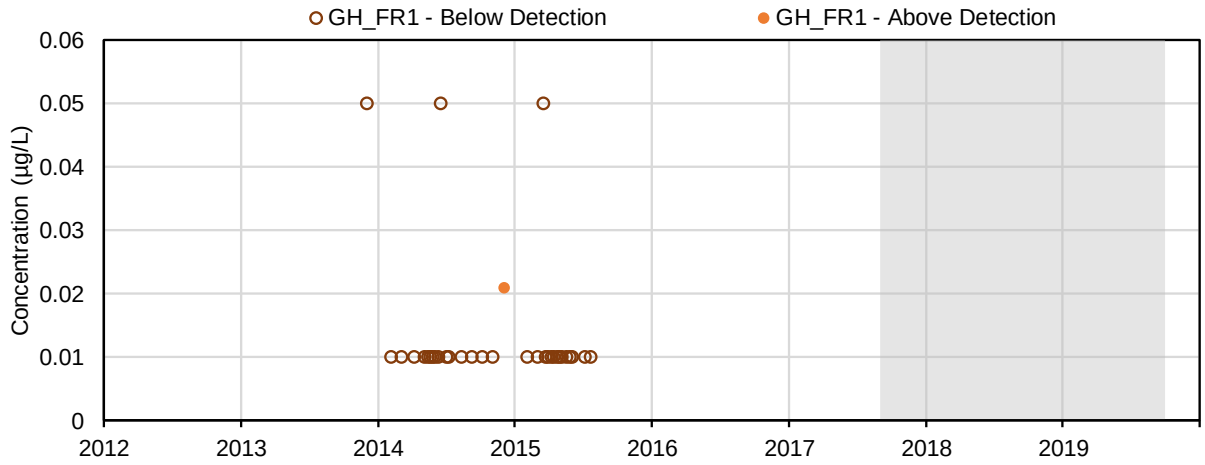
(148) Benzo(g,h,i)perylene (µg/L); Parent PAHs

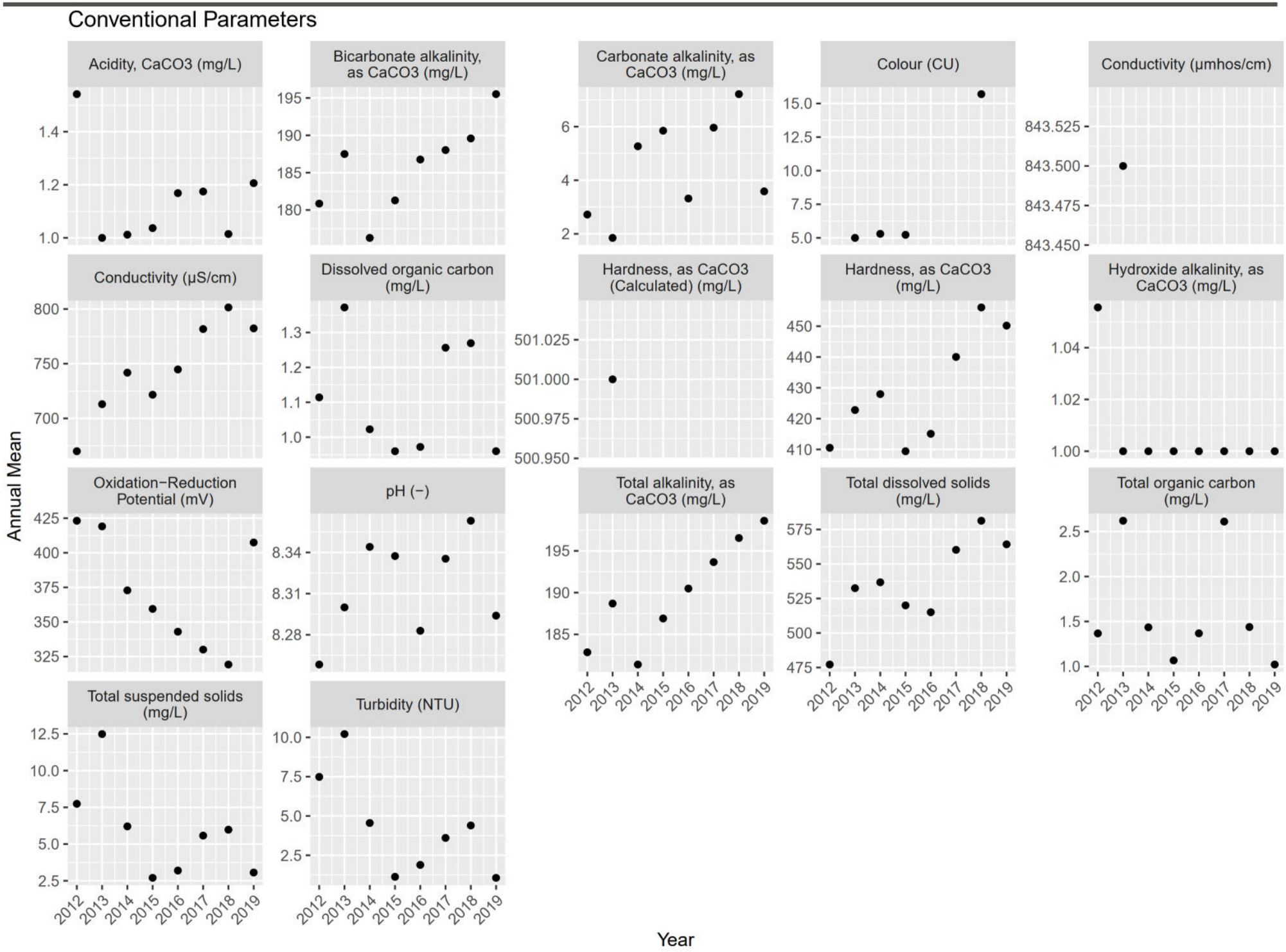


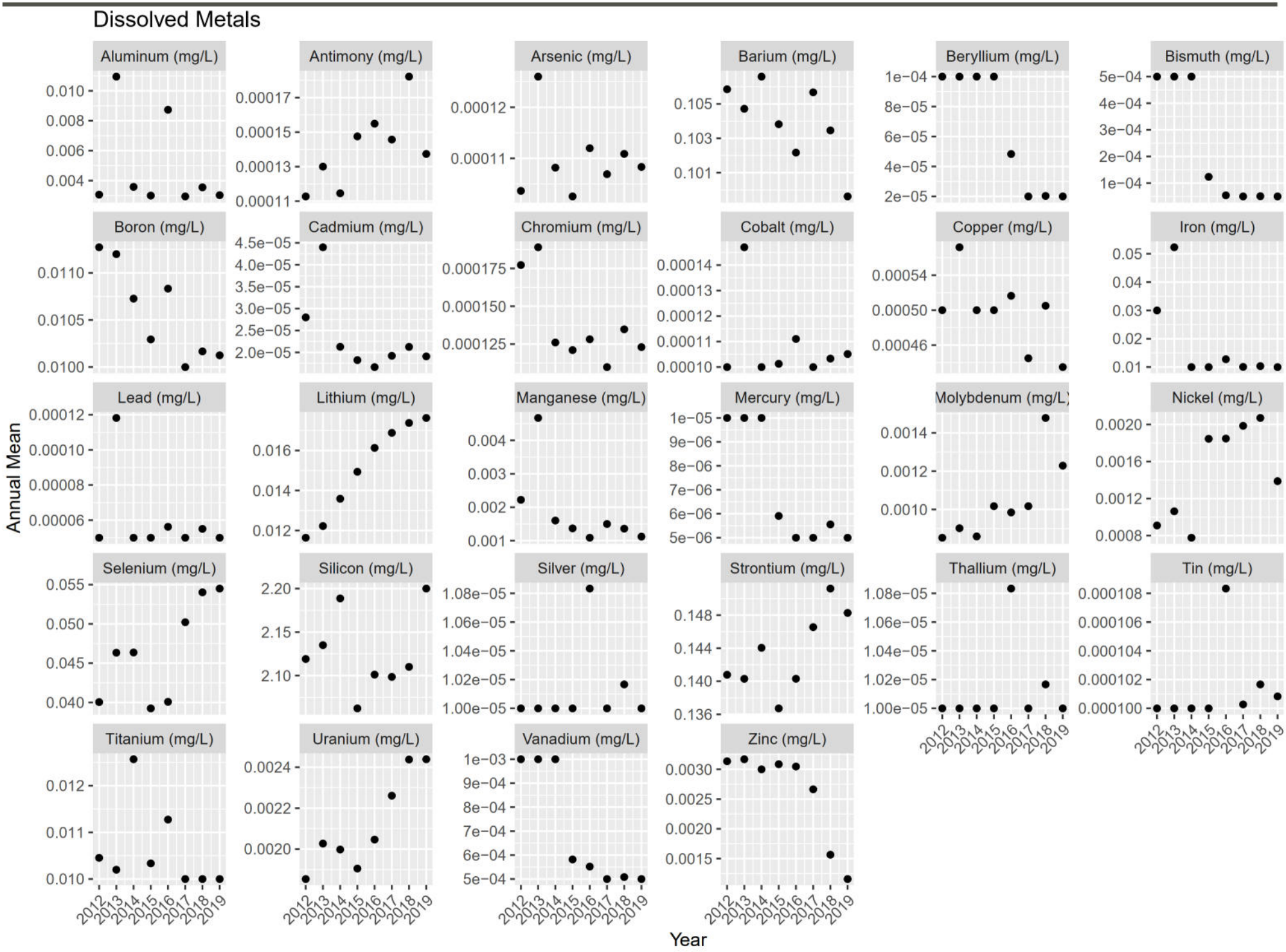
(149) Indeno(c,d-123)pyrene (µg/L); Parent PAHs

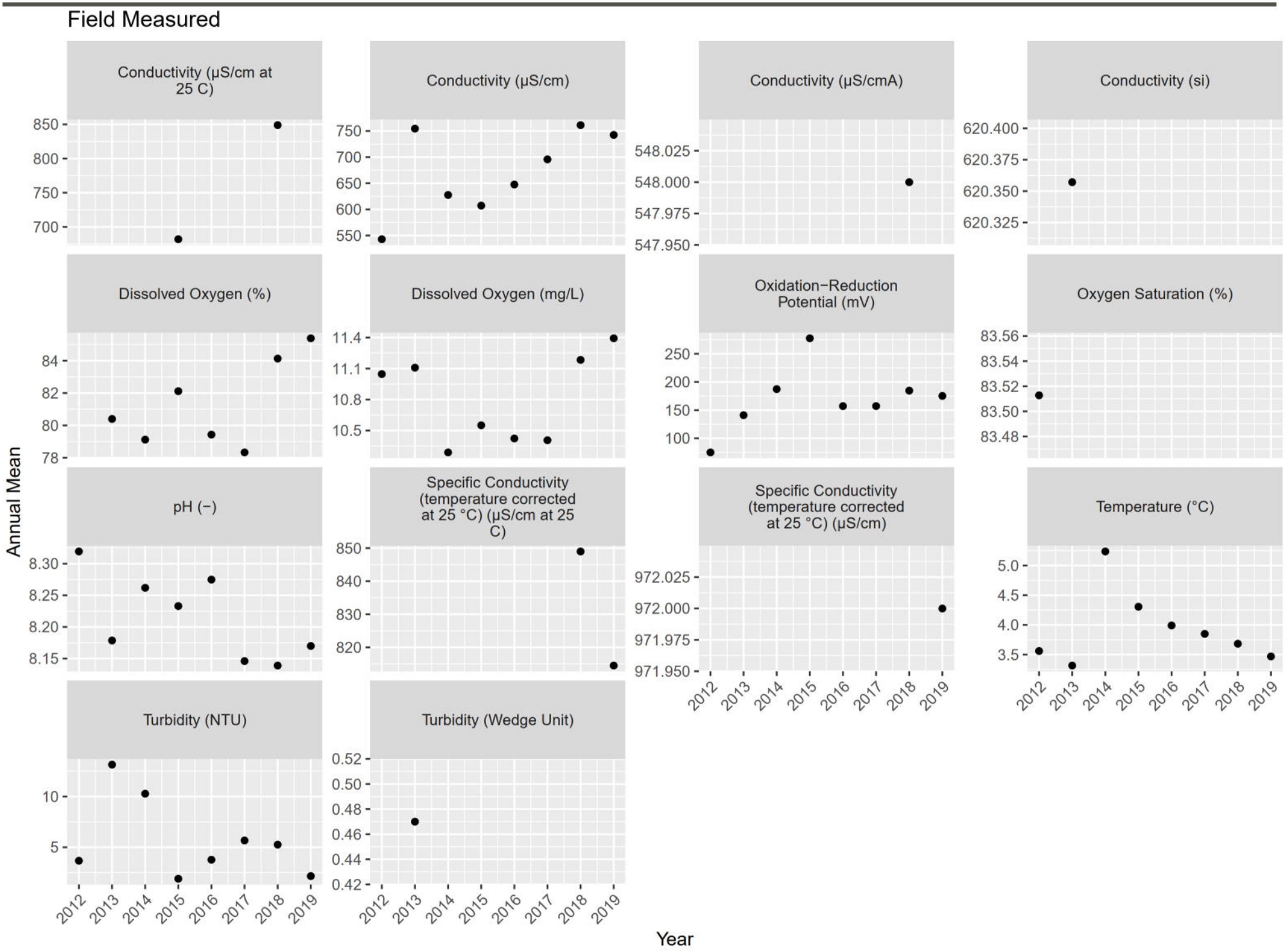


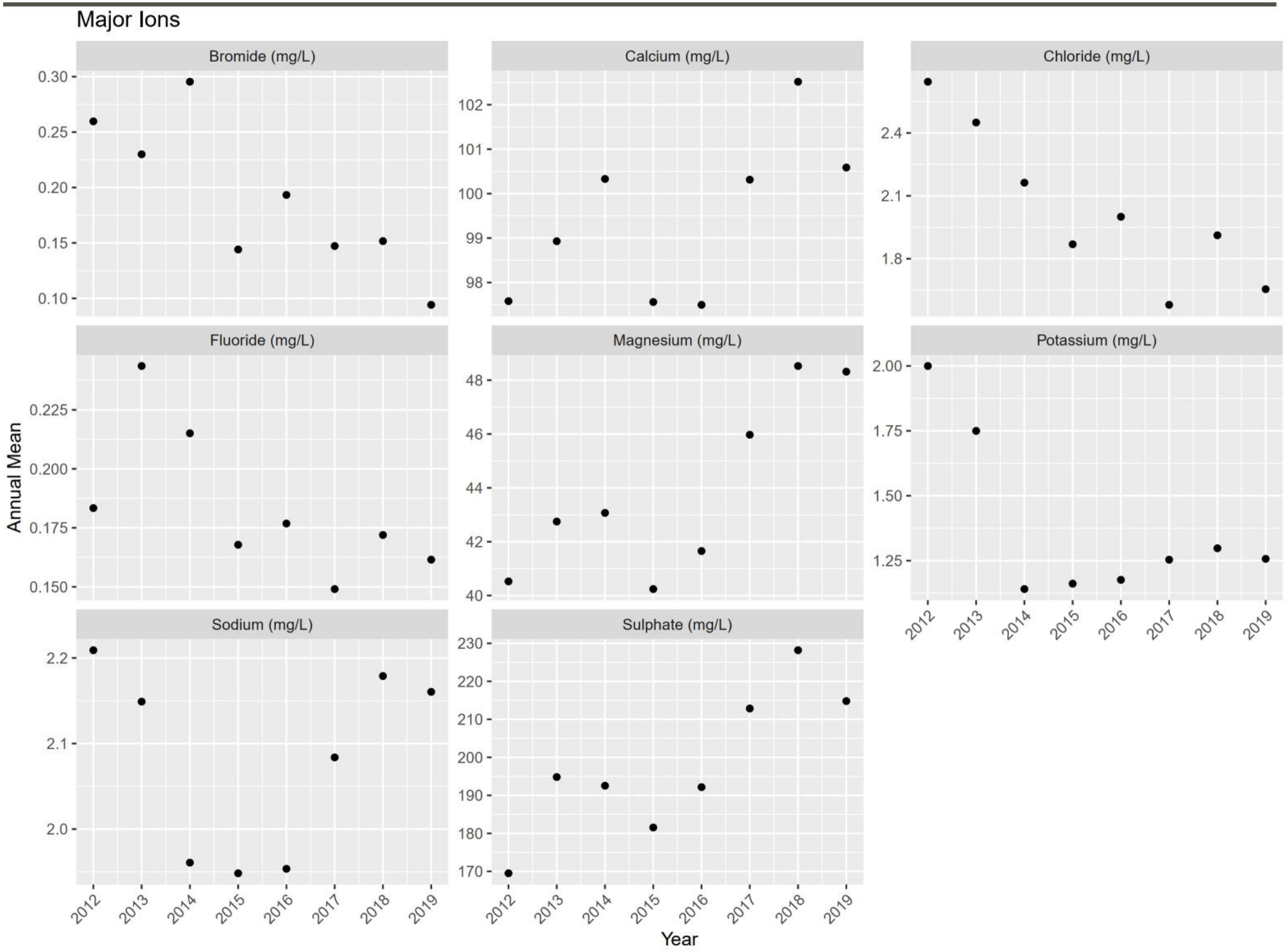
(150) Dibenzo(a,h)anthracene (µg/L); Parent PAHs

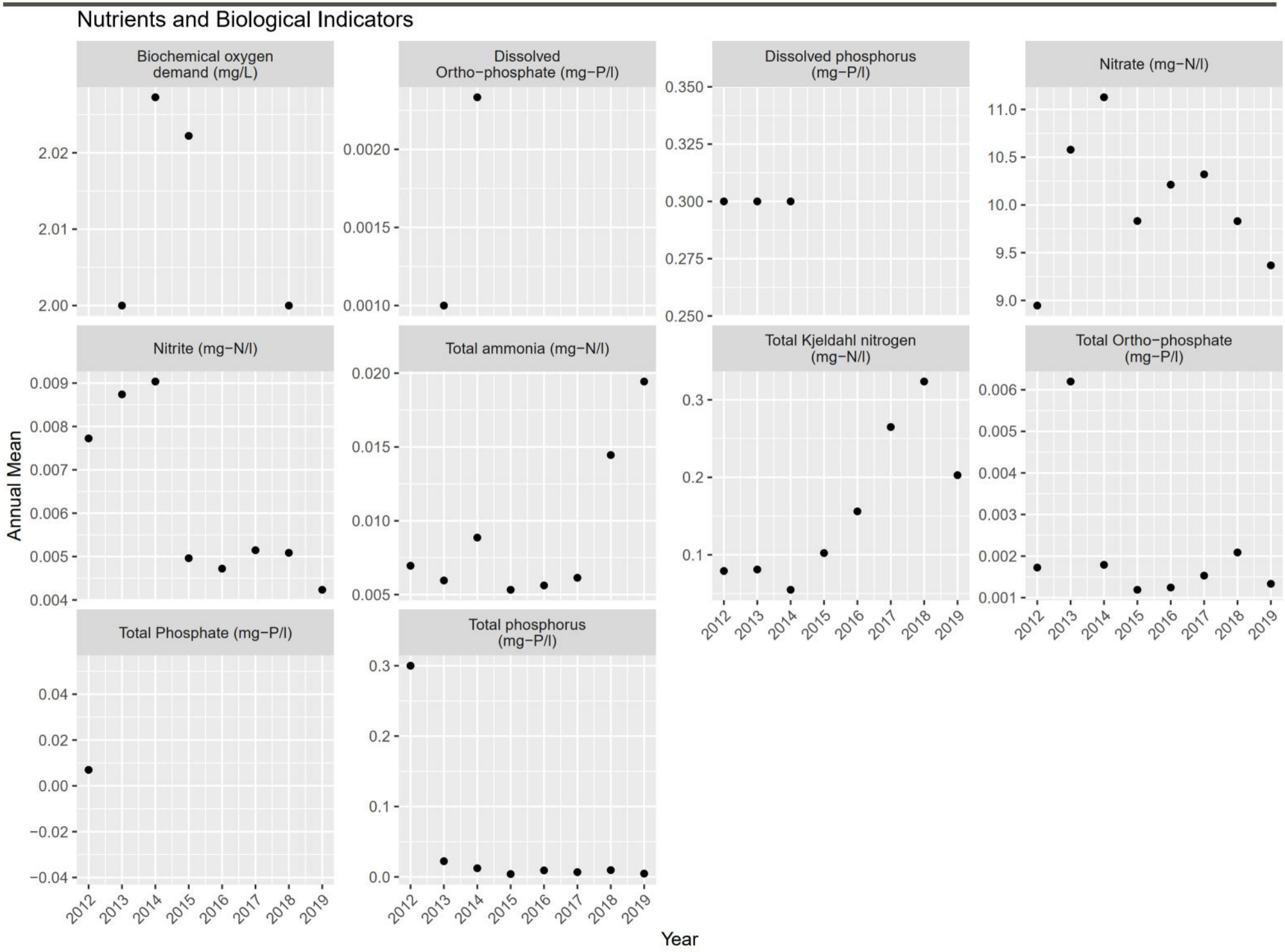


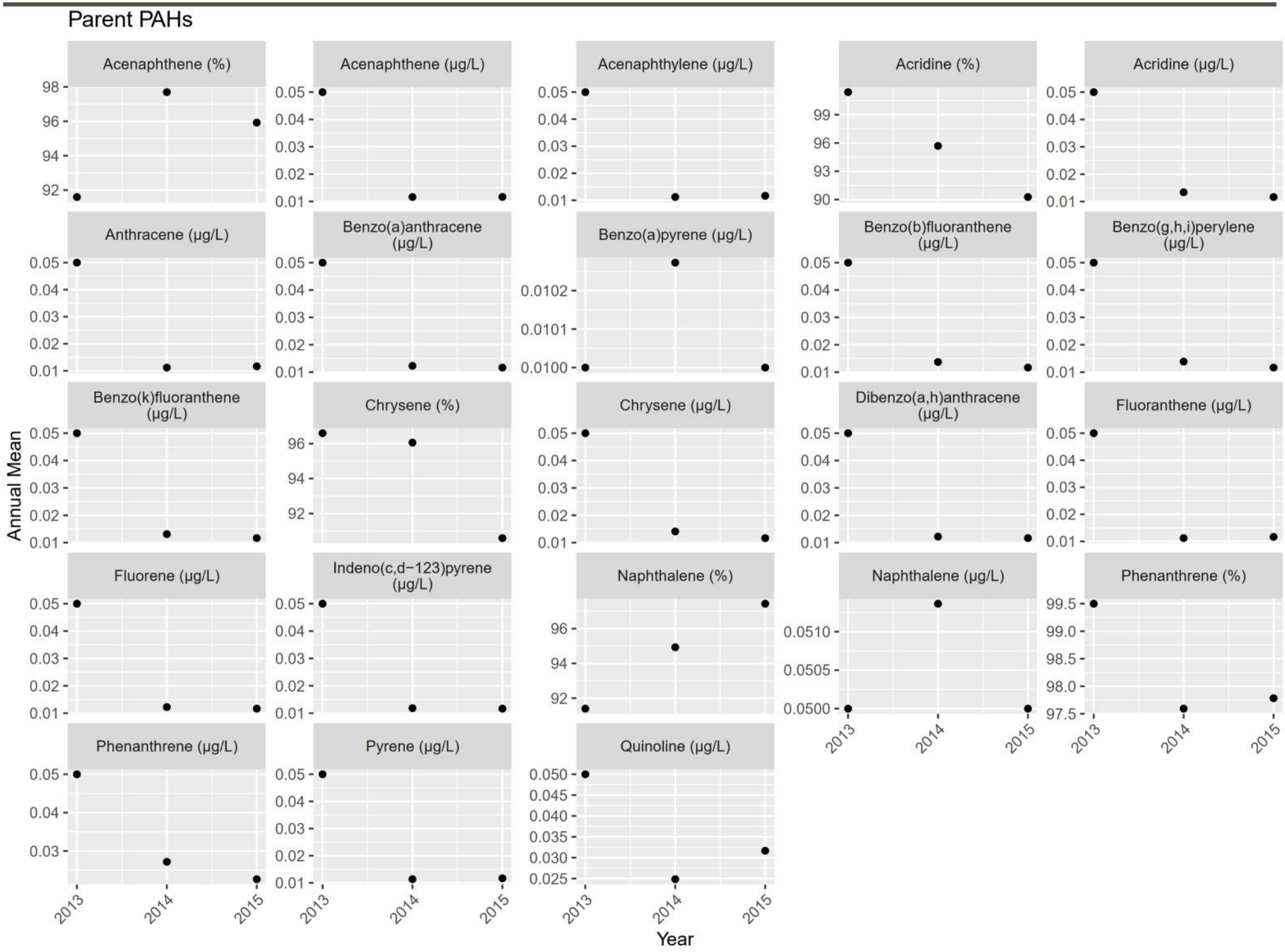

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Colour (CU)
Conductivity (µmhos/cm)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (Calculated) (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year

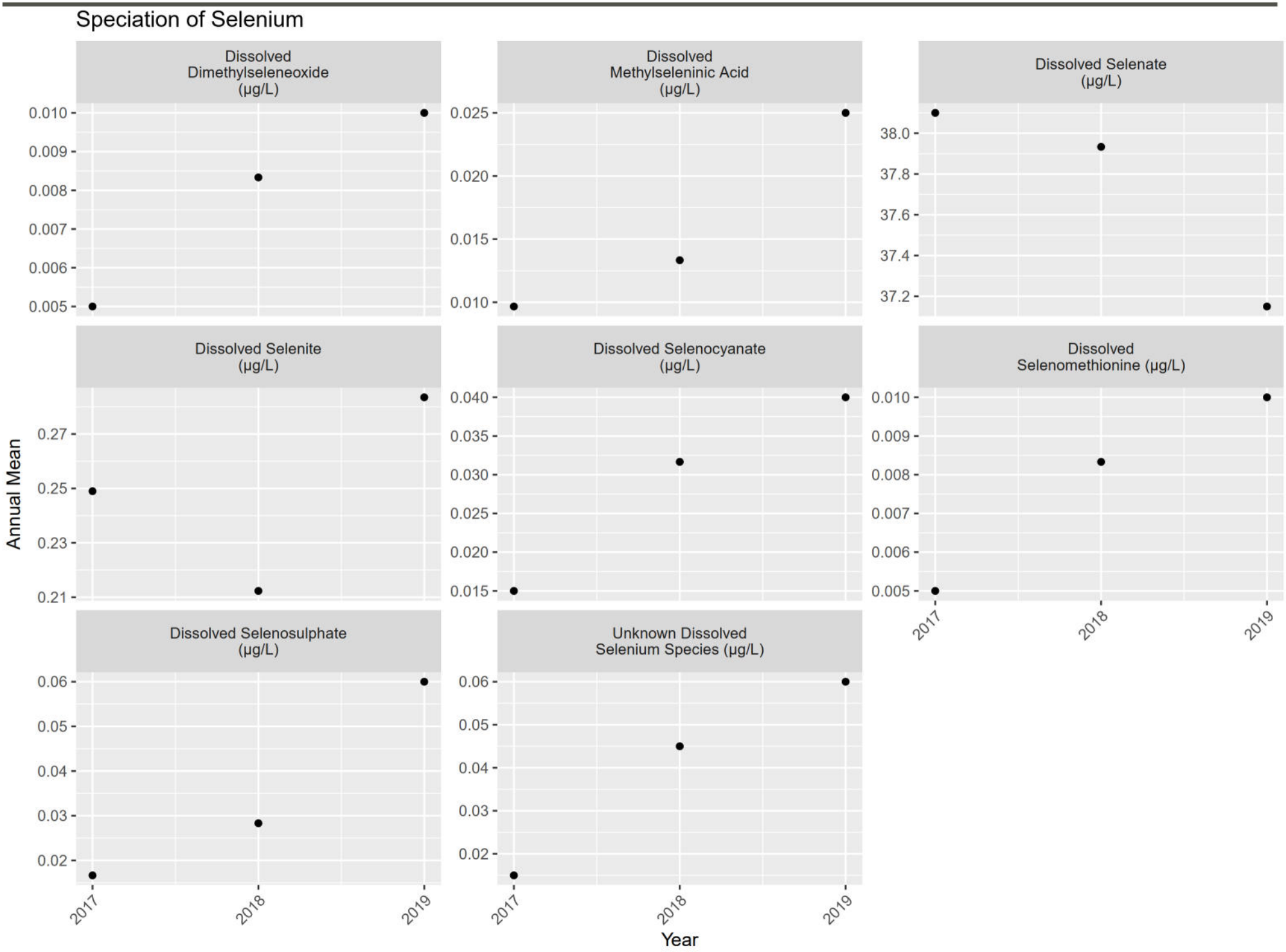

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

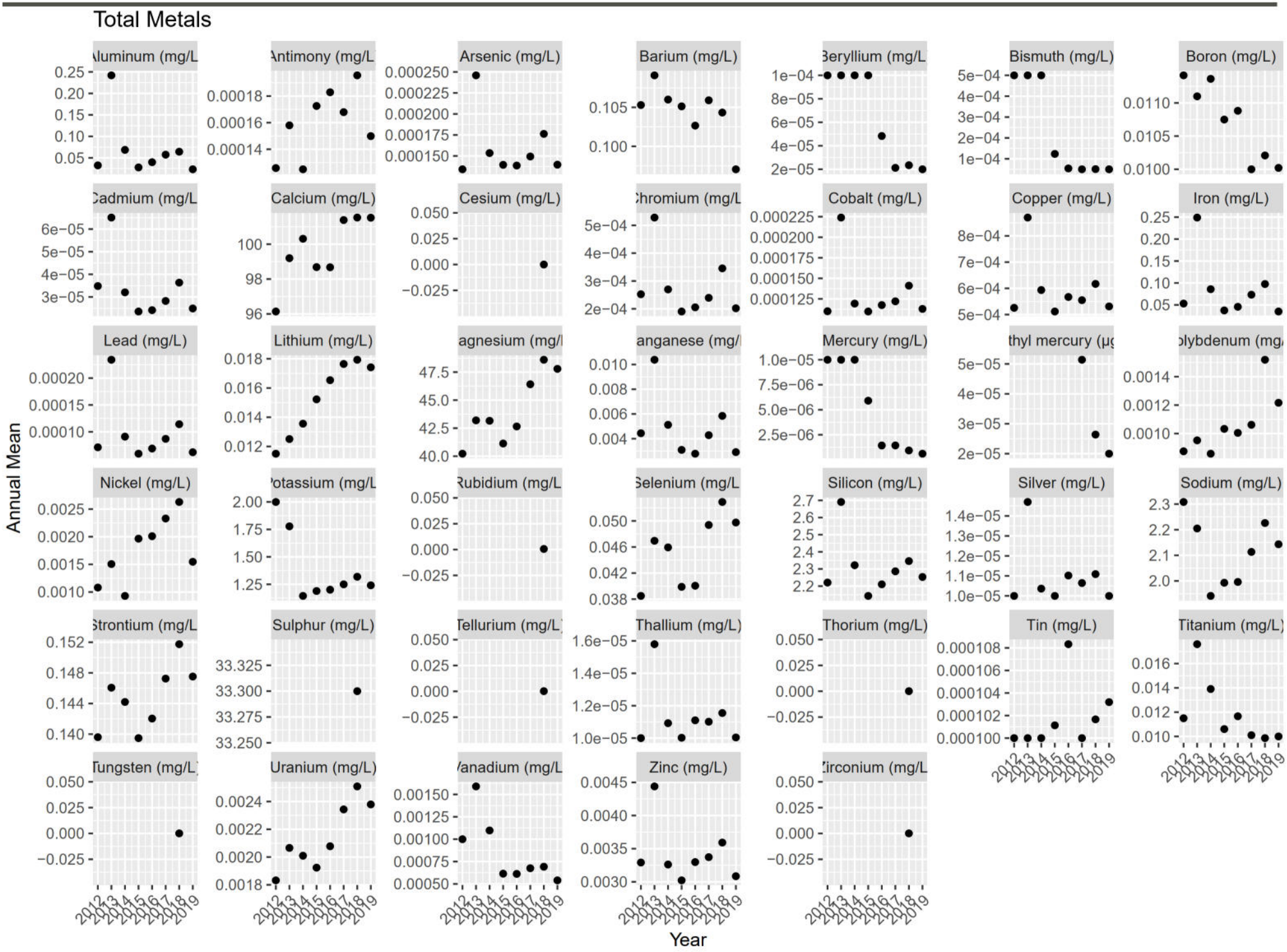

Field Measured
Conductivity (µS/cm at 25 C)
Conductivity (µS/cm)
Conductivity (µS/cmA)
Conductivity (si)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
Oxygen Saturation (%)
pH (−)
Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)
Specific Conductivity (temperature corrected at 25 °C) (µS/cm)
Temperature (°C)
Turbidity (NTU)
Turbidity (Wedge Unit)
Annual Mean
Year

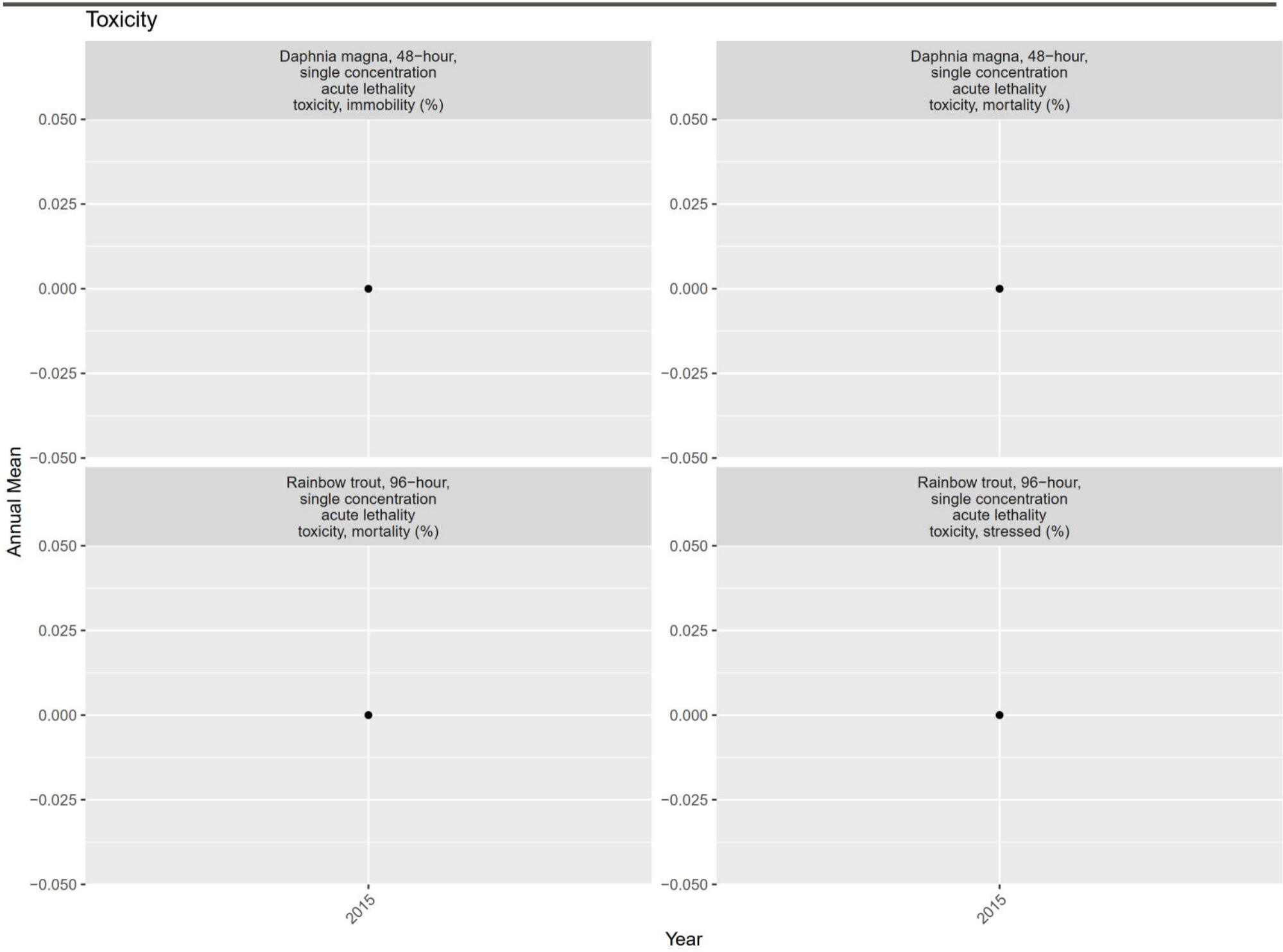

Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
0.30
0.25
0.20
0.15
0.10
102
101
100
99
98
2.4
2.1
1.8
0.225
0.200
0.175
0.150
48
46
44
42
40
2.00
1.75
1.50
1.25
2.2
2.1
2.0
230
220
210
200
190
180
170
2012
2013
2014
2015
2016
2017
2018
2019

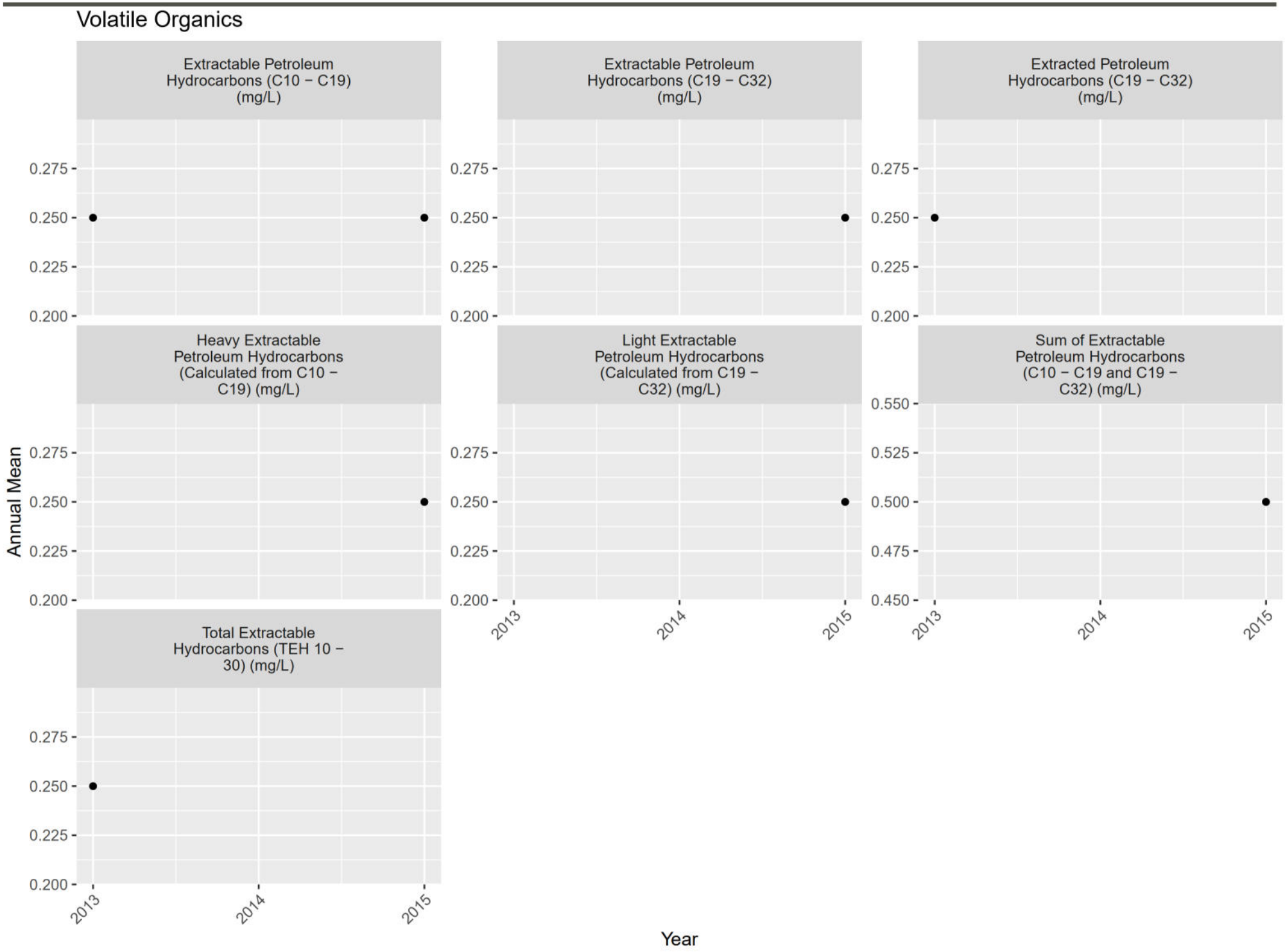

Nutrients and Biological Indicators
Biochemical oxygen demand (mg/L)
Dissolved Ortho−phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year


Parent PAHs
Acenaphthene (%)
Acenaphthene (µg/L)
Acenaphthylene (µg/L)
Acridine (%)
Acridine (µg/L)
Anthracene (µg/L)
Benzo(a)anthracene (µg/L)
Benzo(a)pyrene (µg/L)
Benzo(b)fluoranthene (µg/L)
Benzo(g,h,i)perylene (µg/L)
Benzo(k)fluoranthene (µg/L)
Chrysene (%)
Chrysene (µg/L)
Dibenzo(a,h)anthracene (µg/L)
Fluoranthene (µg/L)
Fluorene (µg/L)
Indeno(c,d−123)pyrene (µg/L)
Naphthalene (%)
Naphthalene (µg/L)
Phenanthrene (%)
Phenanthrene (µg/L)
Pyrene (µg/L)
Quinoline (µg/L)
Annual Mean
Year
2013
2014
2015


Speciation of Selenium
Dissolved Dimethylseleneoxide (µg/L)
Dissolved Methylseleninic Acid (µg/L)
Dissolved Selenate (µg/L)
Dissolved Selenite (µg/L)
Dissolved Selenocyanate (µg/L)
Dissolved Selenomethionine (µg/L)
Dissolved Selenosulphate (µg/L)
Unknown Dissolved Selenium Species (µg/L)
Annual Mean
Year
2017
2018
2019


Total Metals
Aluminum (mg/L
Antimony (mg/L
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L
Calcium (mg/L)
Cesium (mg/L)
Chromium (mg/L
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
agnesium (mg/
anganese (mg/
Mercury (mg/L)
thyl mercury (µg
olybdenum (mg
Nickel (mg/L)
otassium (mg/L
Rubidium (mg/L
Selenium (mg/L
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L
Sulphur (mg/L)
Tellurium (mg/L
Thallium (mg/L)
Thorium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Tungsten (mg/L
Uranium (mg/L)
Vanadium (mg/L
Zinc (mg/L)
Zirconium (mg/L
Annual Mean
Year

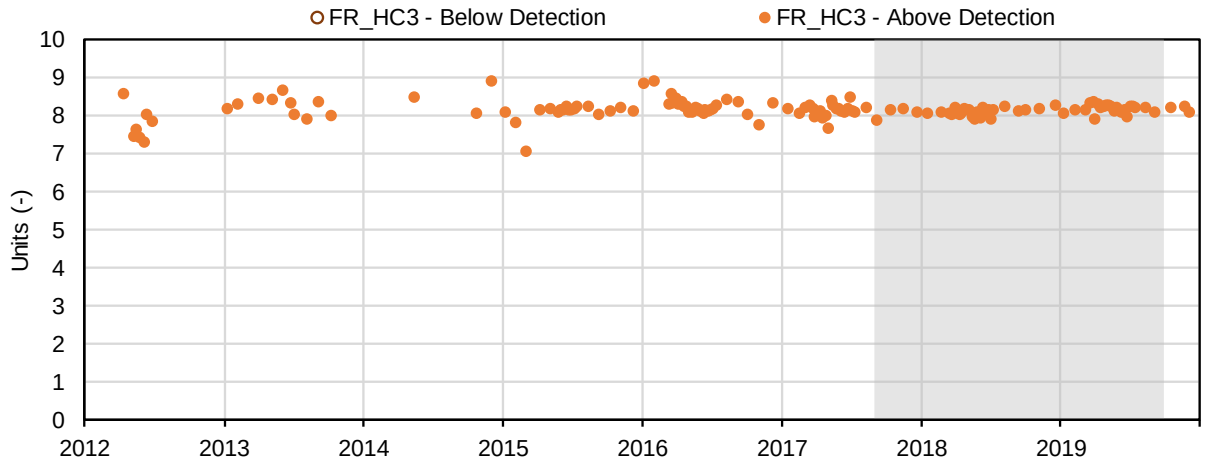

Toxicity
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, immobility (%)
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, stressed (%)
Annual Mean
0.050
0.025
0.000
−0.025
−0.050
2015
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extractable Petroleum Hydrocarbons (C19 − C32) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 − C19) (mg/L)
Light Extractable Petroleum Hydrocarbons (Calculated from C19 − C32) (mg/L)
Sum of Extractable Petroleum Hydrocarbons (C10 − C19 and C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
Year
0.200
0.225
0.250
0.275
0.450
0.475
0.500
0.525
0.550
2013
2014
2015

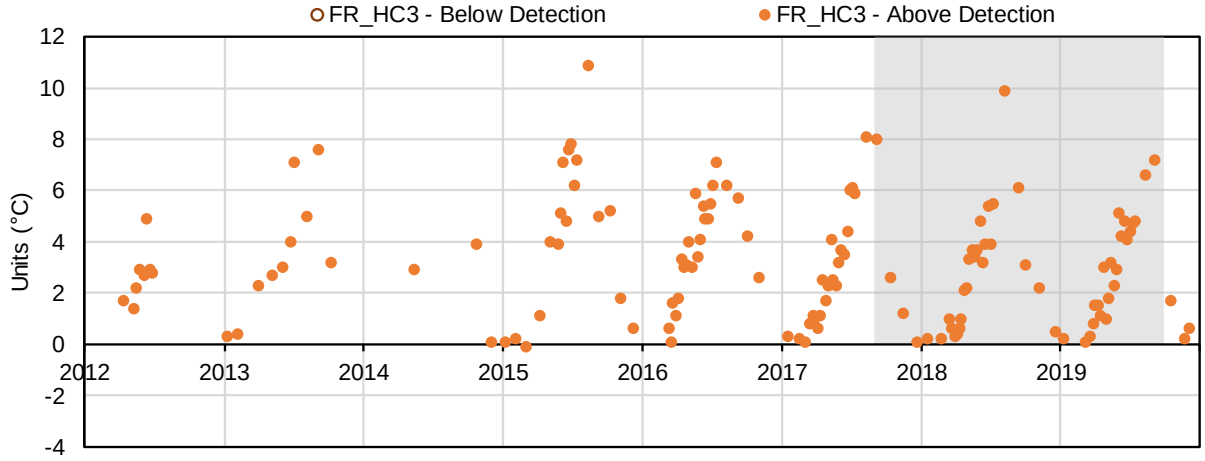
ATTACHMENT F17

FR_HC3 Plots

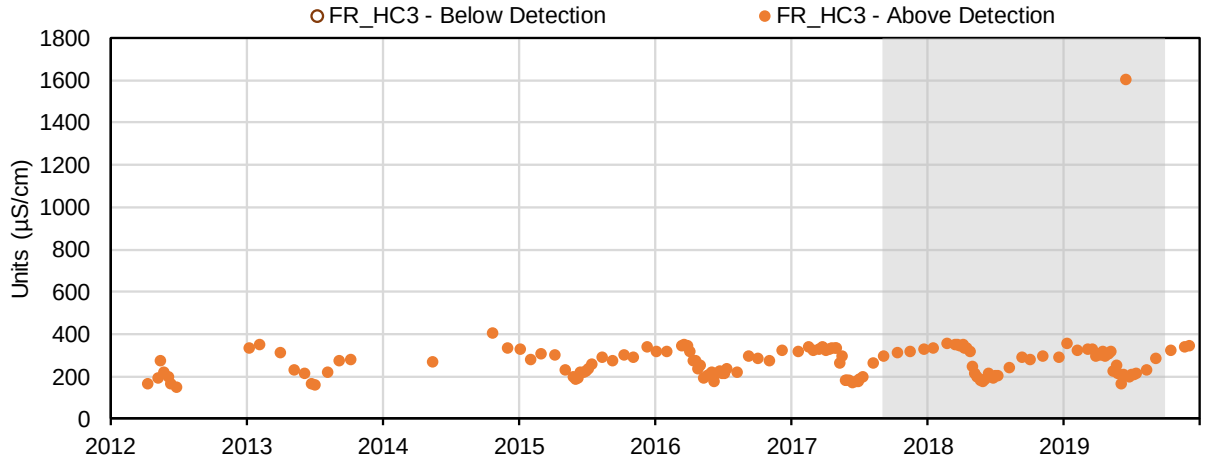
(1) pH (-); Field Measured



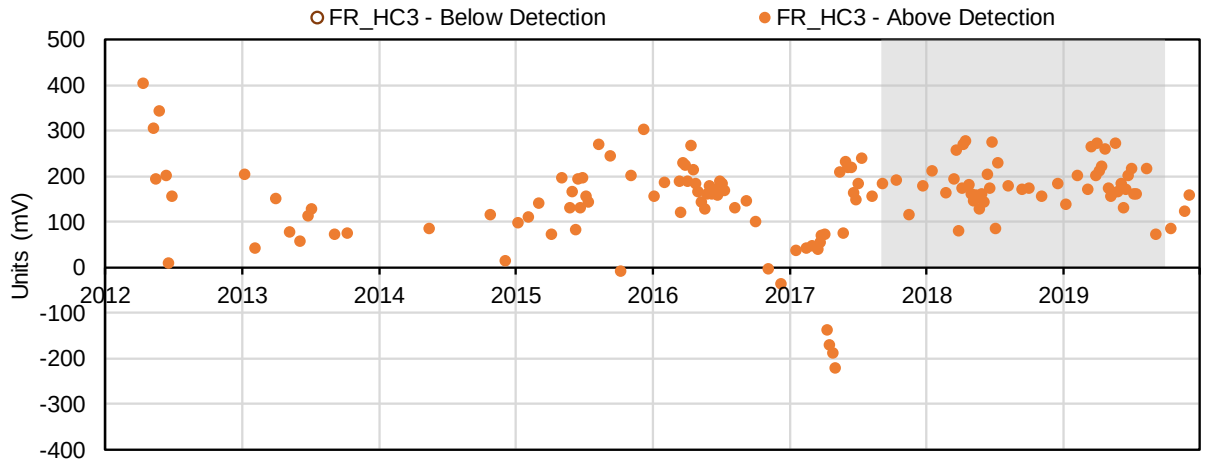
(2) Temperature (°C); Field Measured



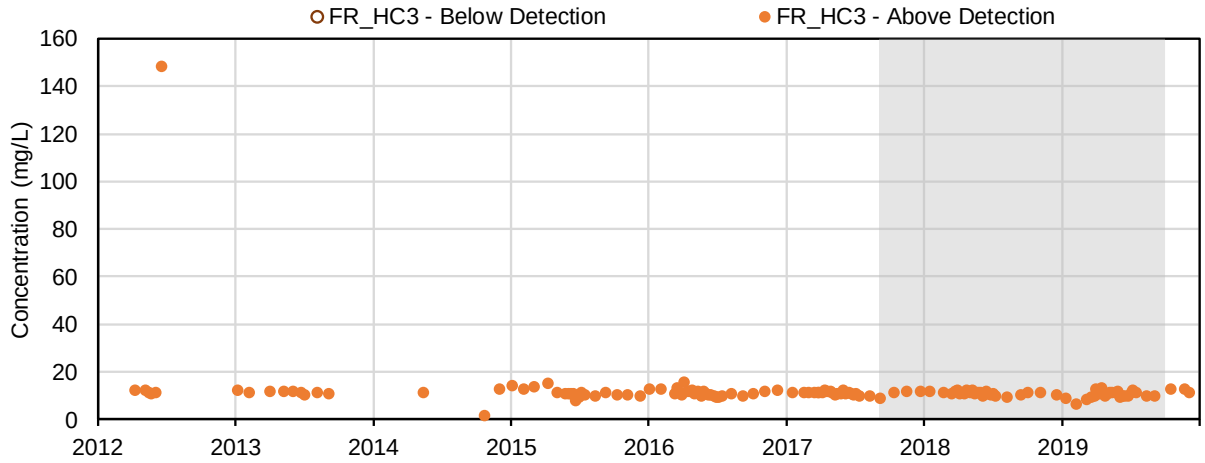
(3) Conductivity (µS/cm); Field Measured



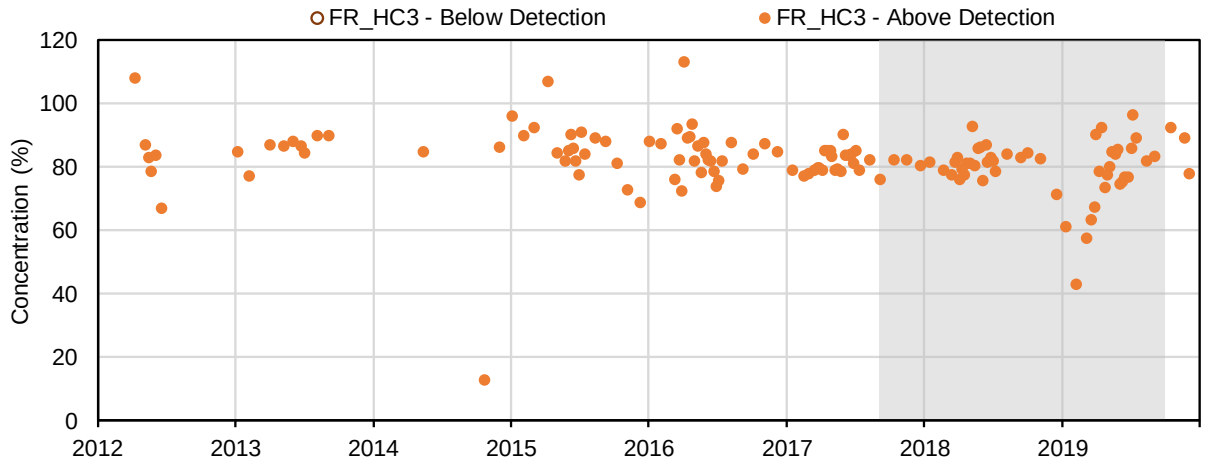
(4) Oxidation-Reduction Potential (mV); Field Measured



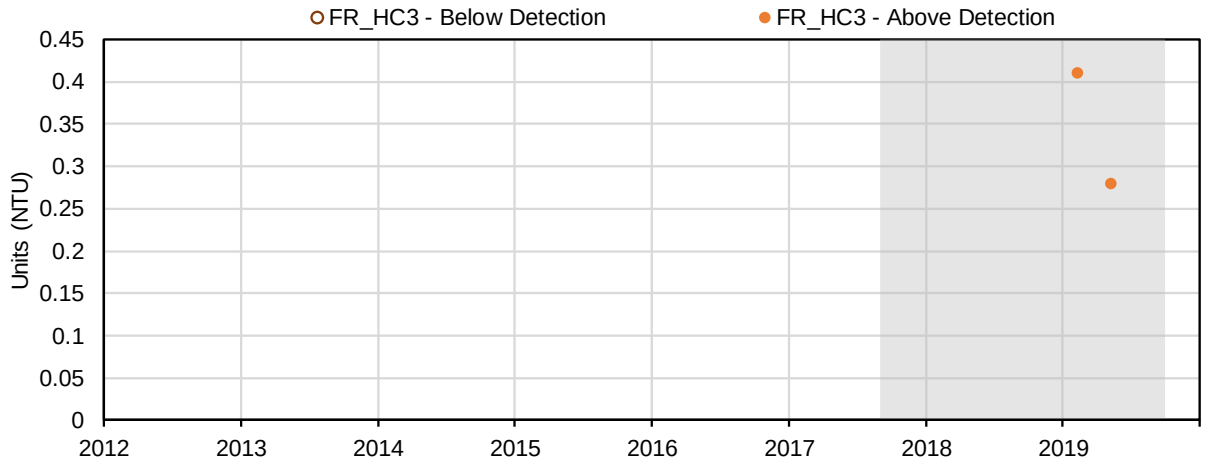
(5) Dissolved Oxygen (mg/L); Field Measured



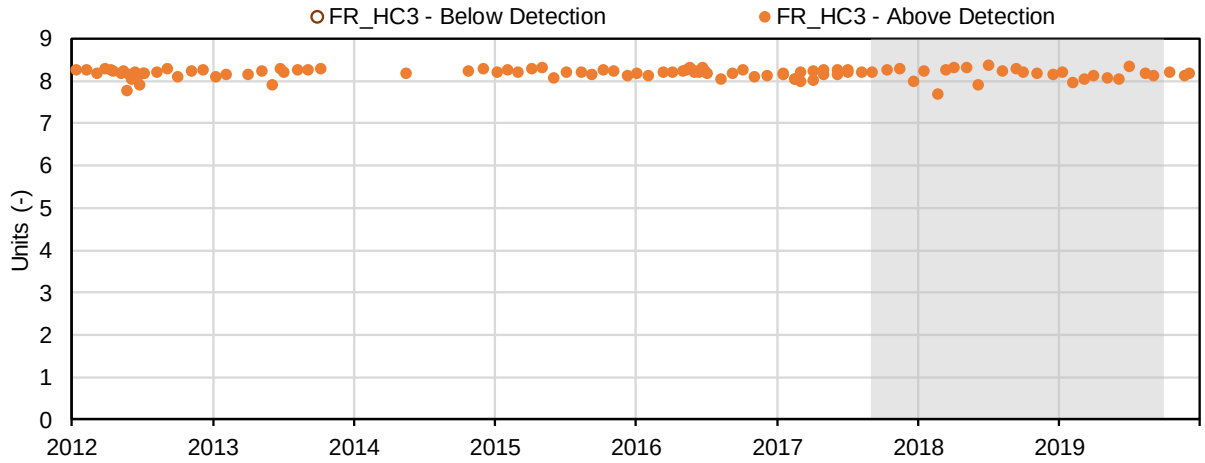
(6) Dissolved Oxygen (%); Field Measured



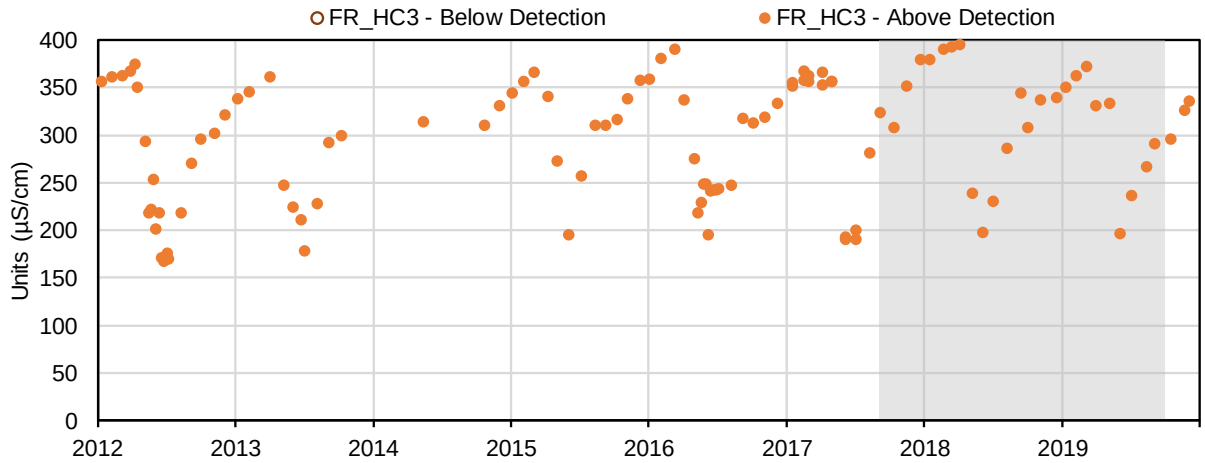
(7) Turbidity (NTU); Field Measured



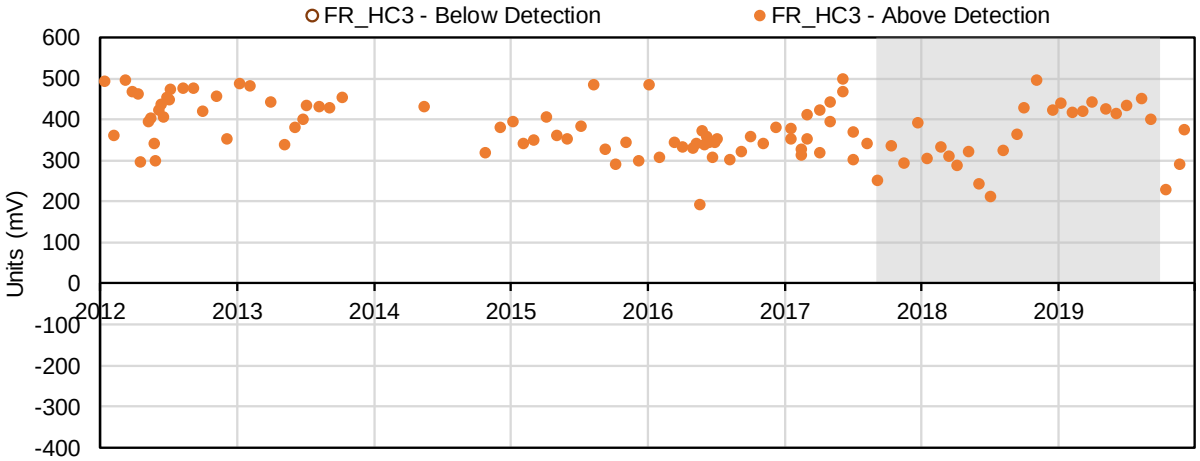
(8) pH (-); Conventional Parameters



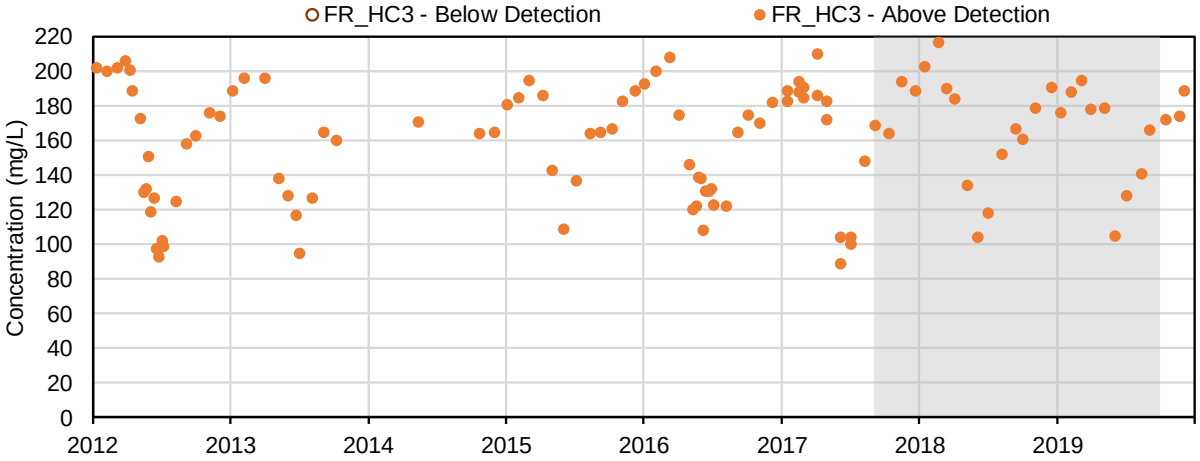
(9) Conductivity (µS/cm); Conventional Parameters



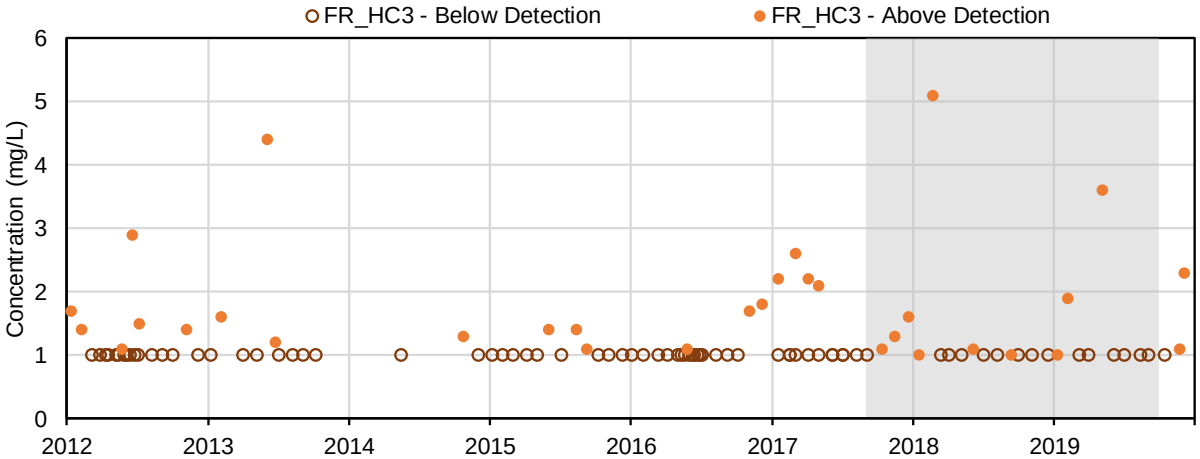
(10) Oxidation-Reduction Potential (mV); Conventional Parameters



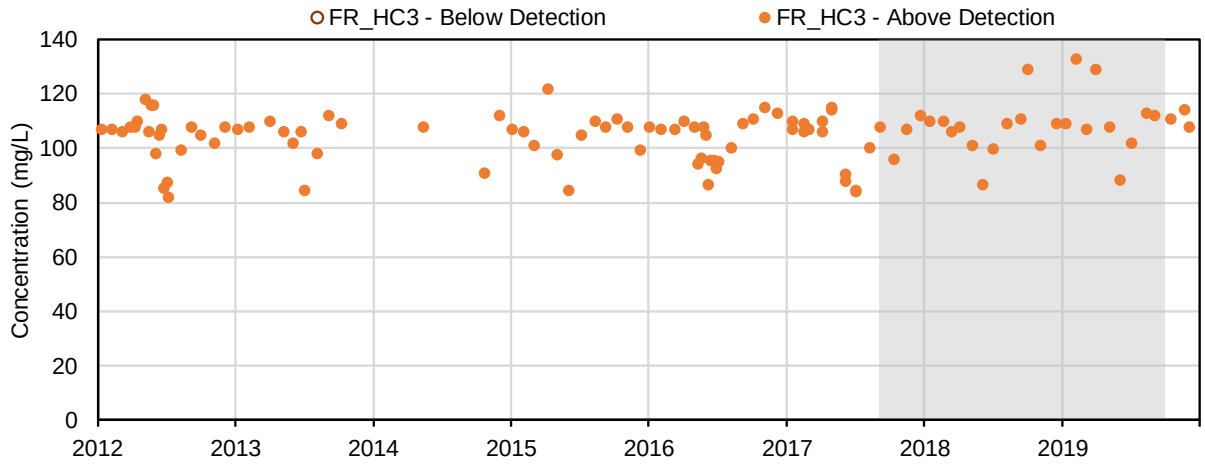
(11) Hardness, as CaCO3 (mg/L); Conventional Parameters



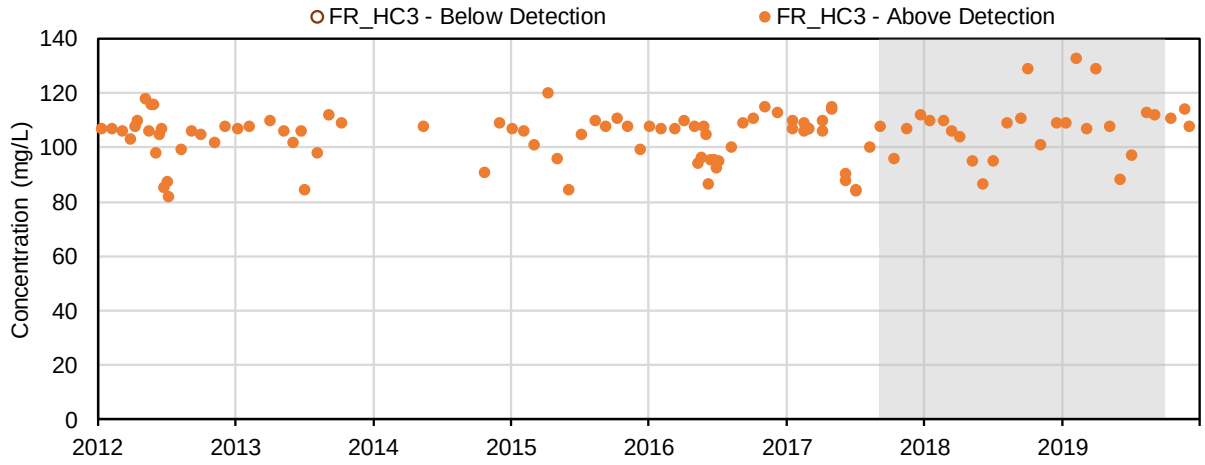
(12) Acidity, CaCO3 (mg/L); Conventional Parameters



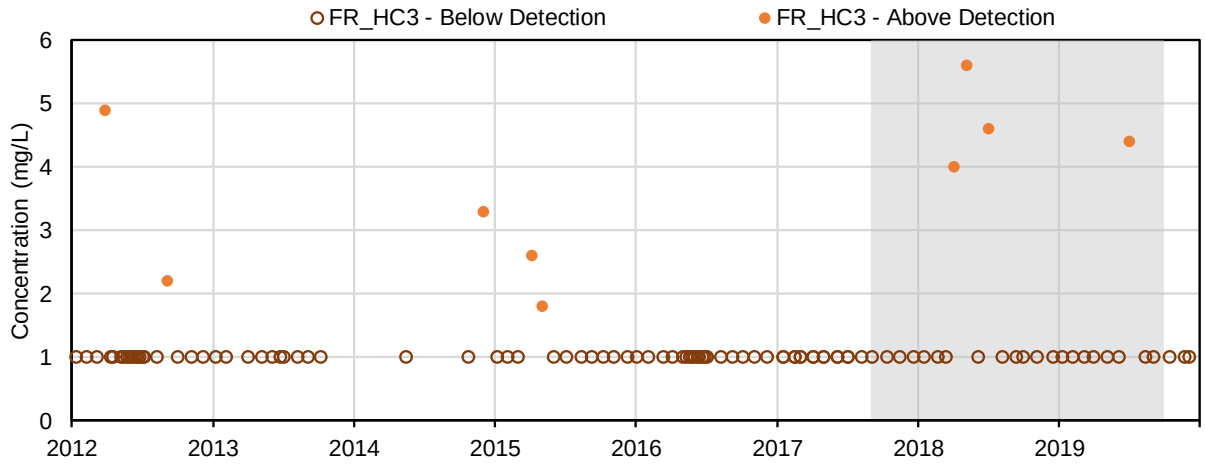
(13) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



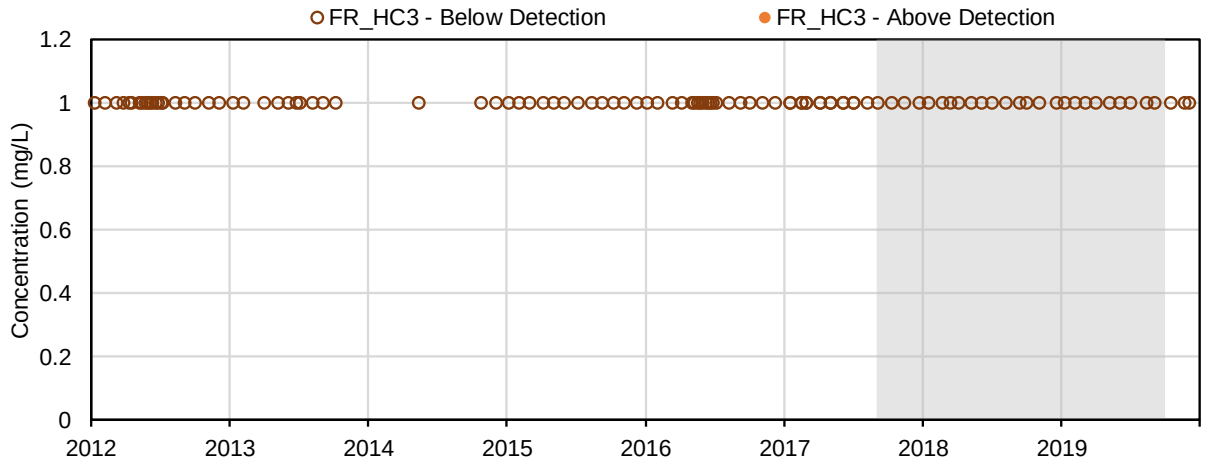
(14) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



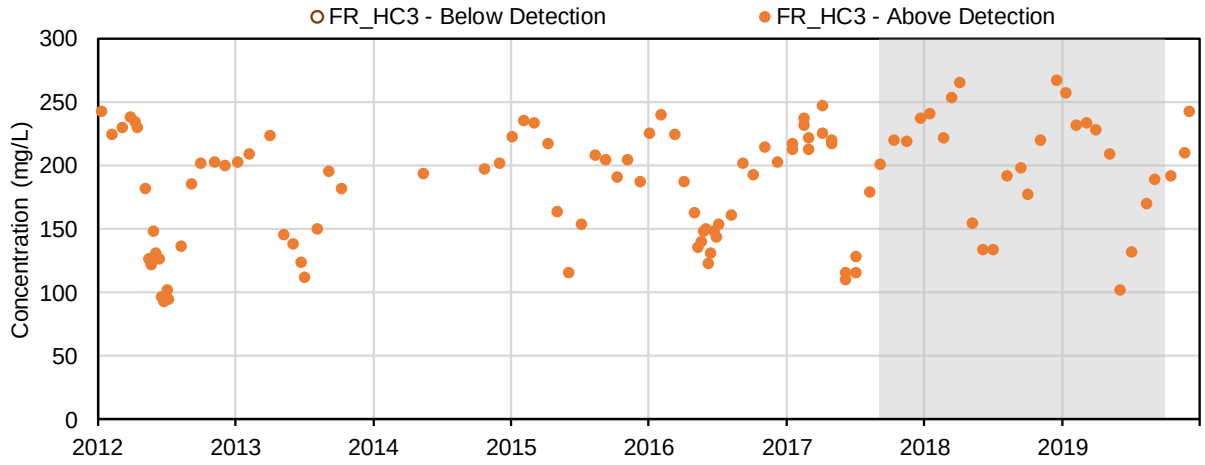
(15) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



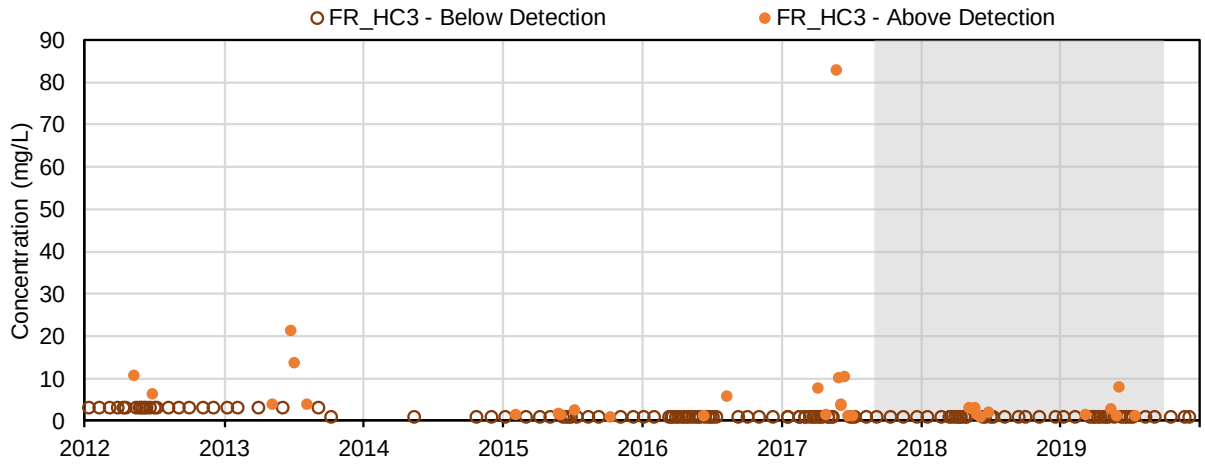
(16) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



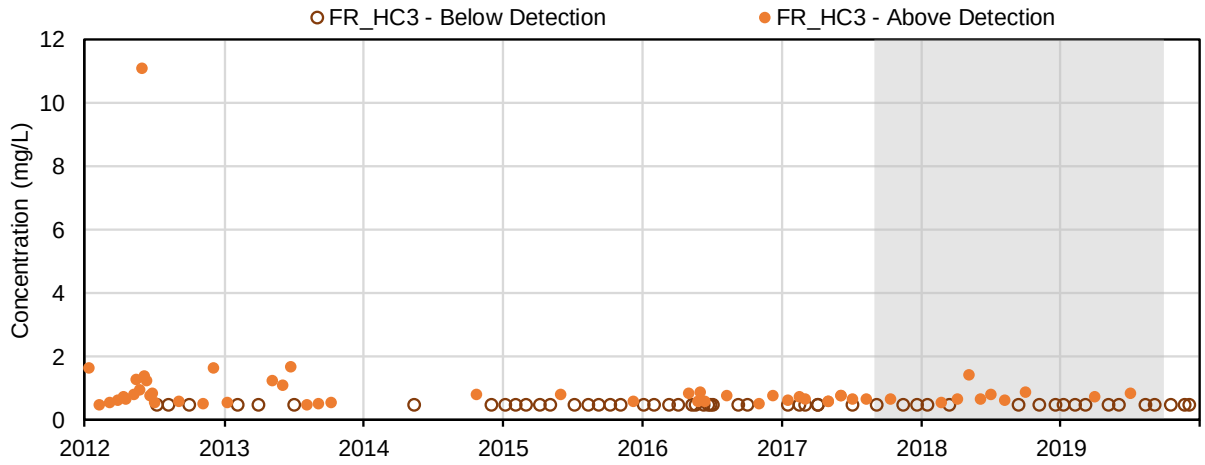
(17) Total dissolved solids (mg/L); Conventional Parameters



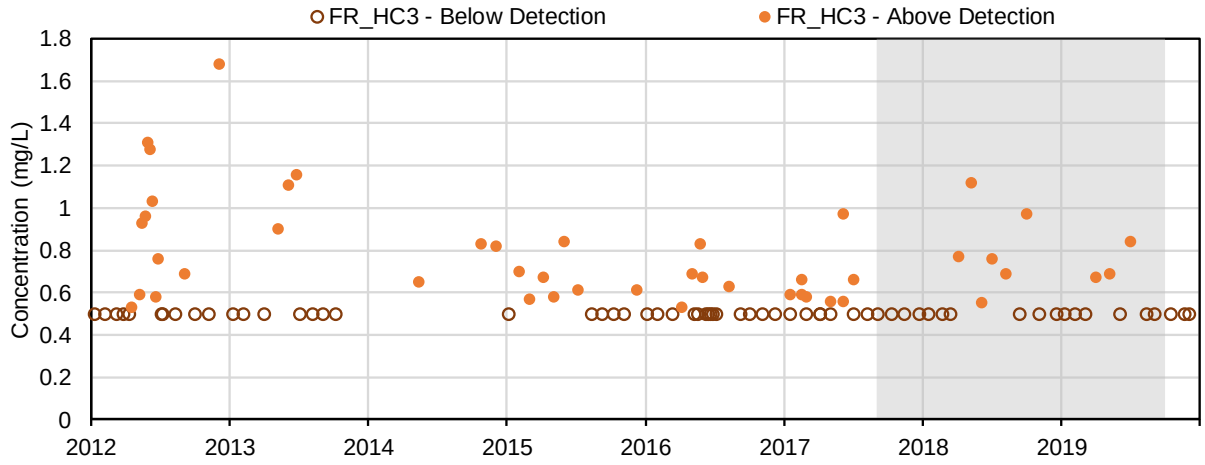
(18) Total suspended solids (mg/L); Conventional Parameters



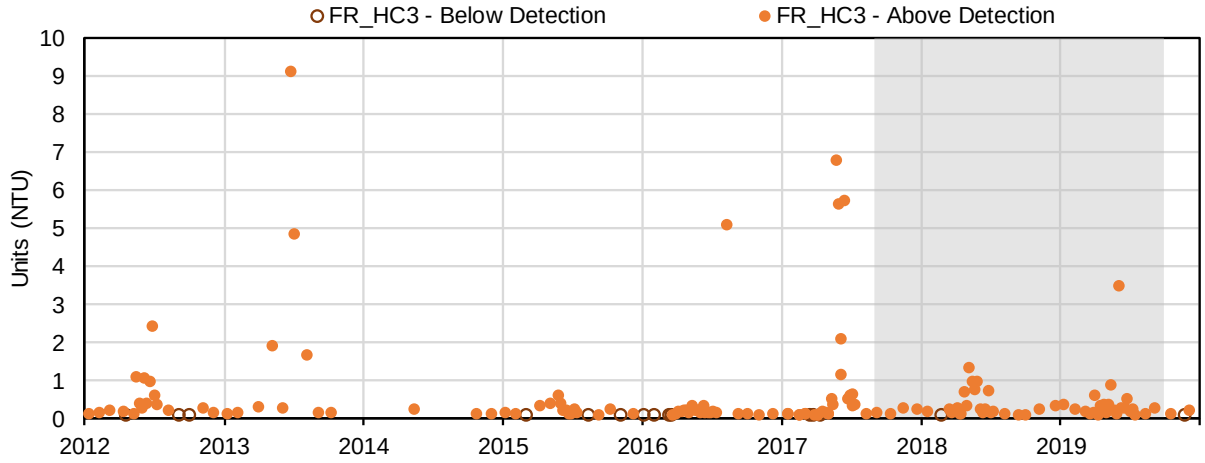
(19) Total organic carbon (mg/L); Conventional Parameters



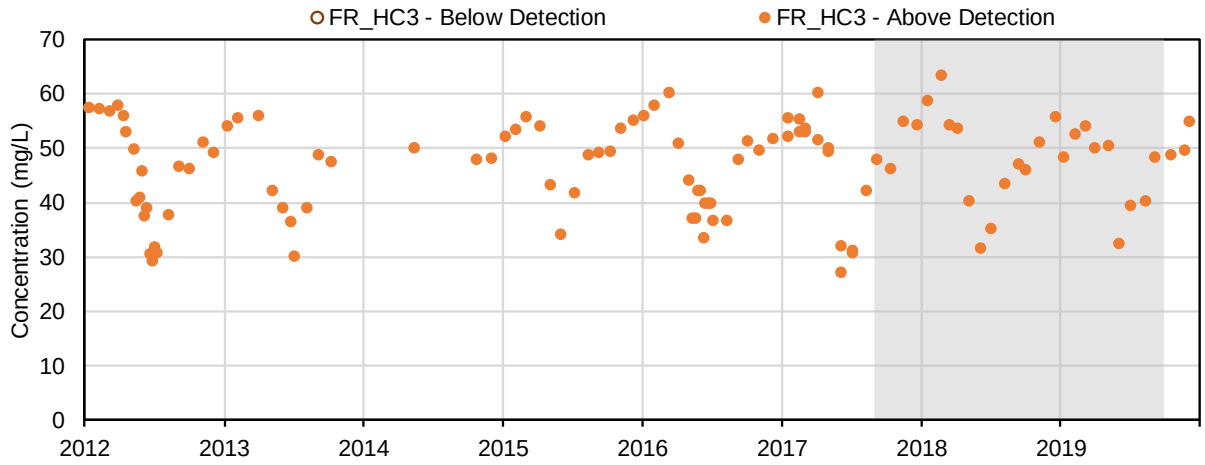
(20) Dissolved organic carbon (mg/L); Conventional Parameters



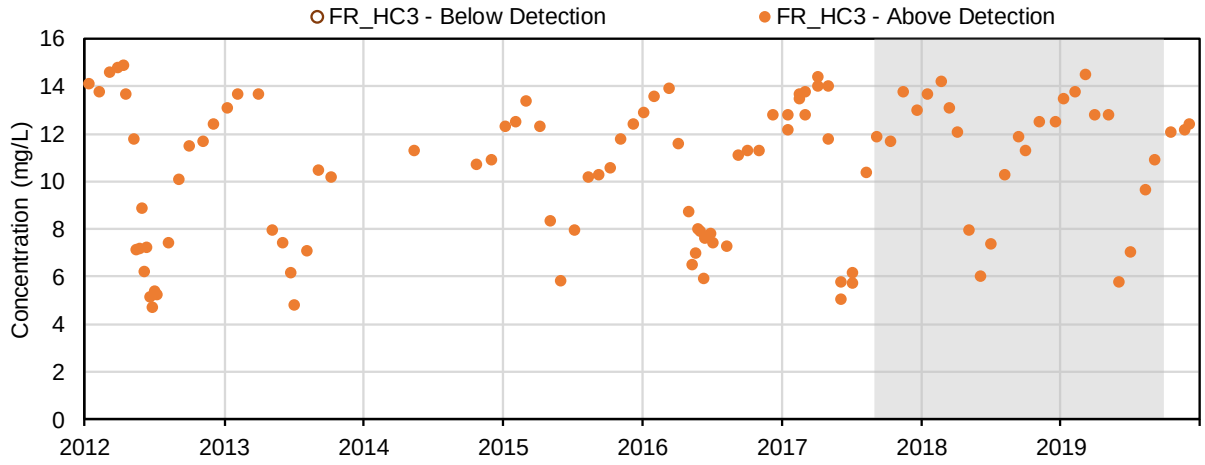
(21) Turbidity (NTU); Conventional Parameters



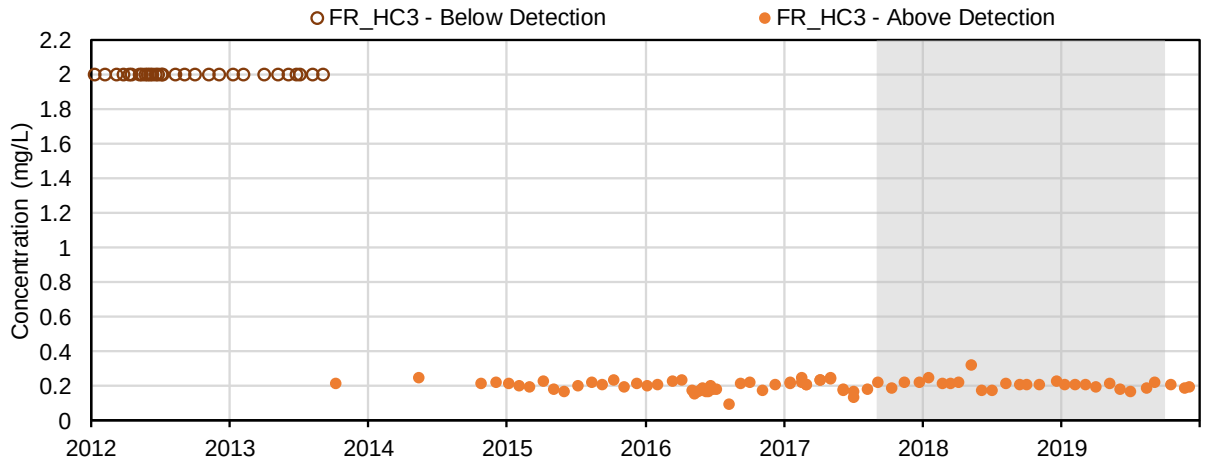
(22) Calcium (mg/L); Major Ions



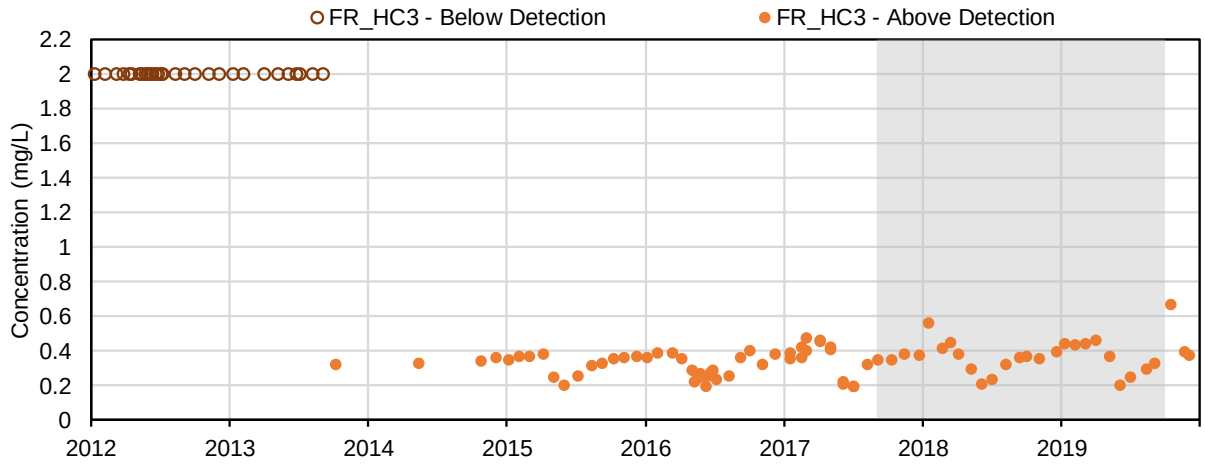
(23) Magnesium (mg/L); Major Ions



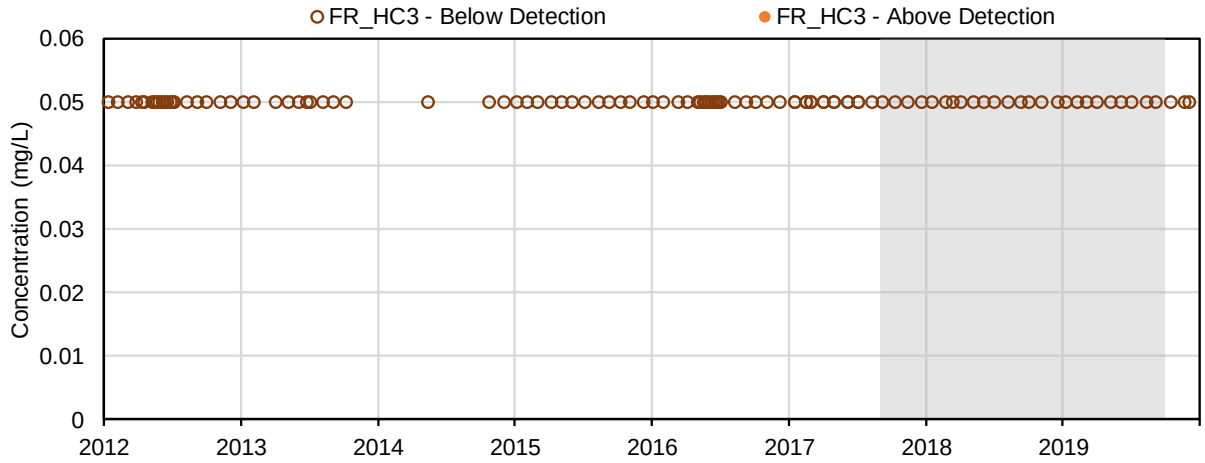
(24) Potassium (mg/L); Major Ions



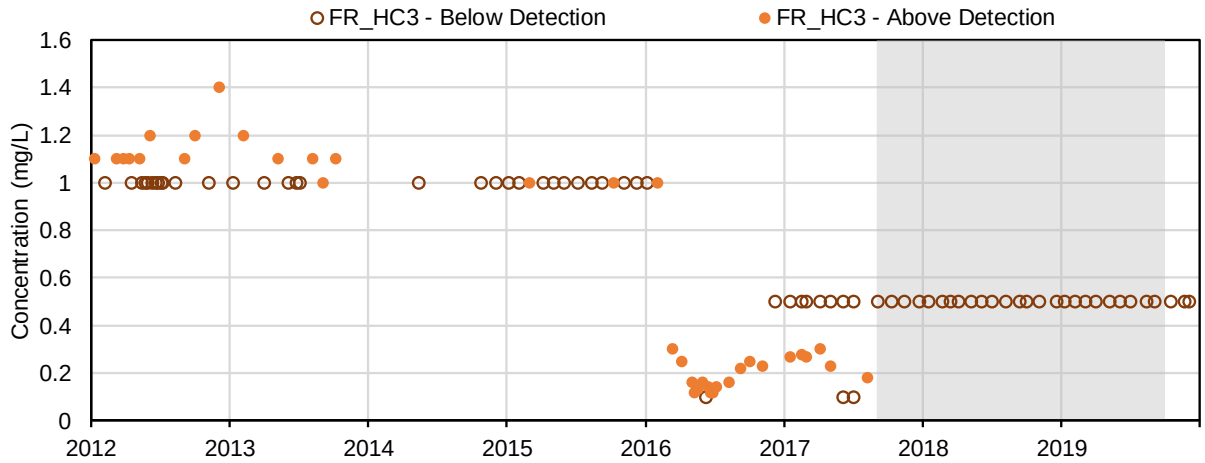
(25) Sodium (mg/L); Major Ions



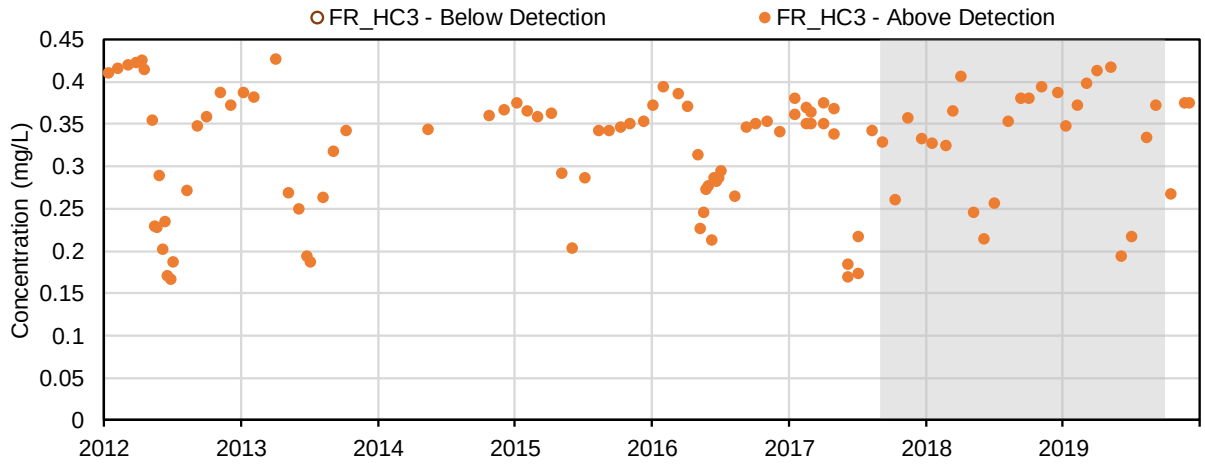
(26) Bromide (mg/L); Major Ions



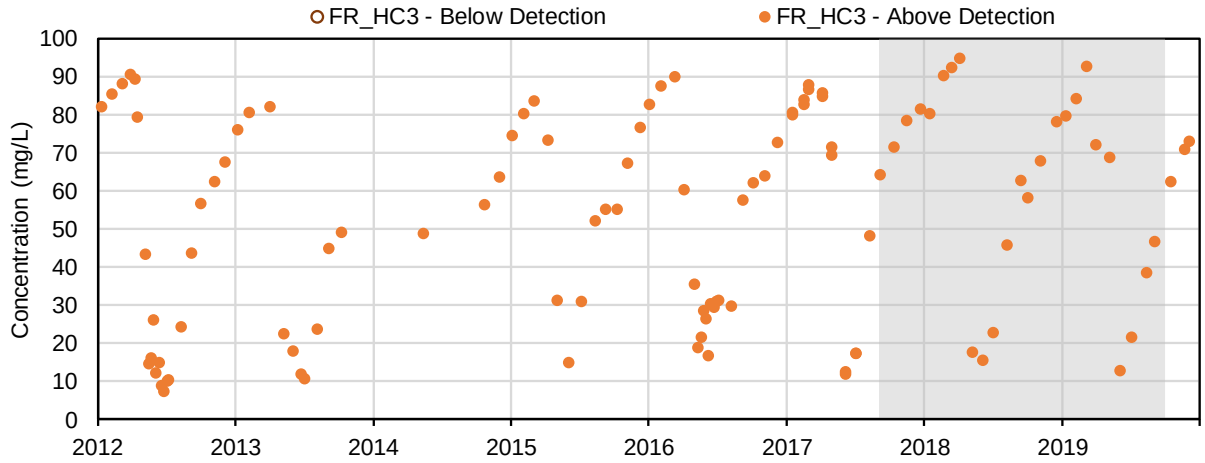
(27) Chloride (mg/L); Major Ions



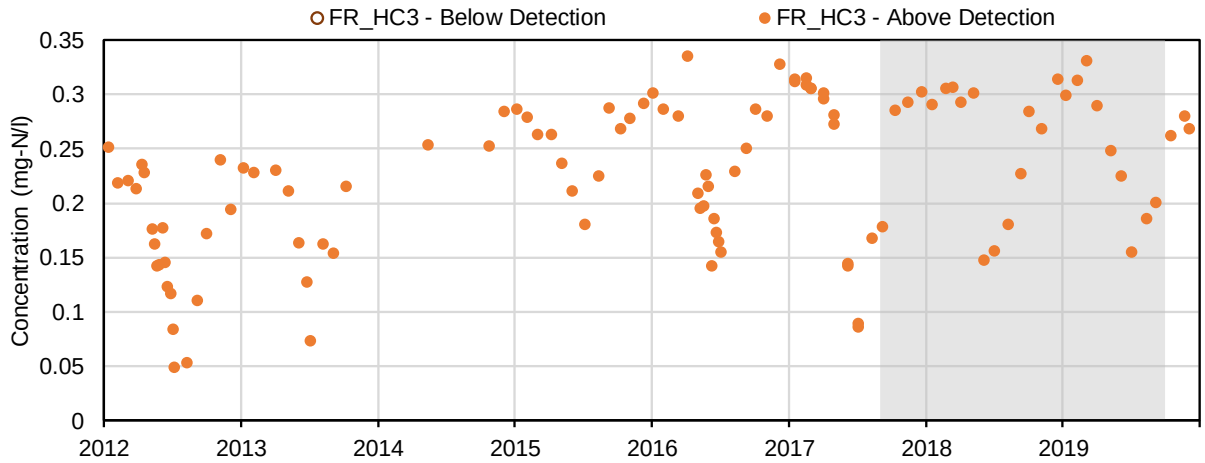
(28) Fluoride (mg/L); Major Ions



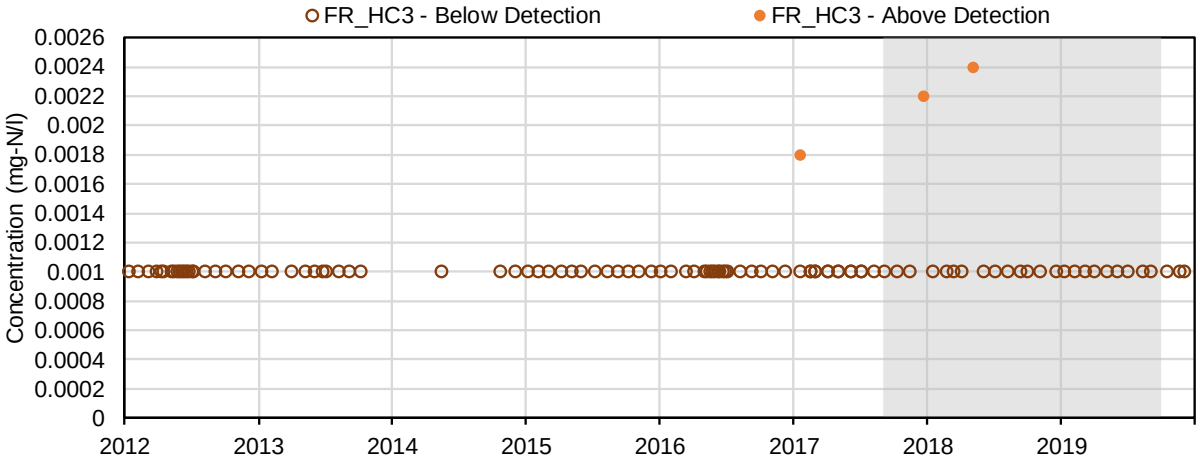
(29) Sulphate (mg/L); Major Ions



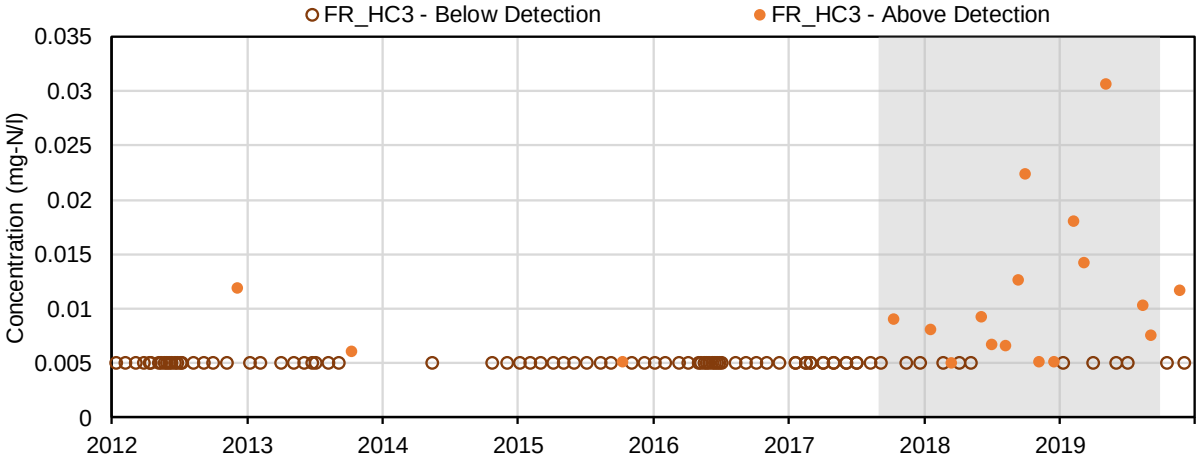
(30) Nitrate (mg-N/l); Nutrients and Biological Indicators



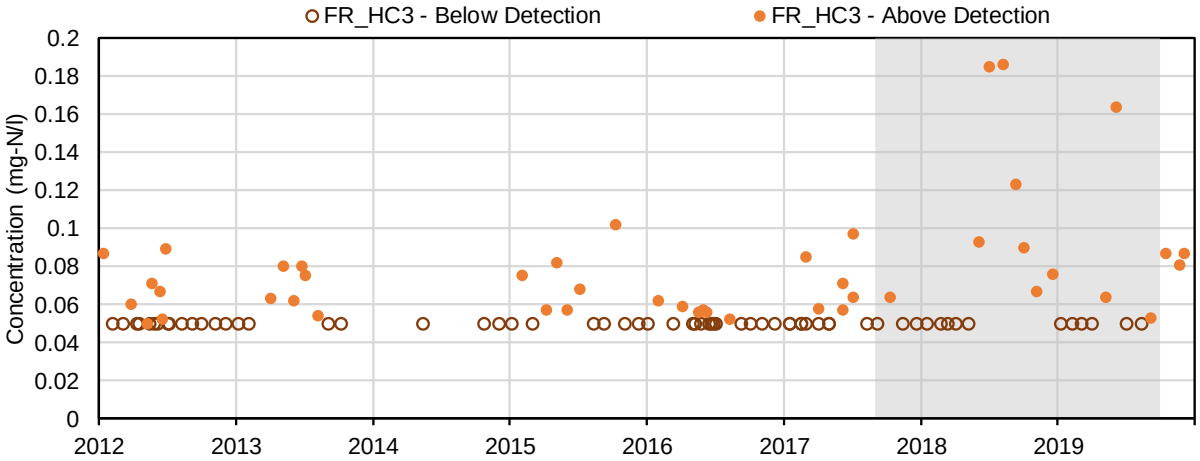
(31) Nitrite (mg-N/l); Nutrients and Biological Indicators



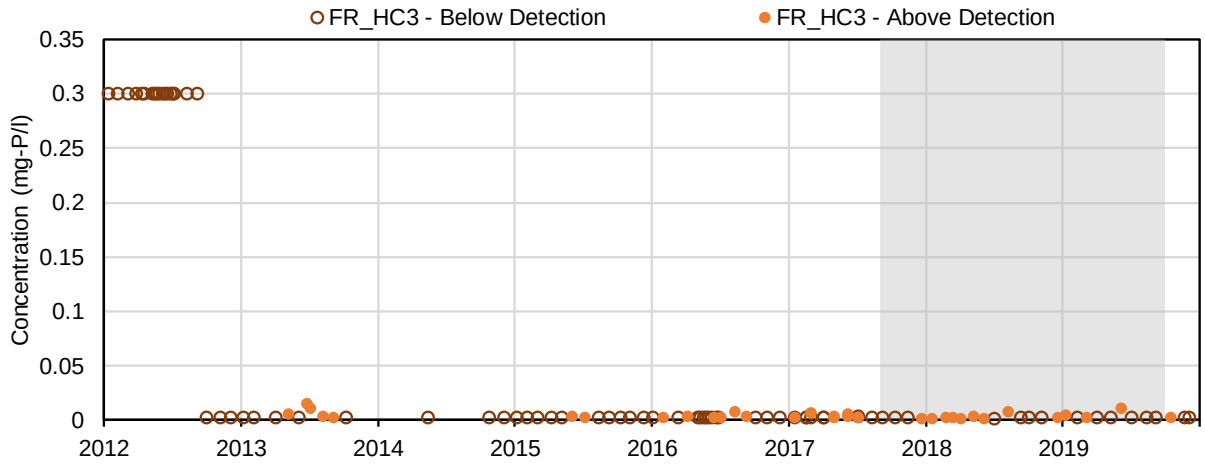
(32) Total ammonia (mg-N/l); Nutrients and Biological Indicators



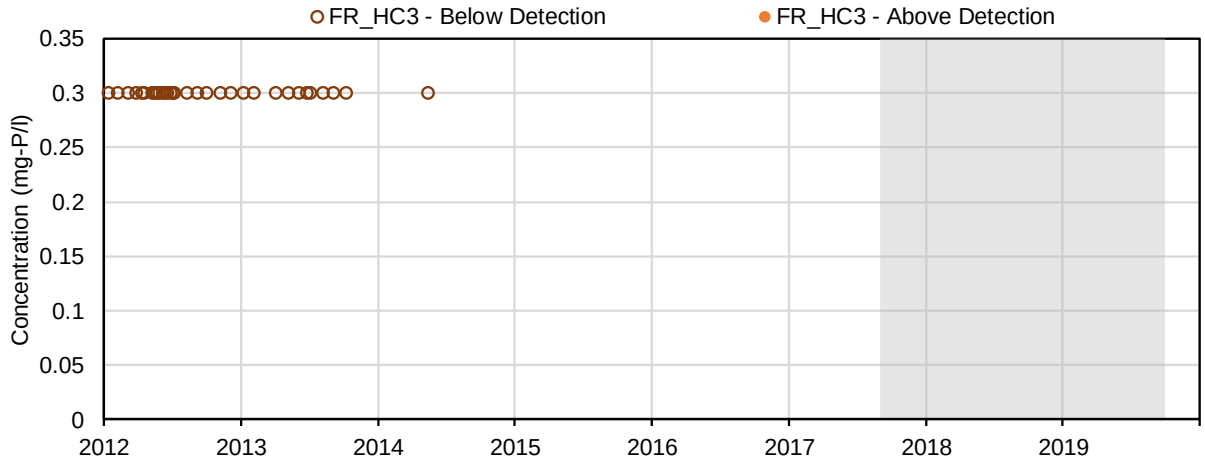
(33) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



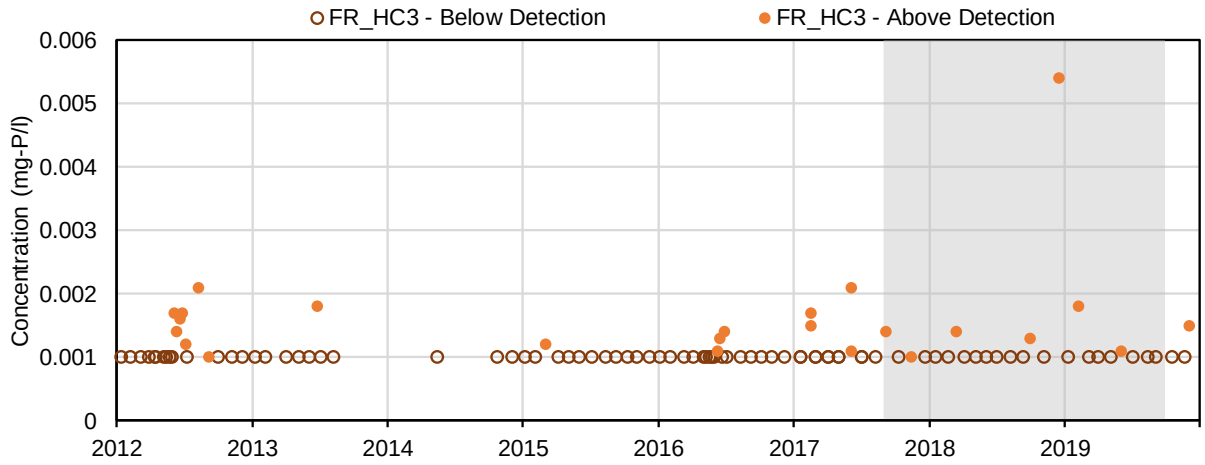
(34) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



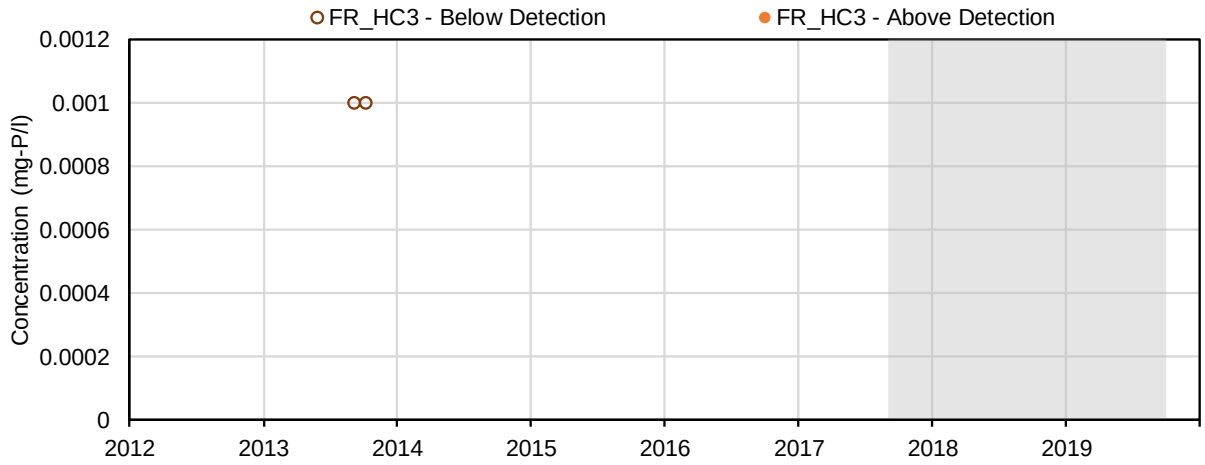
(35) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



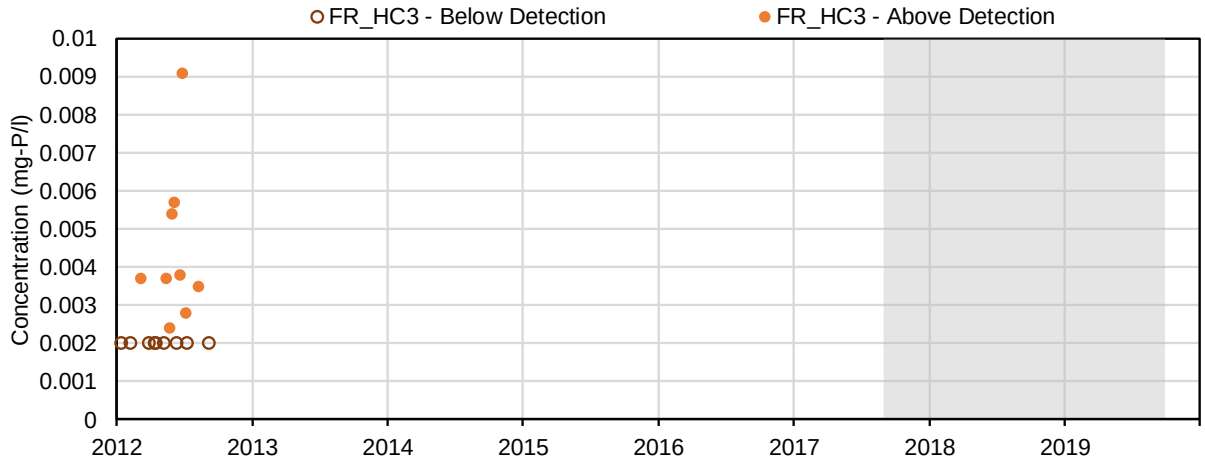
(36) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



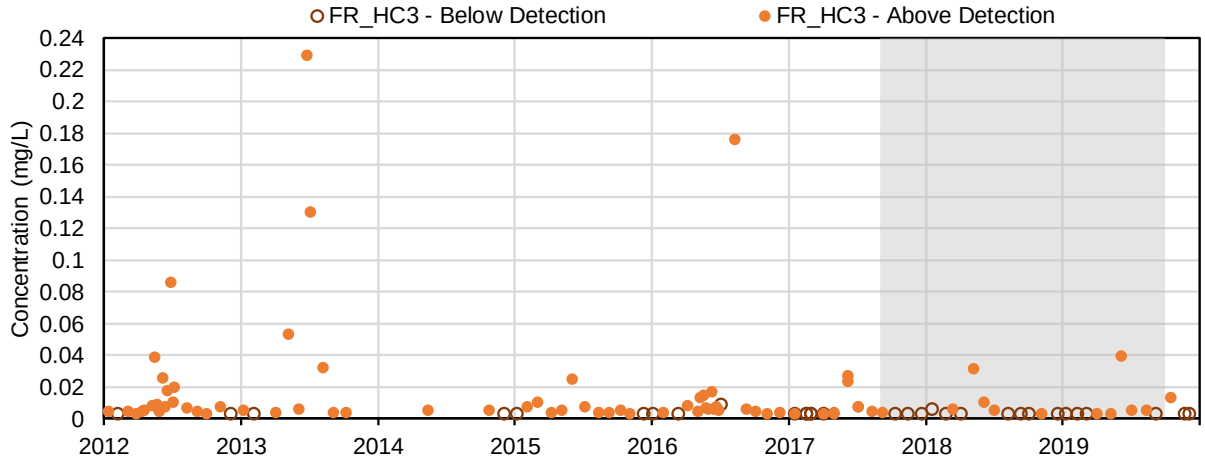
(37) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



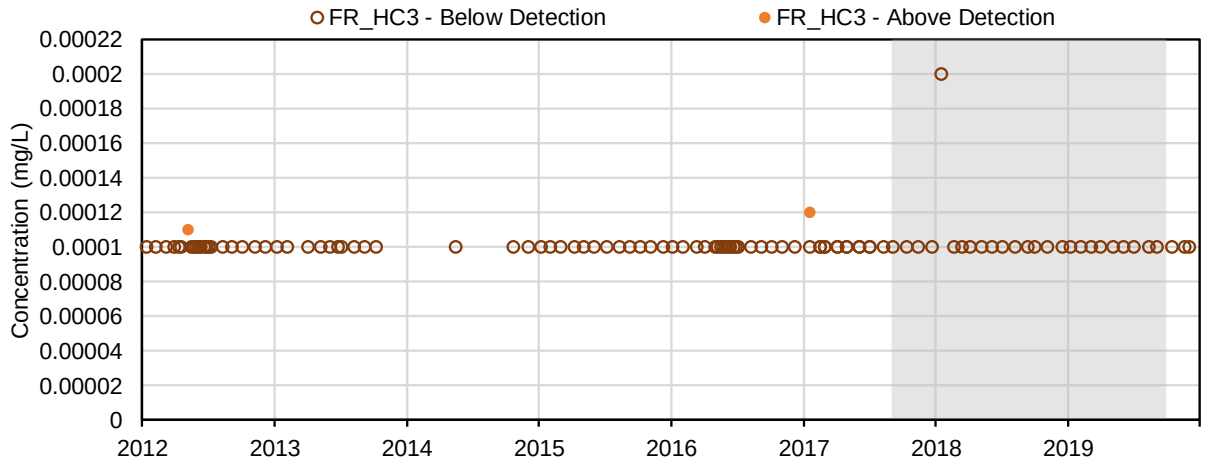
(38) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



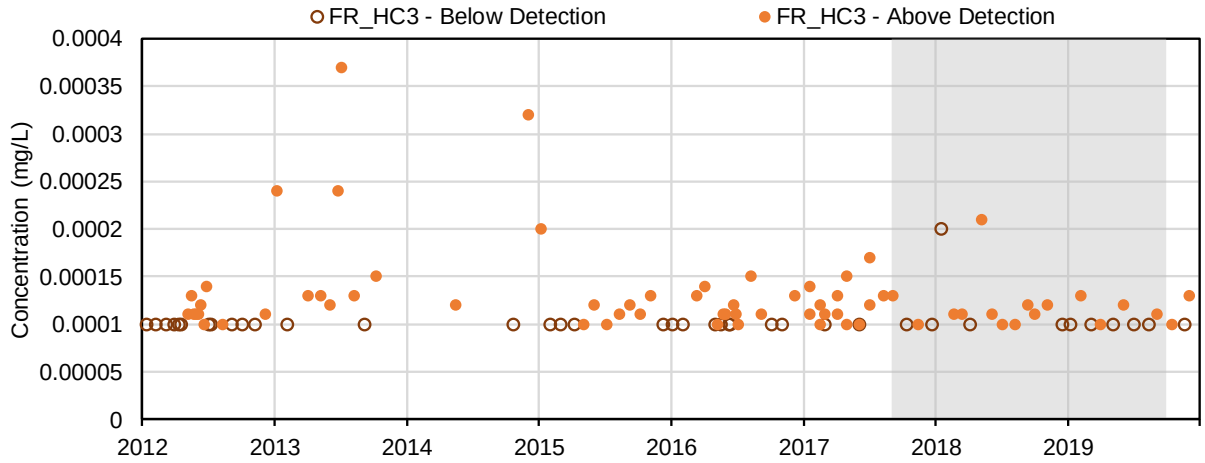
(39) Aluminum (mg/L); Total Metals



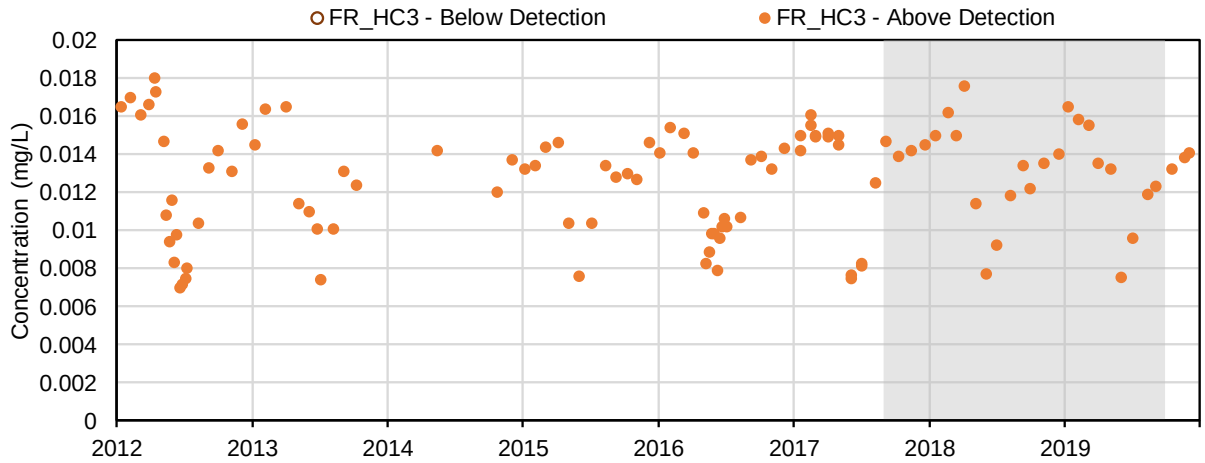
(40) Antimony (mg/L); Total Metals



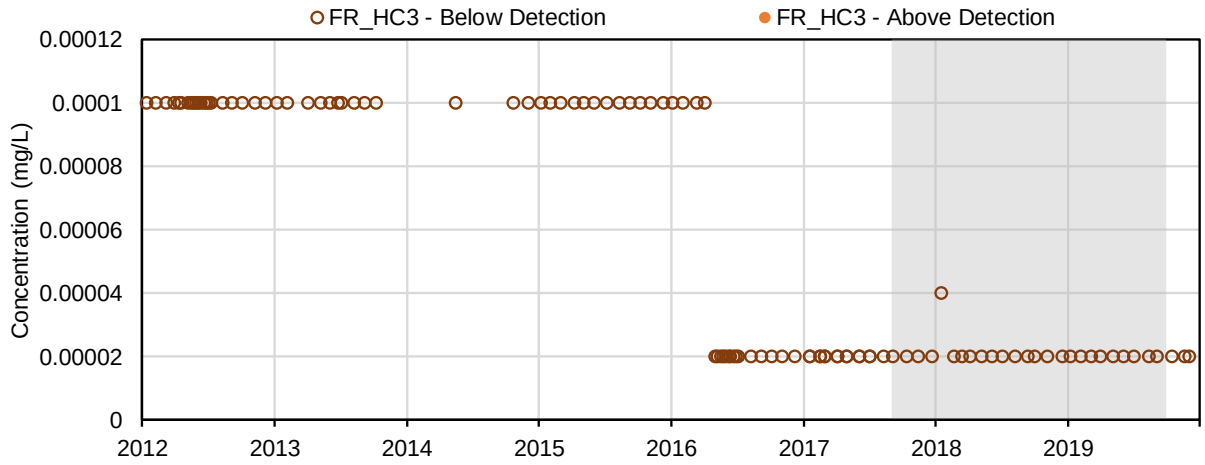
(41) Arsenic (mg/L); Total Metals



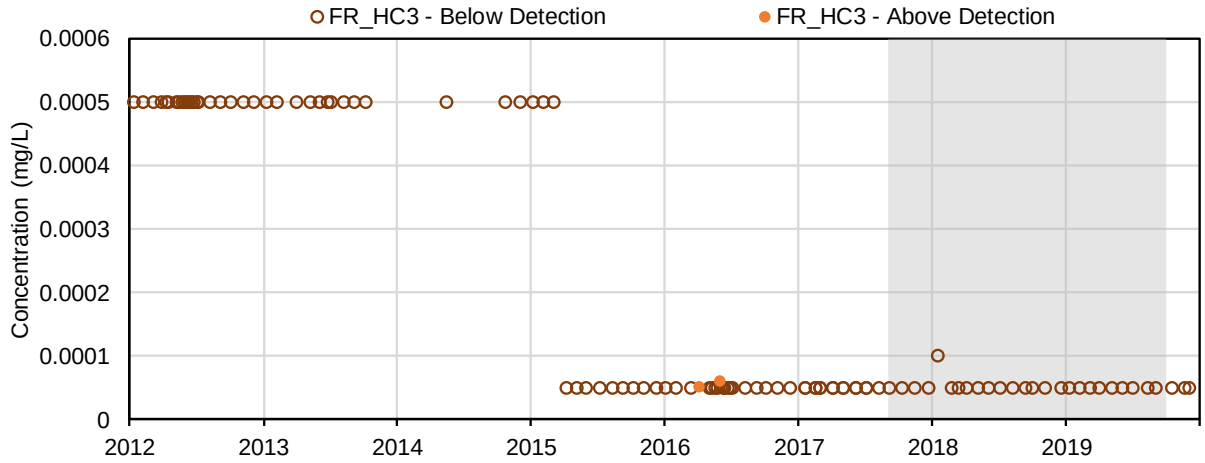
(42) Barium (mg/L); Total Metals



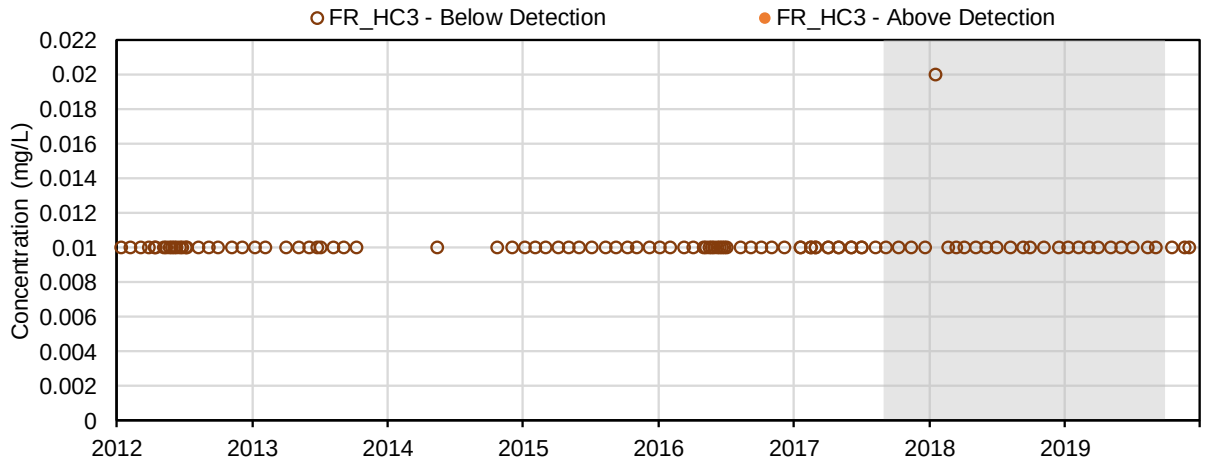
(43) Beryllium (mg/L); Total Metals



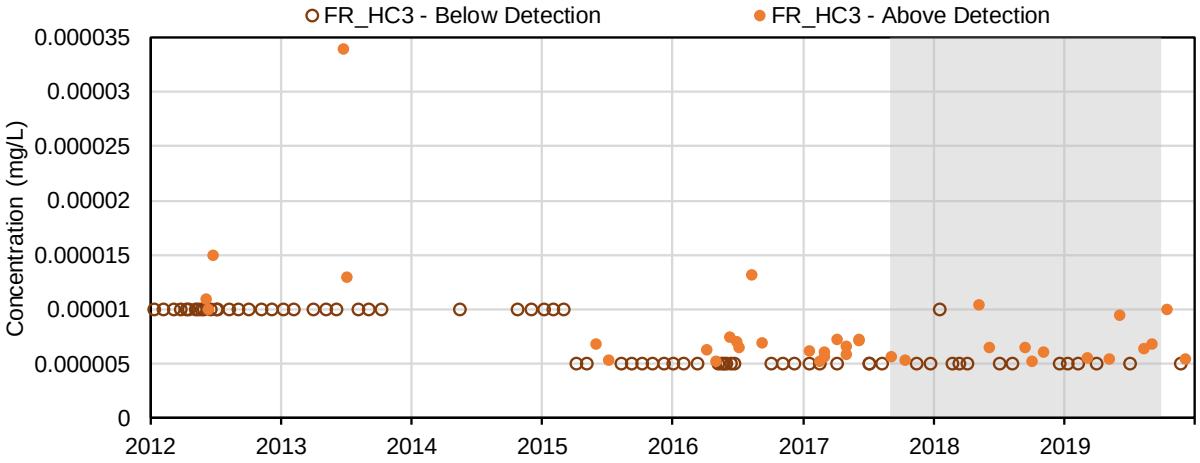
(44) Bismuth (mg/L); Total Metals



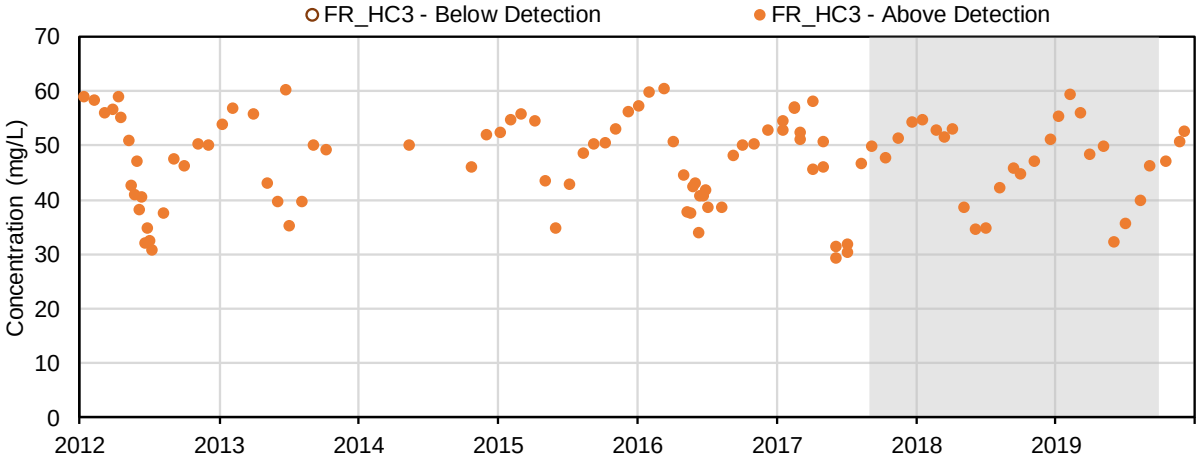
(45) Boron (mg/L); Total Metals



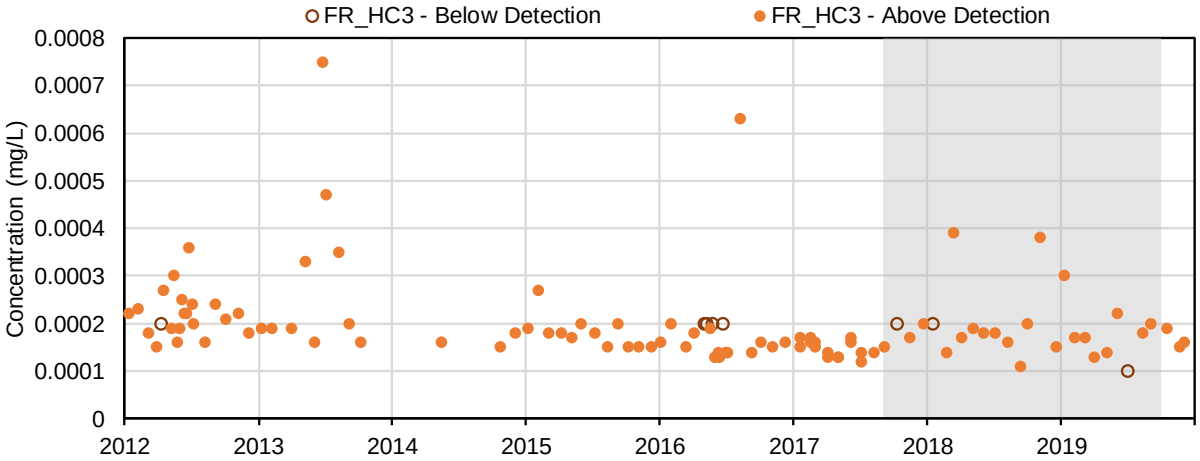
(46) Cadmium (mg/L); Total Metals



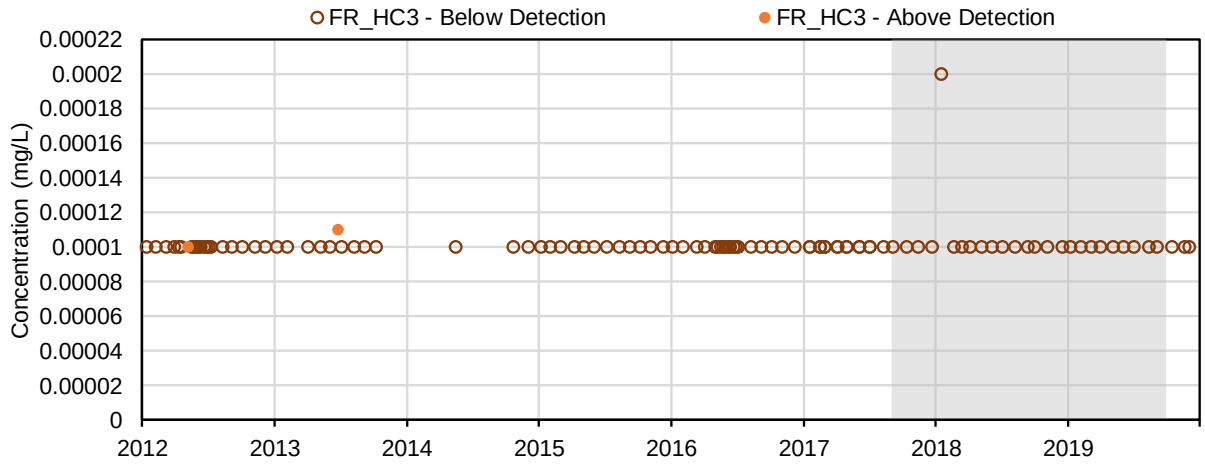
(47) Calcium (mg/L); Total Metals



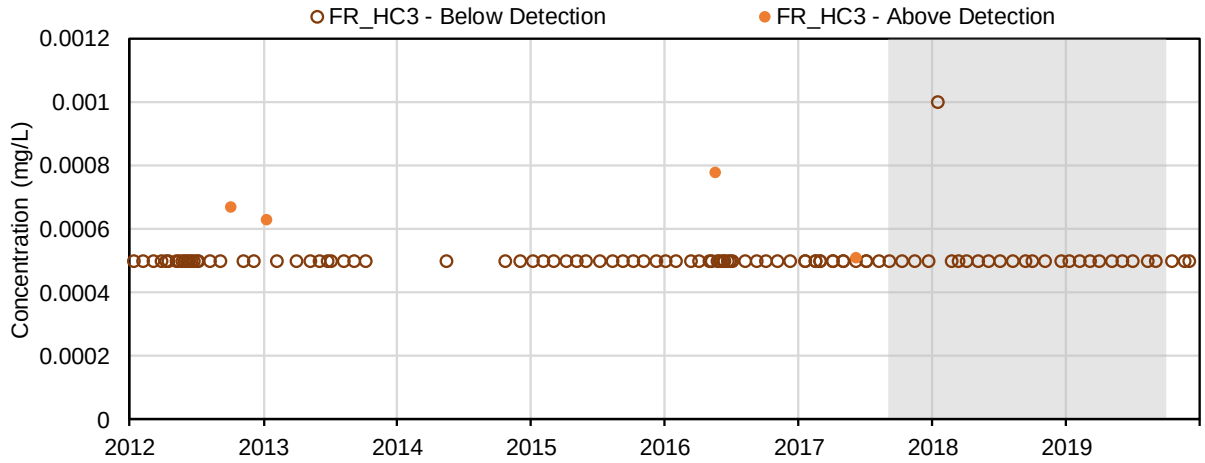
(48) Chromium (mg/L); Total Metals



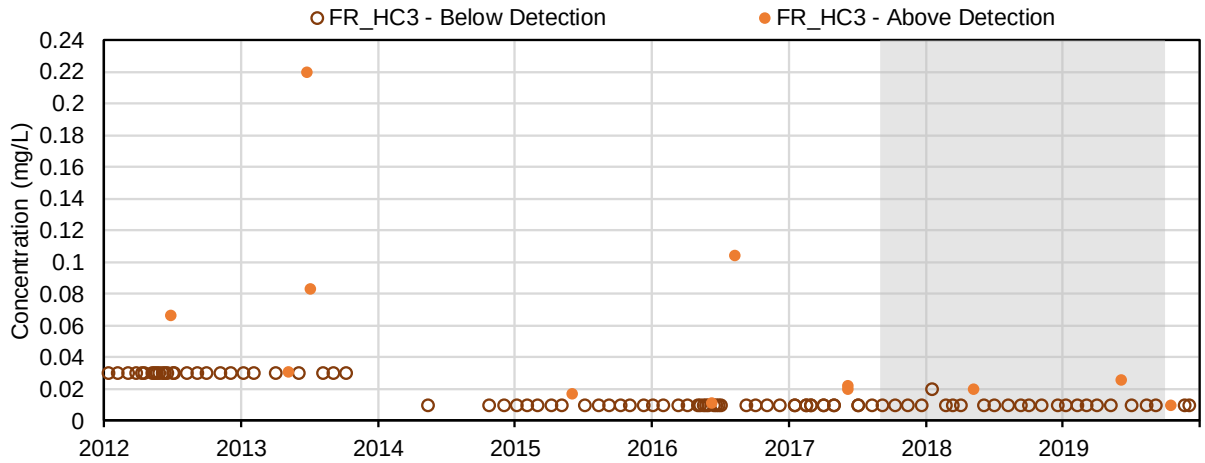
(49) Cobalt (mg/L); Total Metals



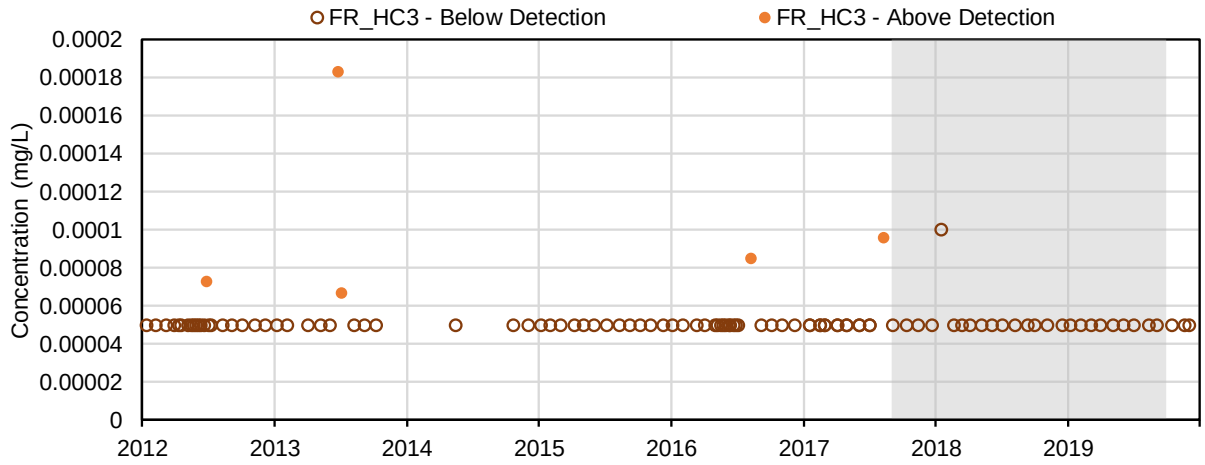
(50) Copper (mg/L); Total Metals



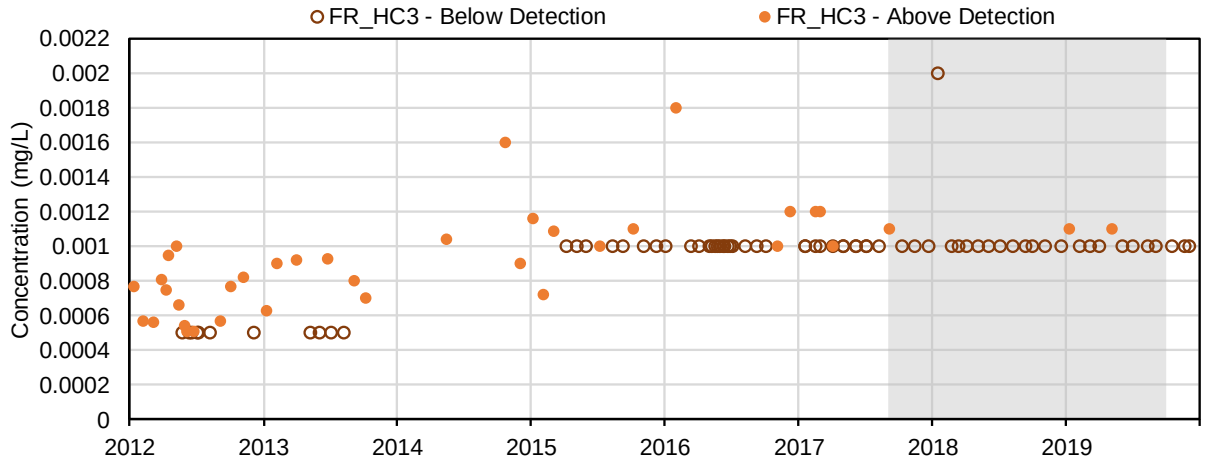
(51) Iron (mg/L); Total Metals



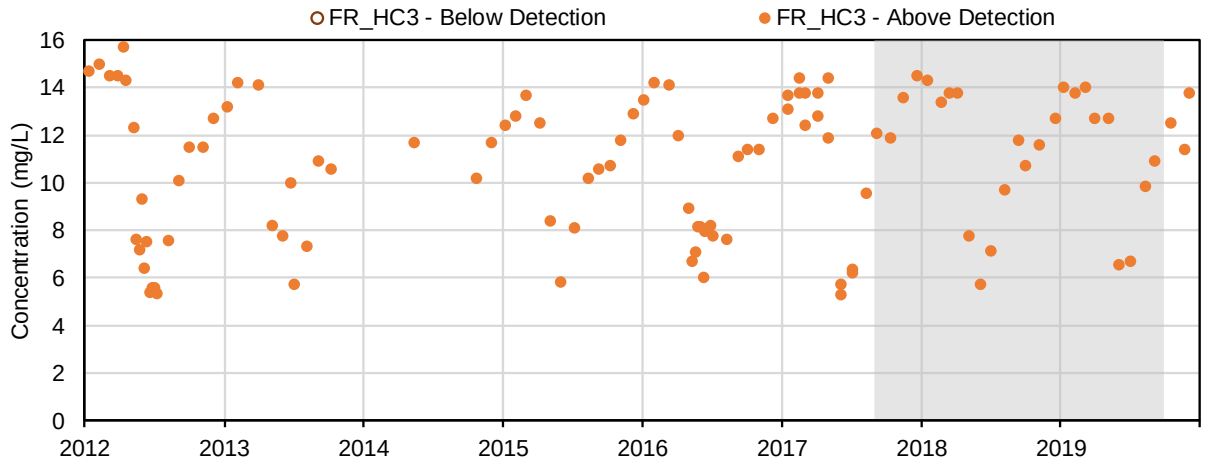
(52) Lead (mg/L); Total Metals



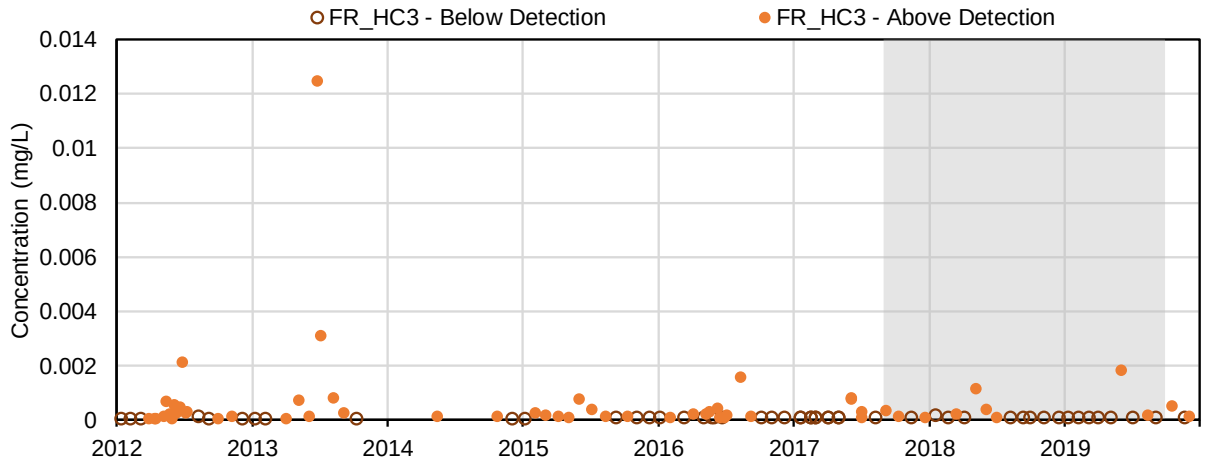
(53) Lithium (mg/L); Total Metals



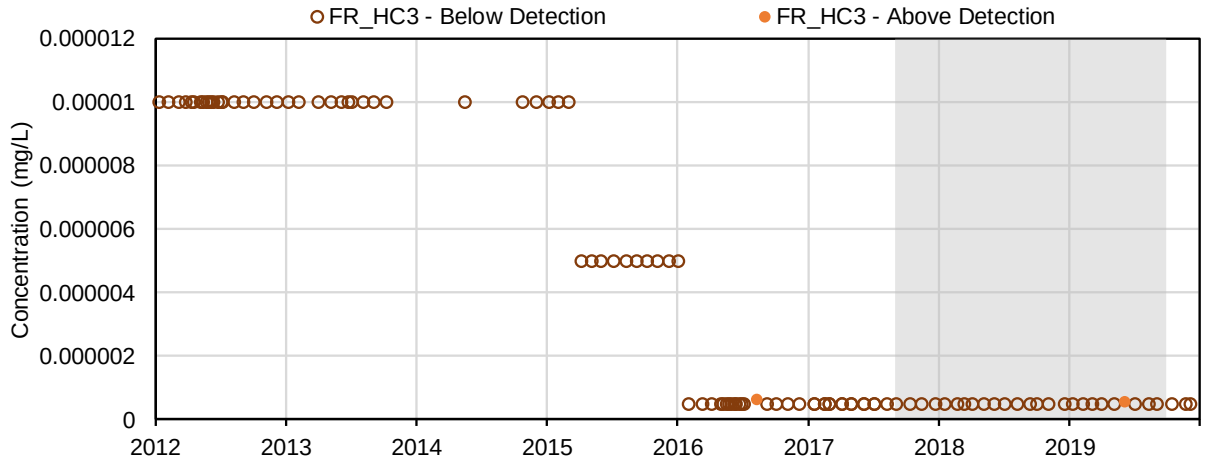
(54) Magnesium (mg/L); Total Metals



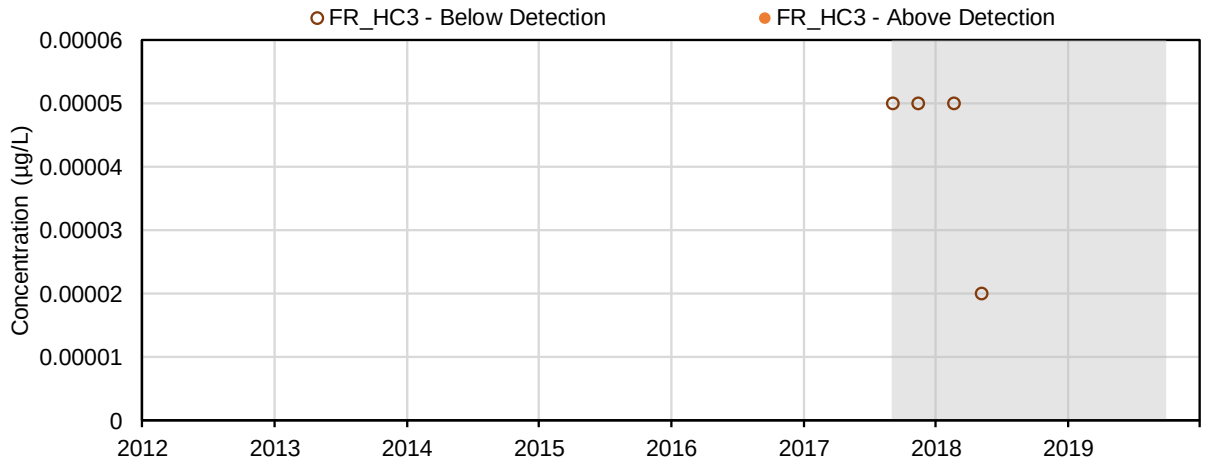
(55) Manganese (mg/L); Total Metals



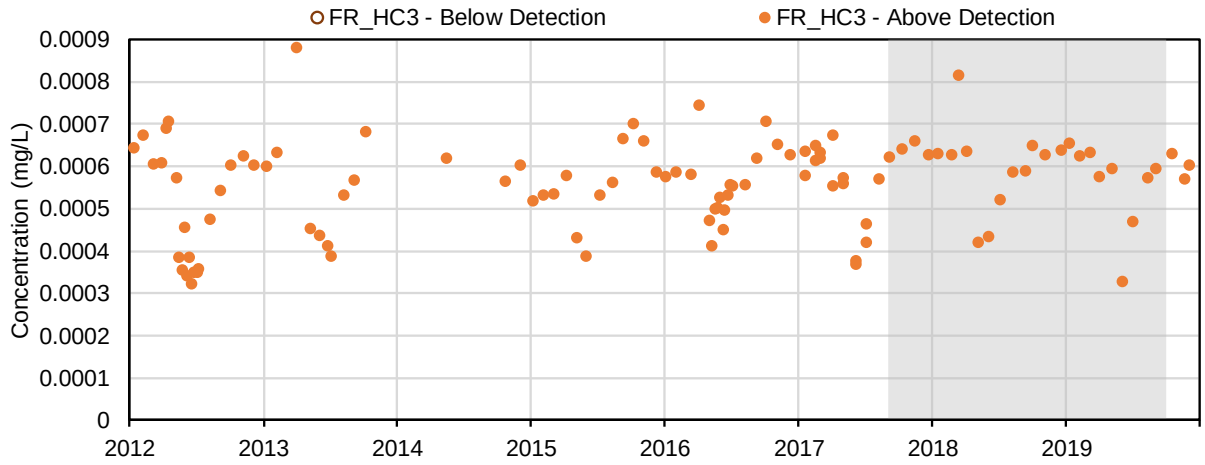
(56) Mercury (mg/L); Total Metals



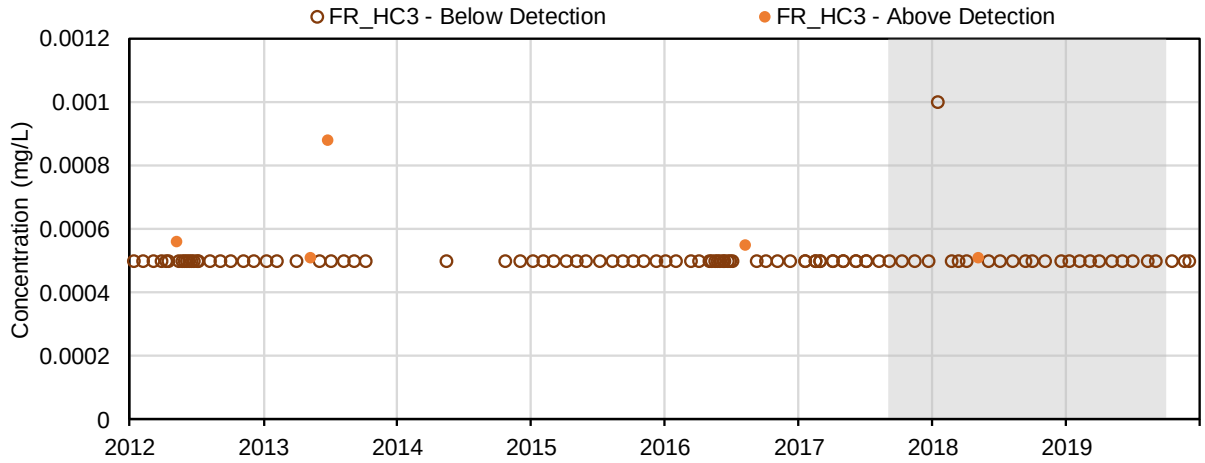
(57) Methyl mercury (µg/L); Total Metals



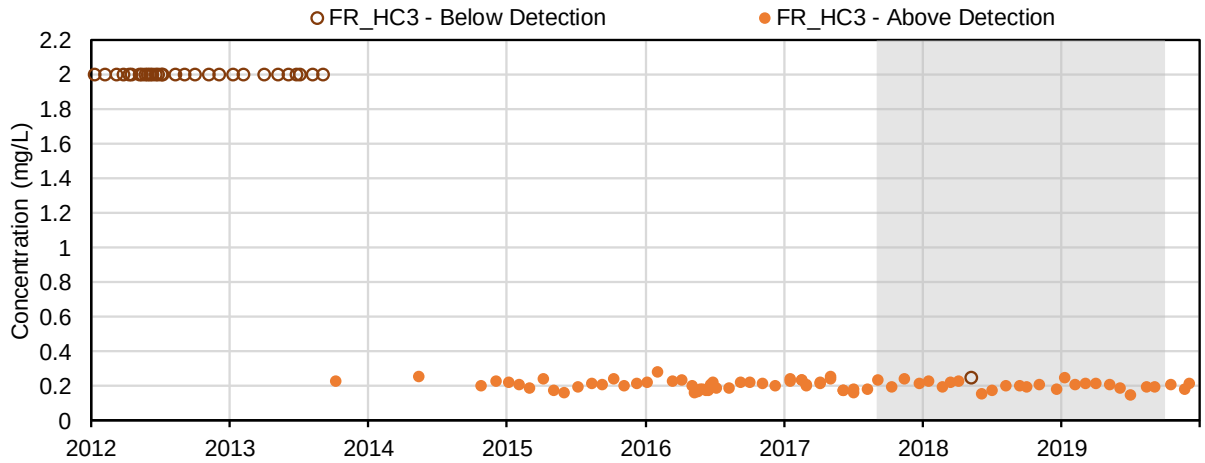
(58) Molybdenum (mg/L); Total Metals



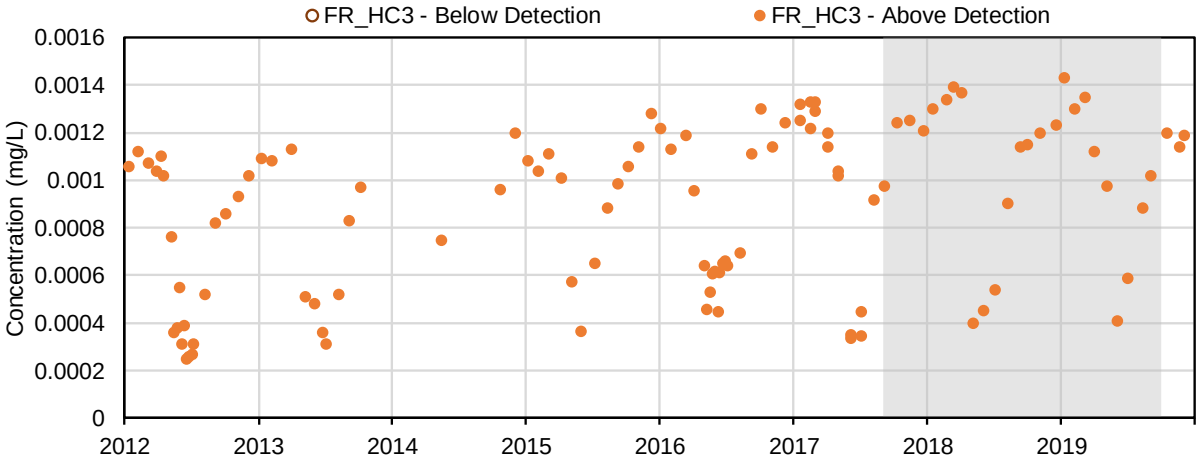
(59) Nickel (mg/L); Total Metals



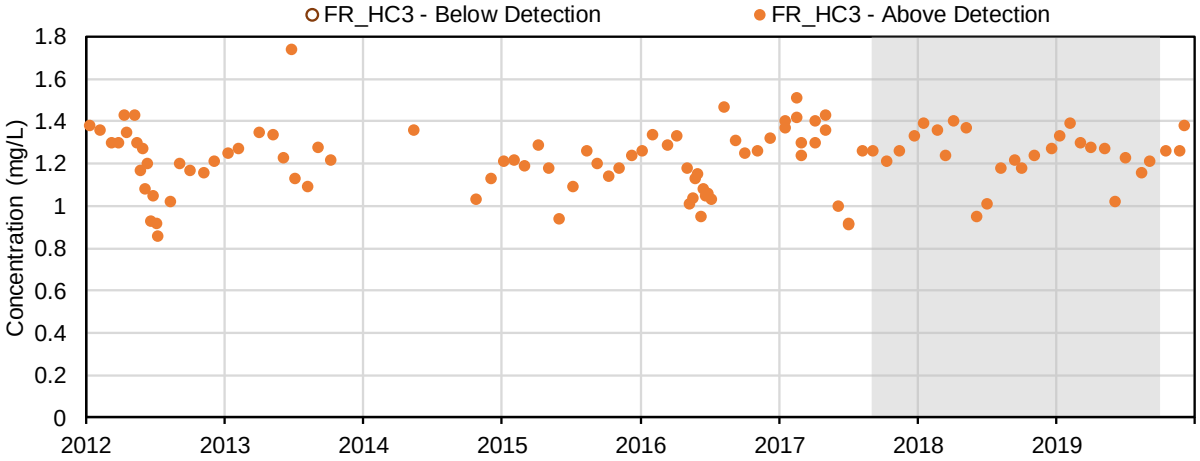
(60) Potassium (mg/L); Total Metals



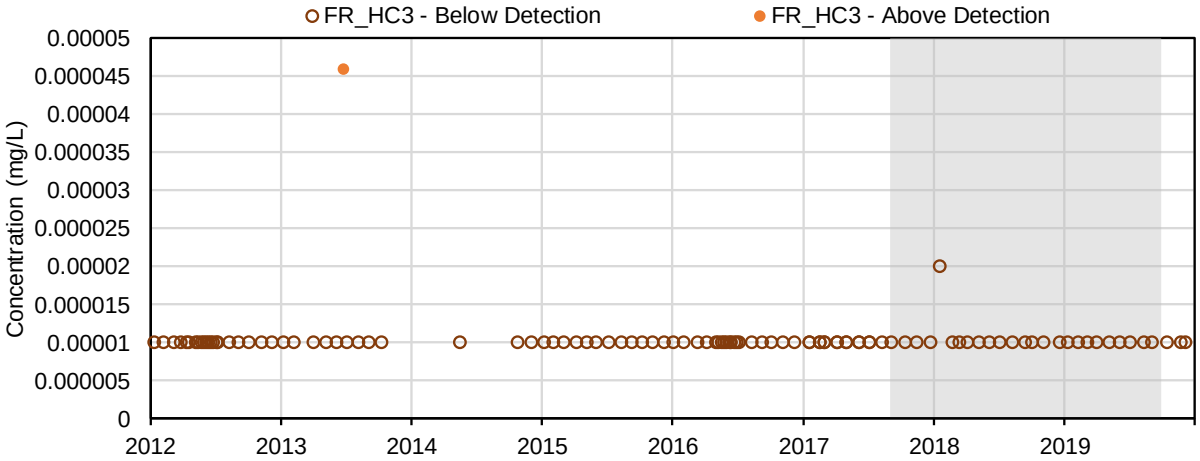
(61) Selenium (mg/L); Total Metals



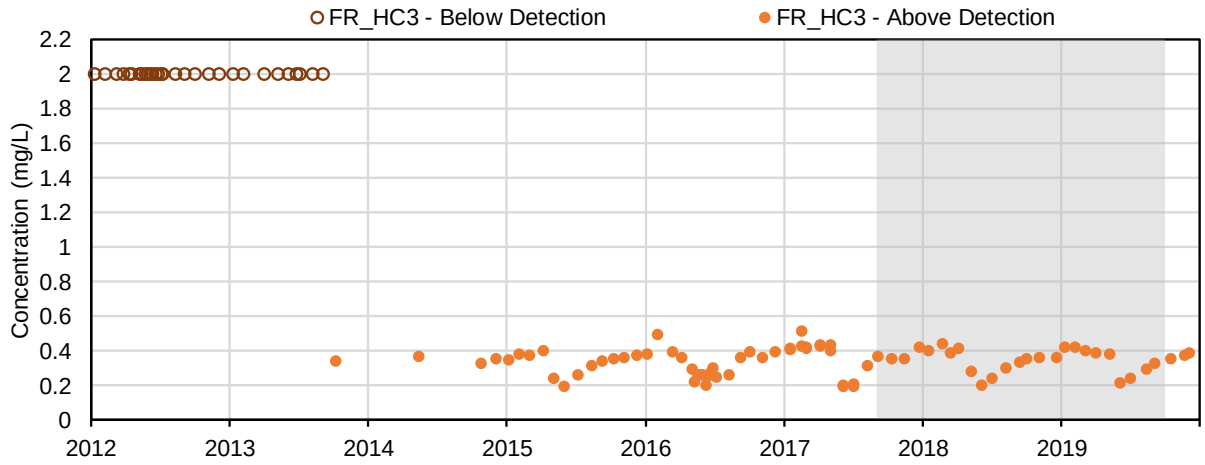
(62) Silicon (mg/L); Total Metals



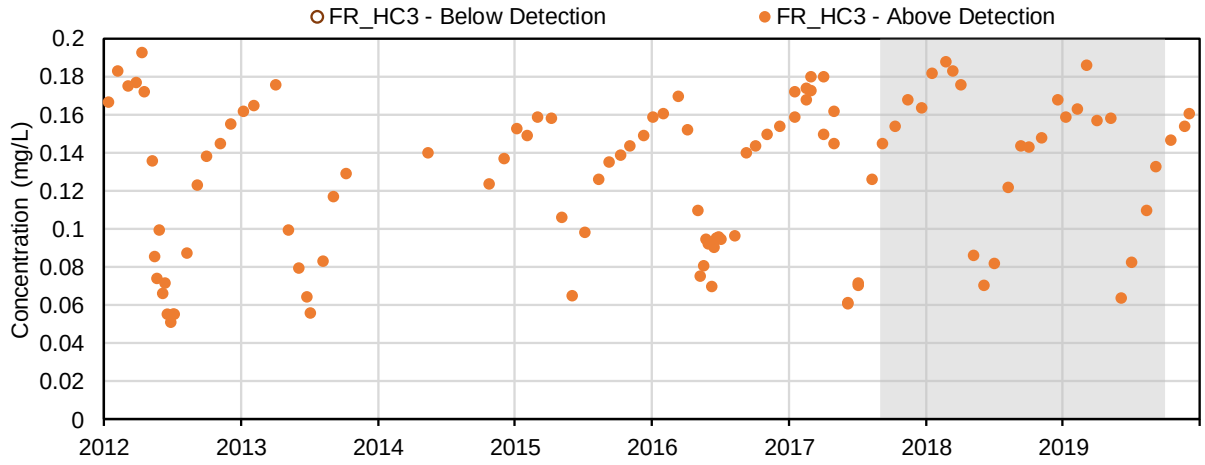
(63) Silver (mg/L); Total Metals



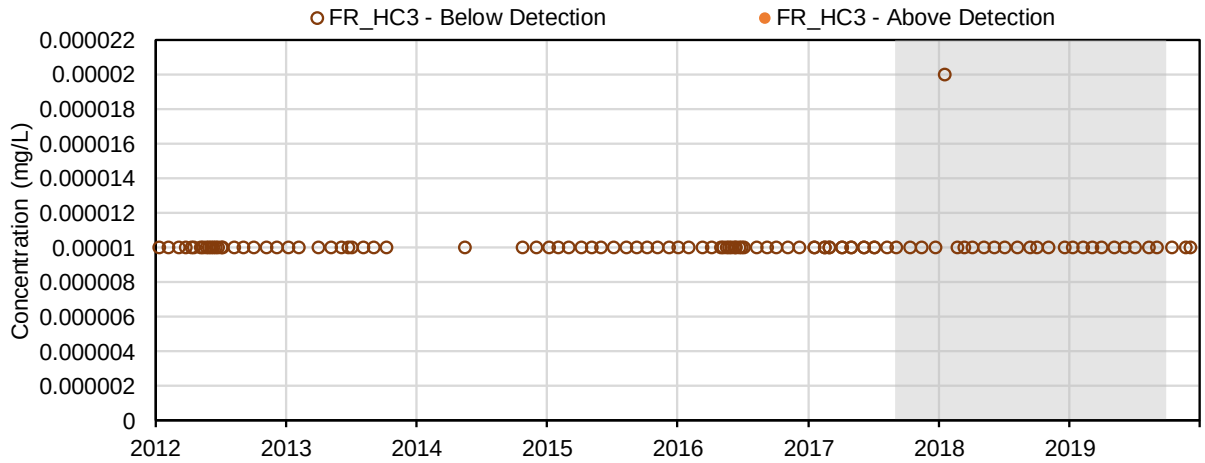
(64) Sodium (mg/L); Total Metals



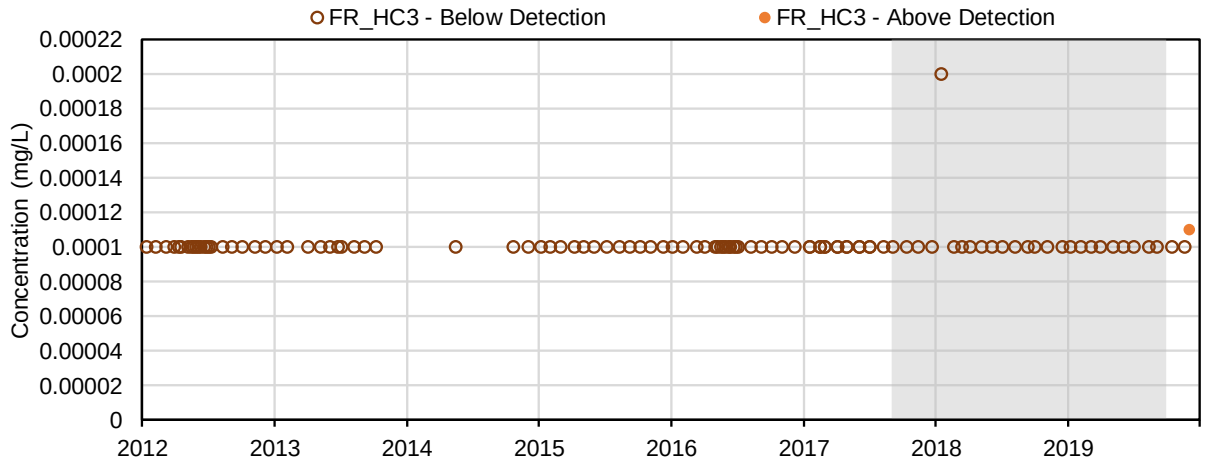
(65) Strontium (mg/L); Total Metals



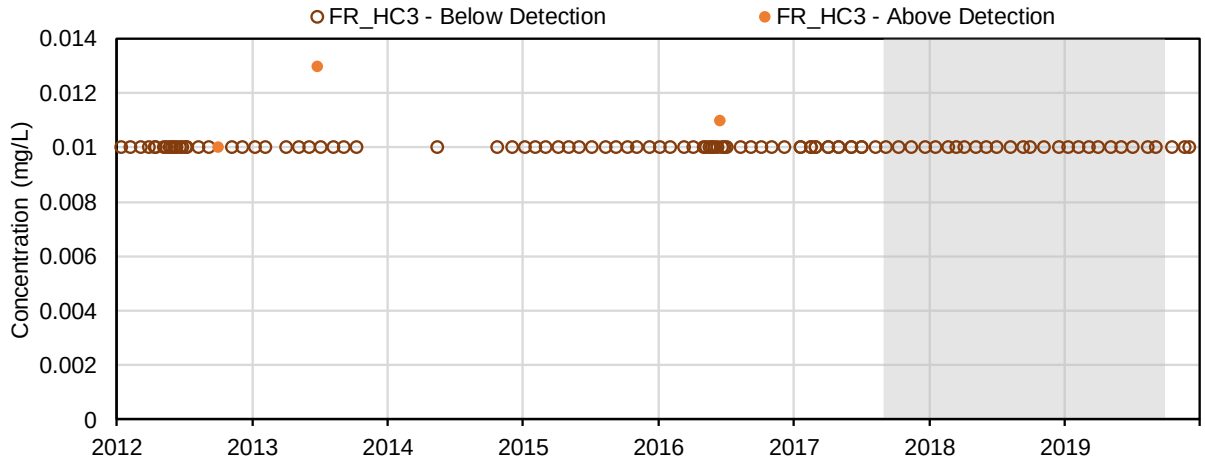
(66) Thallium (mg/L); Total Metals



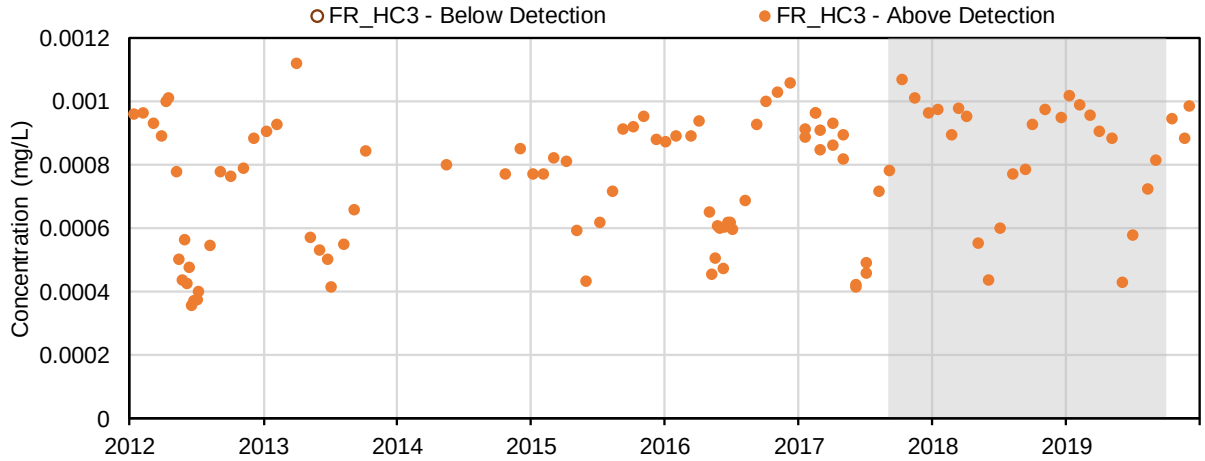
(67) Tin (mg/L); Total Metals



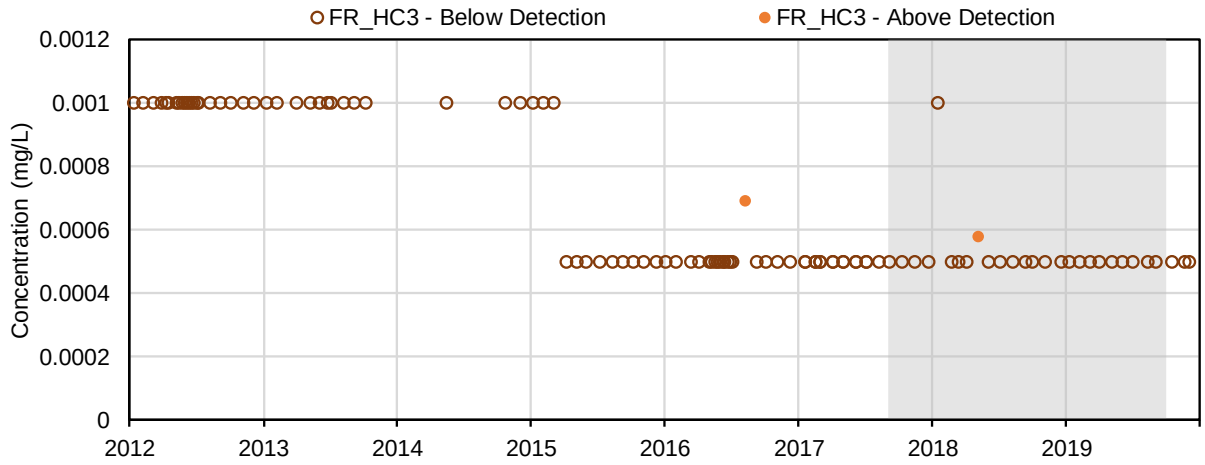
(68) Titanium (mg/L); Total Metals



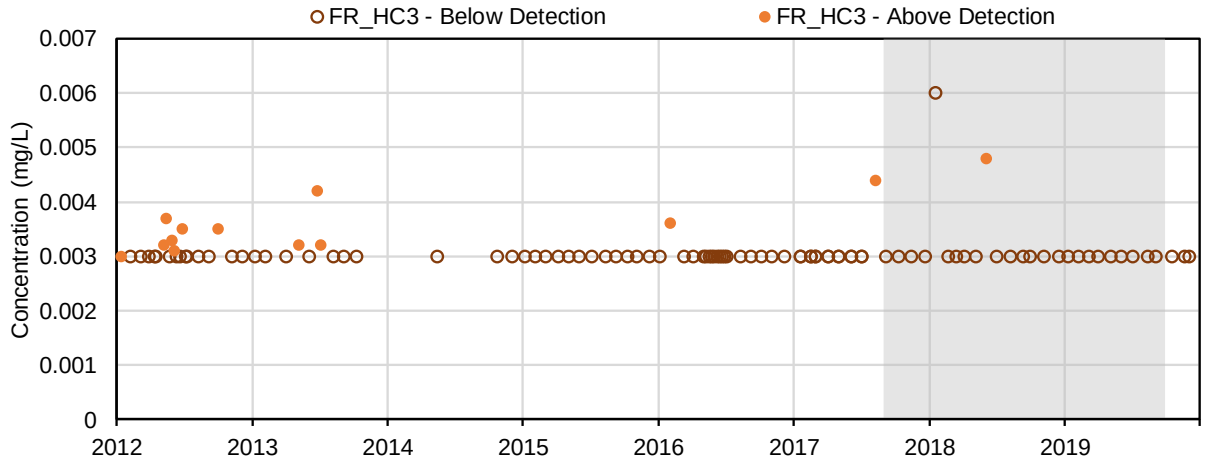
(69) Uranium (mg/L); Total Metals



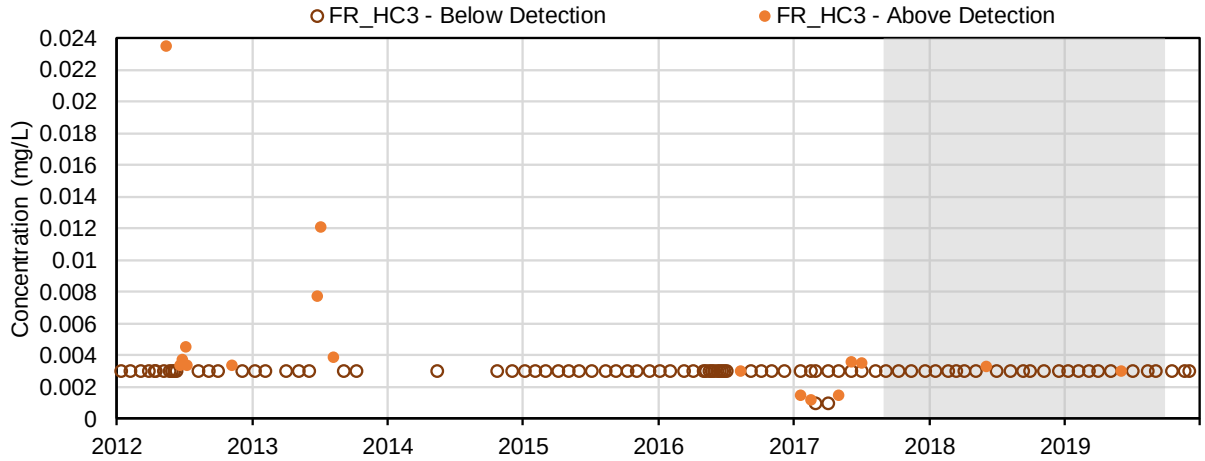
(70) Vanadium (mg/L); Total Metals



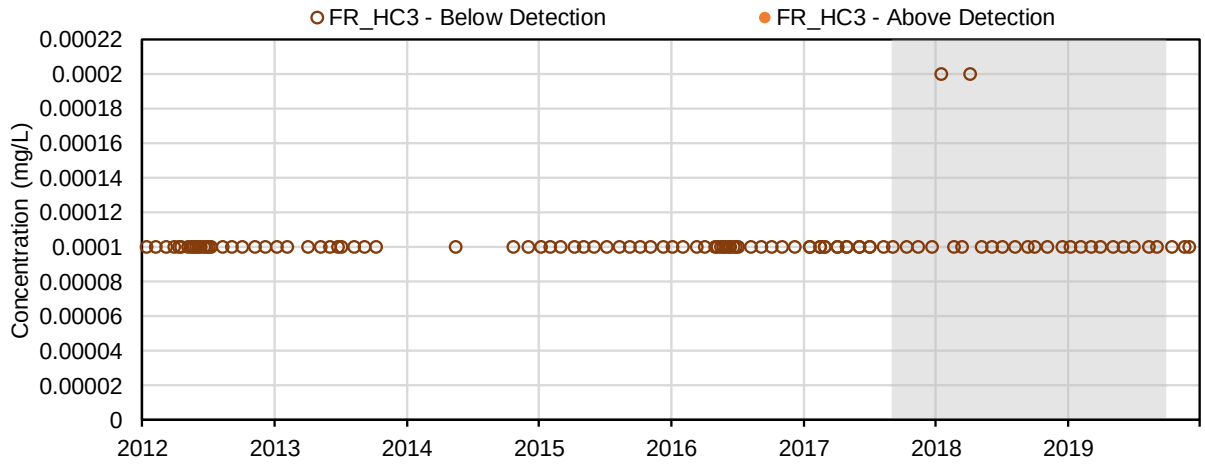
(71) Zinc (mg/L); Total Metals



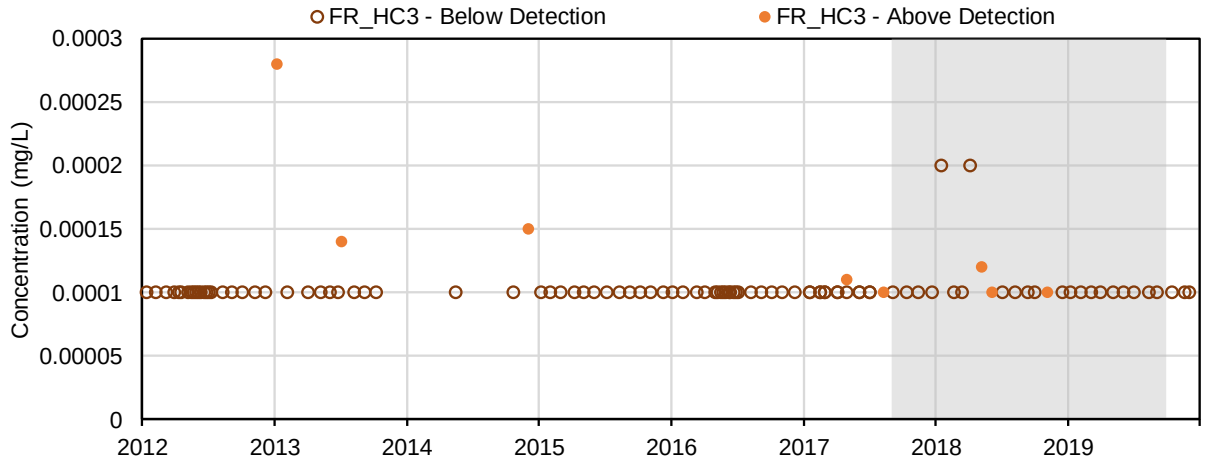
(72) Aluminum (mg/L); Dissolved Metals



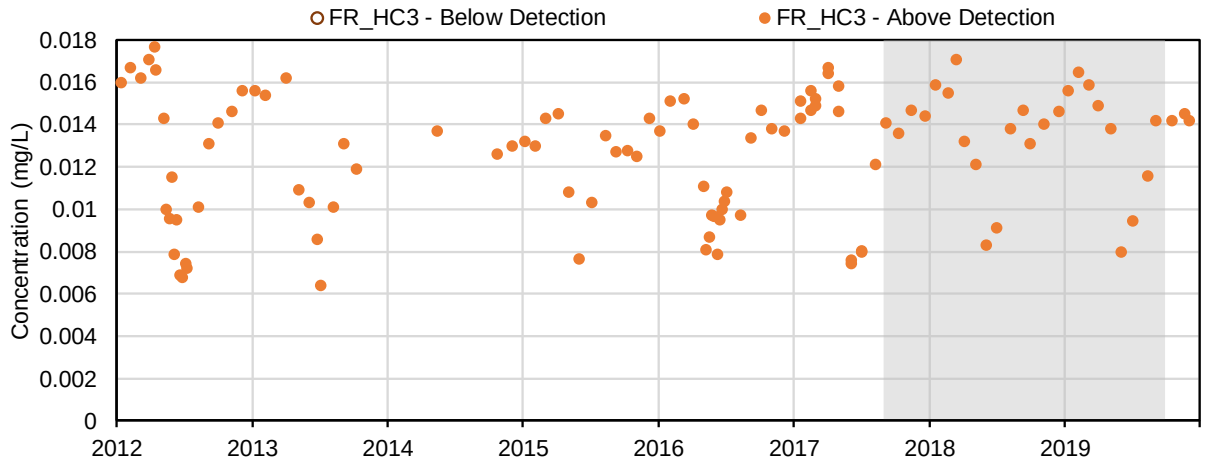
(73) Antimony (mg/L); Dissolved Metals



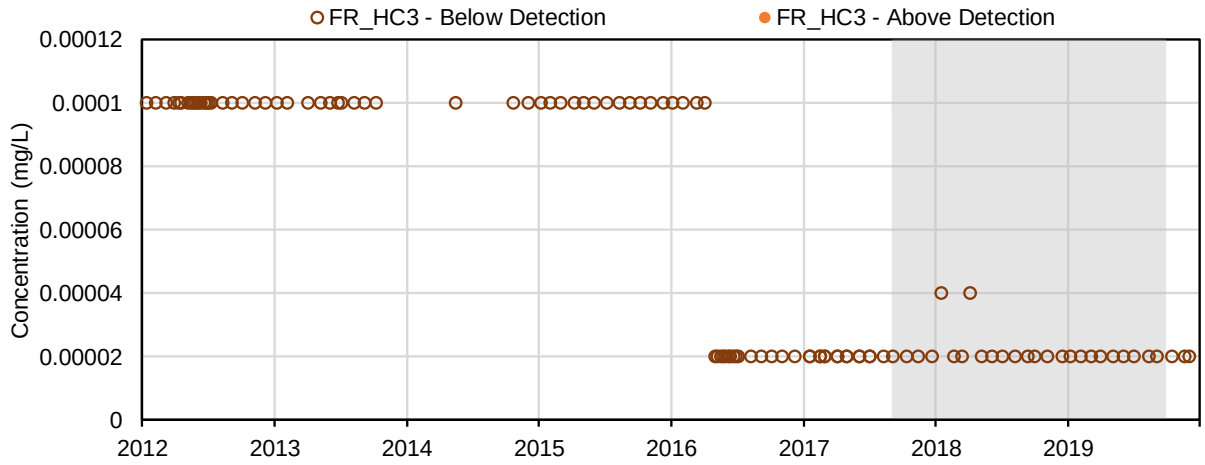
(74) Arsenic (mg/L); Dissolved Metals



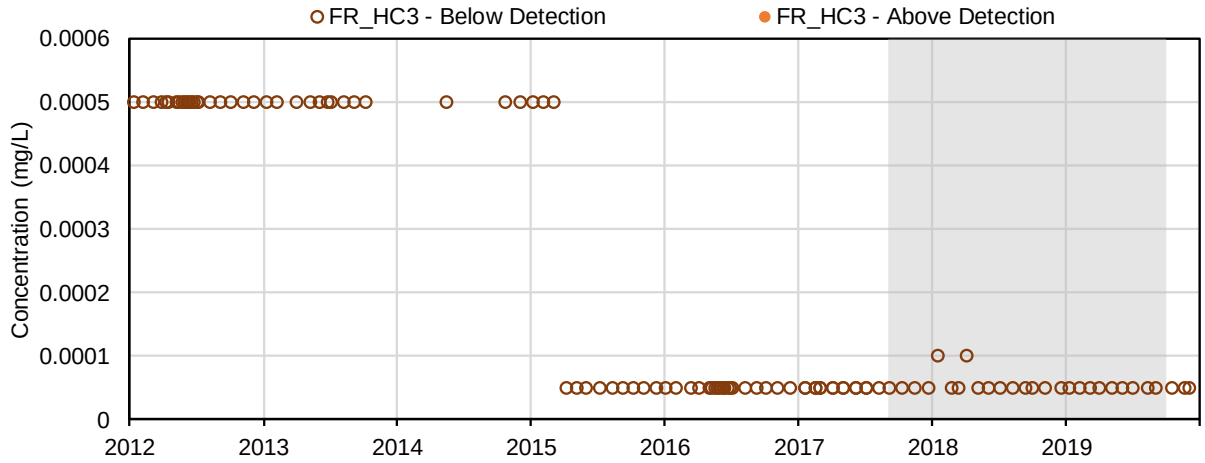
(75) Barium (mg/L); Dissolved Metals



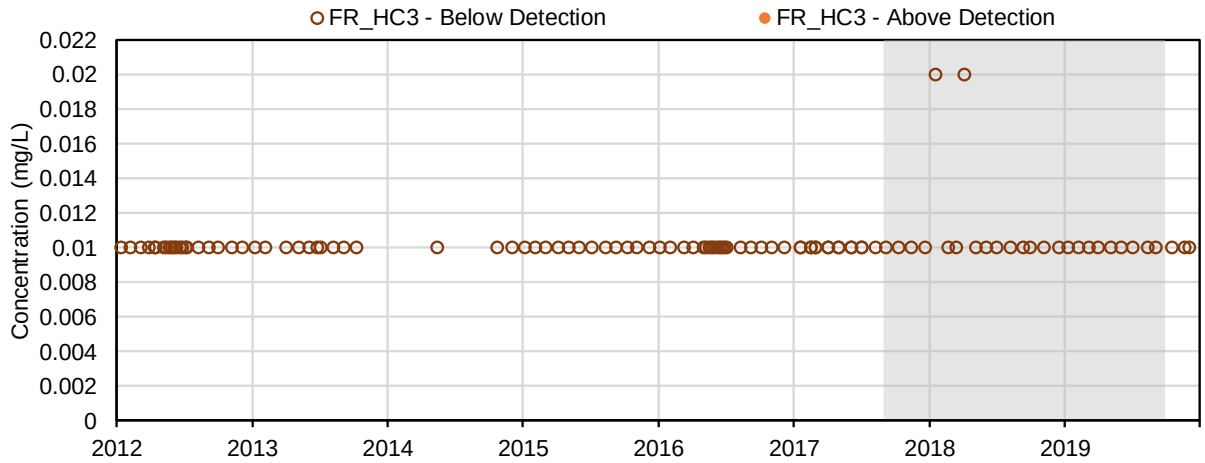
(76) Beryllium (mg/L); Dissolved Metals



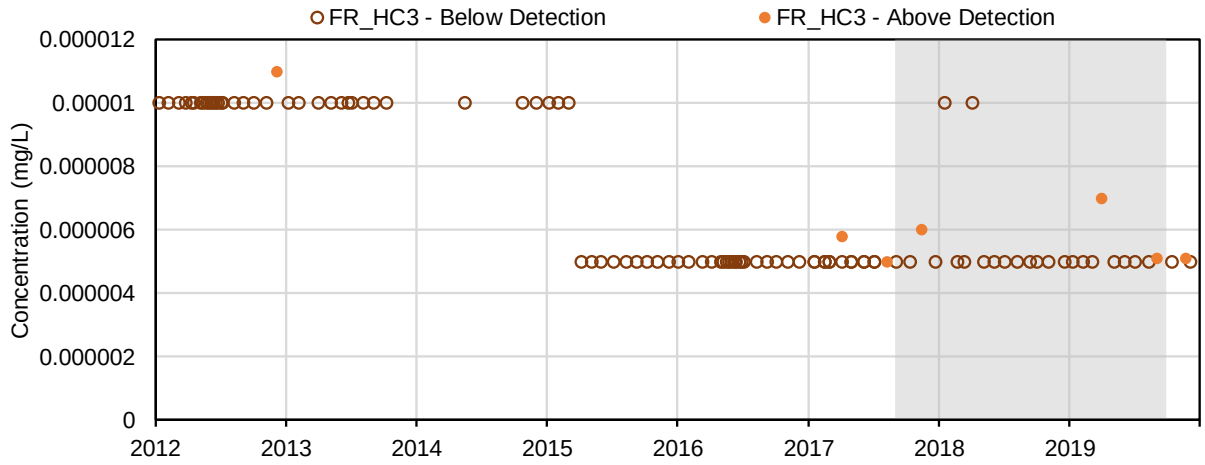
(77) Bismuth (mg/L); Dissolved Metals



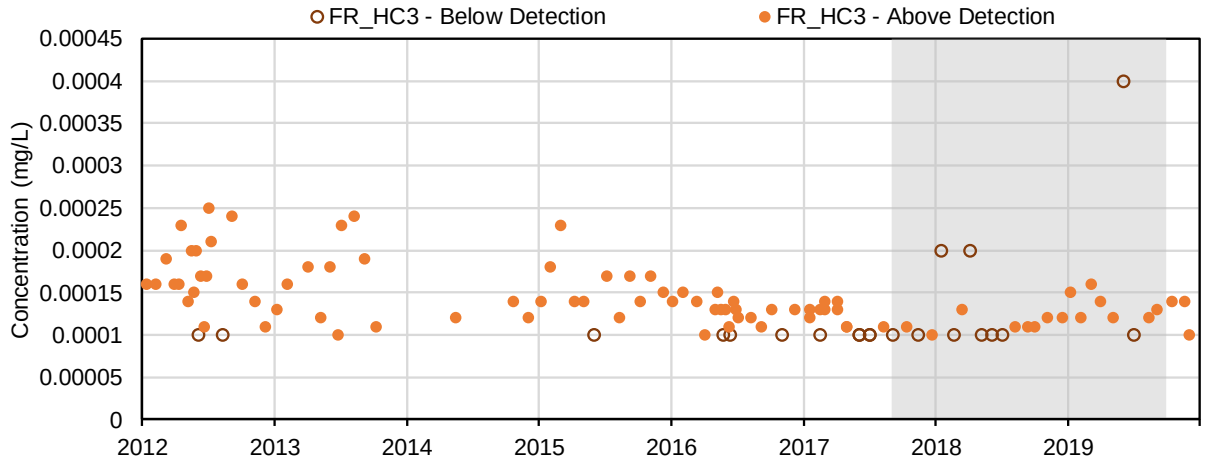
(78) Boron (mg/L); Dissolved Metals



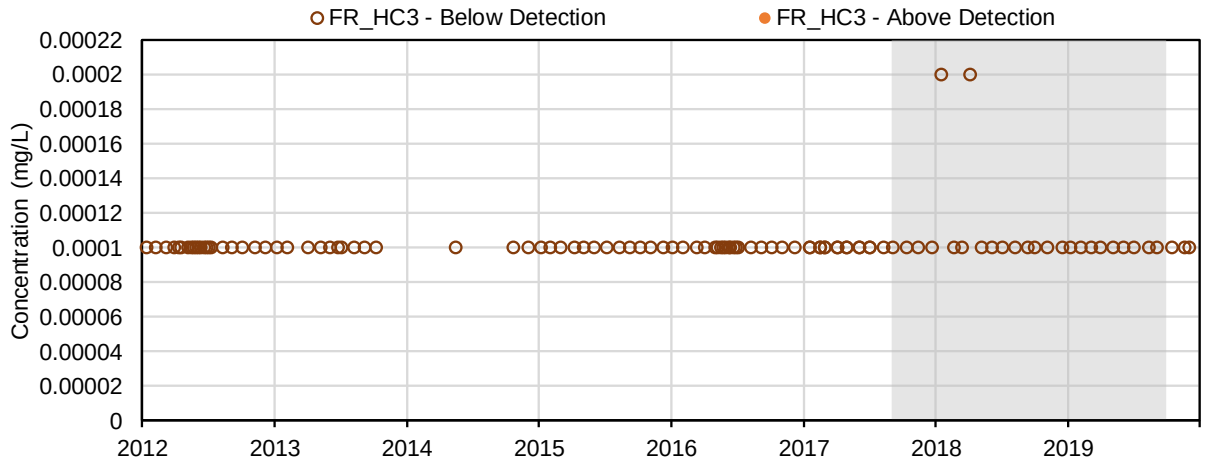
(79) Cadmium (mg/L); Dissolved Metals



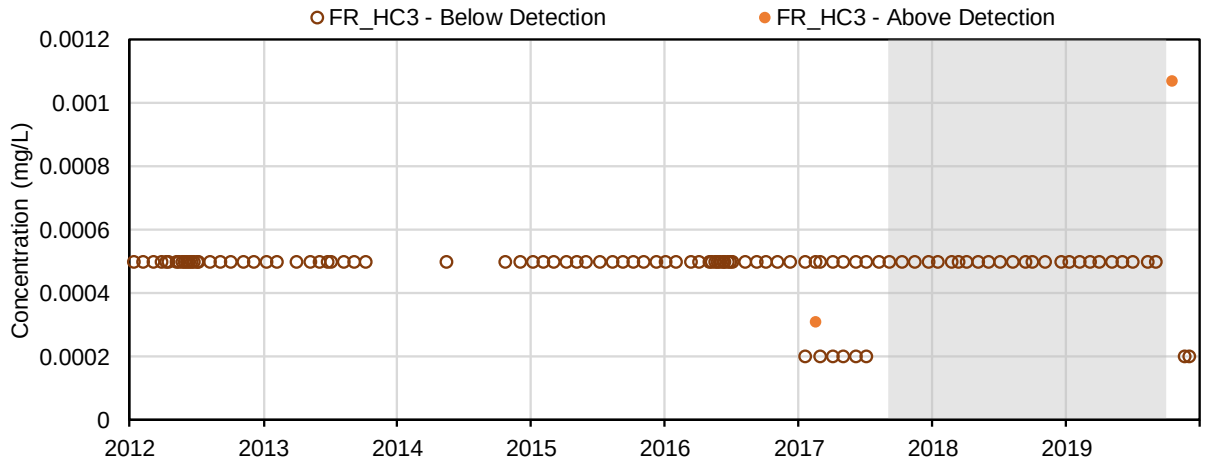
(80) Chromium (mg/L); Dissolved Metals



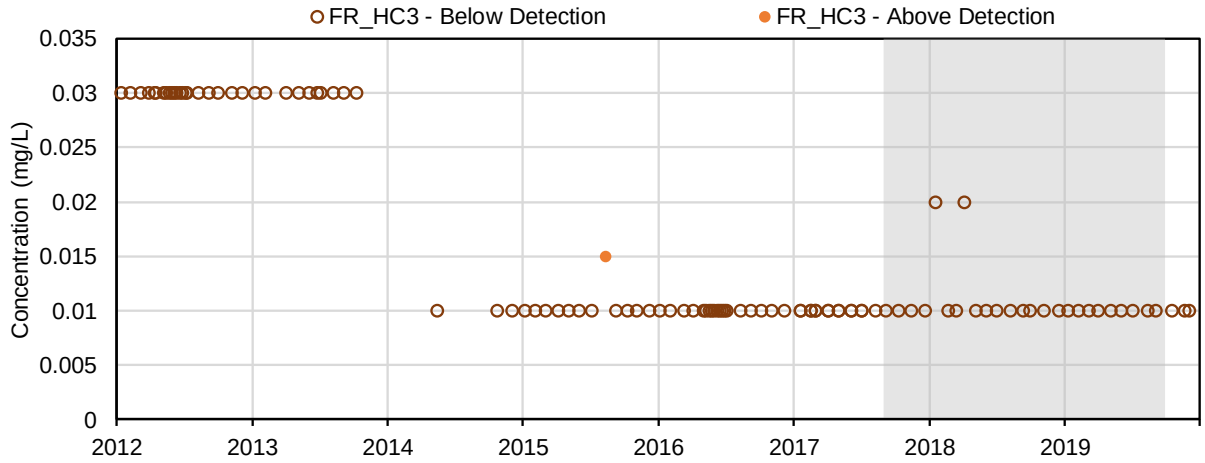
(81) Cobalt (mg/L); Dissolved Metals



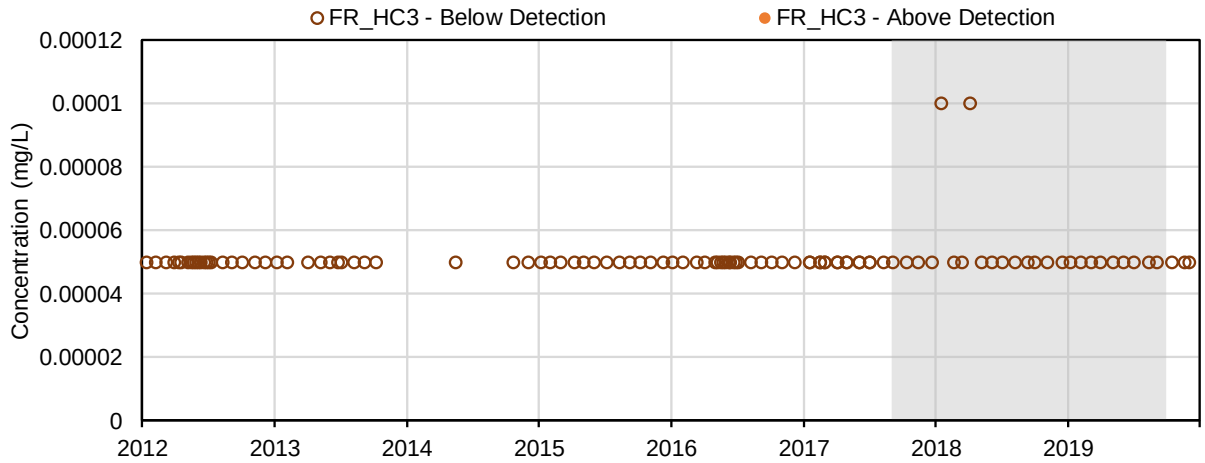
(82) Copper (mg/L); Dissolved Metals



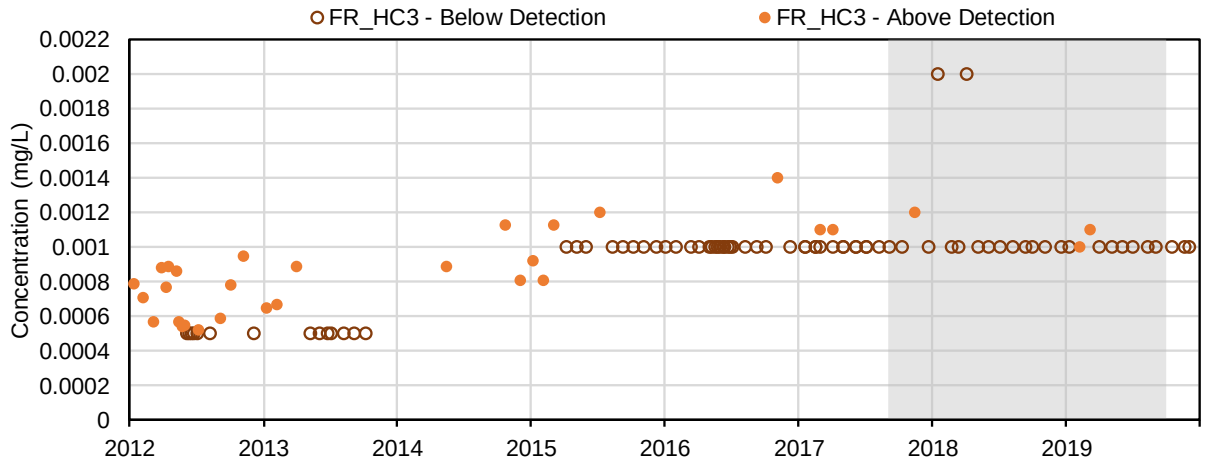
(83) Iron (mg/L); Dissolved Metals



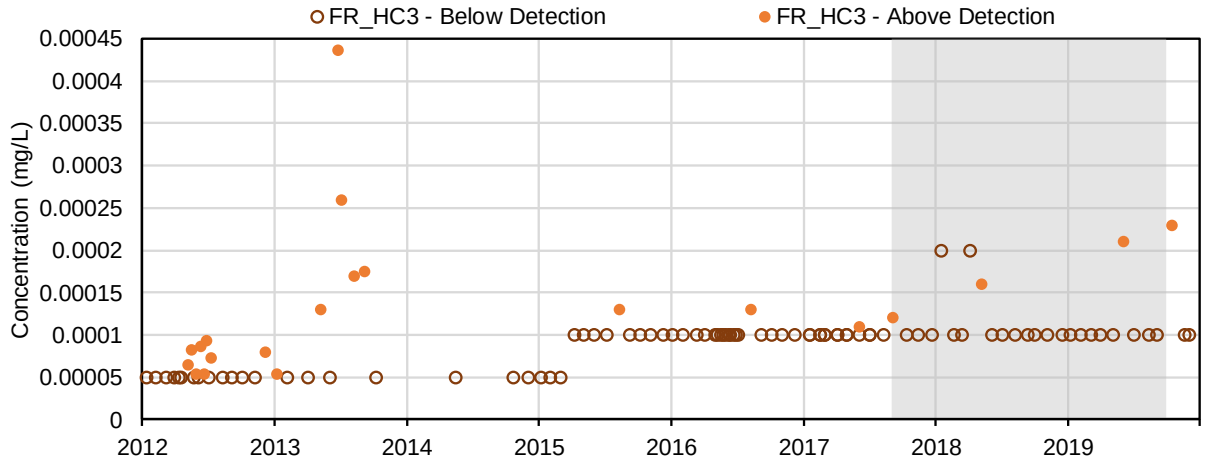
(84) Lead (mg/L); Dissolved Metals



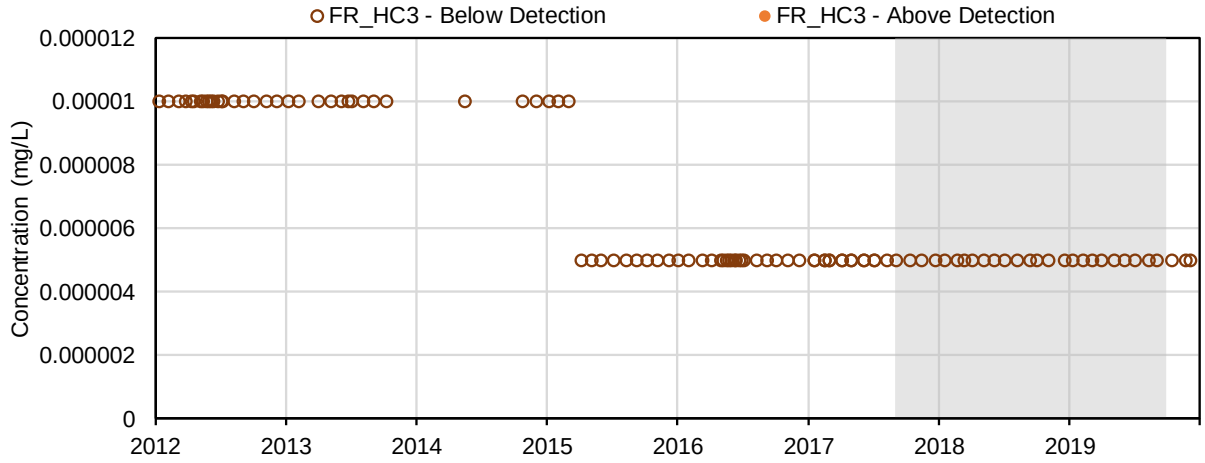
(85) Lithium (mg/L); Dissolved Metals



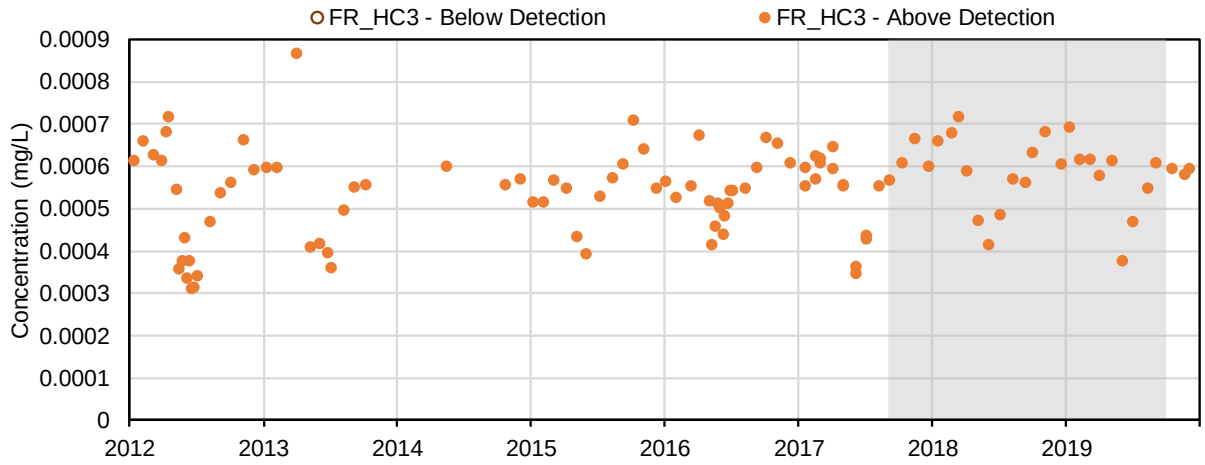
(86) Manganese (mg/L); Dissolved Metals



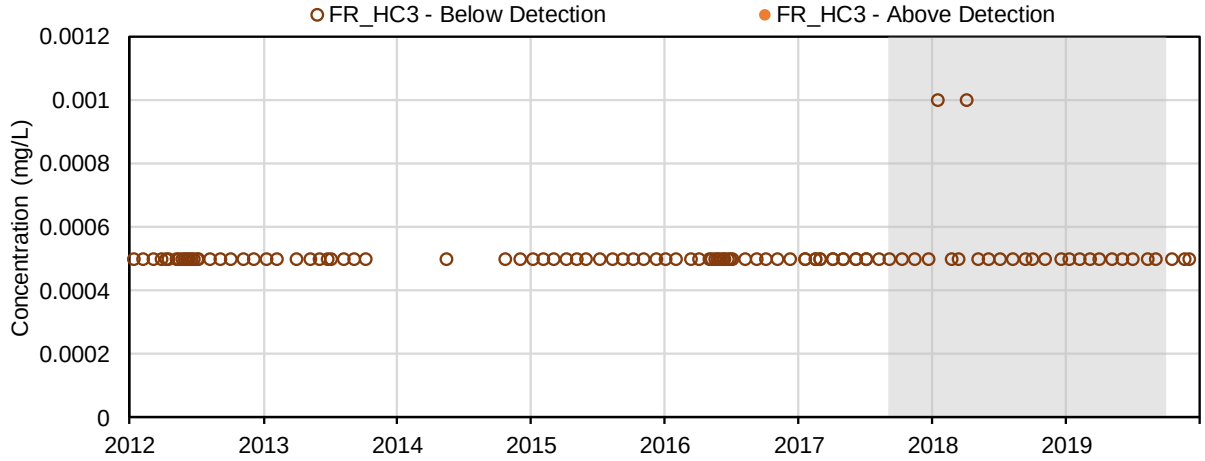
(87) Mercury (mg/L); Dissolved Metals



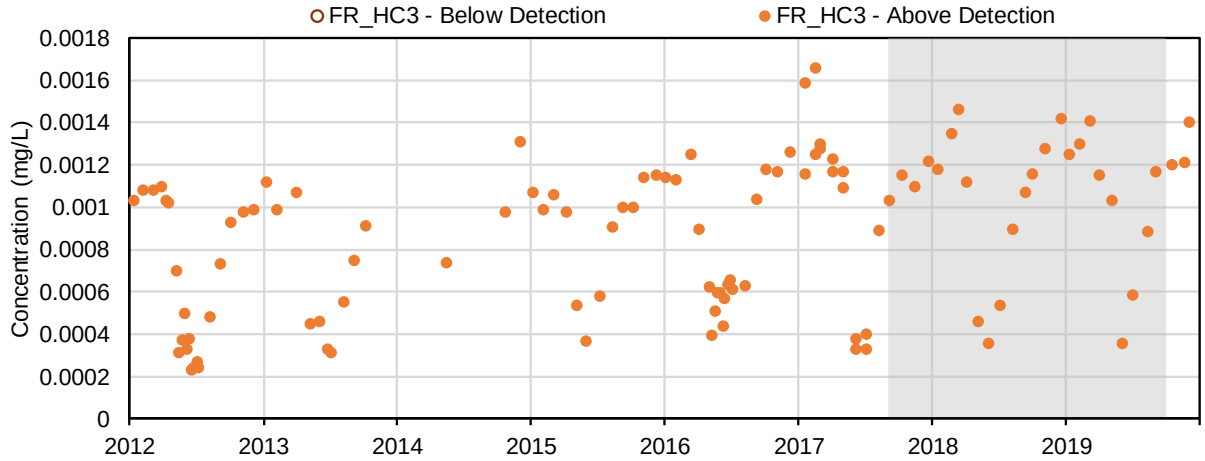
(88) Molybdenum (mg/L); Dissolved Metals



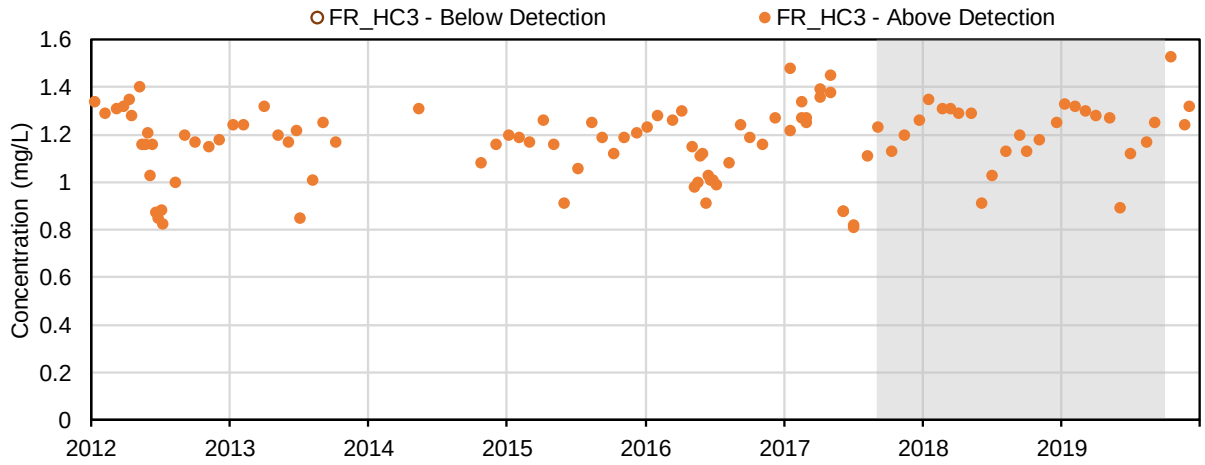
(89) Nickel (mg/L); Dissolved Metals



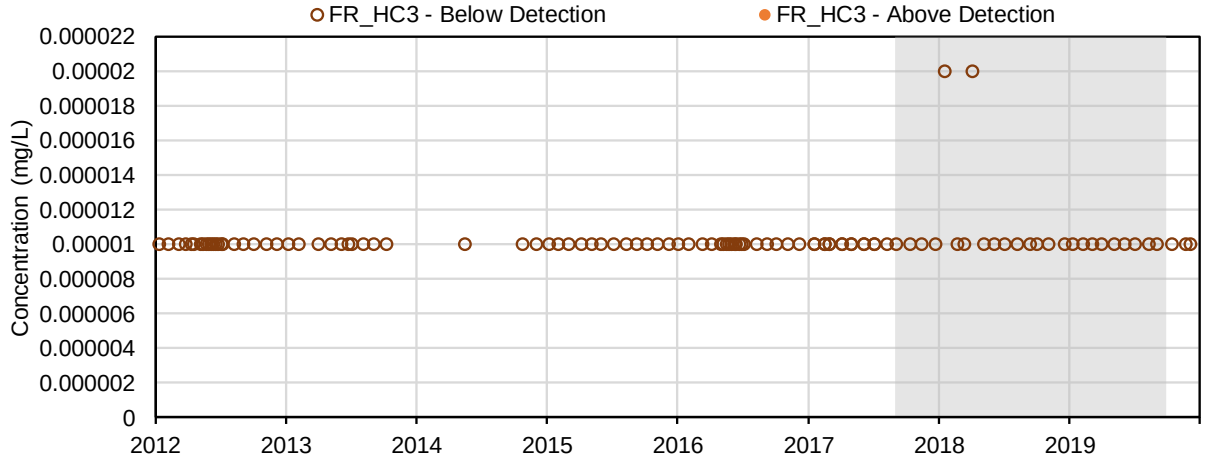
(90) Selenium (mg/L); Dissolved Metals



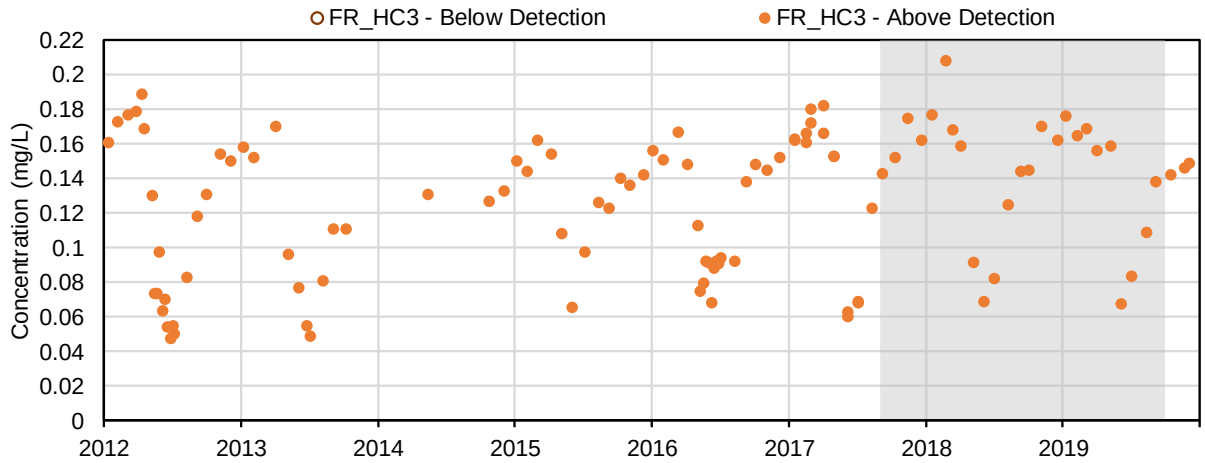
(91) Silicon (mg/L); Dissolved Metals



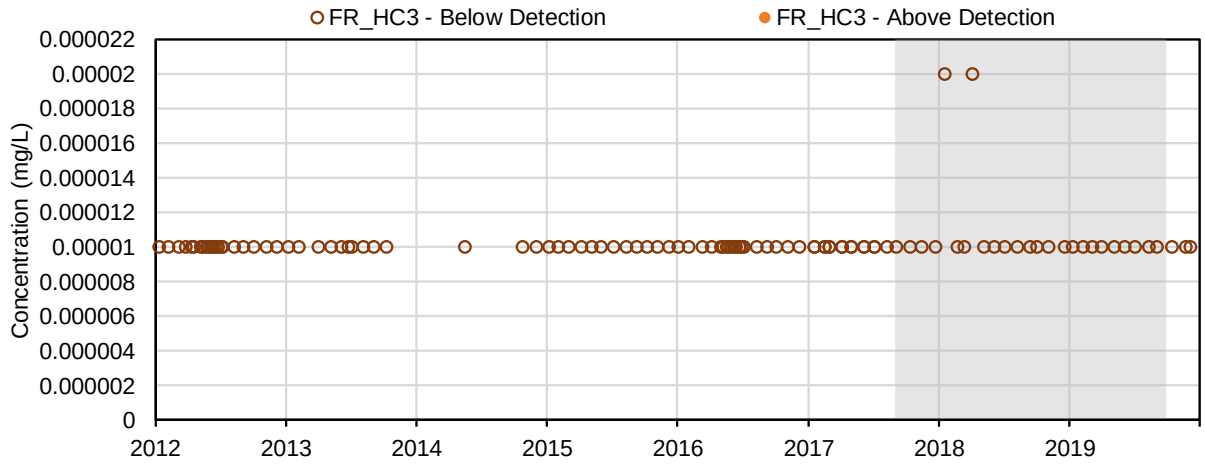
(92) Silver (mg/L); Dissolved Metals



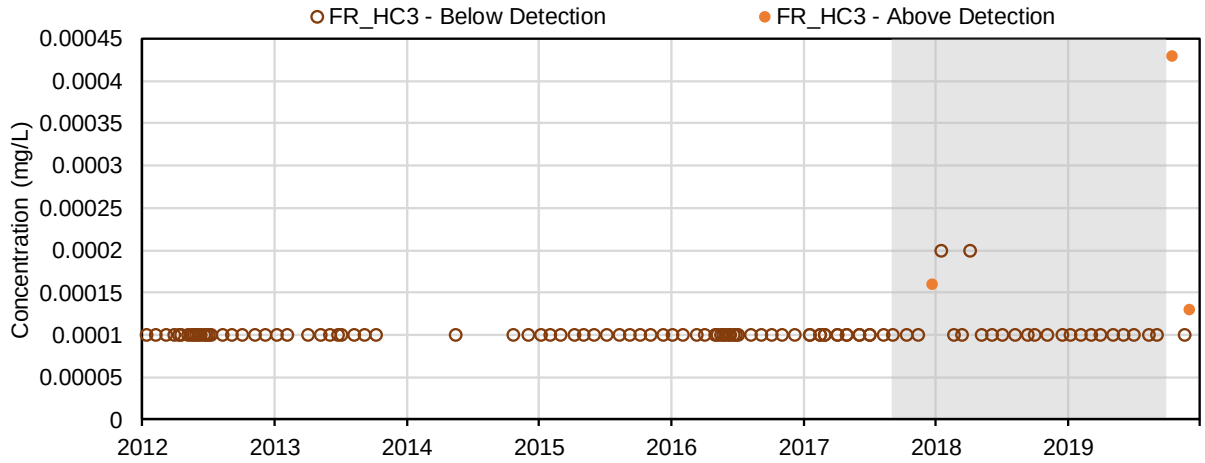
(93) Strontium (mg/L); Dissolved Metals



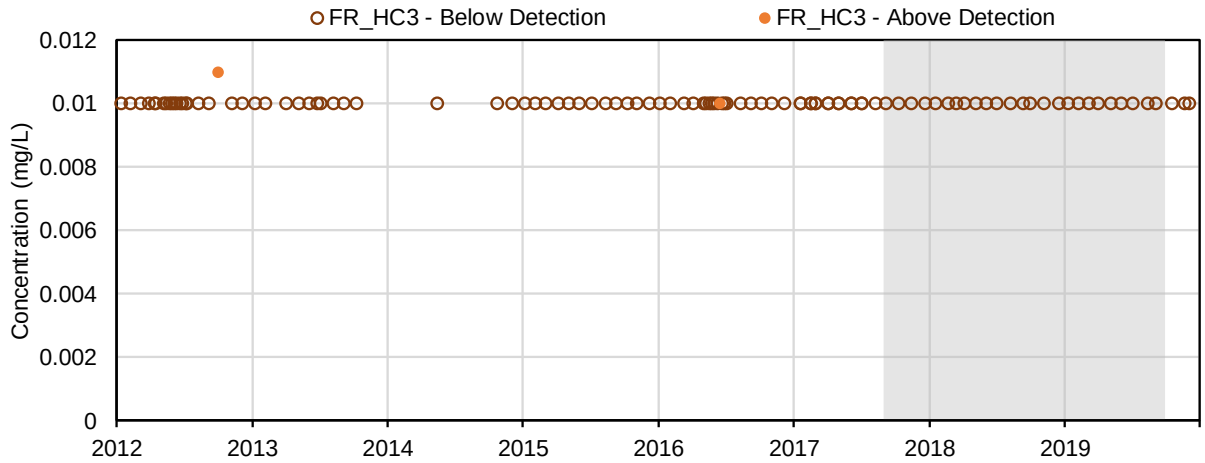
(94) Thallium (mg/L); Dissolved Metals



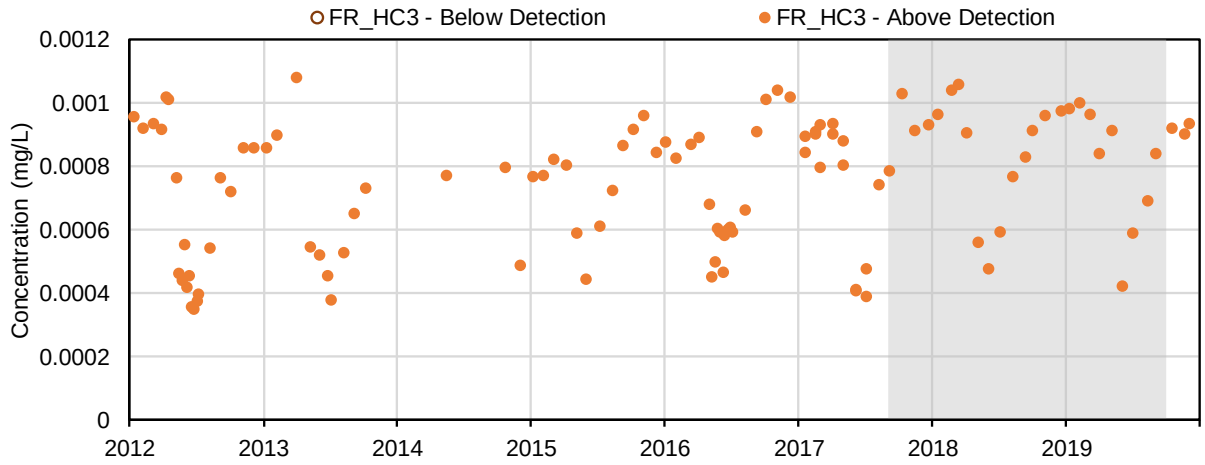
(95) Tin (mg/L); Dissolved Metals



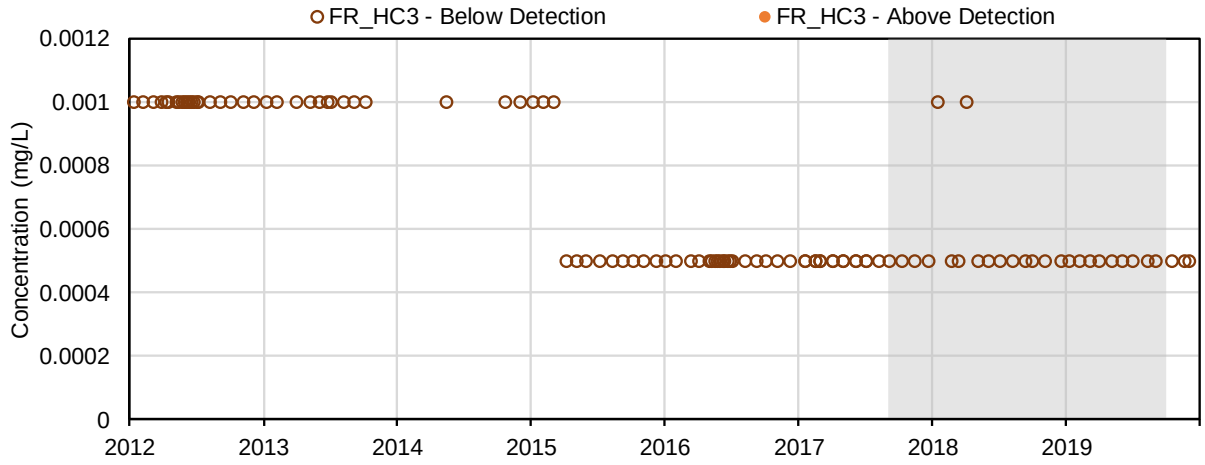
(96) Titanium (mg/L); Dissolved Metals



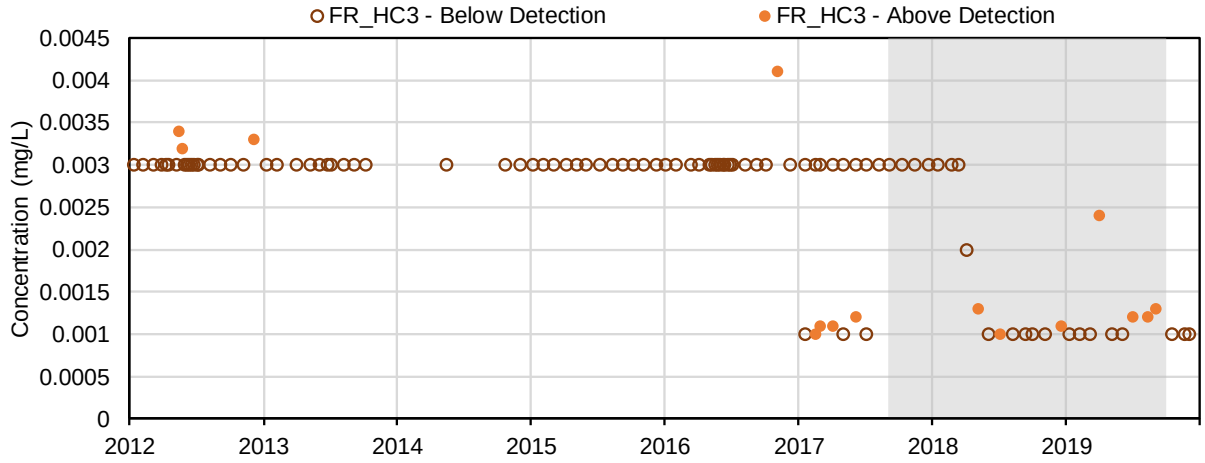
(97) Uranium (mg/L); Dissolved Metals



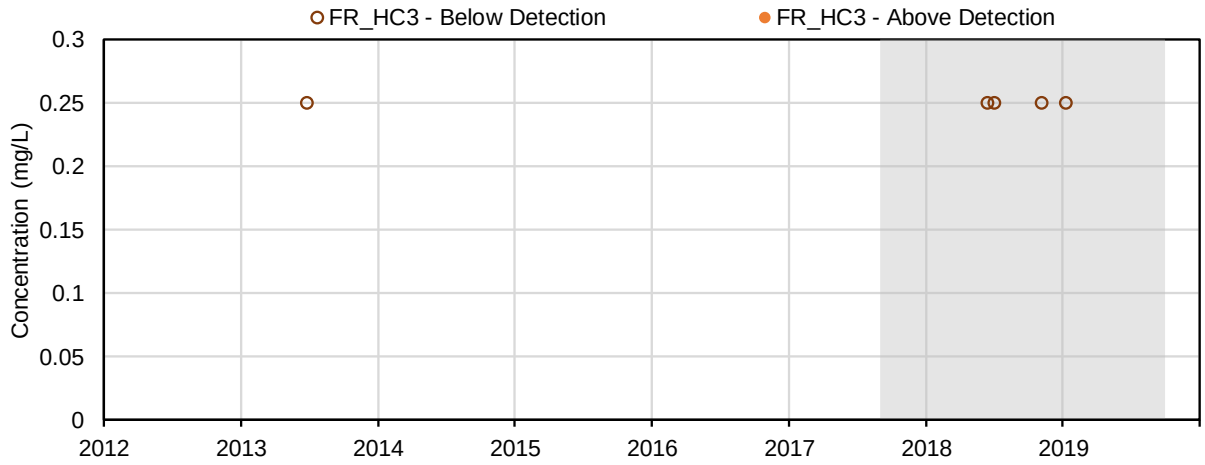
(98) Vanadium (mg/L); Dissolved Metals



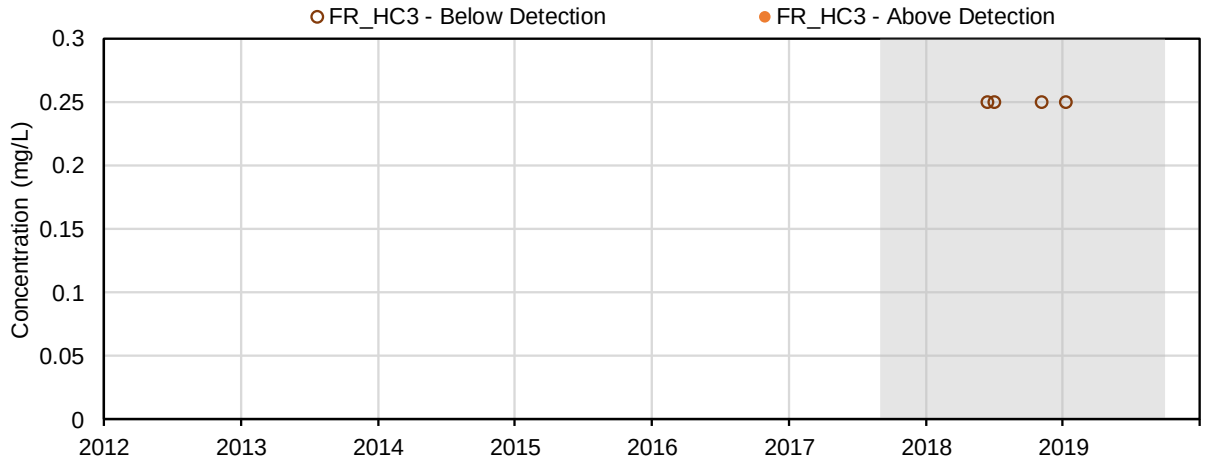
(99) Zinc (mg/L); Dissolved Metals



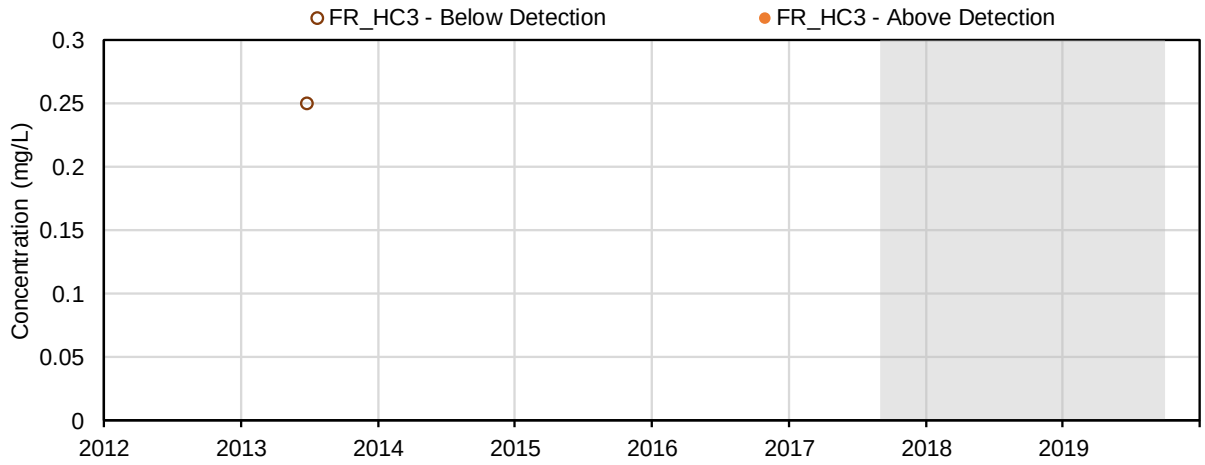
(100) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



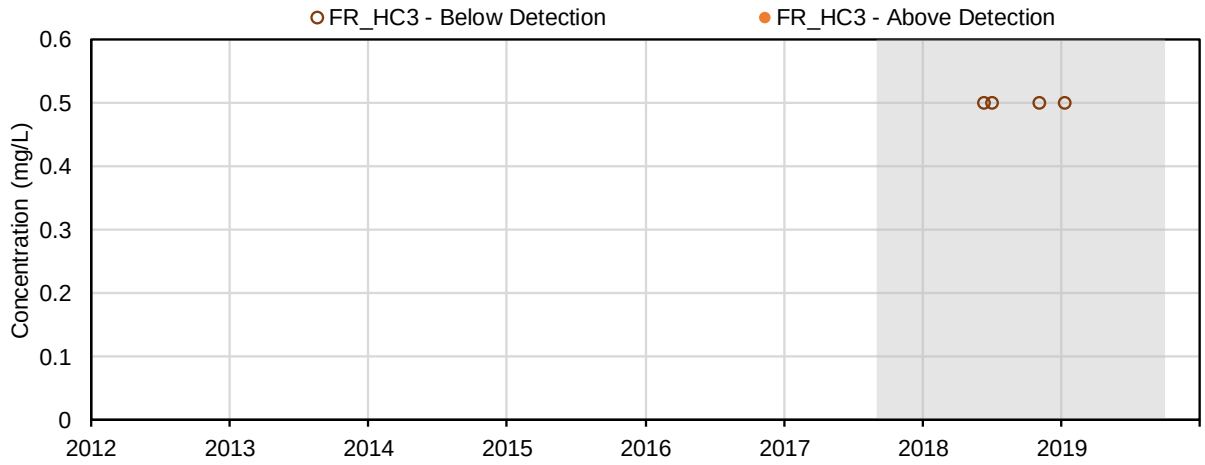
(101) Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



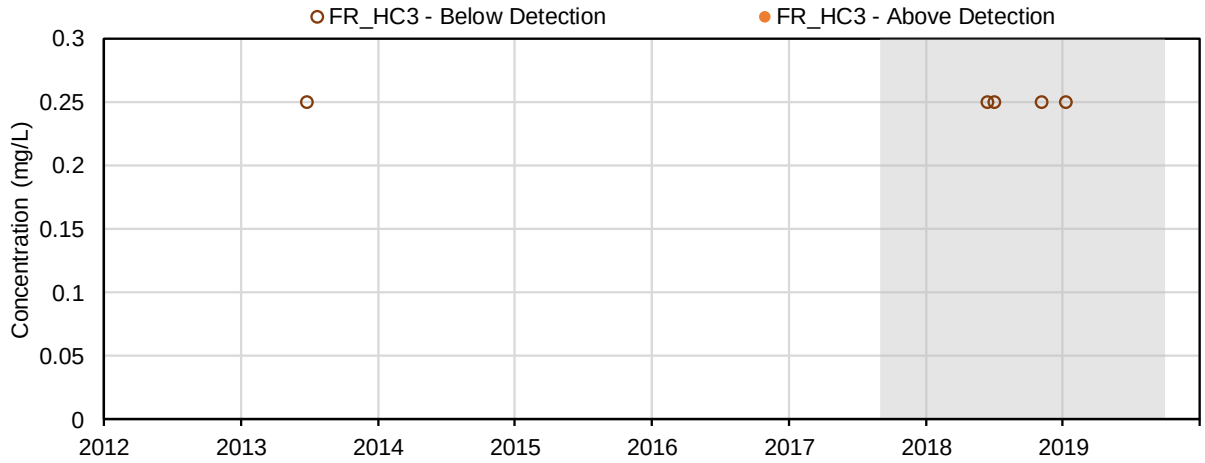
(102) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



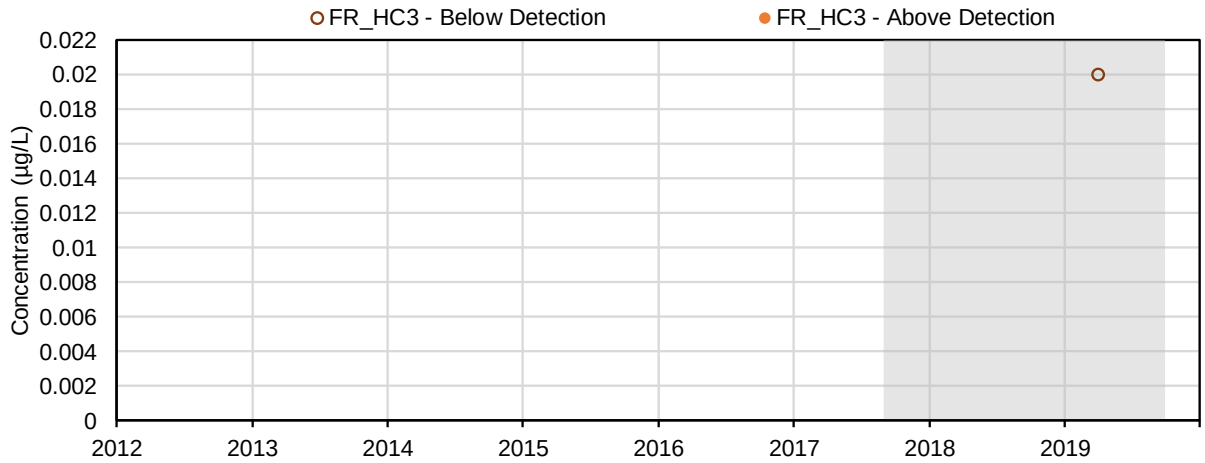
(103) Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L); Volatile Organics



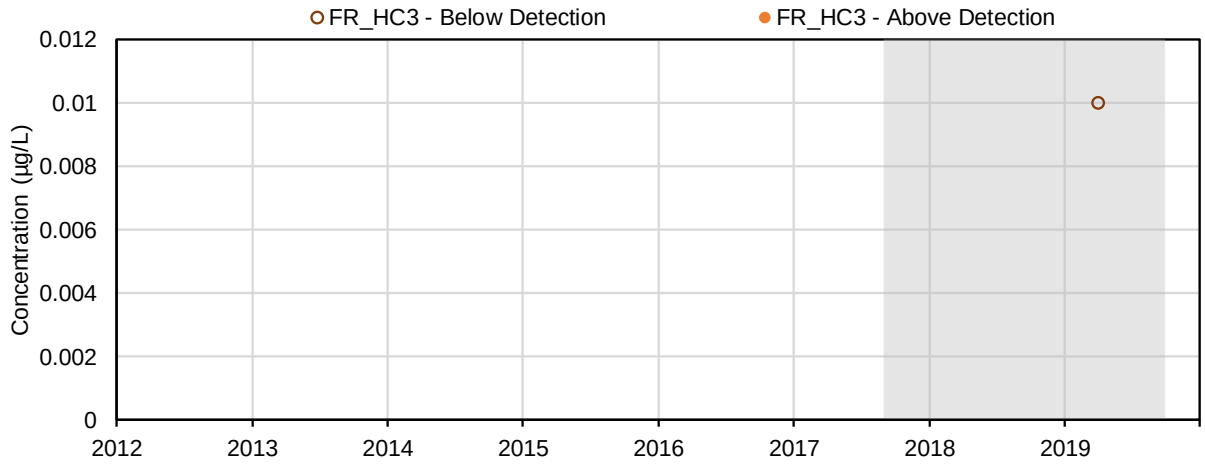
(104) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics



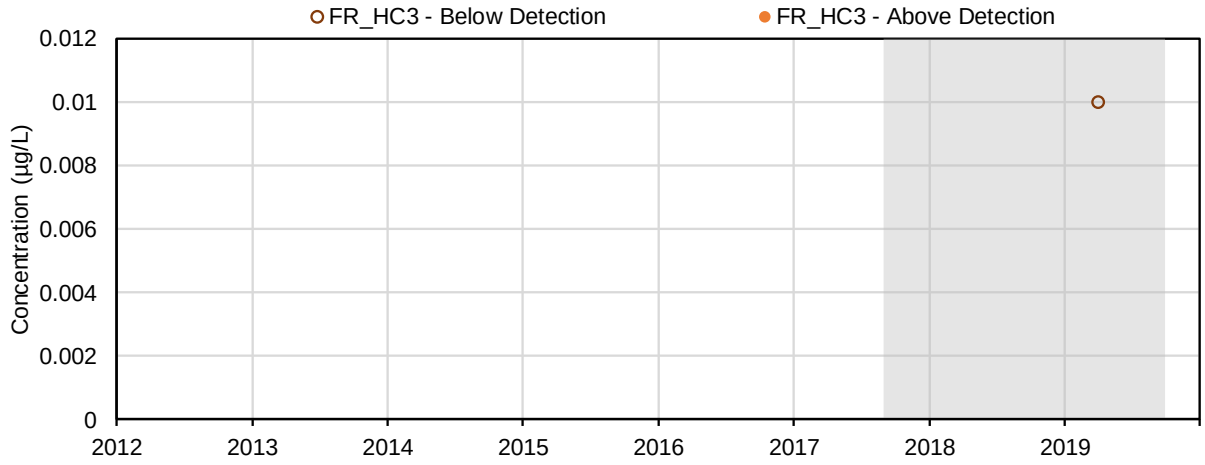
(105) Naphthalene (µg/L); Parent PAHs



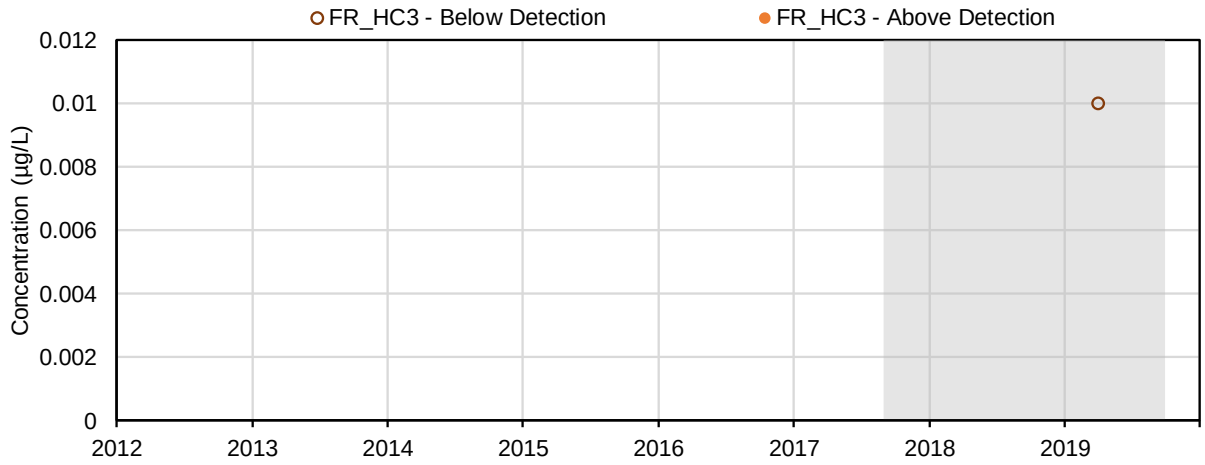
(106) Acenaphthylene (µg/L); Parent PAHs



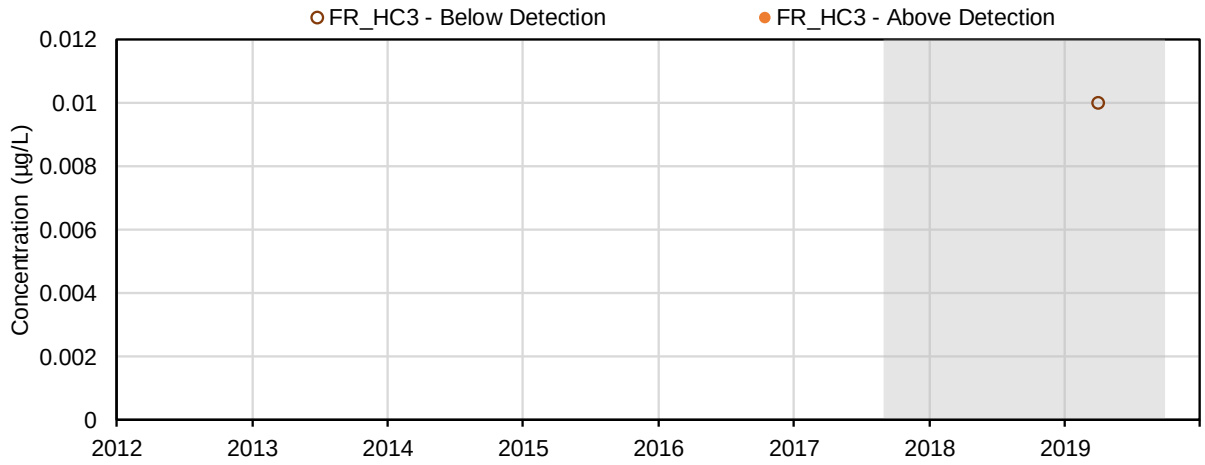
(107) Acenaphthene (µg/L); Parent PAHs



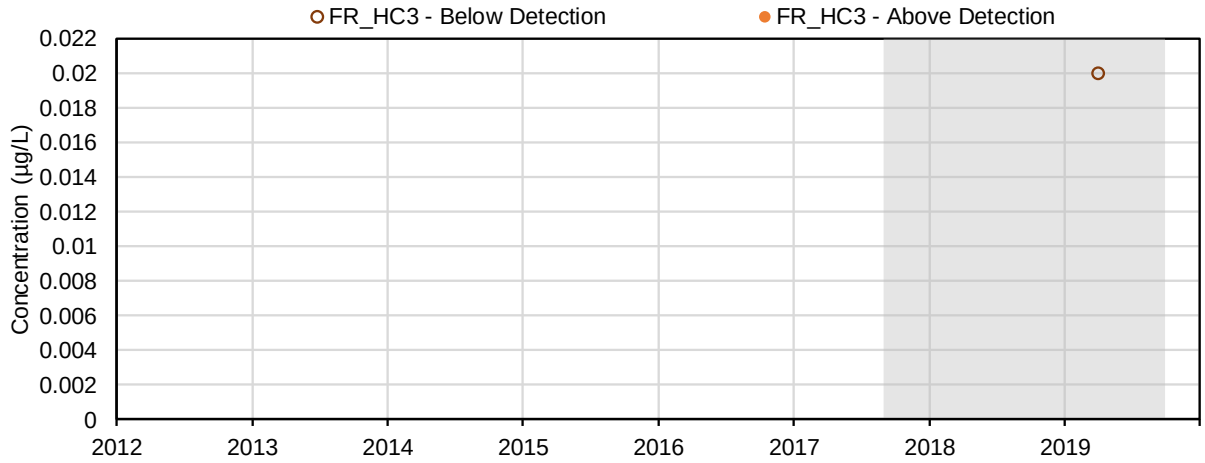
(108) Acridine (µg/L); Parent PAHs



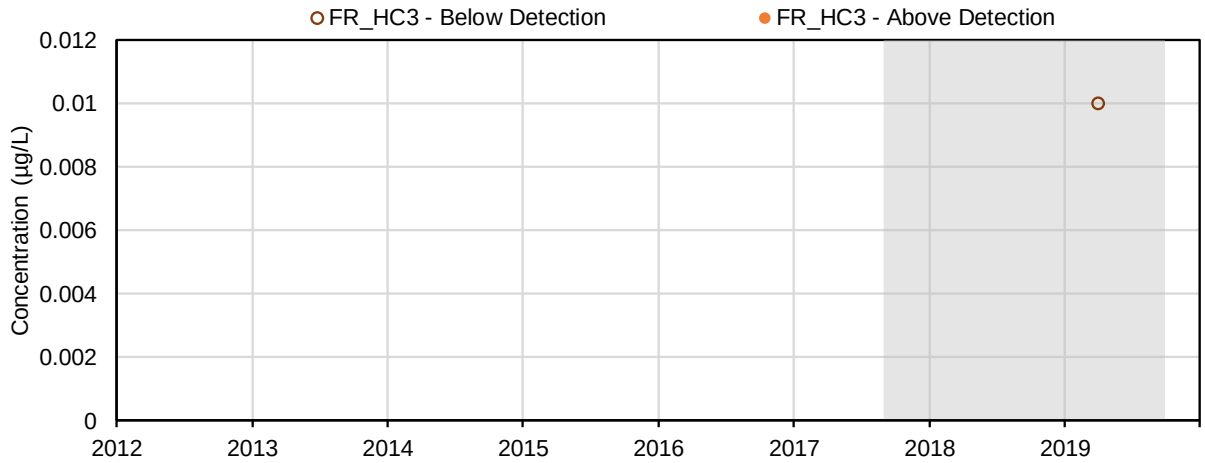
(109) Fluorene (µg/L); Parent PAHs



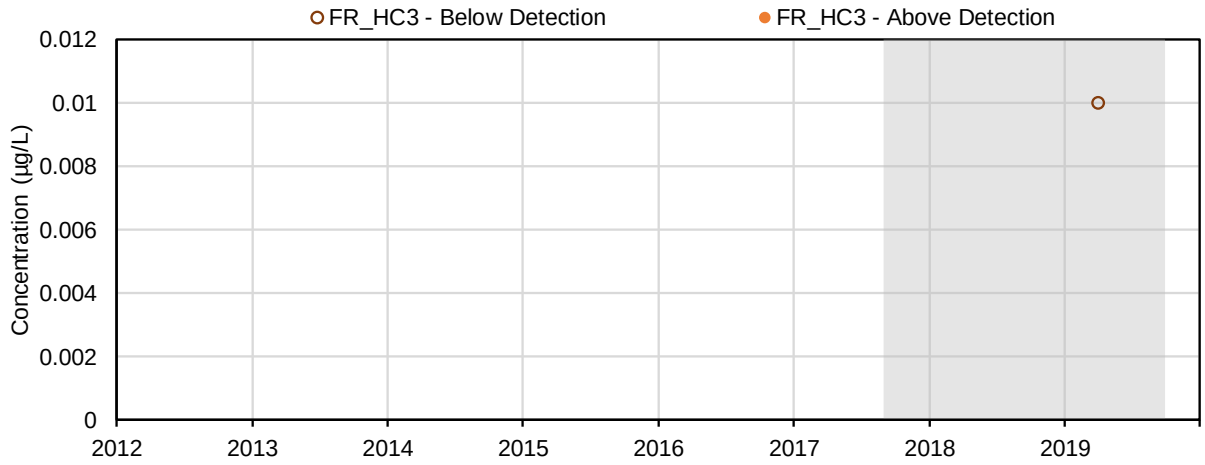
(110) Phenanthrene (µg/L); Parent PAHs



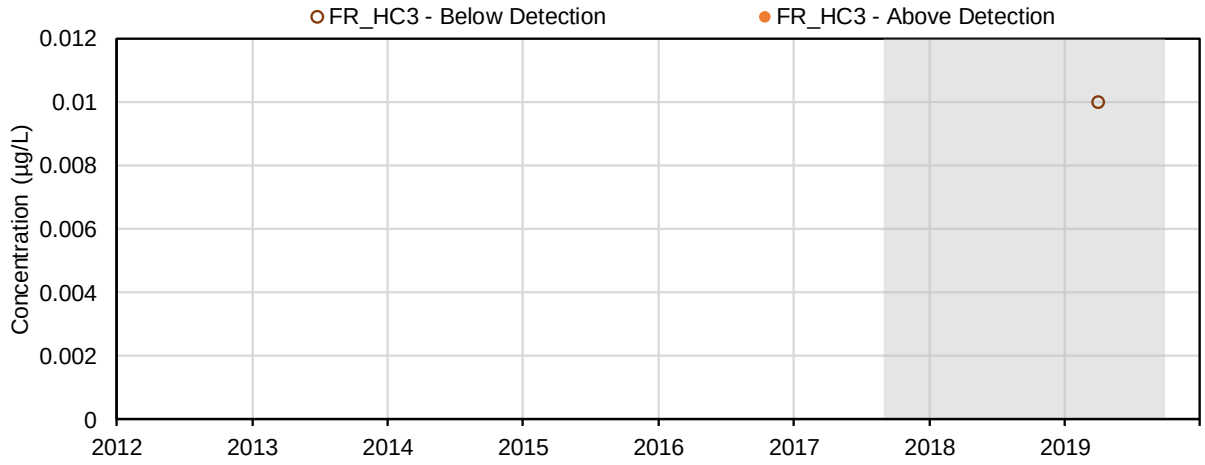
(112) Anthracene (µg/L); Parent PAHs



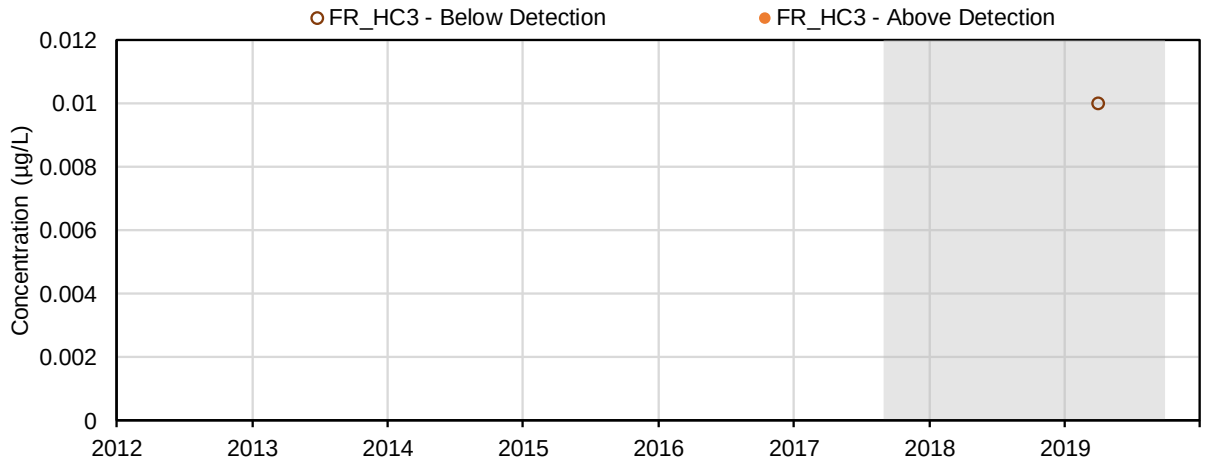
(113) Pyrene (µg/L); Parent PAHs



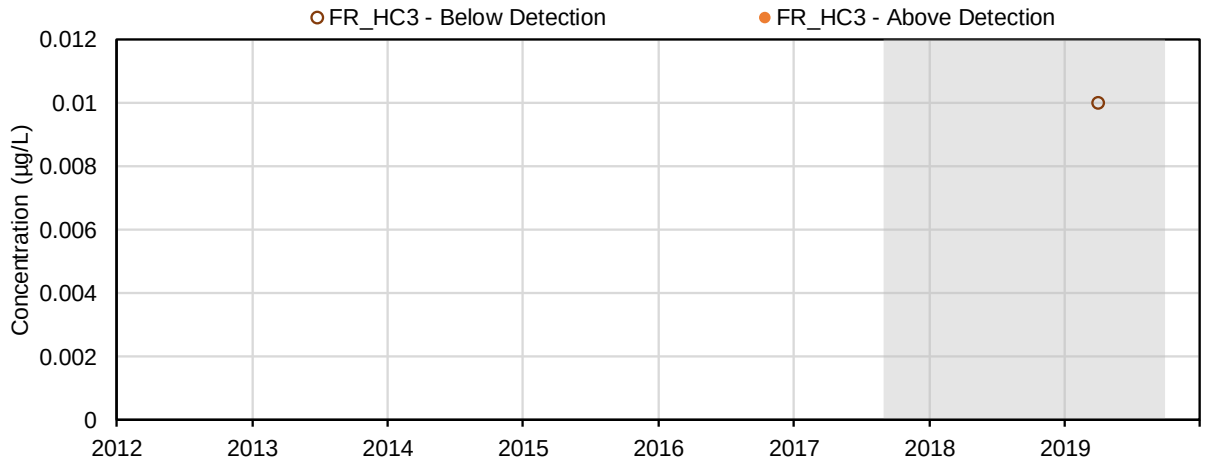
(114) Fluoranthene (µg/L); Parent PAHs



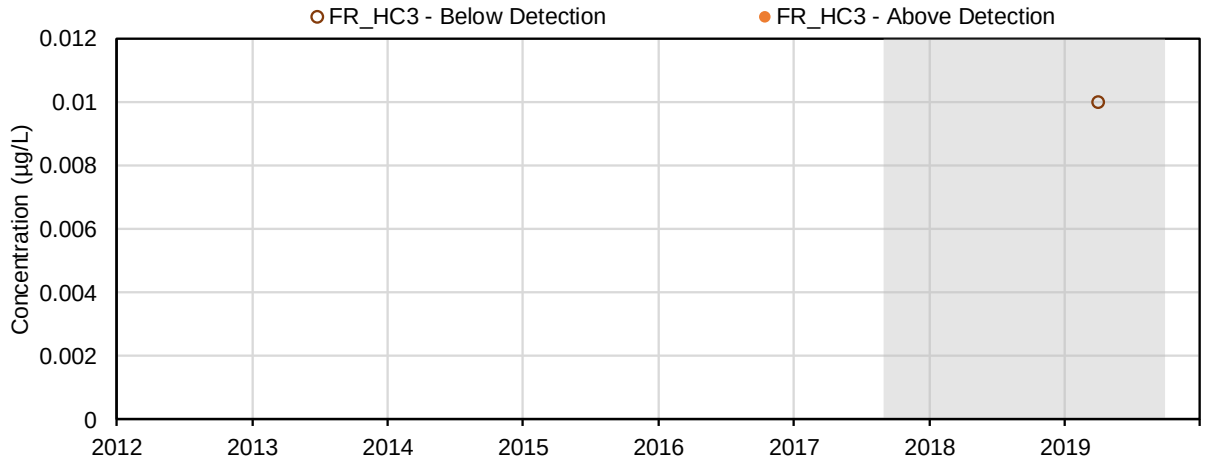
(115) Benzo(a)anthracene (µg/L); Parent PAHs



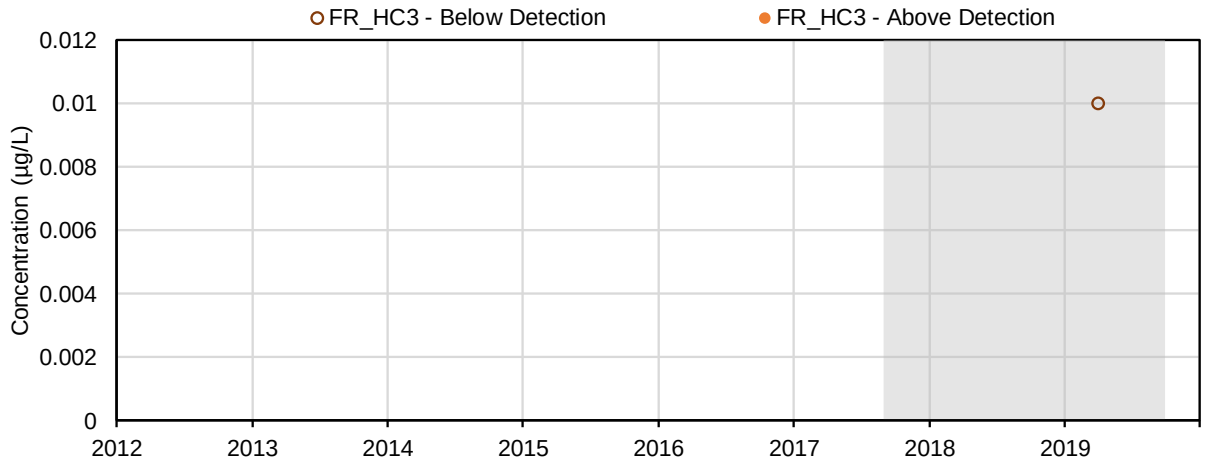
(116) Chrysene (µg/L); Parent PAHs



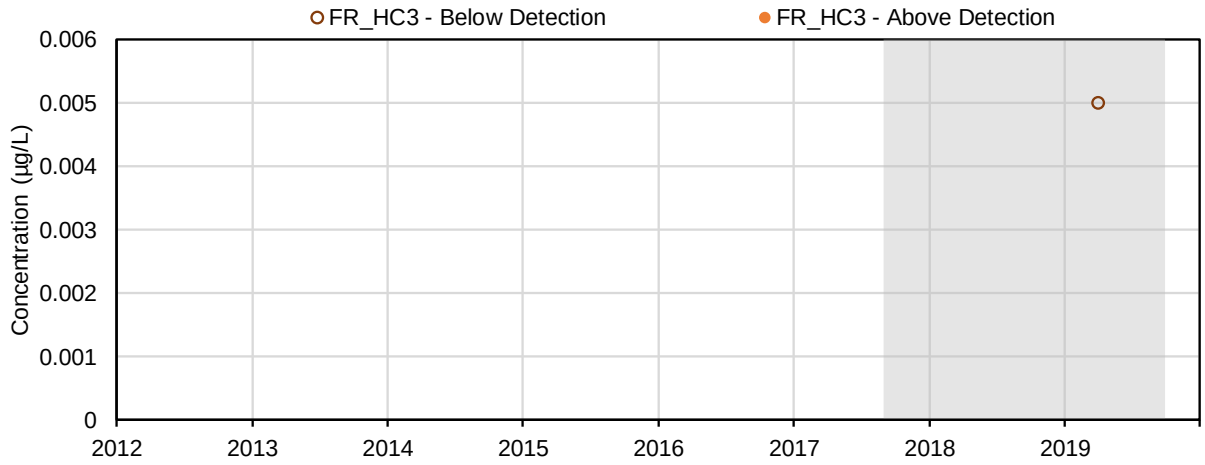
(117) Benzo(b,j)fluoranthene (µg/L); Parent PAHs



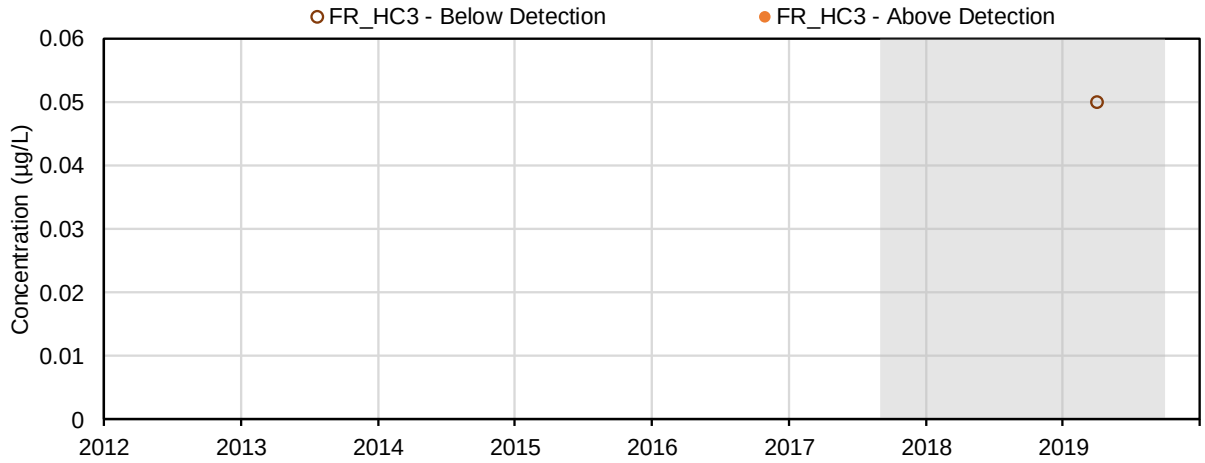
(118) Benzo(k)fluoranthene (µg/L); Parent PAHs



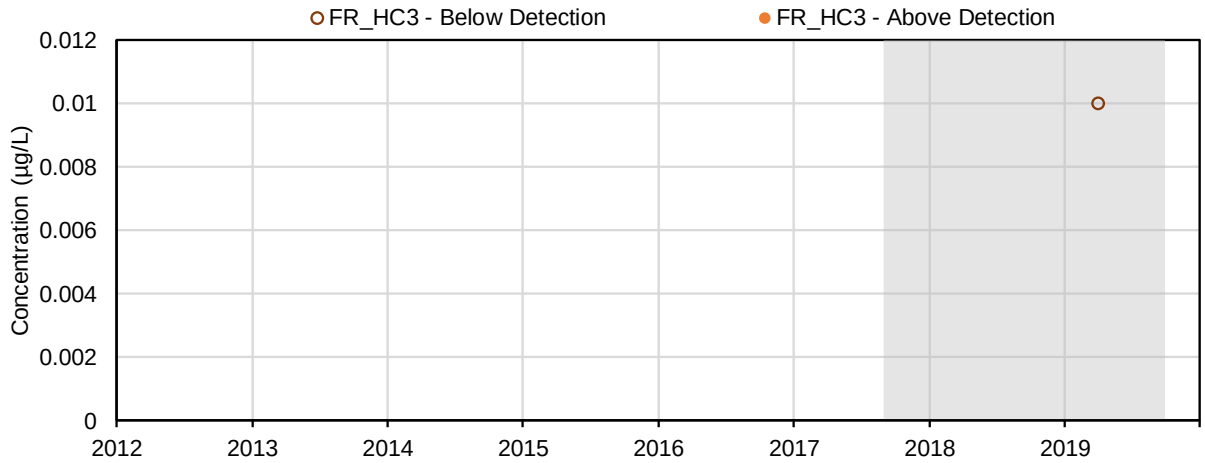
(119) Benzo(a)pyrene (µg/L); Parent PAHs



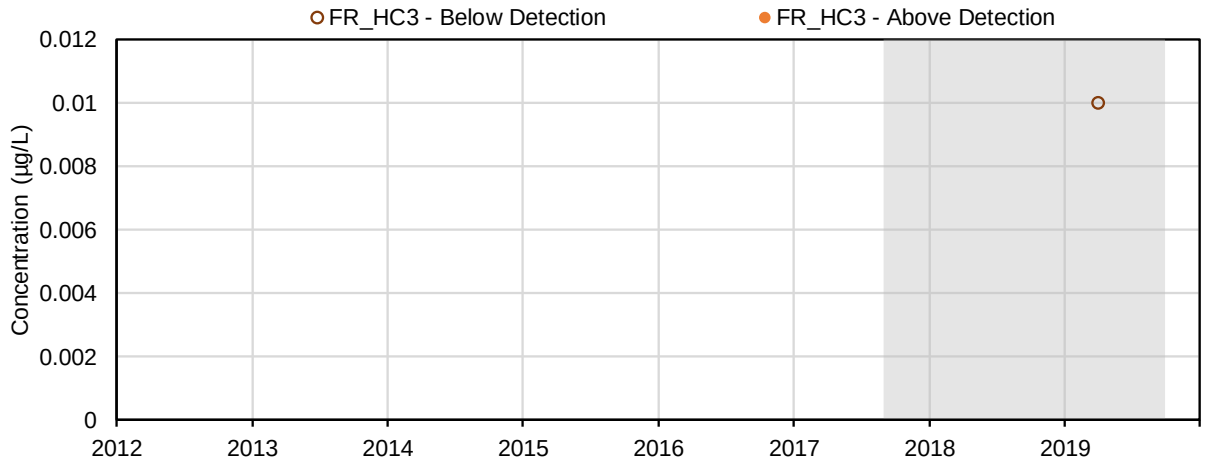
(120) Quinoline (µg/L); Parent PAHs



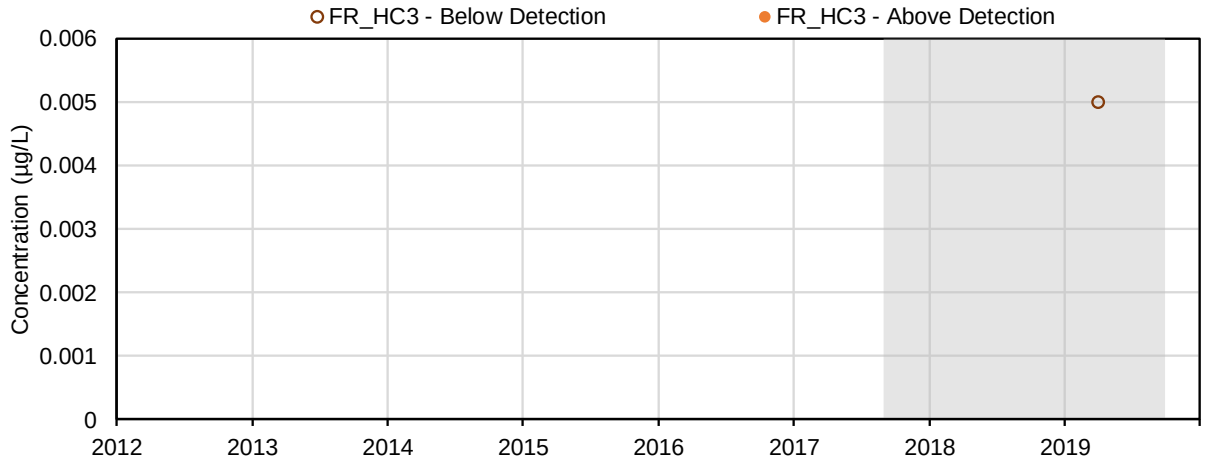
(121) Benzo(g,h,i)perylene (µg/L); Parent PAHs



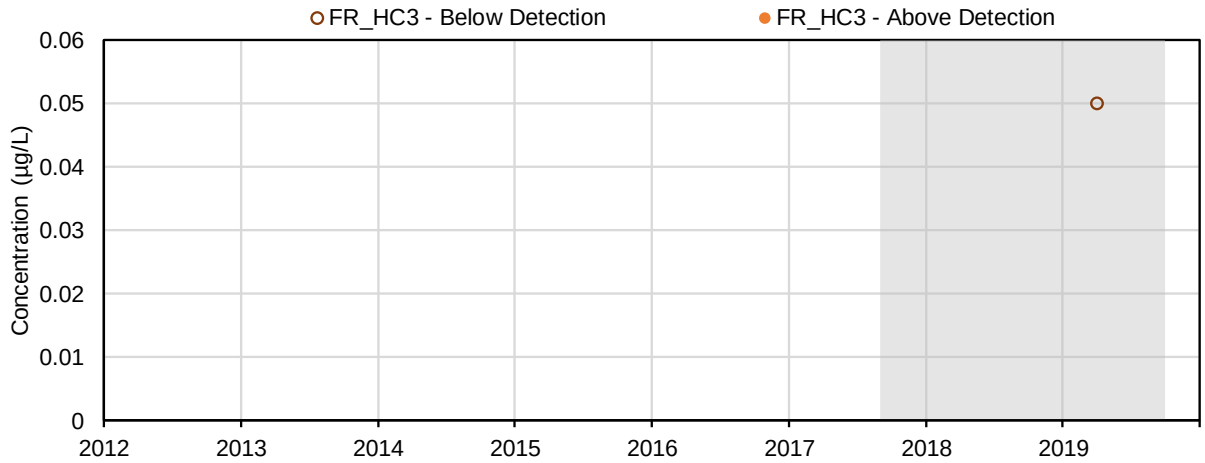
(122) Indeno(c,d-123)pyrene (µg/L); Parent PAHs



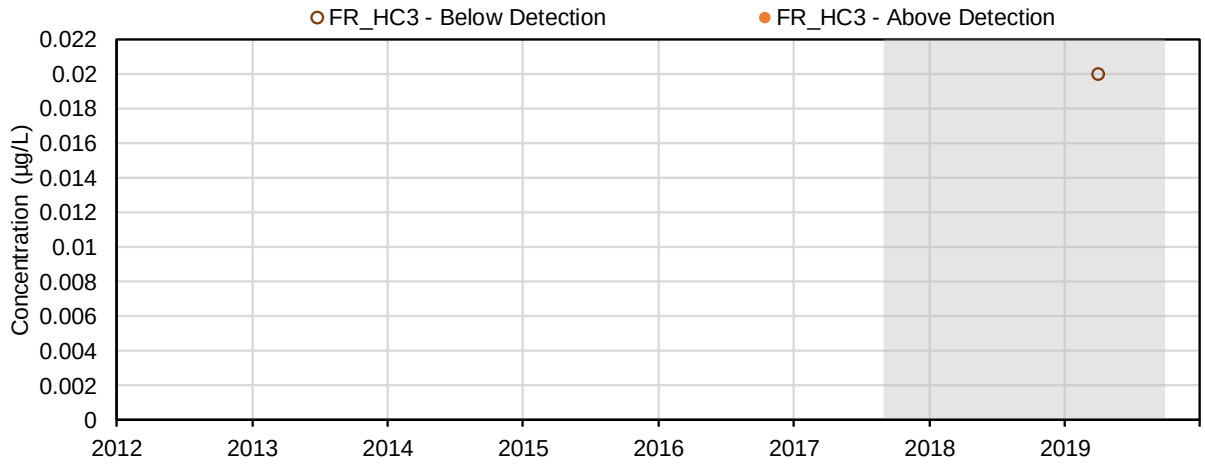
(123) Dibenzo(a,h)anthracene (µg/L); Parent PAHs



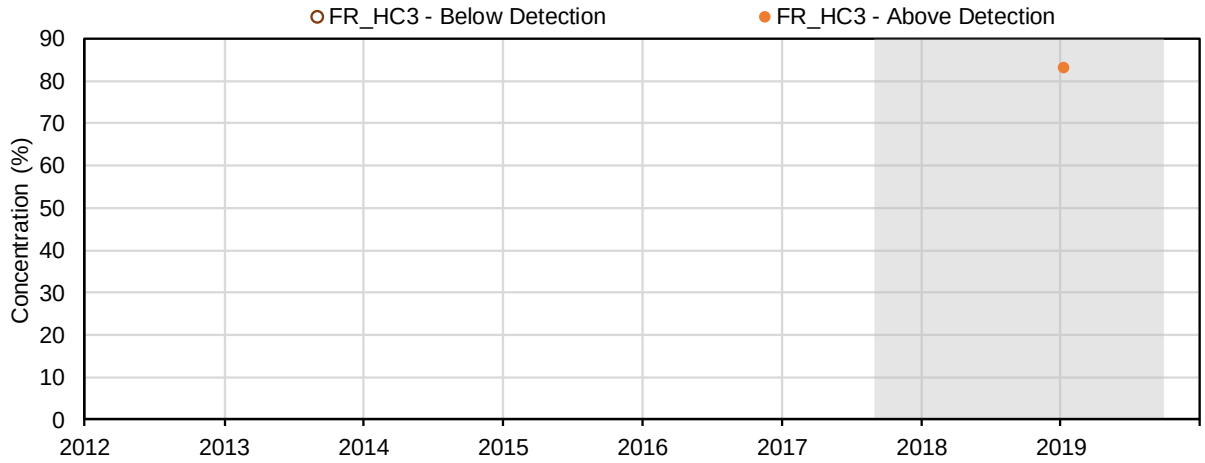
(124) 1-Methylnaphthalene (µg/L); Alkylated PAHs

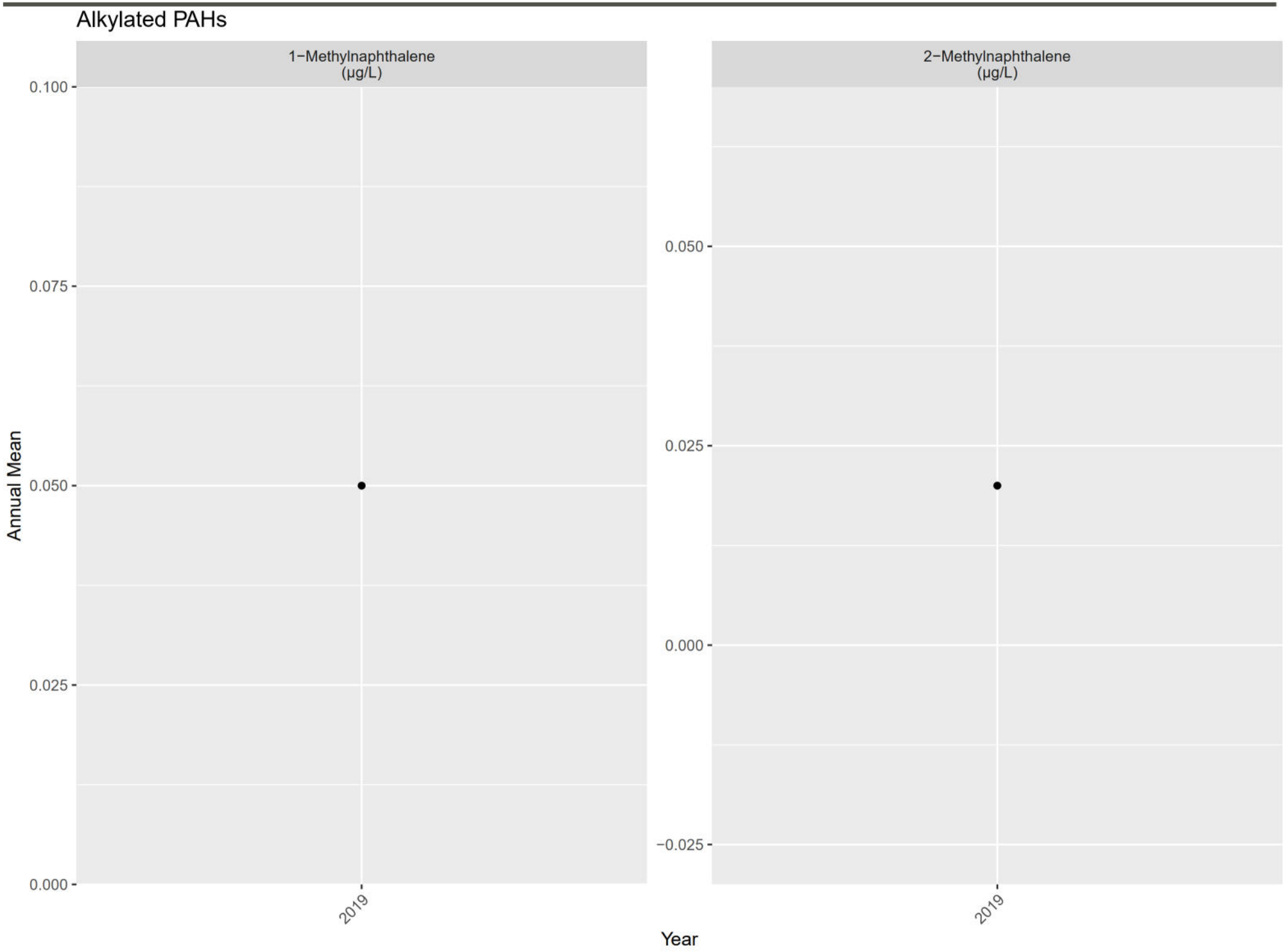


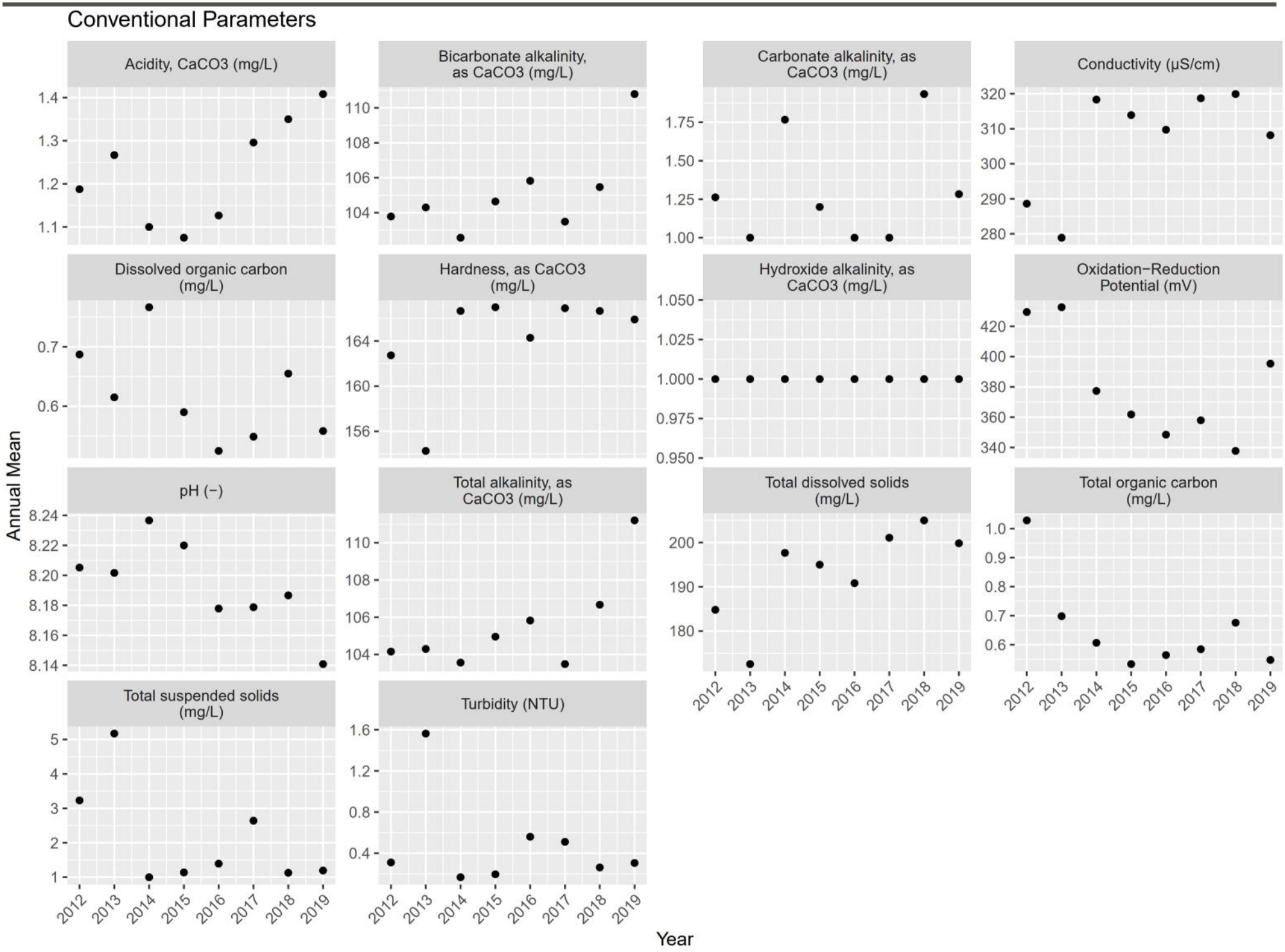
(125) 2-Methylnaphthalene (µg/L); Alkylated PAHs

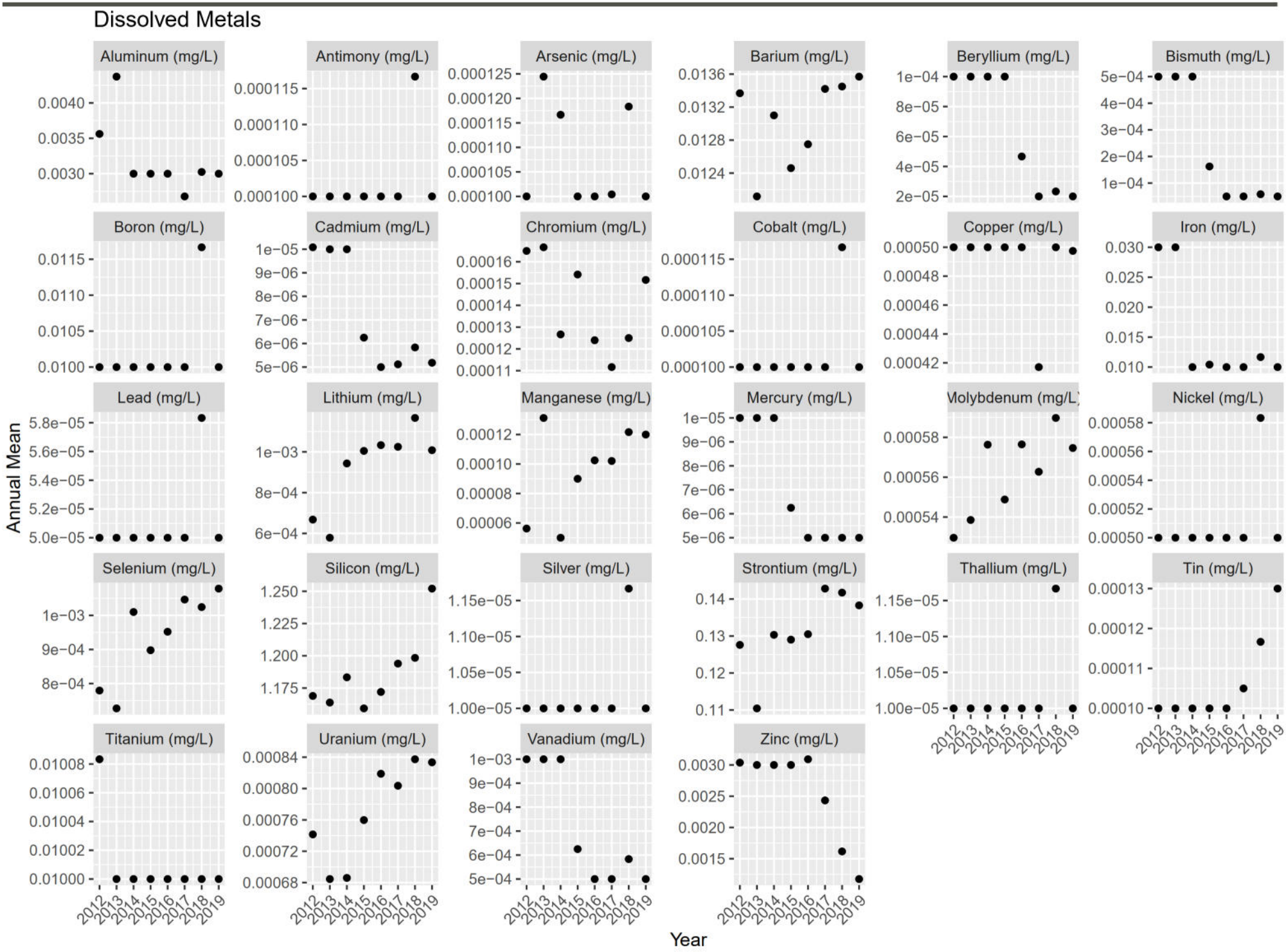


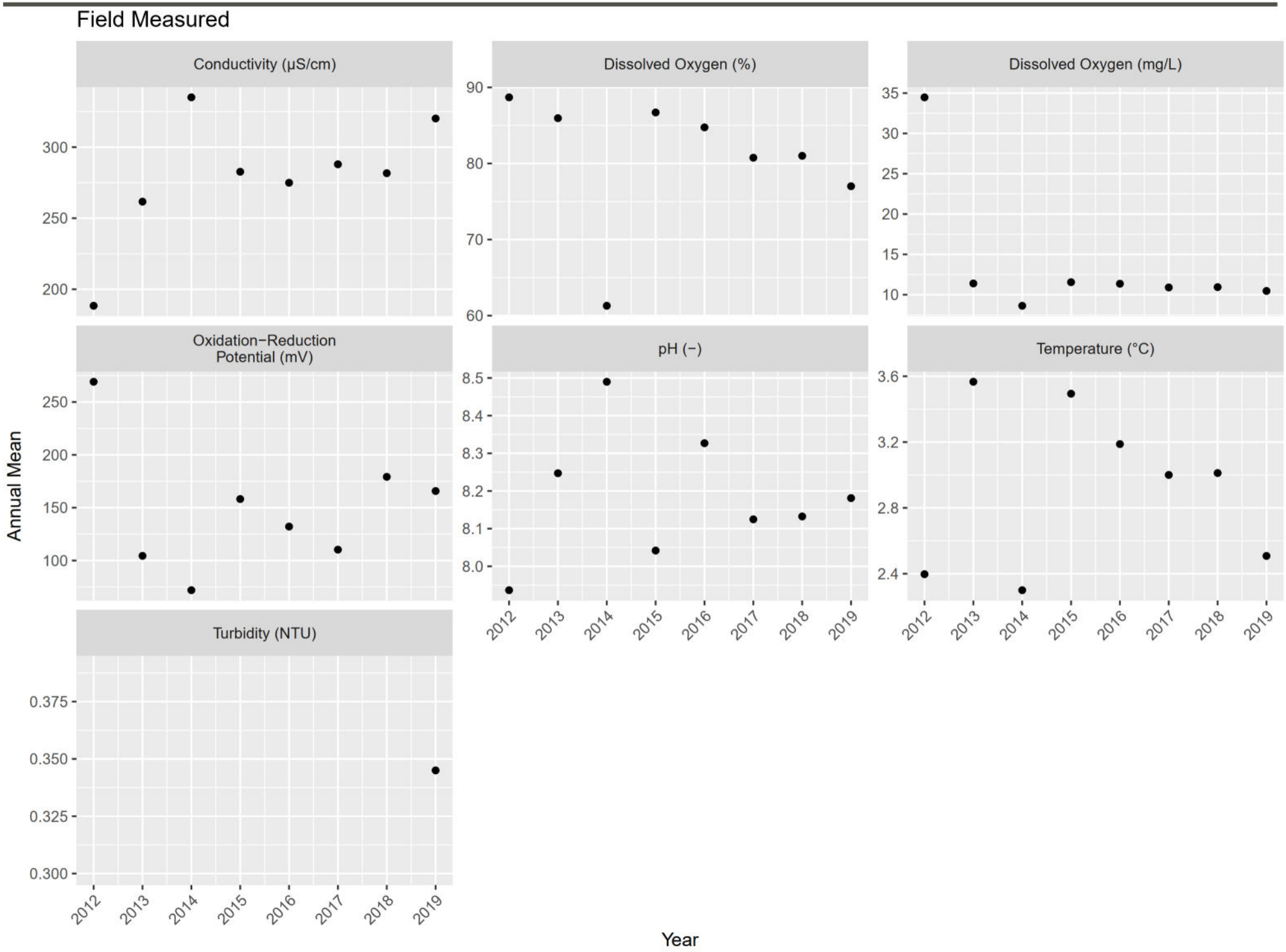
(126) 2-Bromobenzotrifluoride (%); Unknown

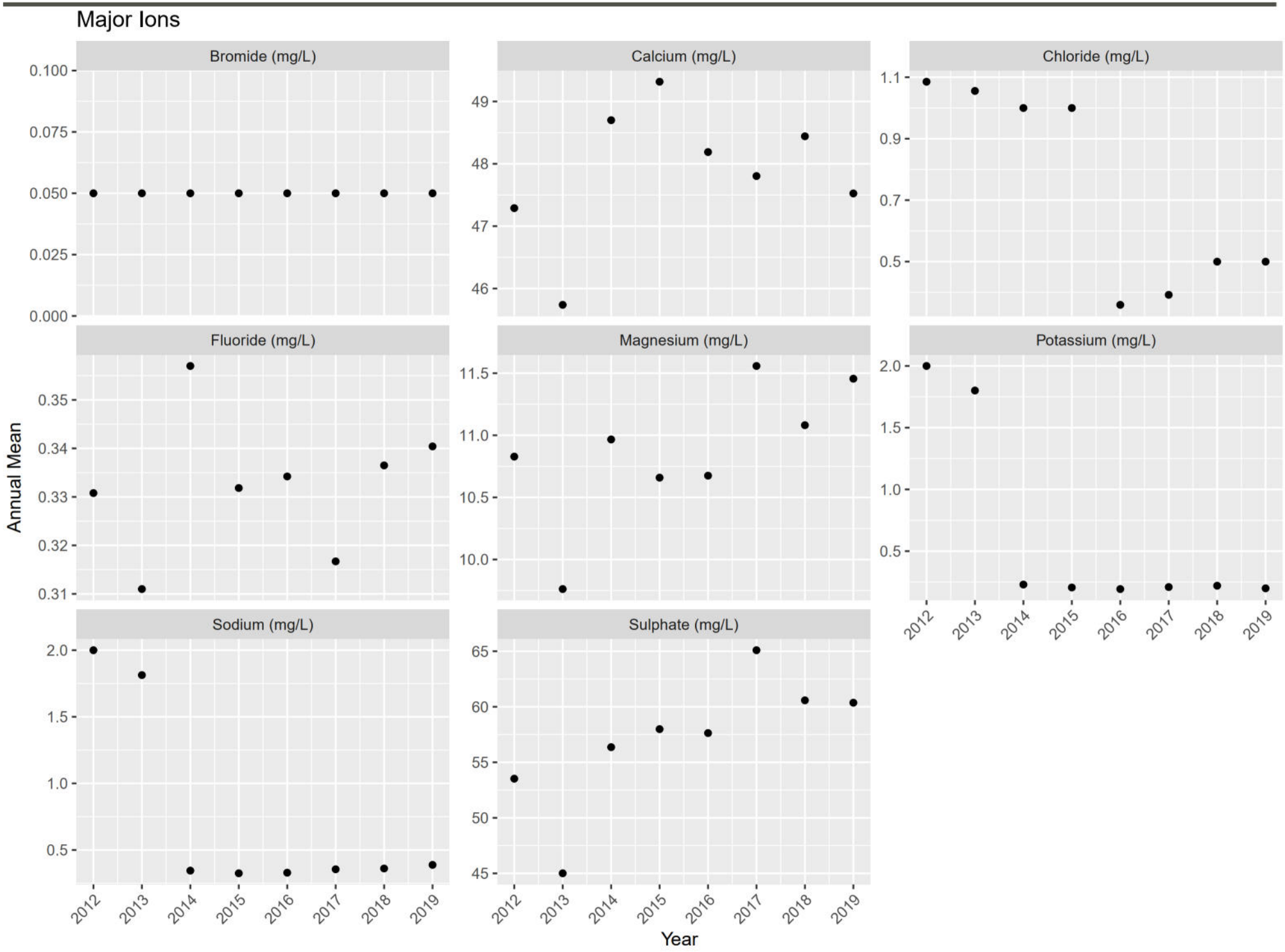


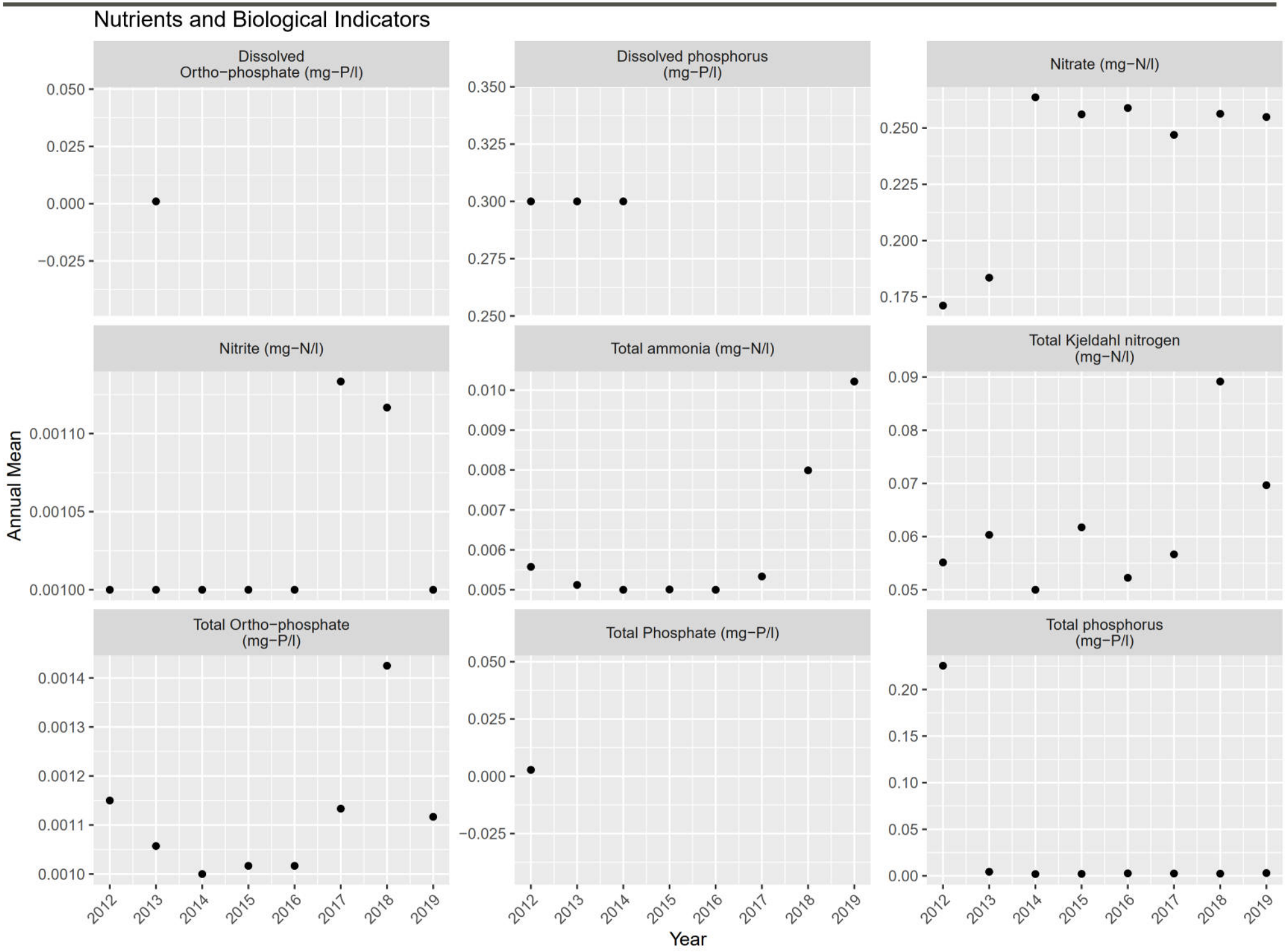

Alkylated PAHs
1−Methylnaphthalene (µg/L)
2−Methylnaphthalene (µg/L)
Annual Mean
0.100
0.075
0.050
0.025
0.000
−0.025
2019
Year

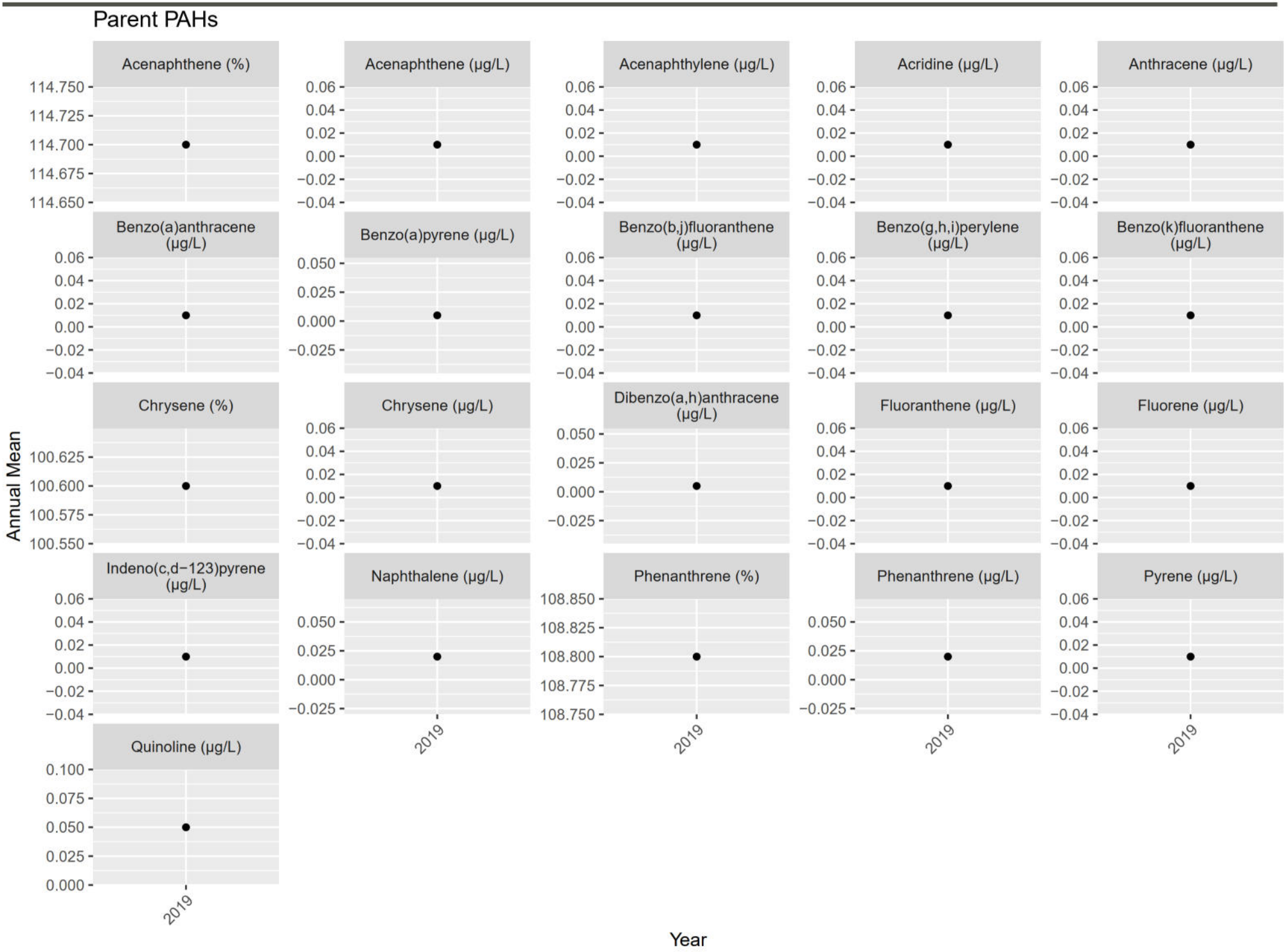

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year

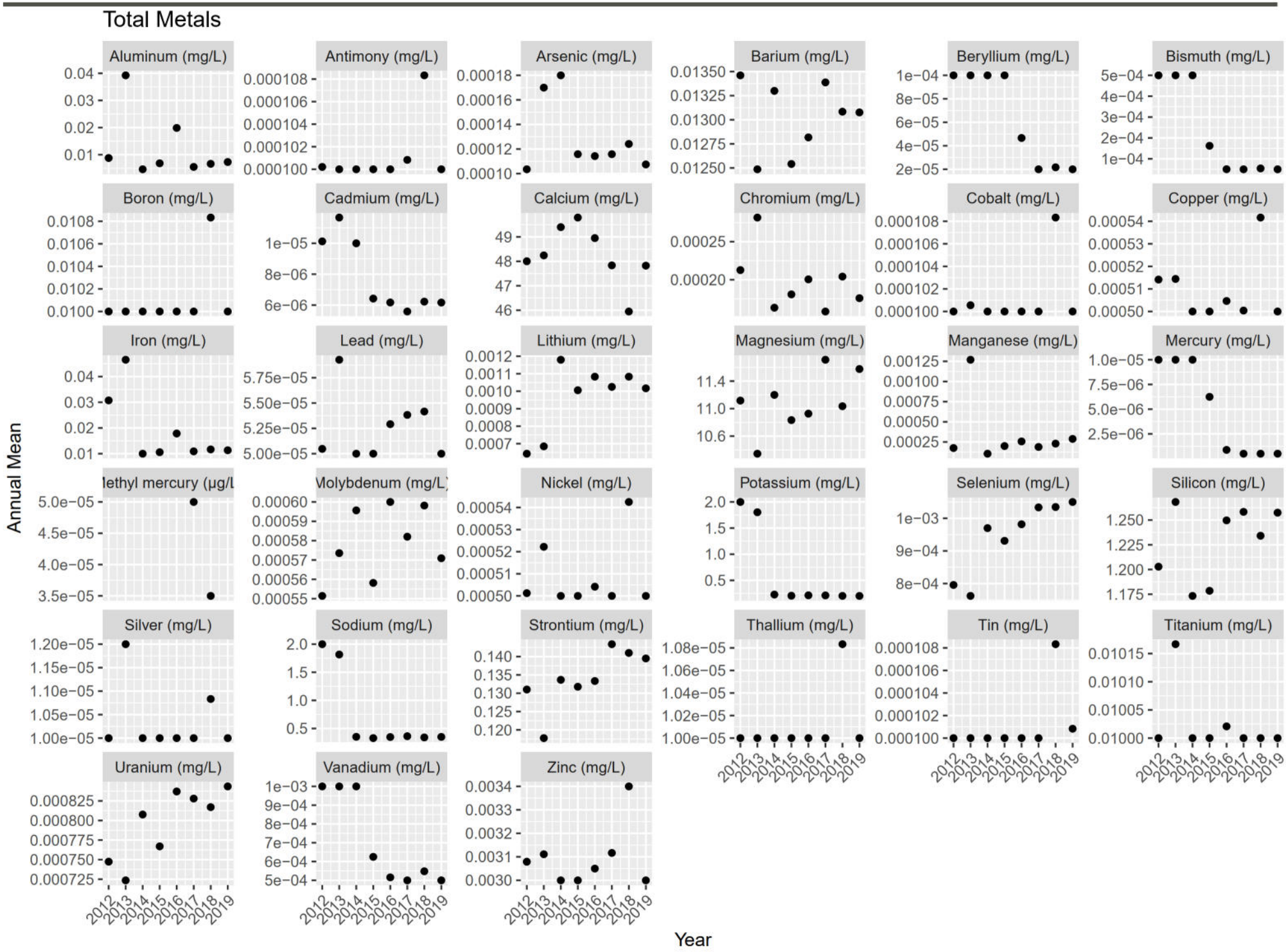

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

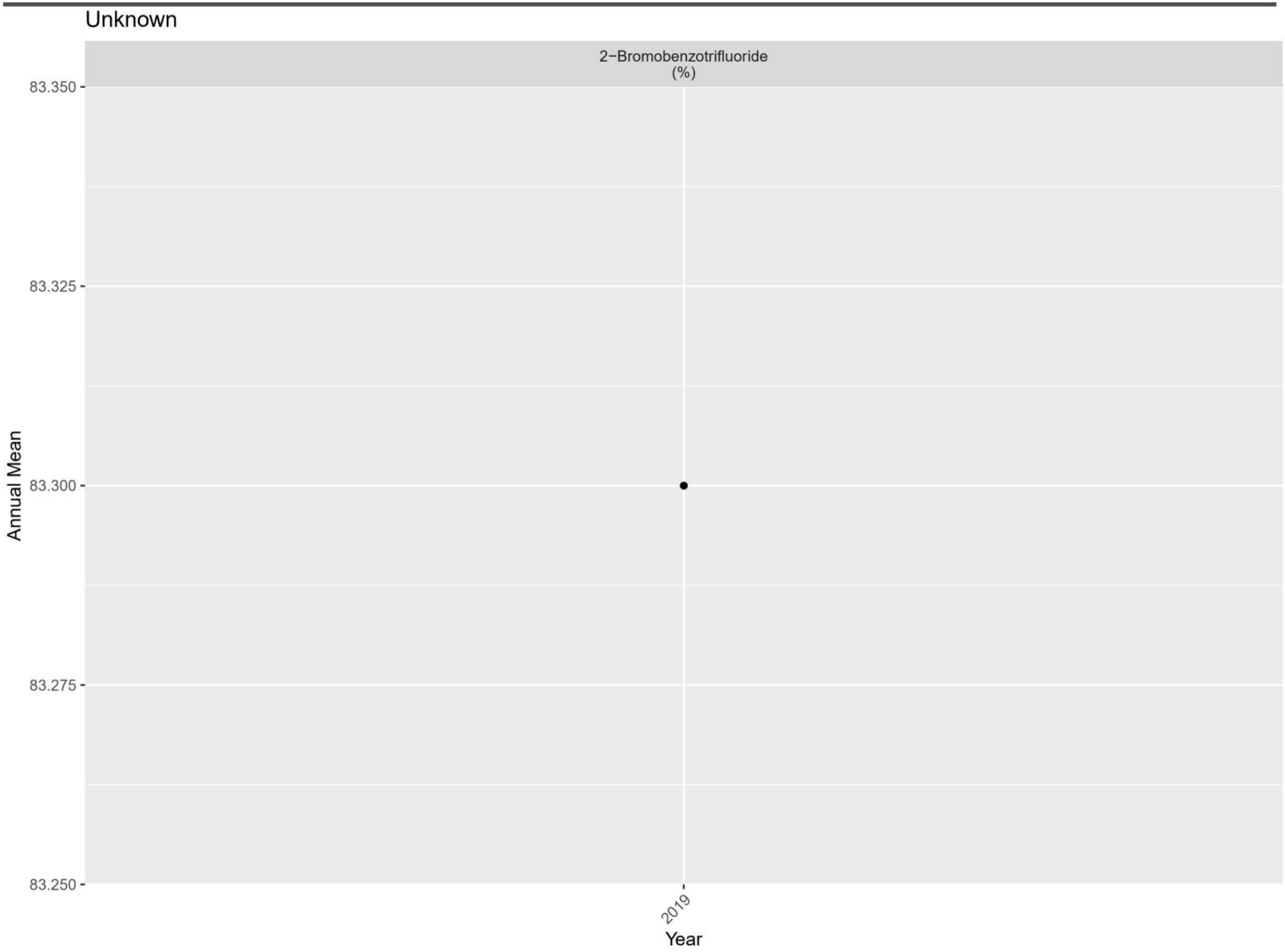

Field Measured
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Temperature (°C)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

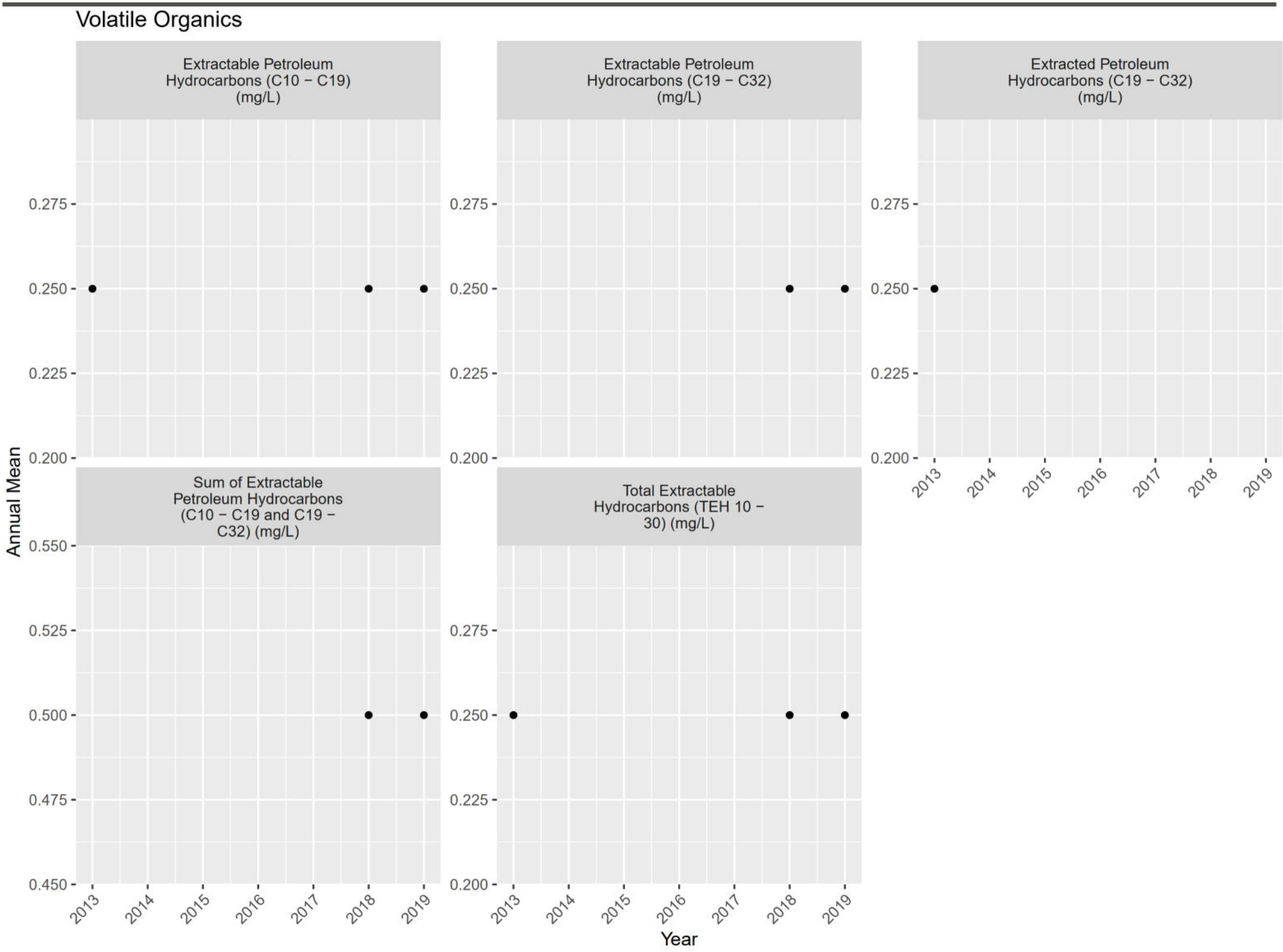

Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
0.100
0.075
0.050
0.025
0.000
49
48
47
46
1.1
0.9
0.7
0.5
0.35
0.34
0.33
0.32
0.31
11.5
11.0
10.5
10.0
2.0
1.5
1.0
0.5
65
60
55
50
45
2012
2013
2014
2015
2016
2017
2018
2019


Nutrients and Biological Indicators
Dissolved Ortho−phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Parent PAHs
Acenaphthene (%)
Acenaphthene (µg/L)
Acenaphthylene (µg/L)
Acridine (µg/L)
Anthracene (µg/L)
Benzo(a)anthracene (µg/L)
Benzo(a)pyrene (µg/L)
Benzo(b,j)fluoranthene (µg/L)
Benzo(g,h,i)perylene (µg/L)
Benzo(k)fluoranthene (µg/L)
Chrysene (%)
Chrysene (µg/L)
Dibenzo(a,h)anthracene (µg/L)
Fluoranthene (µg/L)
Fluorene (µg/L)
Indeno(c,d−123)pyrene (µg/L)
Naphthalene (µg/L)
Phenanthrene (%)
Phenanthrene (µg/L)
Pyrene (µg/L)
Quinoline (µg/L)
Annual Mean
Year
2019


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
lethyl mercury (µg/l
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year

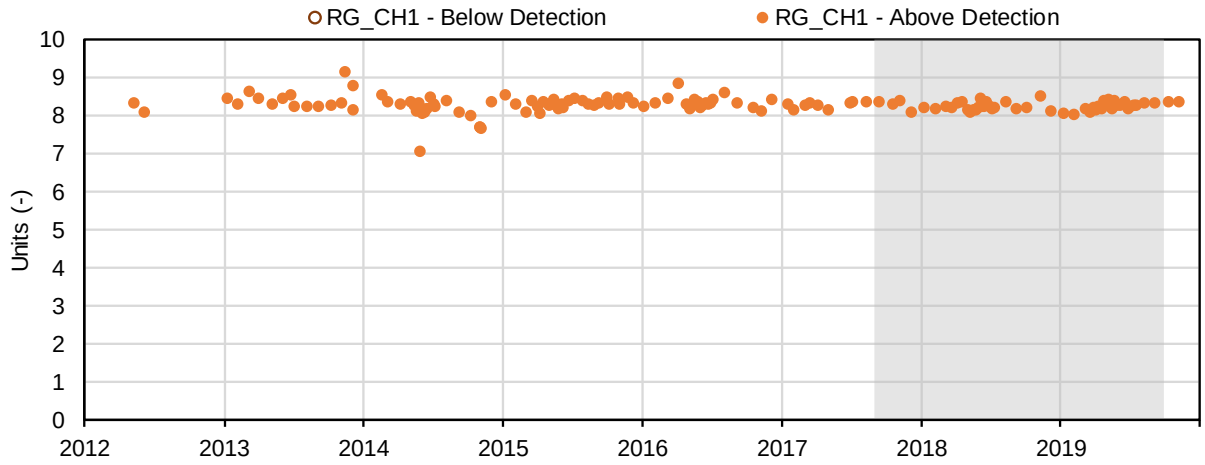

Unknown
2−Bromobenzotrifluoride
(%)
83.350
83.325
83.300
83.275
83.250
Annual Mean
2019
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extractable Petroleum Hydrocarbons (C19 − C32) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Sum of Extractable Petroleum Hydrocarbons (C10 − C19 and C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
Year
0.275
0.250
0.225
0.200
0.550
0.525
0.500
0.475
0.450
2013
2014
2015
2016
2017
2018
2019

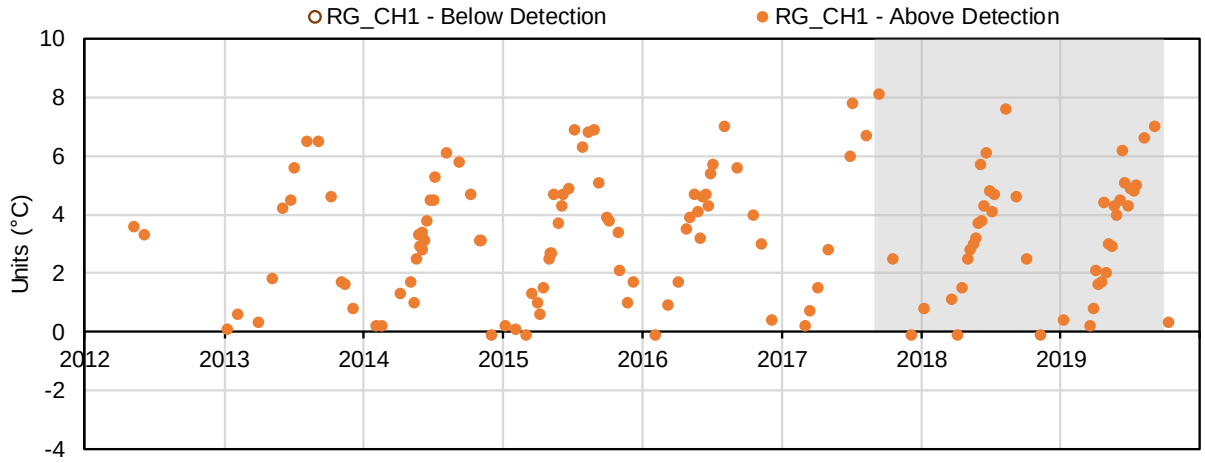
ATTACHMENT F18

RG_CH1 Plots

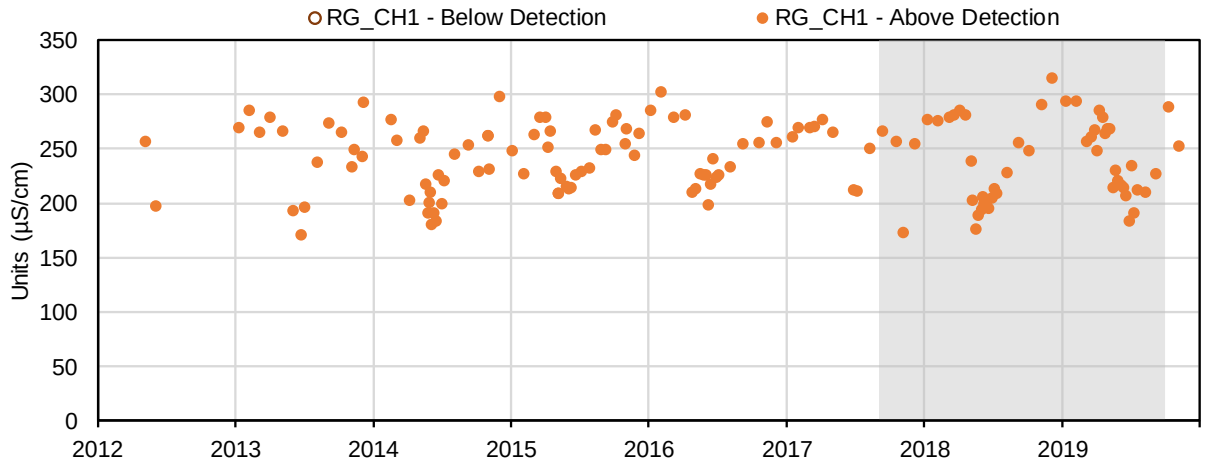
(1) pH (-); Field Measured



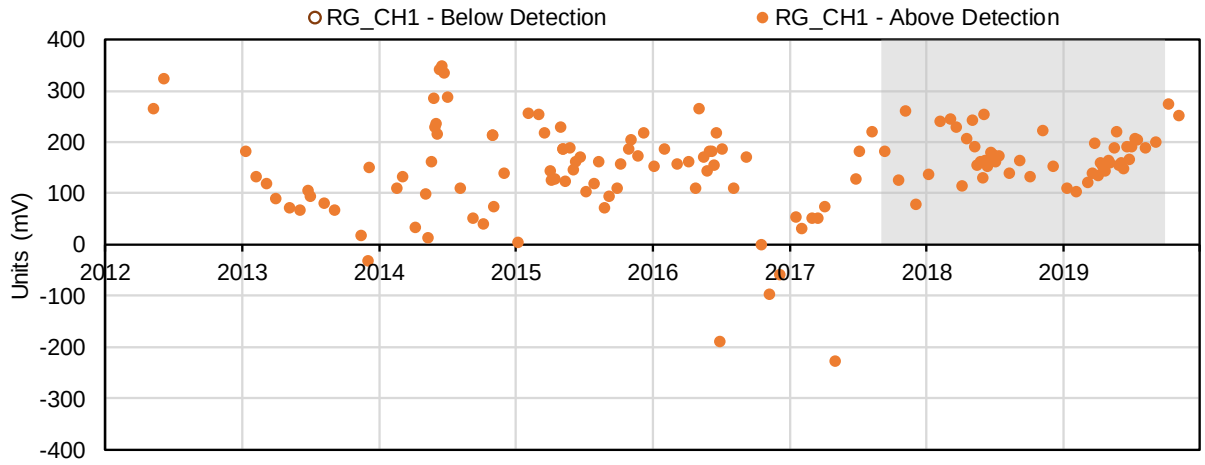
(2) Temperature (°C); Field Measured



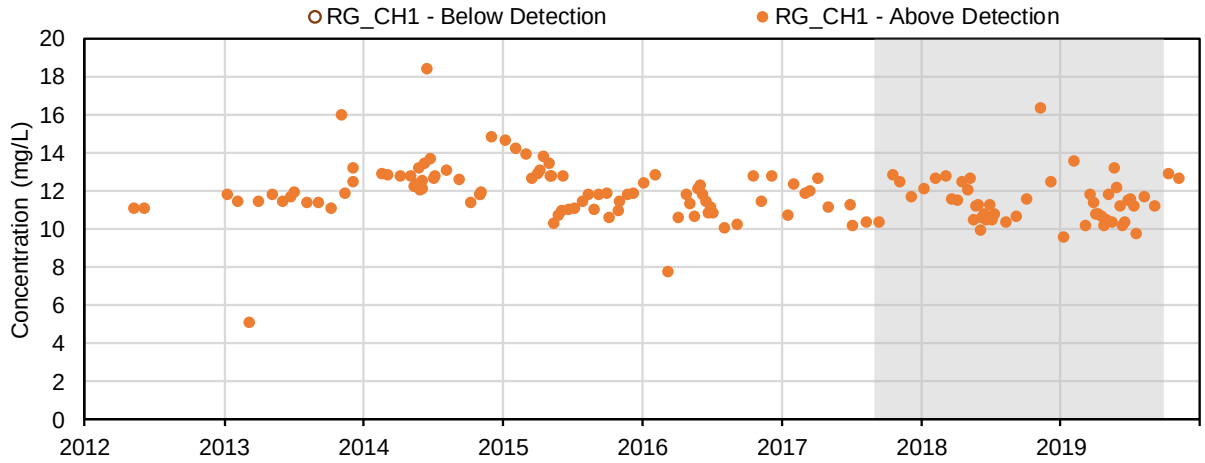
(3) Conductivity (µS/cm); Field Measured



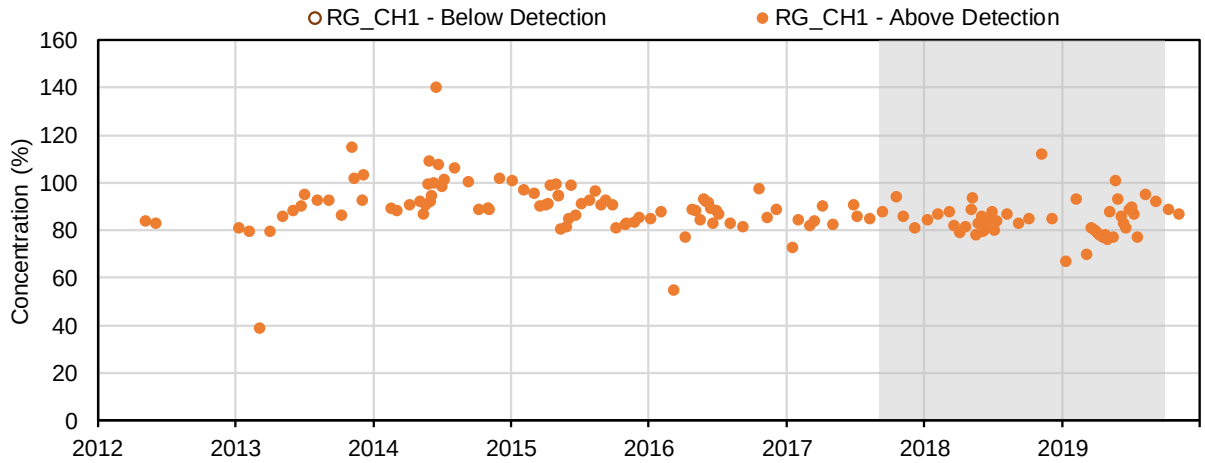
(4) Oxidation-Reduction Potential (mV); Field Measured



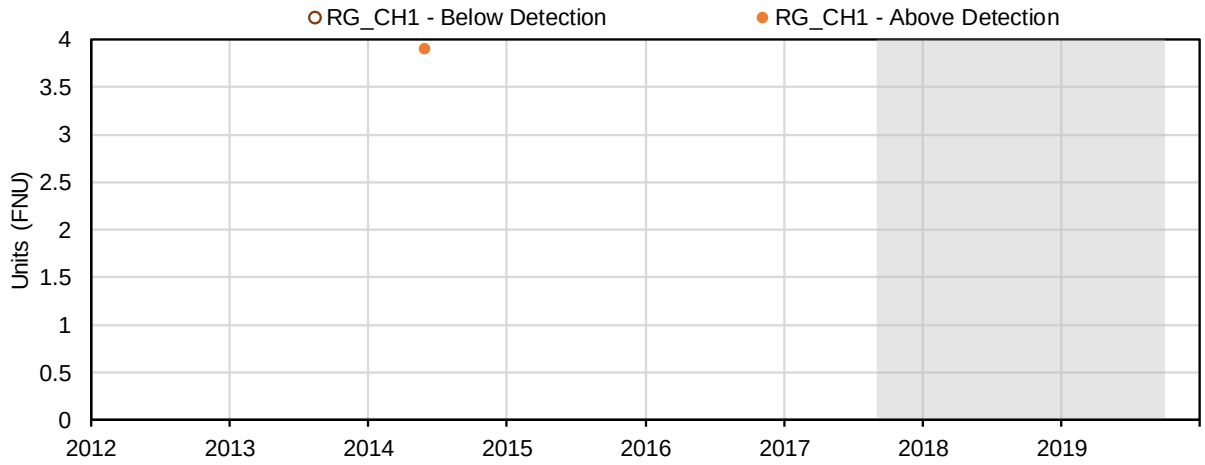
(5) Dissolved Oxygen (mg/L); Field Measured



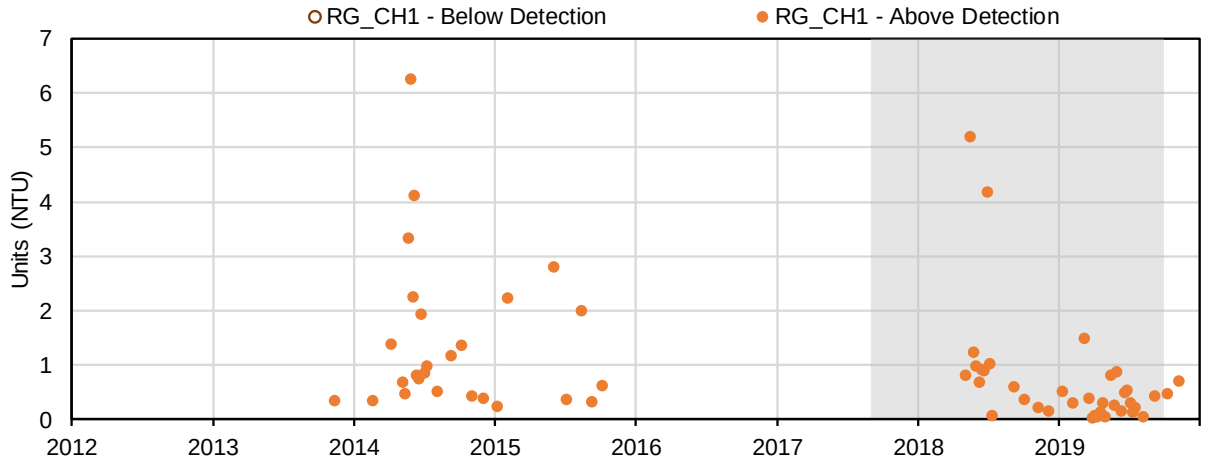
(6) Dissolved Oxygen (%); Field Measured



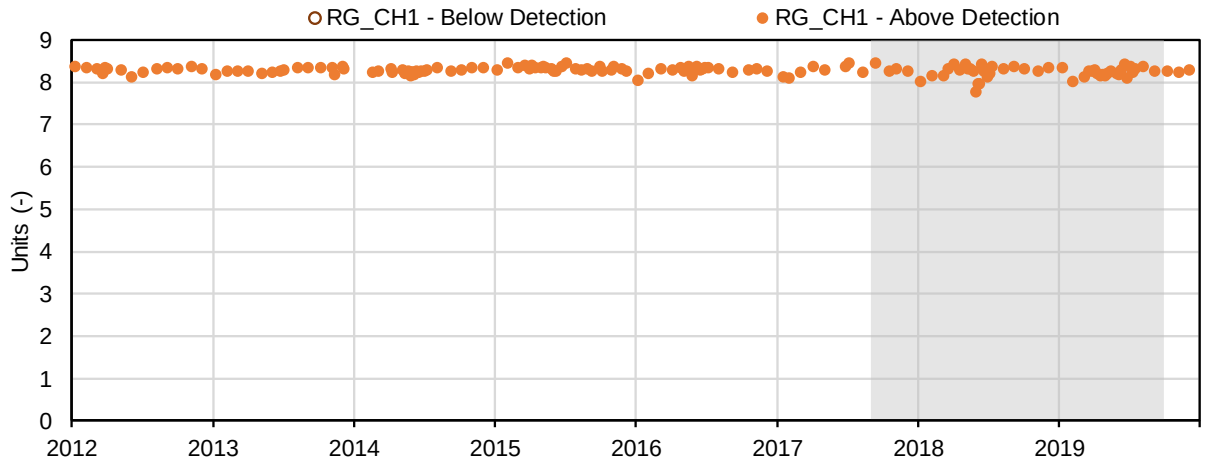
(7) Turbidity (FNU); Field Measured



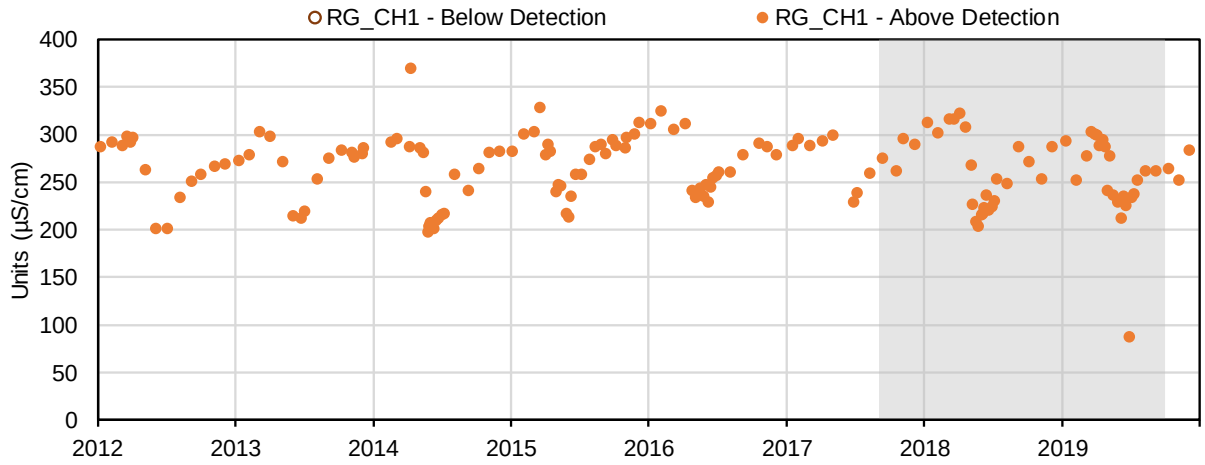
(8) Turbidity (NTU); Field Measured



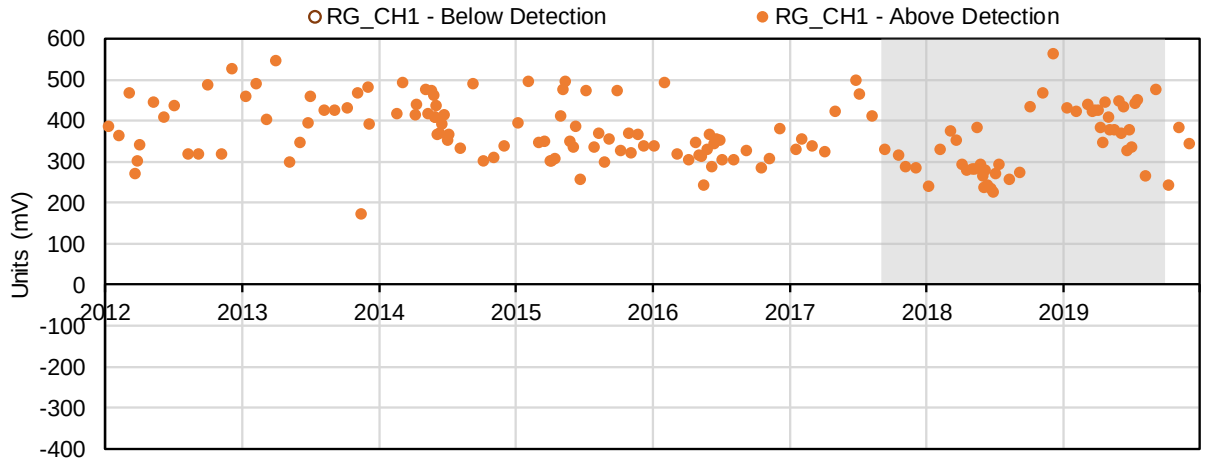
(9) pH (-); Conventional Parameters



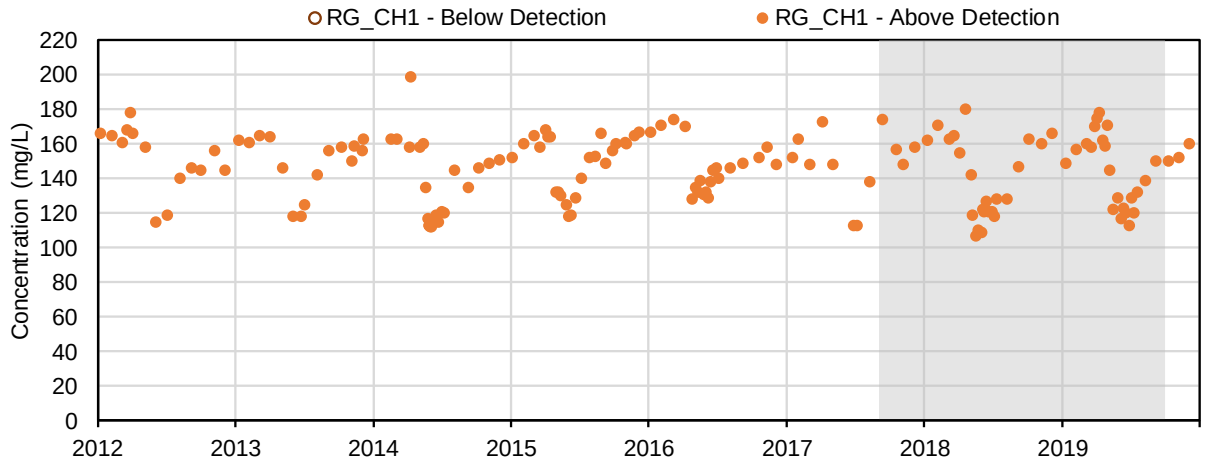
(10) Conductivity (µS/cm); Conventional Parameters



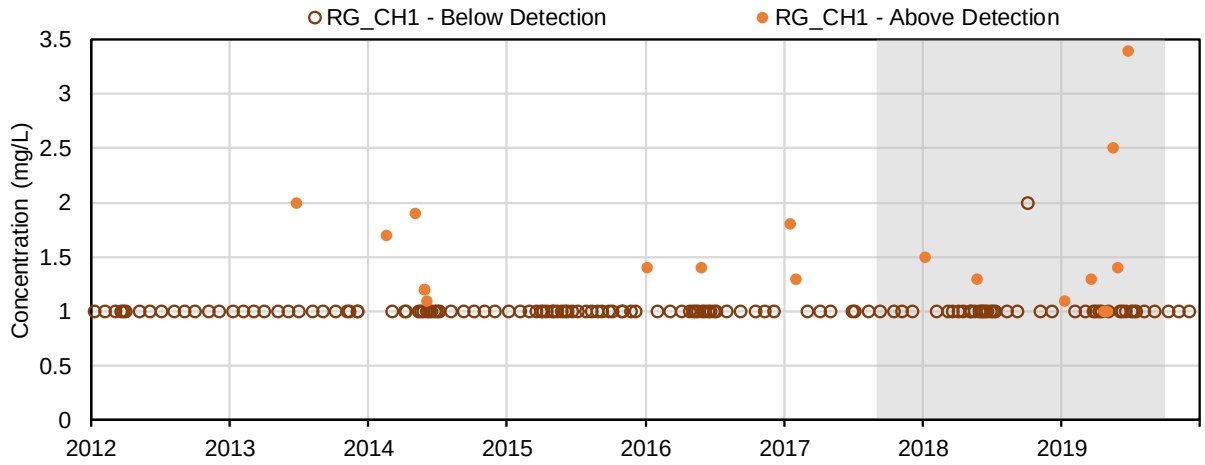
(11) Oxidation-Reduction Potential (mV); Conventional Parameters



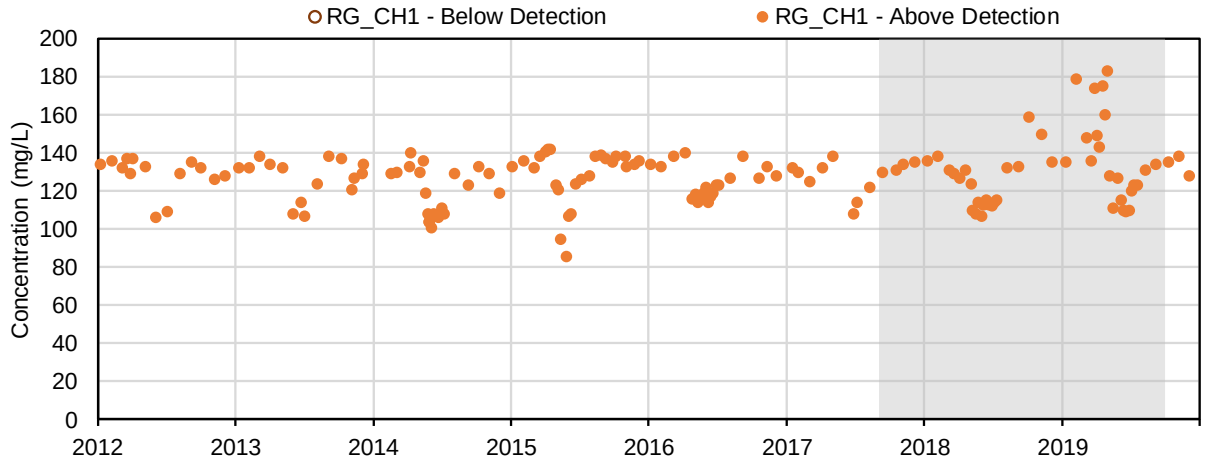
(12) Hardness, as CaCO3 (mg/L); Conventional Parameters



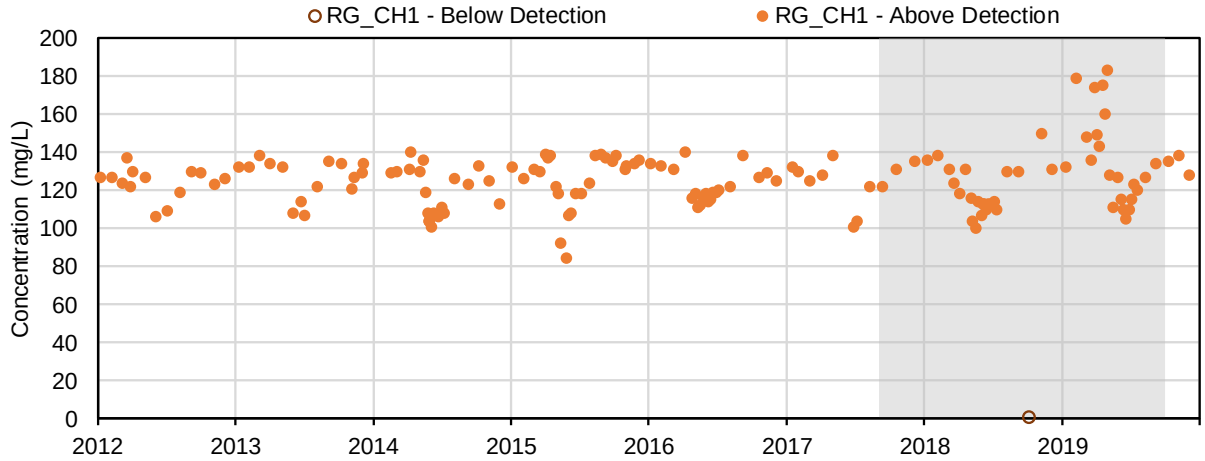
(13) Acidity, CaCO3 (mg/L); Conventional Parameters



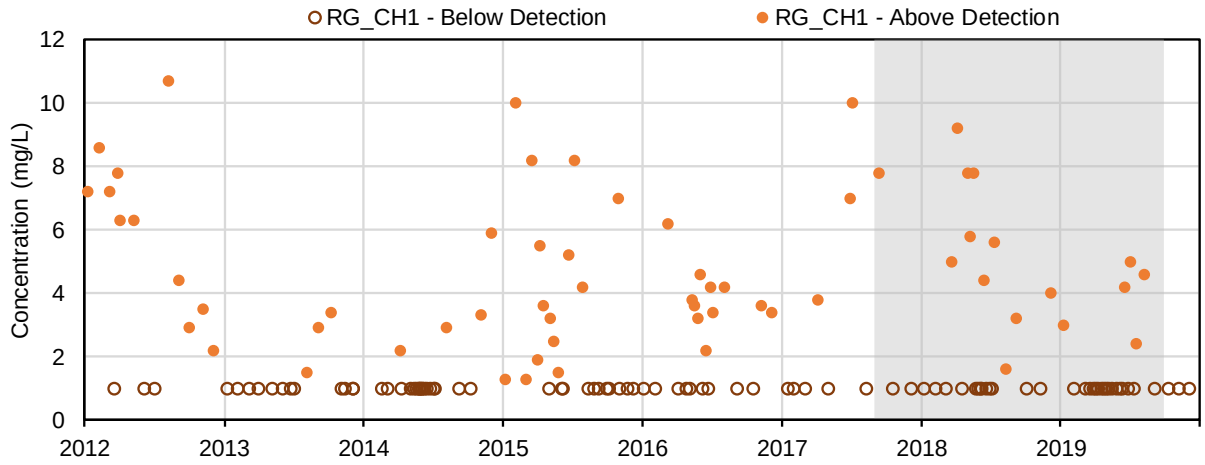
(14) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



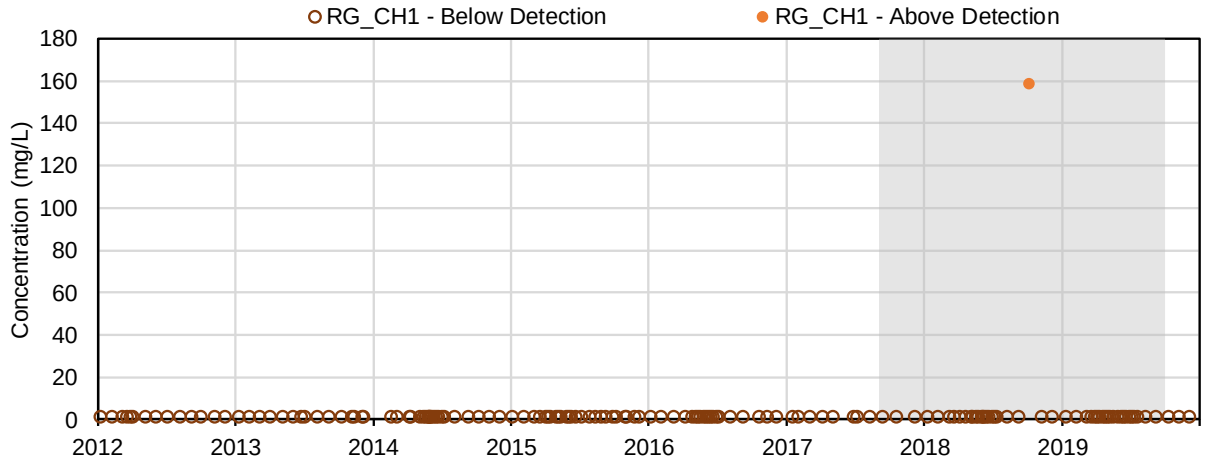
(15) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



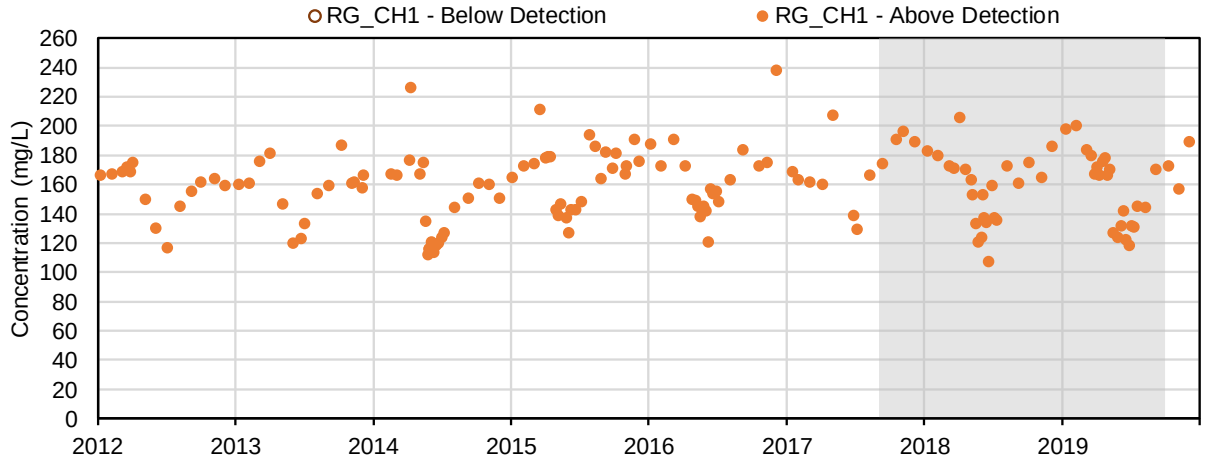
(16) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



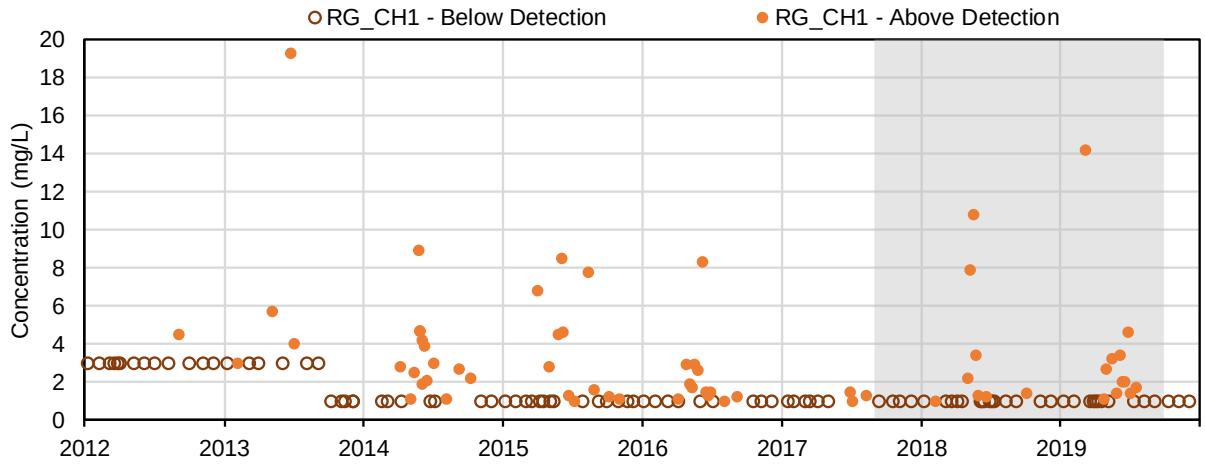
(17) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



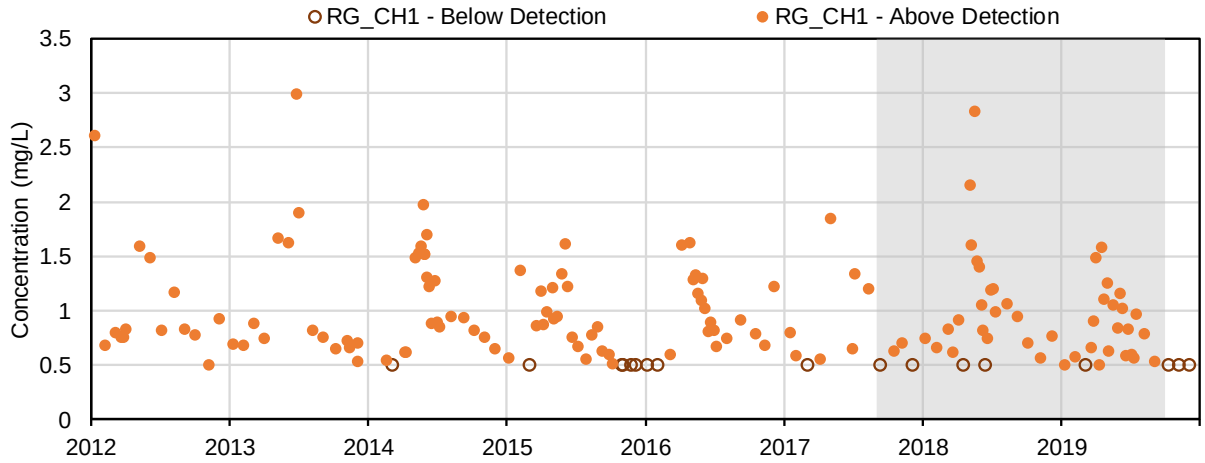
(18) Total dissolved solids (mg/L); Conventional Parameters



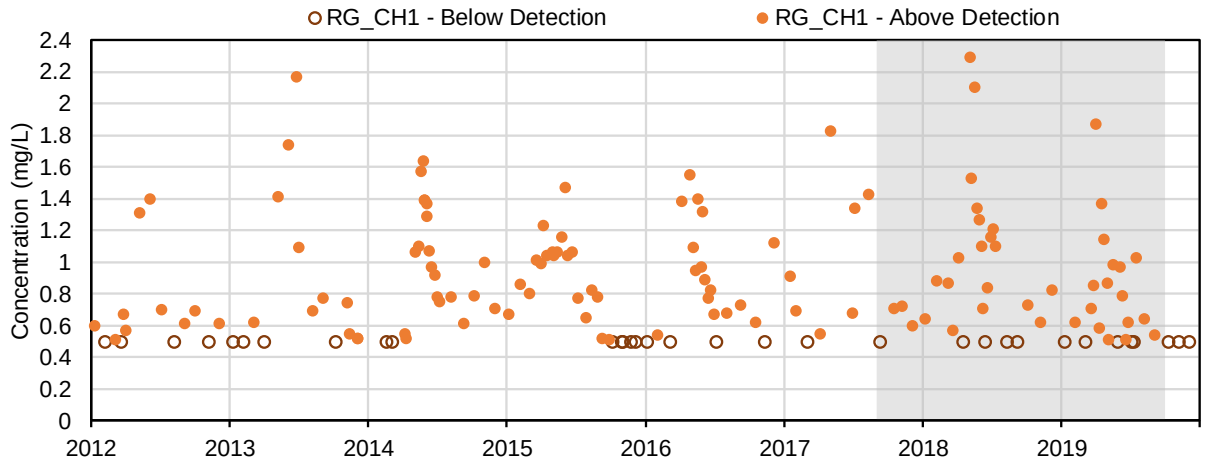
(19) Total suspended solids (mg/L); Conventional Parameters



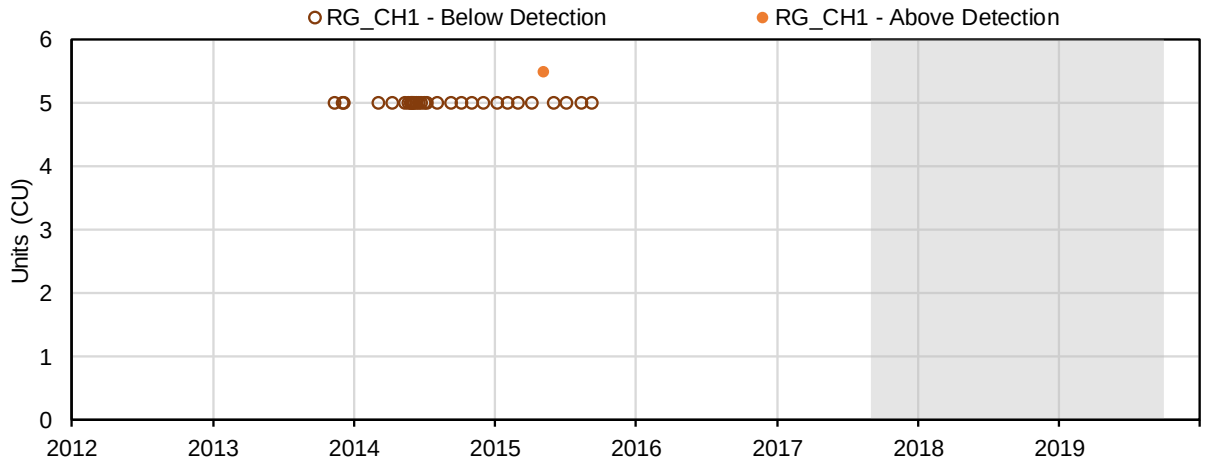
(20) Total organic carbon (mg/L); Conventional Parameters



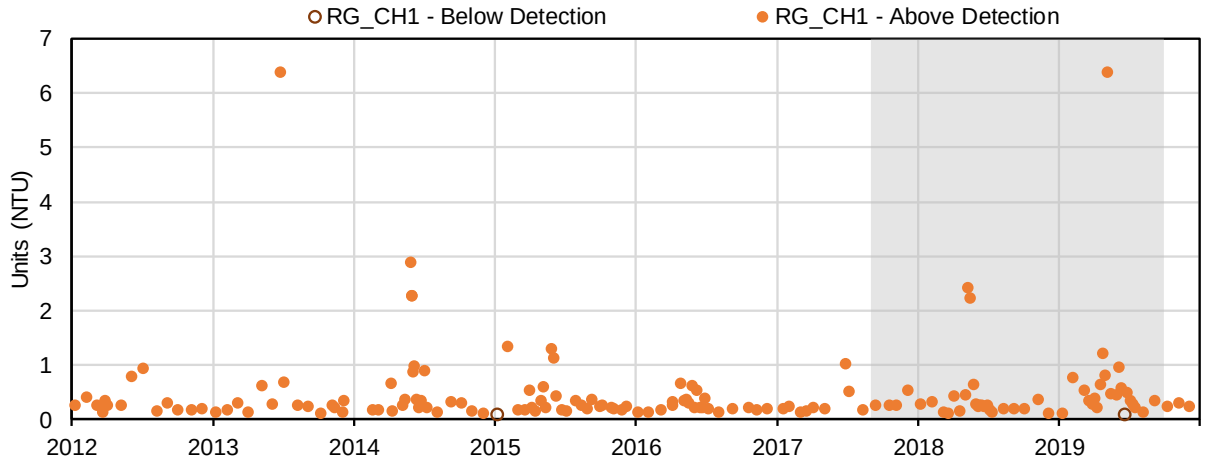
(21) Dissolved organic carbon (mg/L); Conventional Parameters



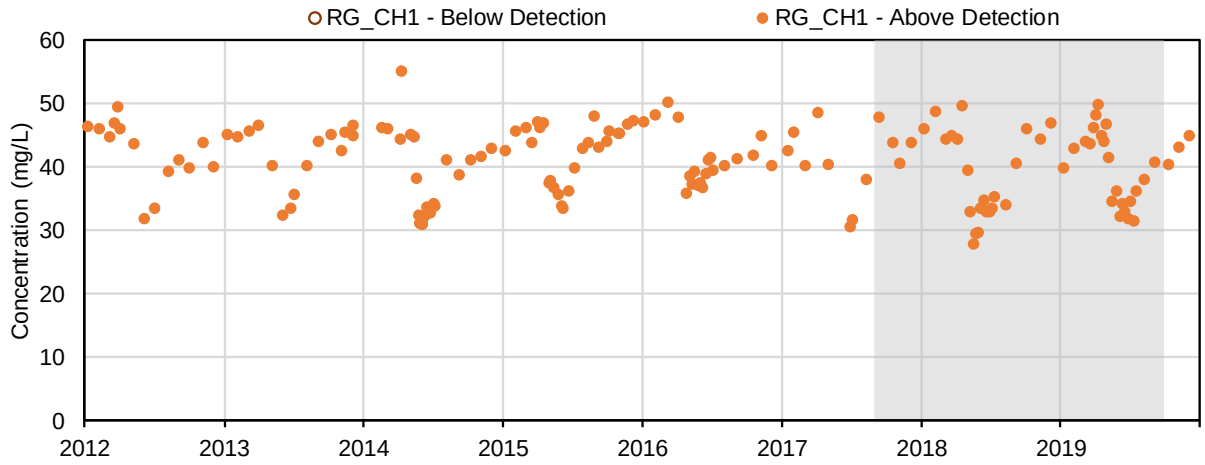
(22) Colour (CU); Conventional Parameters



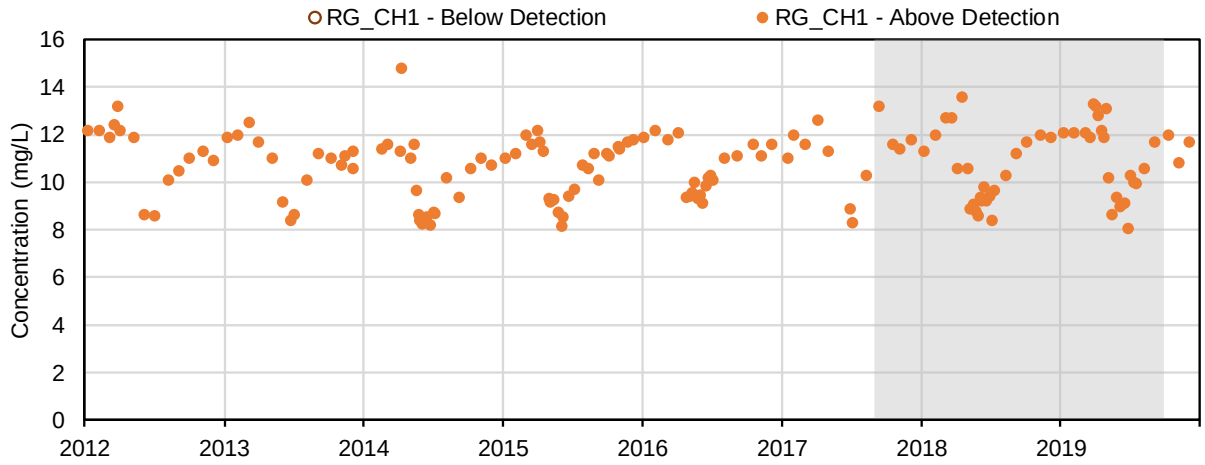
(23) Turbidity (NTU); Conventional Parameters



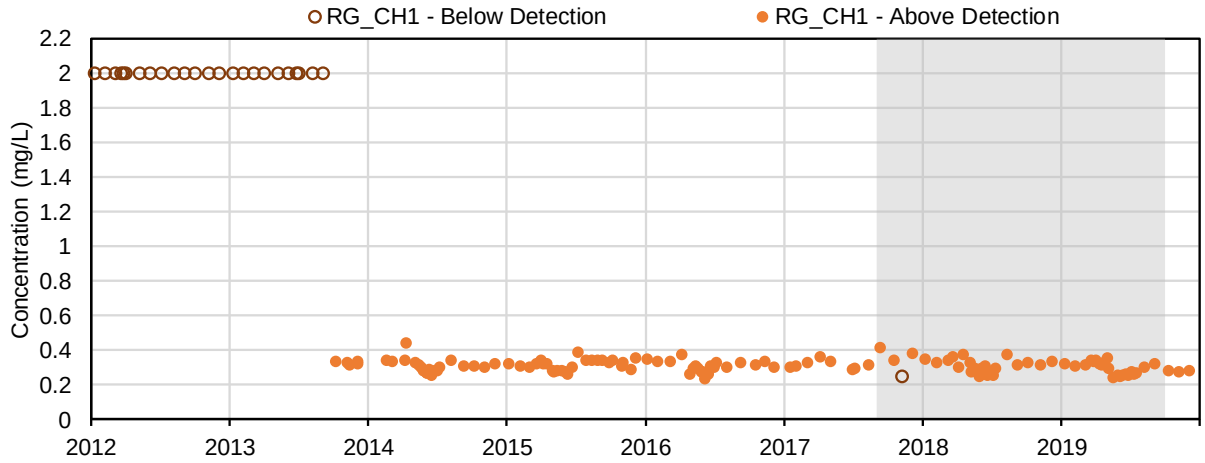
(24) Calcium (mg/L); Major Ions



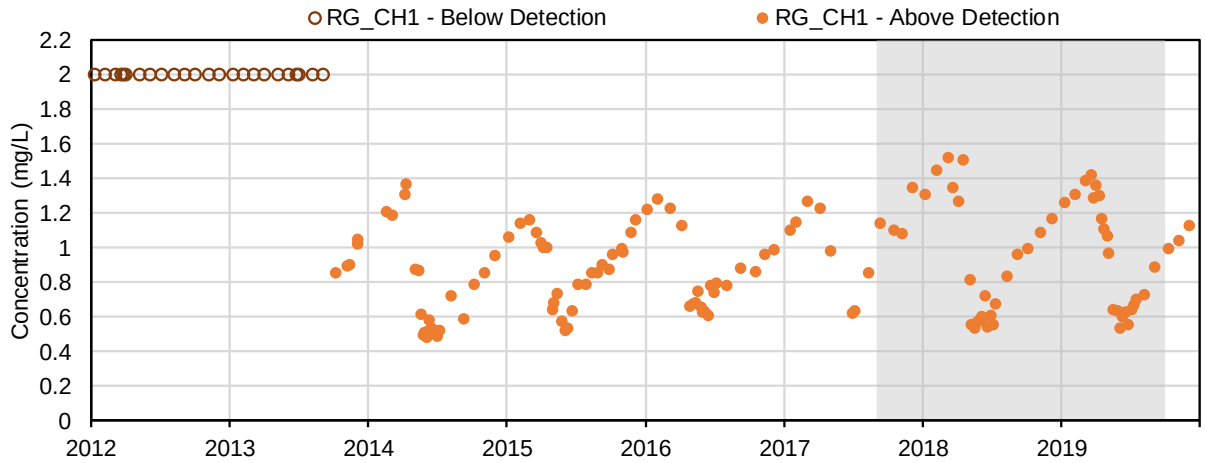
(25) Magnesium (mg/L); Major Ions



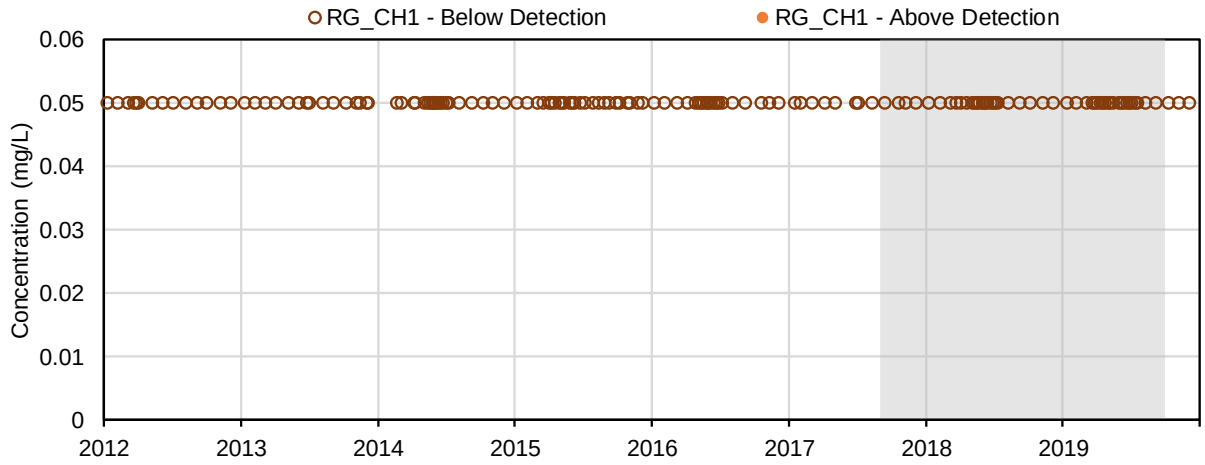
(26) Potassium (mg/L); Major Ions



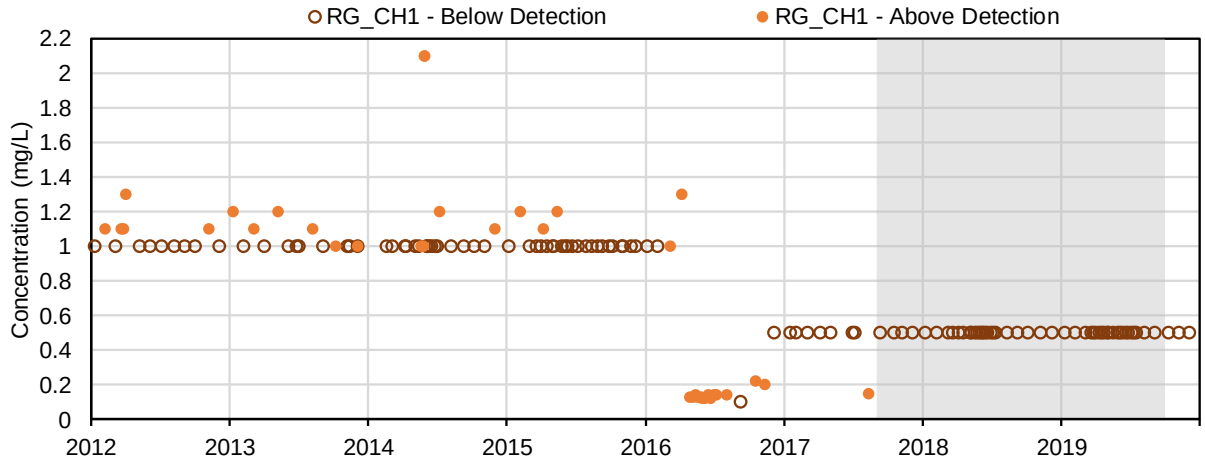
(27) Sodium (mg/L); Major Ions



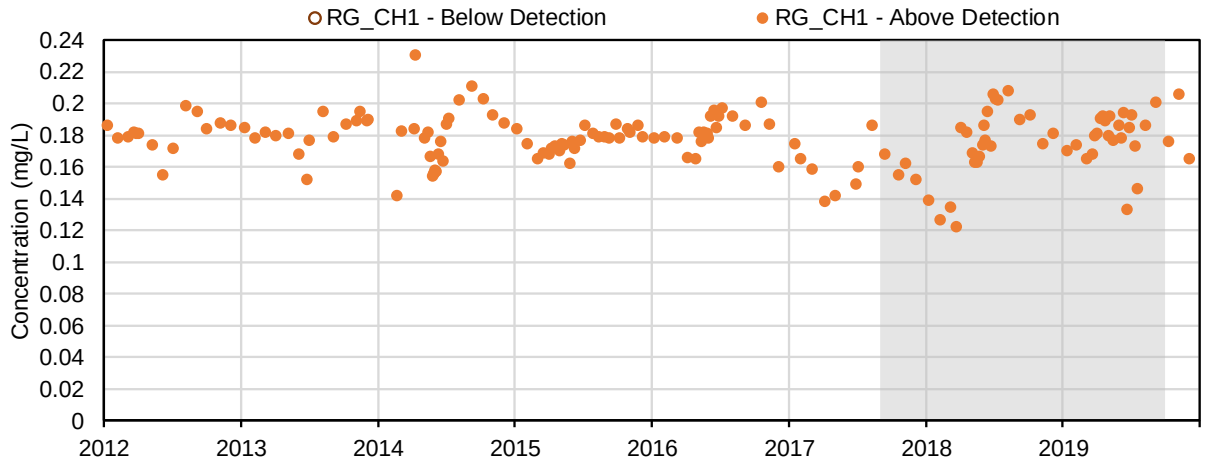
(28) Bromide (mg/L); Major Ions



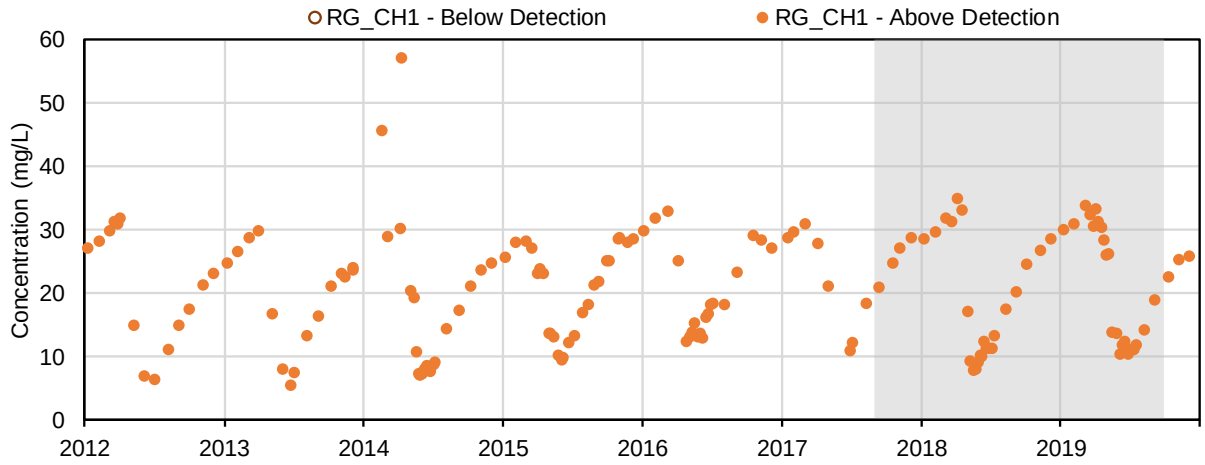
(29) Chloride (mg/L); Major Ions



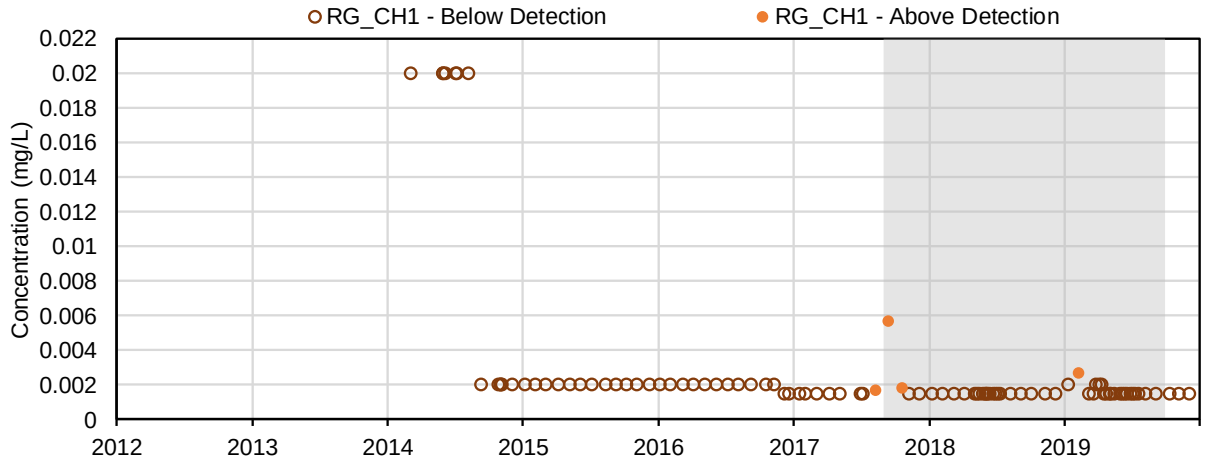
(30) Fluoride (mg/L); Major Ions



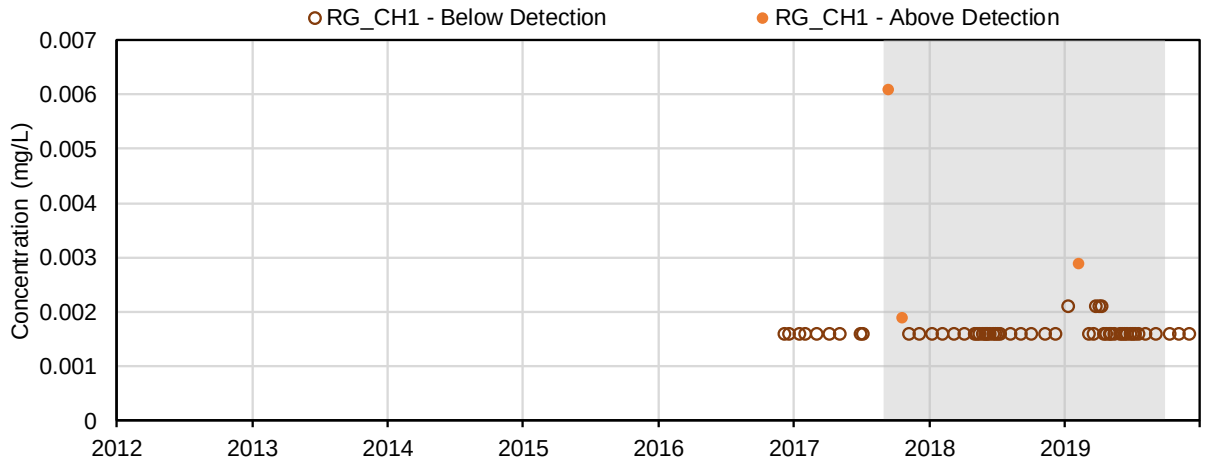
(31) Sulphate (mg/L); Major Ions



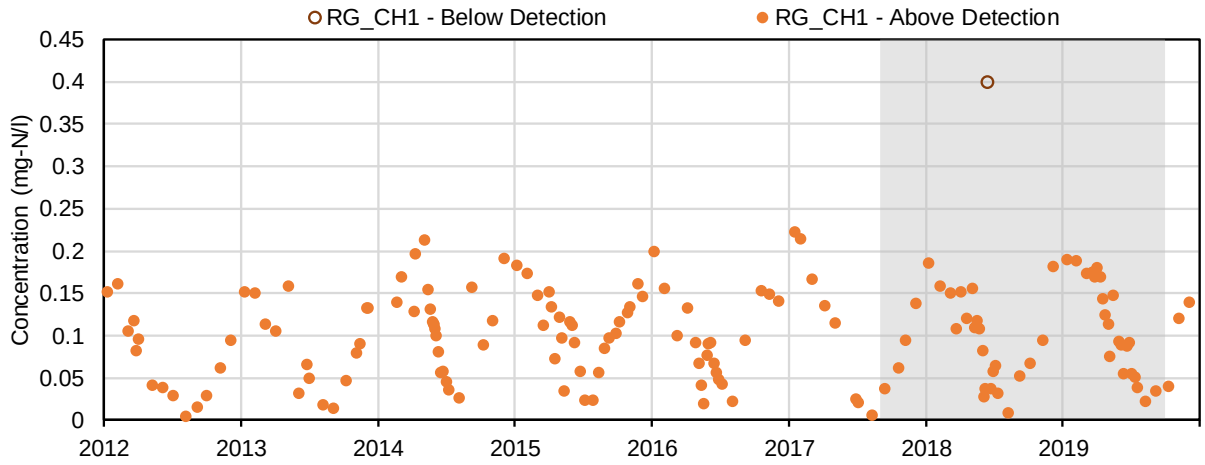
(32) Sulphide (mg/L); Major Ions



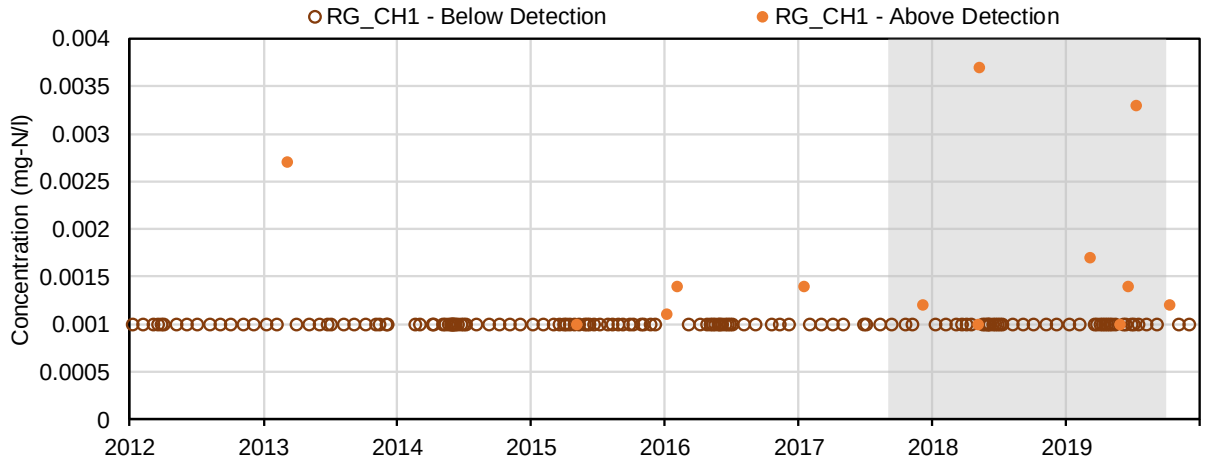
(33) Hydrogen Sulphide (mg/L); Major Ions



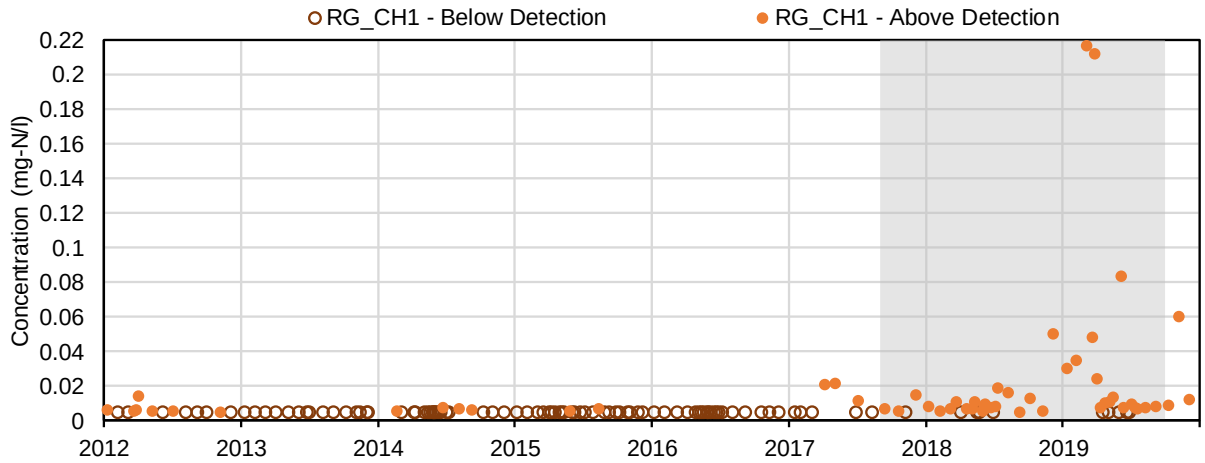
(34) Nitrate (mg-N/l); Nutrients and Biological Indicators



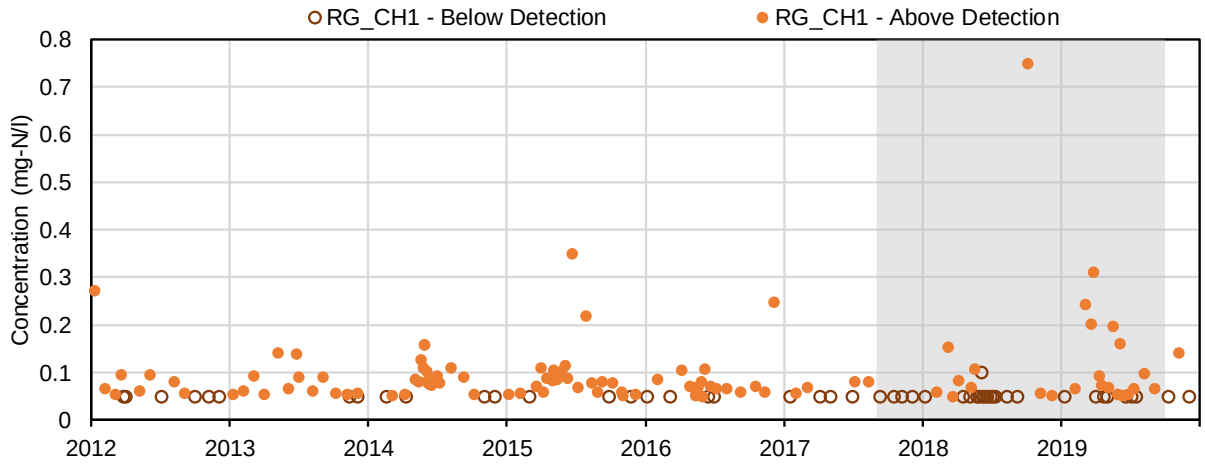
(35) Nitrite (mg-N/l); Nutrients and Biological Indicators



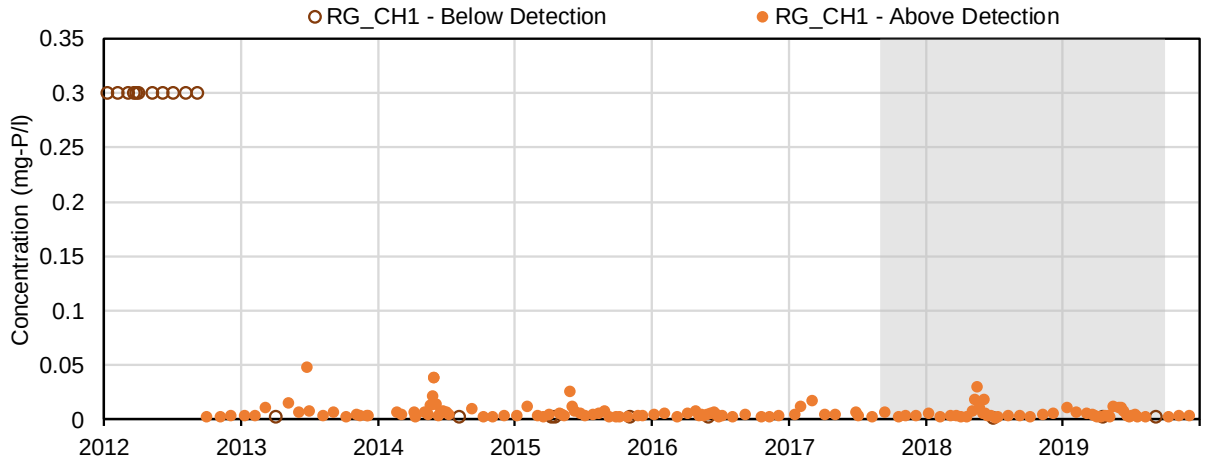
(36) Total ammonia (mg-N/l); Nutrients and Biological Indicators



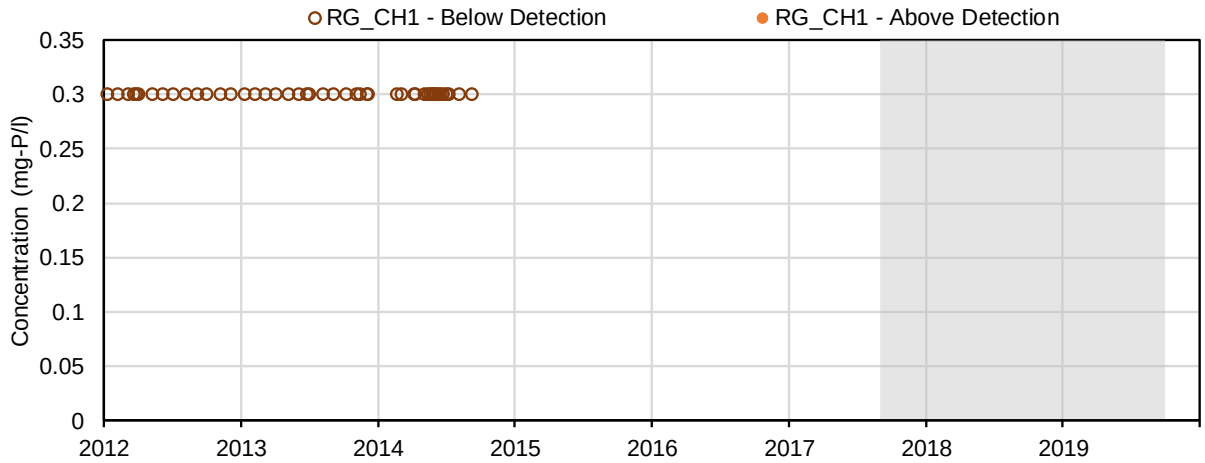
(37) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



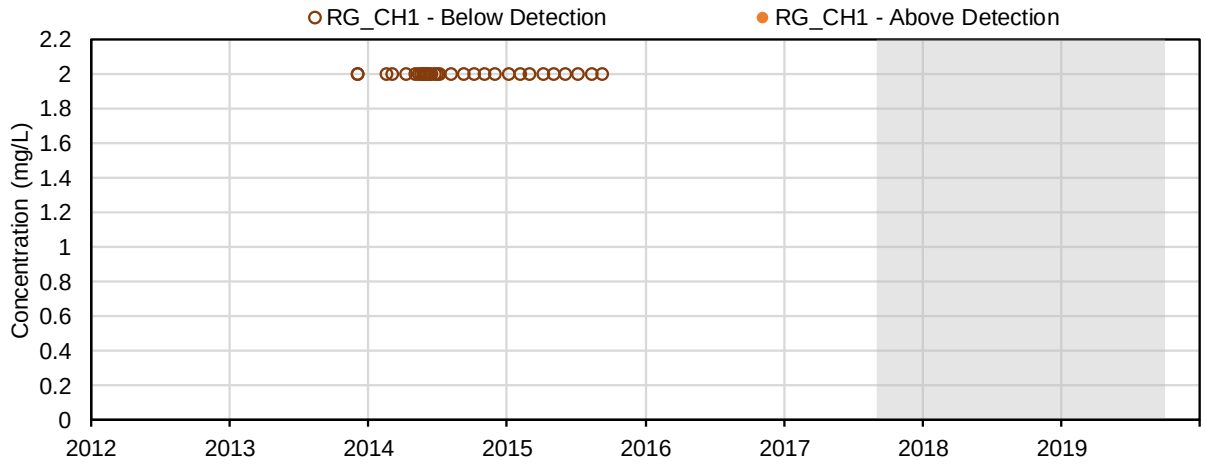
(38) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



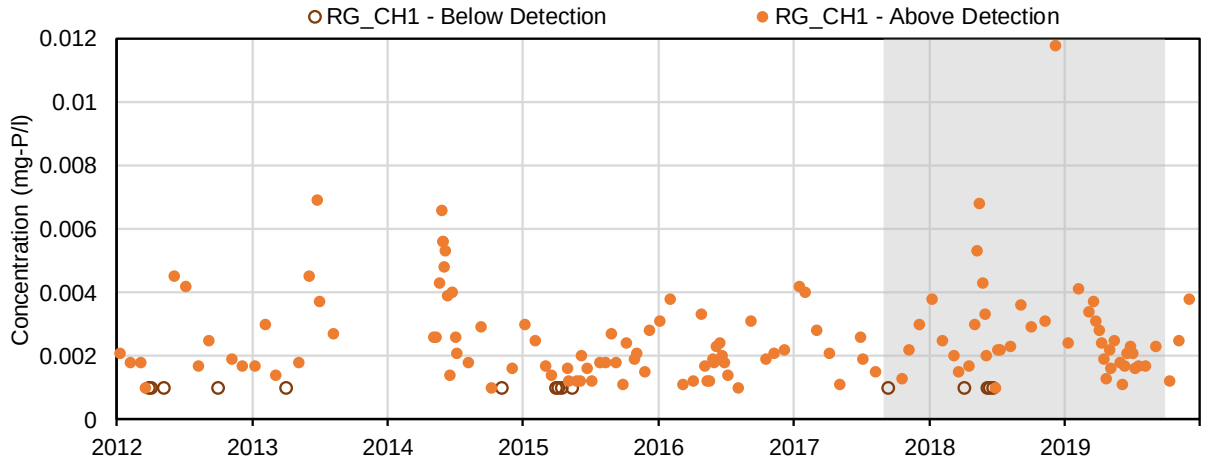
(39) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



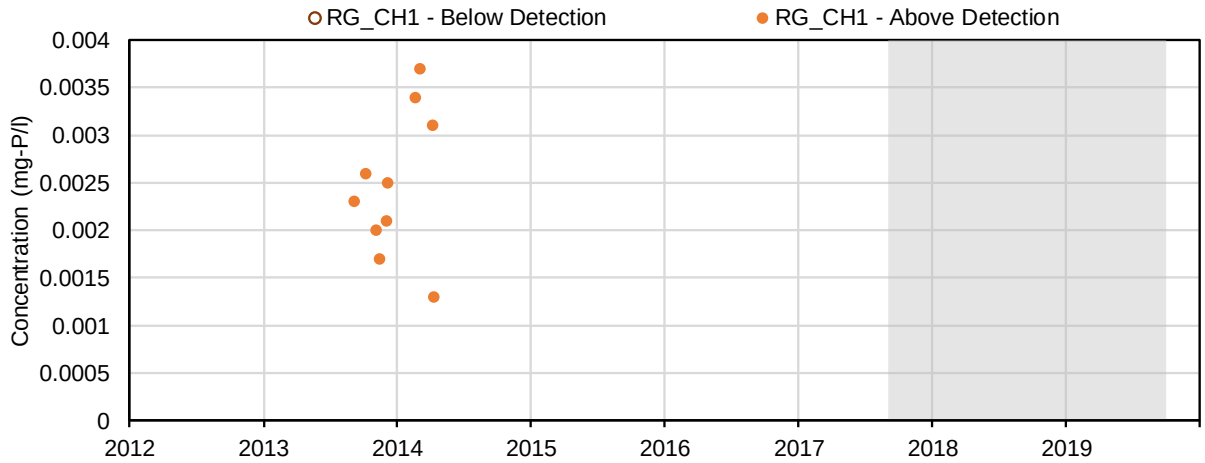
(40) Biochemical oxygen demand (mg/L); Nutrients and Biological Indicators



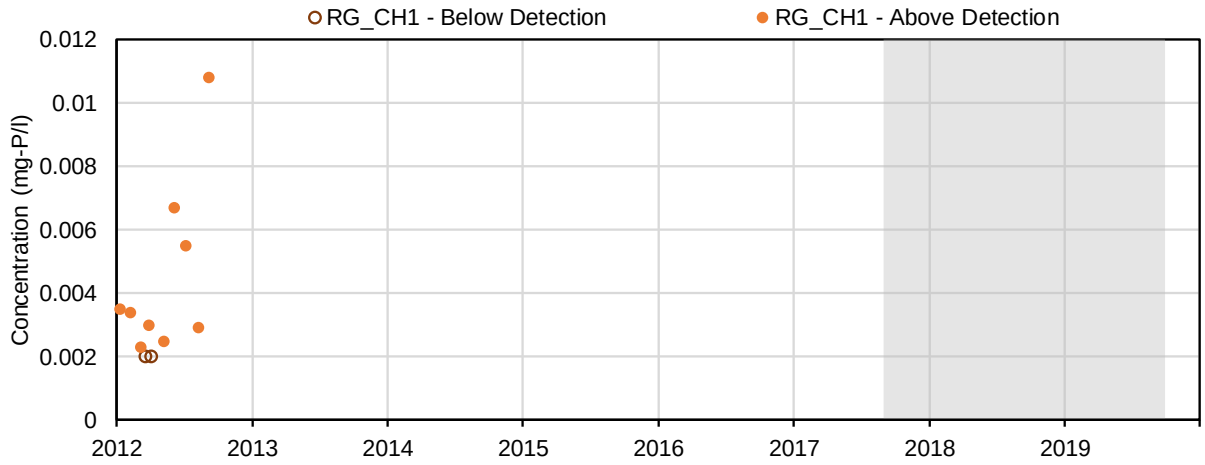
(41) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



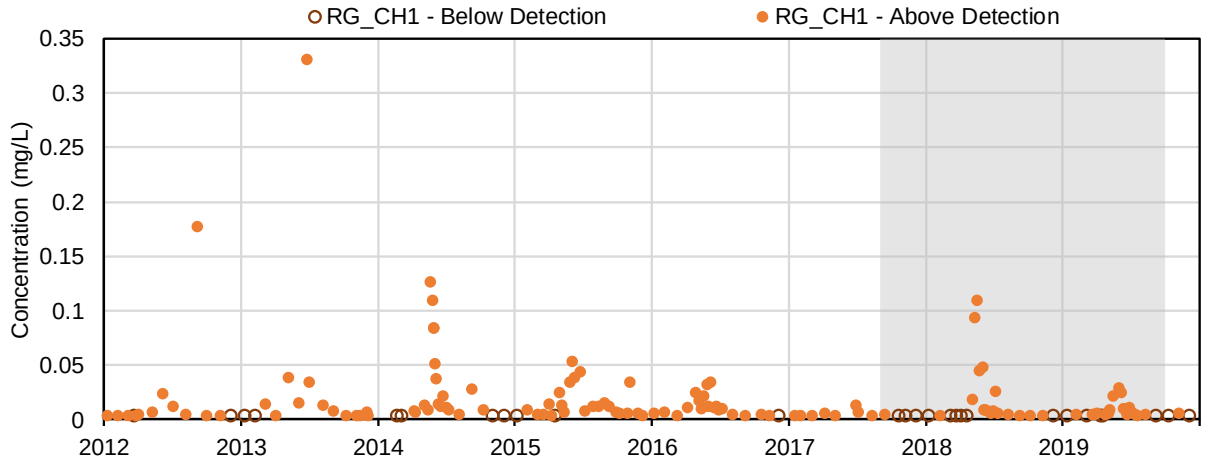
(42) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



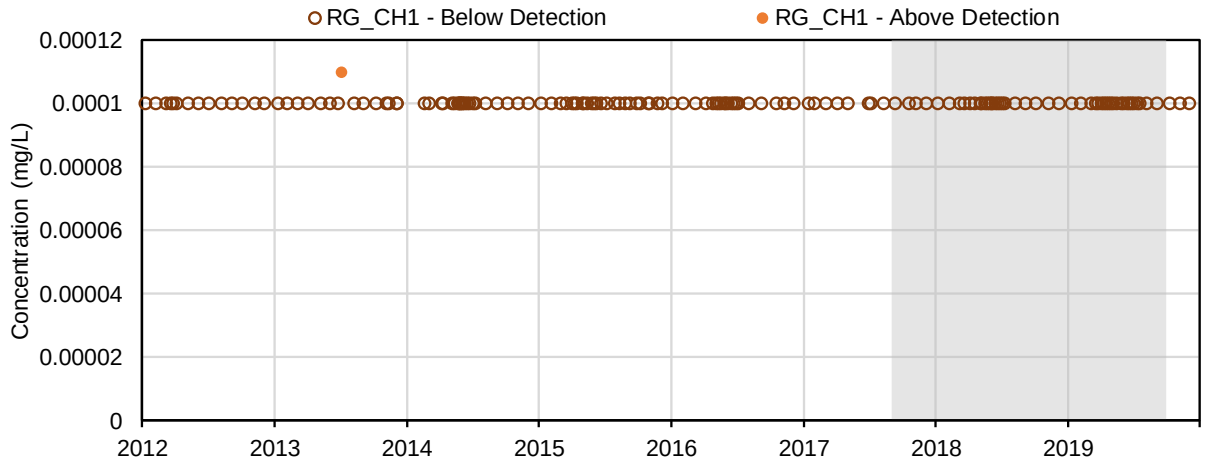
(43) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



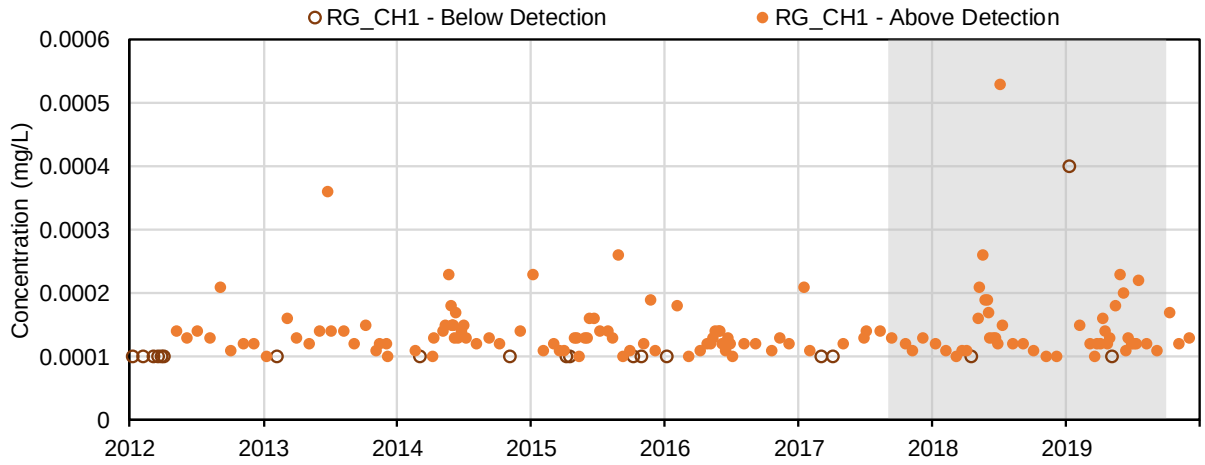
(44) Aluminum (mg/L); Total Metals



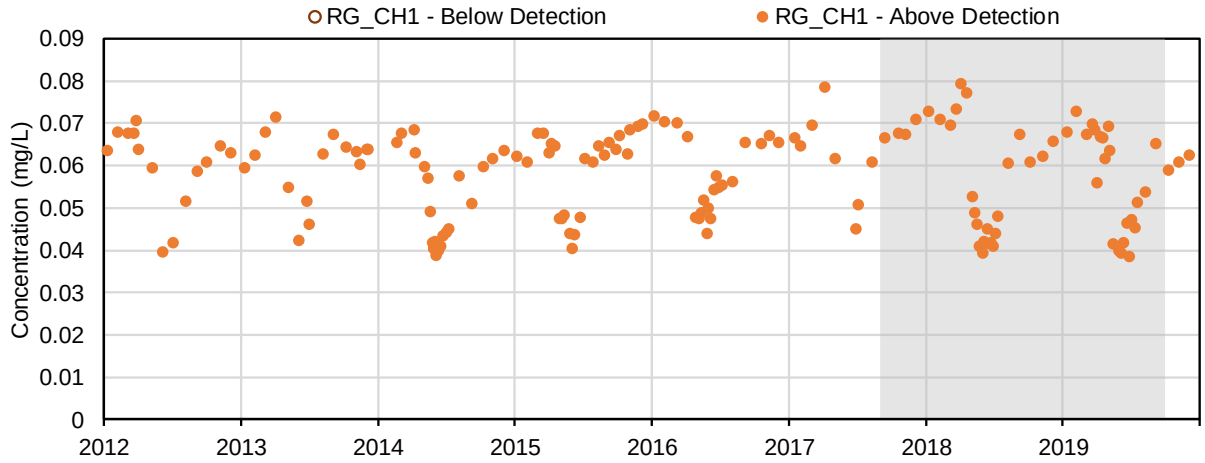
(45) Antimony (mg/L); Total Metals



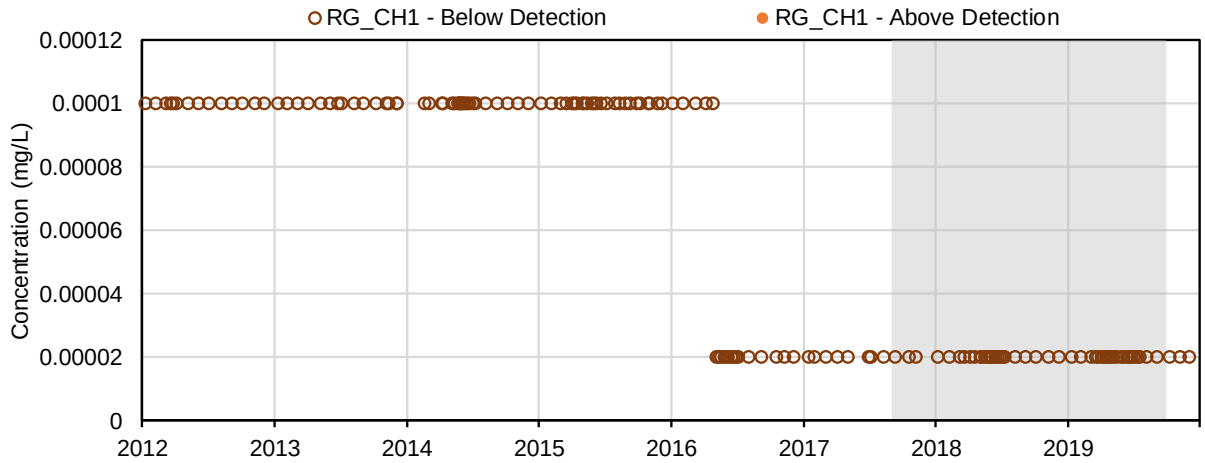
(46) Arsenic (mg/L); Total Metals



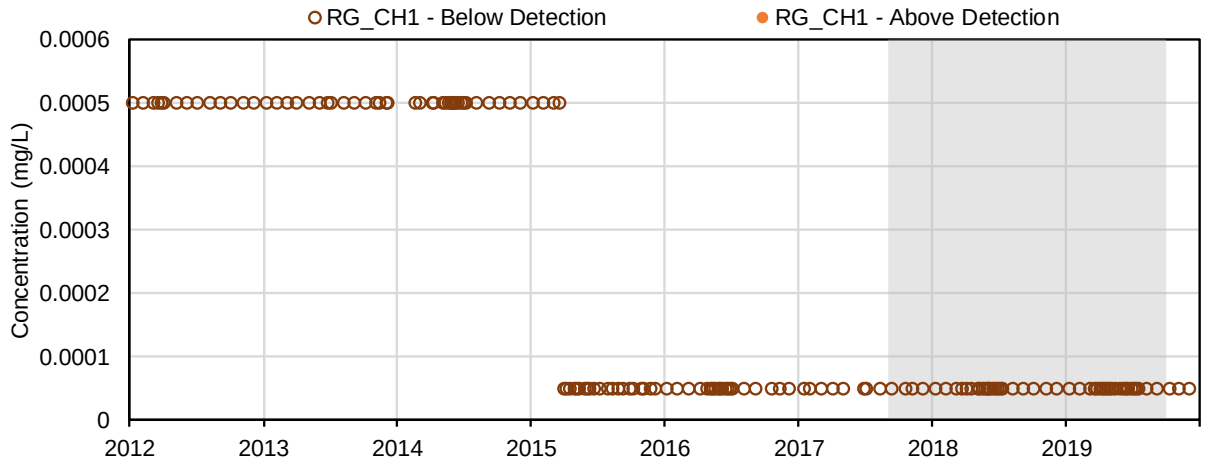
(47) Barium (mg/L); Total Metals



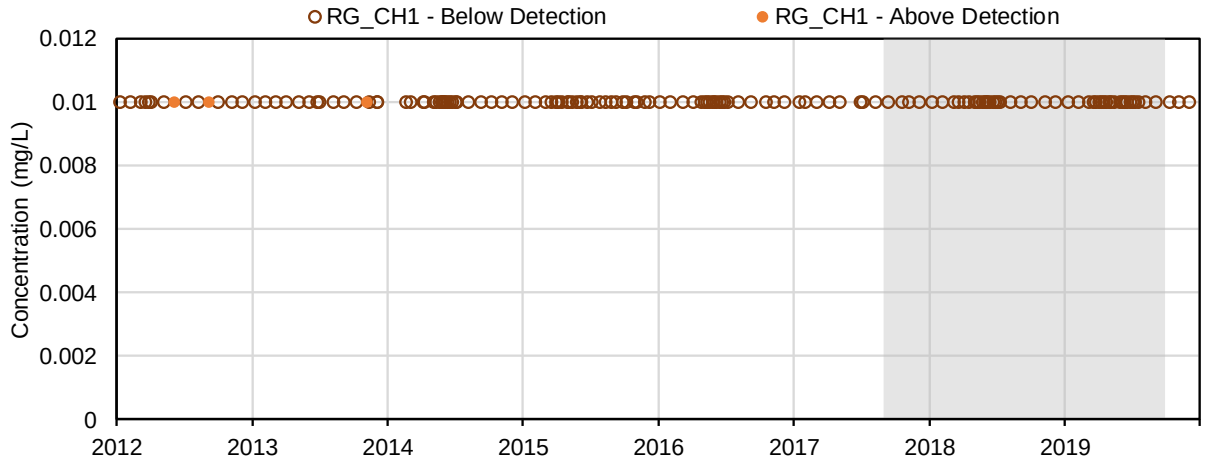
(48) Beryllium (mg/L); Total Metals



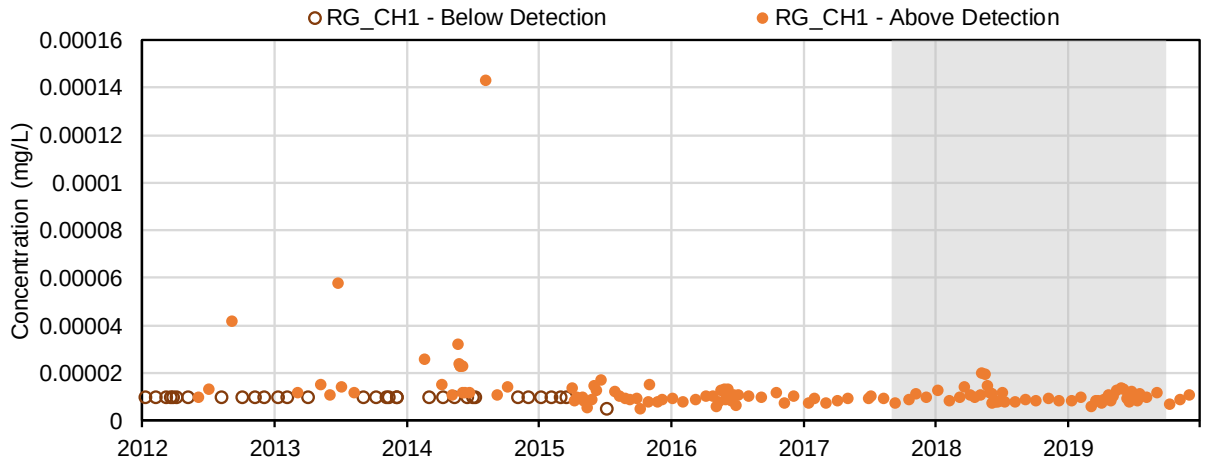
(49) Bismuth (mg/L); Total Metals



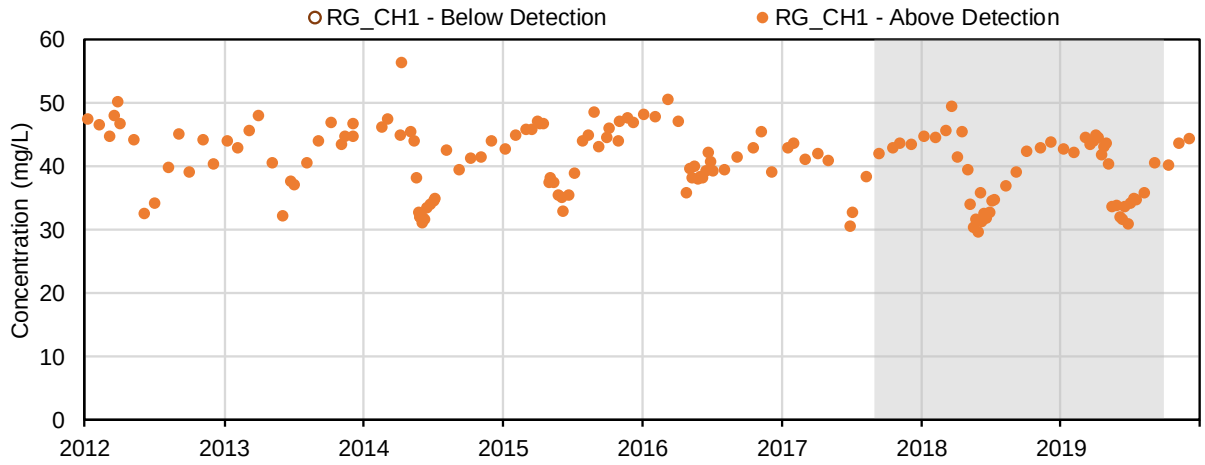
(50) Boron (mg/L); Total Metals



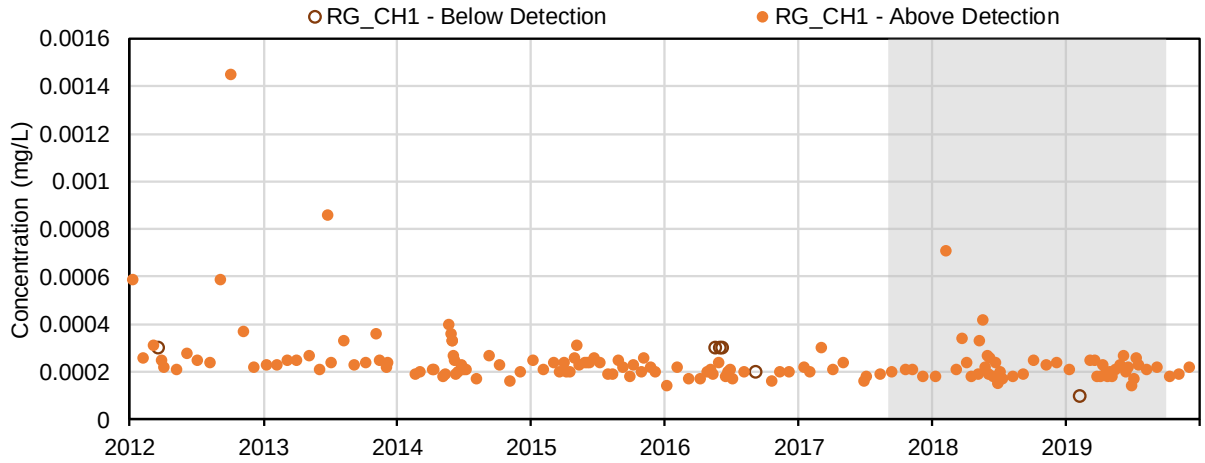
(51) Cadmium (mg/L); Total Metals



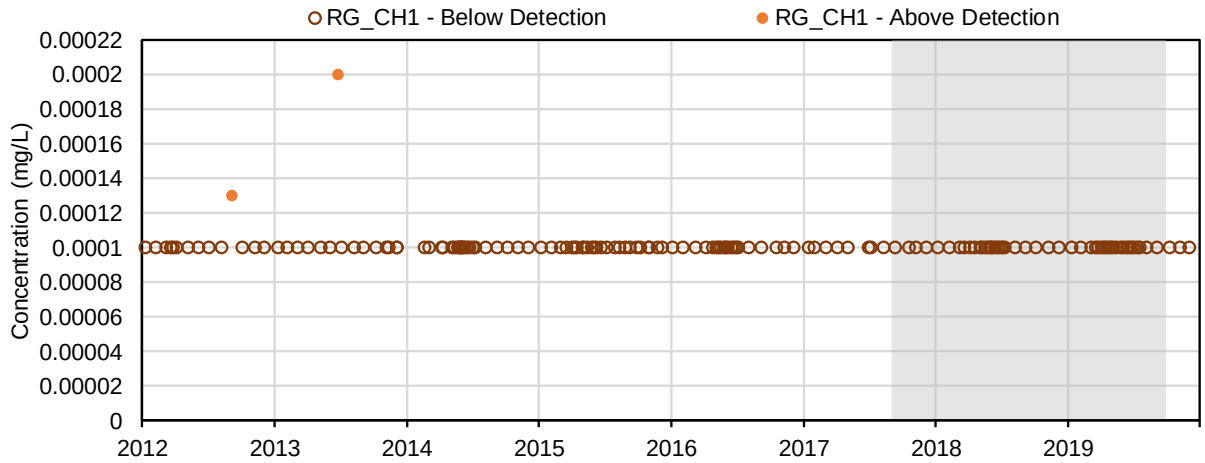
(52) Calcium (mg/L); Total Metals



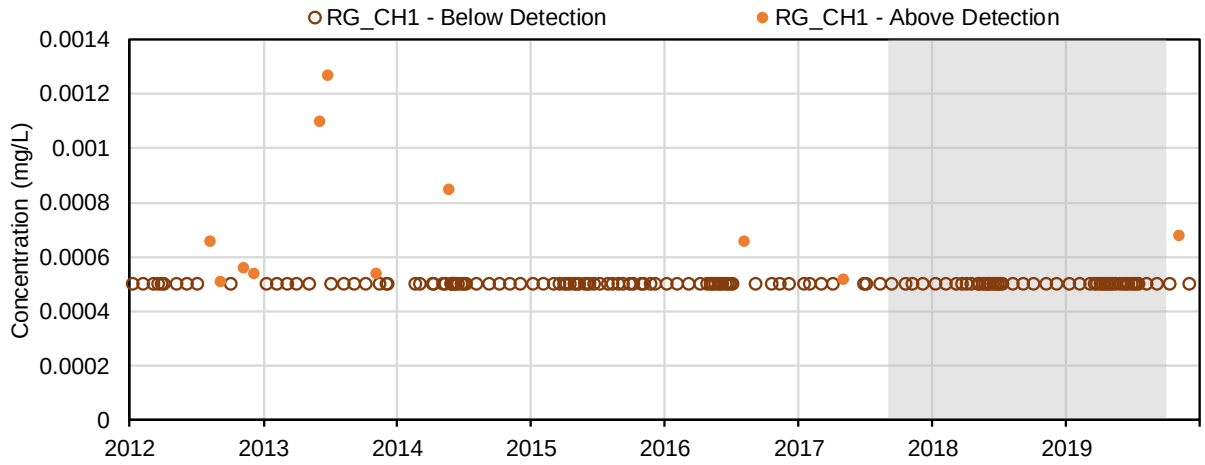
(53) Chromium (mg/L); Total Metals



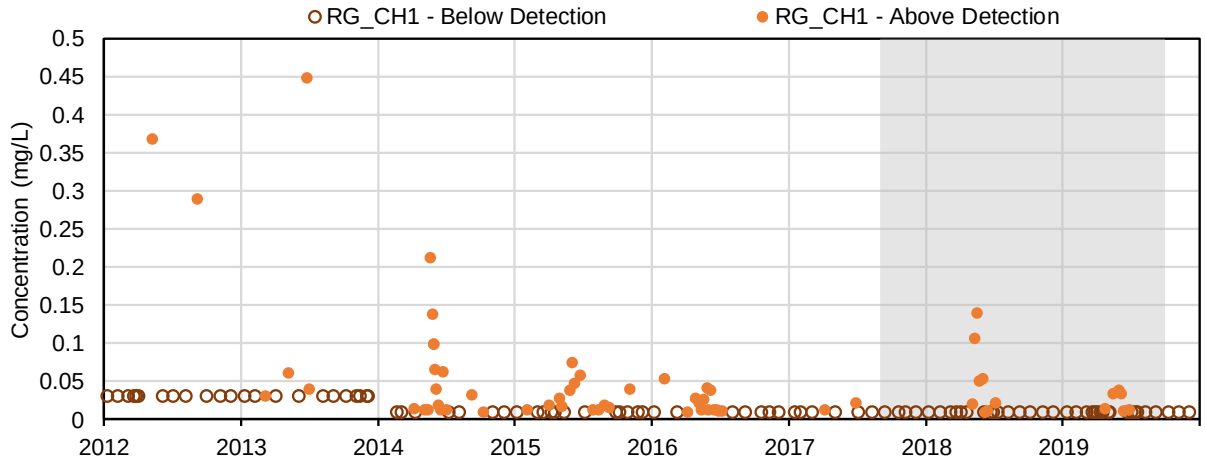
(54) Cobalt (mg/L); Total Metals



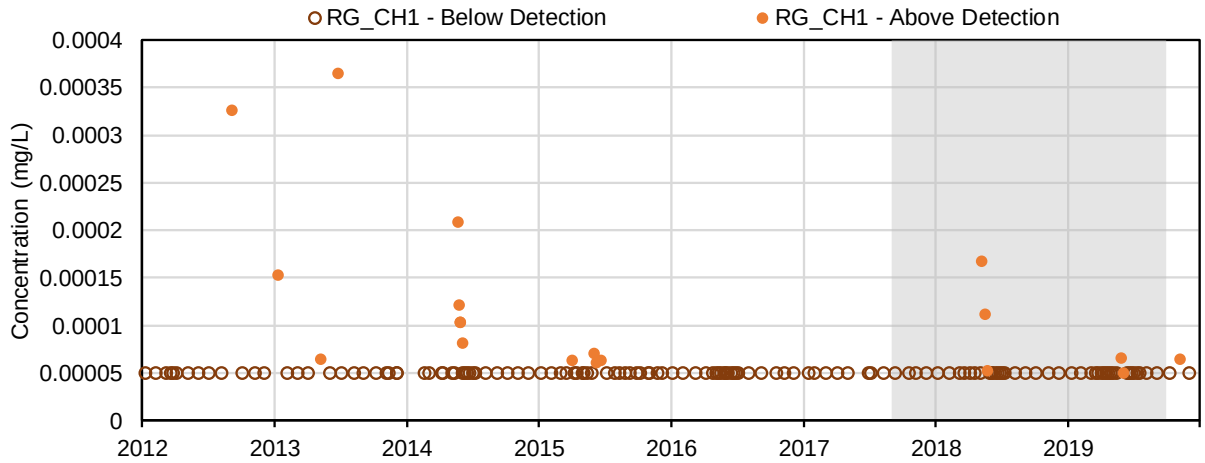
(55) Copper (mg/L); Total Metals



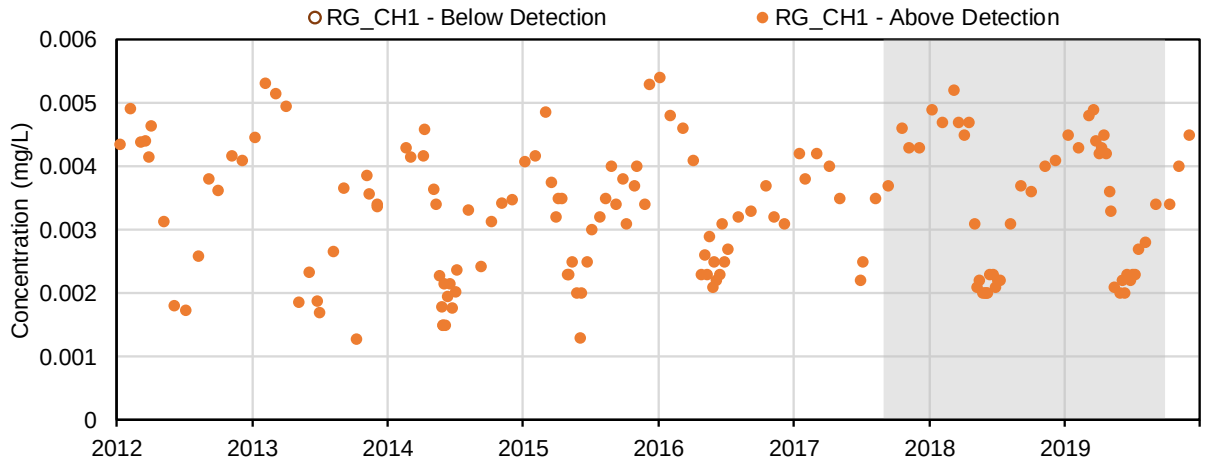
(56) Iron (mg/L); Total Metals



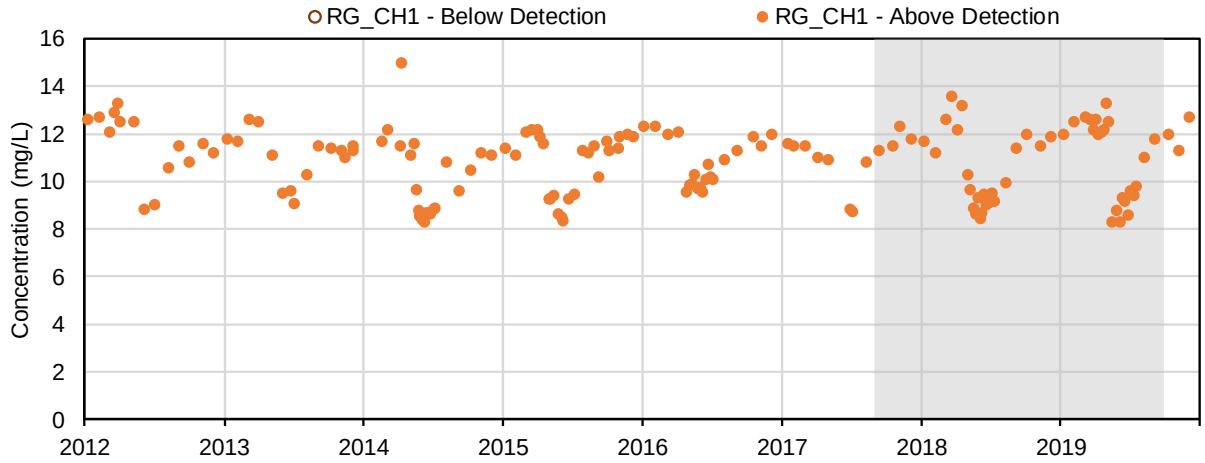
(57) Lead (mg/L); Total Metals



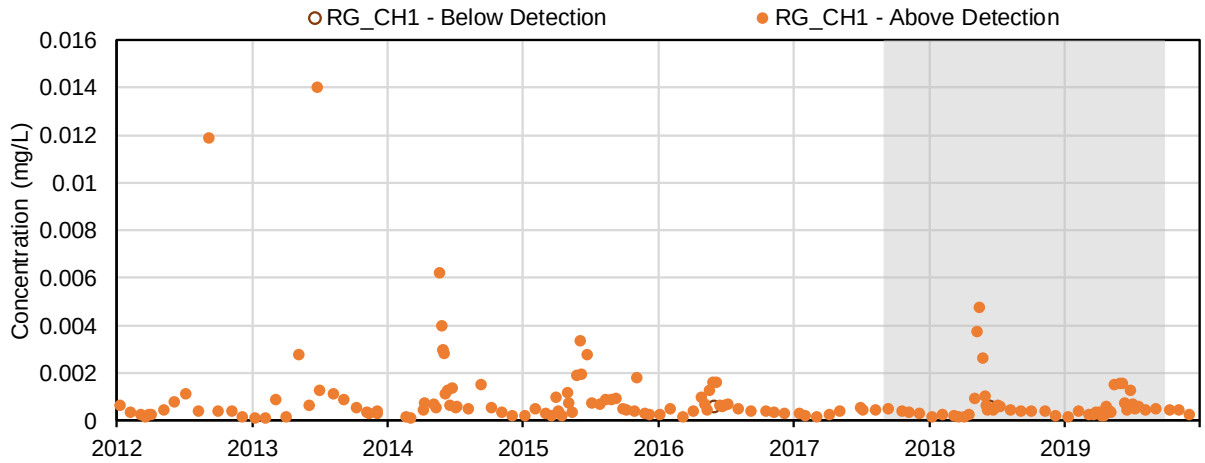
(58) Lithium (mg/L); Total Metals



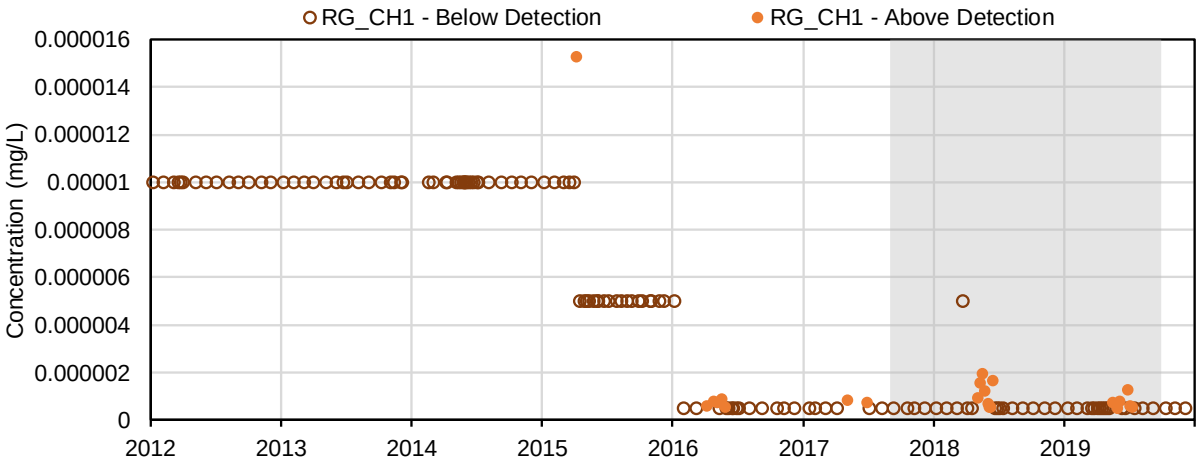
(59) Magnesium (mg/L); Total Metals



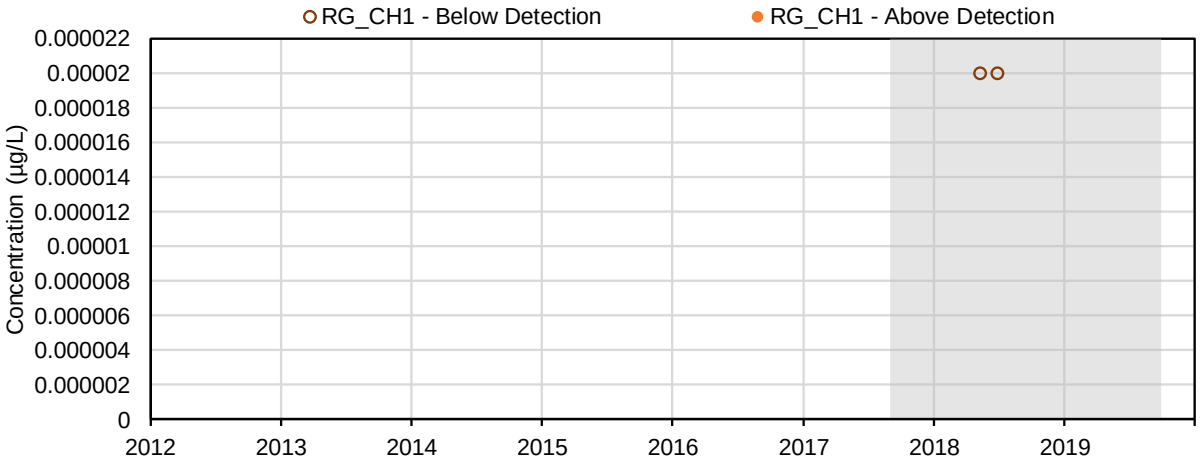
(60) Manganese (mg/L); Total Metals



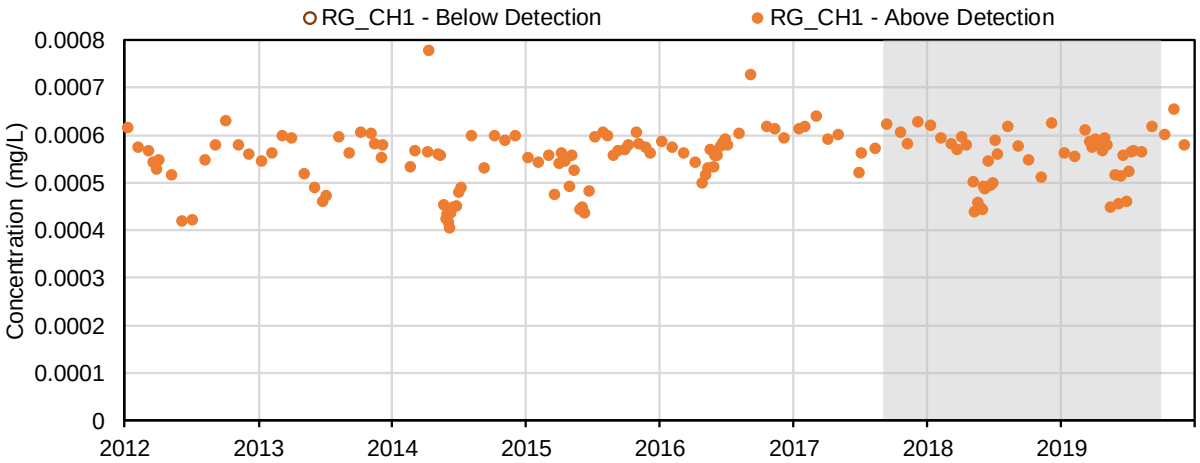
(61) Mercury (mg/L); Total Metals



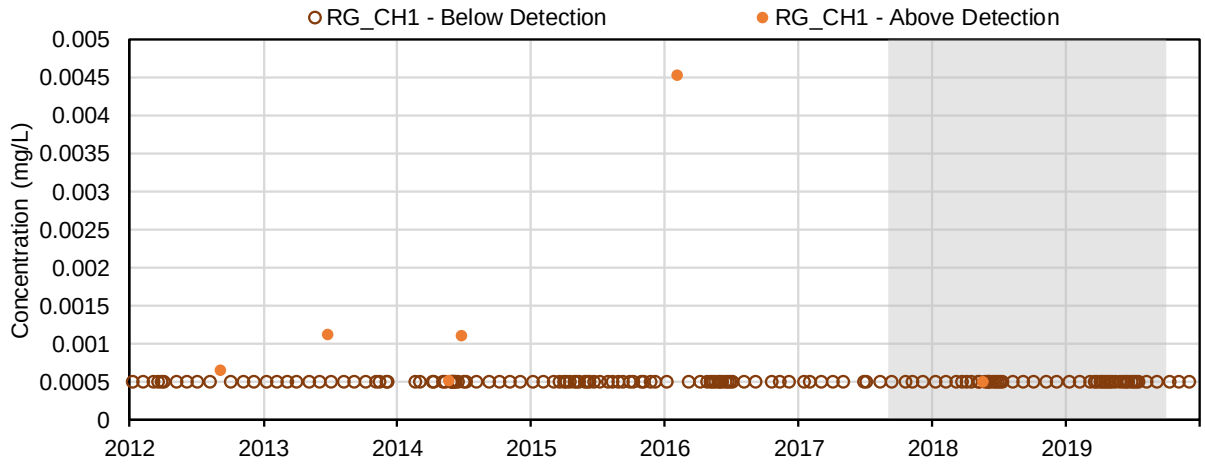
(62) Methyl mercury (µg/L); Total Metals



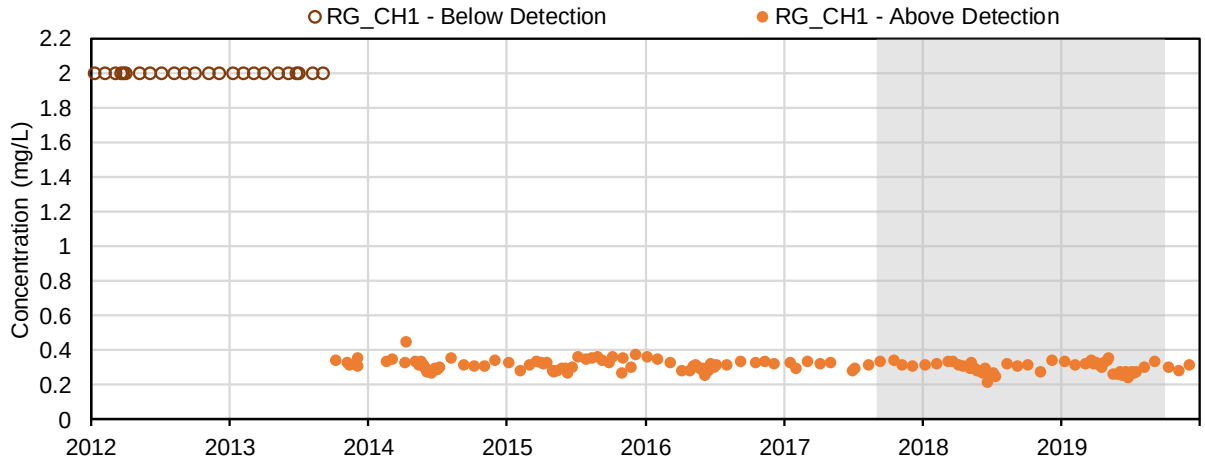
(63) Molybdenum (mg/L); Total Metals



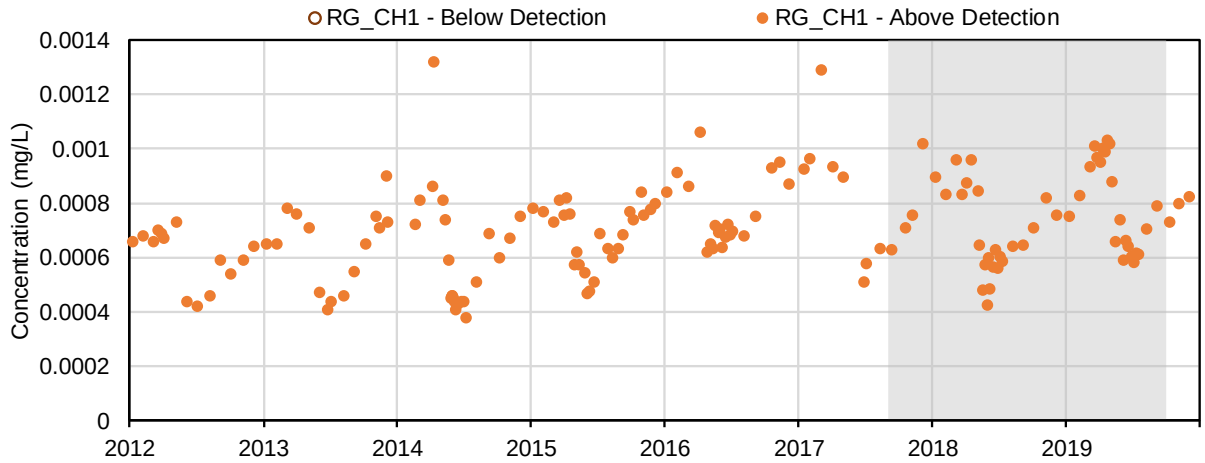
(64) Nickel (mg/L); Total Metals



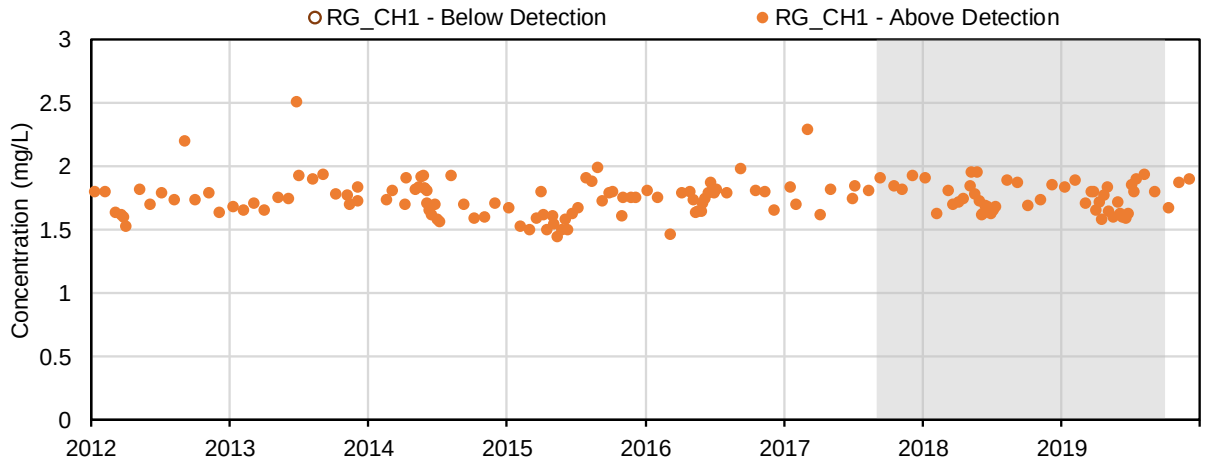
(65) Potassium (mg/L); Total Metals



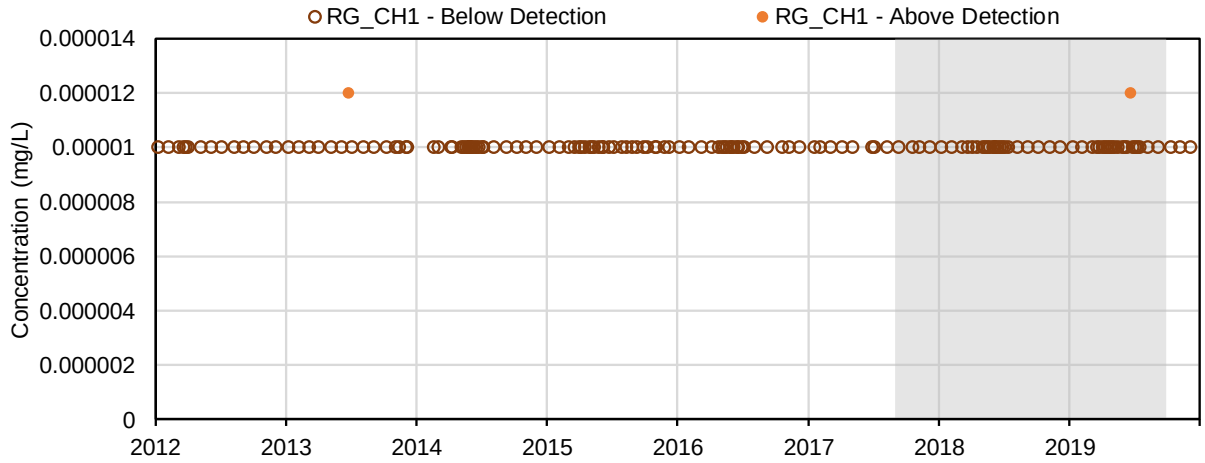
(66) Selenium (mg/L); Total Metals



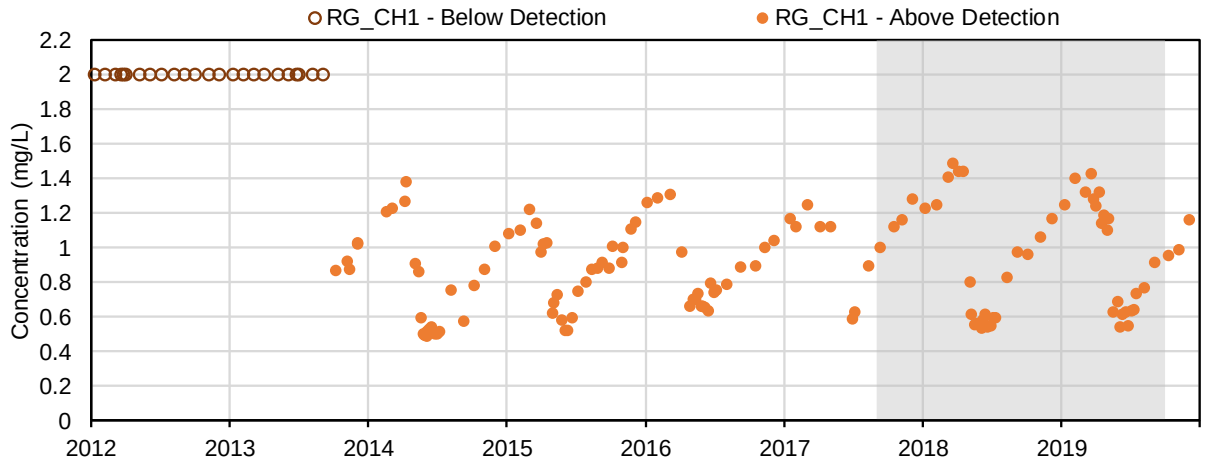
(67) Silicon (mg/L); Total Metals



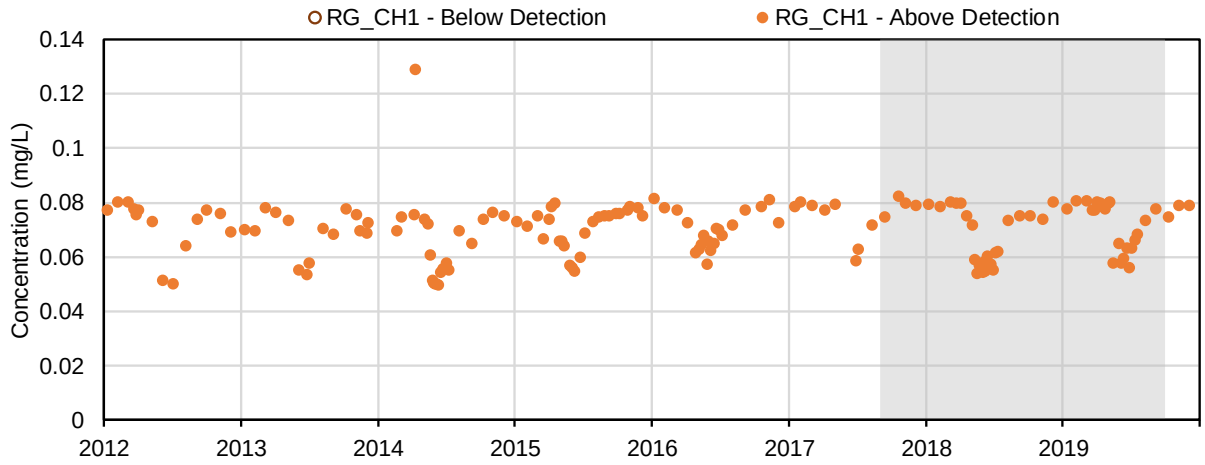
(68) Silver (mg/L); Total Metals



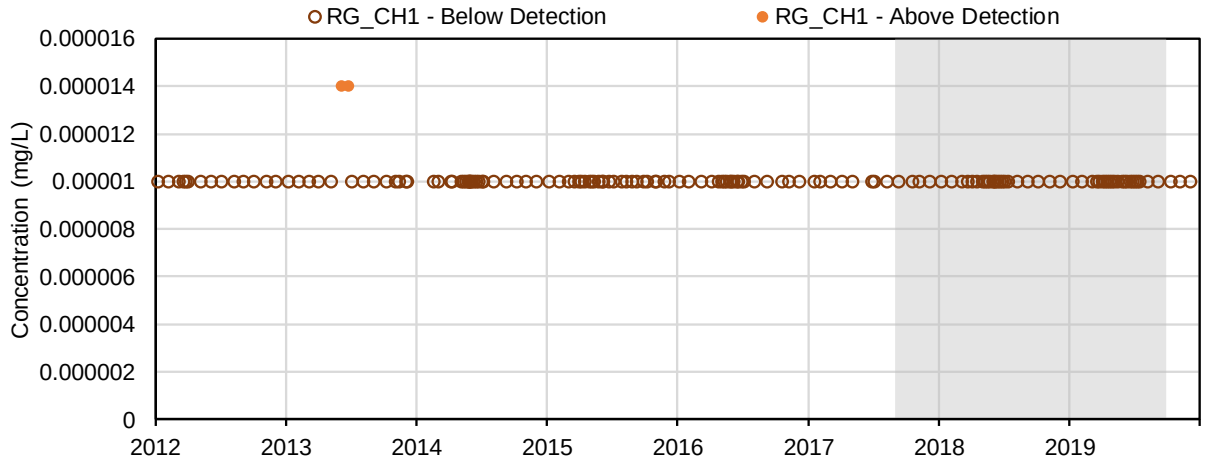
(69) Sodium (mg/L); Total Metals



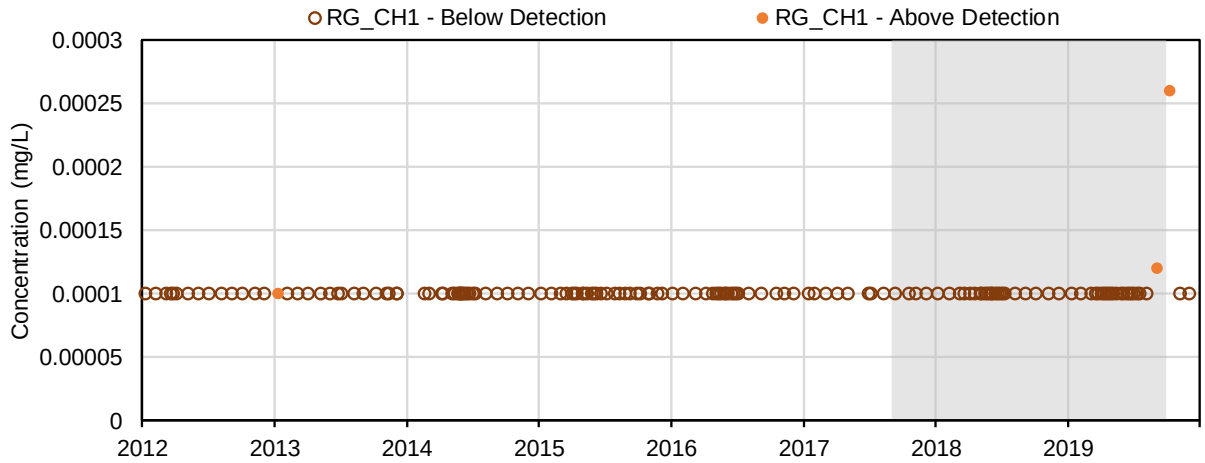
(70) Strontium (mg/L); Total Metals



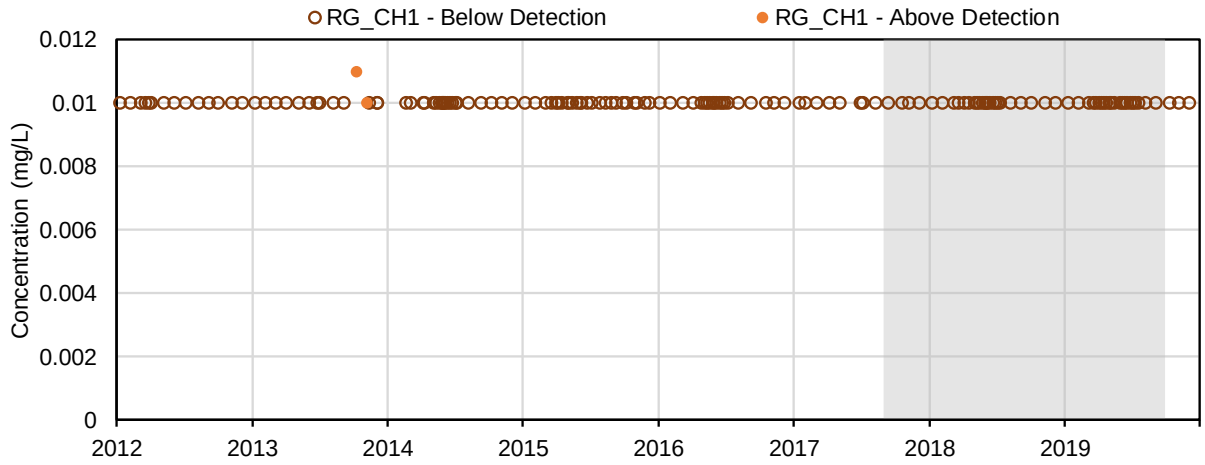
(71) Thallium (mg/L); Total Metals



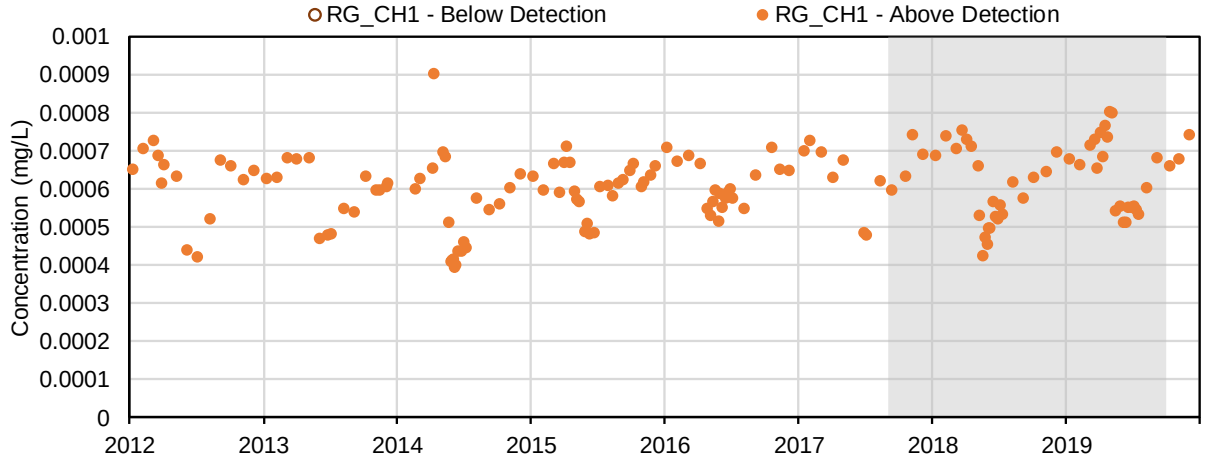
(72) Tin (mg/L); Total Metals



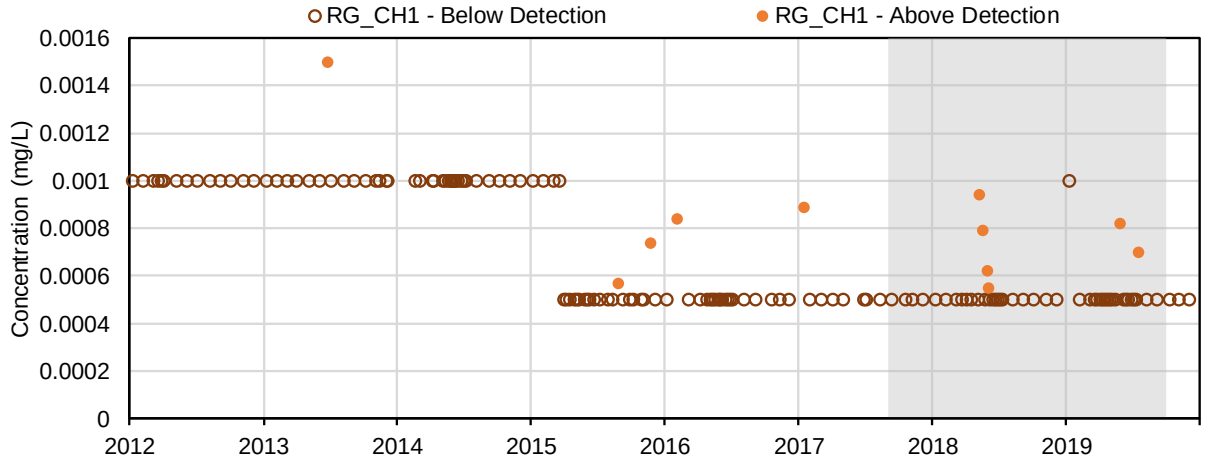
(73) Titanium (mg/L); Total Metals



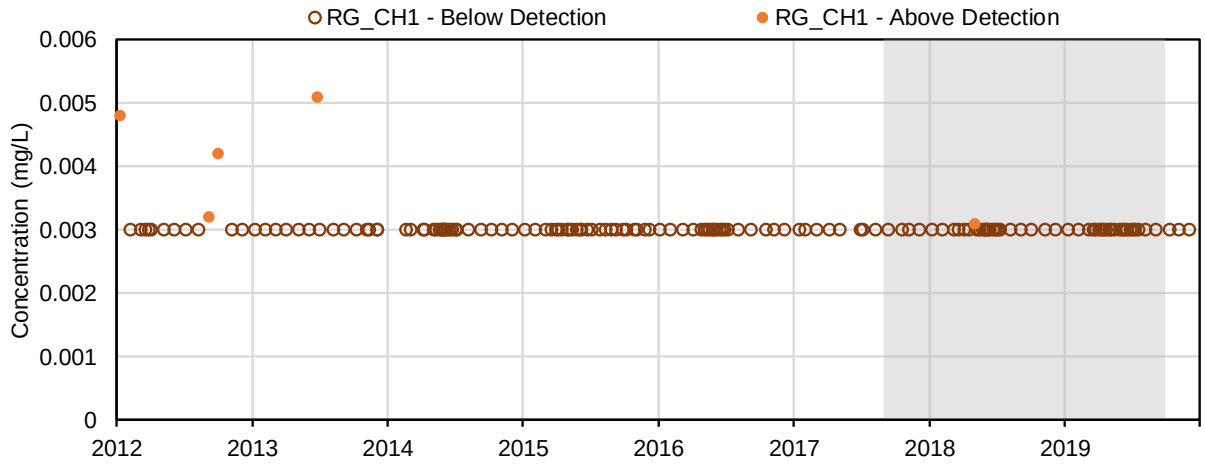
(74) Uranium (mg/L); Total Metals



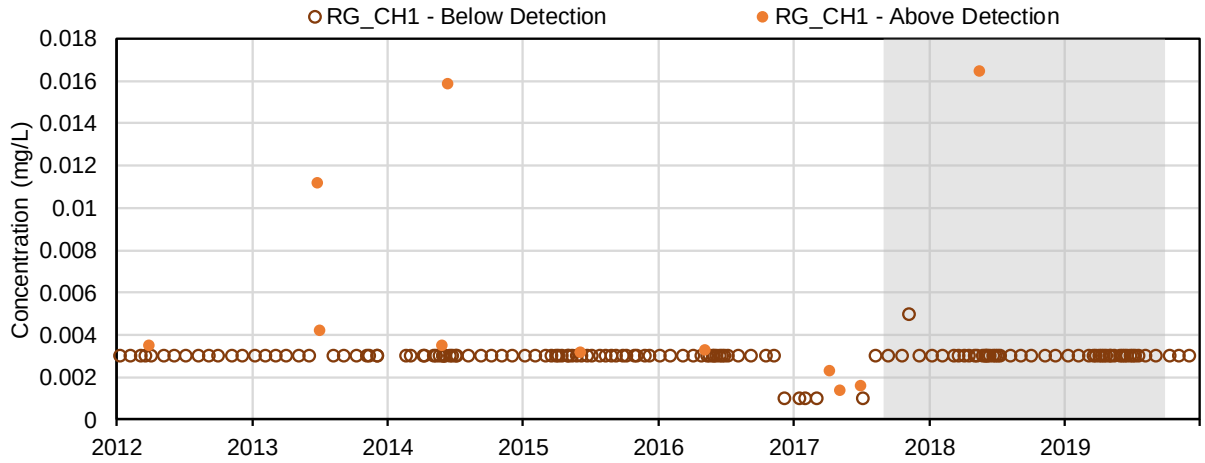
(75) Vanadium (mg/L); Total Metals



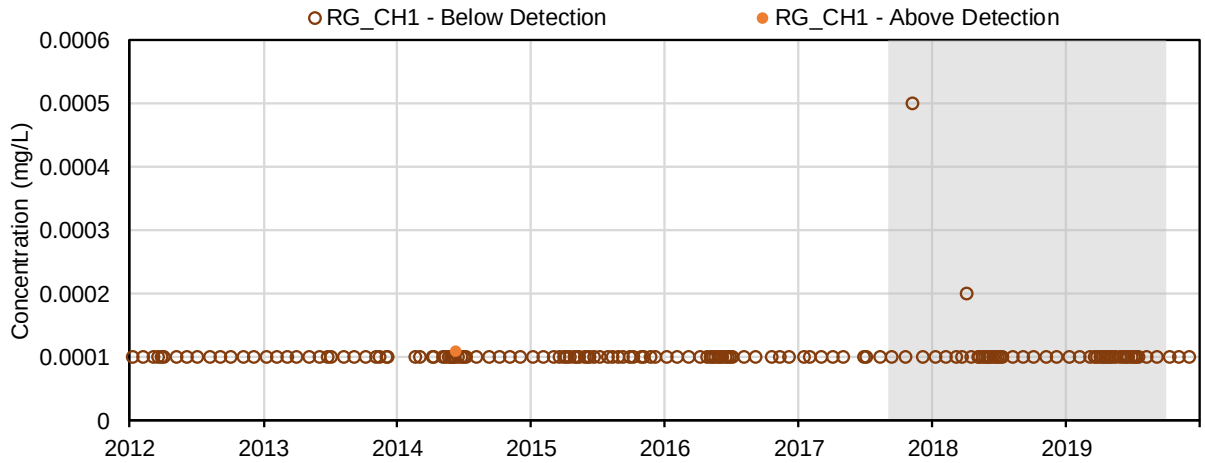
(76) Zinc (mg/L); Total Metals



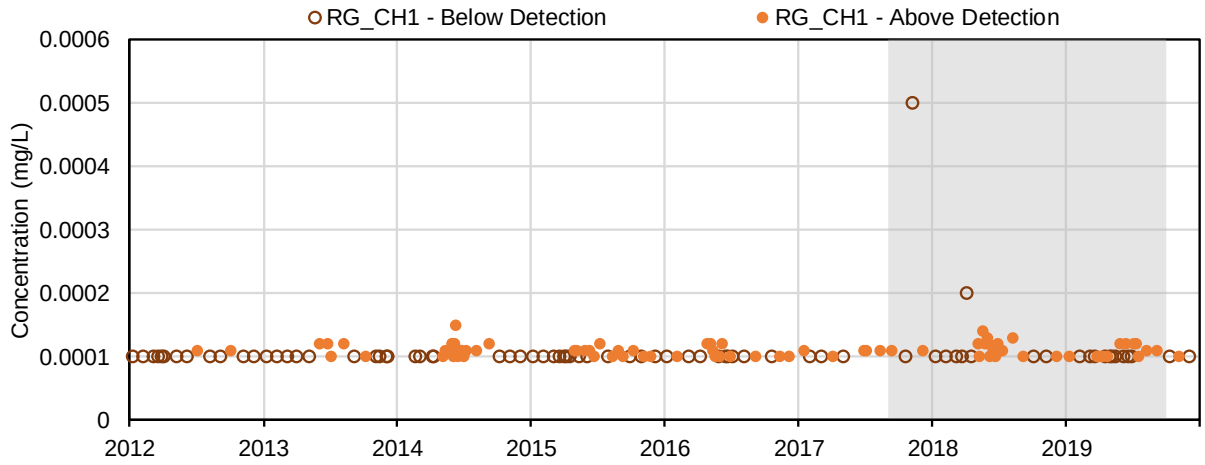
(77) Aluminum (mg/L); Dissolved Metals



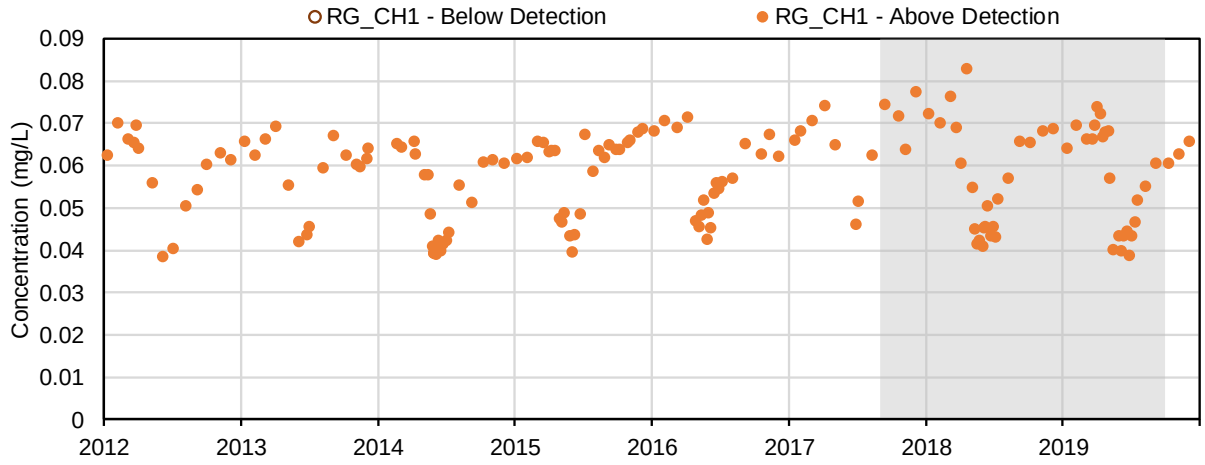
(78) Antimony (mg/L); Dissolved Metals



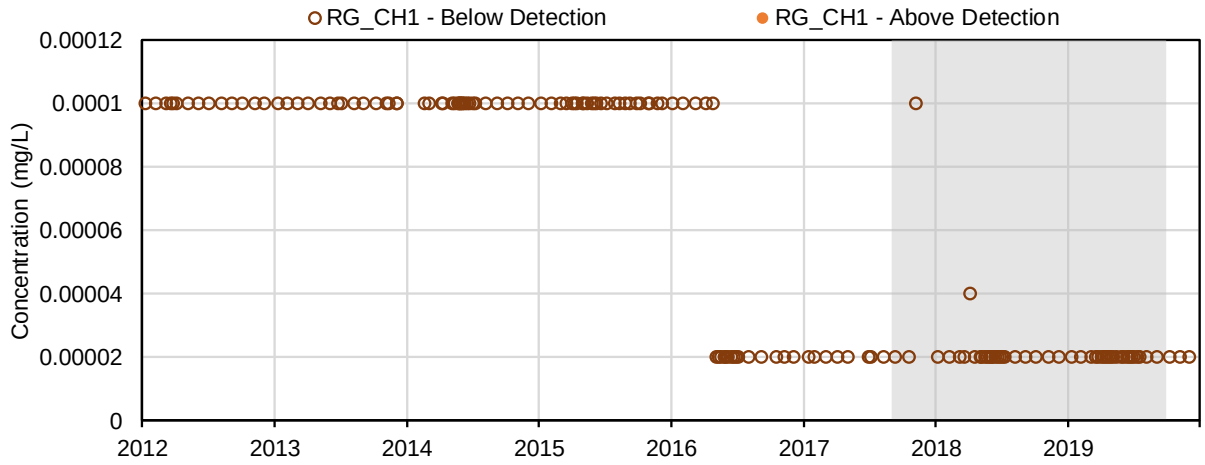
(79) Arsenic (mg/L); Dissolved Metals



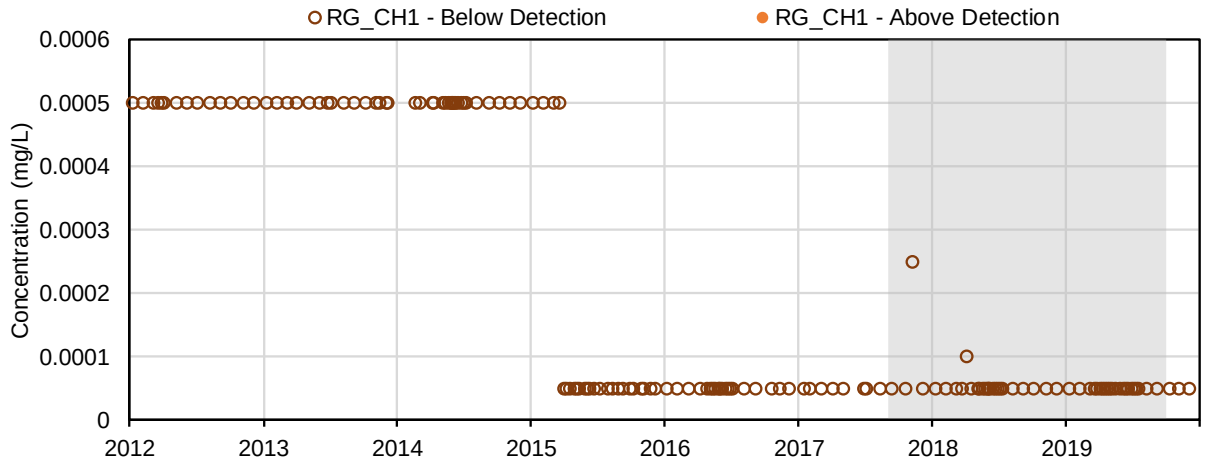
(80) Barium (mg/L); Dissolved Metals



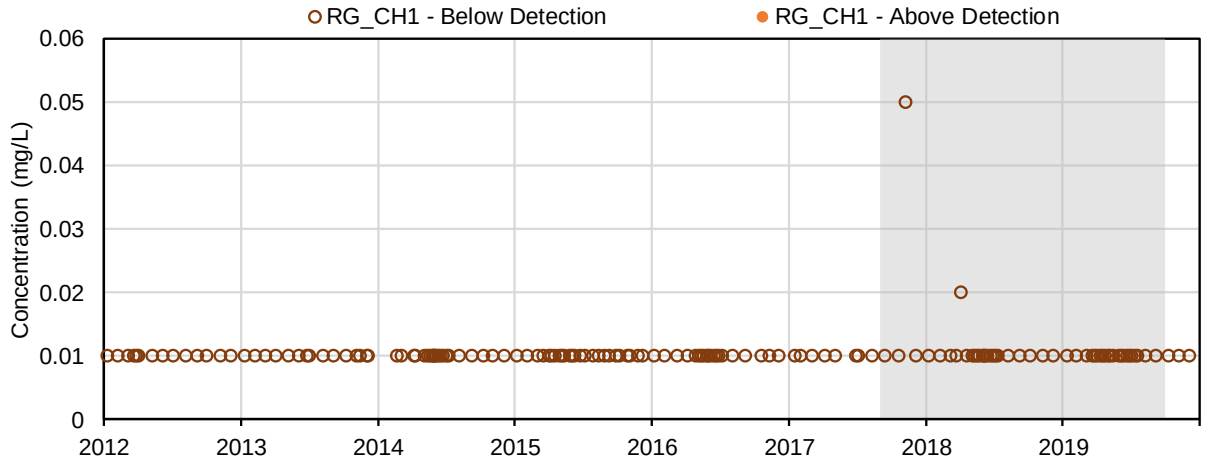
(81) Beryllium (mg/L); Dissolved Metals



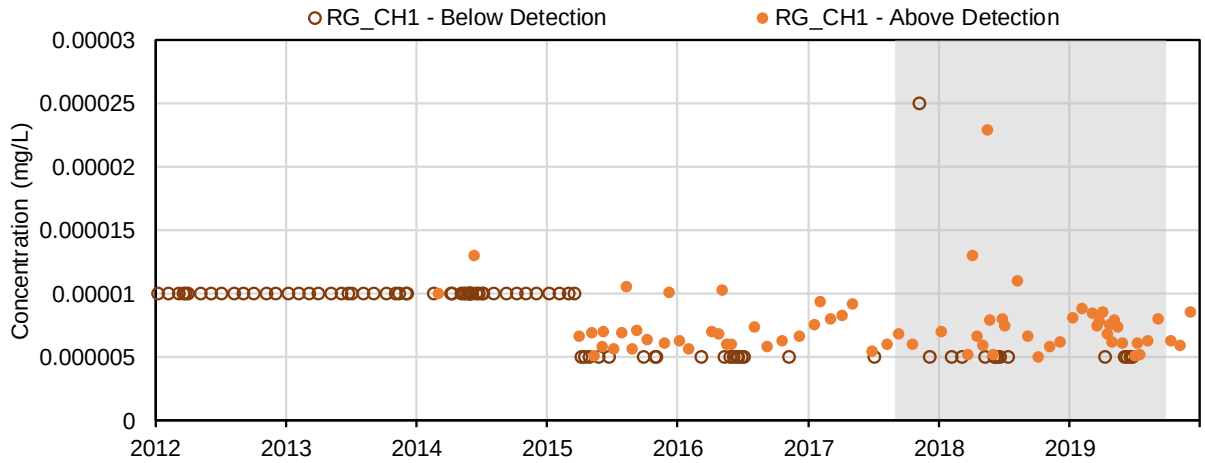
(82) Bismuth (mg/L); Dissolved Metals



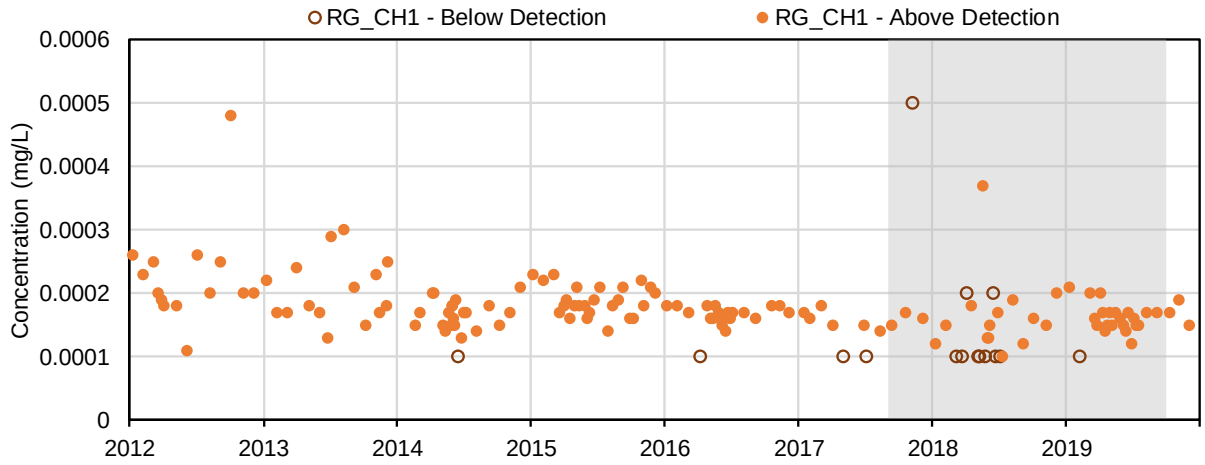
(83) Boron (mg/L); Dissolved Metals



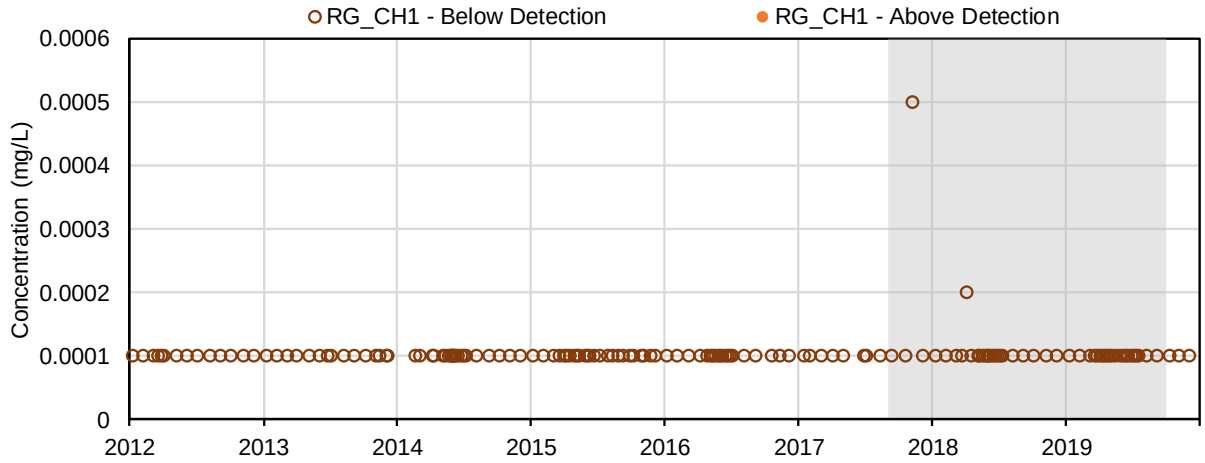
(84) Cadmium (mg/L); Dissolved Metals



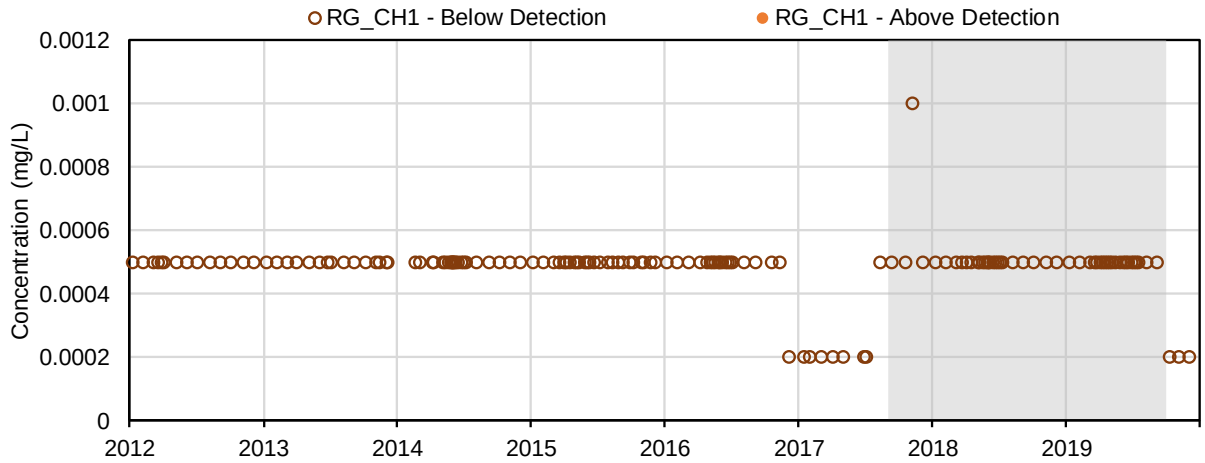
(85) Chromium (mg/L); Dissolved Metals



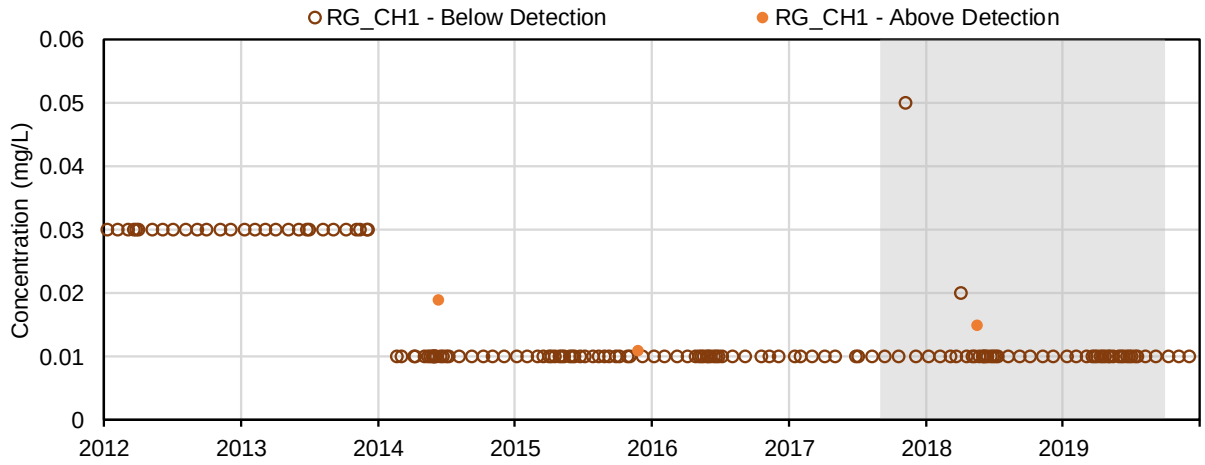
(86) Cobalt (mg/L); Dissolved Metals



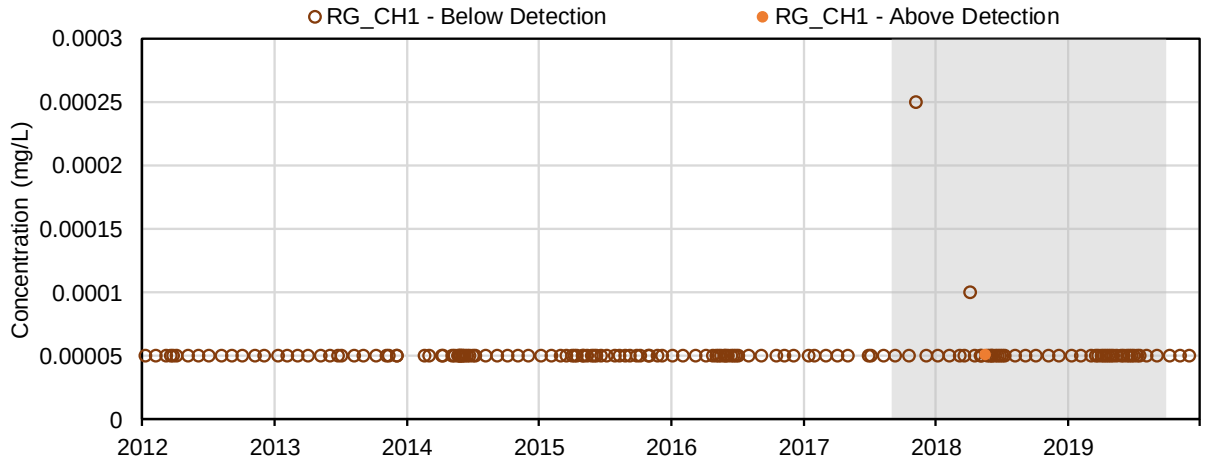
(87) Copper (mg/L); Dissolved Metals



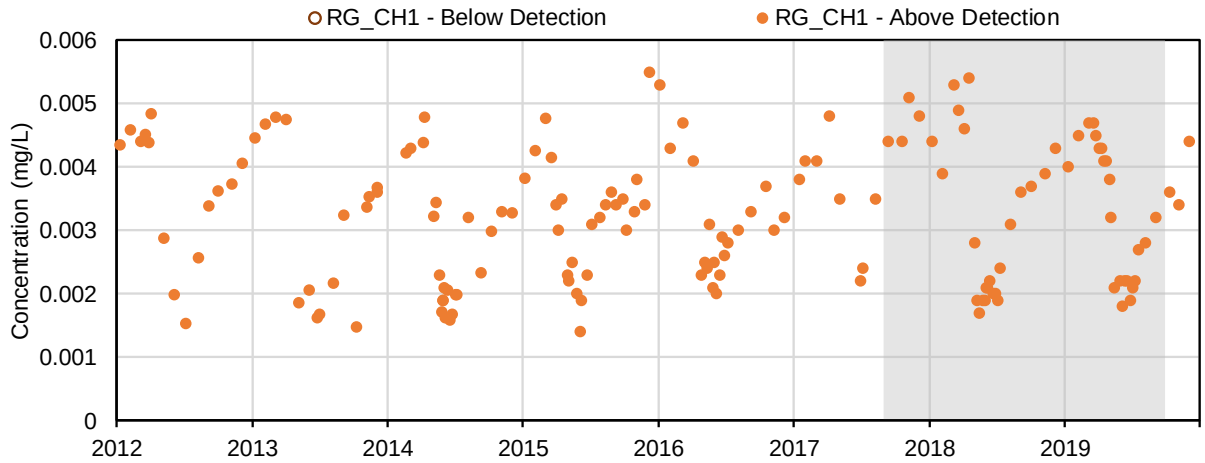
(88) Iron (mg/L); Dissolved Metals



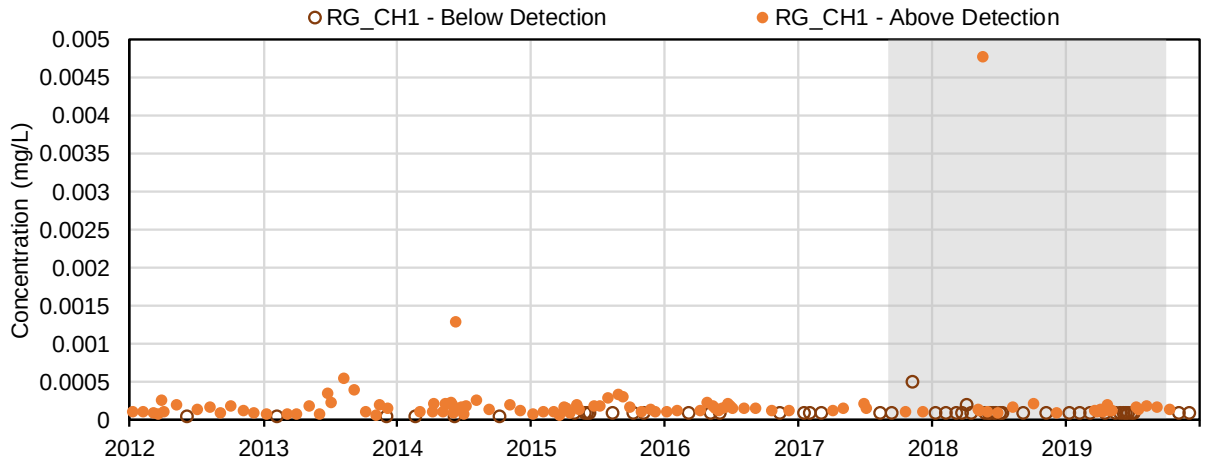
(89) Lead (mg/L); Dissolved Metals



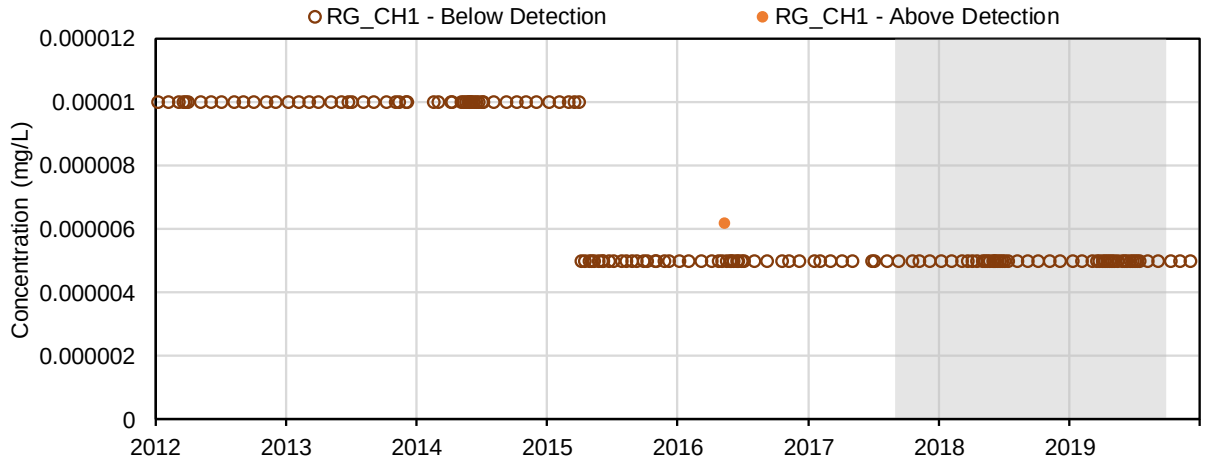
(90) Lithium (mg/L); Dissolved Metals



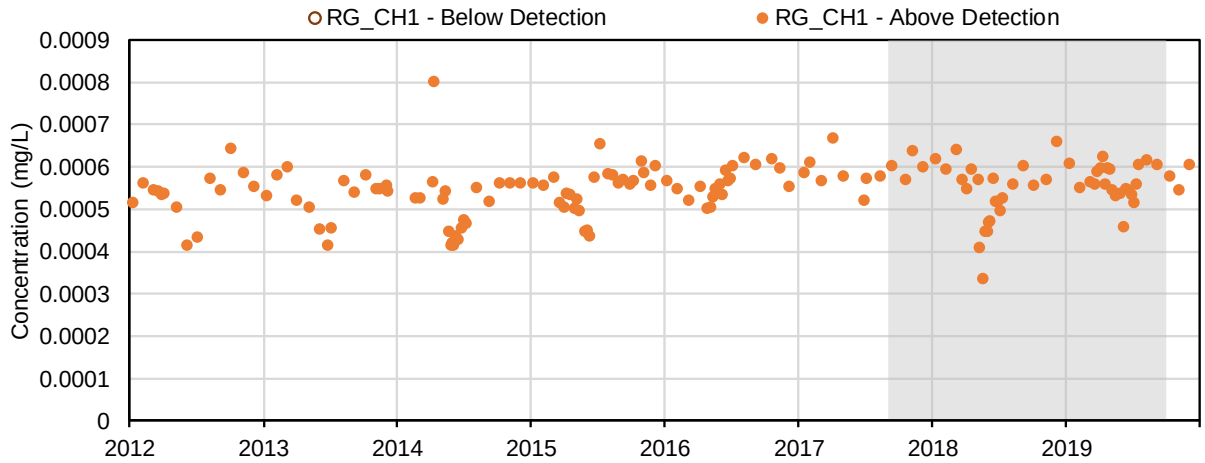
(91) Manganese (mg/L); Dissolved Metals



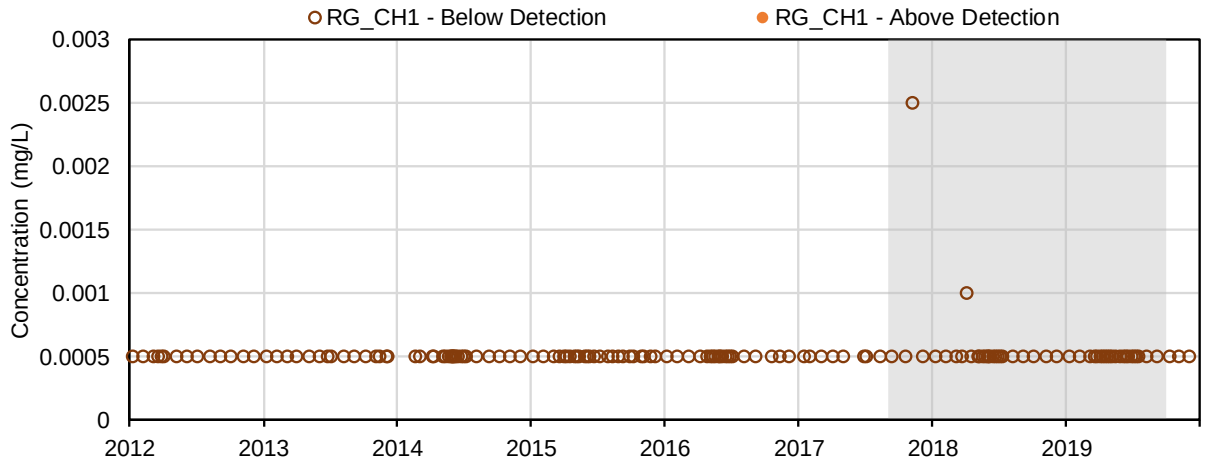
(92) Mercury (mg/L); Dissolved Metals



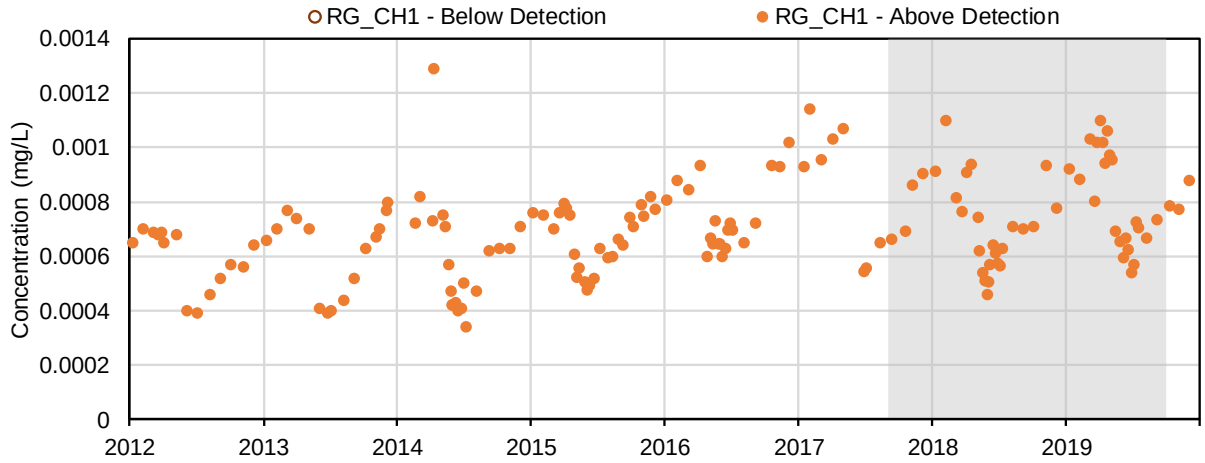
(93) Molybdenum (mg/L); Dissolved Metals



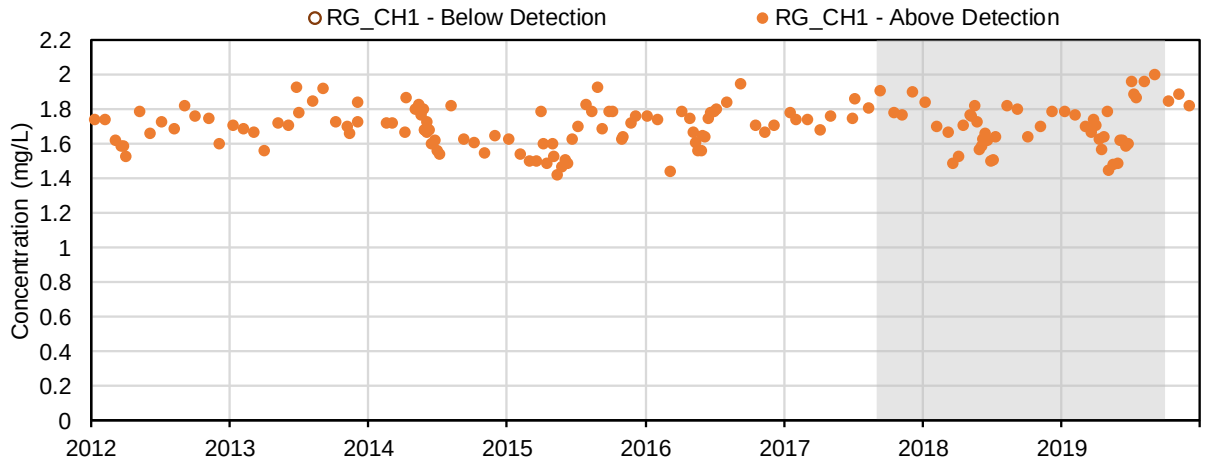
(94) Nickel (mg/L); Dissolved Metals



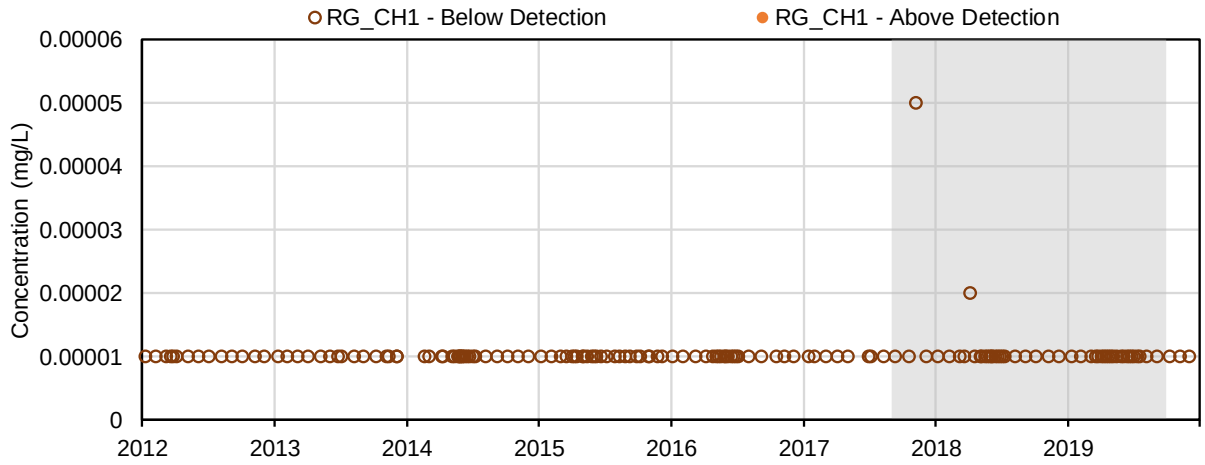
(95) Selenium (mg/L); Dissolved Metals



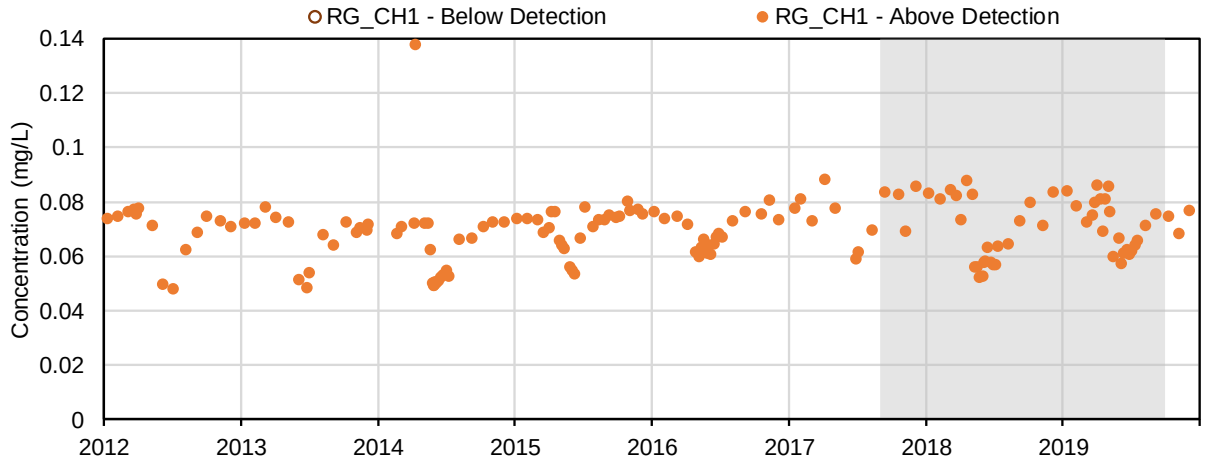
(96) Silicon (mg/L); Dissolved Metals



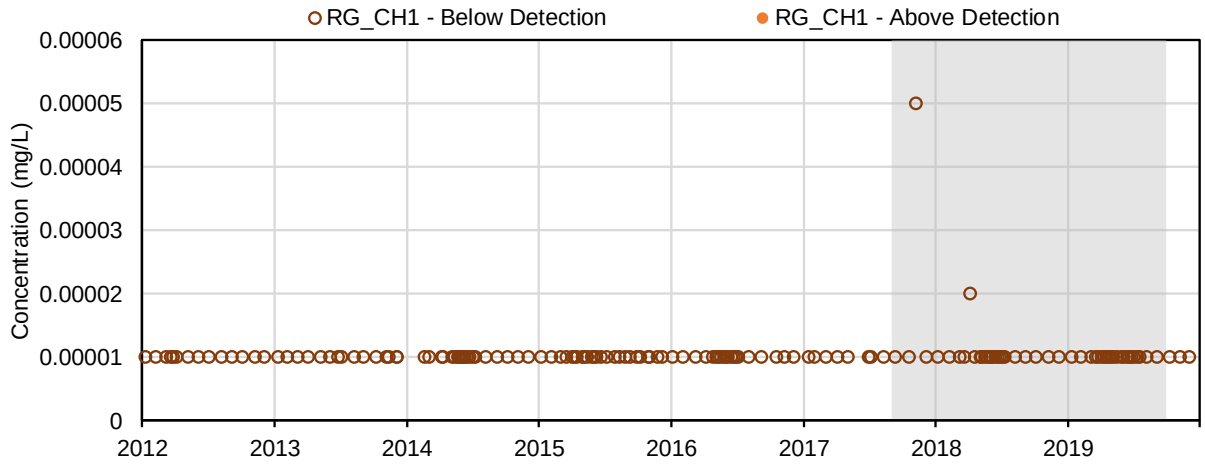
(97) Silver (mg/L); Dissolved Metals



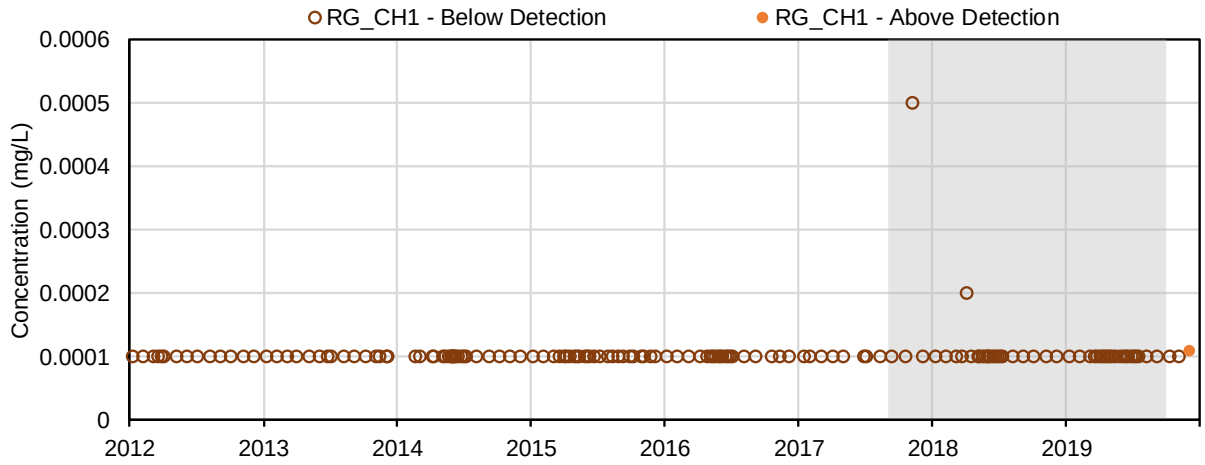
(98) Strontium (mg/L); Dissolved Metals



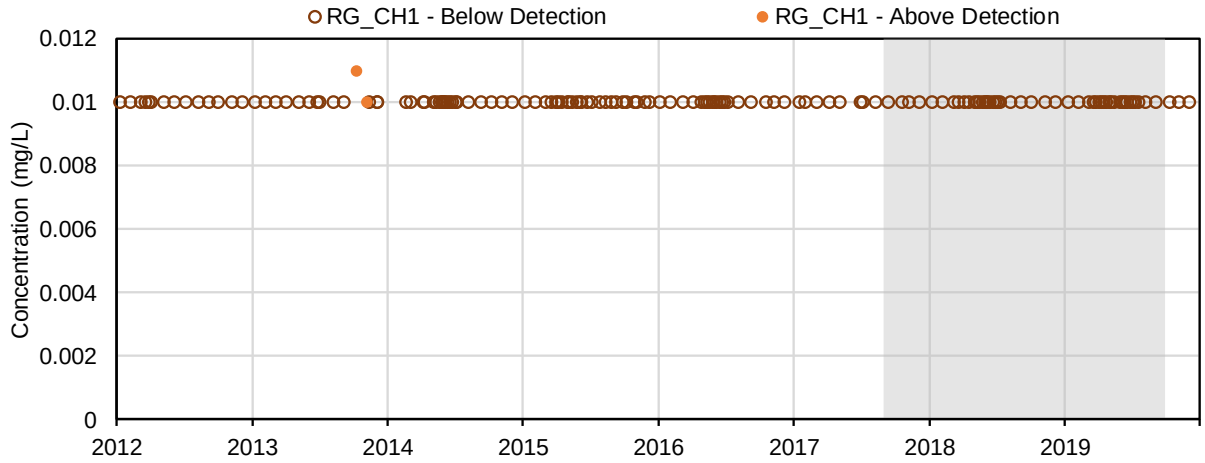
(99) Thallium (mg/L); Dissolved Metals



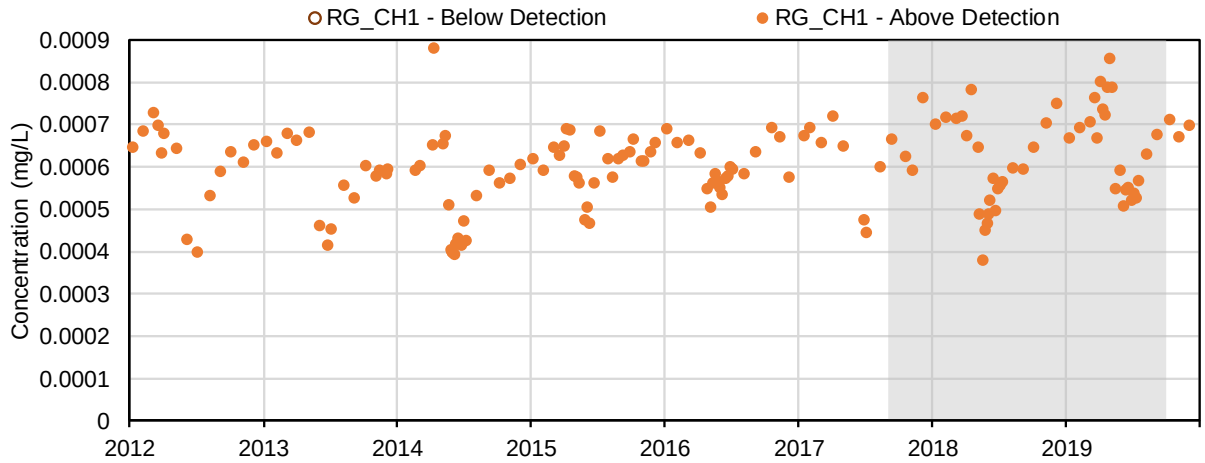
(100) Tin (mg/L); Dissolved Metals



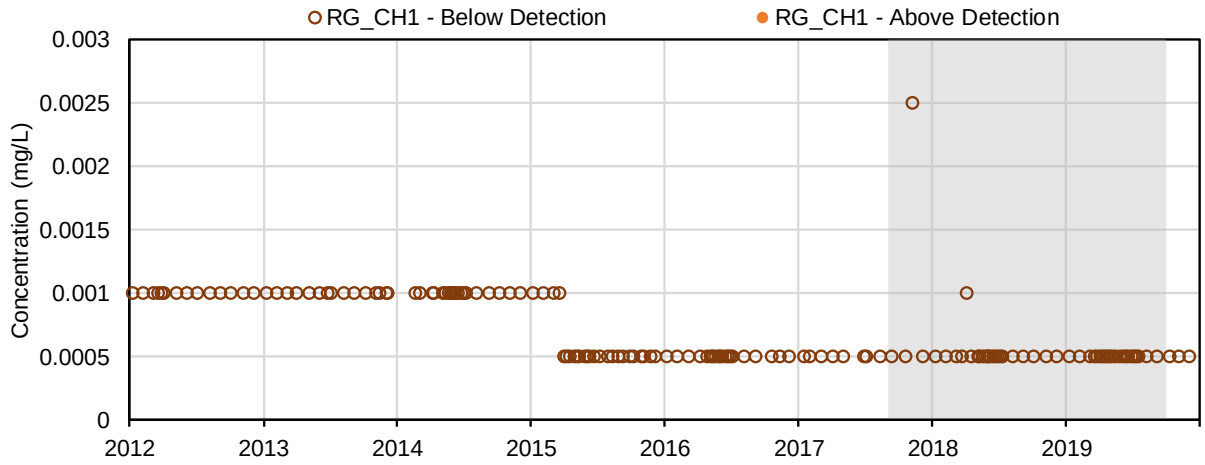
(101) Titanium (mg/L); Dissolved Metals



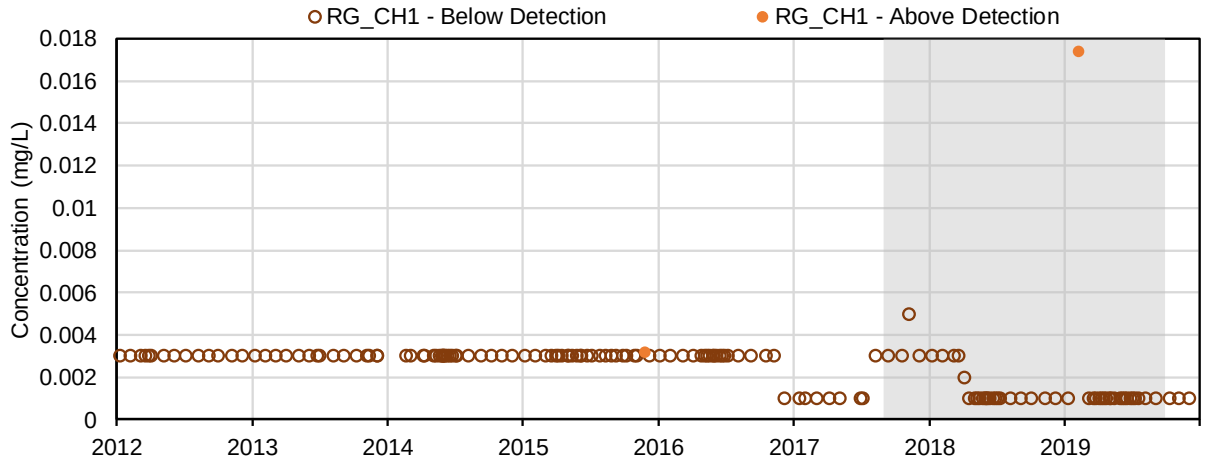
(102) Uranium (mg/L); Dissolved Metals



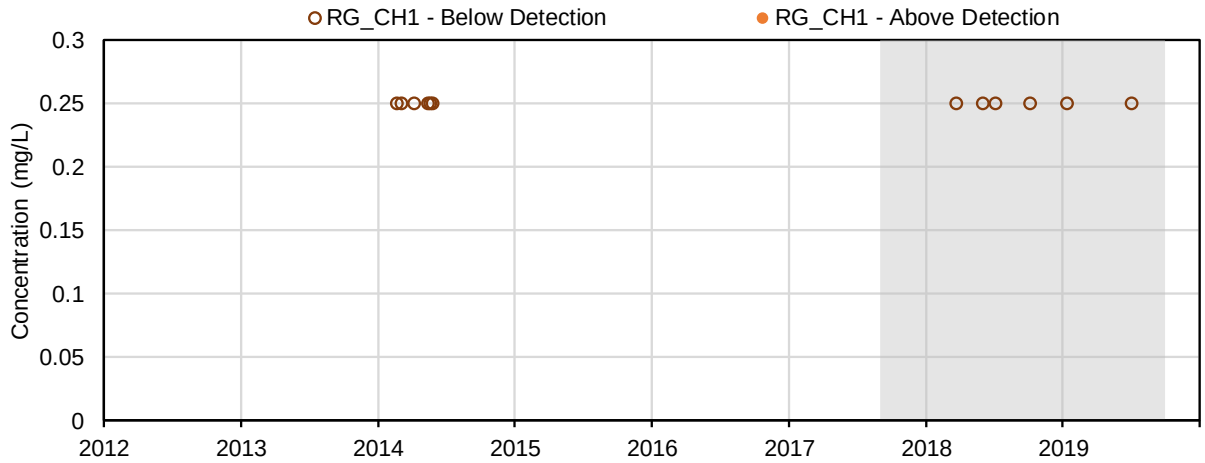
(103) Vanadium (mg/L); Dissolved Metals



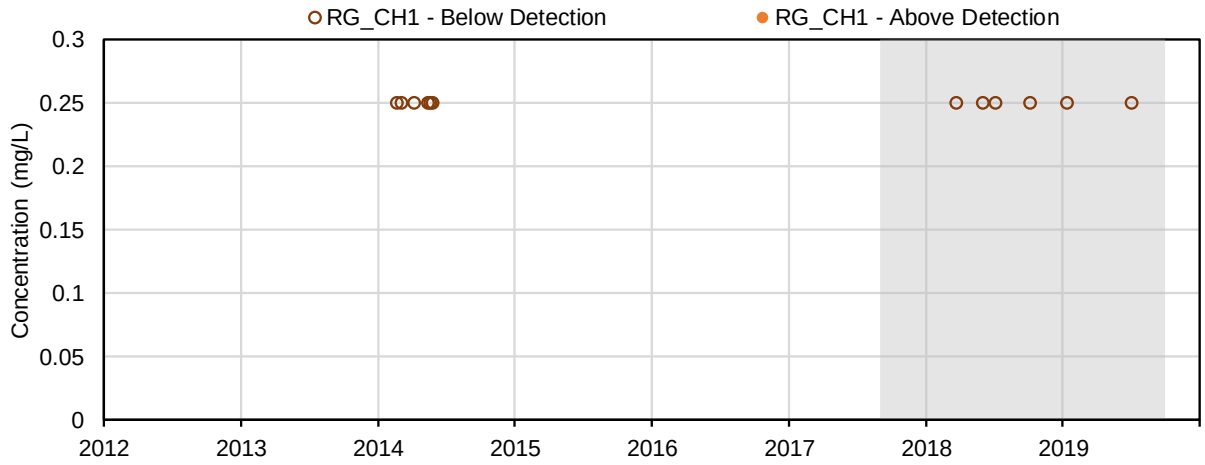
(104) Zinc (mg/L); Dissolved Metals



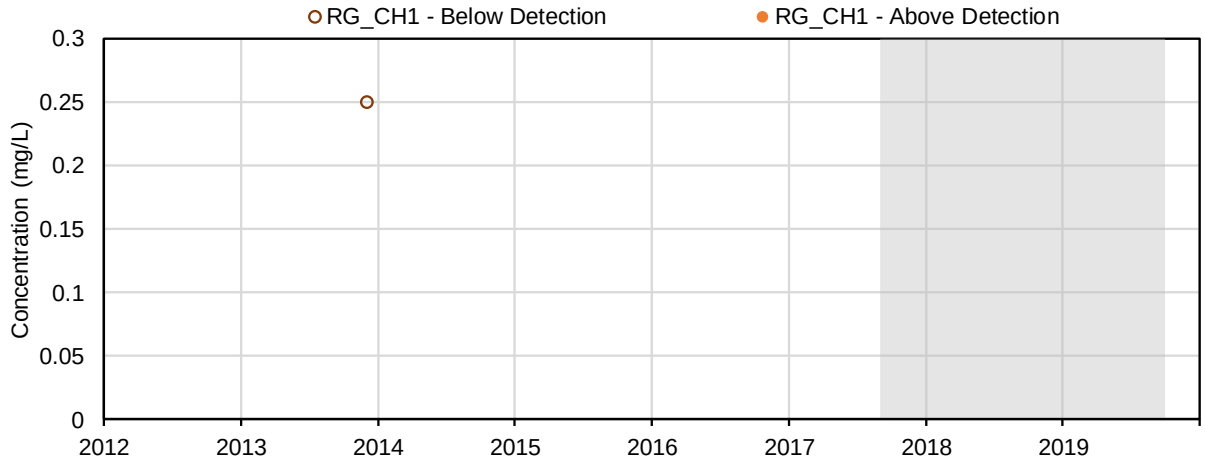
(105) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



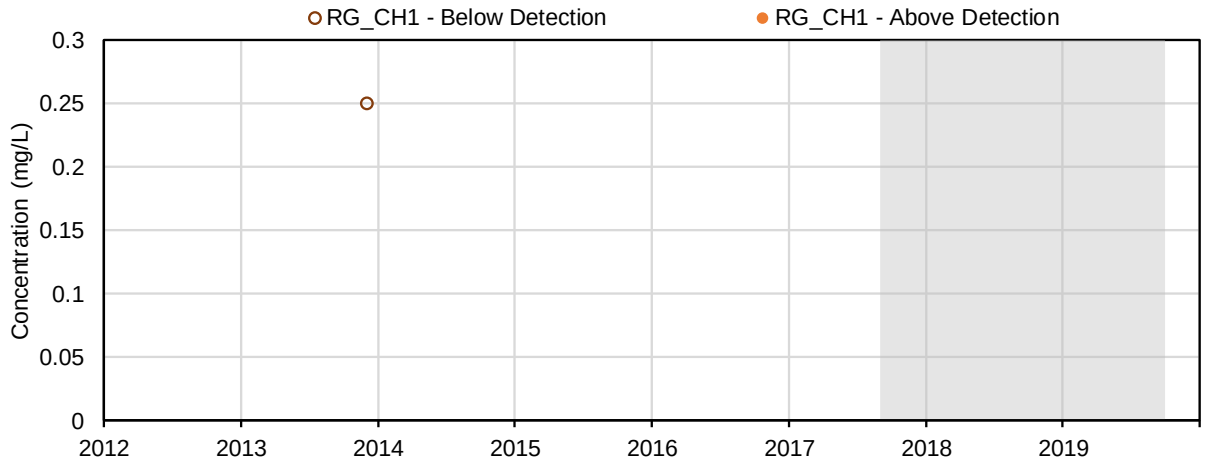
(106) Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



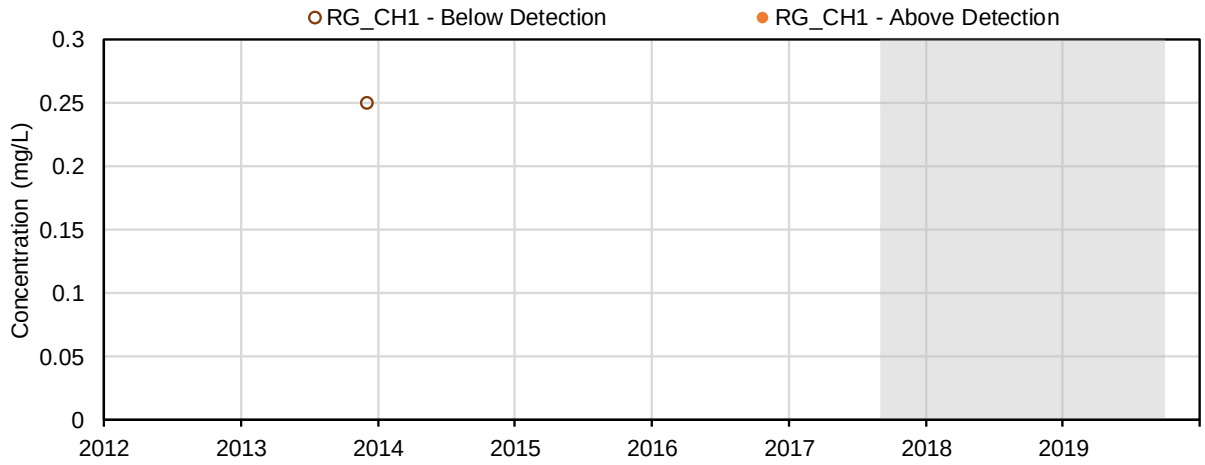
(107) Extracted Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



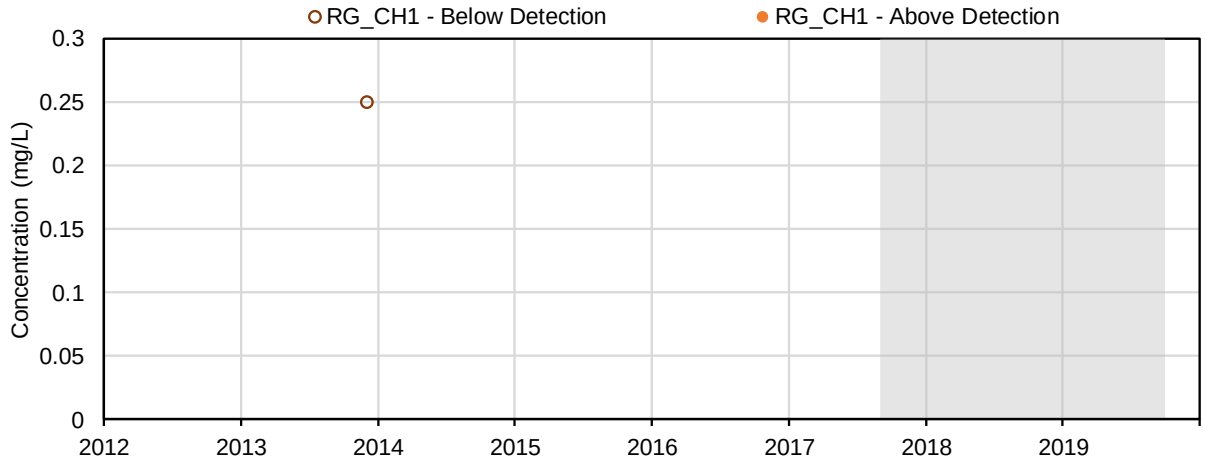
(108) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



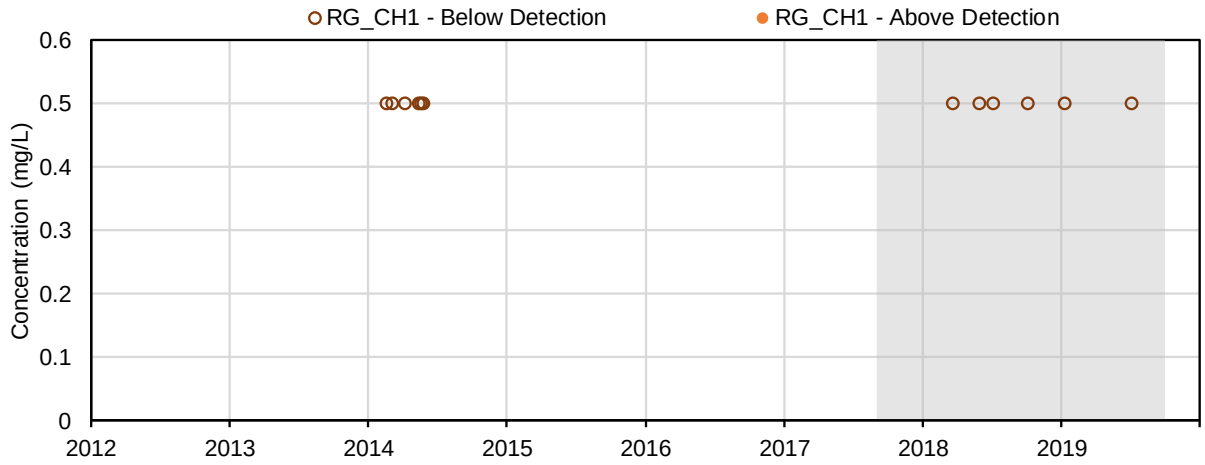
(109) Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L); Volatile Organics



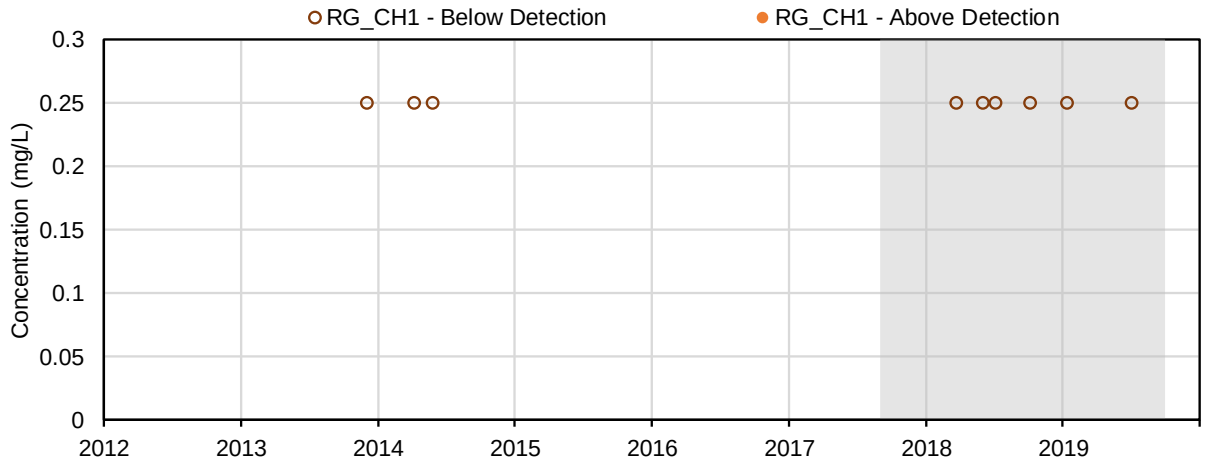
(110) Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L); Volatile Organics



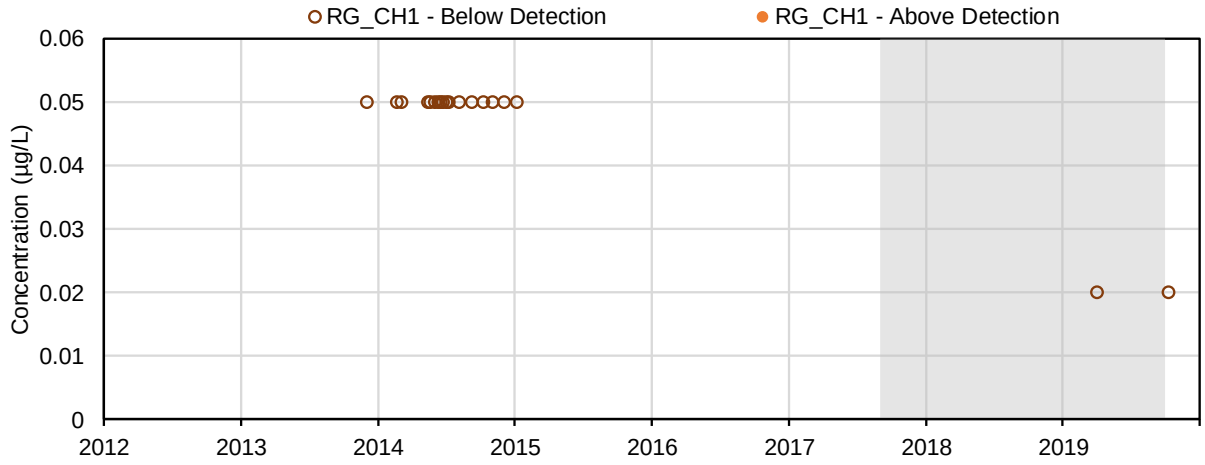
(111) Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L); Volatile Organics



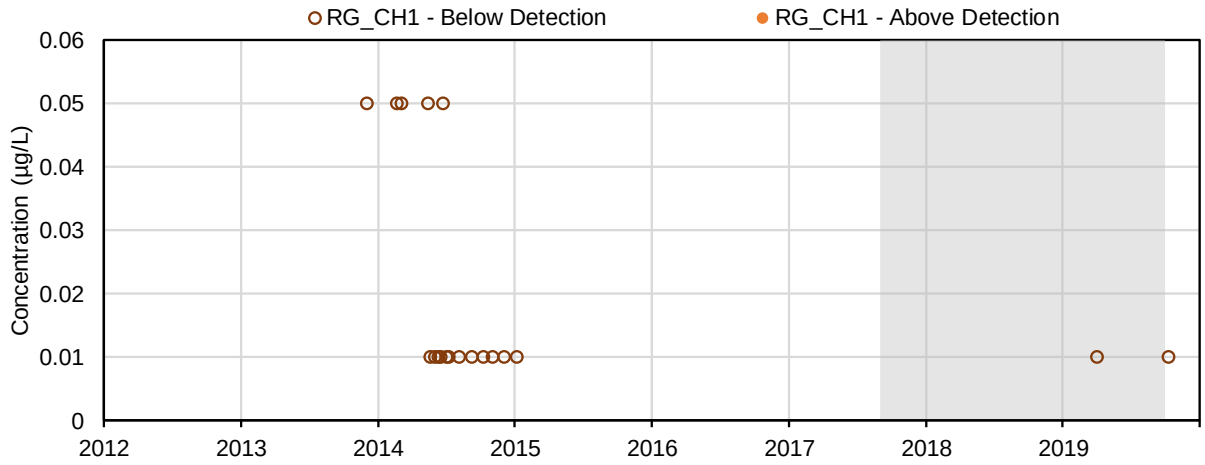
(112) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics



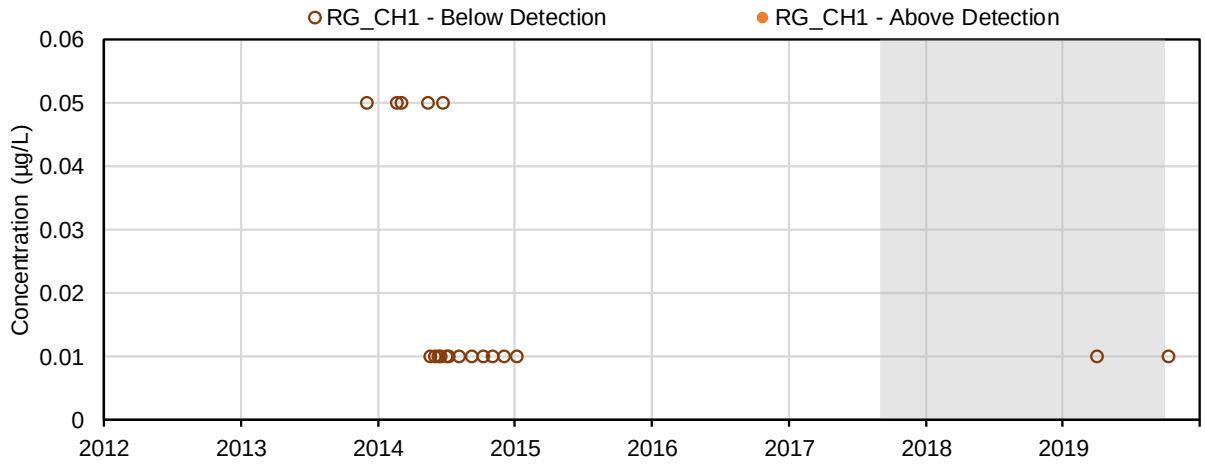
(113) Naphthalene (µg/L); Parent PAHs



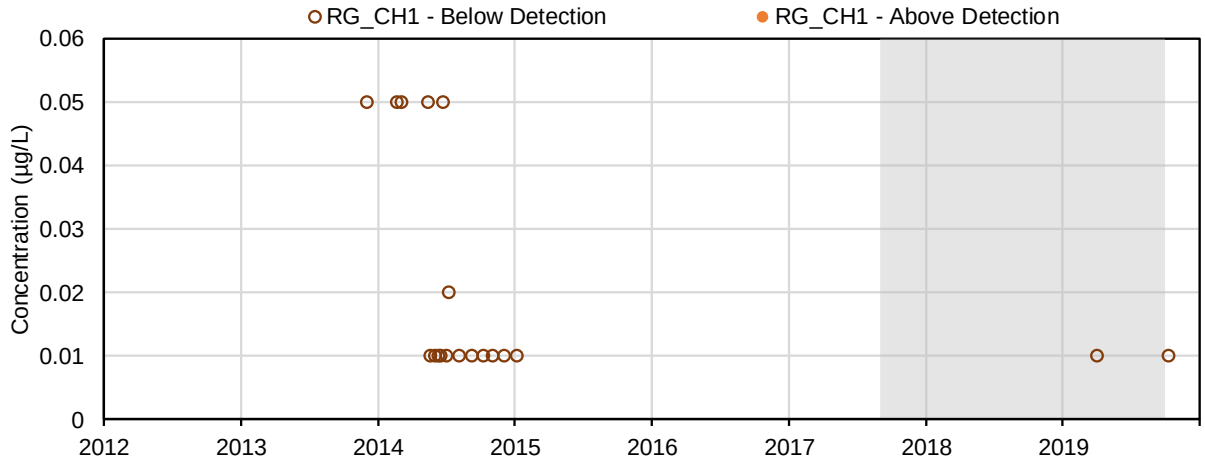
(114) Acenaphthylene (µg/L); Parent PAHs



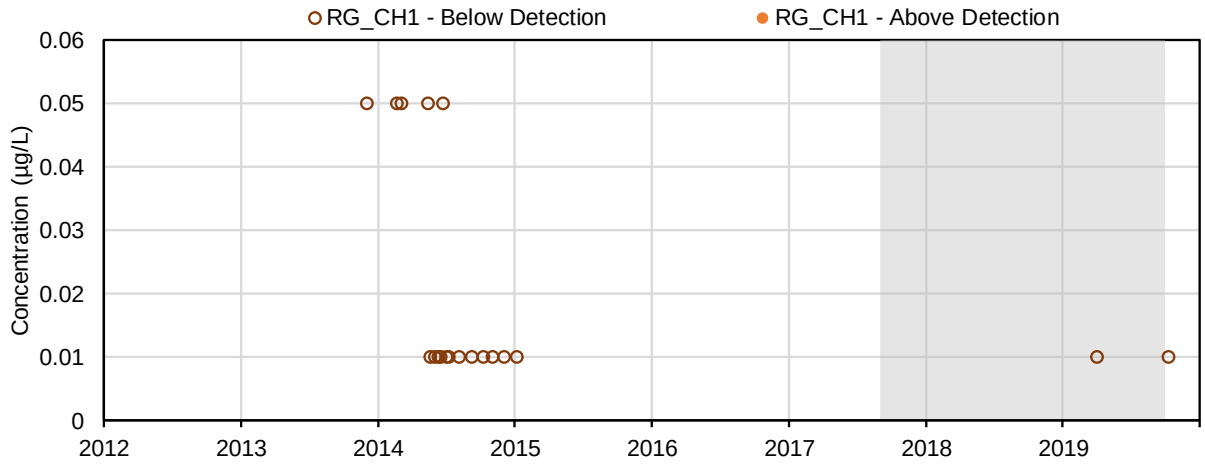
(115) Acenaphthene (µg/L); Parent PAHs



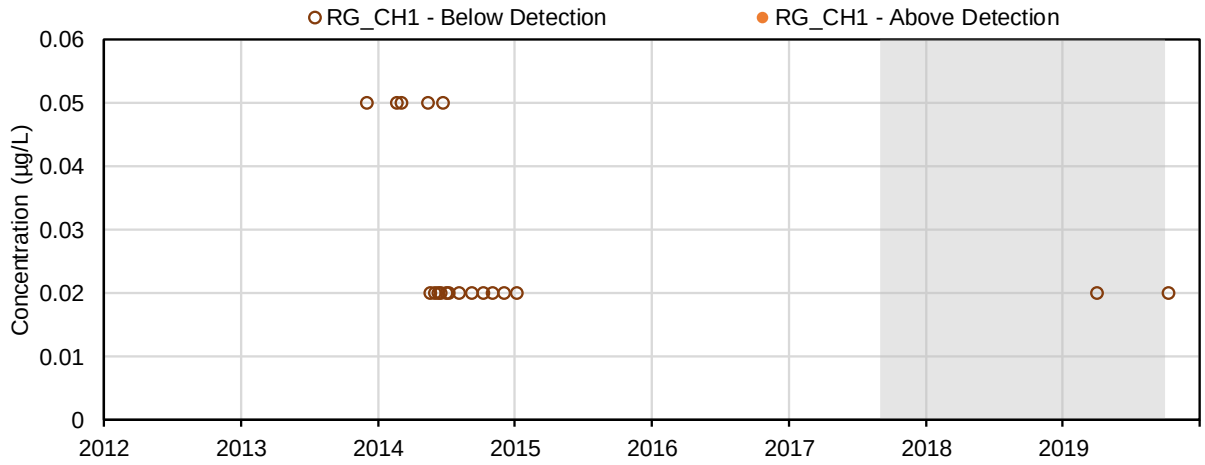
(116) Acridine (µg/L); Parent PAHs



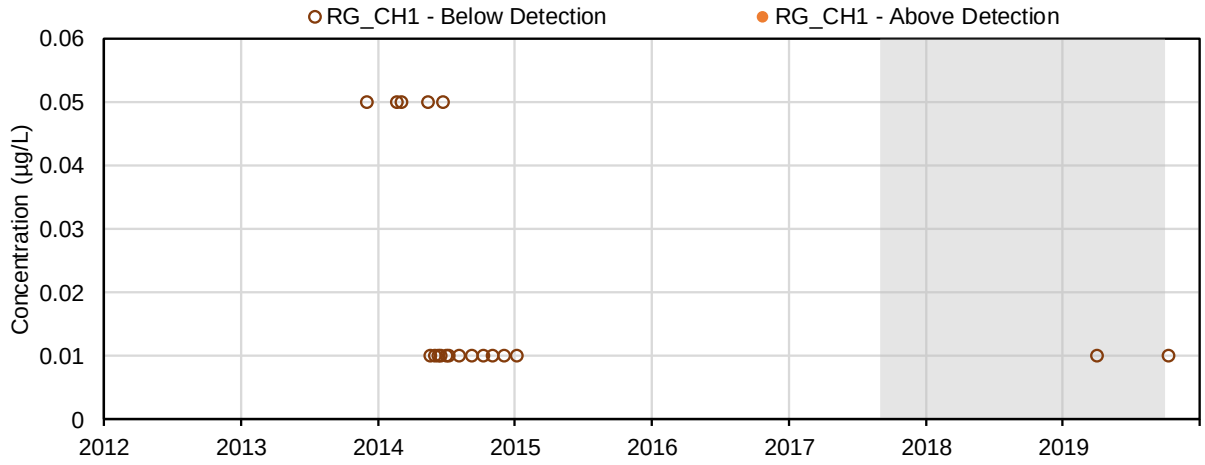
(117) Fluorene (µg/L); Parent PAHs



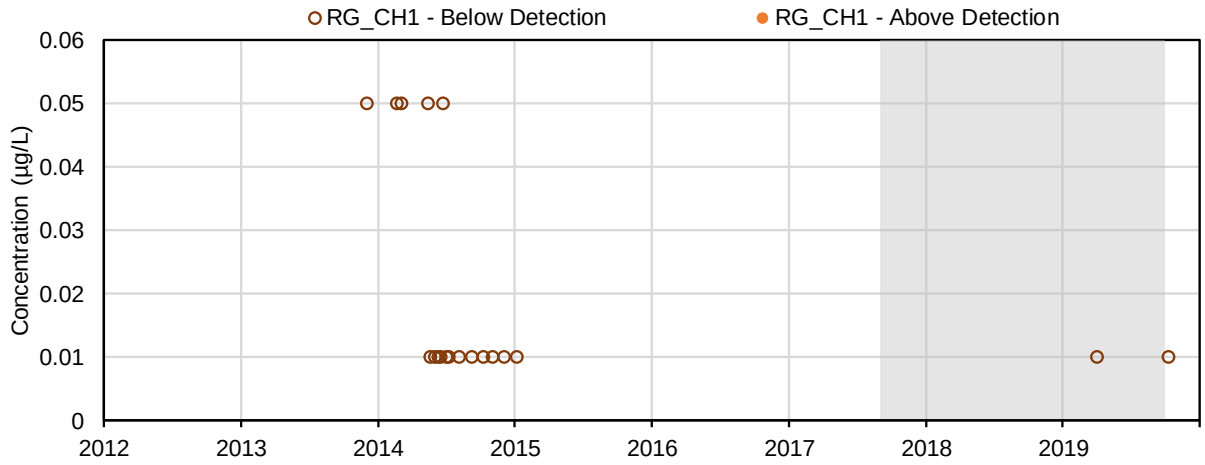
(118) Phenanthrene (µg/L); Parent PAHs



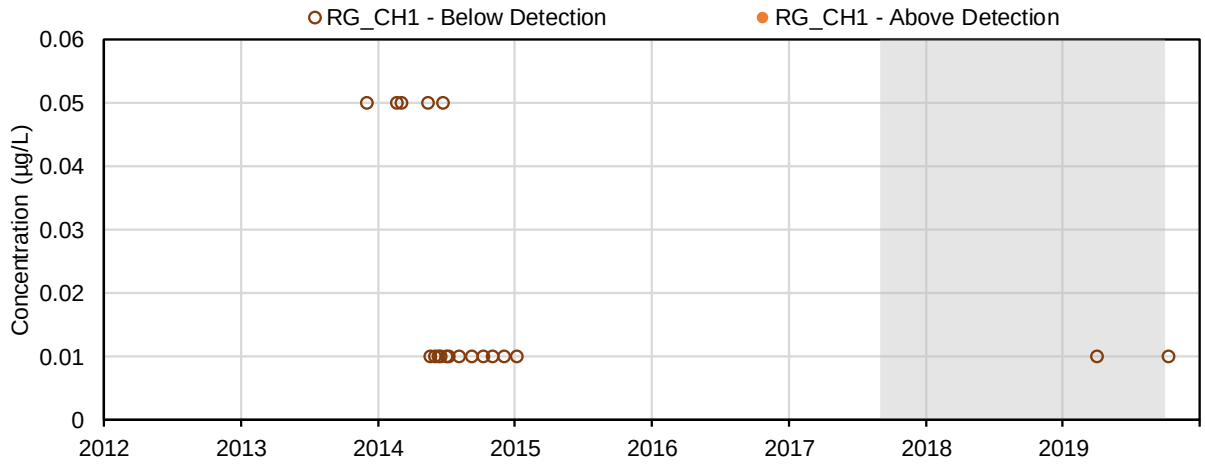
(119) Anthracene (µg/L); Parent PAHs



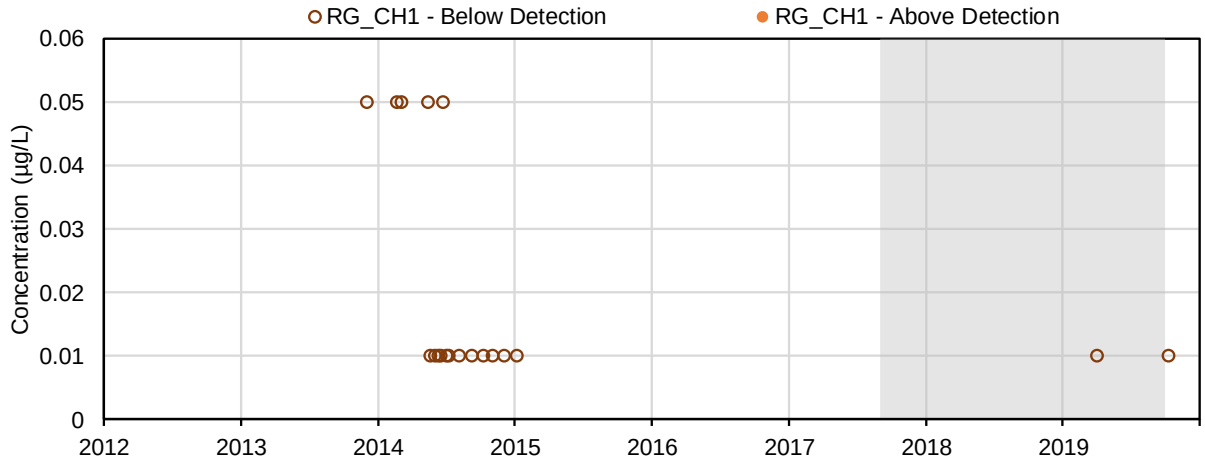
(120) Pyrene (µg/L); Parent PAHs



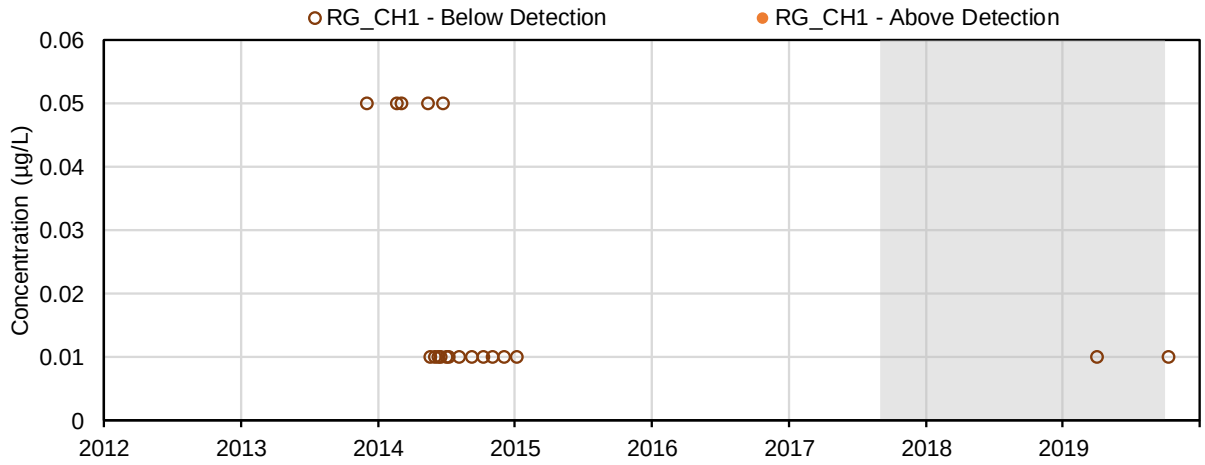
(121) Fluoranthene (µg/L); Parent PAHs



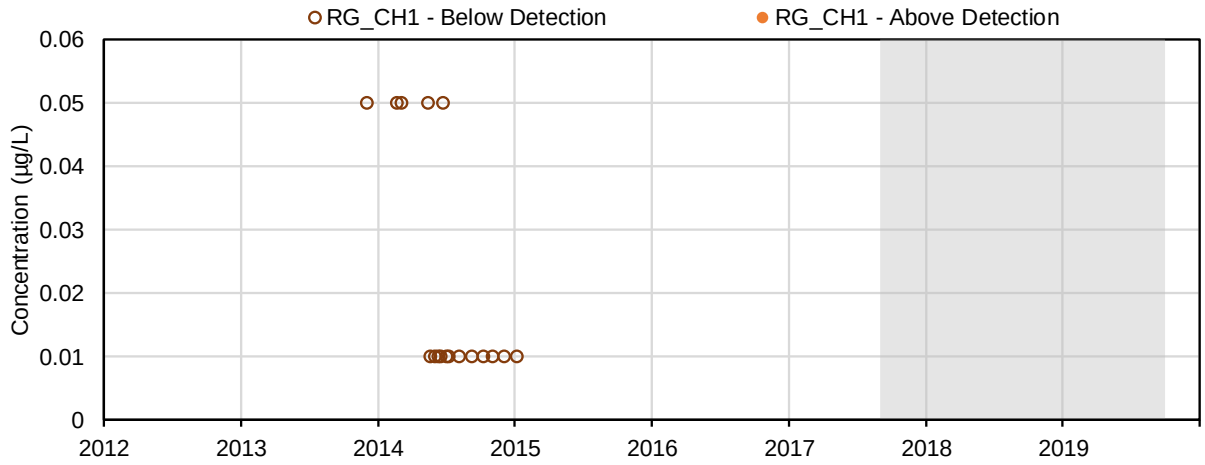
(122) Benzo(a)anthracene (µg/L); Parent PAHs



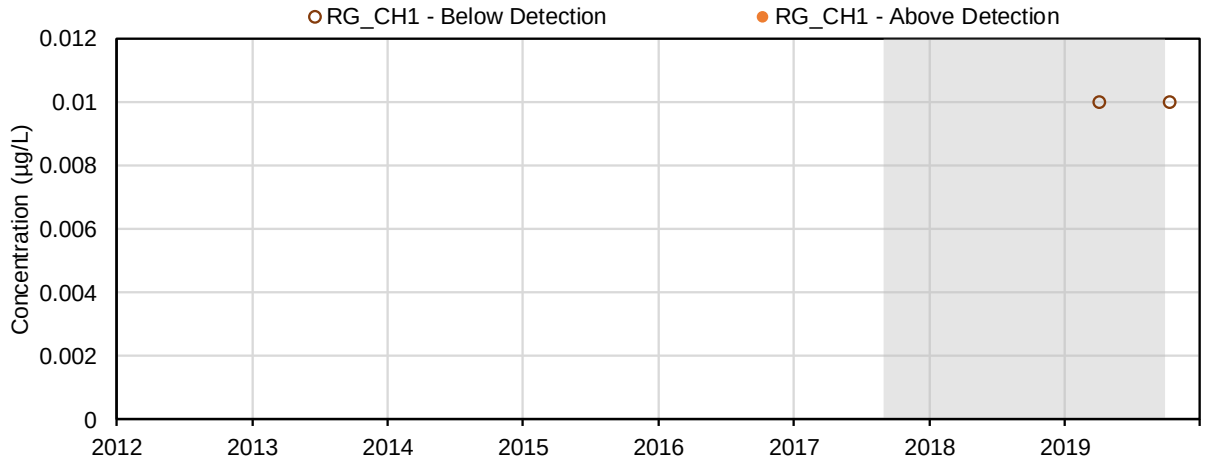
(123) Chrysene (µg/L); Parent PAHs



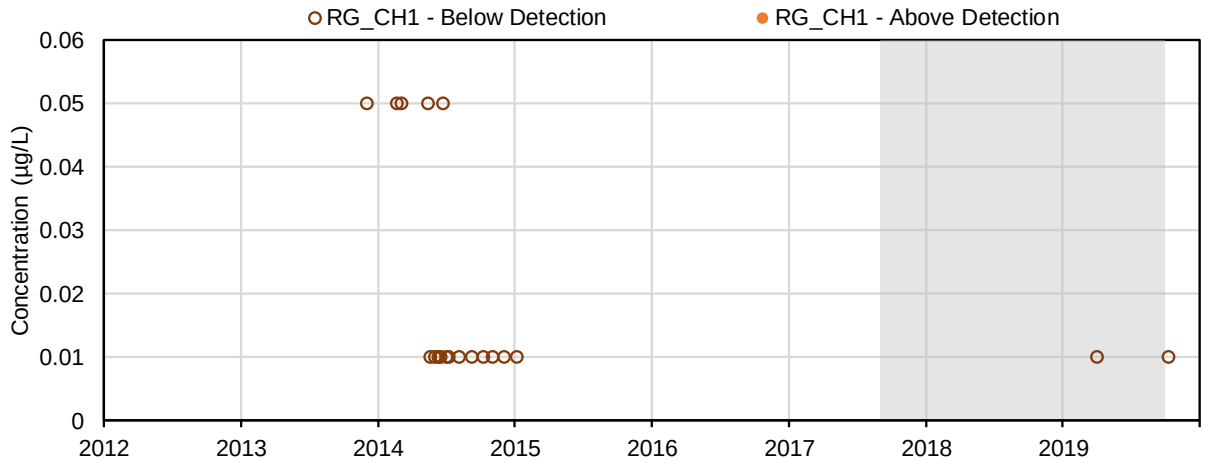
(124) Benzo(b)fluoranthene (µg/L); Parent PAHs



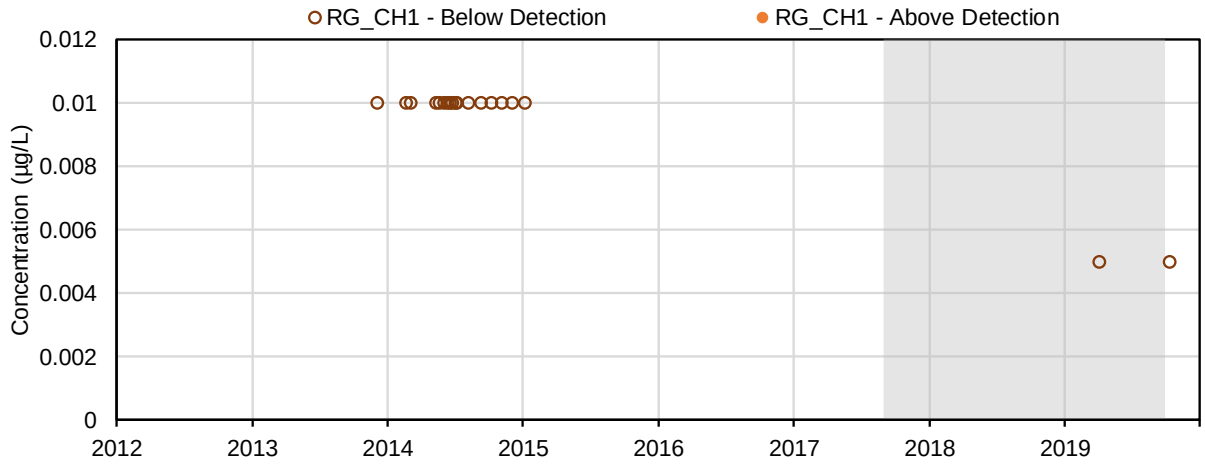
(125) Benzo(b,j)fluoranthene (µg/L); Parent PAHs



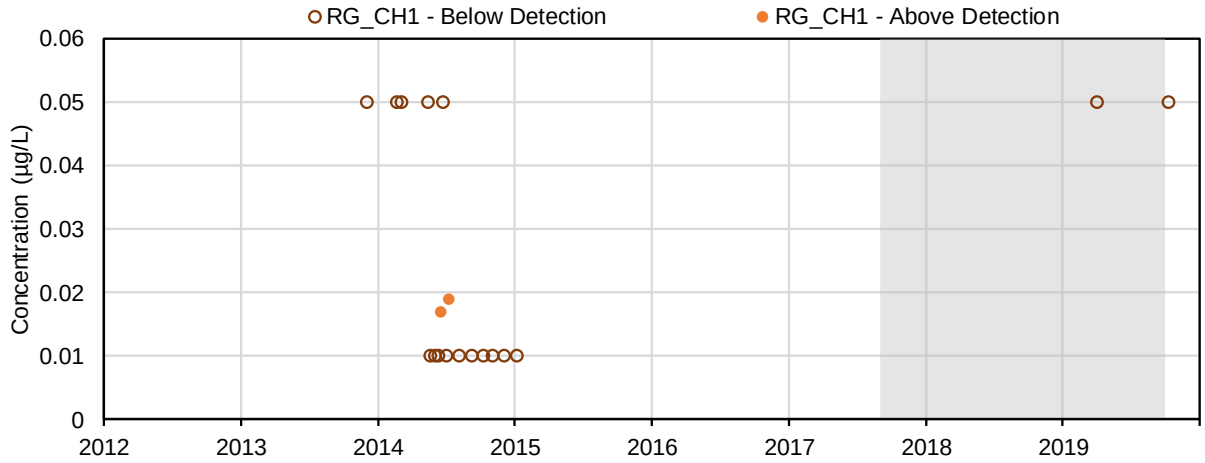
(126) Benzo(k)fluoranthene (µg/L); Parent PAHs



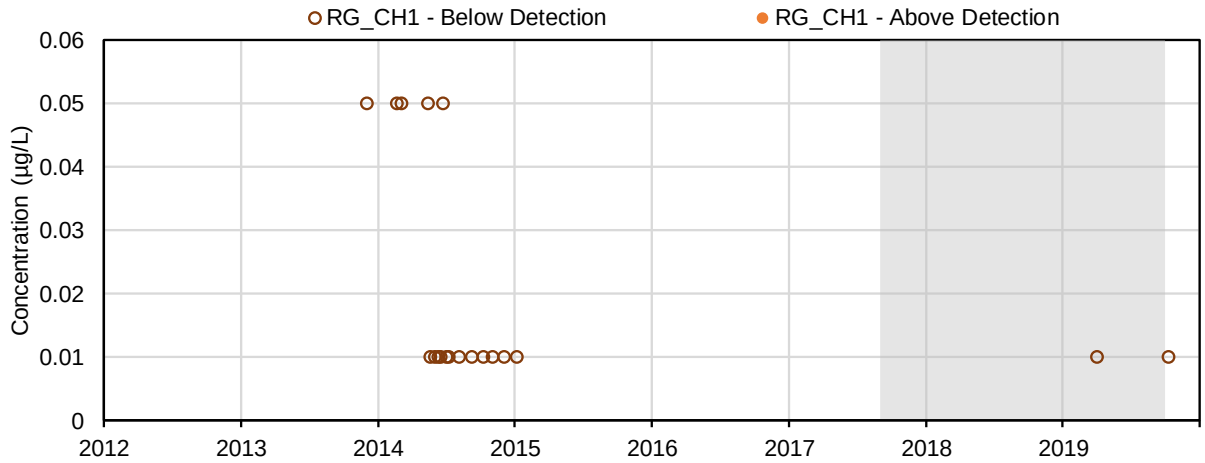
(127) Benzo(a)pyrene (µg/L); Parent PAHs



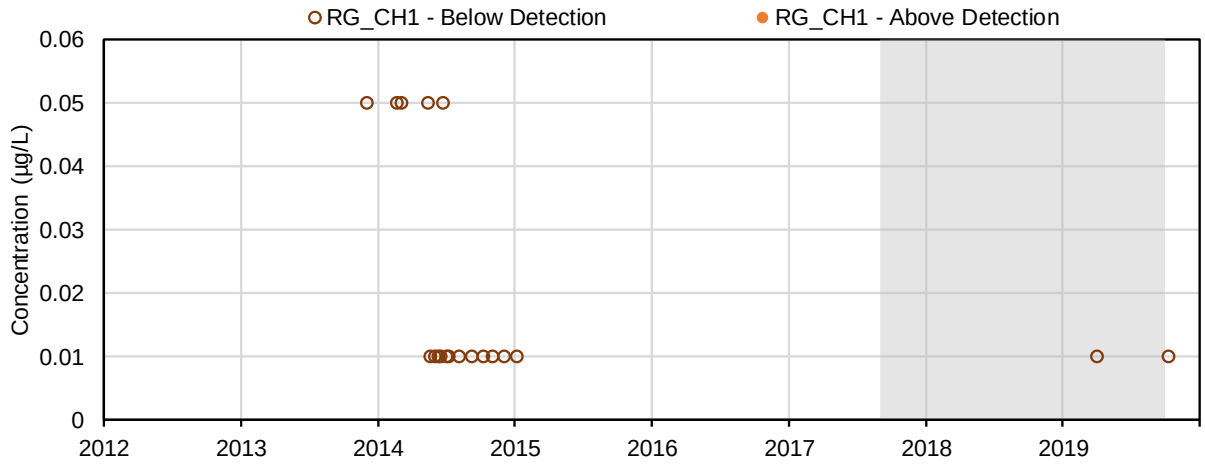
(128) Quinoline (µg/L); Parent PAHs



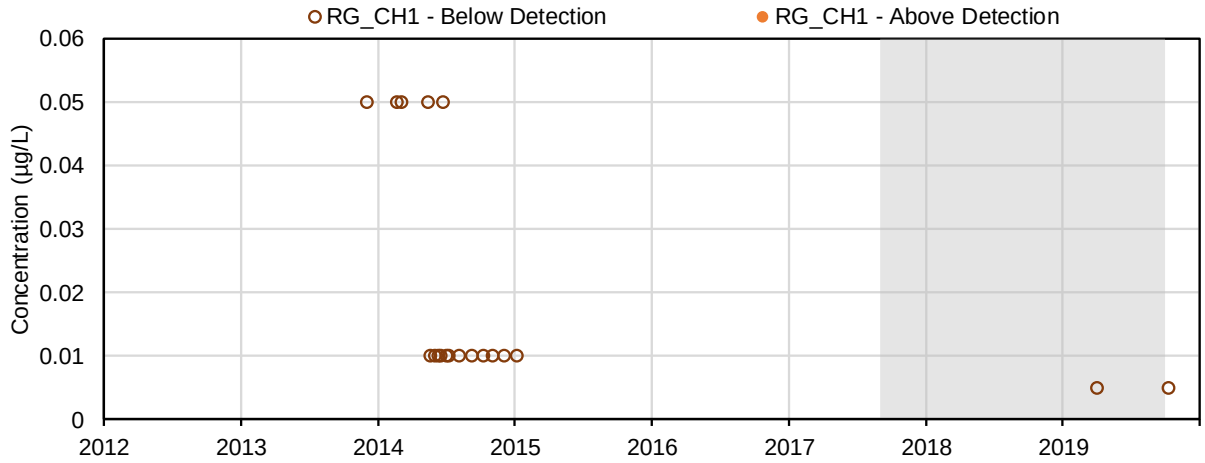
(129) Benzo(g,h,i)perylene (µg/L); Parent PAHs



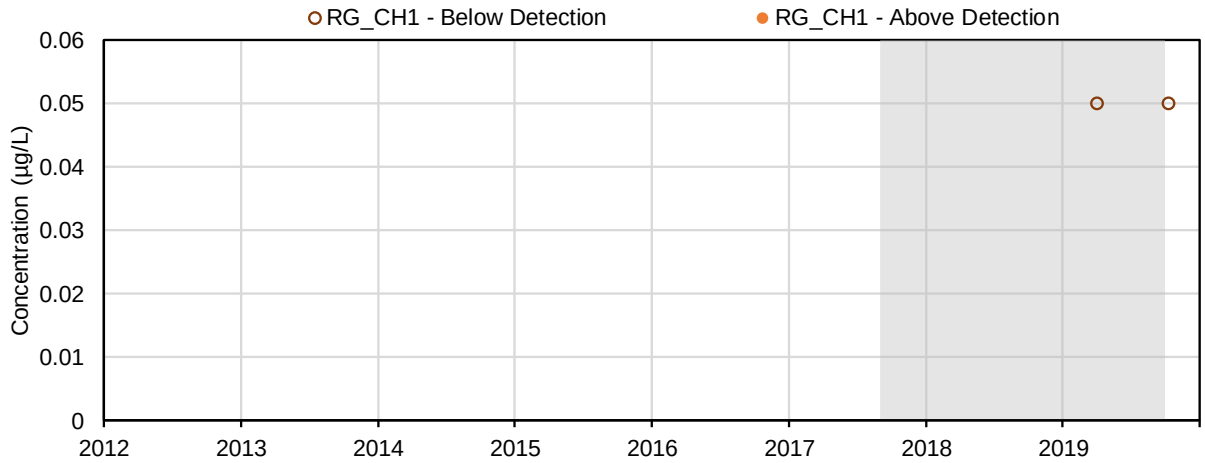
(130) Indeno(c,d-123)pyrene (µg/L); Parent PAHs



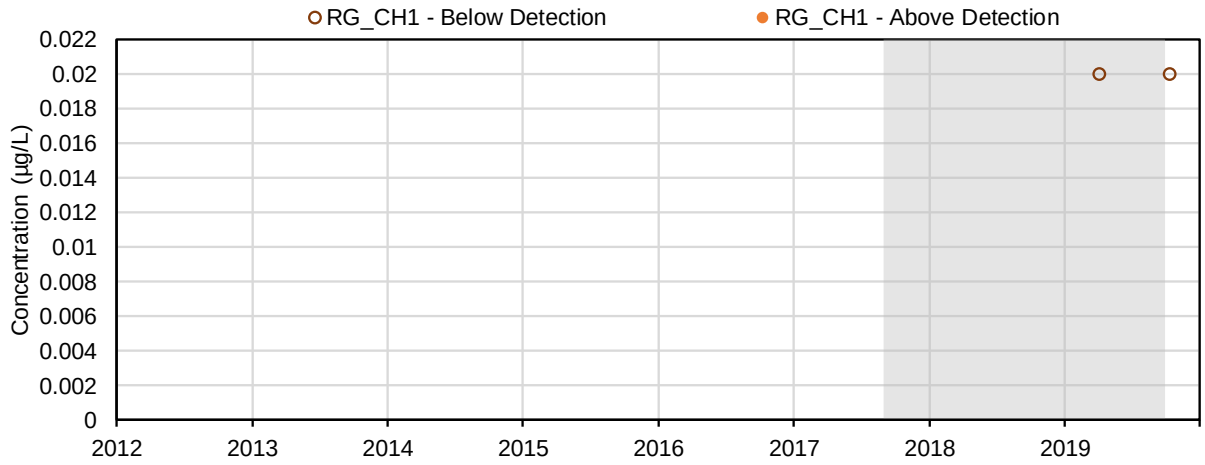
(131) Dibenzo(a,h)anthracene (µg/L); Parent PAHs



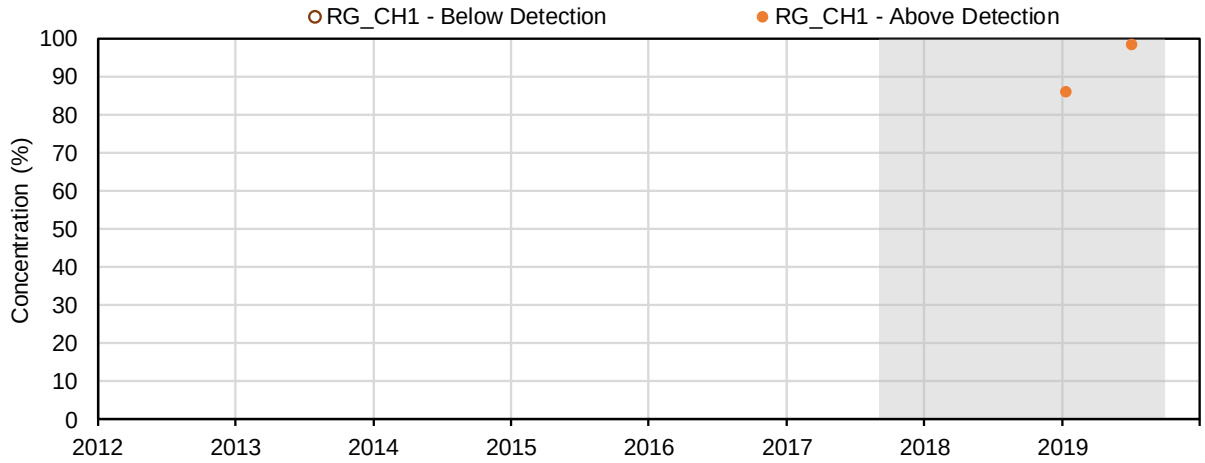
(132) 1-Methylnaphthalene (µg/L); Alkylated PAHs

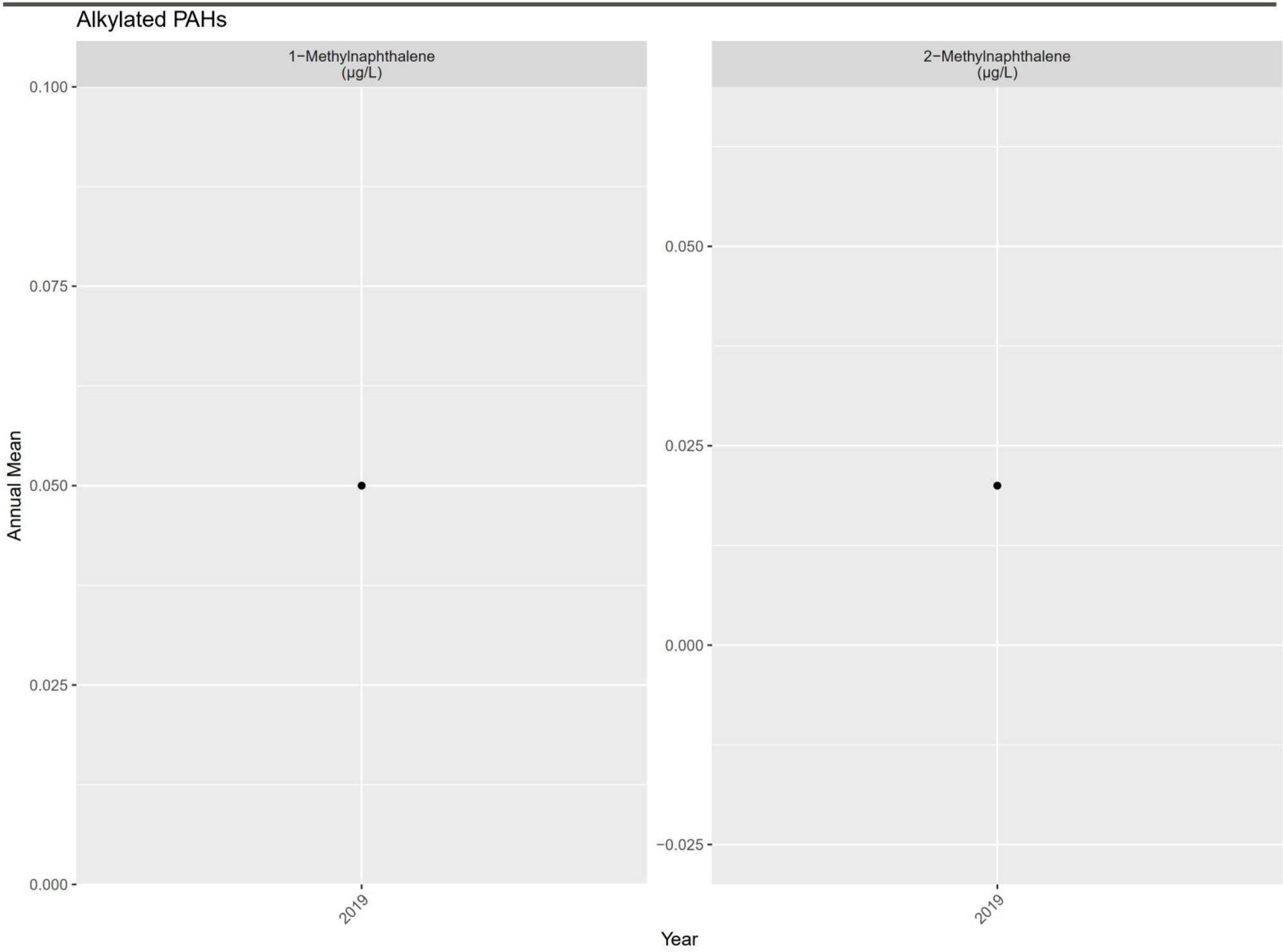


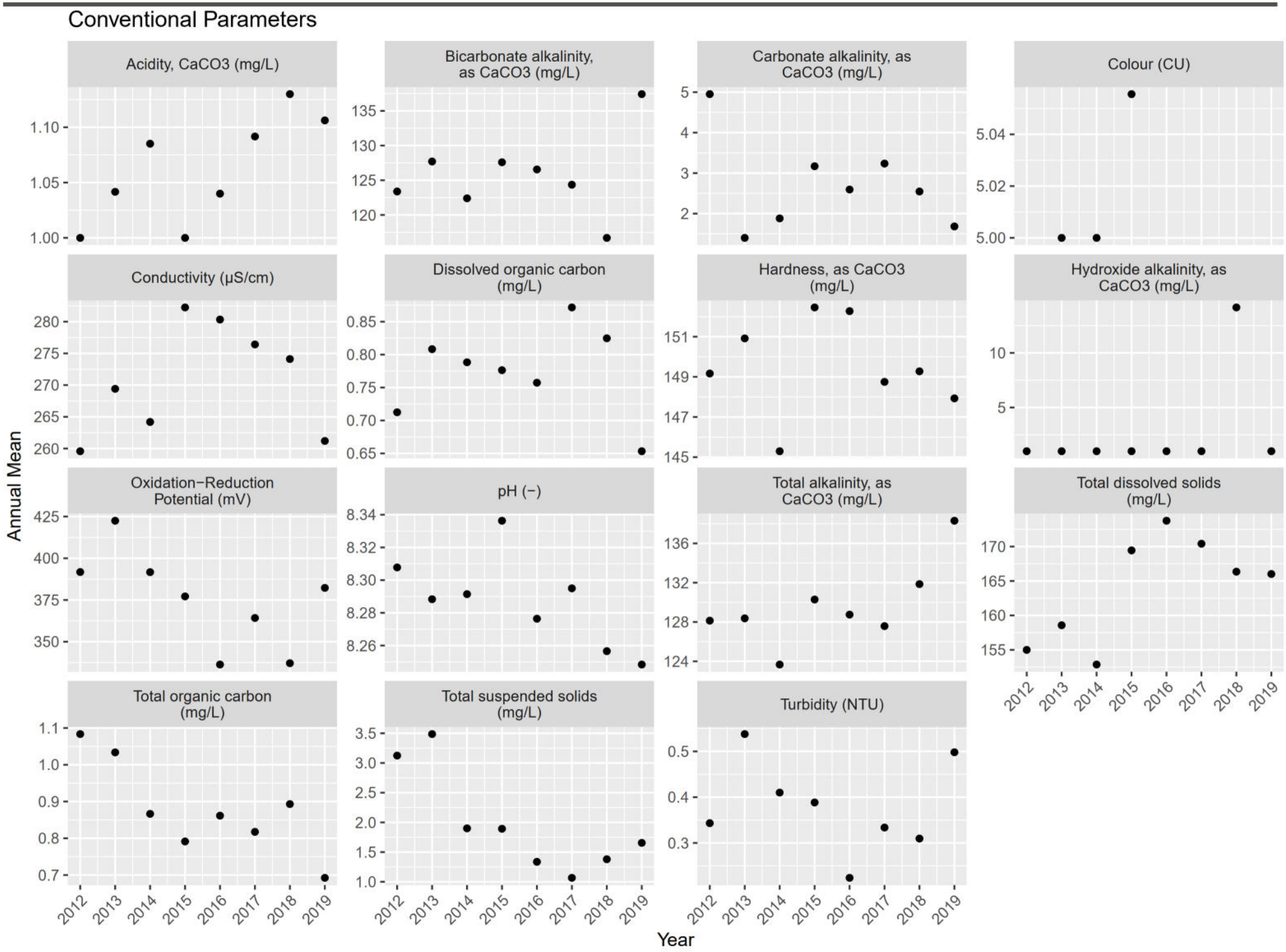
(133) 2-Methylnaphthalene (µg/L); Alkylated PAHs

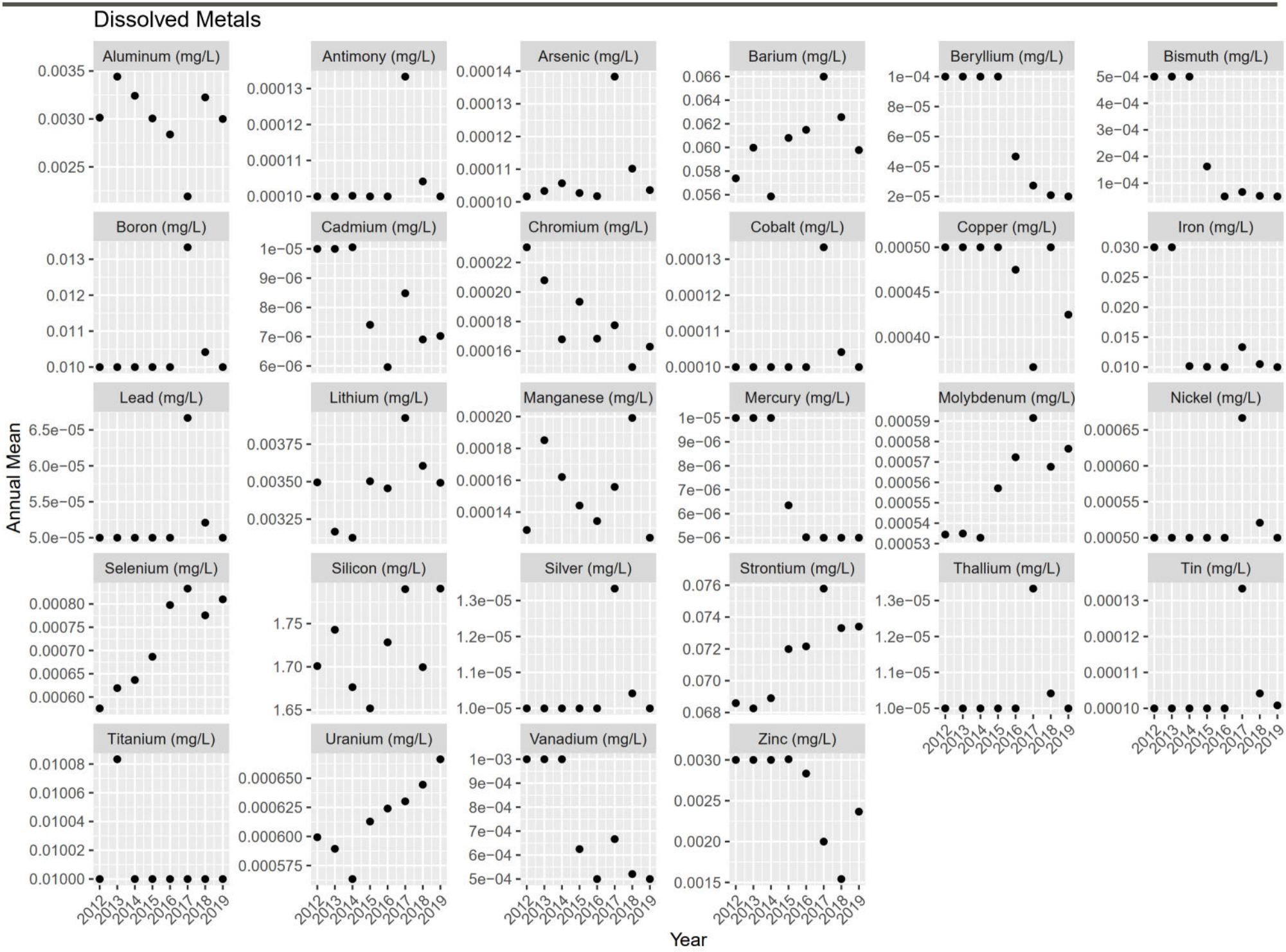


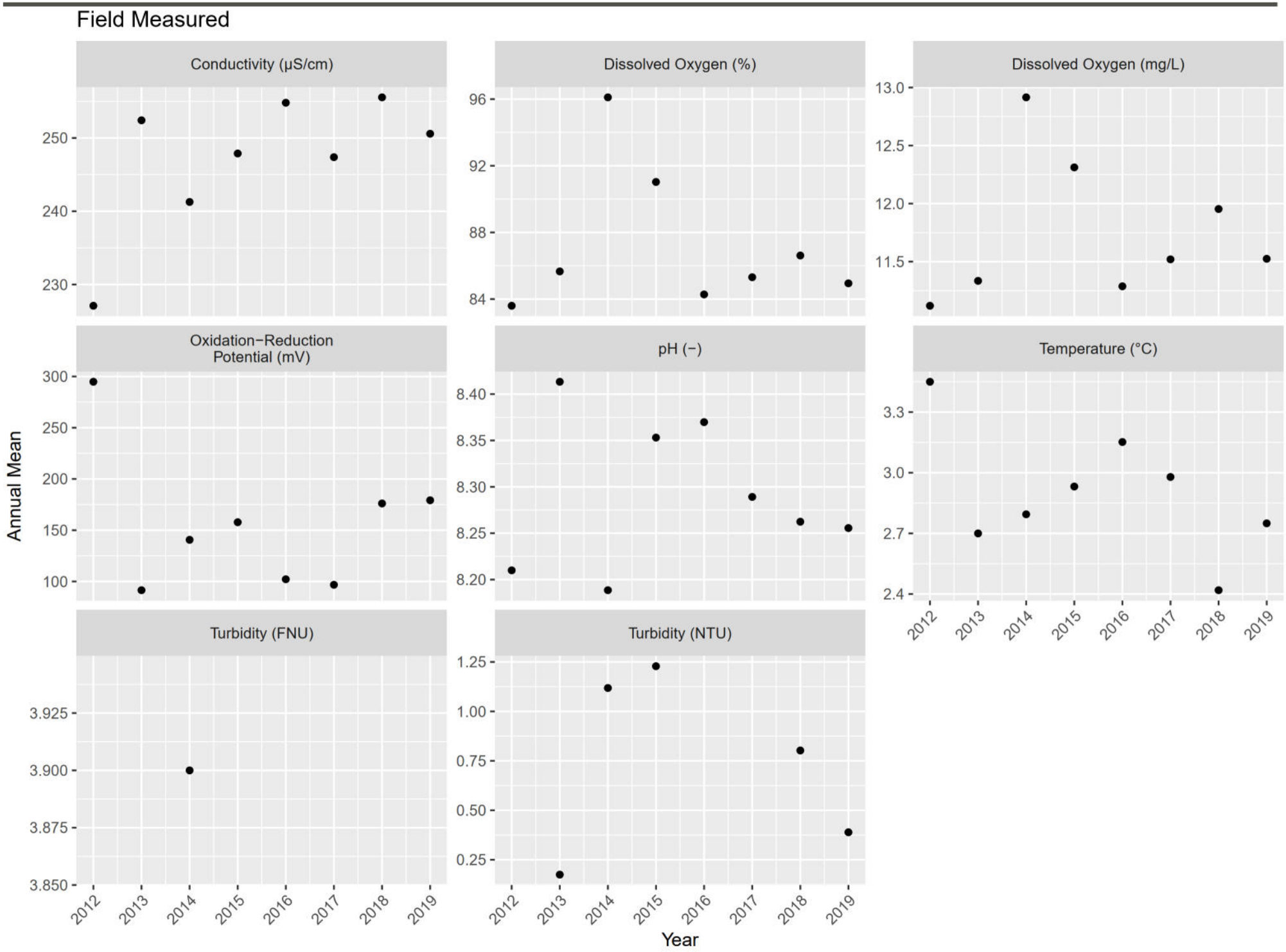
(134) 2-Bromobenzotrifluoride (%); Unknown

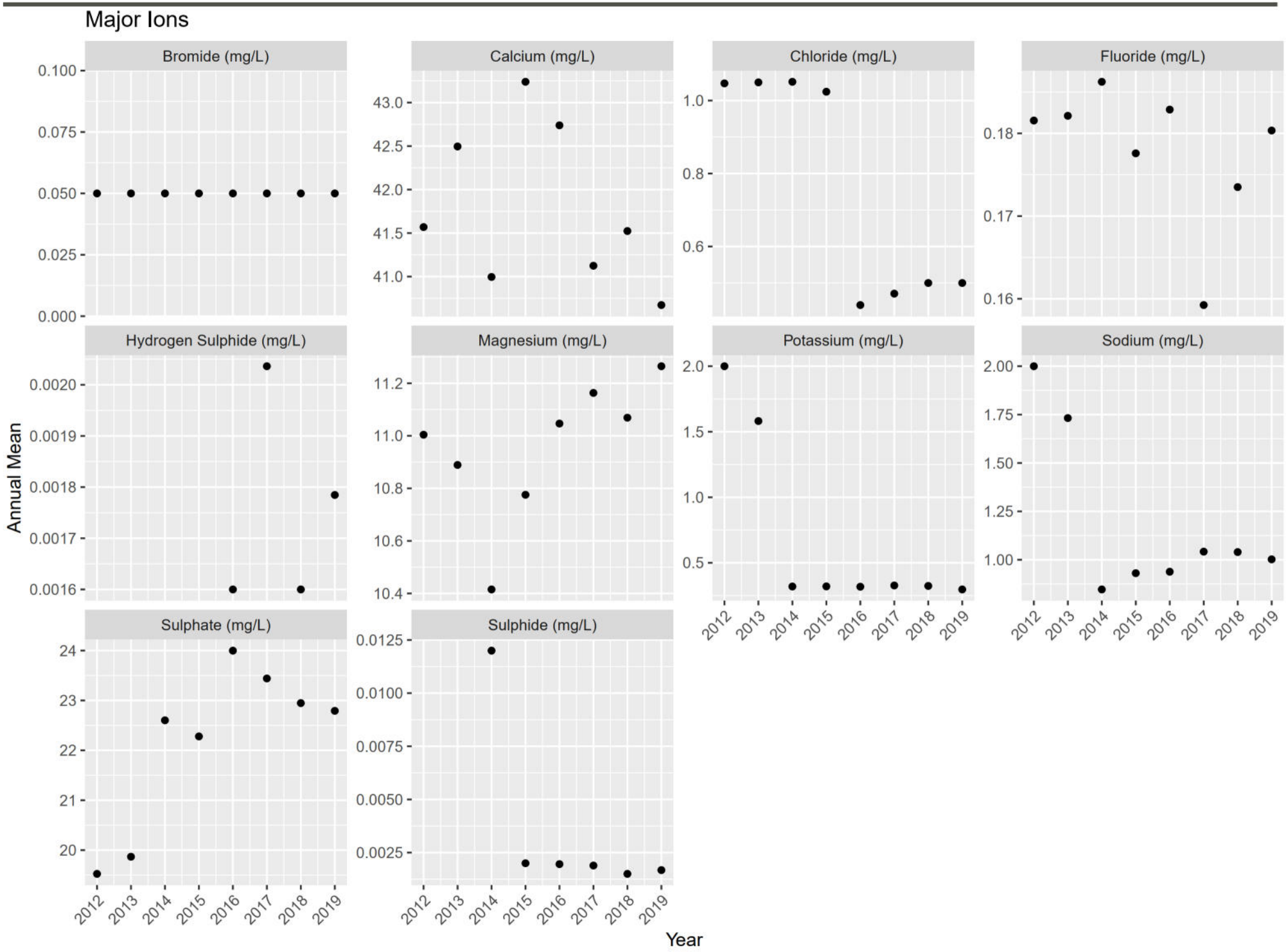


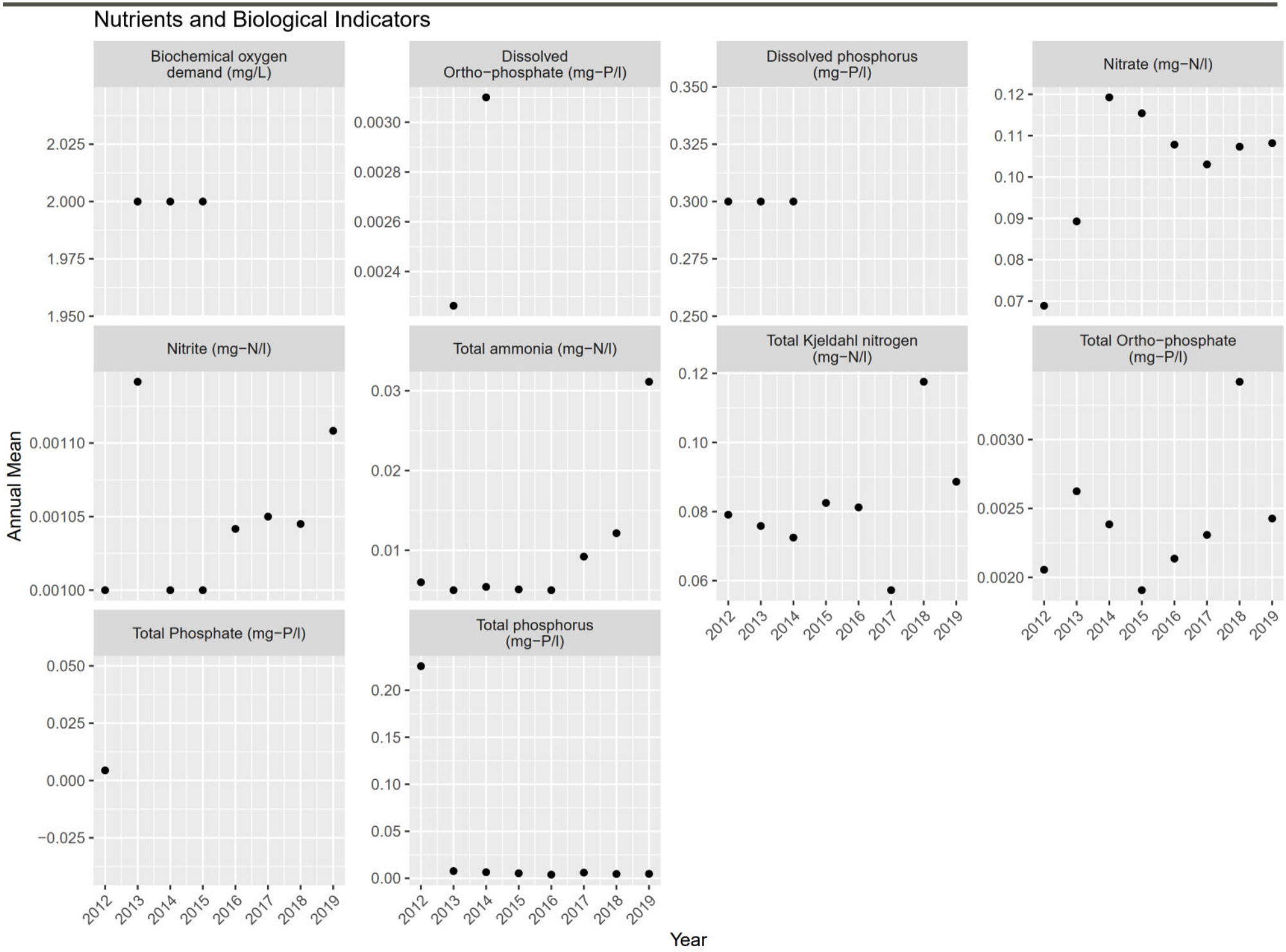

Alkylated PAHs
1−Methylnaphthalene (µg/L)
2−Methylnaphthalene (µg/L)
Annual Mean
0.100
0.075
0.050
0.025
0.000
0.050
0.025
0.000
−0.025
2019
2019
Year

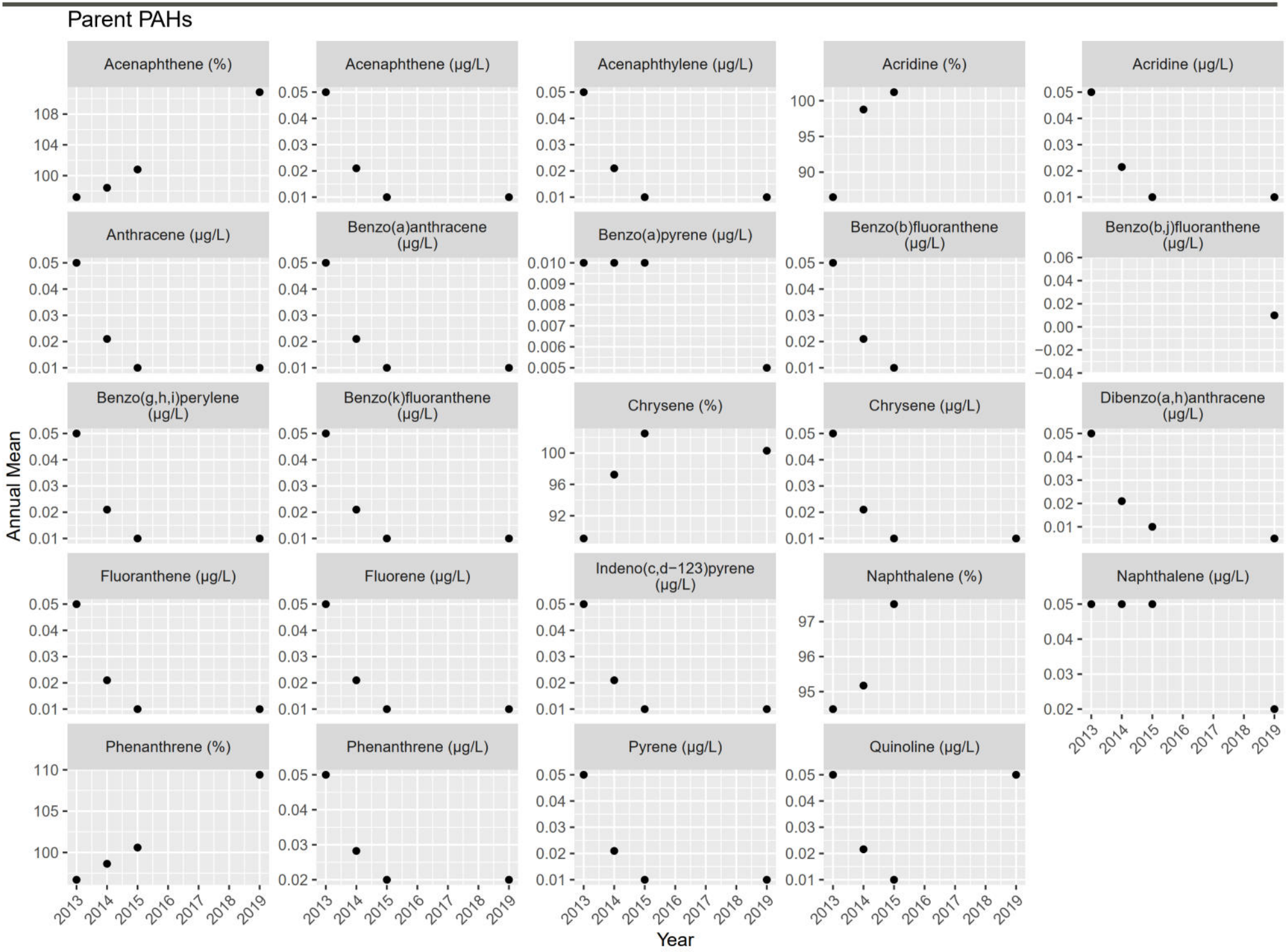

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Colour (CU)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

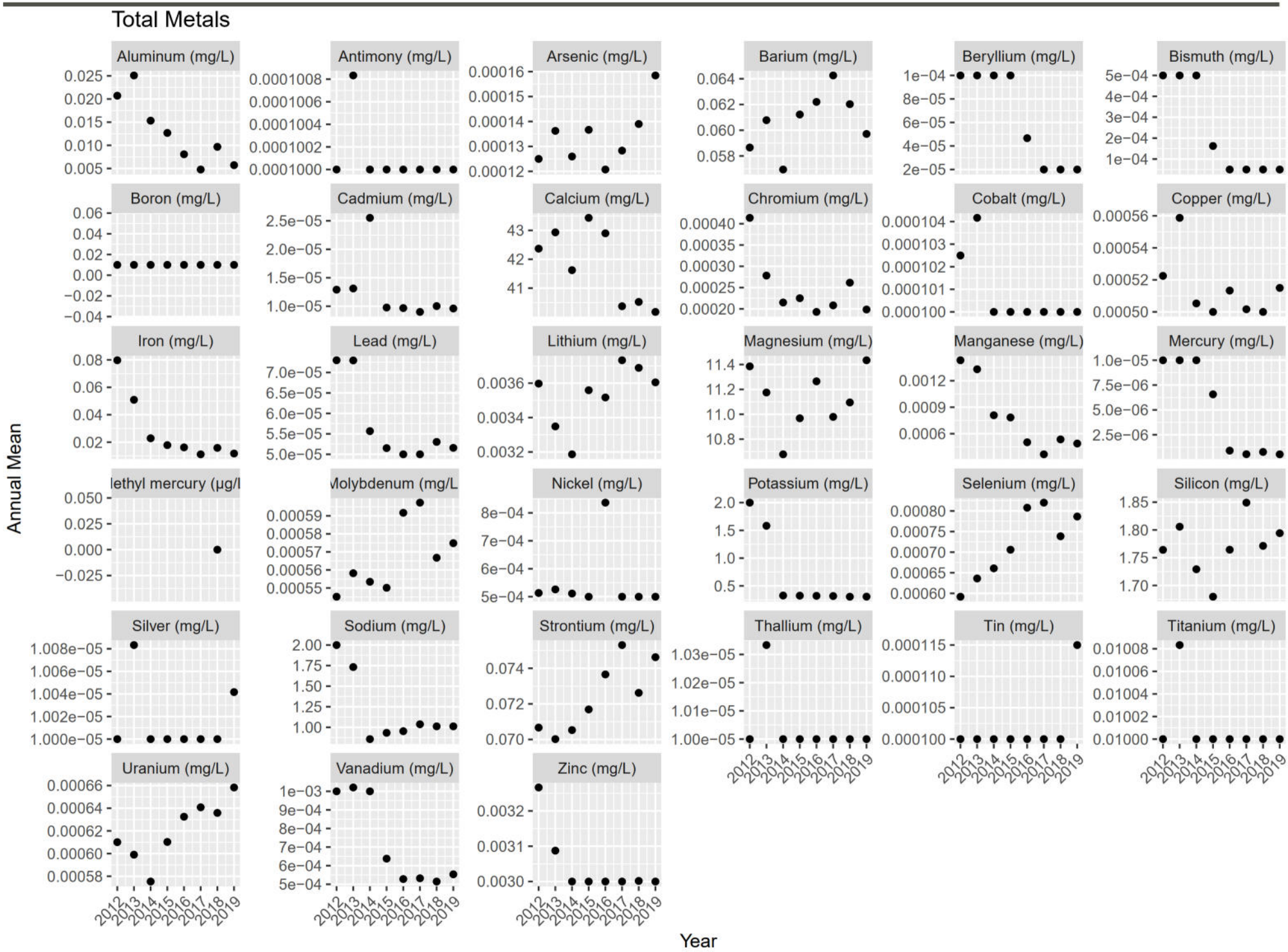

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

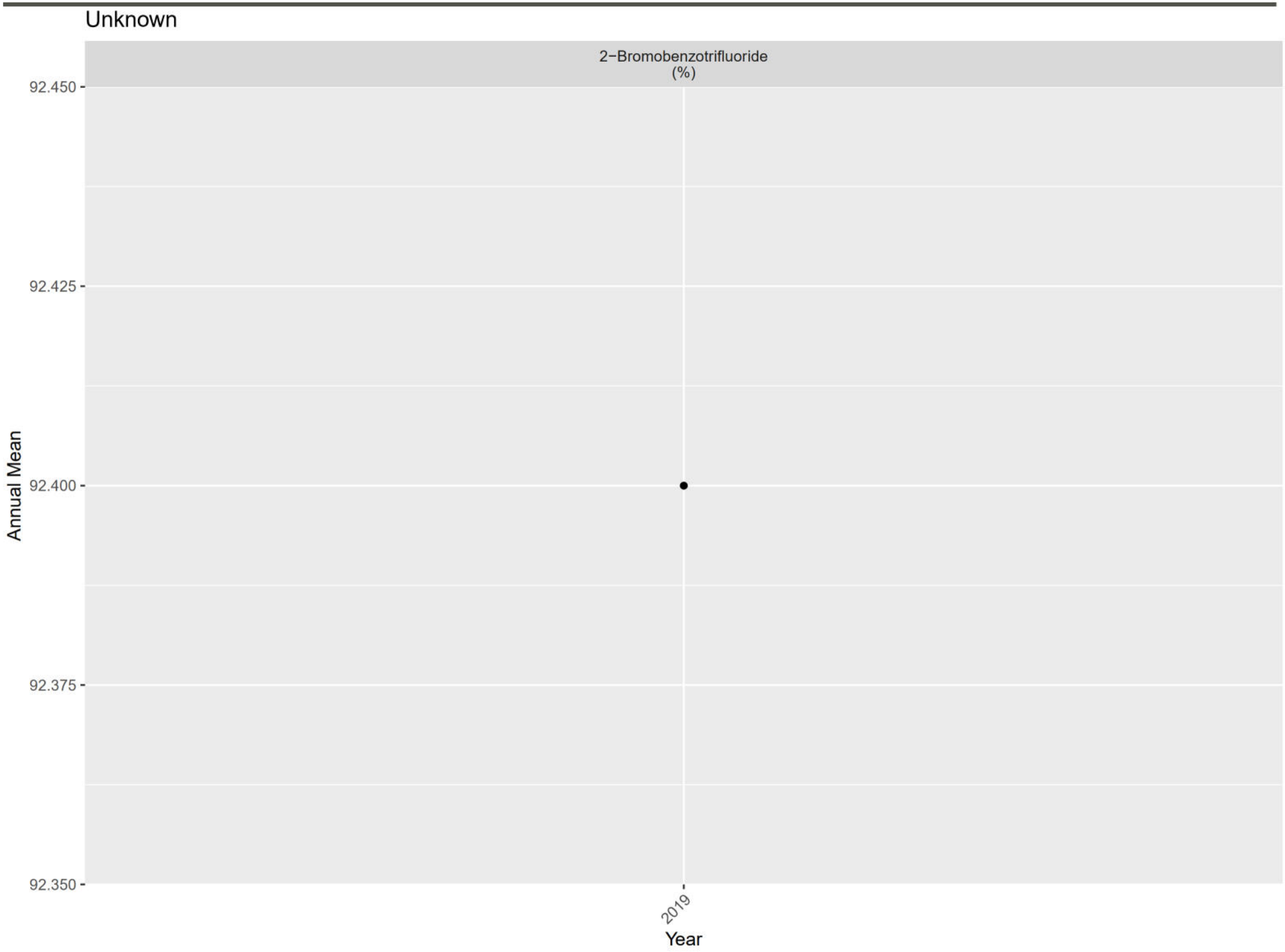

Field Measured
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Temperature (°C)
Turbidity (FNU)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

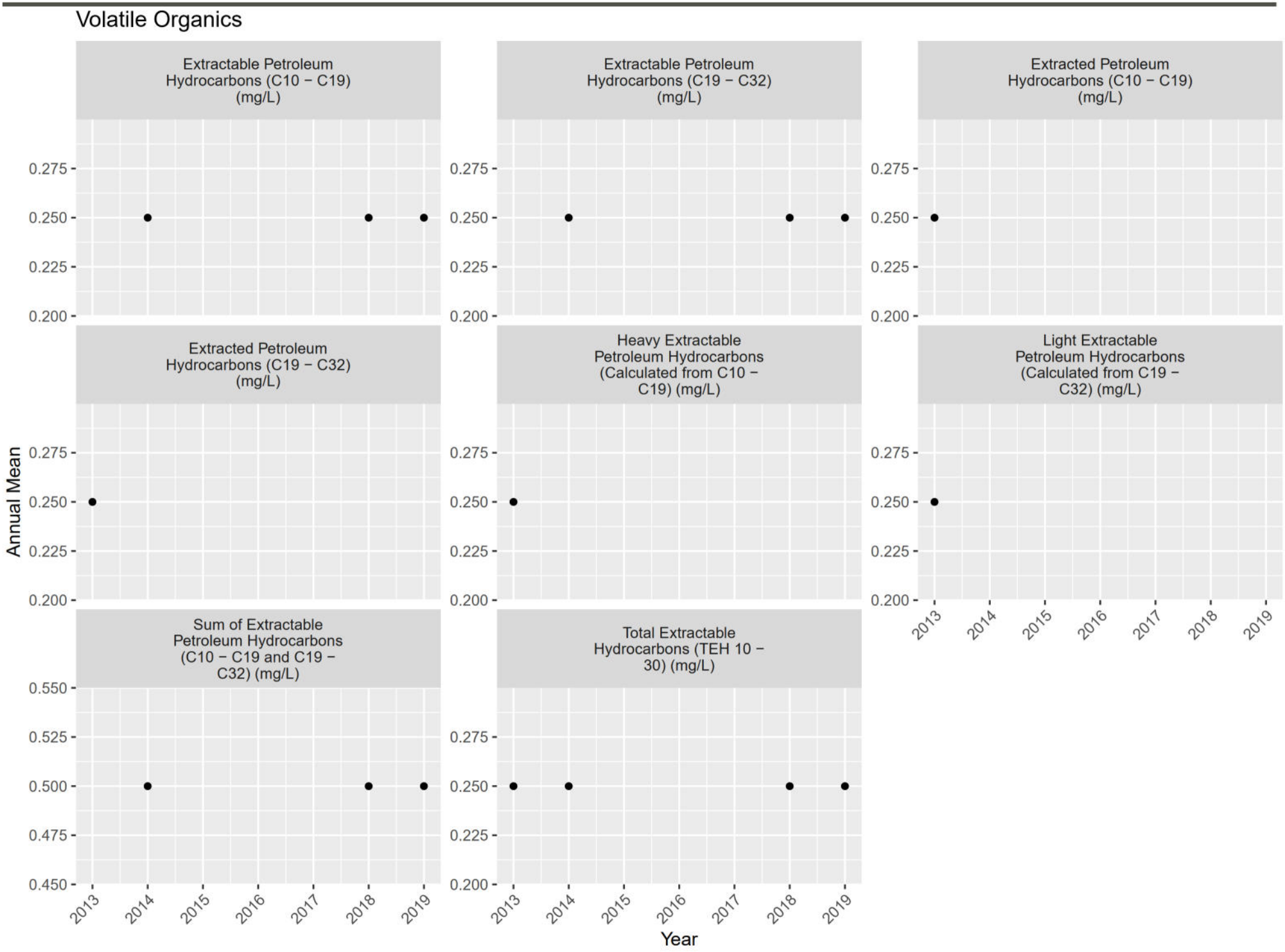

Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Hydrogen Sulphide (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Sulphide (mg/L)
Annual Mean
Year


Nutrients and Biological Indicators
Biochemical oxygen demand (mg/L)
Dissolved Ortho−phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Parent PAHs
Acenaphthene (%)
Acenaphthene (µg/L)
Acenaphthylene (µg/L)
Acridine (%)
Acridine (µg/L)
Anthracene (µg/L)
Benzo(a)anthracene (µg/L)
Benzo(a)pyrene (µg/L)
Benzo(b)fluoranthene (µg/L)
Benzo(b,j)fluoranthene (µg/L)
Benzo(g,h,i)perylene (µg/L)
Benzo(k)fluoranthene (µg/L)
Chrysene (%)
Chrysene (µg/L)
Dibenzo(a,h)anthracene (µg/L)
Fluoranthene (µg/L)
Fluorene (µg/L)
Indeno(c,d−123)pyrene (µg/L)
Naphthalene (%)
Naphthalene (µg/L)
Phenanthrene (%)
Phenanthrene (µg/L)
Pyrene (µg/L)
Quinoline (µg/L)
Annual Mean
Year
2013
2014
2015
2016
2017
2018
2019


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
lethyl mercury (µg/l
Molybdenum (mg/L
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year

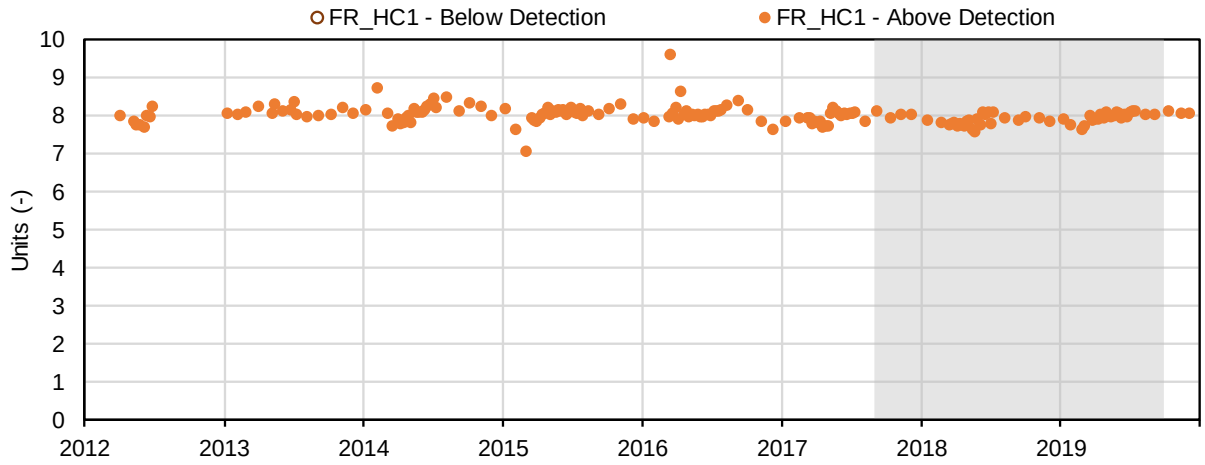

Unknown
2−Bromobenzotrifluoride
(%)
92.450
92.425
92.400
92.375
92.350
Annual Mean
2019
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extractable Petroleum Hydrocarbons (C19 − C32) (mg/L)
Extracted Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 − C19) (mg/L)
Light Extractable Petroleum Hydrocarbons (Calculated from C19 − C32) (mg/L)
Sum of Extractable Petroleum Hydrocarbons (C10 − C19 and C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
Year
0.200
0.225
0.250
0.275
0.450
0.475
0.500
0.525
0.550
2013
2014
2015
2016
2017
2018
2019

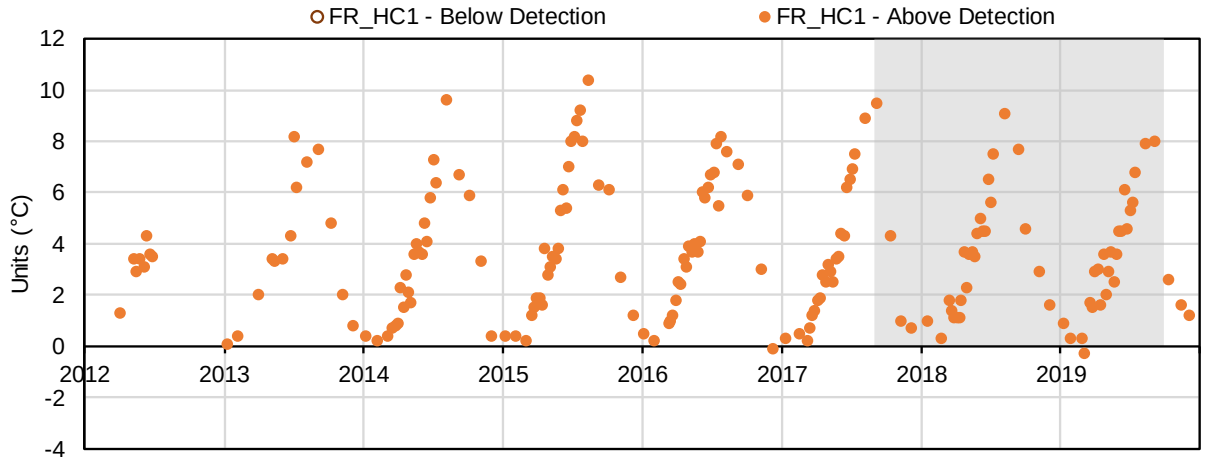
ATTACHMENT F19

FR_HC1 Plots

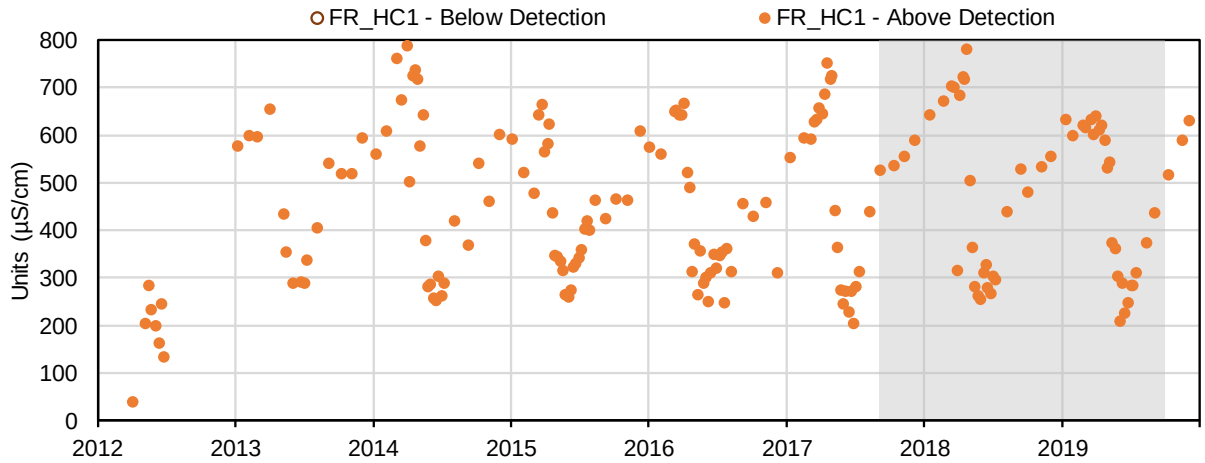
(1) pH (-); Field Measured



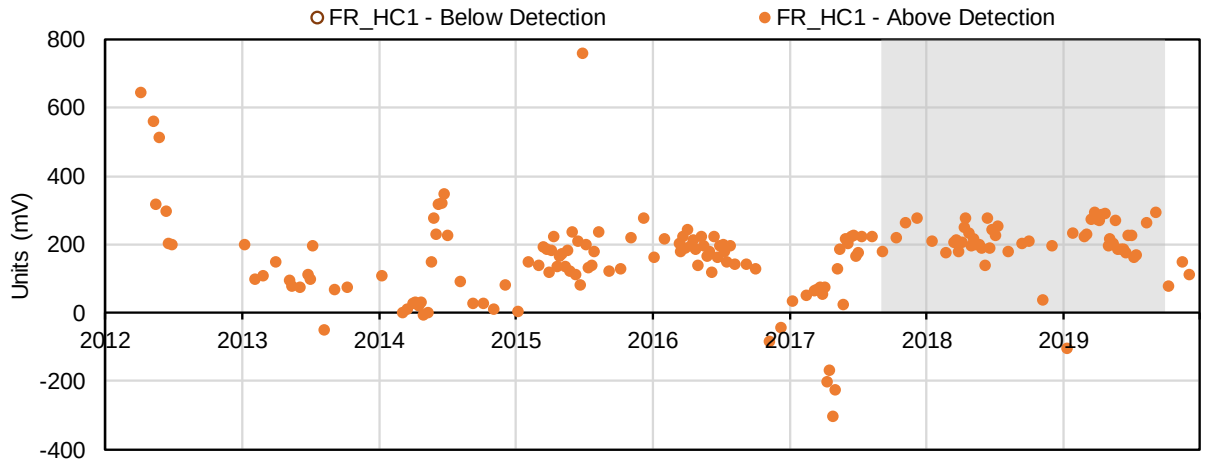
(2) Temperature (°C); Field Measured



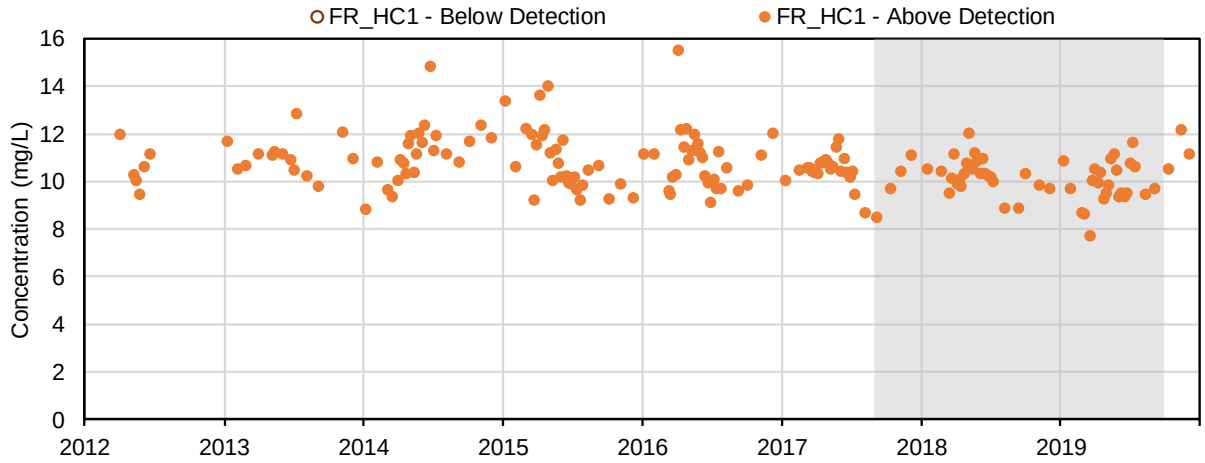
(3) Conductivity (µS/cm); Field Measured



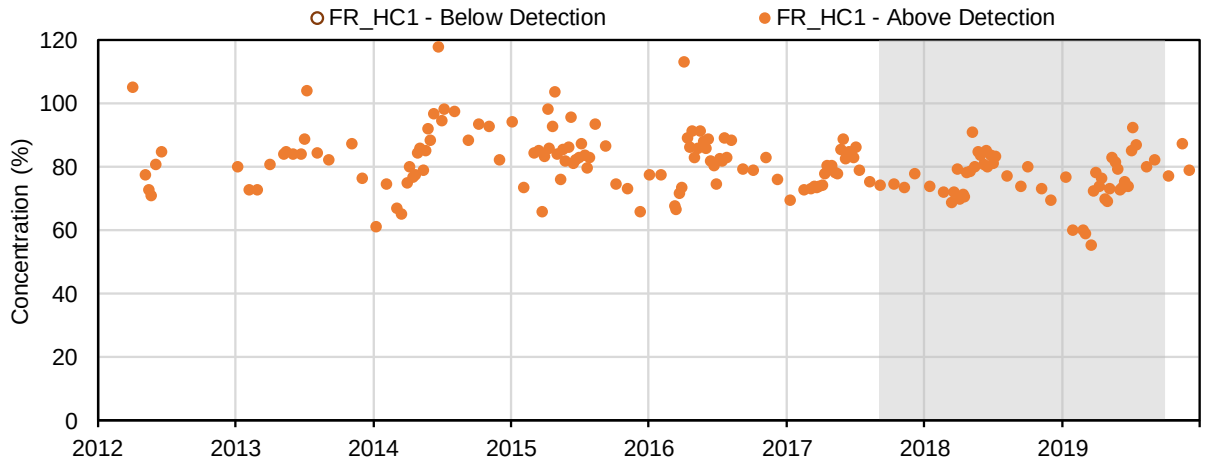
(4) Oxidation-Reduction Potential (mV); Field Measured



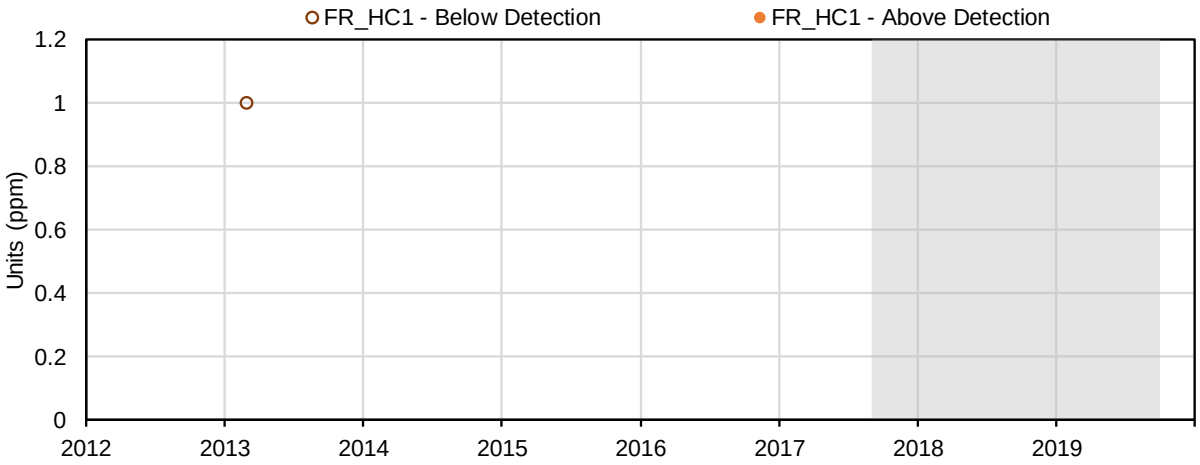
(5) Dissolved Oxygen (mg/L); Field Measured



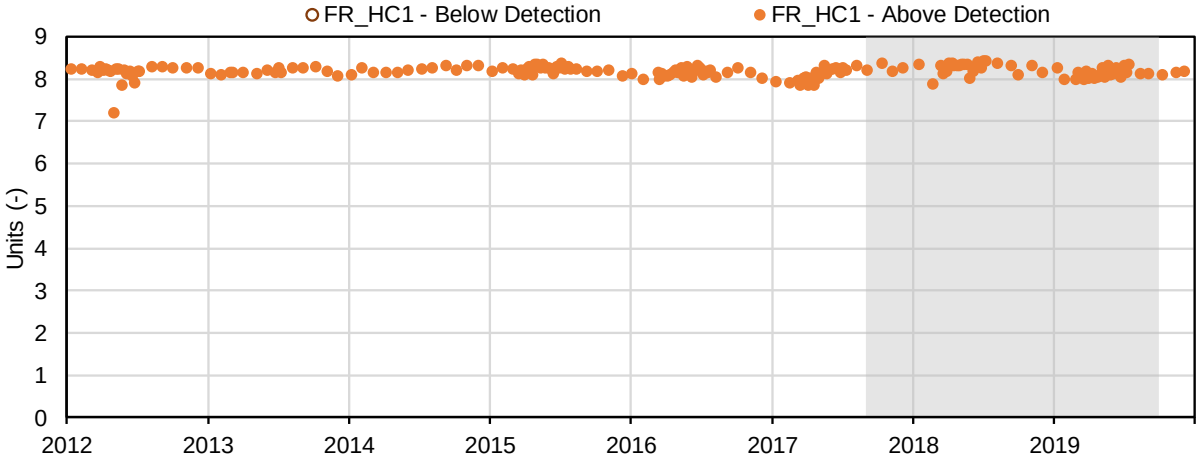
(6) Dissolved Oxygen (%); Field Measured



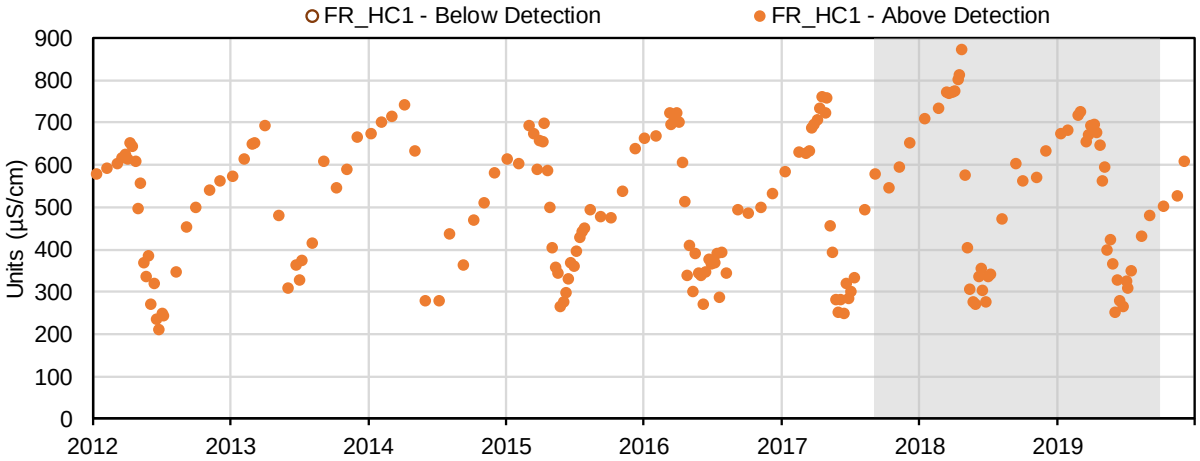
(7) Total Suspended Solids (ppm); Field Measured



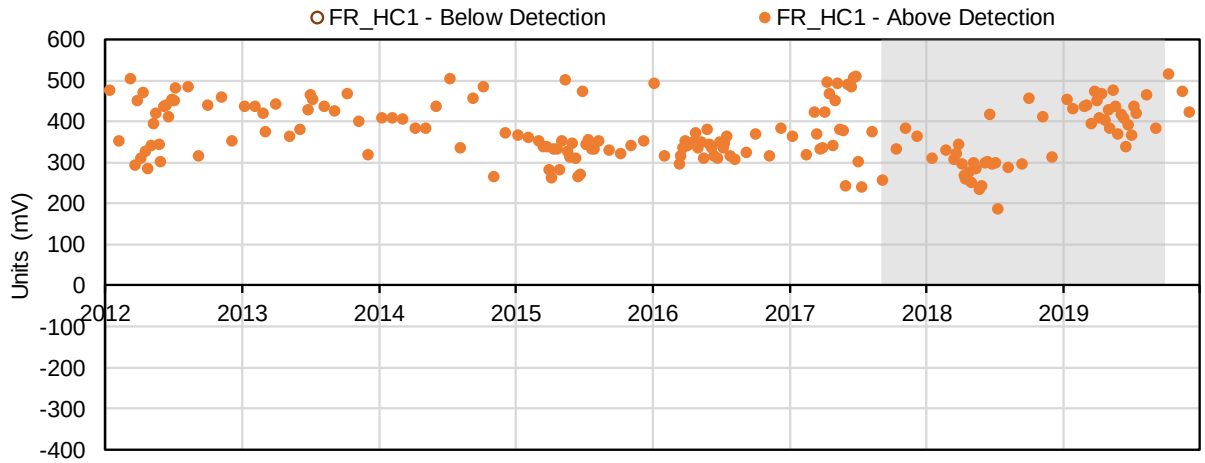
(8) pH (-); Conventional Parameters



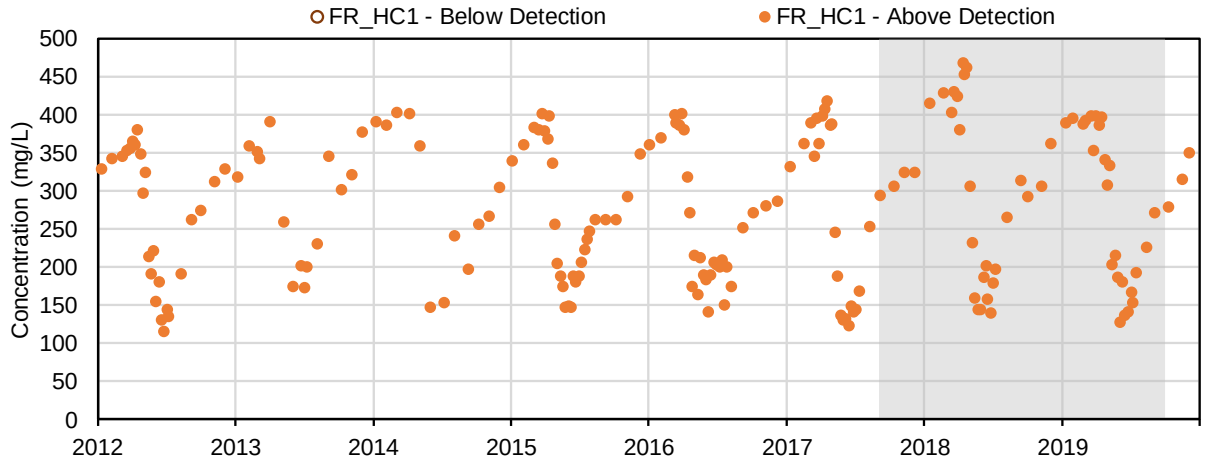
(9) Conductivity (µS/cm); Conventional Parameters



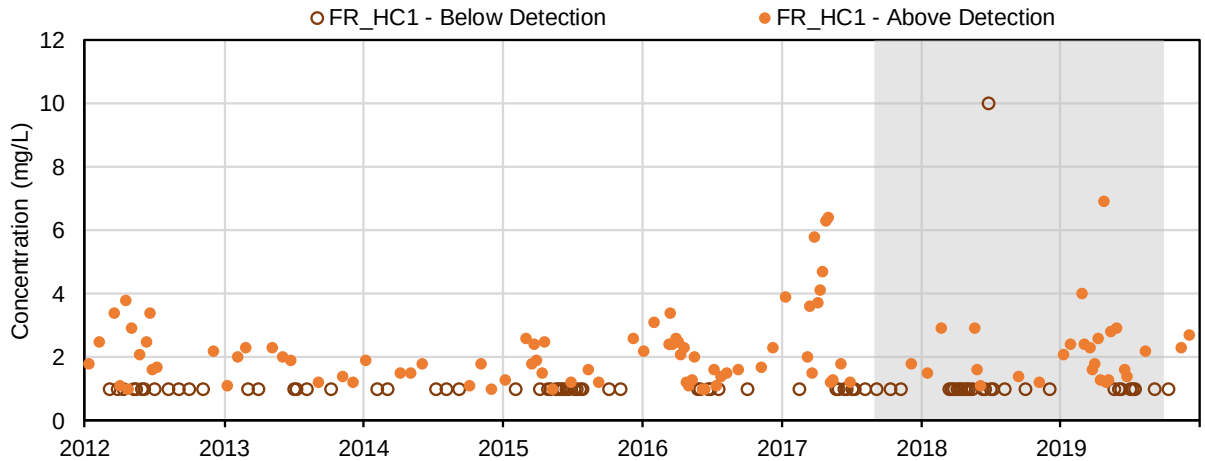
(10) Oxidation-Reduction Potential (mV); Conventional Parameters



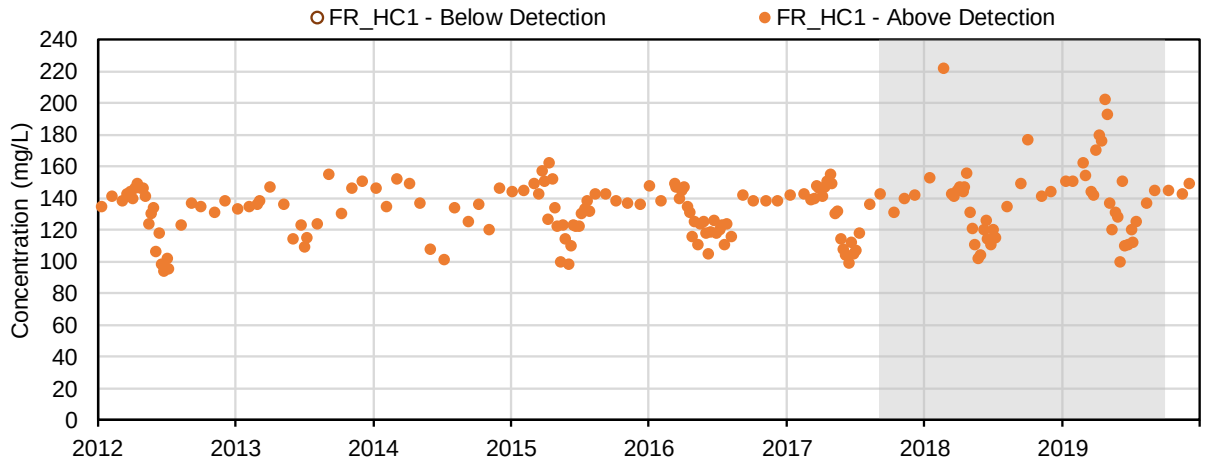
(11) Hardness, as CaCO3 (mg/L); Conventional Parameters



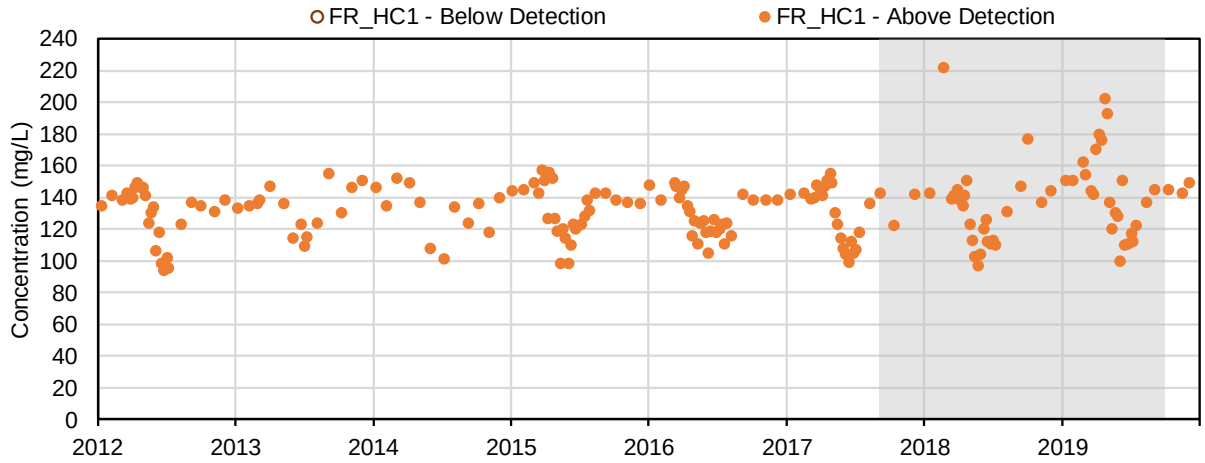
(12) Acidity, CaCO3 (mg/L); Conventional Parameters



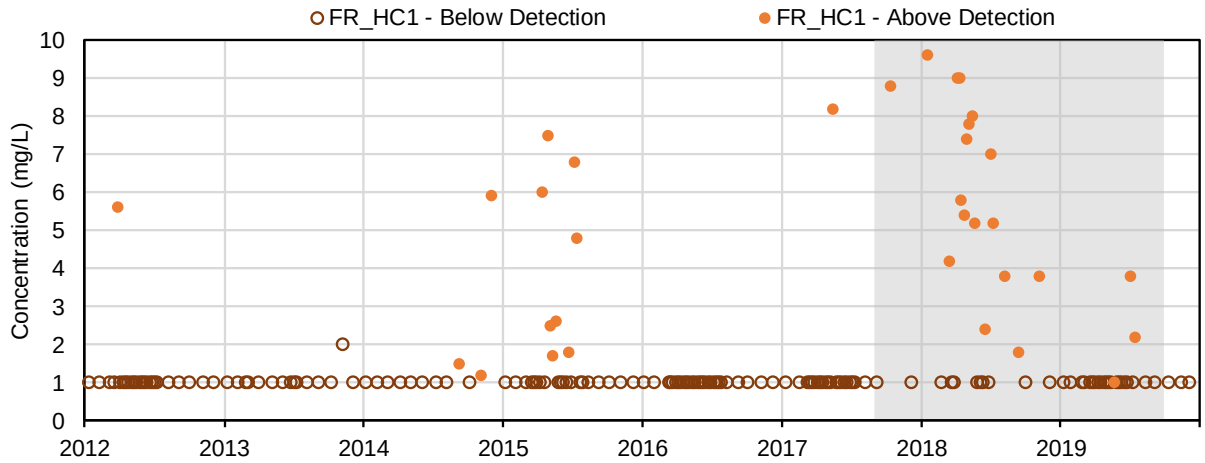
(13) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



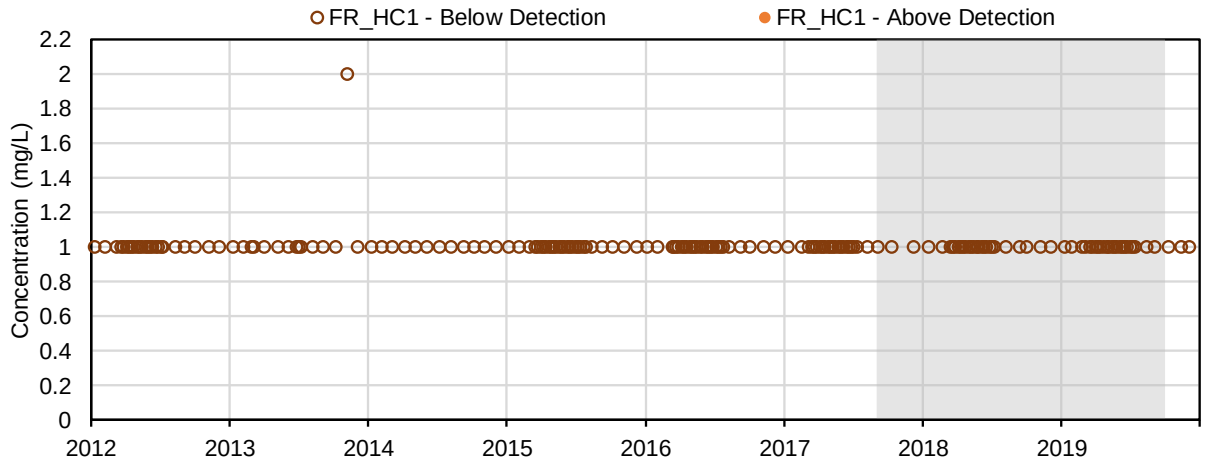
(14) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



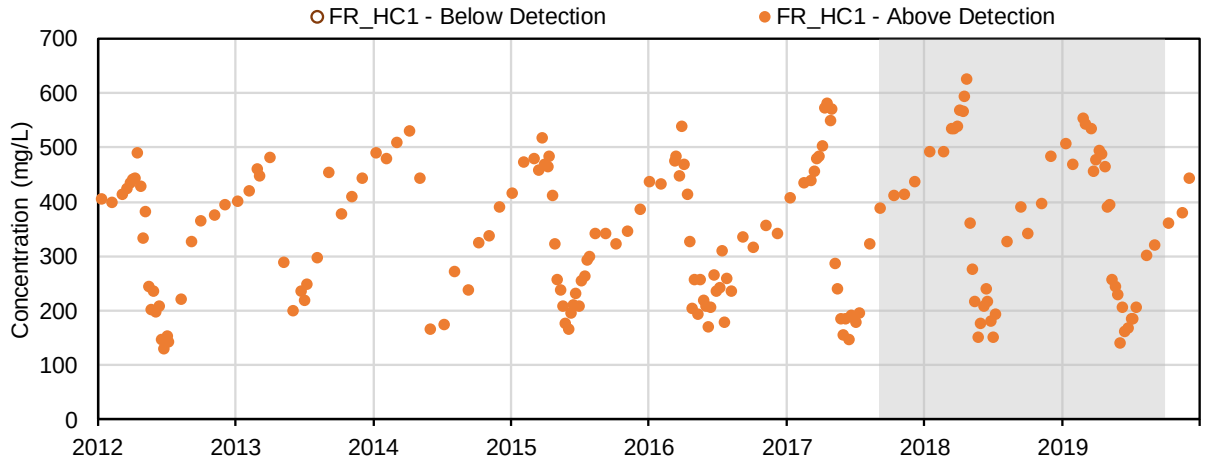
(15) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



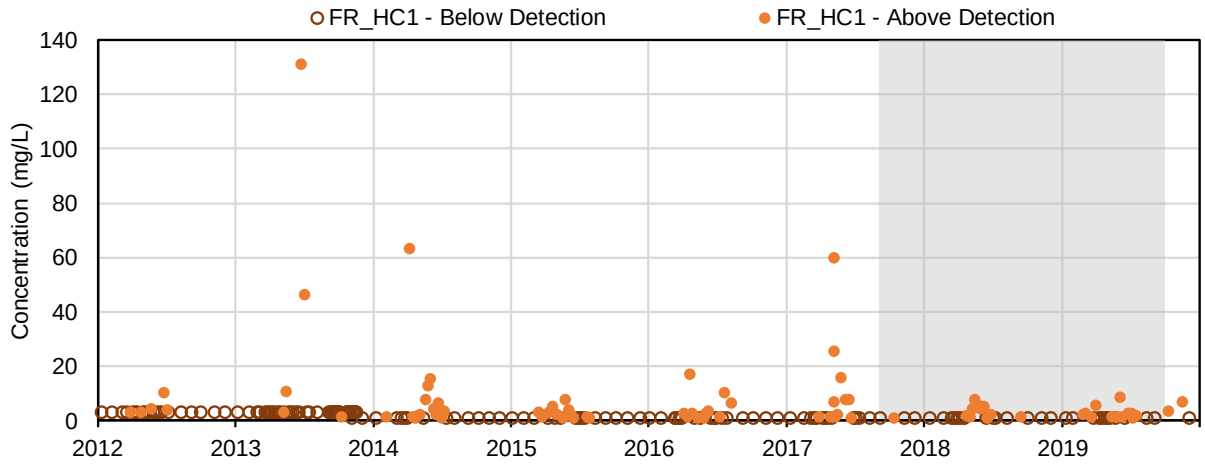
(16) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



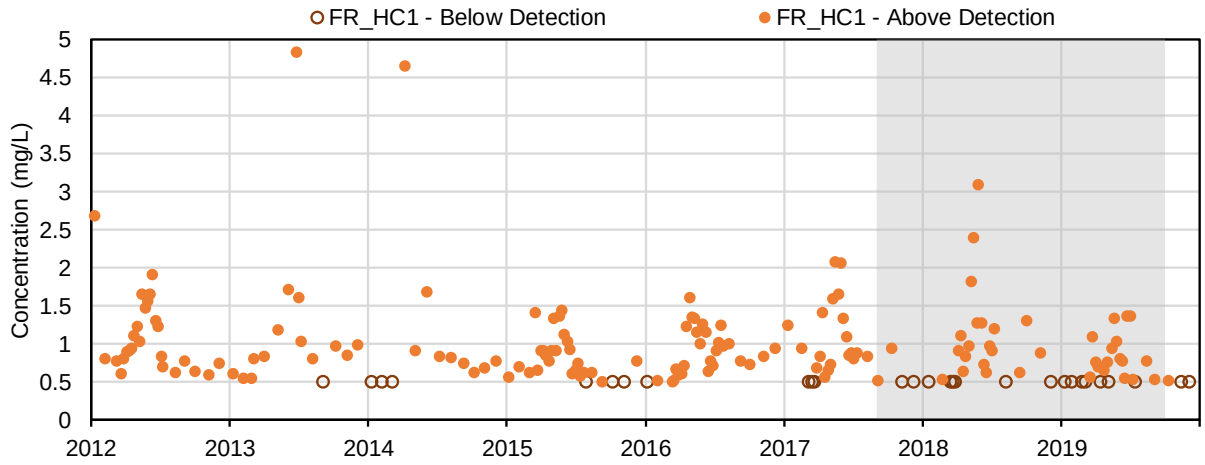
(17) Total dissolved solids (mg/L); Conventional Parameters



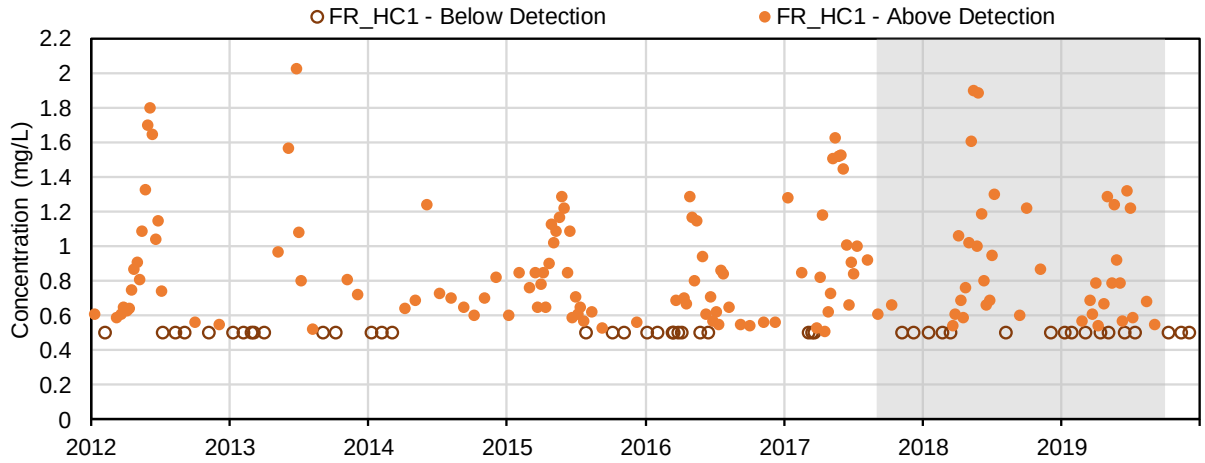
(18) Total suspended solids (mg/L); Conventional Parameters



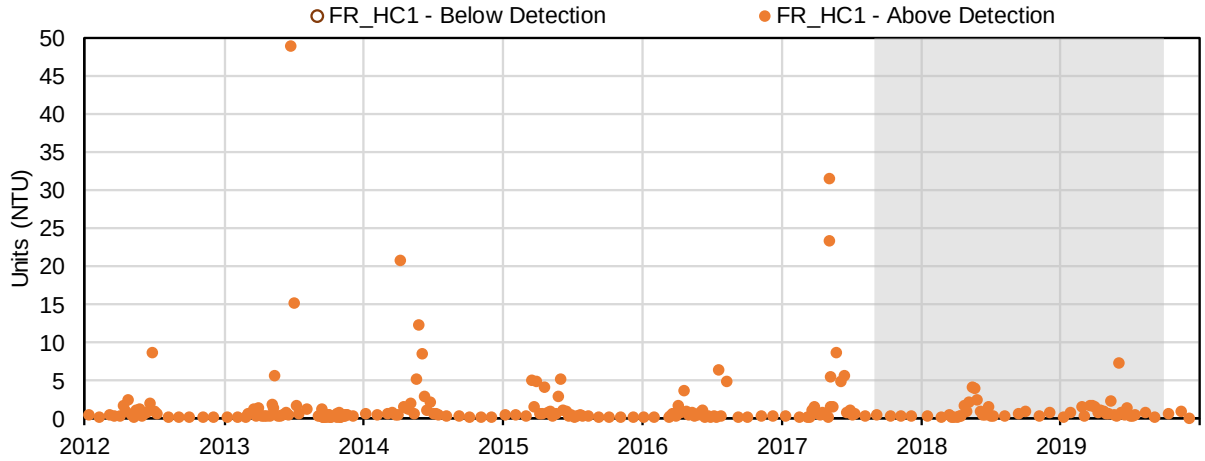
(19) Total organic carbon (mg/L); Conventional Parameters



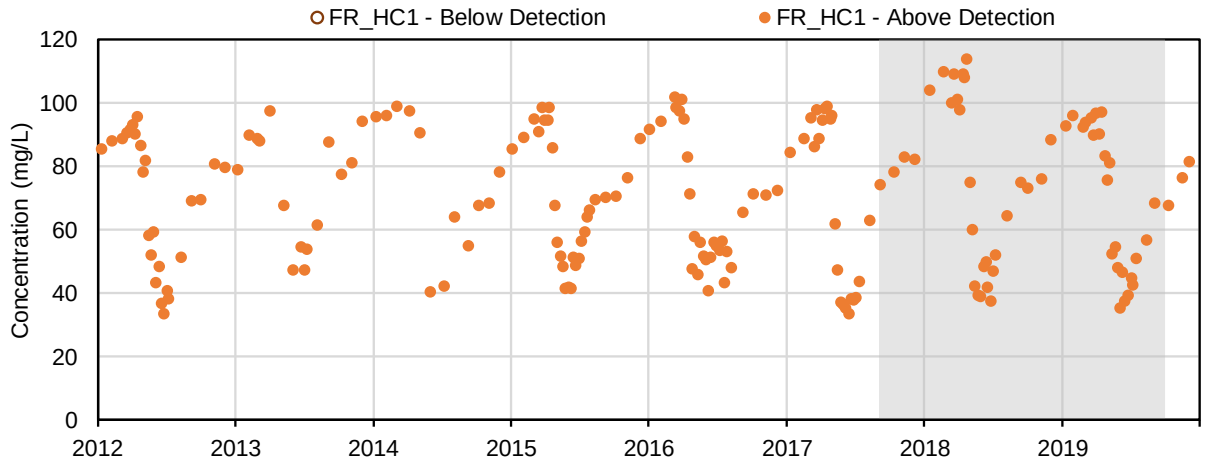
(20) Dissolved organic carbon (mg/L); Conventional Parameters



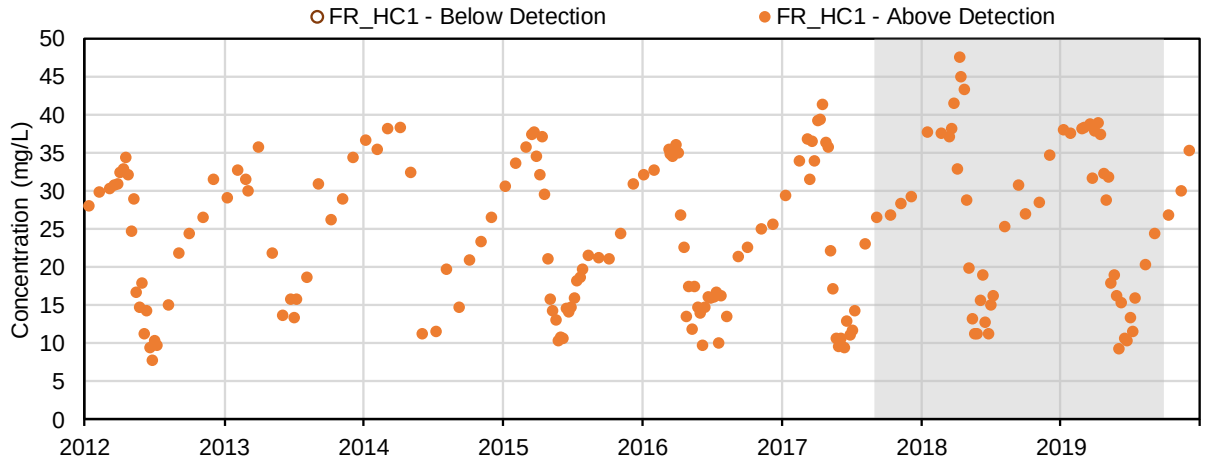
(21) Turbidity (NTU); Conventional Parameters



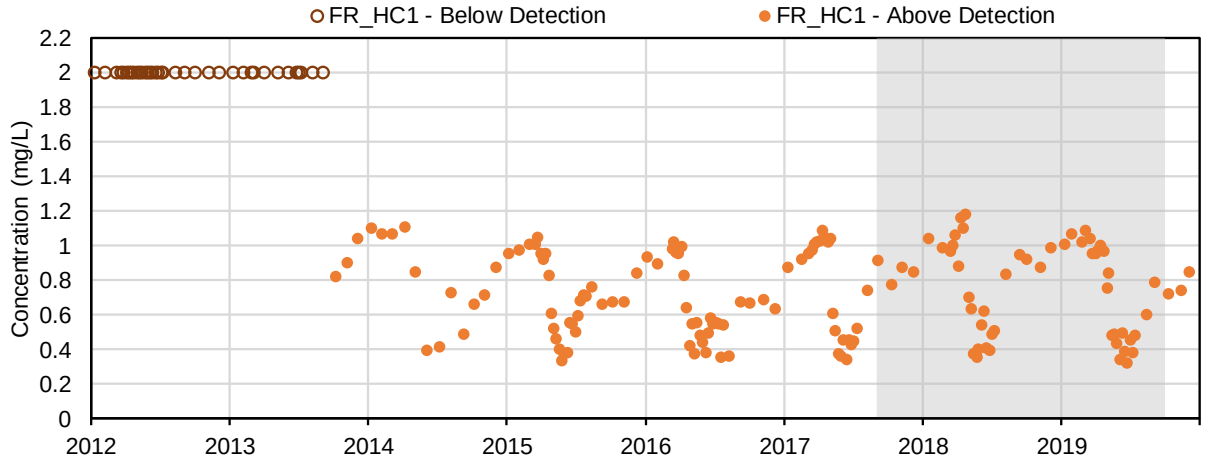
(22) Calcium (mg/L); Major Ions



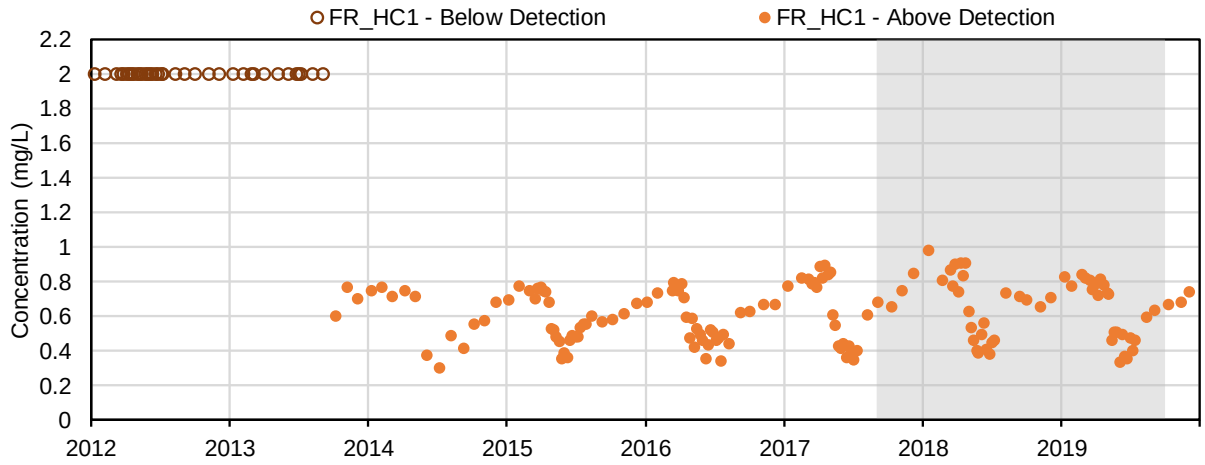
(23) Magnesium (mg/L); Major Ions



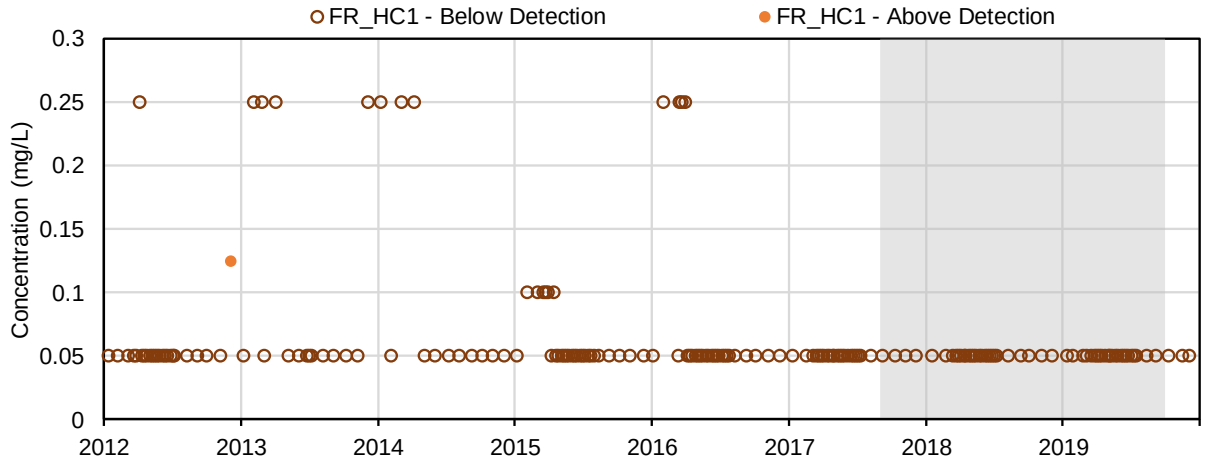
(24) Potassium (mg/L); Major Ions



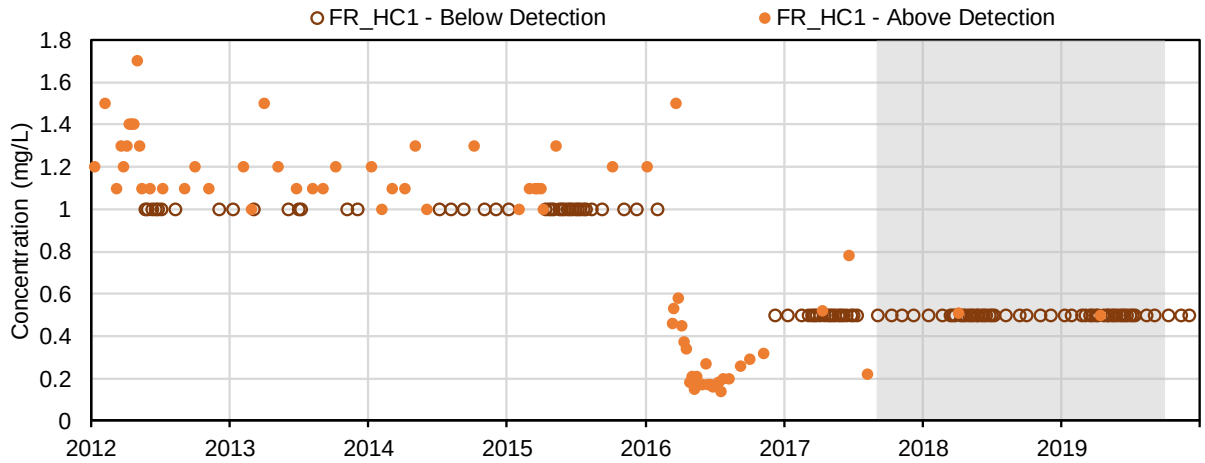
(25) Sodium (mg/L); Major Ions



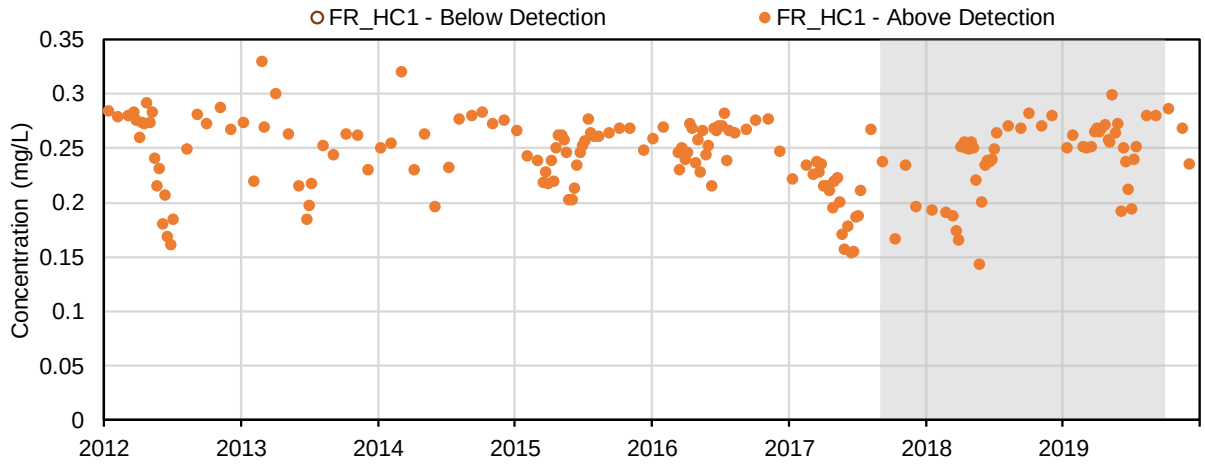
(26) Bromide (mg/L); Major Ions



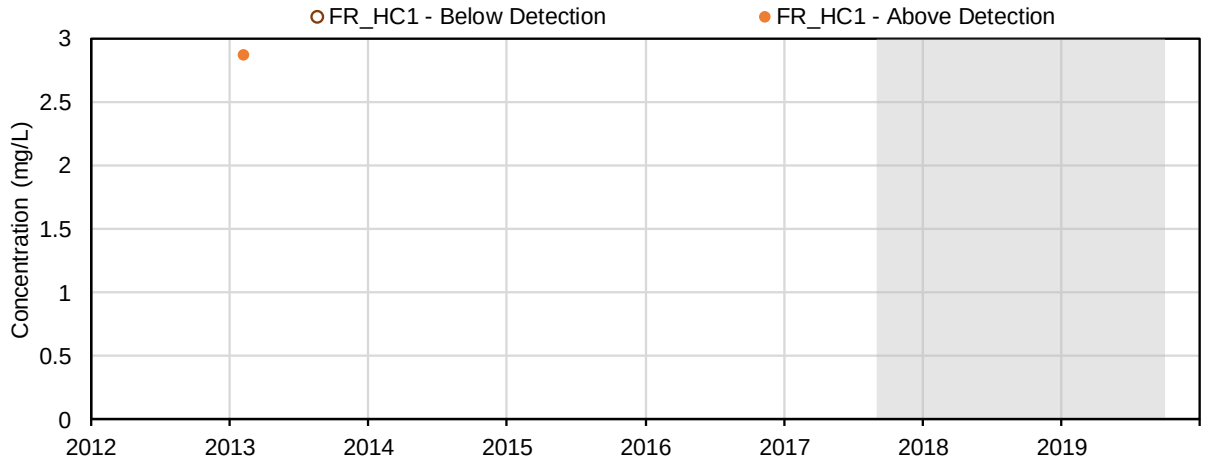
(27) Chloride (mg/L); Major Ions



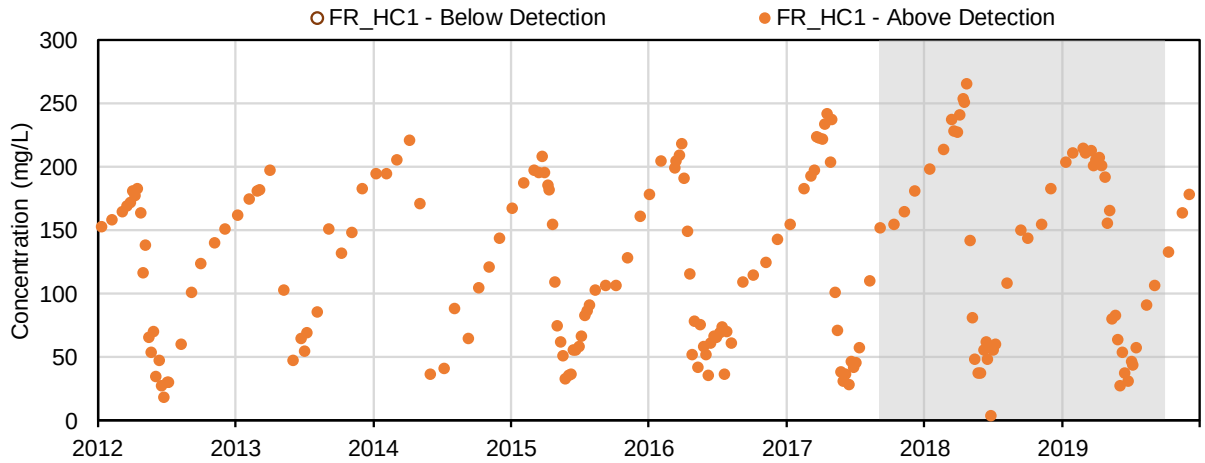
(28) Fluoride (mg/L); Major Ions



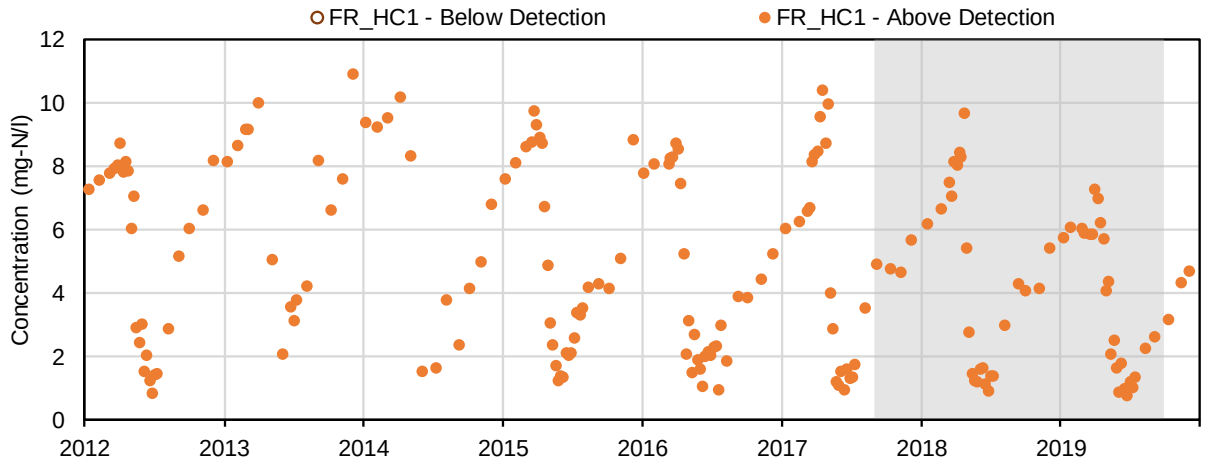
(29) Silica (mg/L); Major Ions



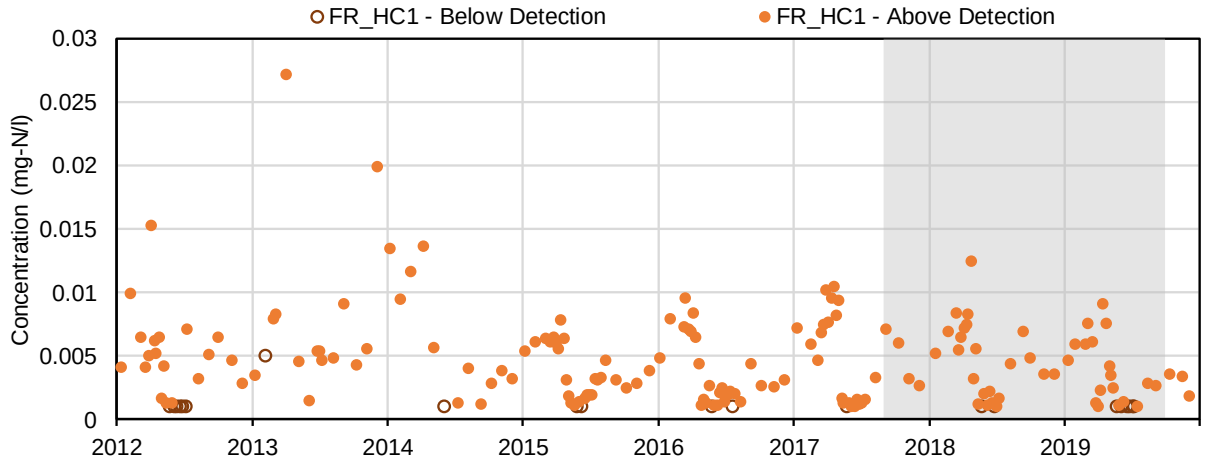
(30) Sulphate (mg/L); Major Ions



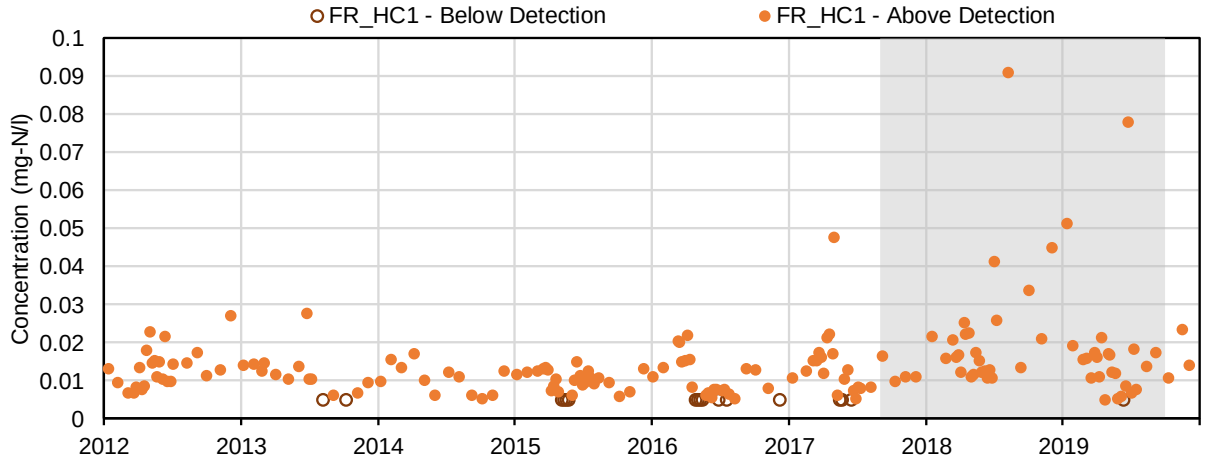
(31) Nitrate (mg-N/l); Nutrients and Biological Indicators



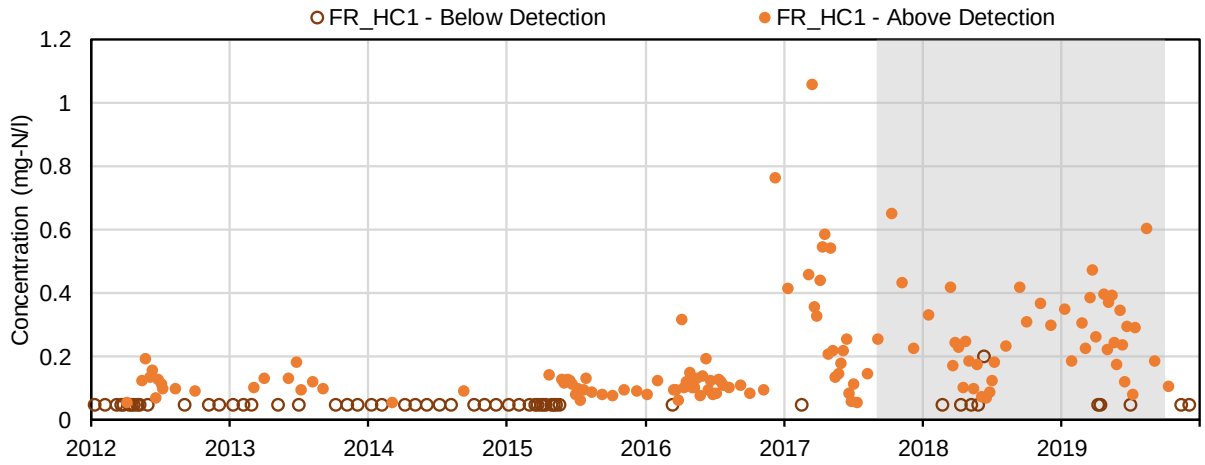
(32) Nitrite (mg-N/l); Nutrients and Biological Indicators



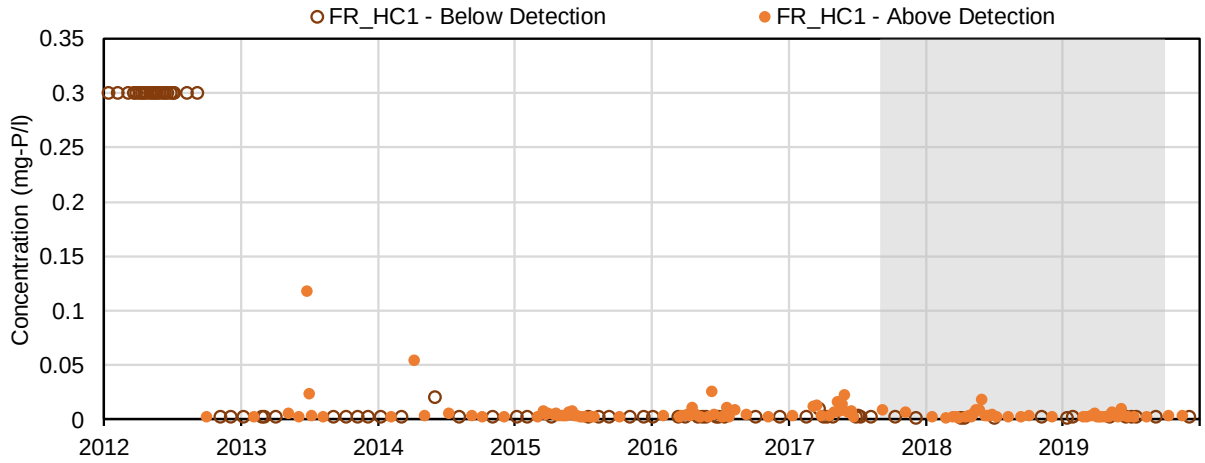
(33) Total ammonia (mg-N/l); Nutrients and Biological Indicators



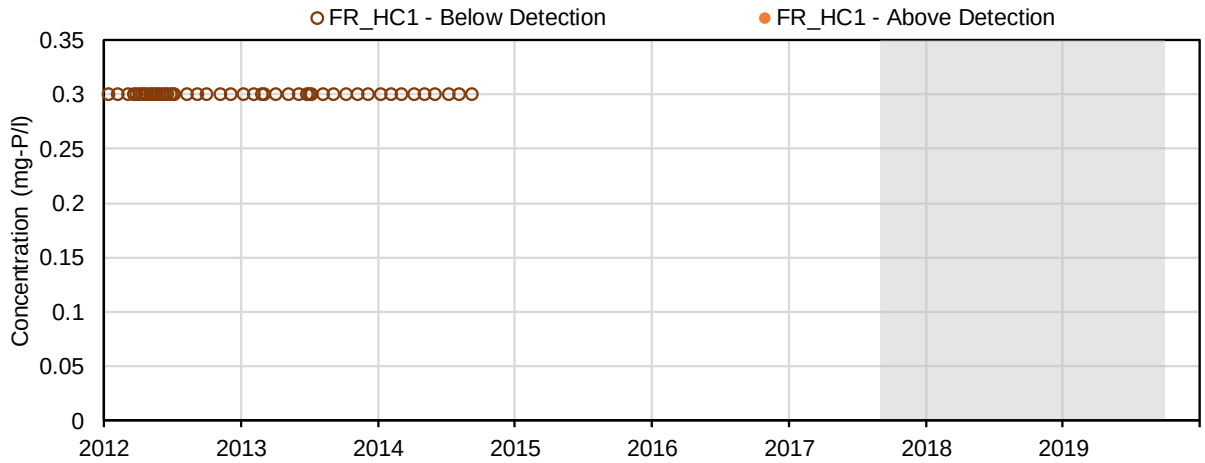
(34) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



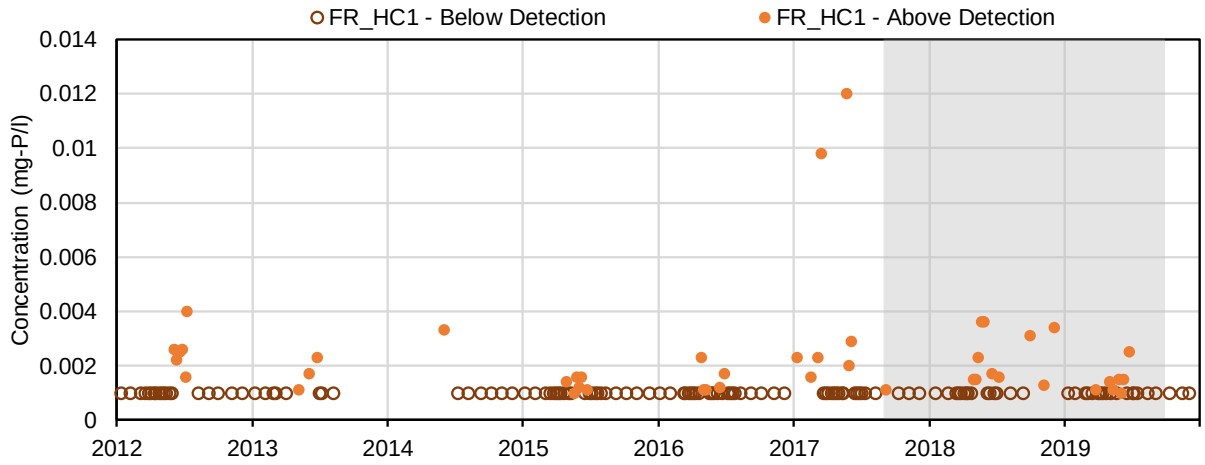
(35) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



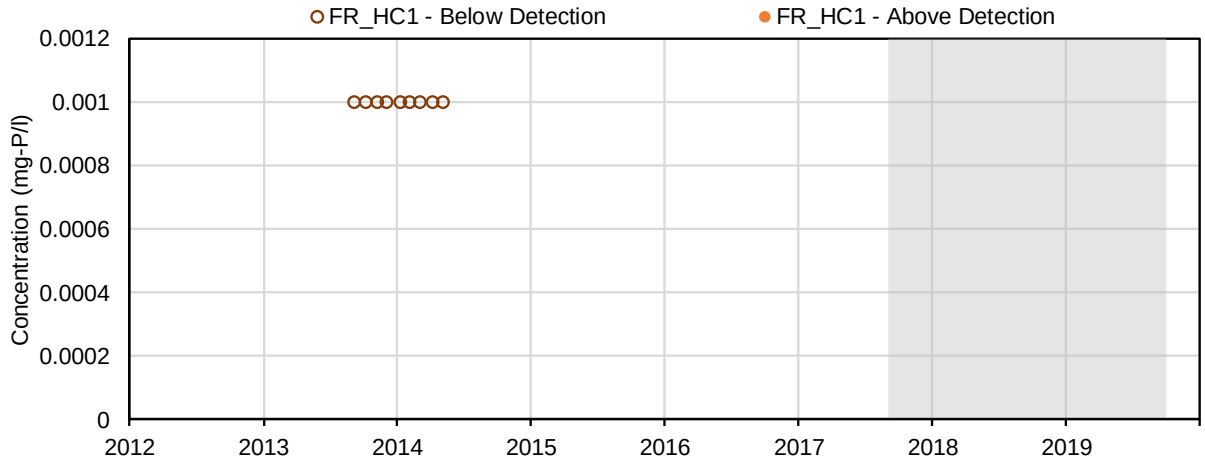
(36) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



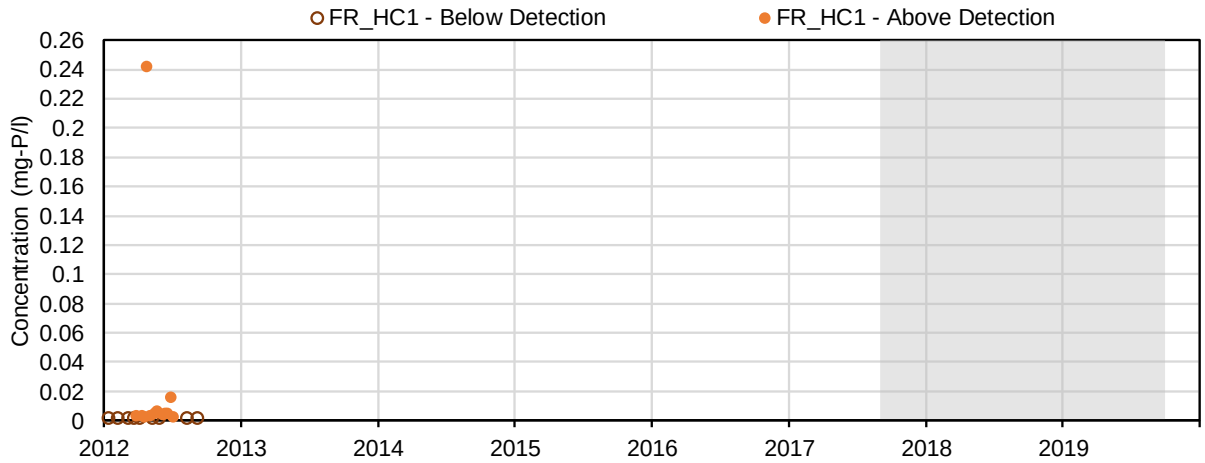
(37) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



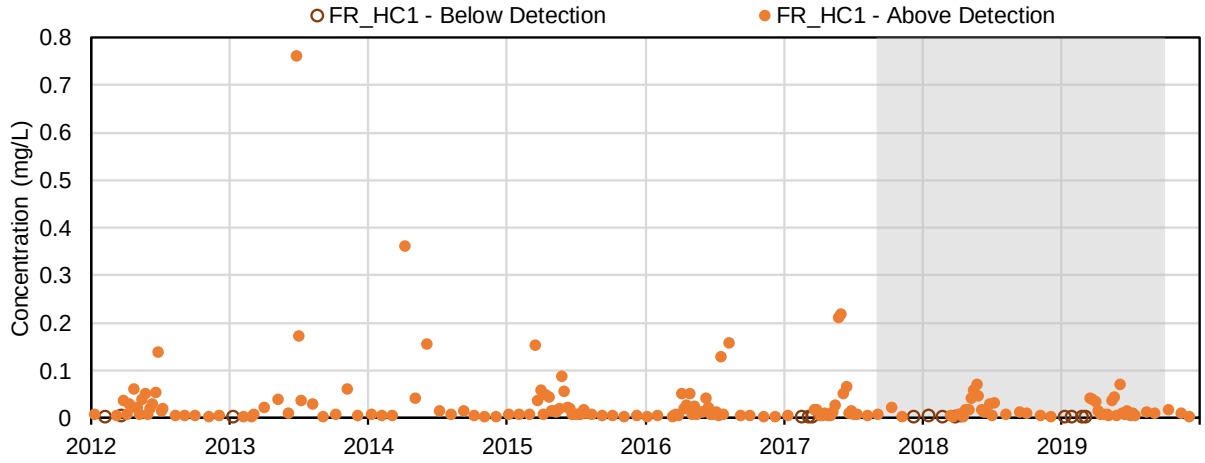
(38) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



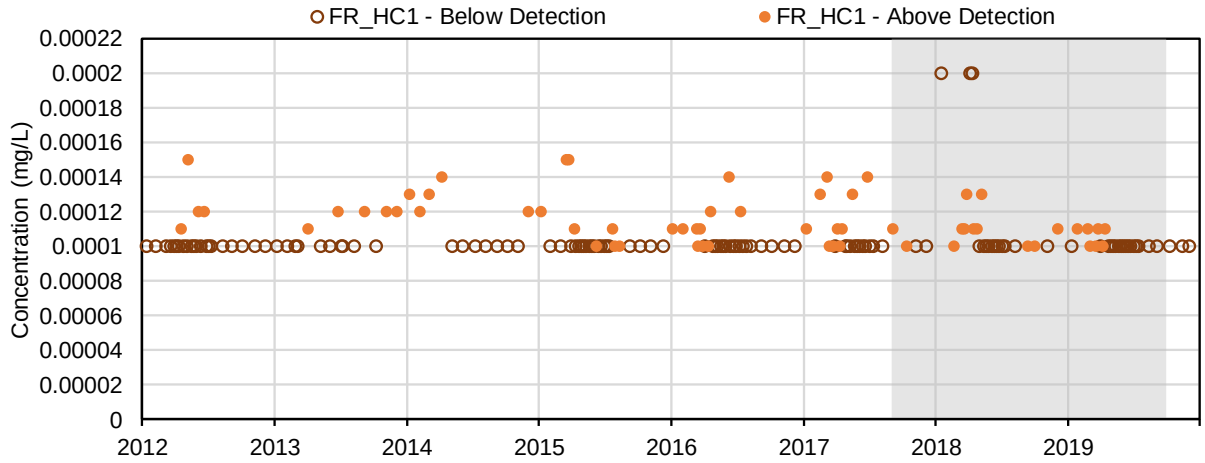
(39) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



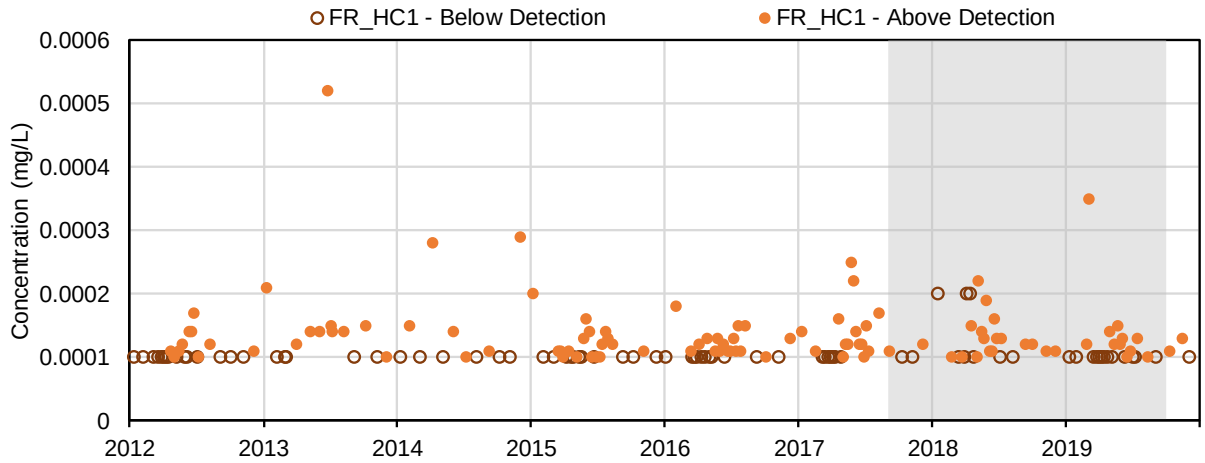
(40) Aluminum (mg/L); Total Metals



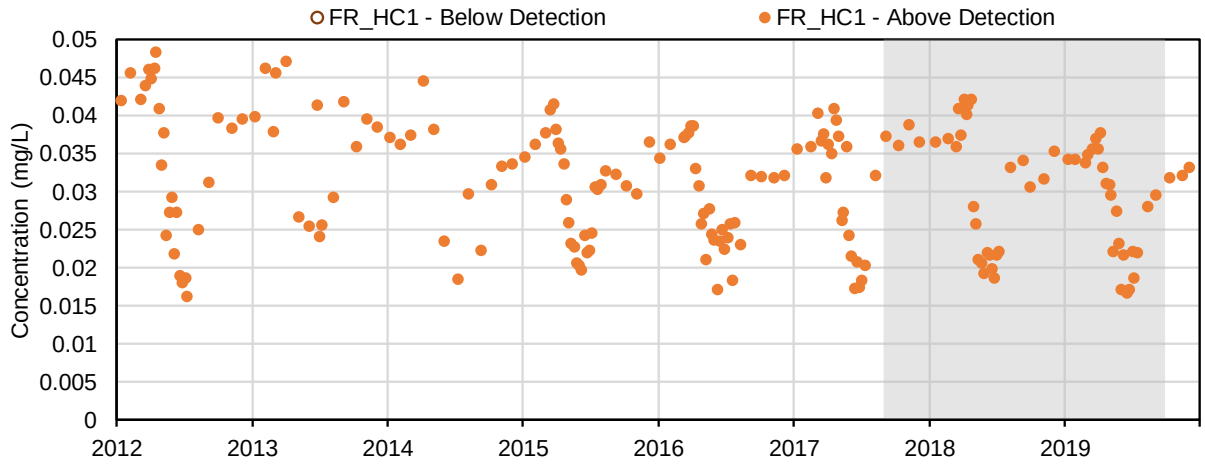
(41) Antimony (mg/L); Total Metals



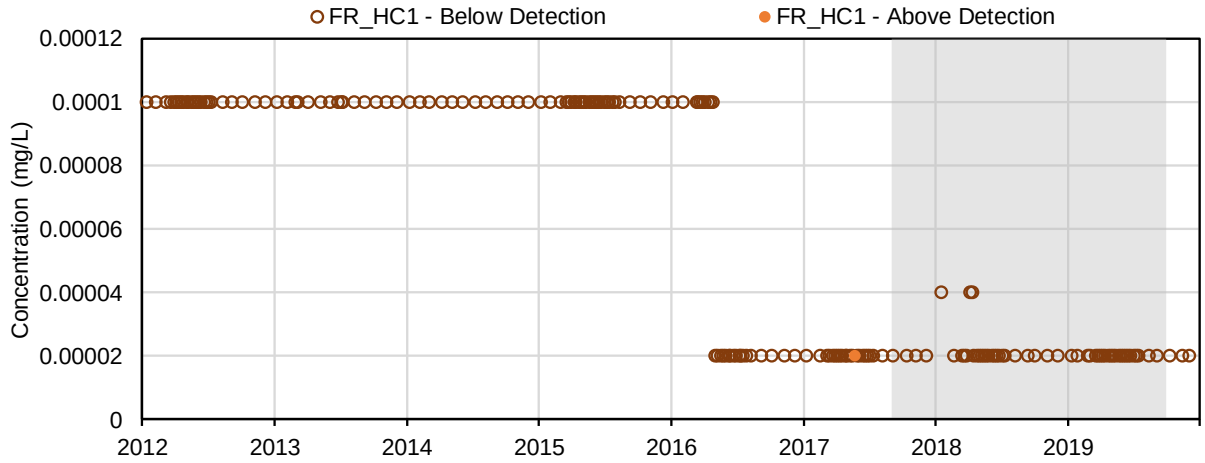
(42) Arsenic (mg/L); Total Metals



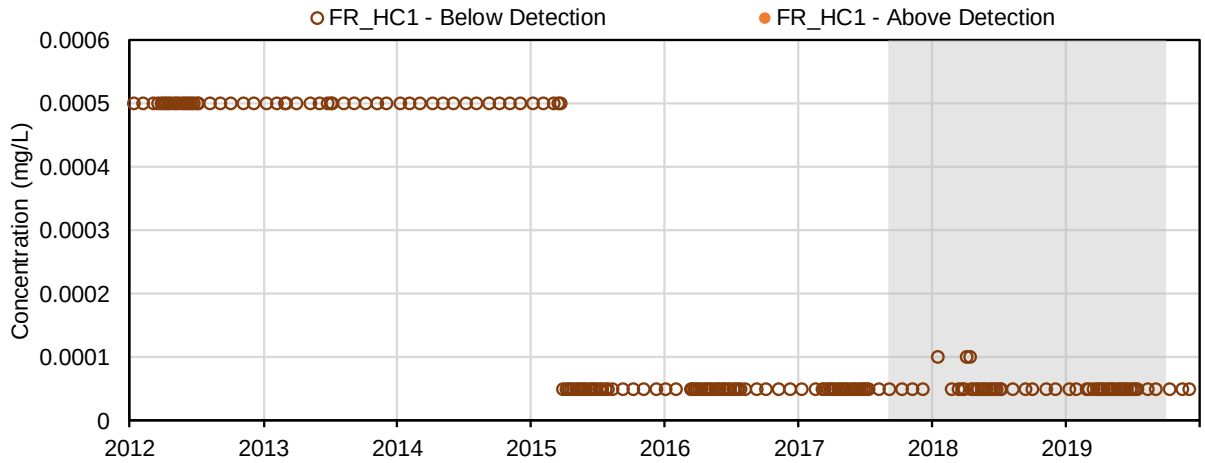
(43) Barium (mg/L); Total Metals



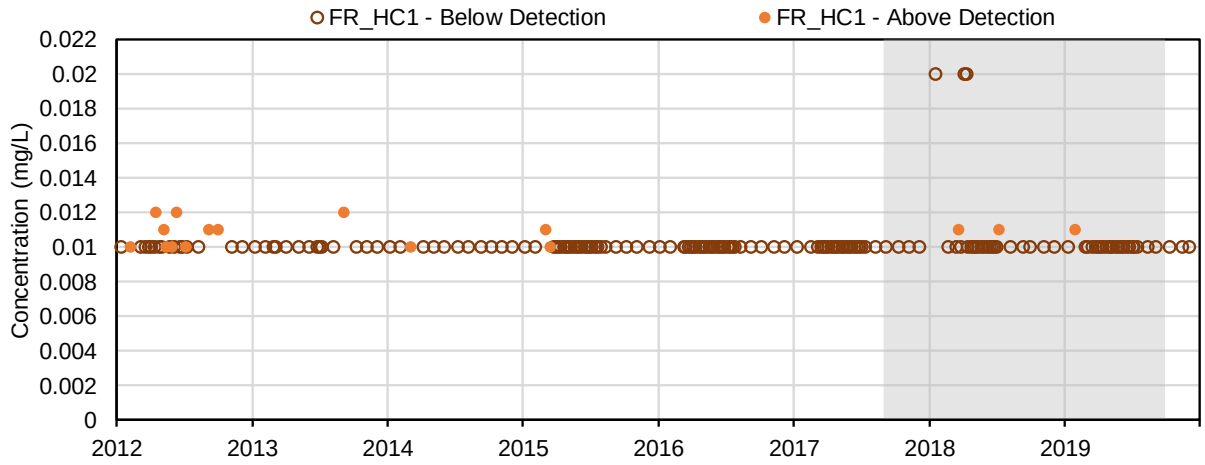
(44) Beryllium (mg/L); Total Metals



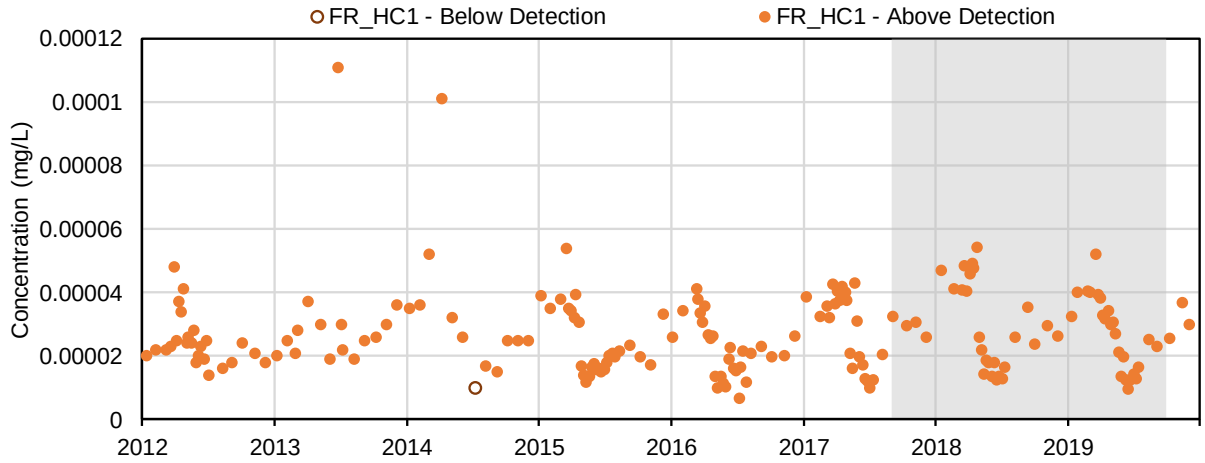
(45) Bismuth (mg/L); Total Metals



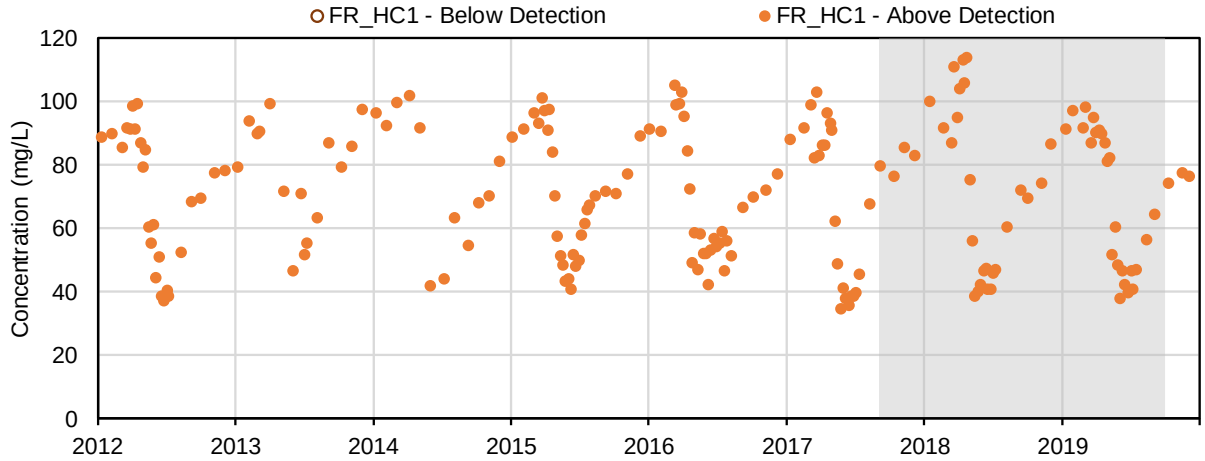
(46) Boron (mg/L); Total Metals



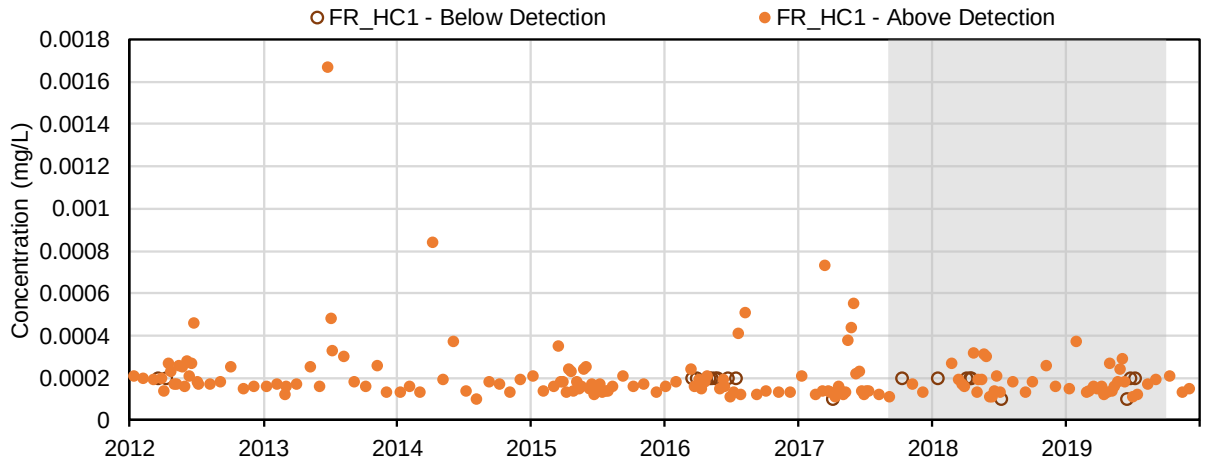
(47) Cadmium (mg/L); Total Metals



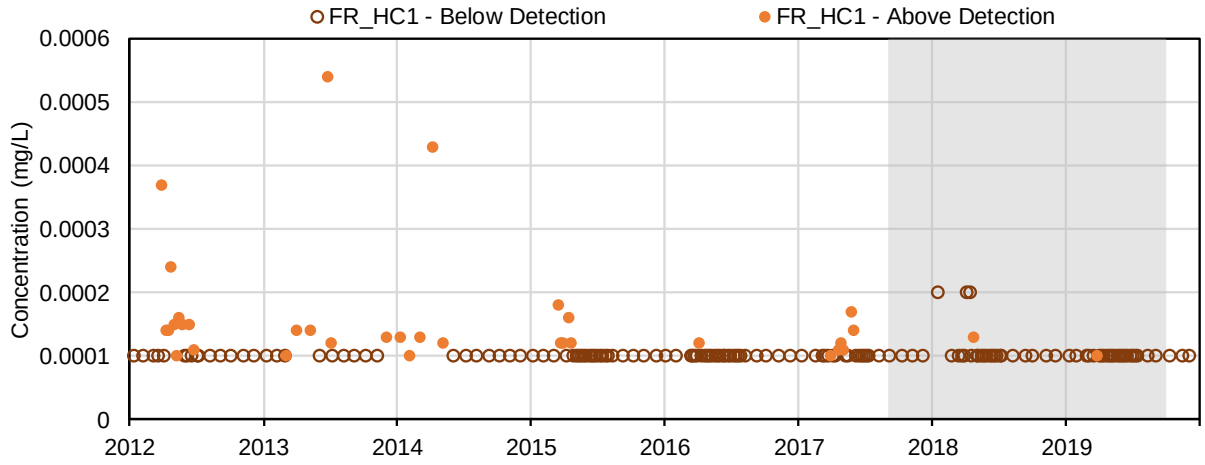
(48) Calcium (mg/L); Total Metals



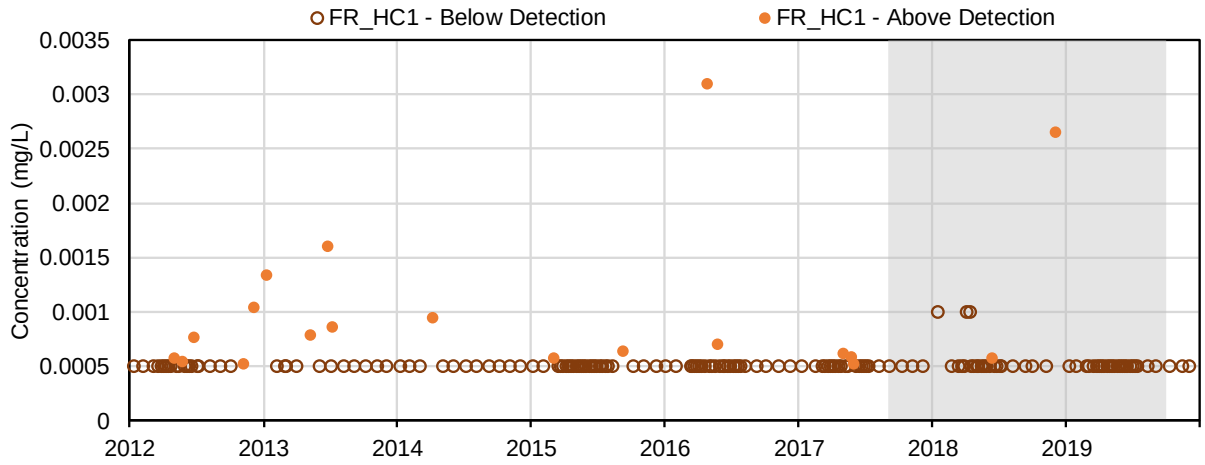
(49) Chromium (mg/L); Total Metals



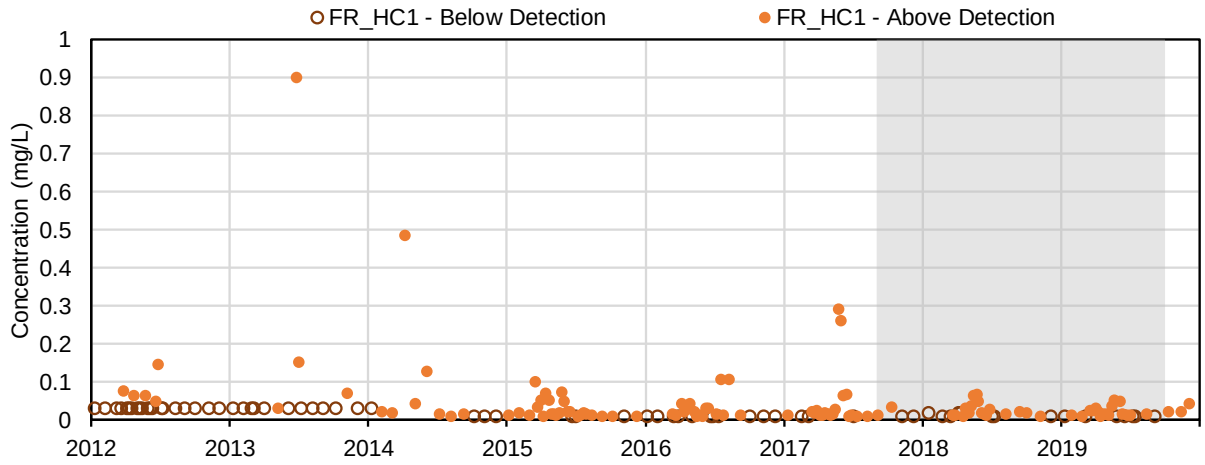
(50) Cobalt (mg/L); Total Metals



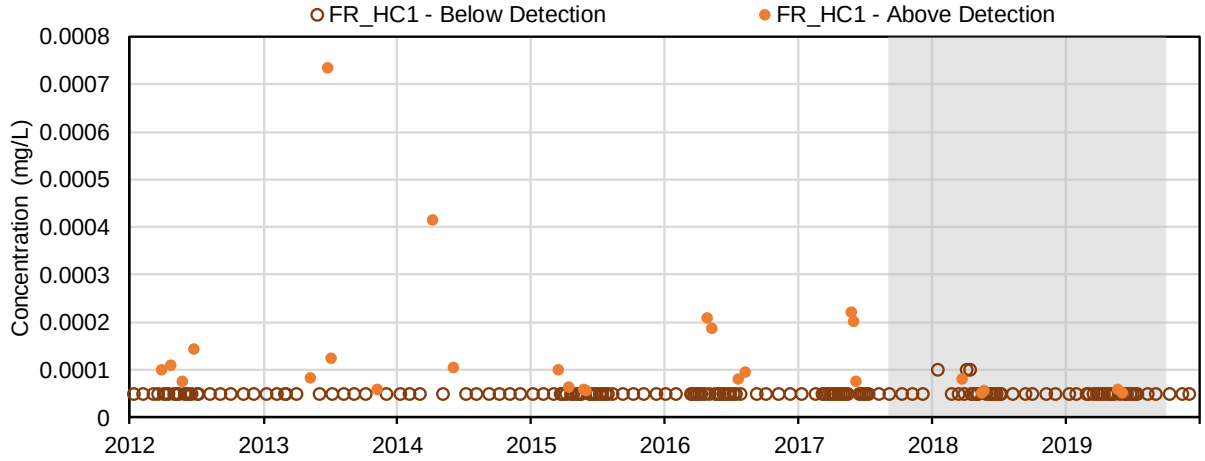
(51) Copper (mg/L); Total Metals



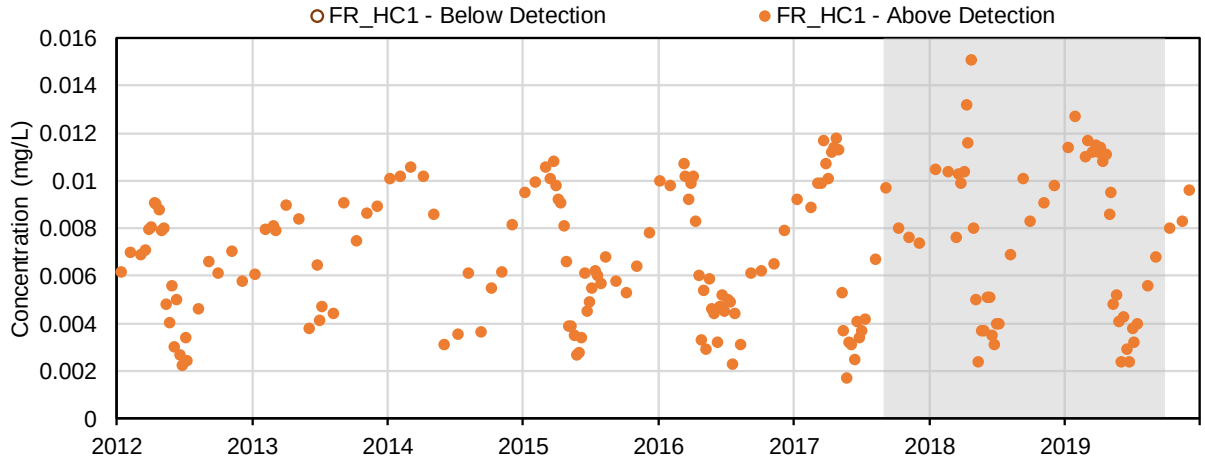
(52) Iron (mg/L); Total Metals



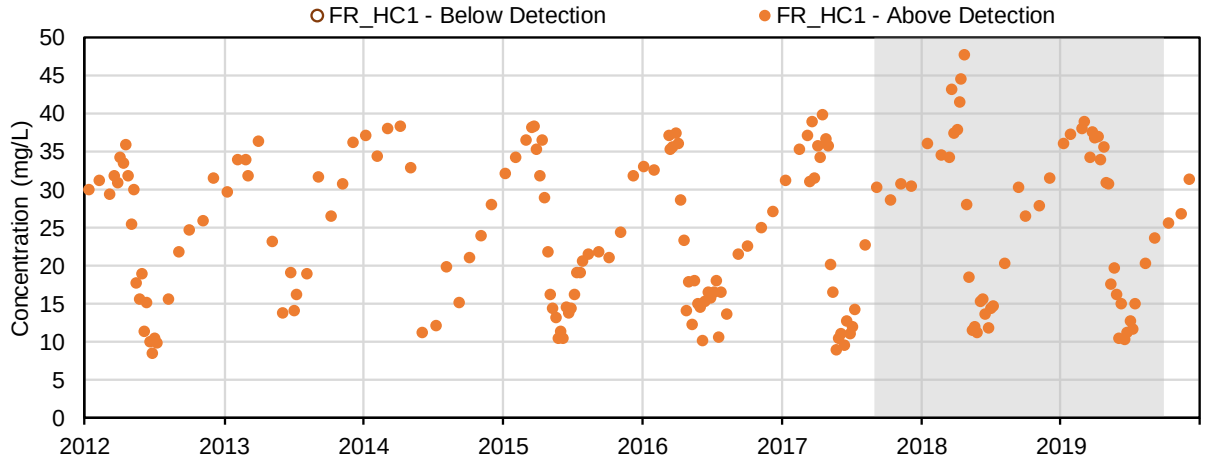
(53) Lead (mg/L); Total Metals



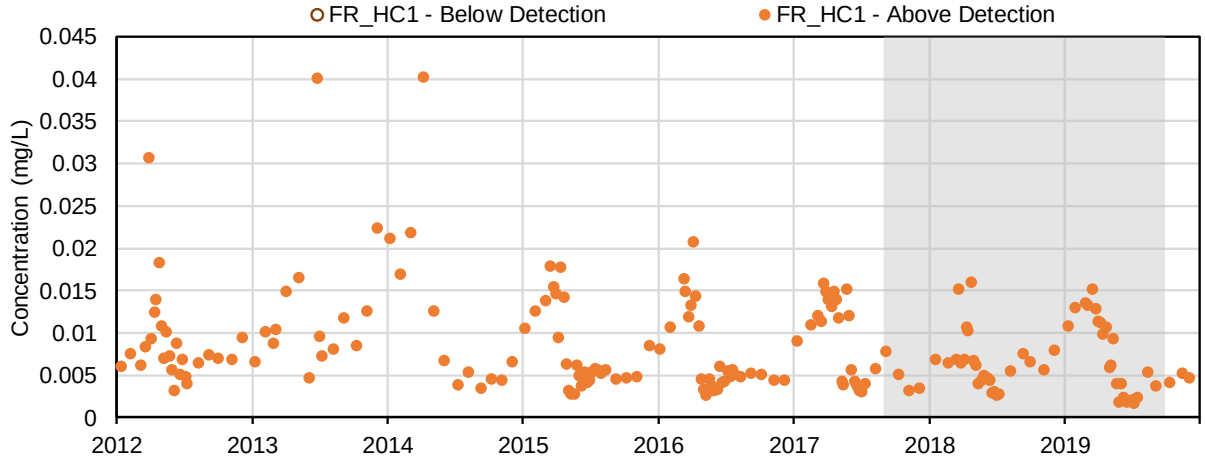
(54) Lithium (mg/L); Total Metals



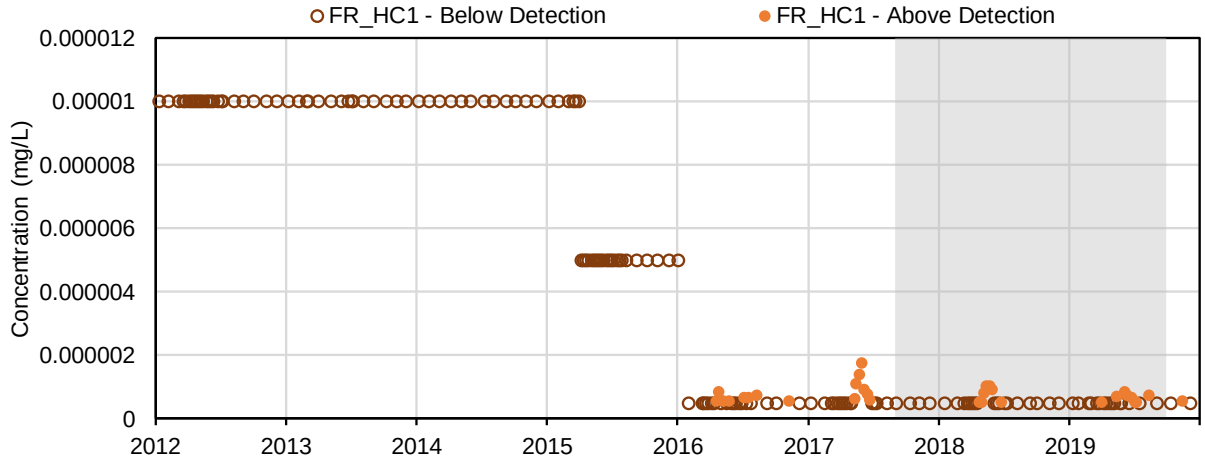
(55) Magnesium (mg/L); Total Metals



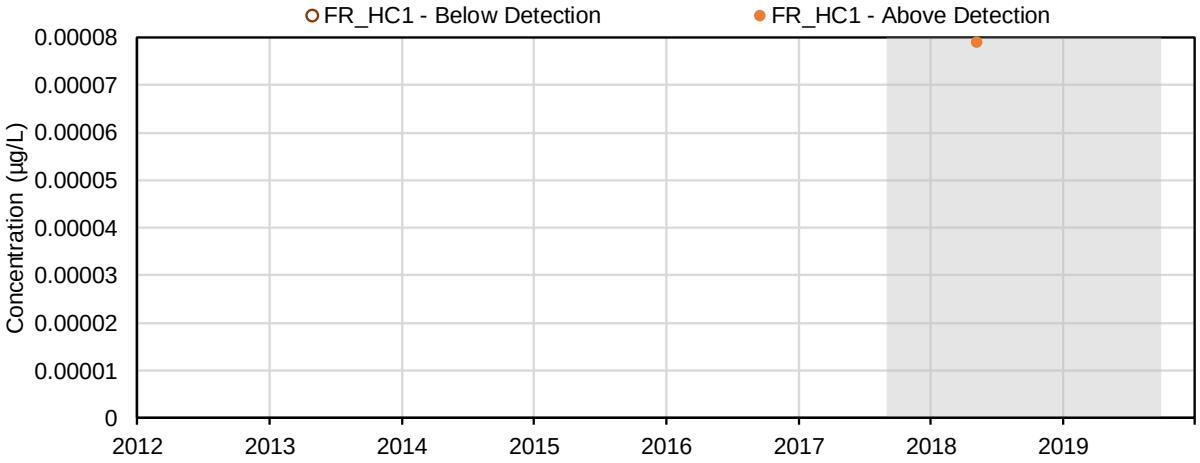
(56) Manganese (mg/L); Total Metals



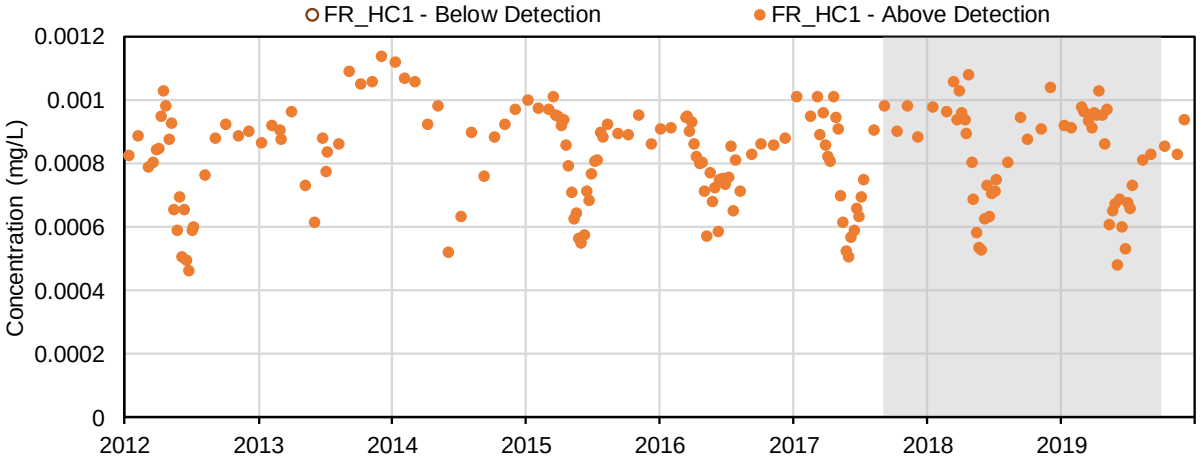
(57) Mercury (mg/L); Total Metals



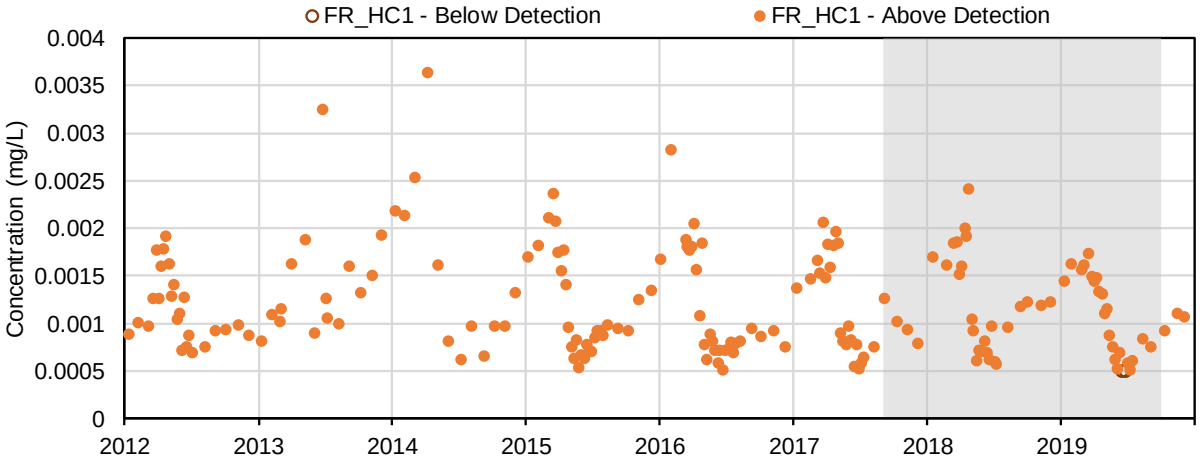
(58) Methyl mercury (µg/L); Total Metals



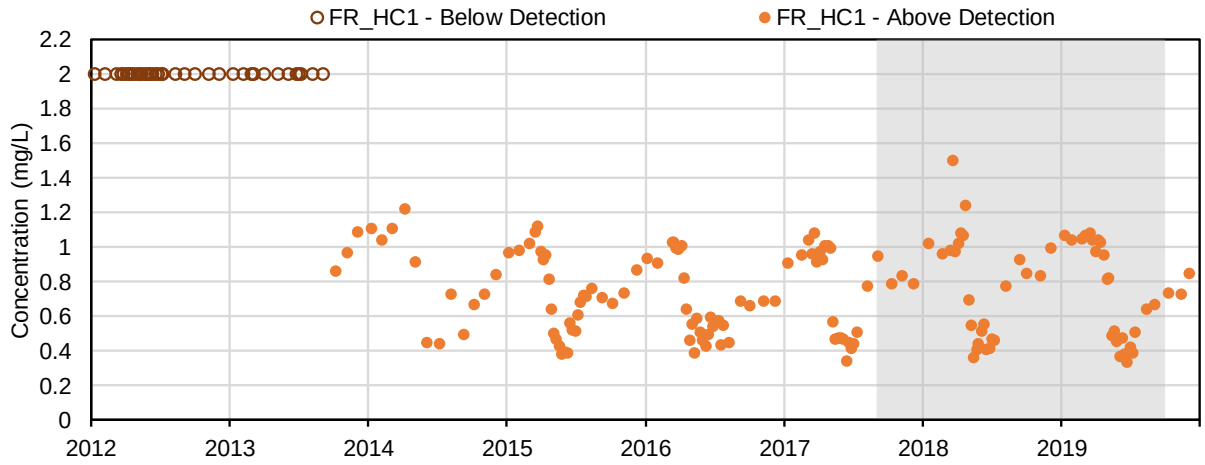
(59) Molybdenum (mg/L); Total Metals



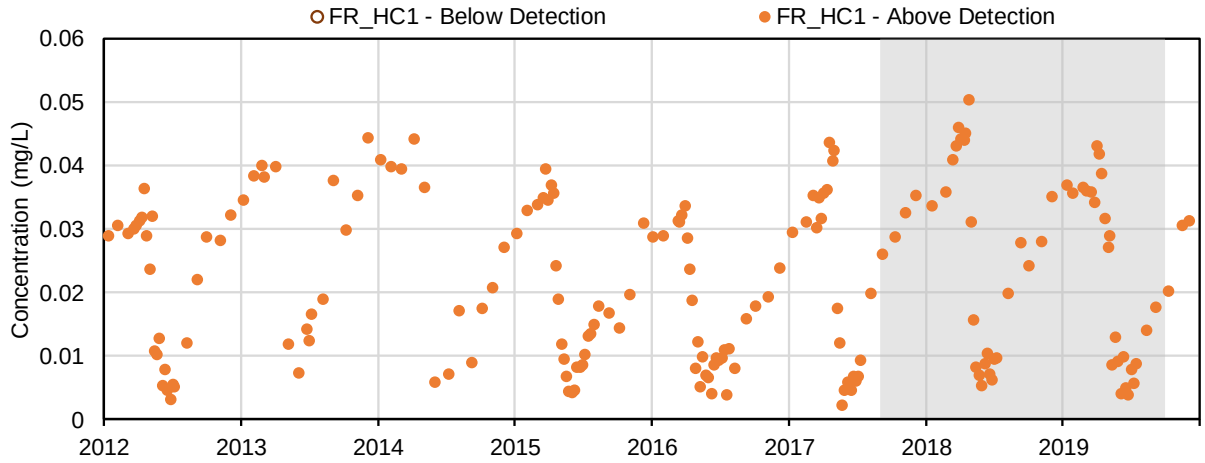
(60) Nickel (mg/L); Total Metals



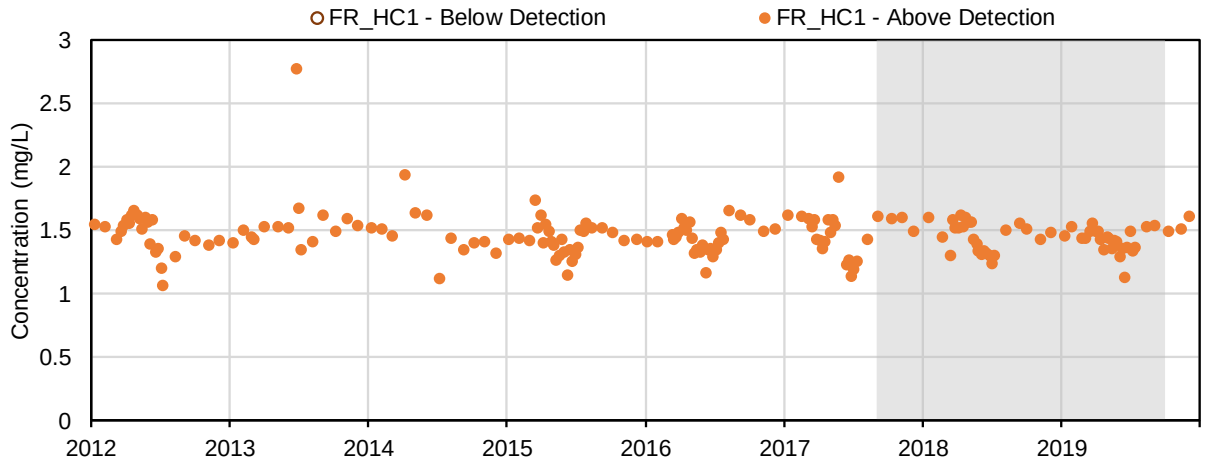
(61) Potassium (mg/L); Total Metals



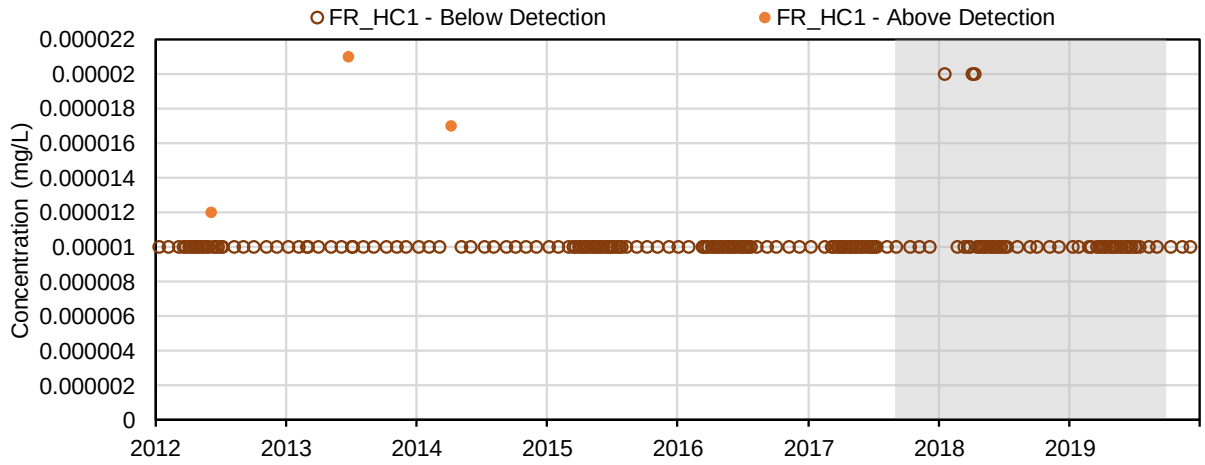
(62) Selenium (mg/L); Total Metals



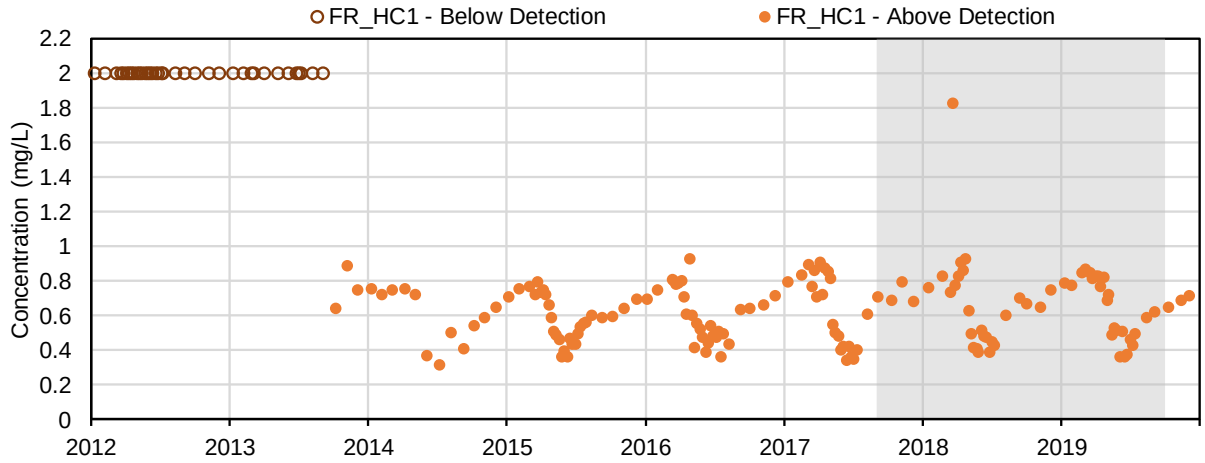
(63) Silicon (mg/L); Total Metals



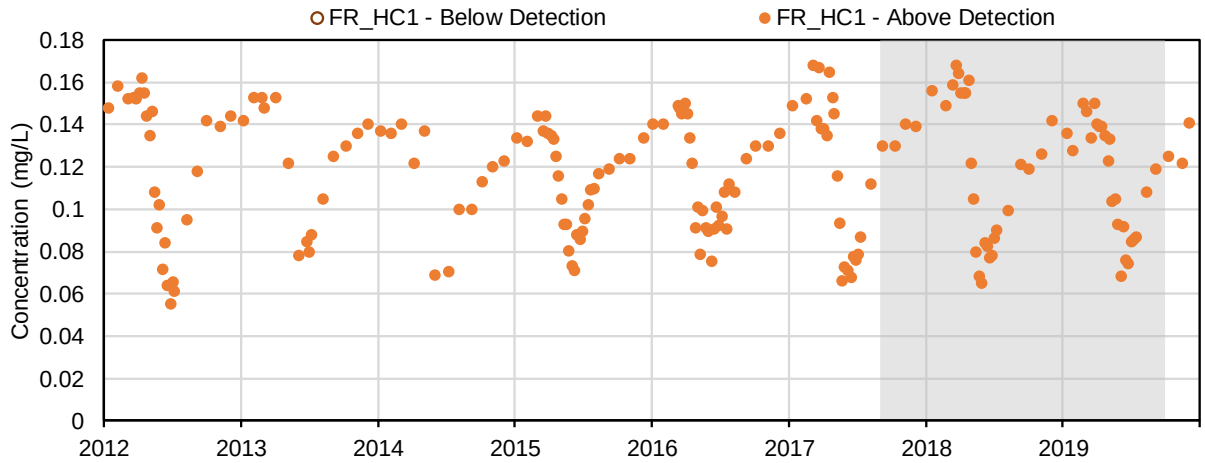
(64) Silver (mg/L); Total Metals



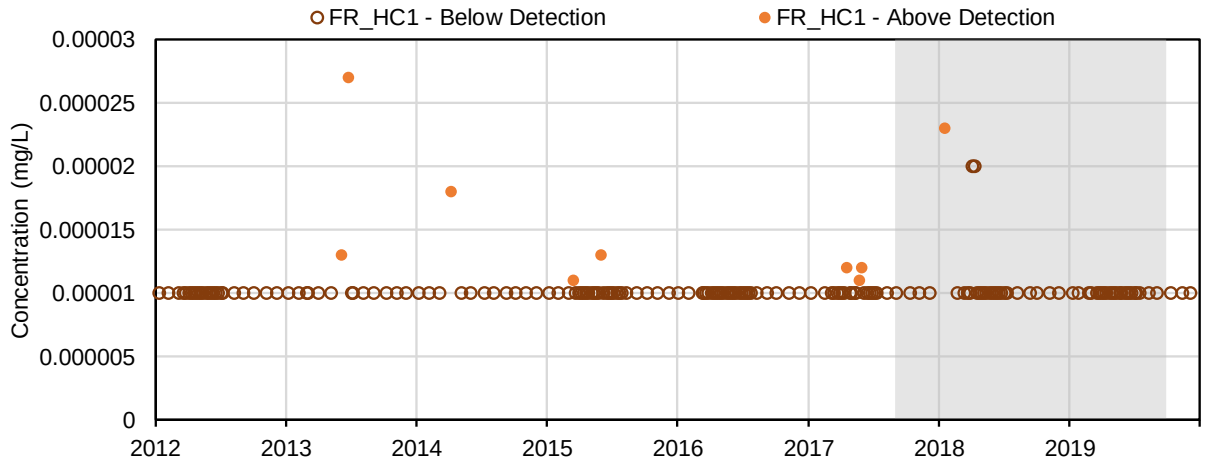
(65) Sodium (mg/L); Total Metals



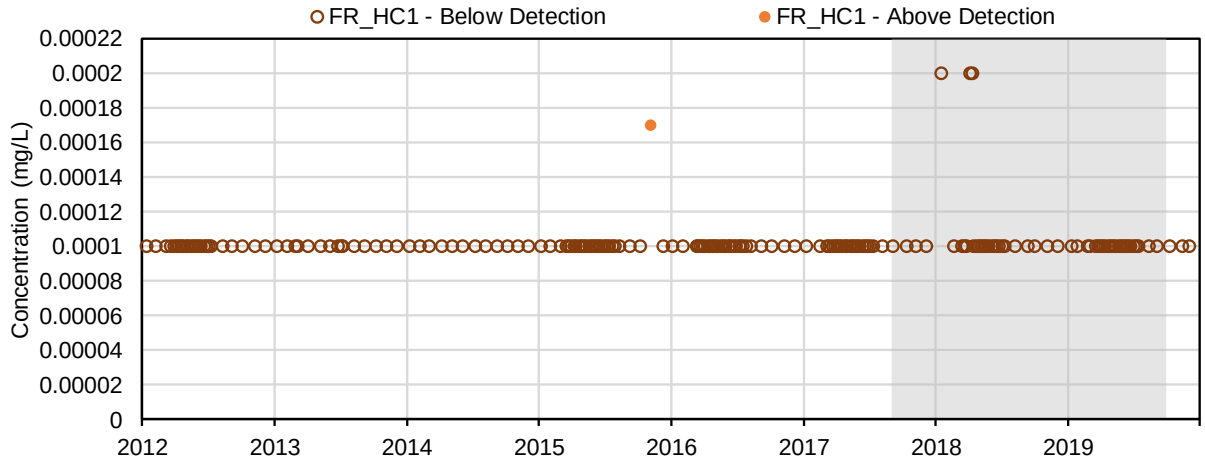
(66) Strontium (mg/L); Total Metals



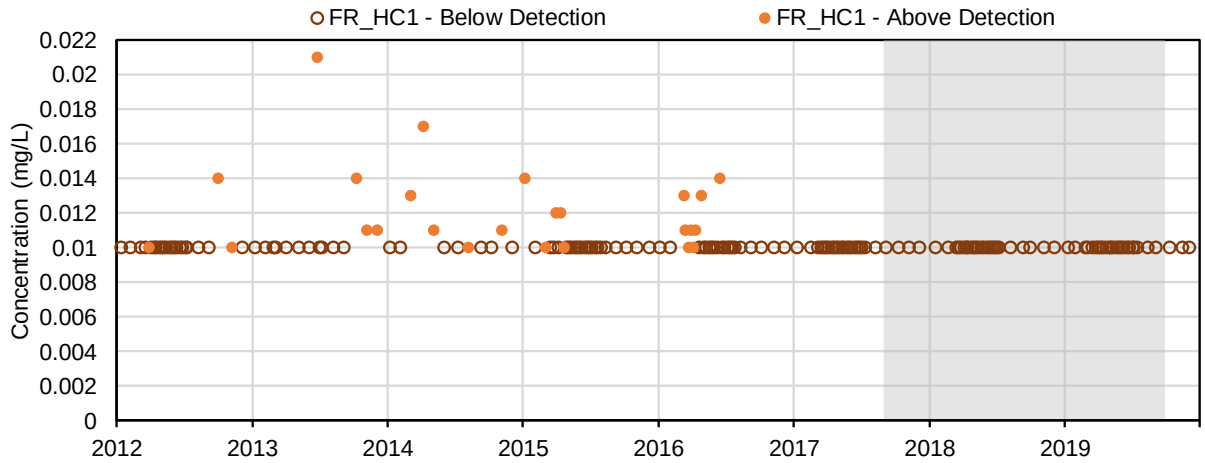
(67) Thallium (mg/L); Total Metals



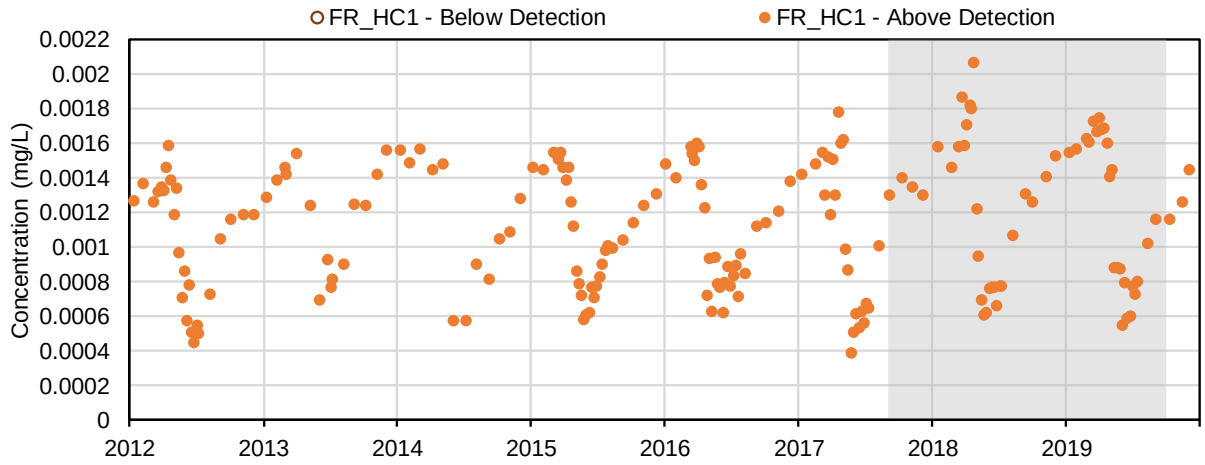
(68) Tin (mg/L); Total Metals



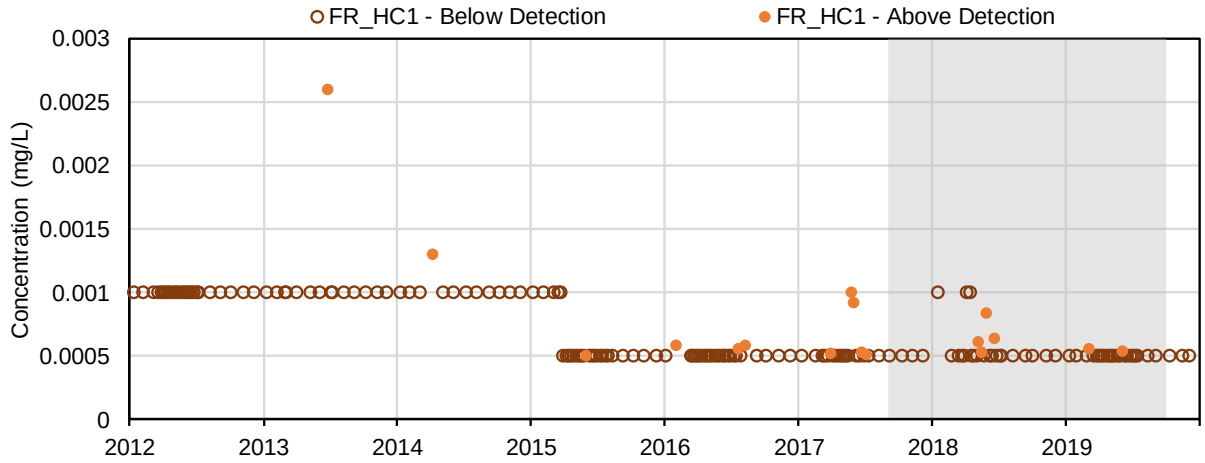
(69) Titanium (mg/L); Total Metals



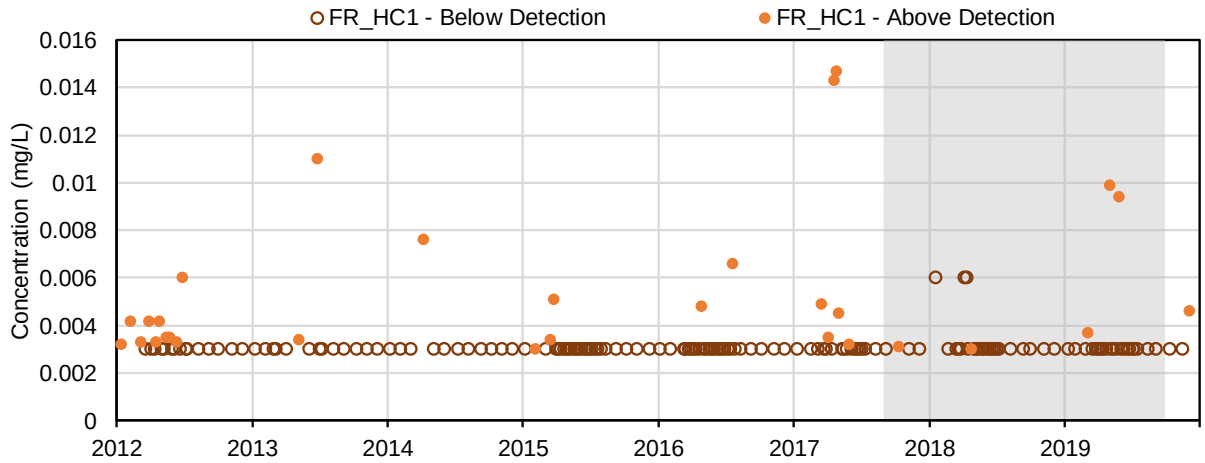
(70) Uranium (mg/L); Total Metals



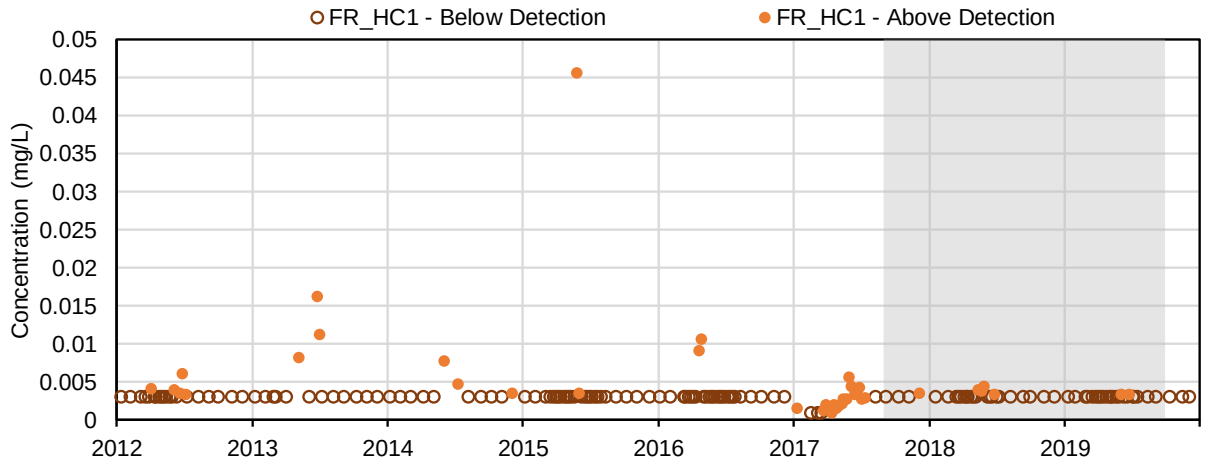
(71) Vanadium (mg/L); Total Metals



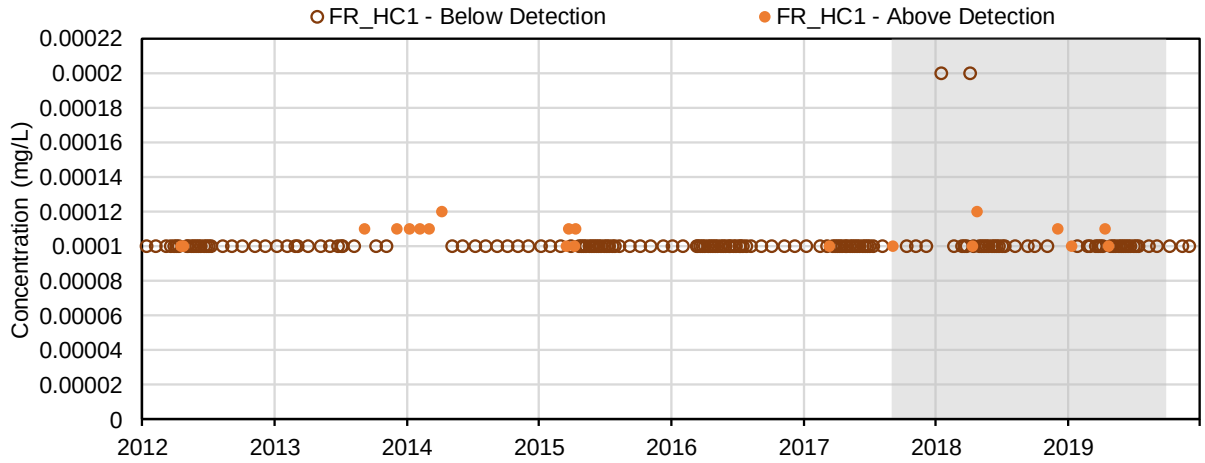
(72) Zinc (mg/L); Total Metals



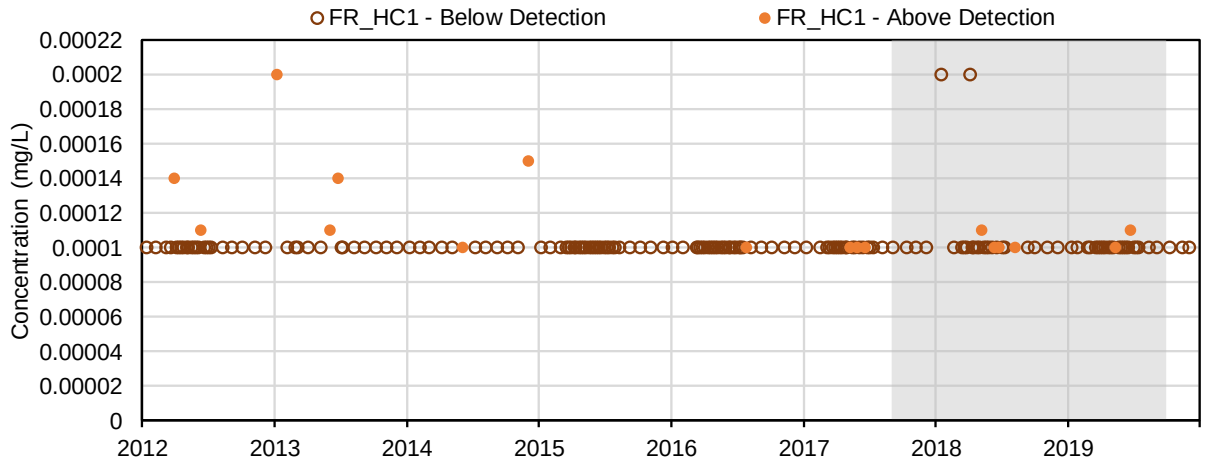
(73) Aluminum (mg/L); Dissolved Metals



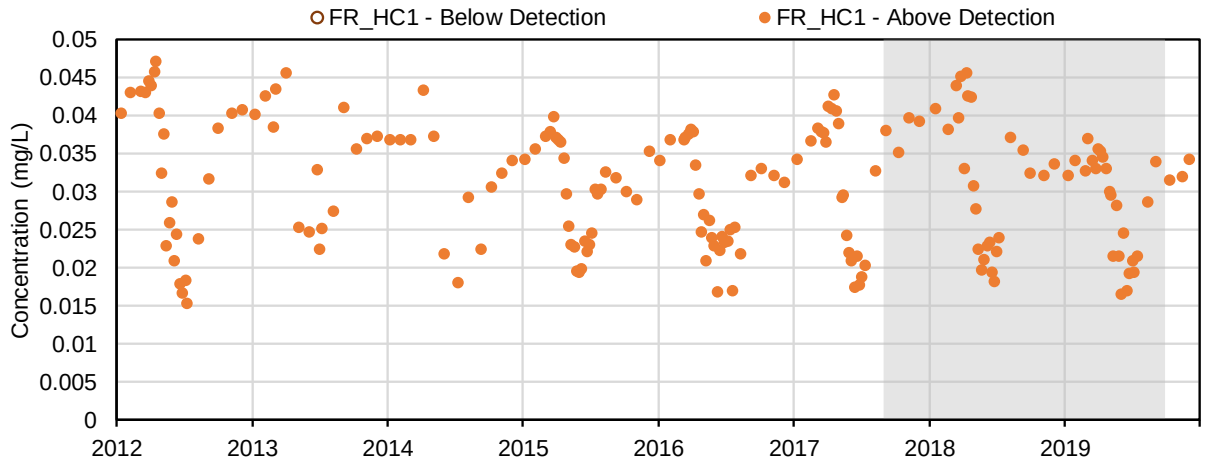
(74) Antimony (mg/L); Dissolved Metals



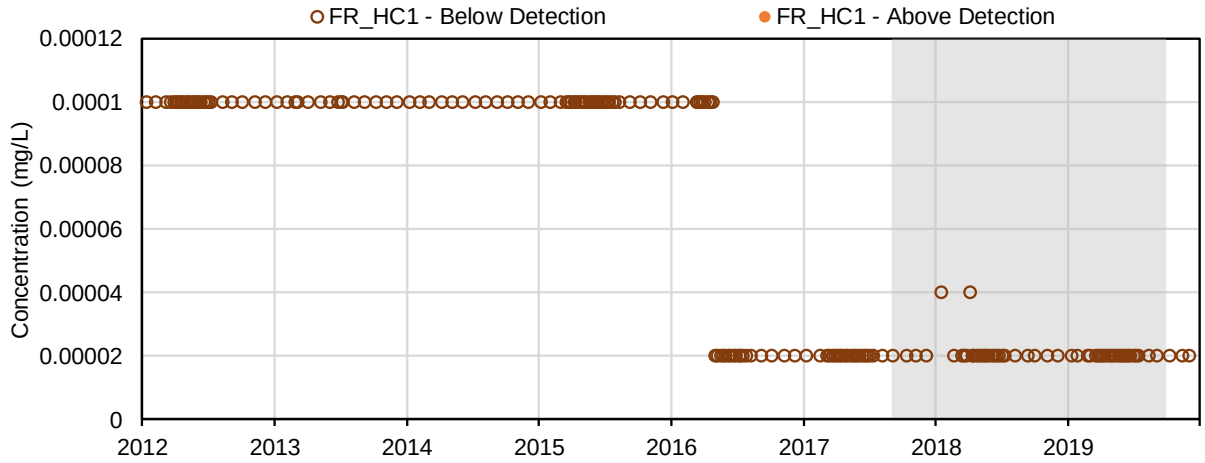
(75) Arsenic (mg/L); Dissolved Metals



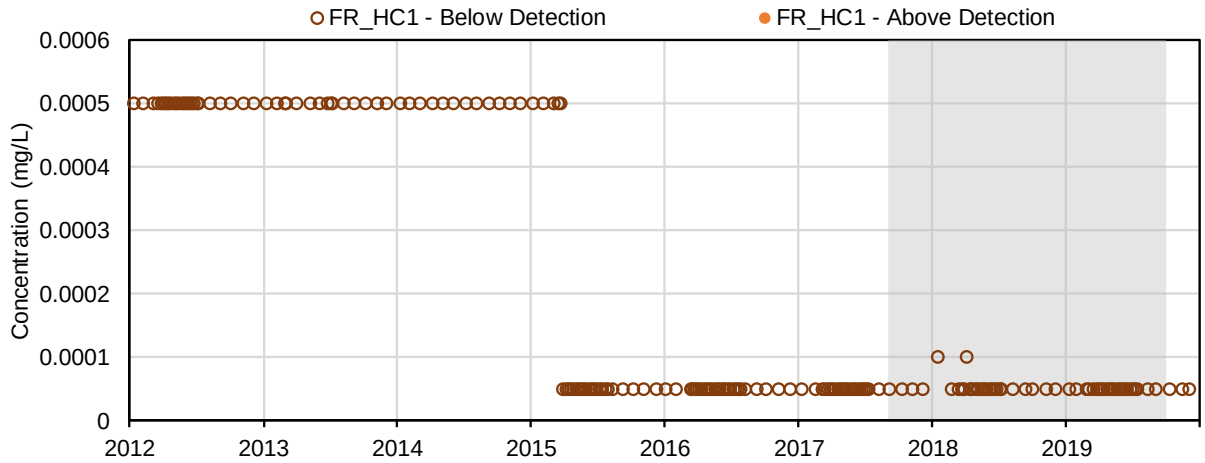
(76) Barium (mg/L); Dissolved Metals



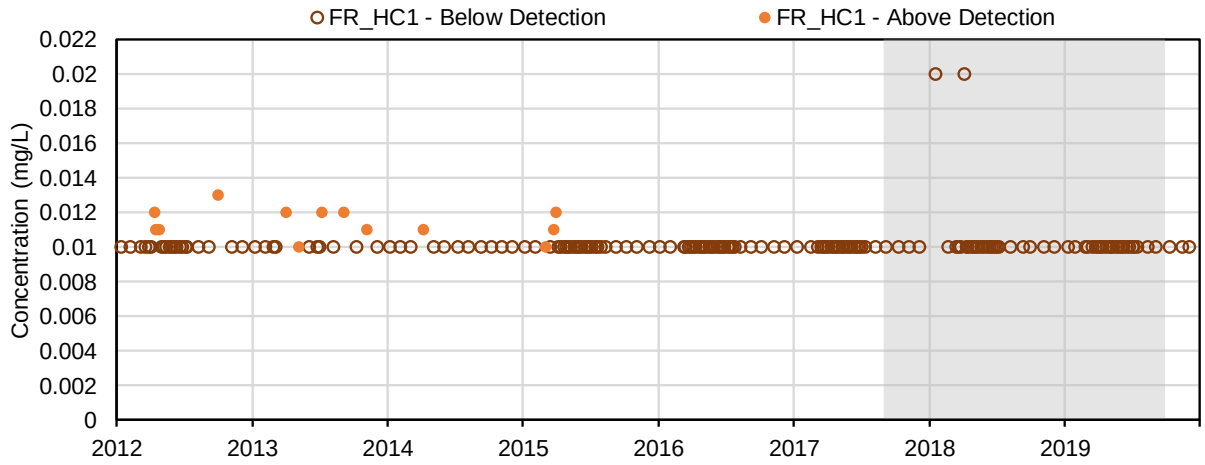
(77) Beryllium (mg/L); Dissolved Metals



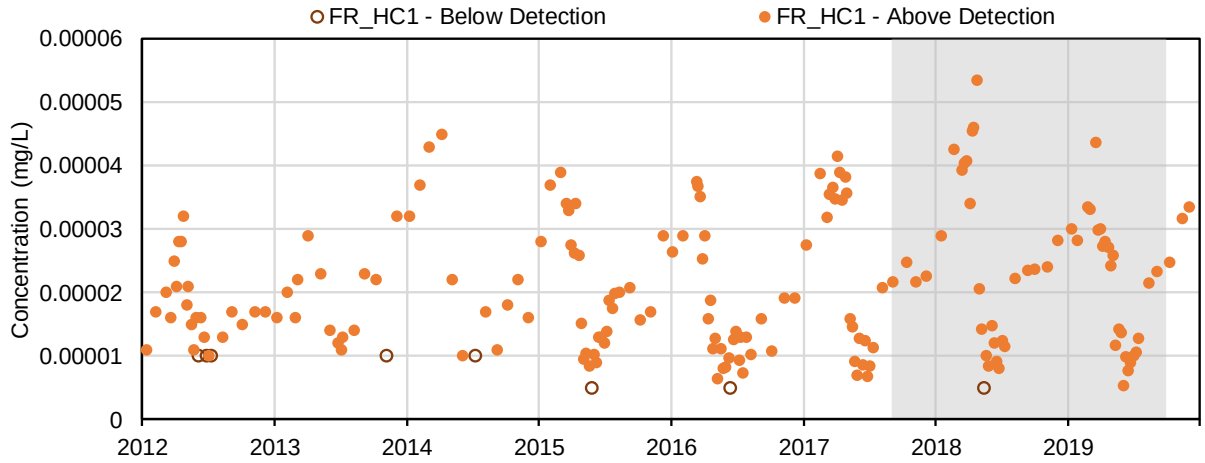
(78) Bismuth (mg/L); Dissolved Metals



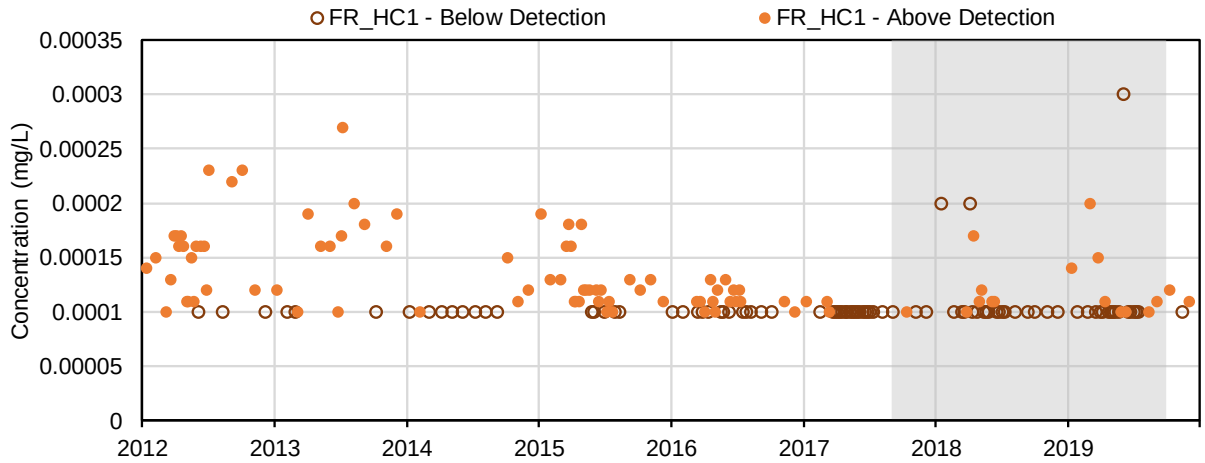
(79) Boron (mg/L); Dissolved Metals



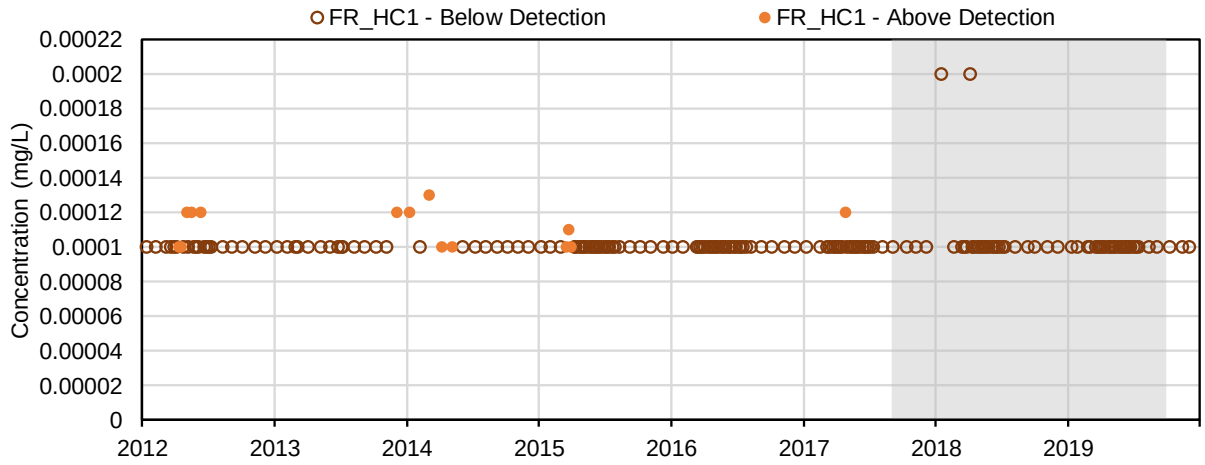
(80) Cadmium (mg/L); Dissolved Metals



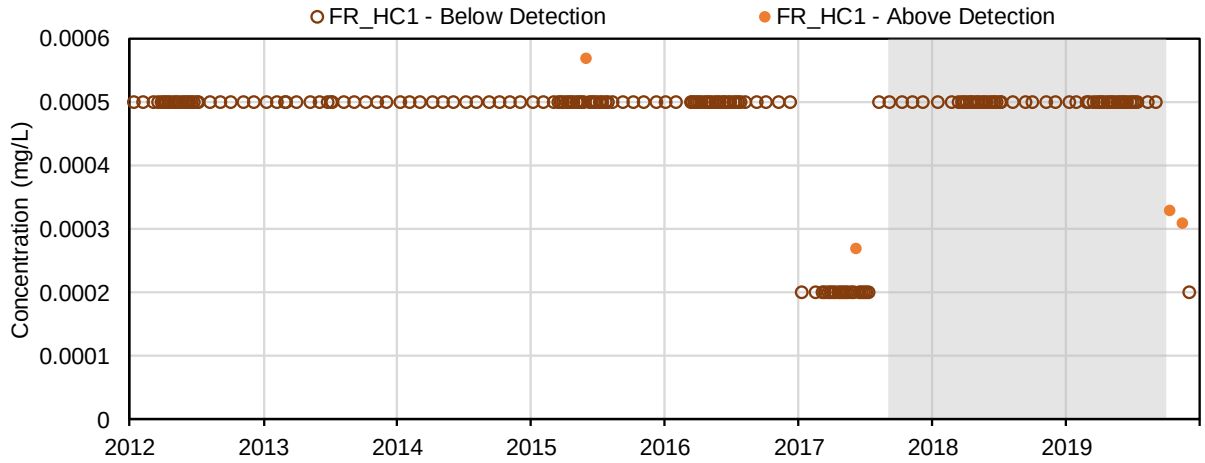
(81) Chromium (mg/L); Dissolved Metals



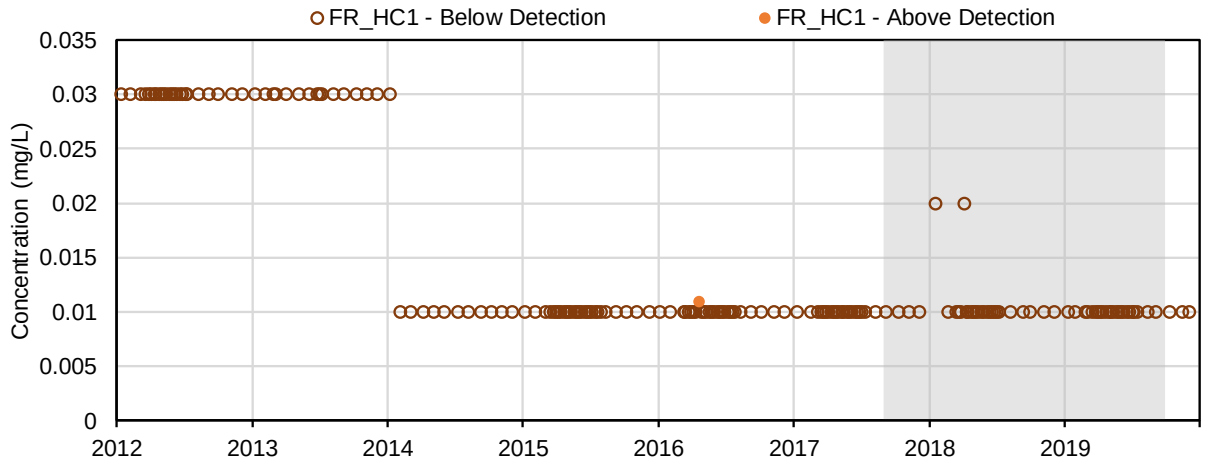
(82) Cobalt (mg/L); Dissolved Metals



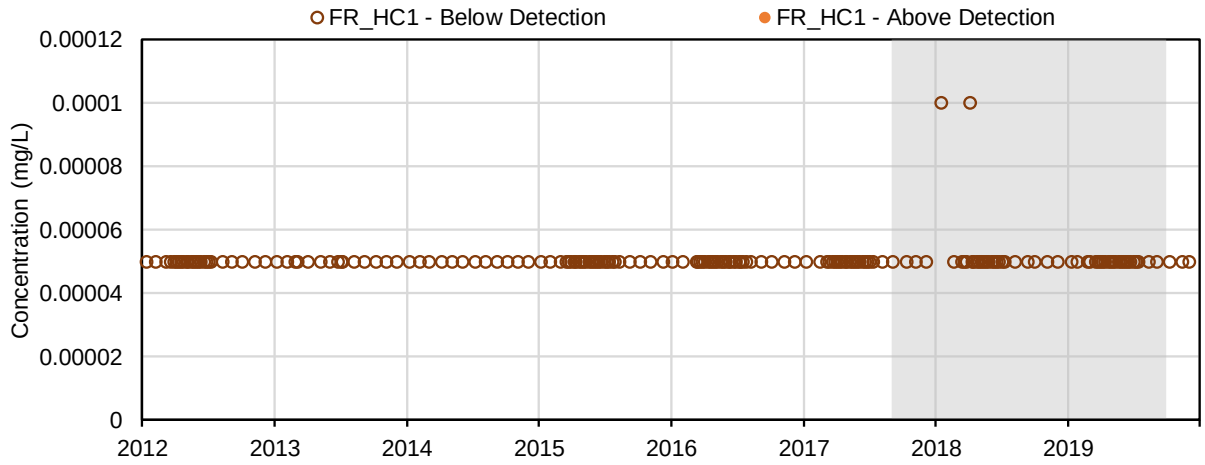
(83) Copper (mg/L); Dissolved Metals



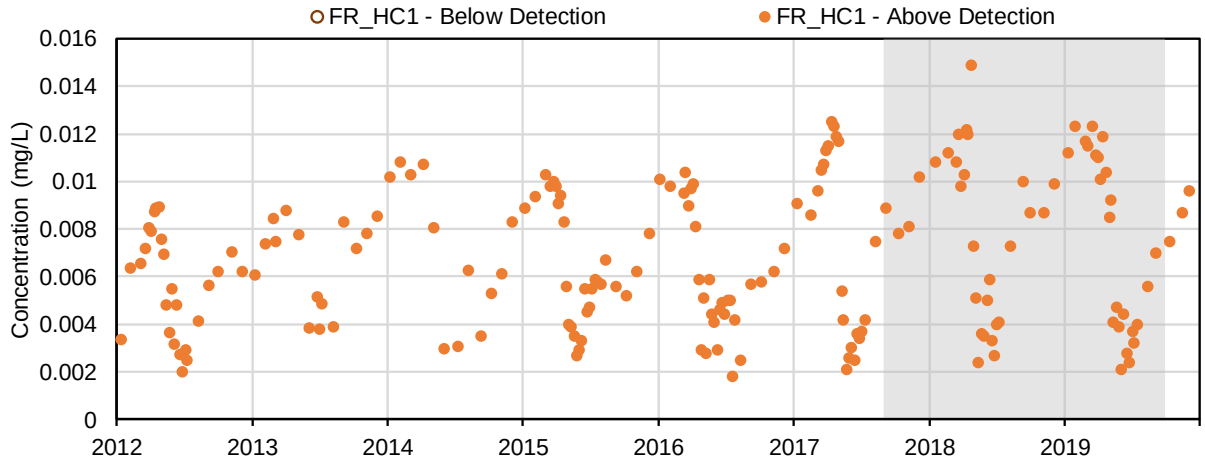
(84) Iron (mg/L); Dissolved Metals



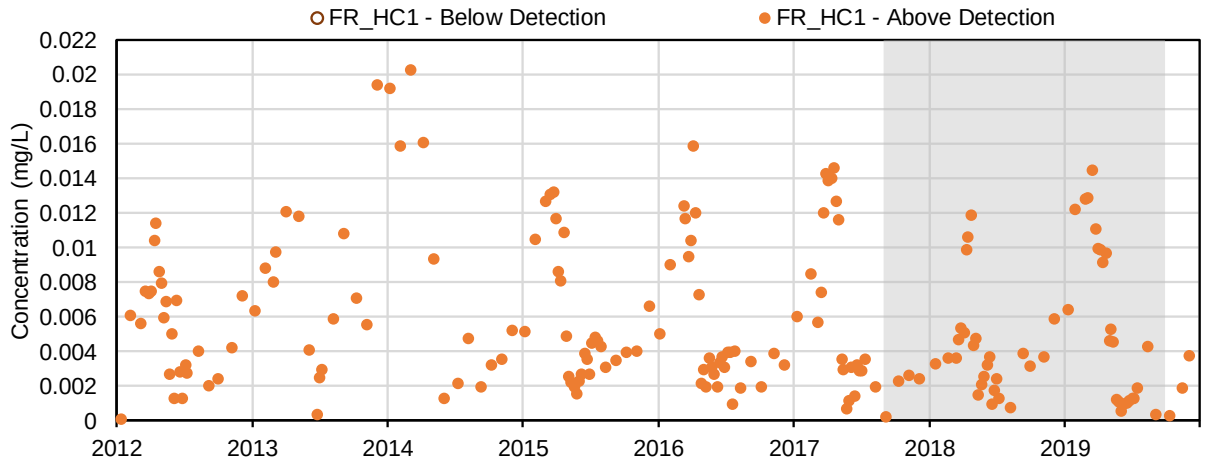
(85) Lead (mg/L); Dissolved Metals



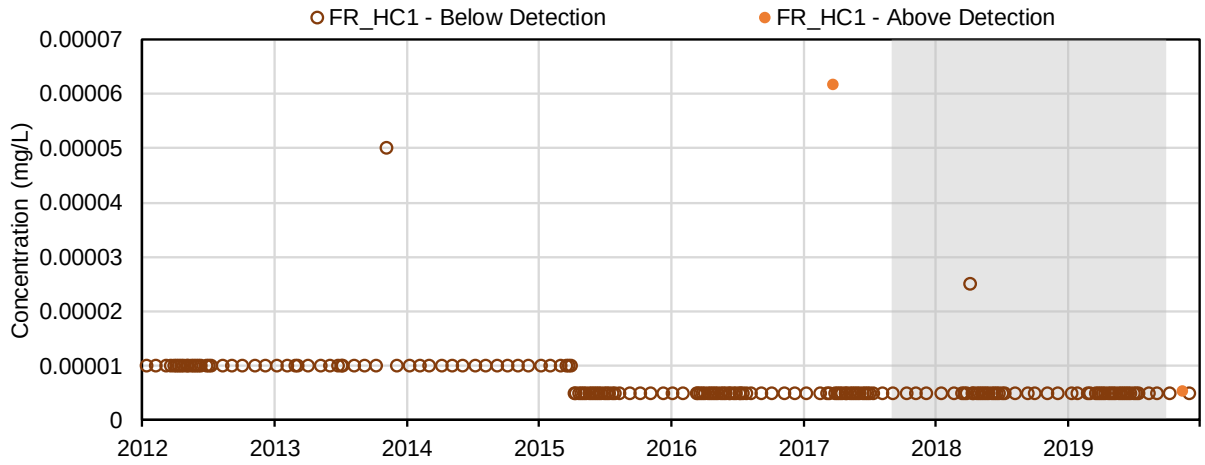
(86) Lithium (mg/L); Dissolved Metals



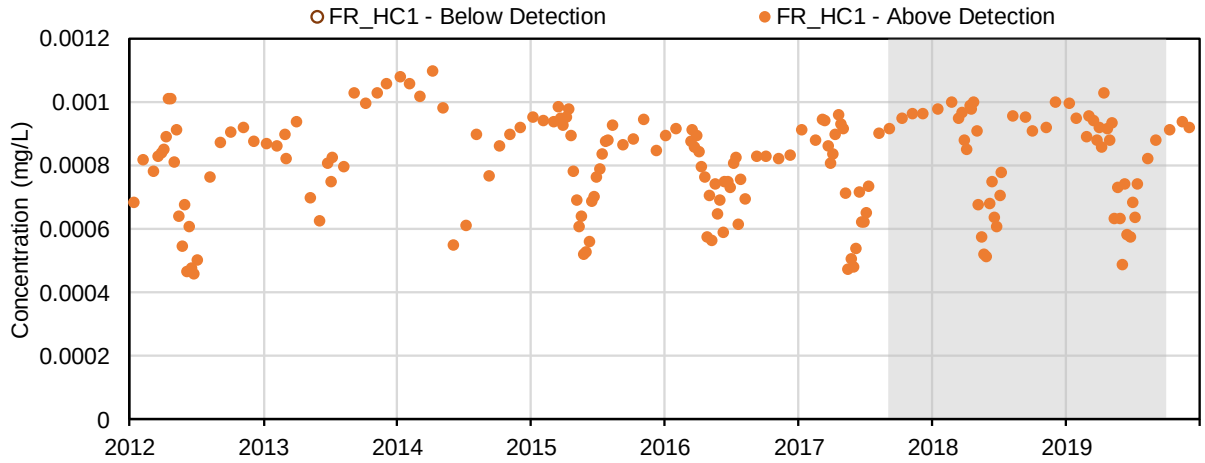
(87) Manganese (mg/L); Dissolved Metals



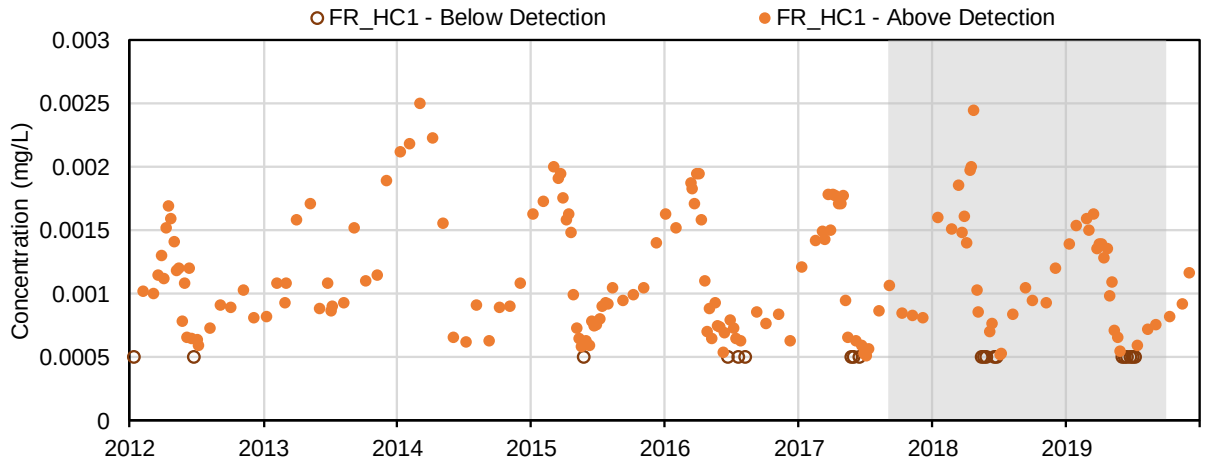
(88) Mercury (mg/L); Dissolved Metals



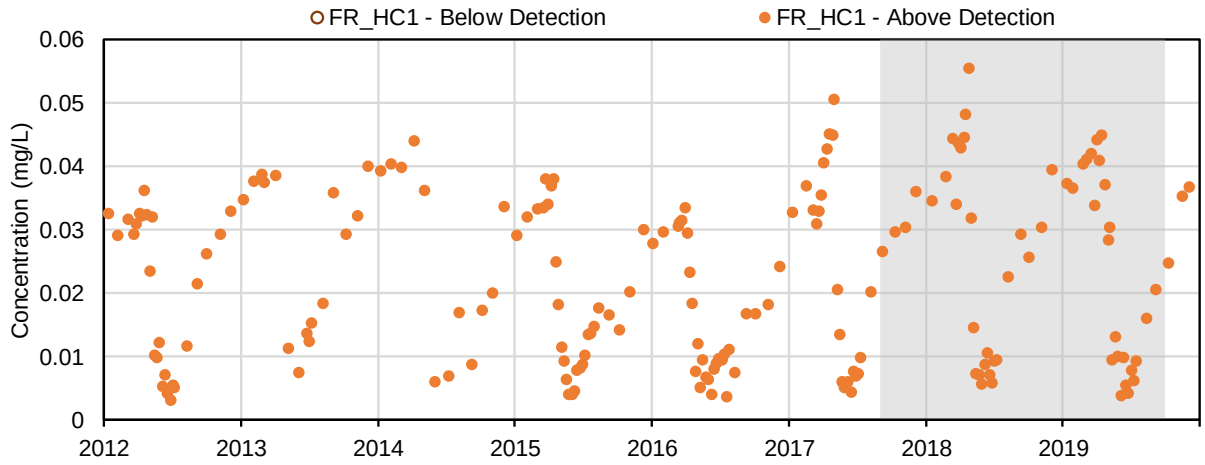
(89) Molybdenum (mg/L); Dissolved Metals



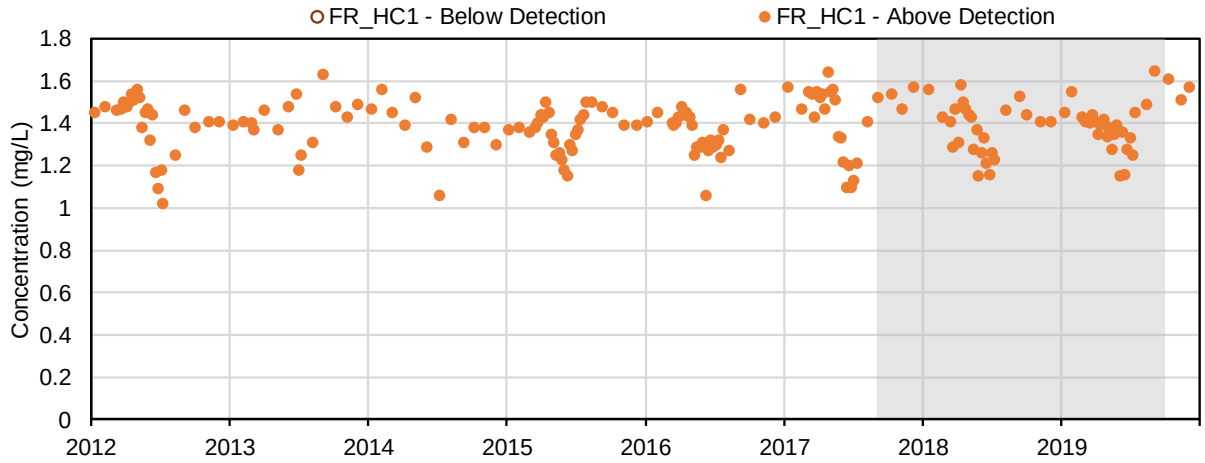
(90) Nickel (mg/L); Dissolved Metals



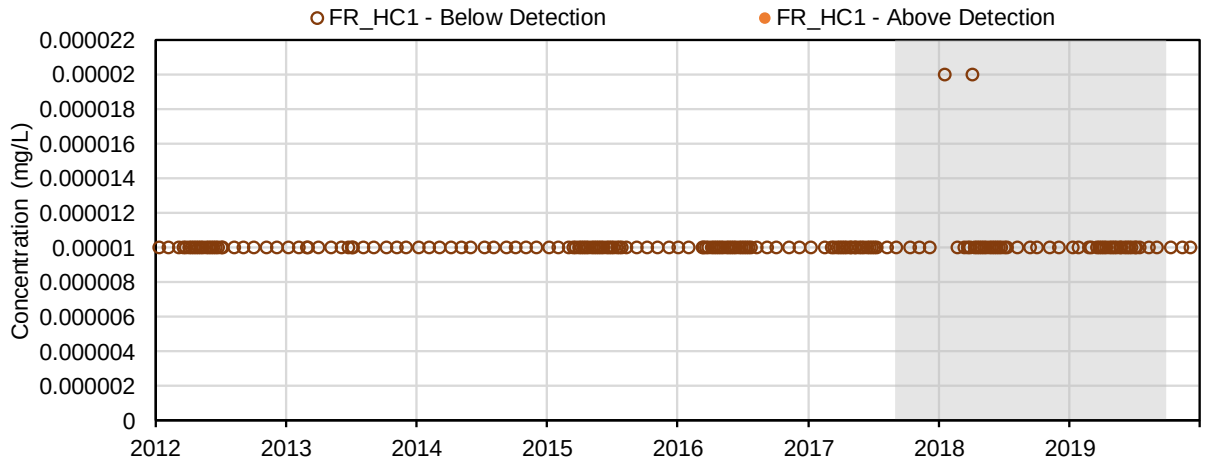
(91) Selenium (mg/L); Dissolved Metals



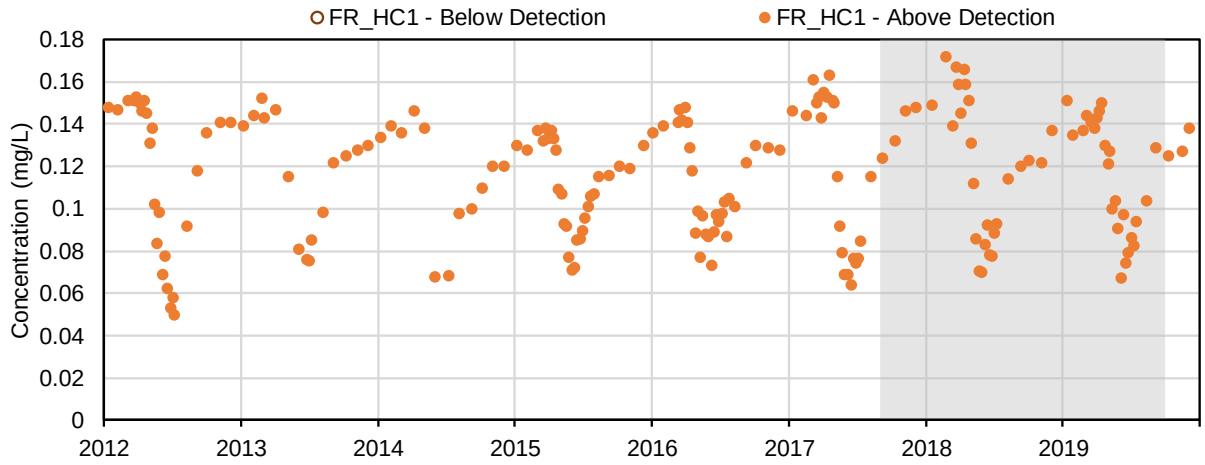
(92) Silicon (mg/L); Dissolved Metals



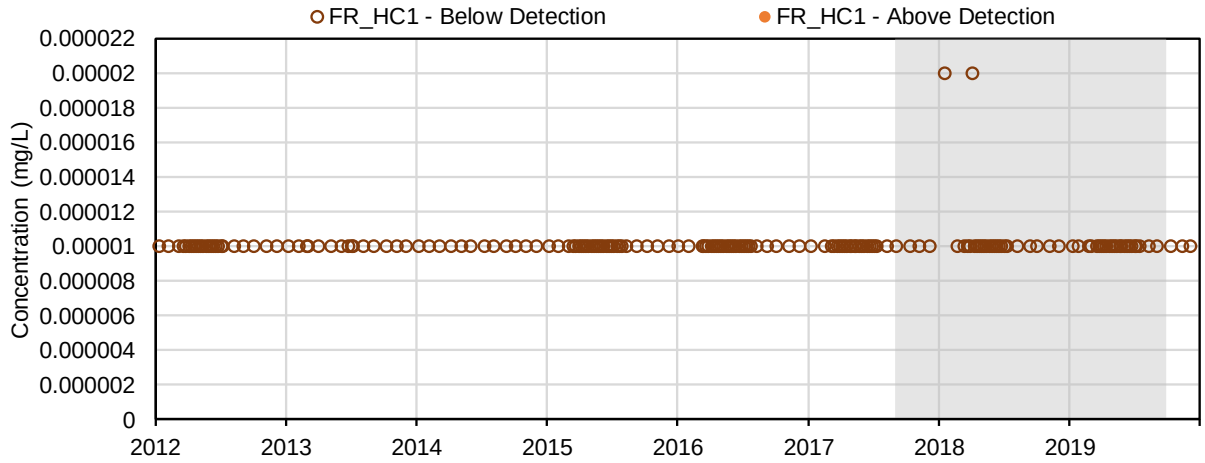
(93) Silver (mg/L); Dissolved Metals



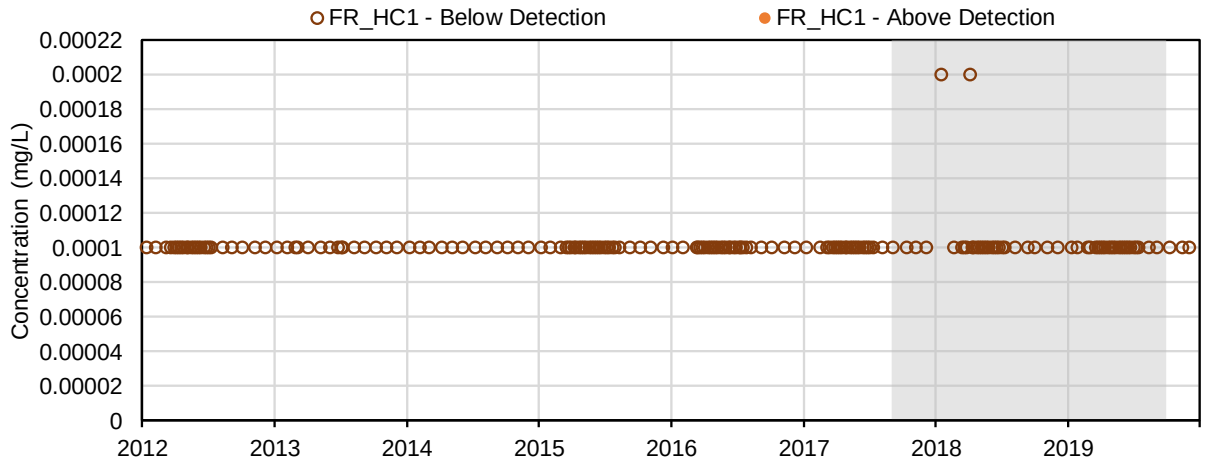
(94) Strontium (mg/L); Dissolved Metals



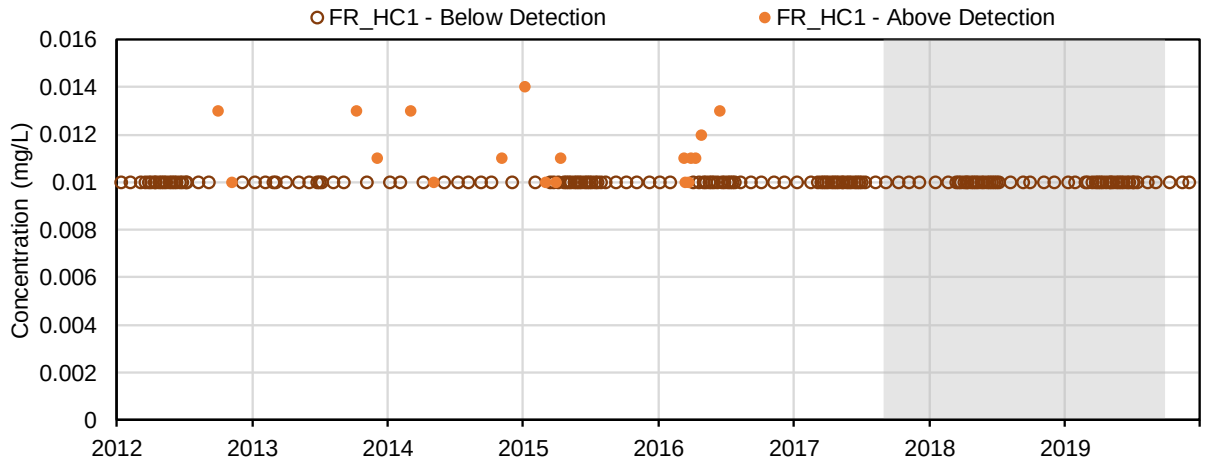
(95) Thallium (mg/L); Dissolved Metals



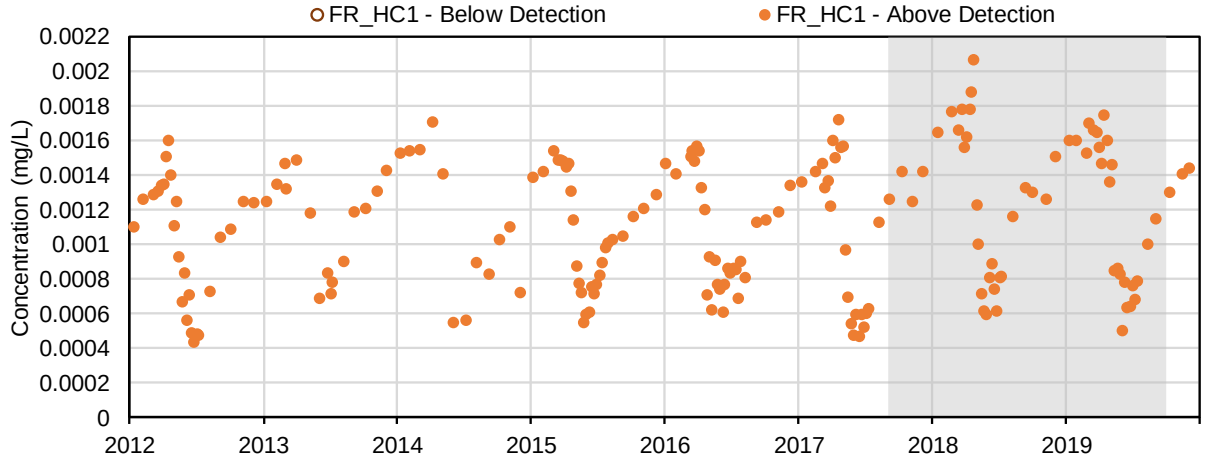
(96) Tin (mg/L); Dissolved Metals



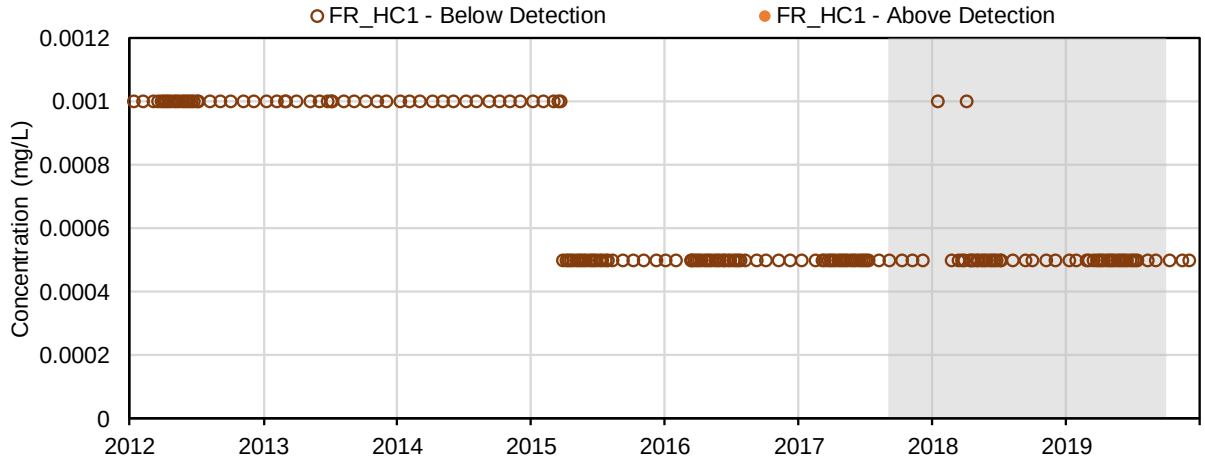
(97) Titanium (mg/L); Dissolved Metals



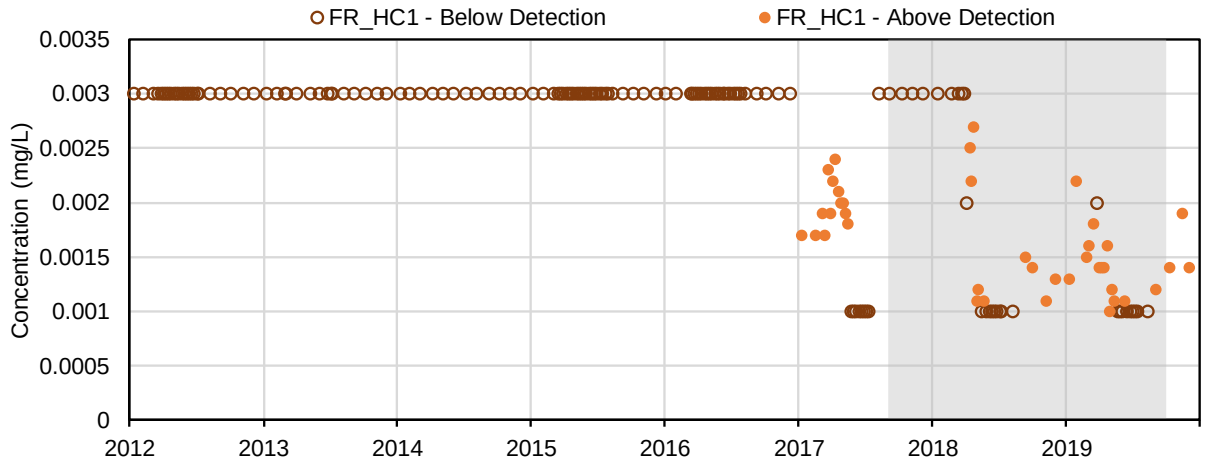
(98) Uranium (mg/L); Dissolved Metals



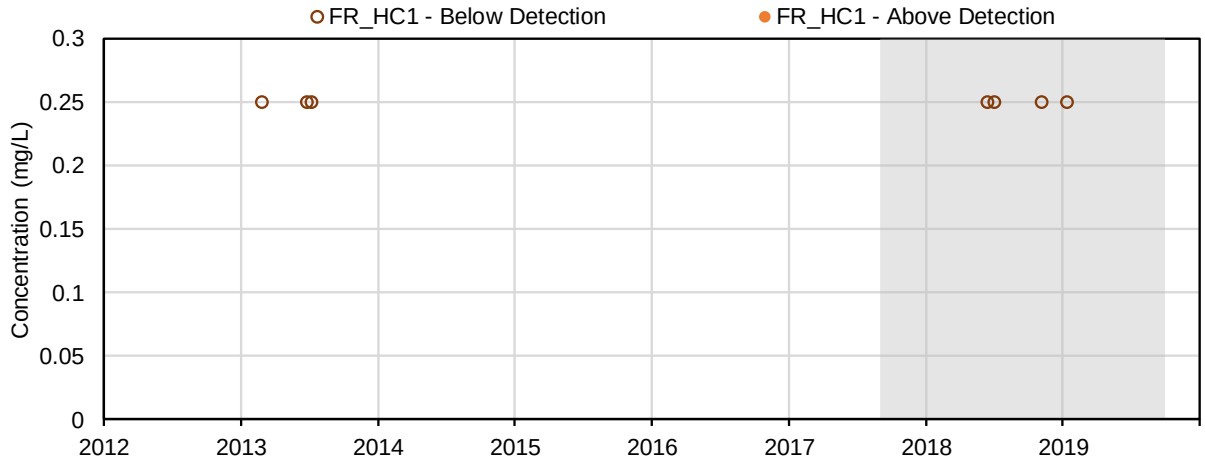
(99) Vanadium (mg/L); Dissolved Metals



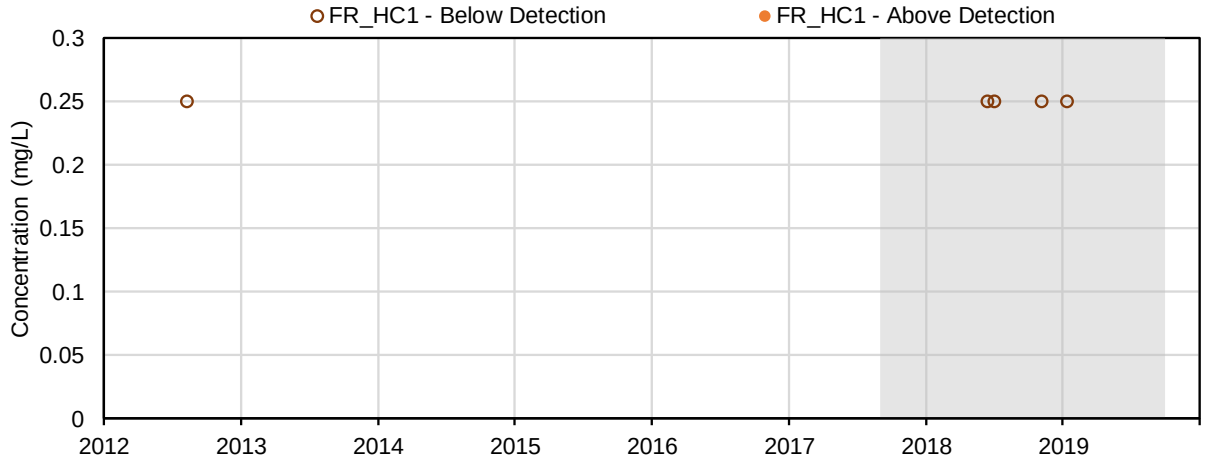
(100) Zinc (mg/L); Dissolved Metals



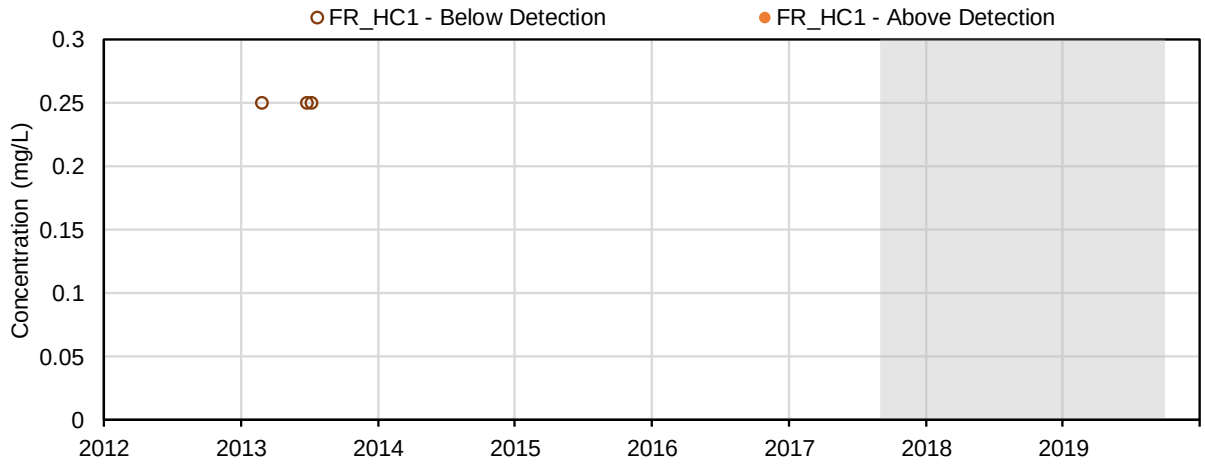
(101) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



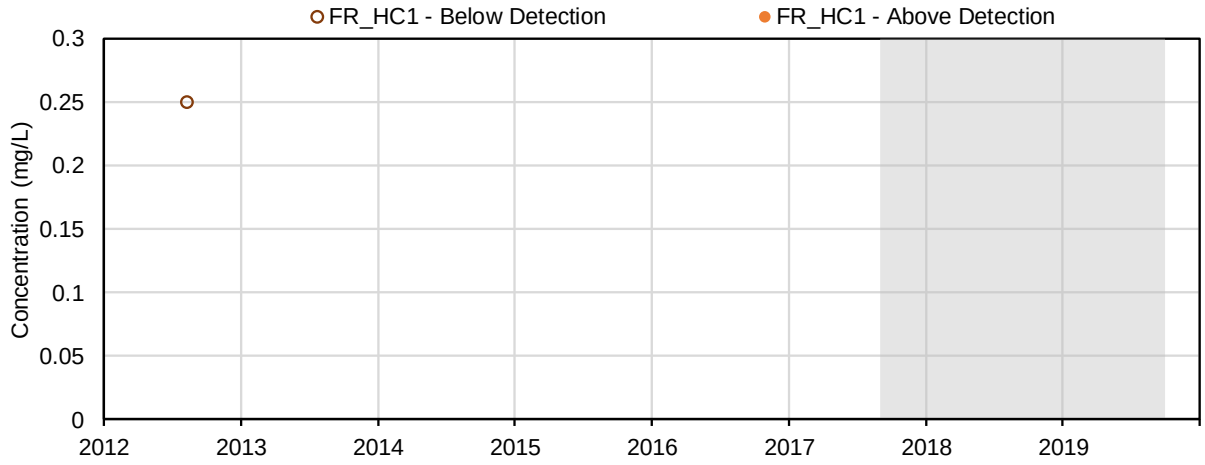
(102) Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



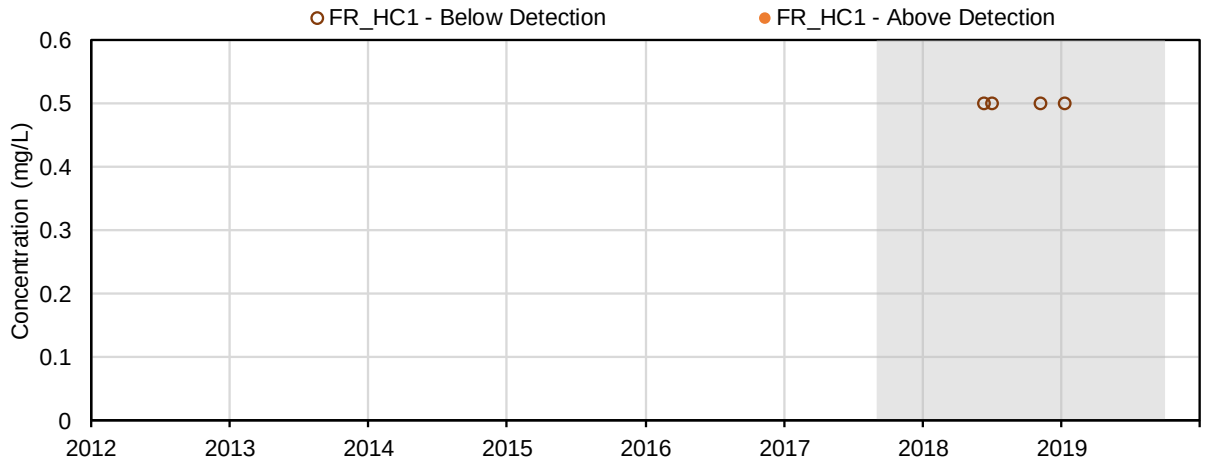
(103) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



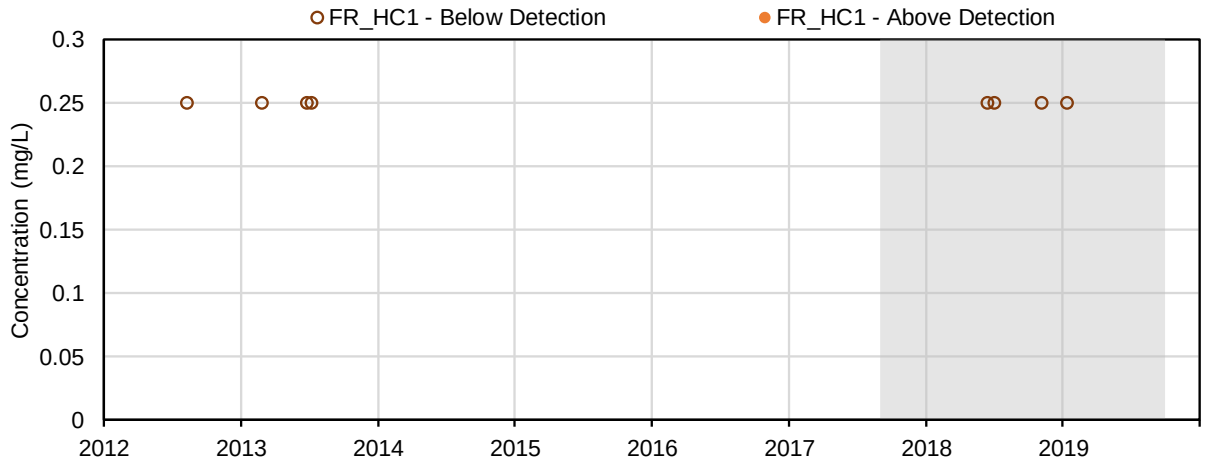
(104) Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L); Volatile Organics



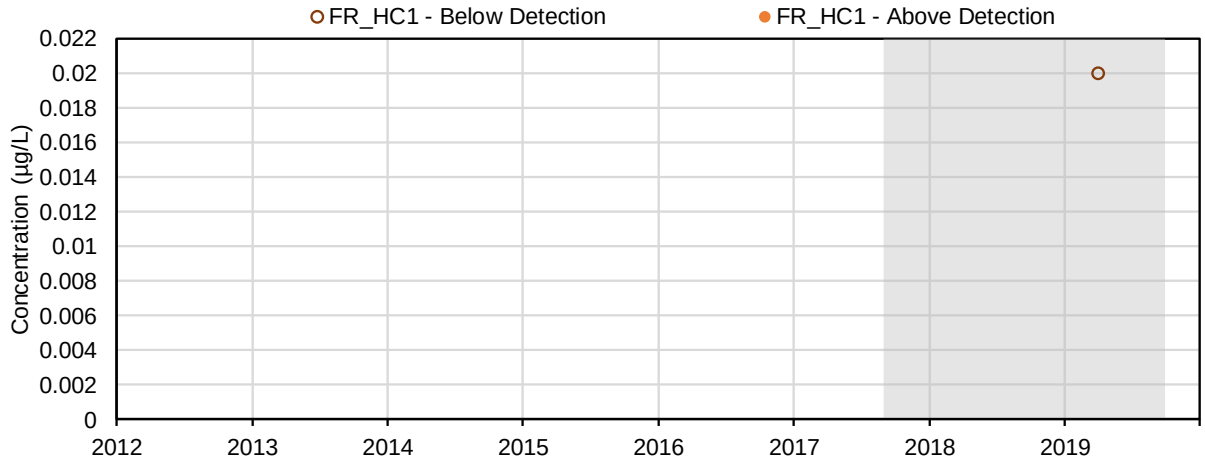
(105) Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L); Volatile Organics



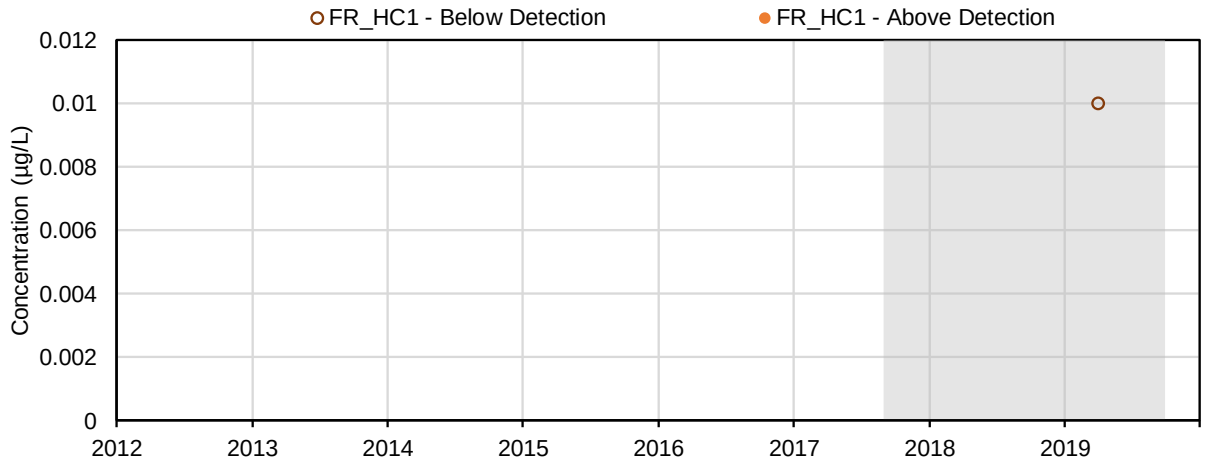
(106) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics



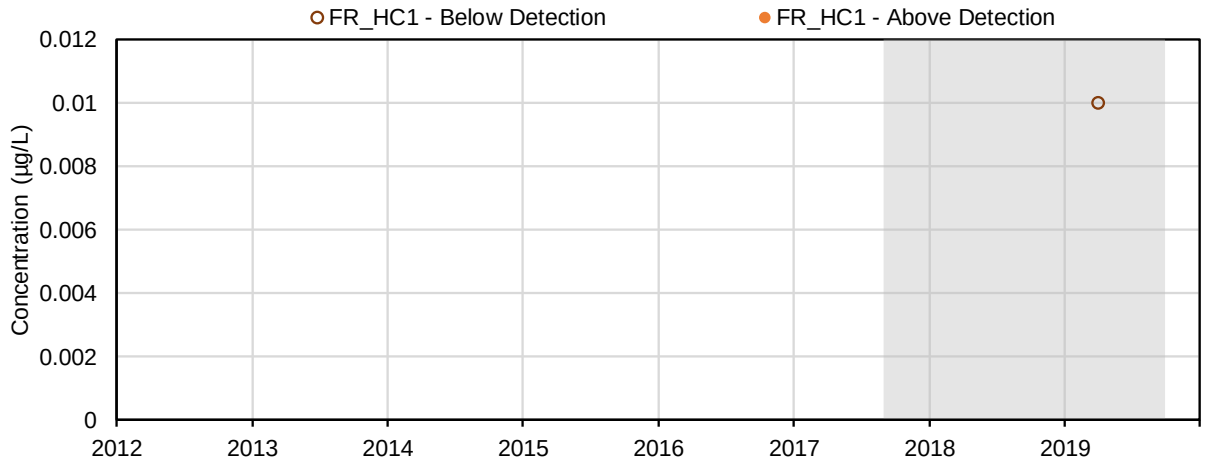
(107) Naphthalene (µg/L); Parent PAHs



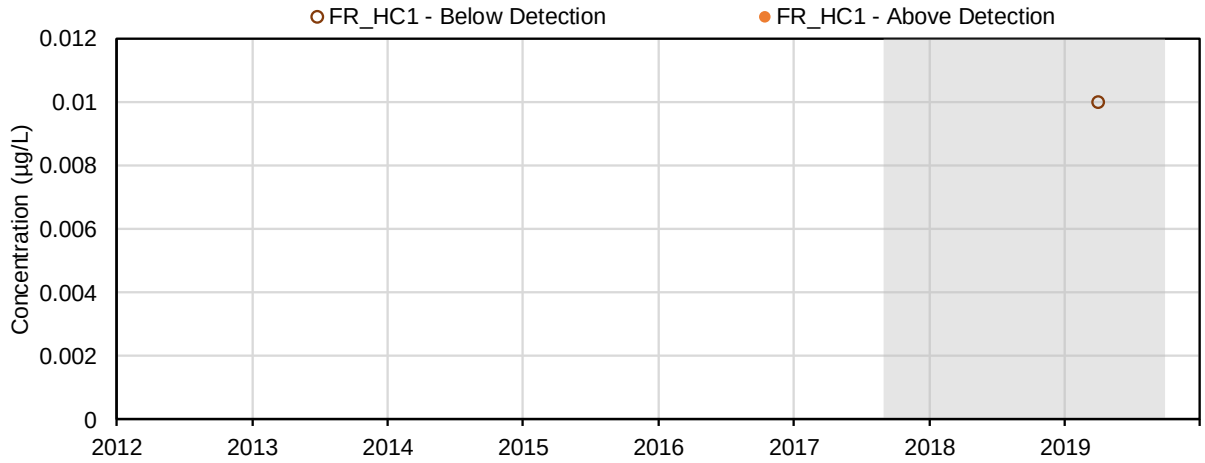
(108) Acenaphthylene (µg/L); Parent PAHs



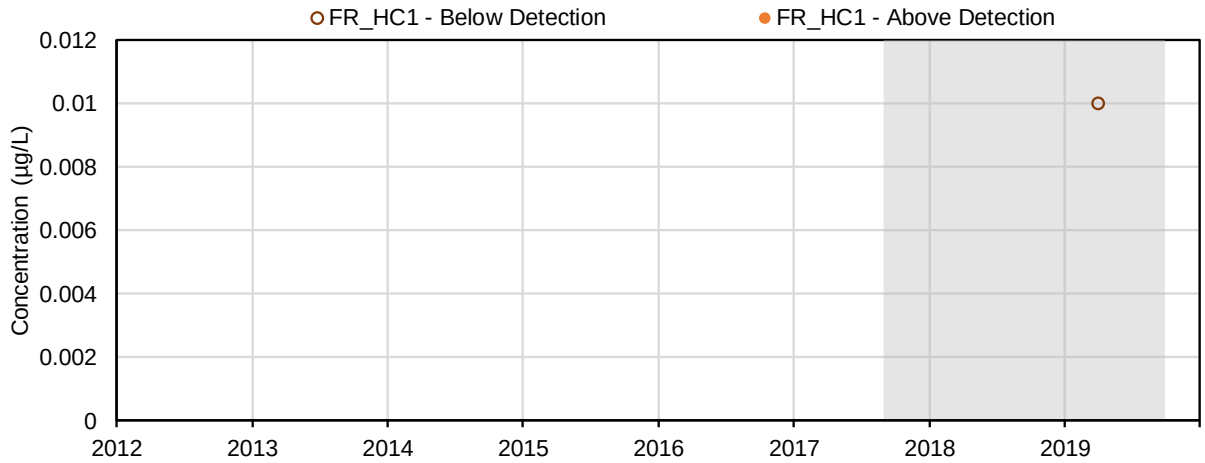
(109) Acenaphthene (µg/L); Parent PAHs



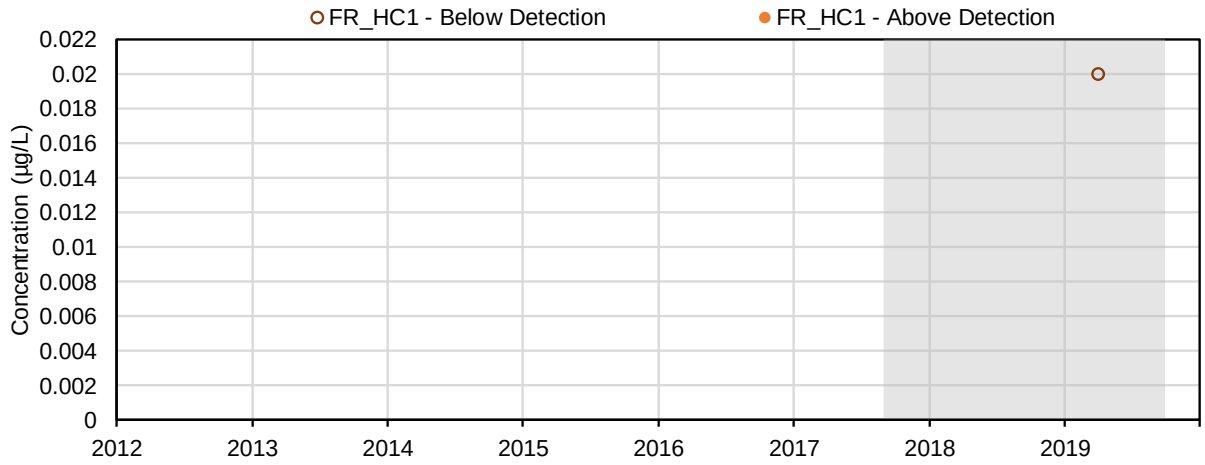
(110) Acridine (µg/L); Parent PAHs



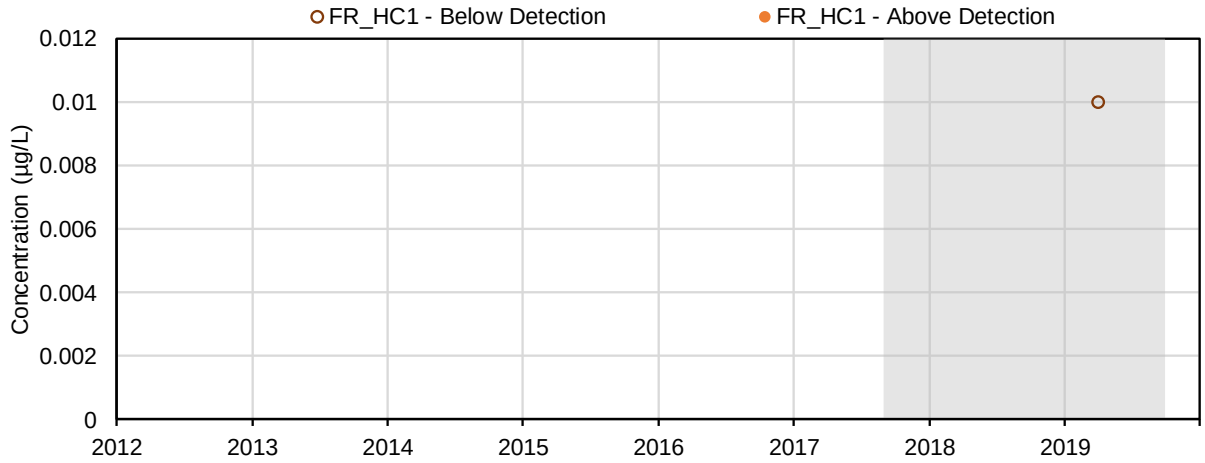
(111) Fluorene (µg/L); Parent PAHs



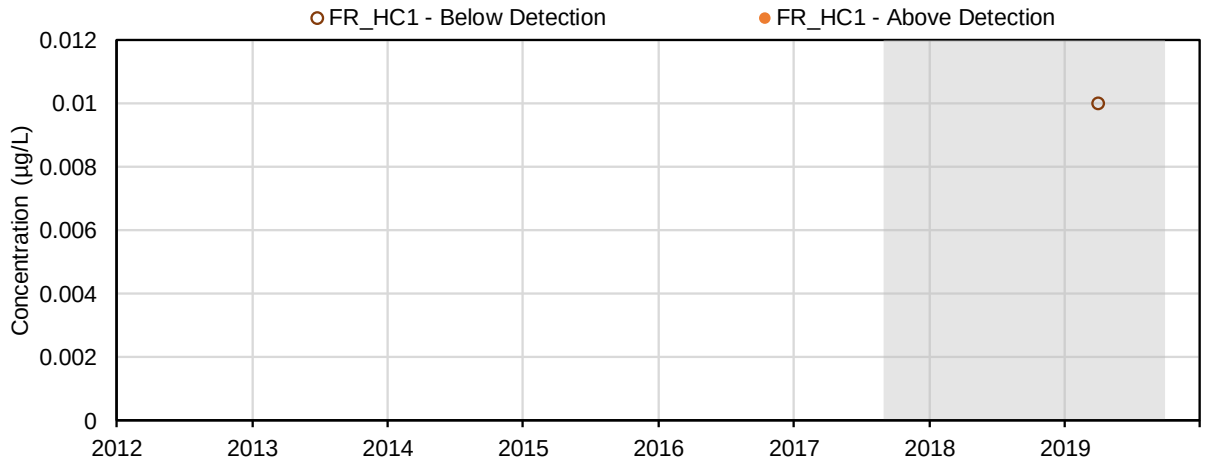
(112) Phenanthrene (µg/L); Parent PAHs



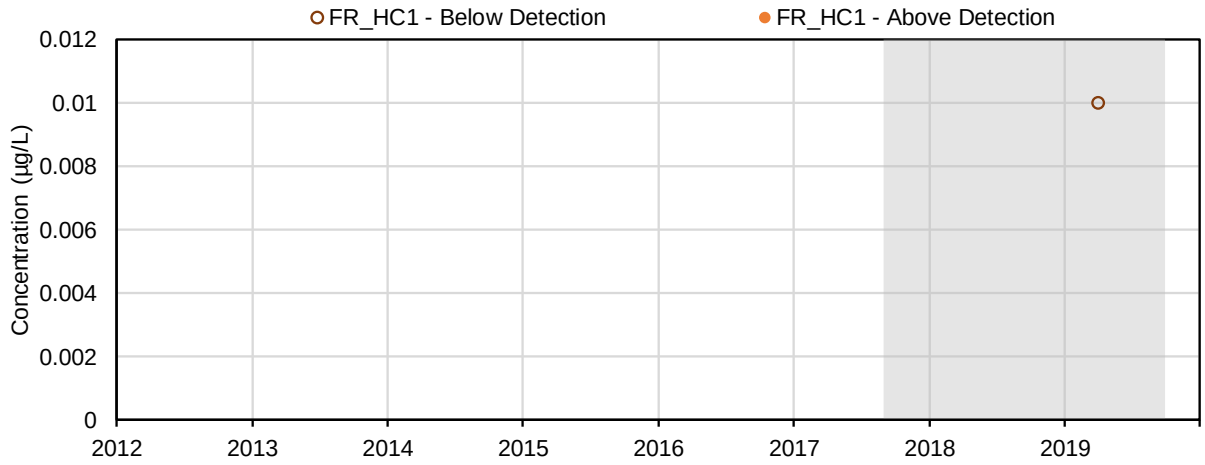
(113) Anthracene (µg/L); Parent PAHs



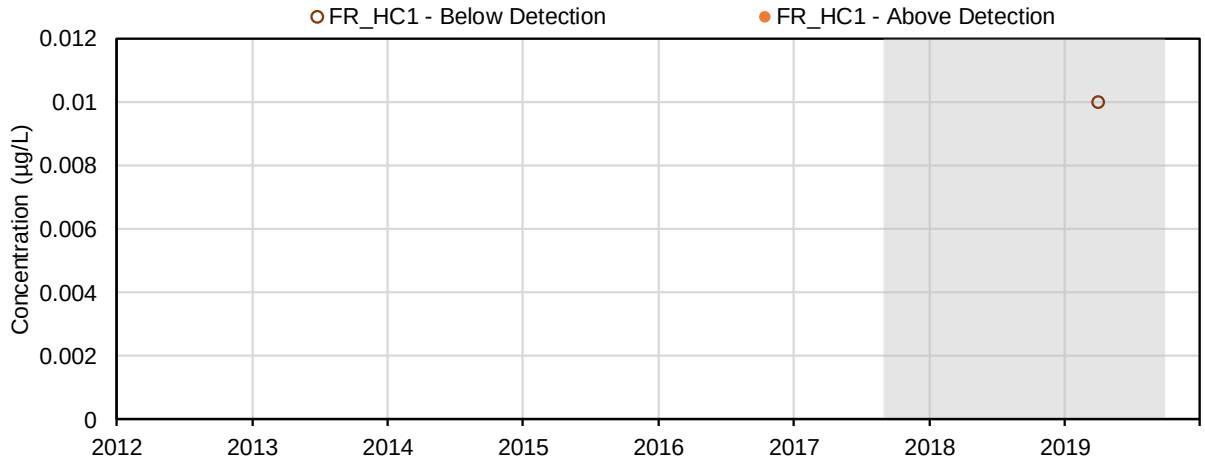
(114) Pyrene (µg/L); Parent PAHs



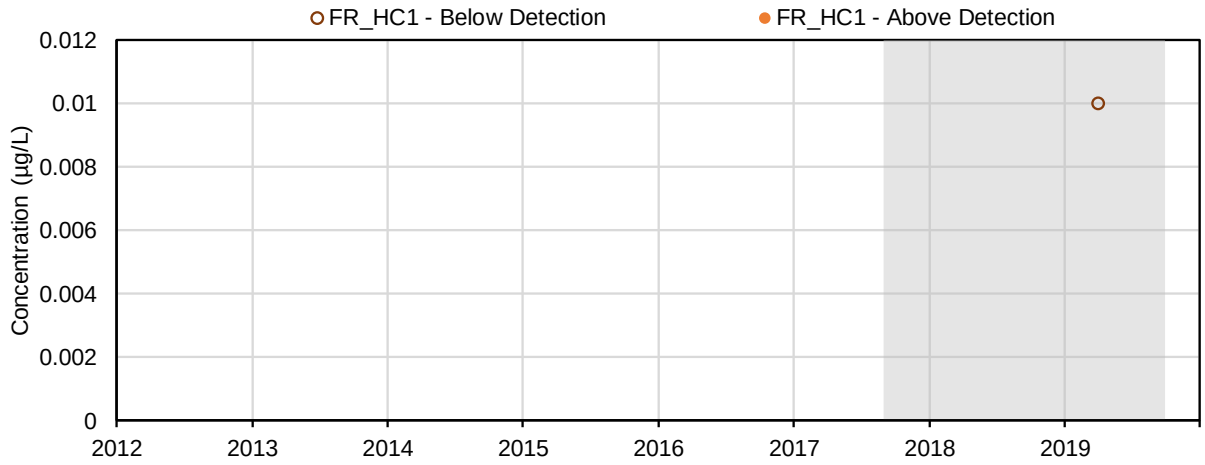
(115) Fluoranthene (µg/L); Parent PAHs



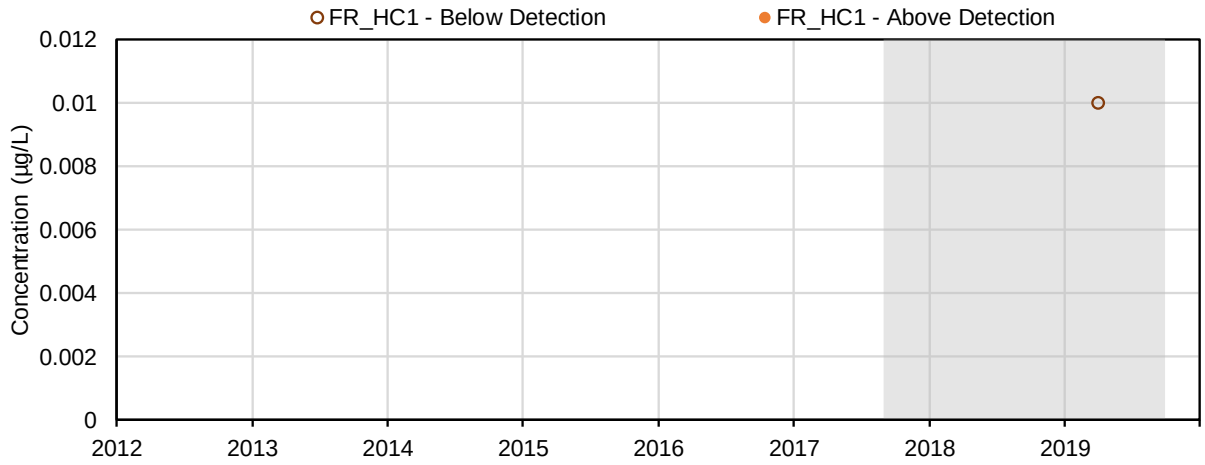
(116) Benzo(a)anthracene (µg/L); Parent PAHs



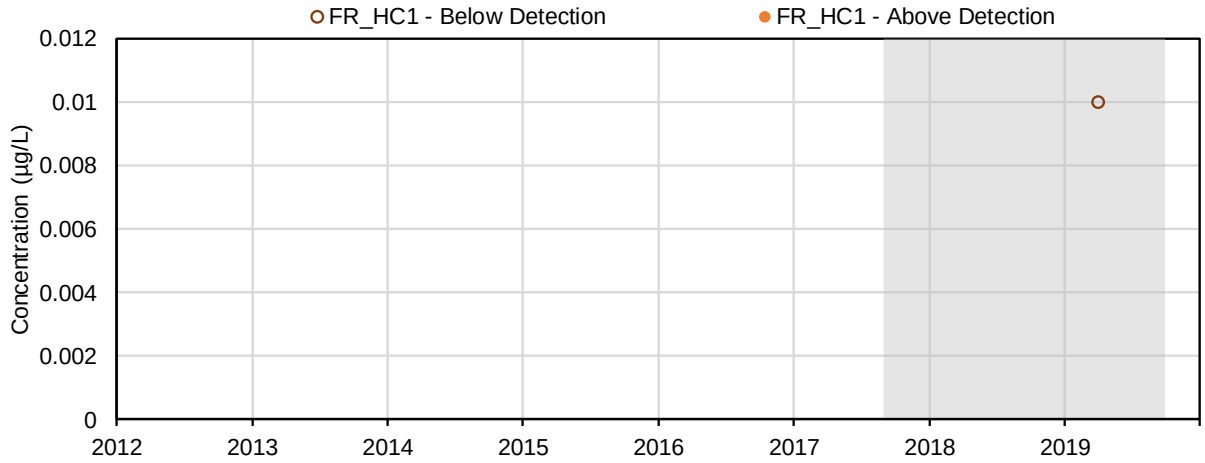
(117) Chrysene (µg/L); Parent PAHs



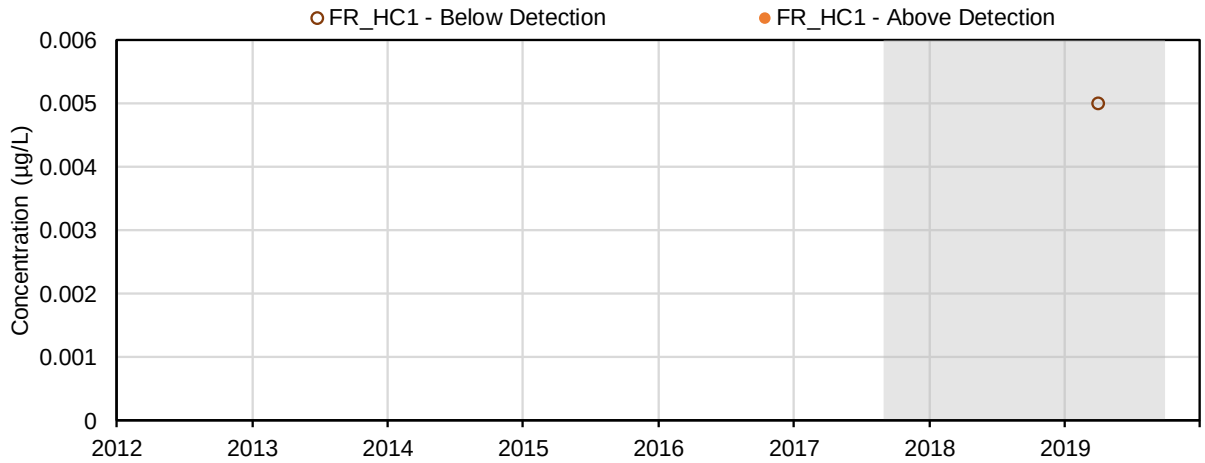
(118) Benzo(b,j)fluoranthene (µg/L); Parent PAHs



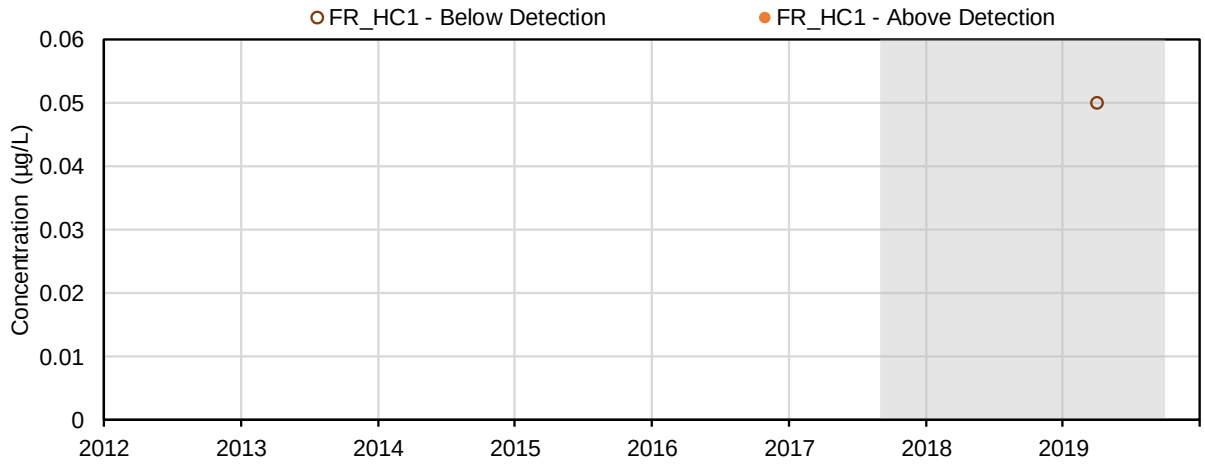
(119) Benzo(k)fluoranthene (µg/L); Parent PAHs



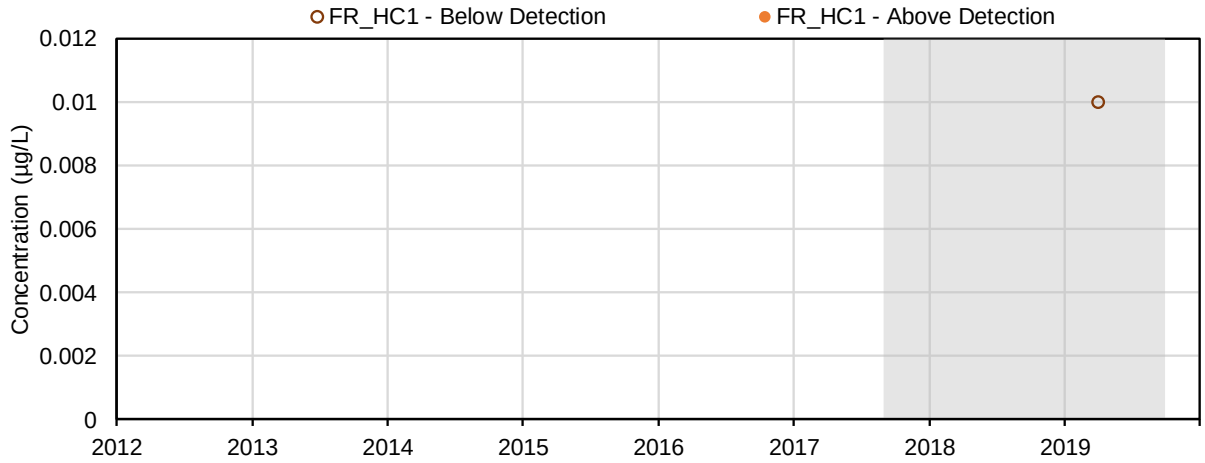
(120) Benzo(a)pyrene (µg/L); Parent PAHs



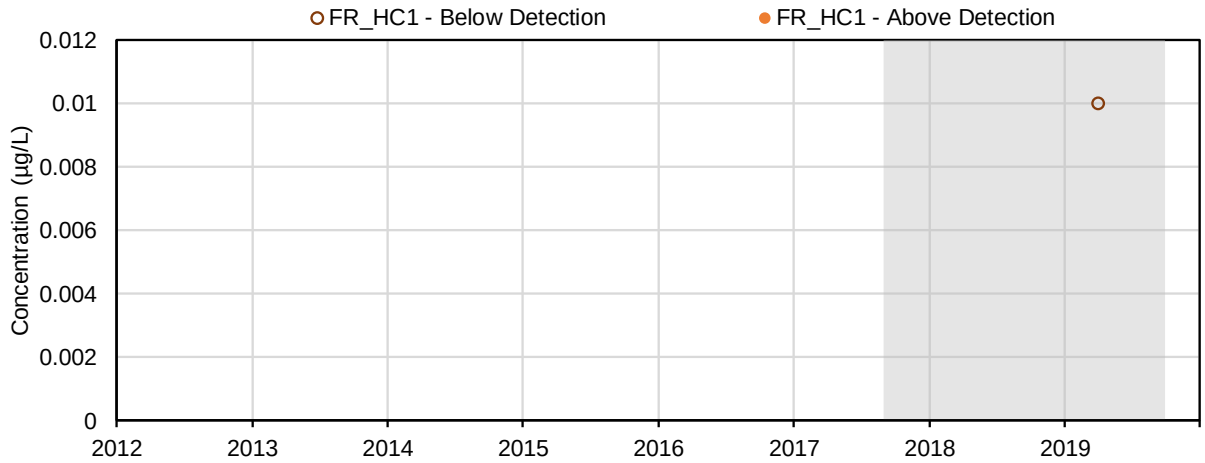
(121) Quinoline (µg/L); Parent PAHs



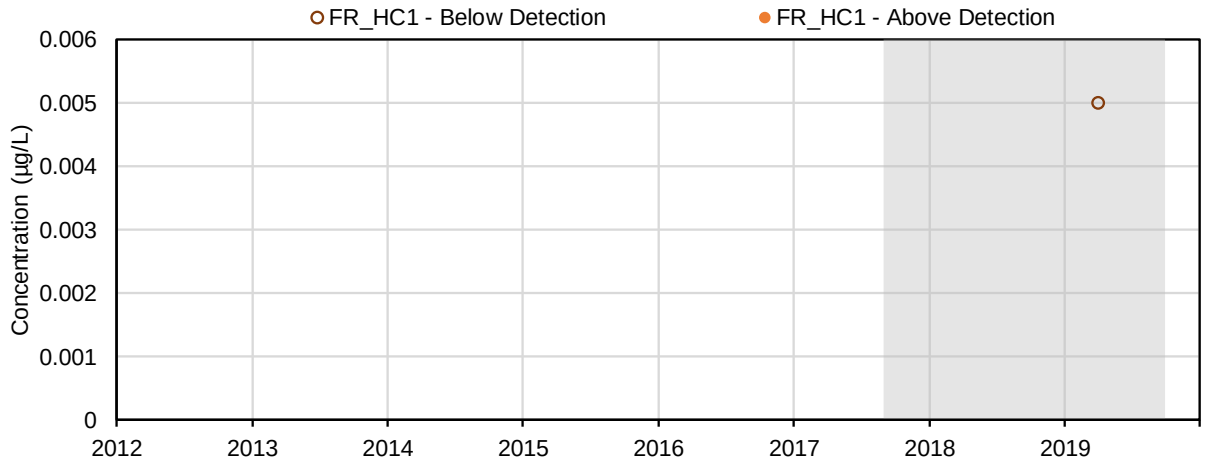
(122) Benzo(g,h,i)perylene (µg/L); Parent PAHs



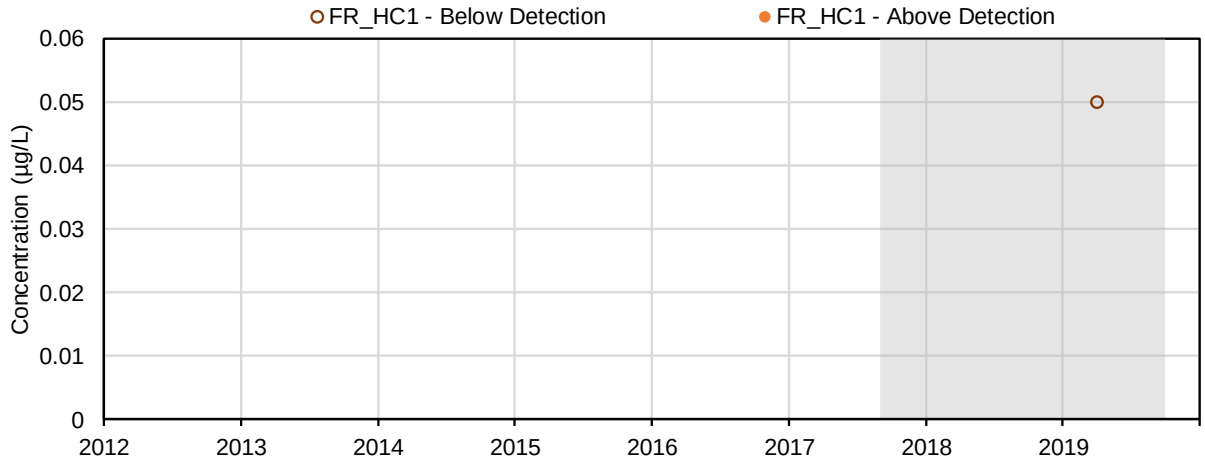
(123) Indeno(c,d-123)pyrene (µg/L); Parent PAHs



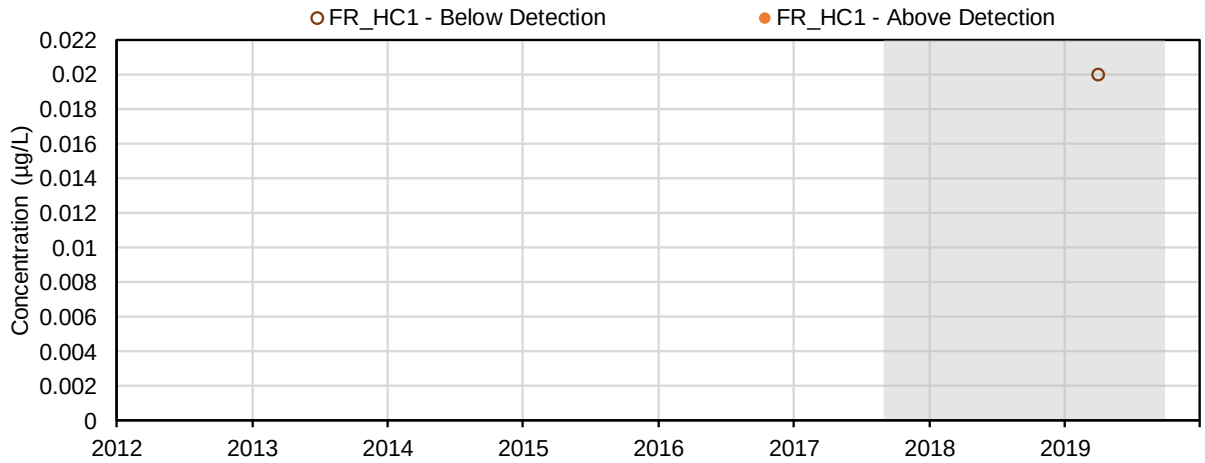
(124) Dibenzo(a,h)anthracene (µg/L); Parent PAHs



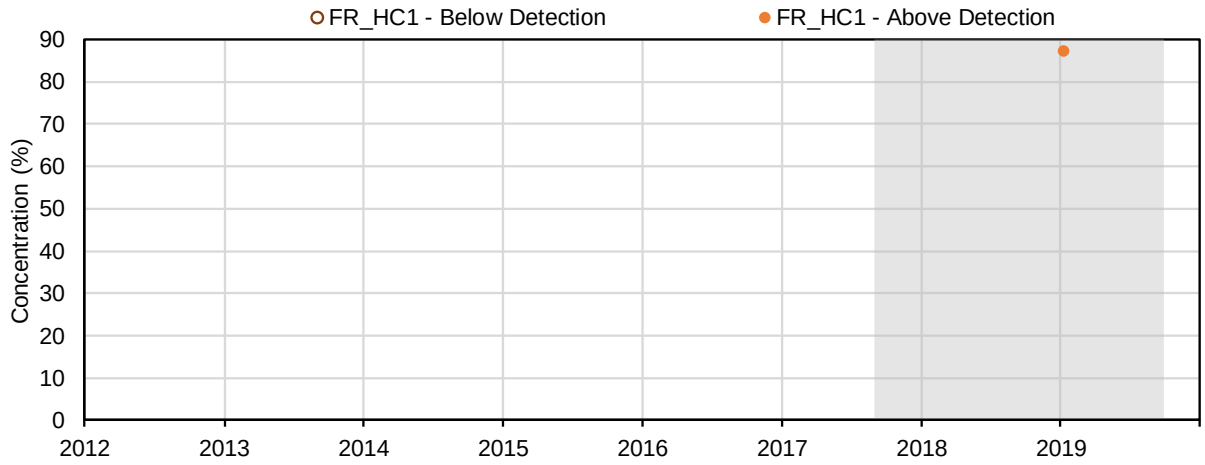
(125) 1-Methylnaphthalene (µg/L); Alkylated PAHs

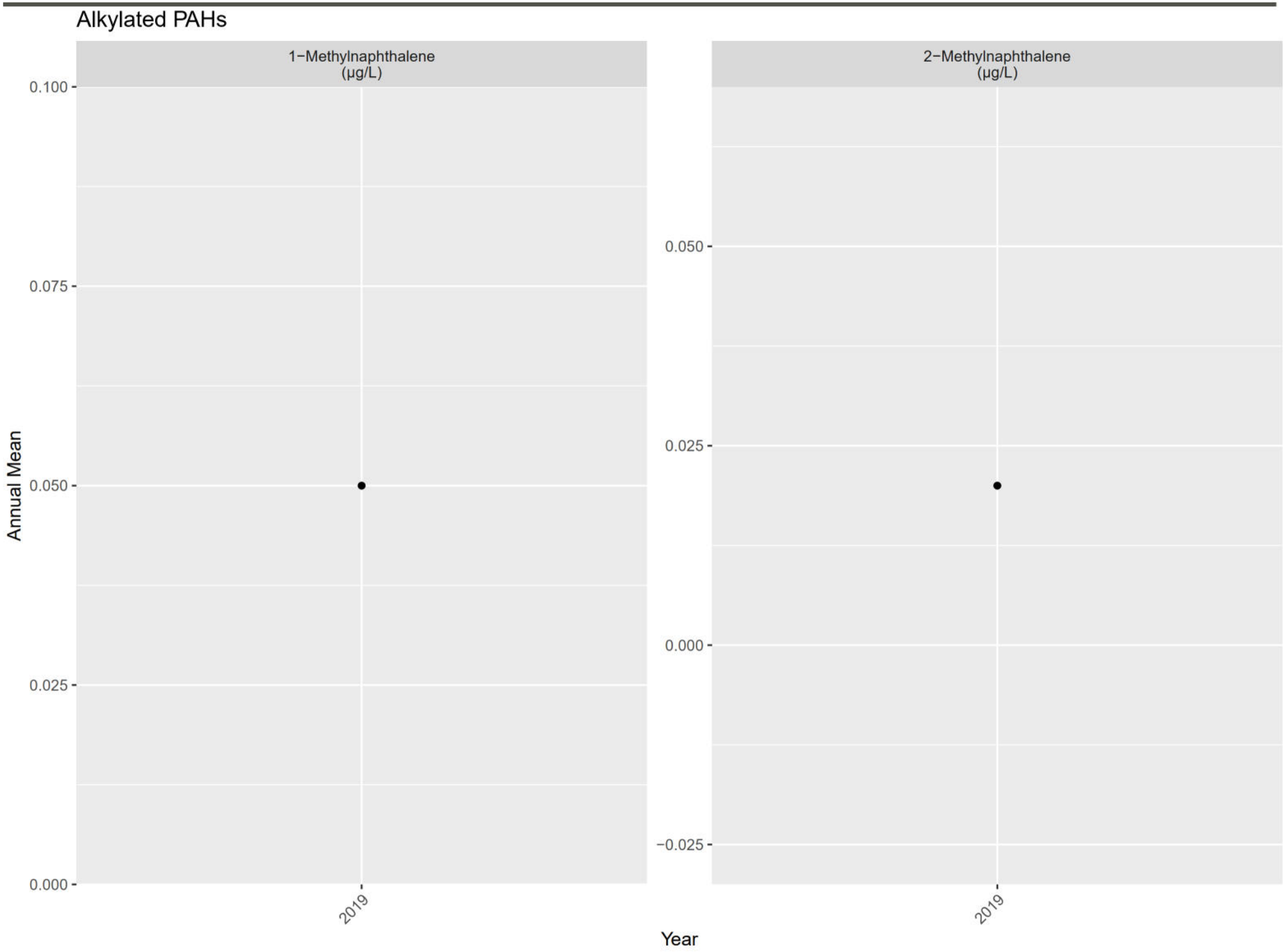


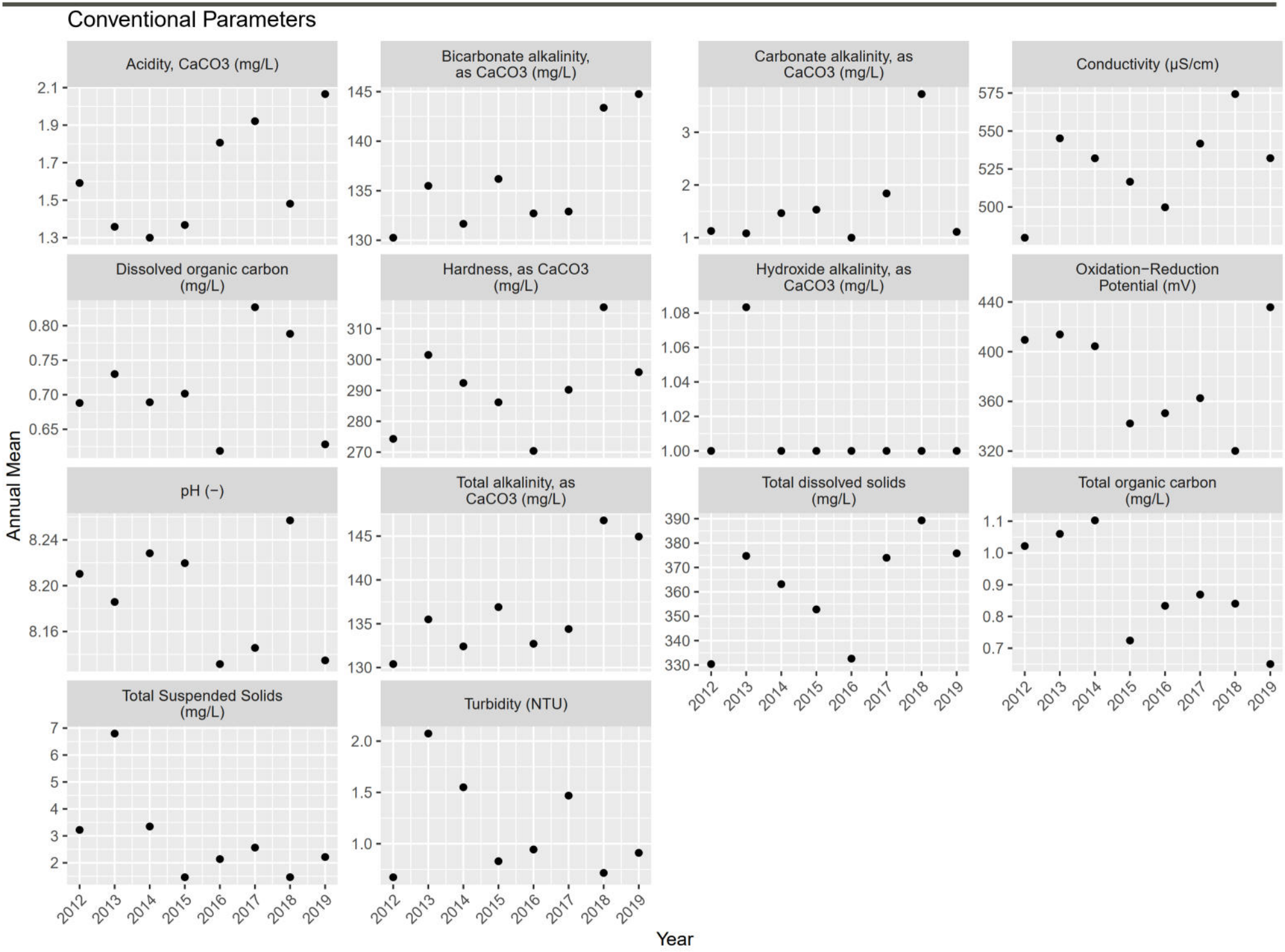
(126) 2-Methylnaphthalene (µg/L); Alkylated PAHs

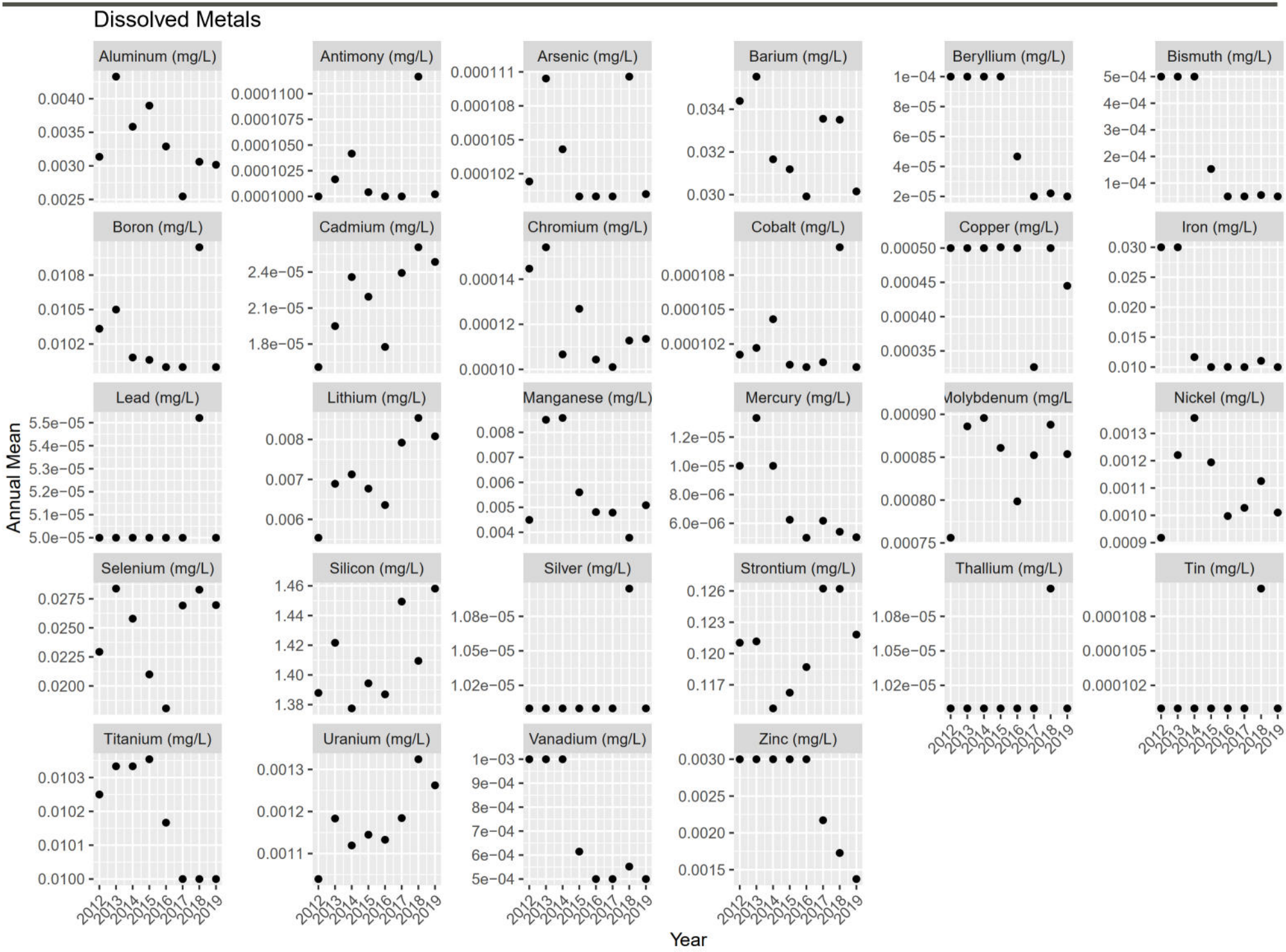


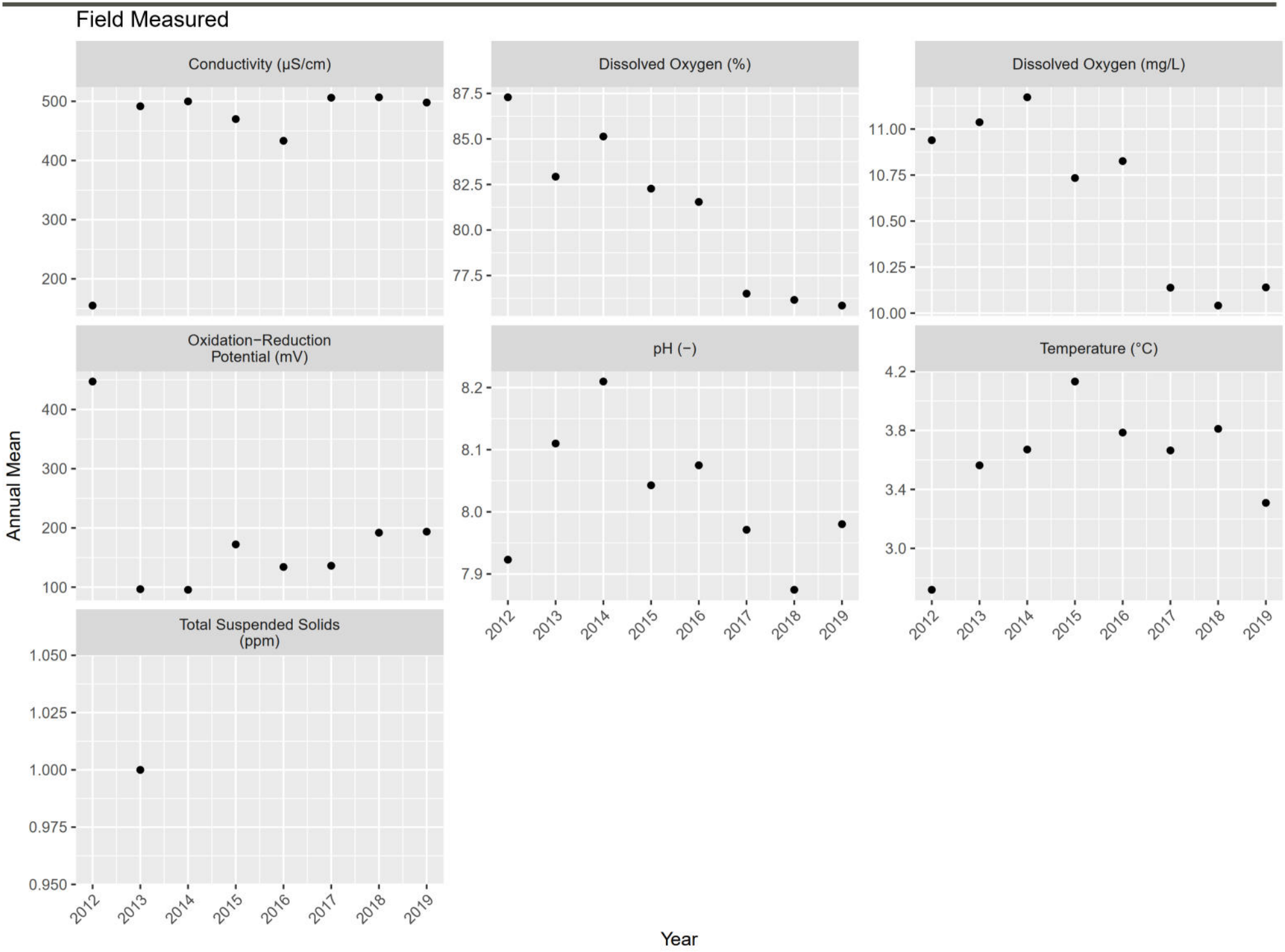
(127) 2-Bromobenzotrifluoride (%); Unknown

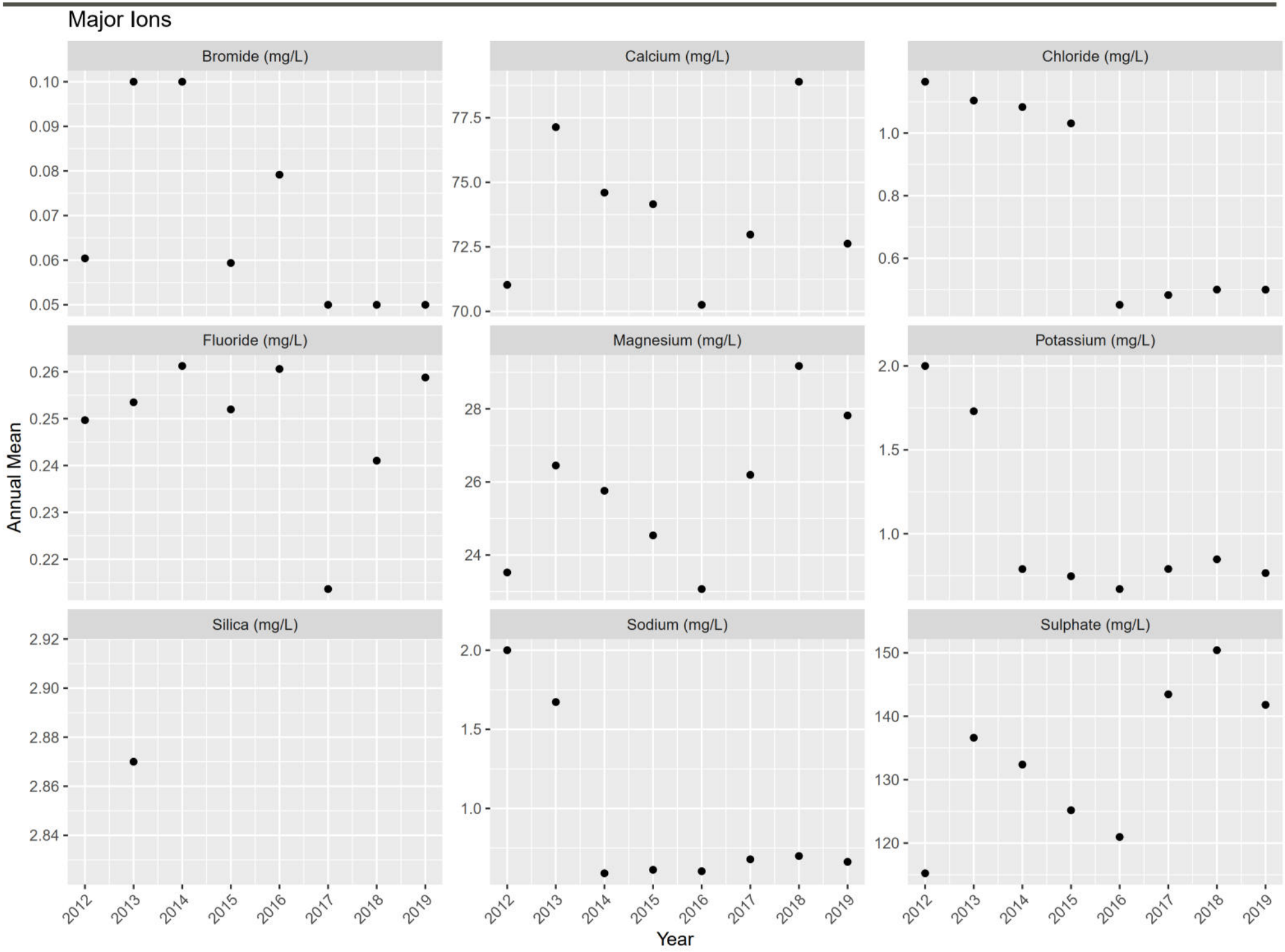


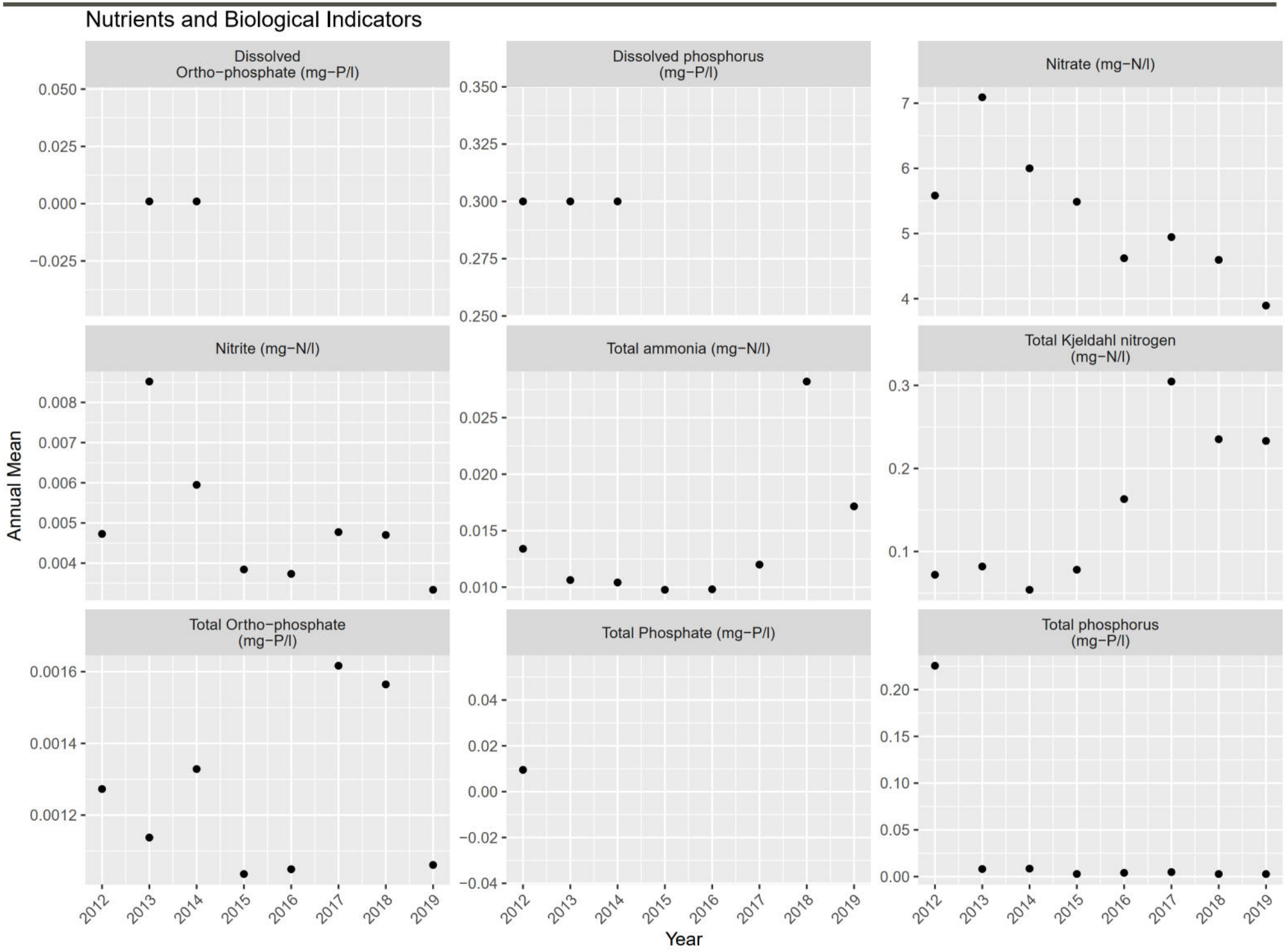

Alkylated PAHs
1−Methylnaphthalene (µg/L)
2−Methylnaphthalene (µg/L)
Annual Mean
0.100
0.075
0.050
0.025
0.000
−0.025
2019
Year

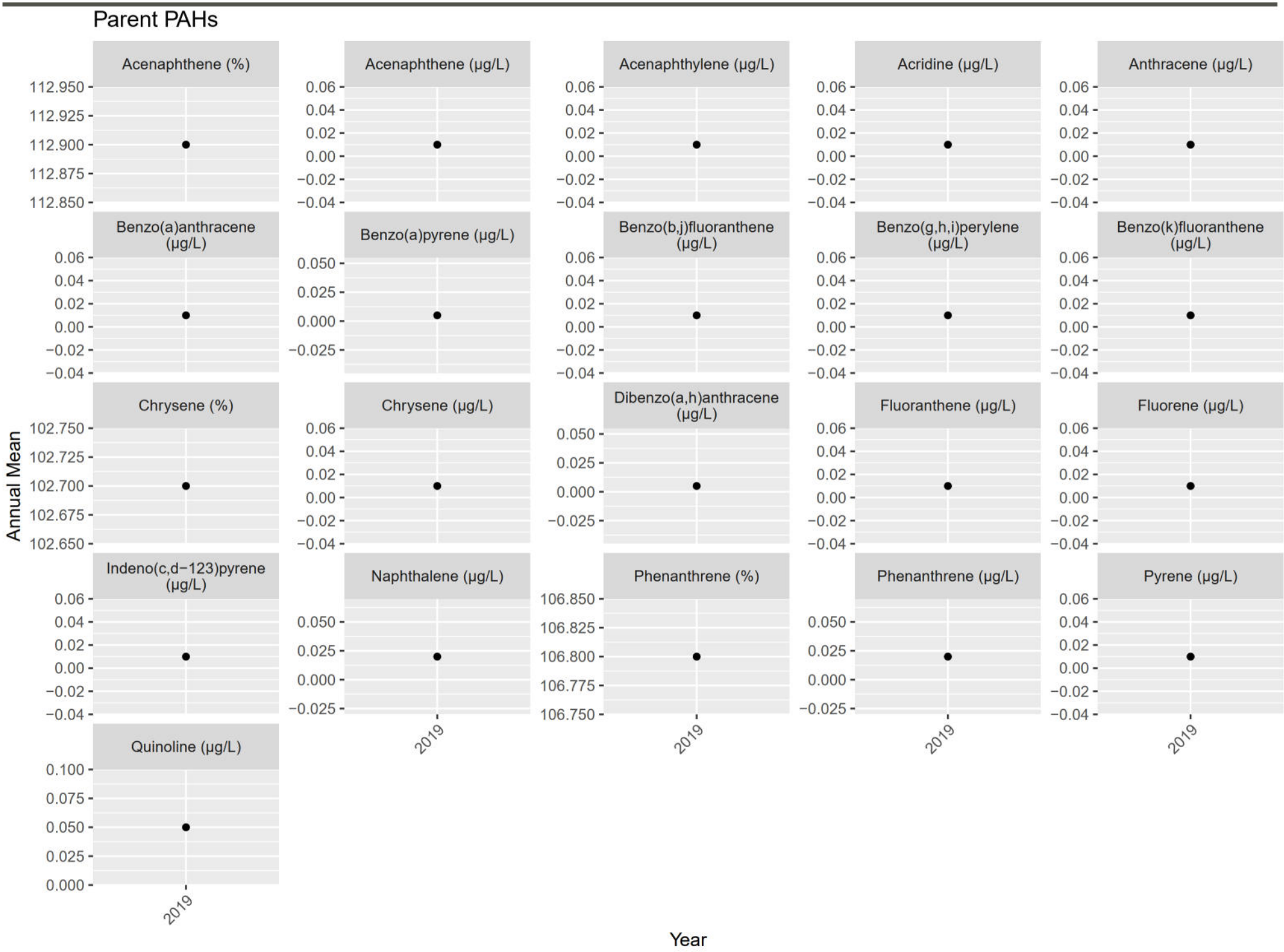

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total Suspended Solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

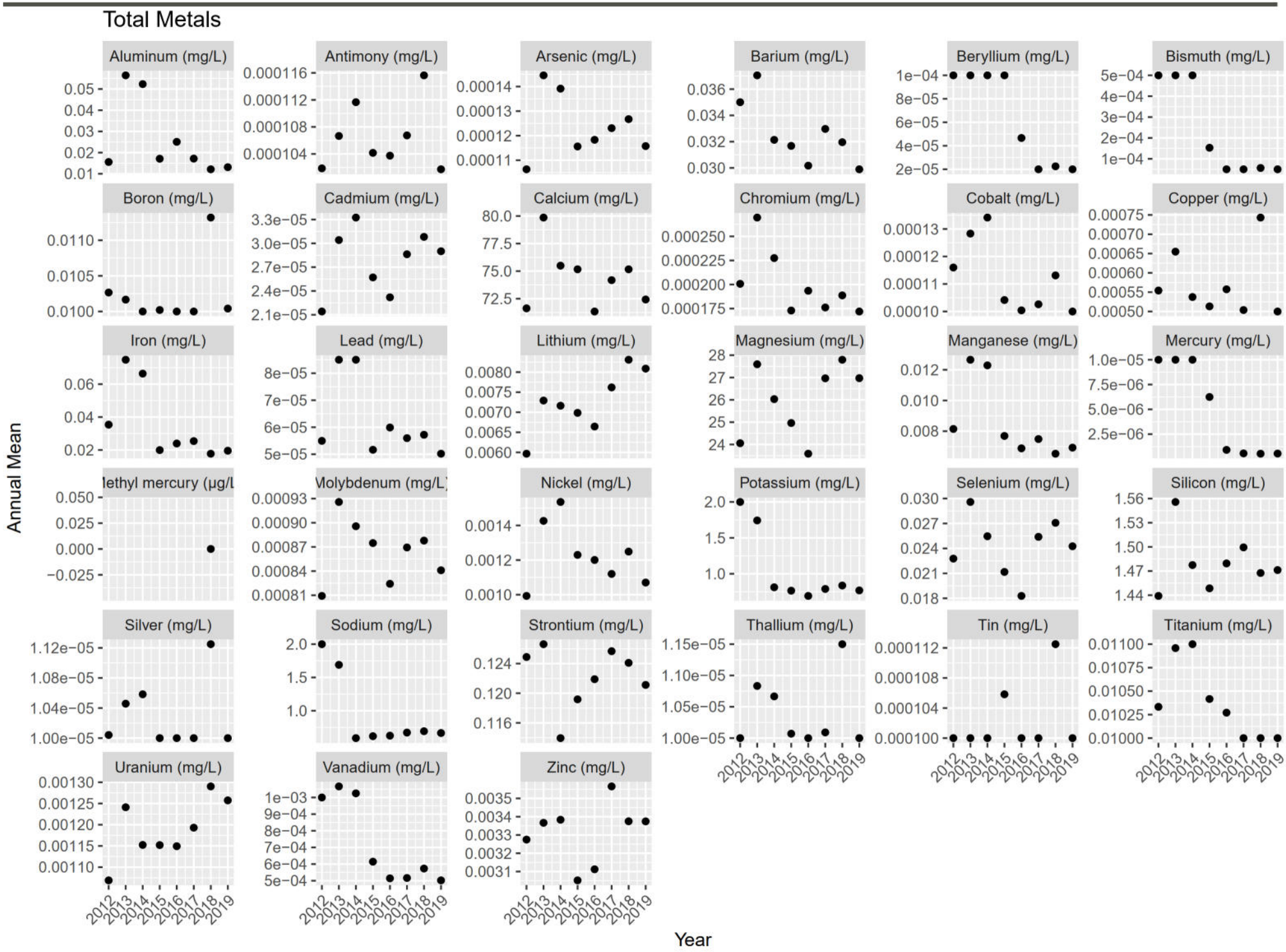

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

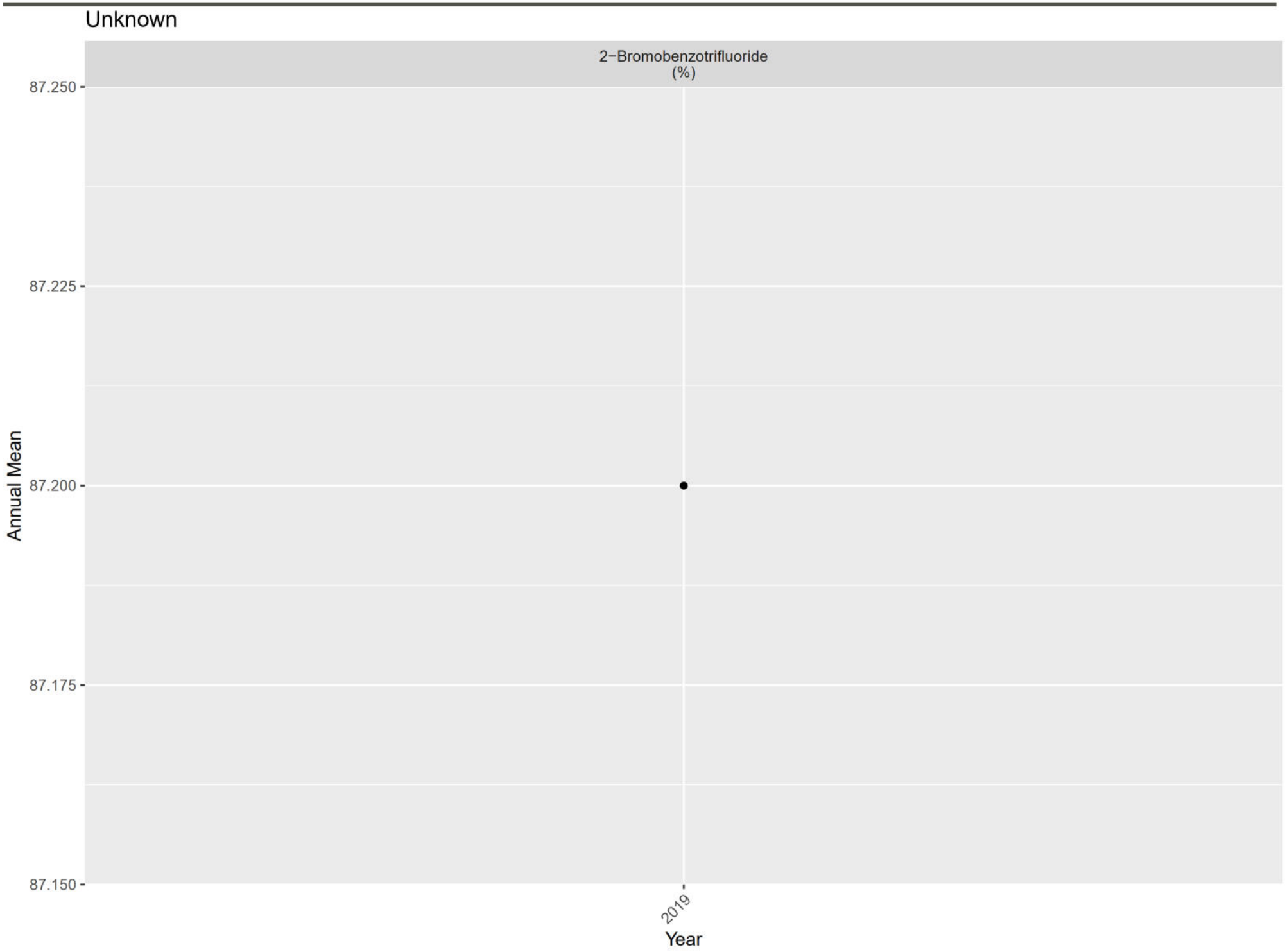

Field Measured
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Temperature (°C)
Total Suspended Solids (ppm)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

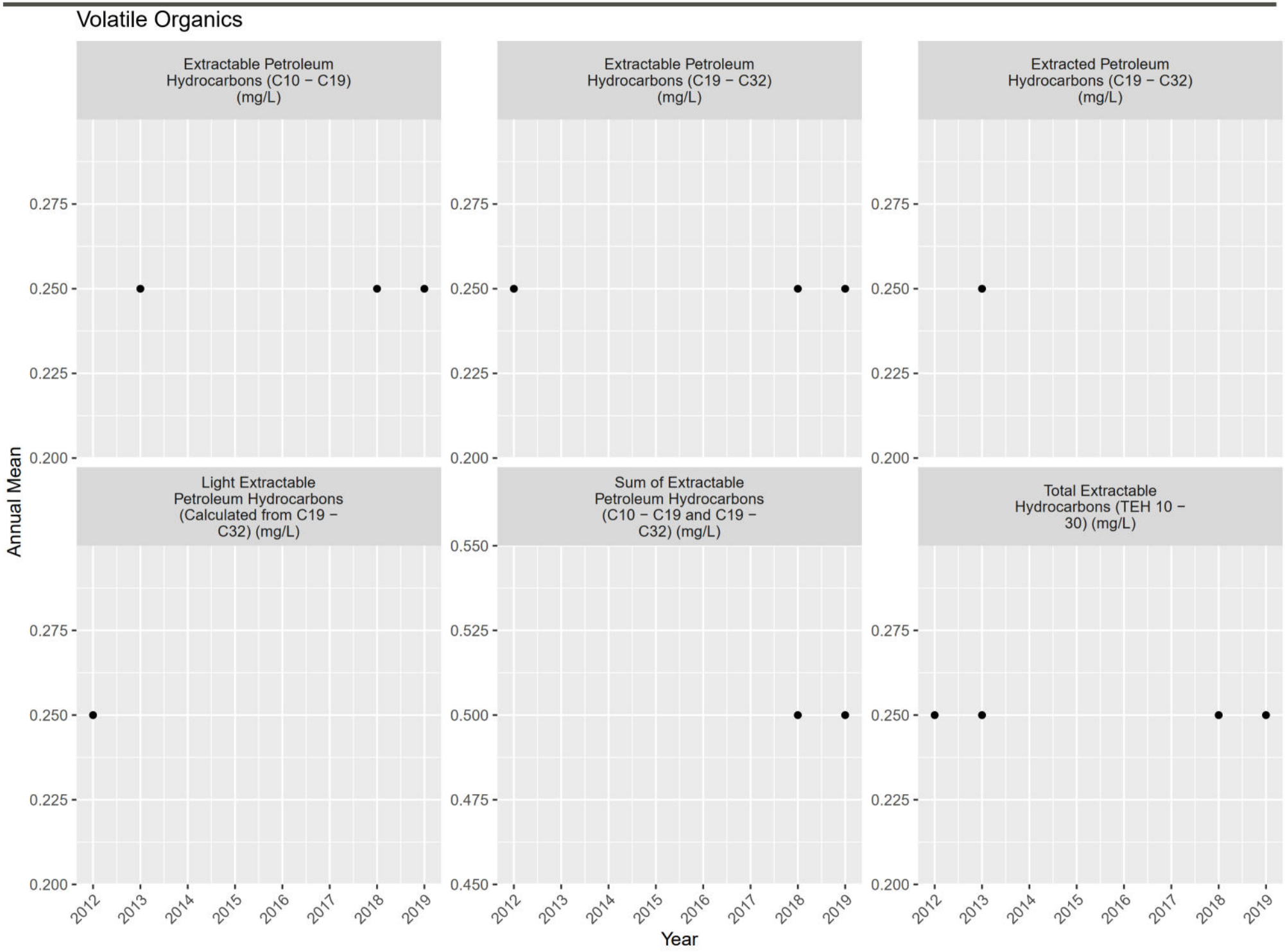

Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Silica (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Nutrients and Biological Indicators
Dissolved Ortho−phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Parent PAHs
Acenaphthene (%)
Acenaphthene (µg/L)
Acenaphthylene (µg/L)
Acridine (µg/L)
Anthracene (µg/L)
Benzo(a)anthracene (µg/L)
Benzo(a)pyrene (µg/L)
Benzo(b,j)fluoranthene (µg/L)
Benzo(g,h,i)perylene (µg/L)
Benzo(k)fluoranthene (µg/L)
Chrysene (%)
Chrysene (µg/L)
Dibenzo(a,h)anthracene (µg/L)
Fluoranthene (µg/L)
Fluorene (µg/L)
Indeno(c,d−123)pyrene (µg/L)
Naphthalene (µg/L)
Phenanthrene (%)
Phenanthrene (µg/L)
Pyrene (µg/L)
Quinoline (µg/L)
Annual Mean
Year
2019


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
lethyl mercury (µg/l
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year

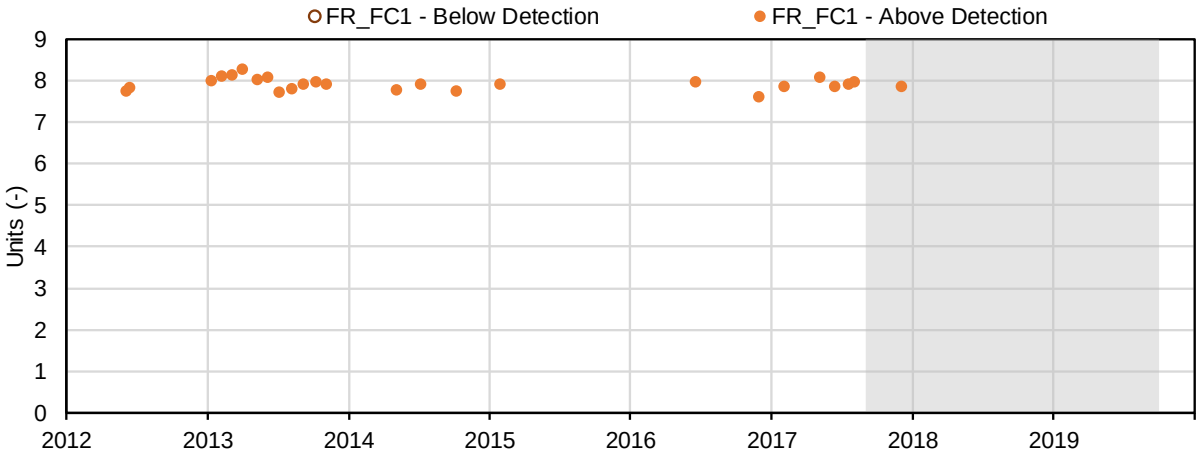

Unknown
2−Bromobenzotrifluoride
(%)
87.250
87.225
87.200
87.175
87.150
Annual Mean
2019
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extractable Petroleum Hydrocarbons (C19 − C32) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Light Extractable Petroleum Hydrocarbons (Calculated from C19 − C32) (mg/L)
Sum of Extractable Petroleum Hydrocarbons (C10 − C19 and C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
Year
0.200
0.225
0.250
0.275
0.450
0.475
0.500
0.525
0.550
2012
2013
2014
2015
2016
2017
2018
2019

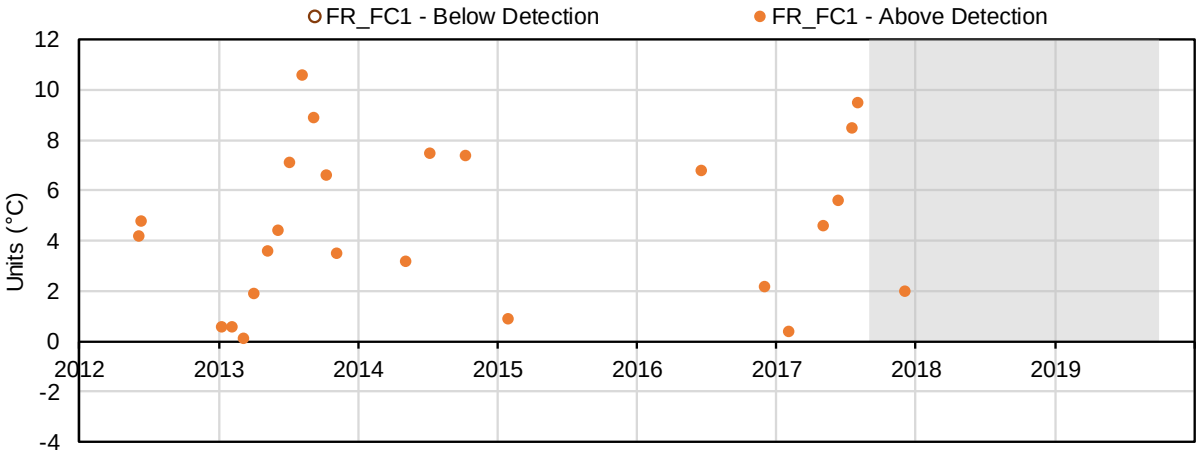
ATTACHMENT F20

FR_FC1 Plots

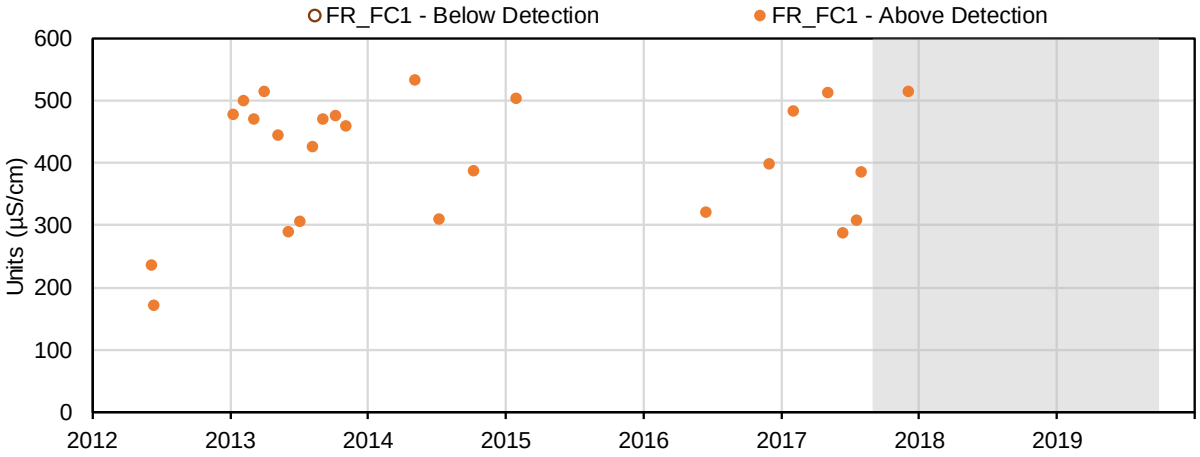
(1) pH (-); Field Measured



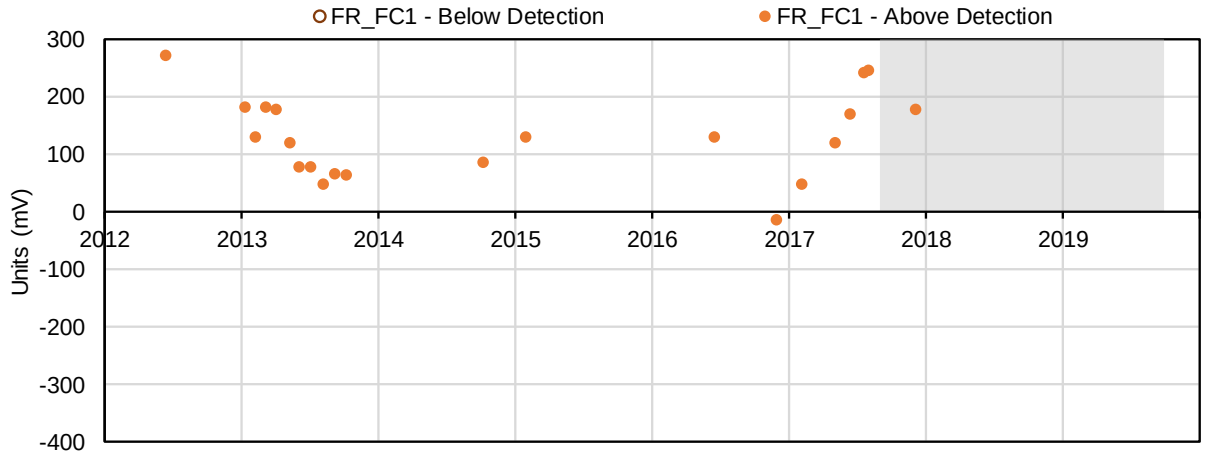
(2) Temperature (°C); Field Measured



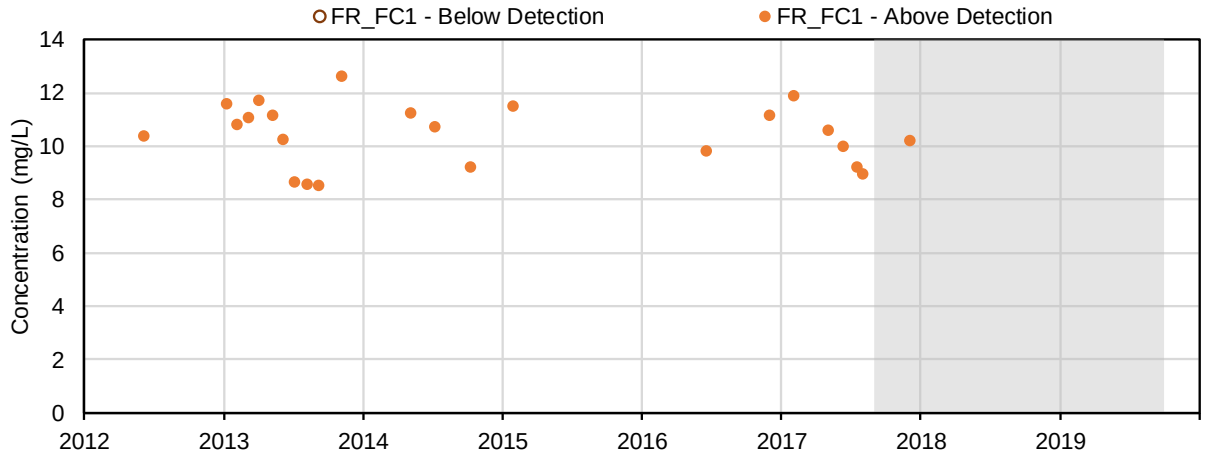
(3) Conductivity (µS/cm); Field Measured



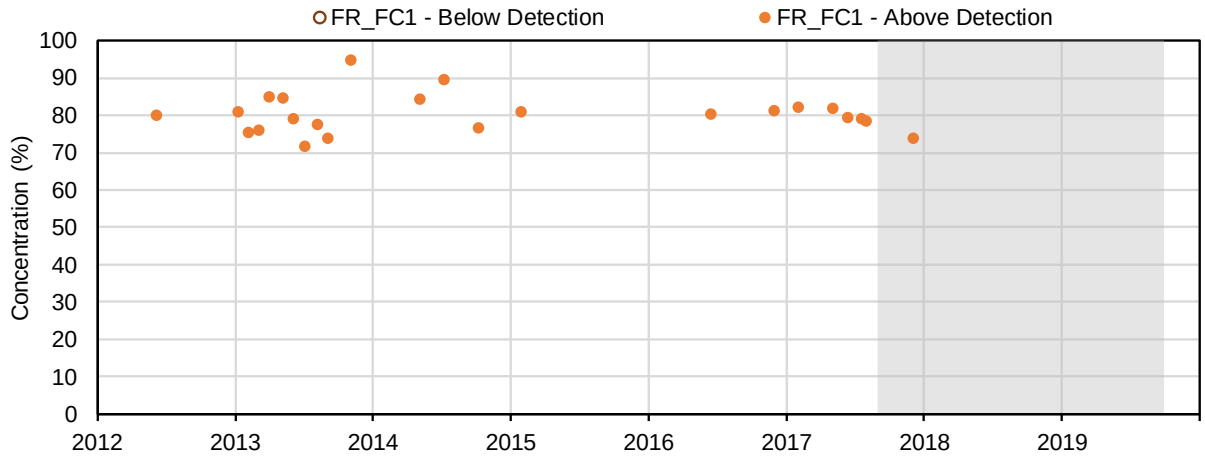
(4) Oxidation-Reduction Potential (mV); Field Measured



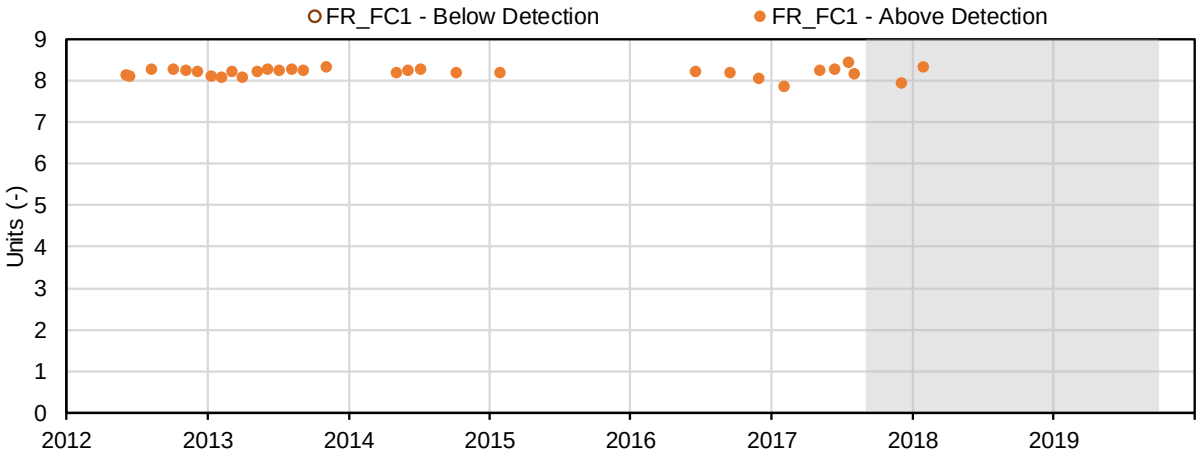
(5) Dissolved Oxygen (mg/L); Field Measured



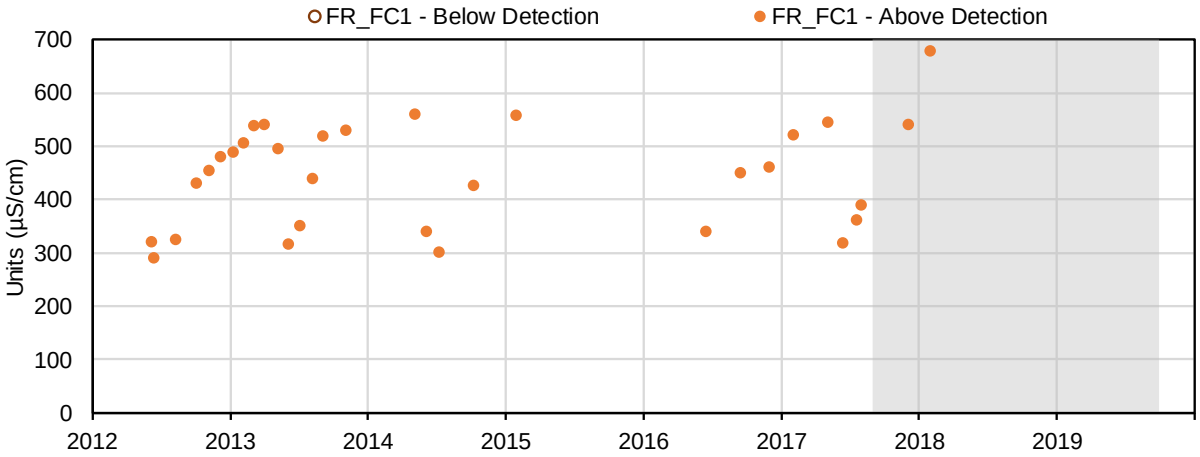
(6) Dissolved Oxygen (%); Field Measured



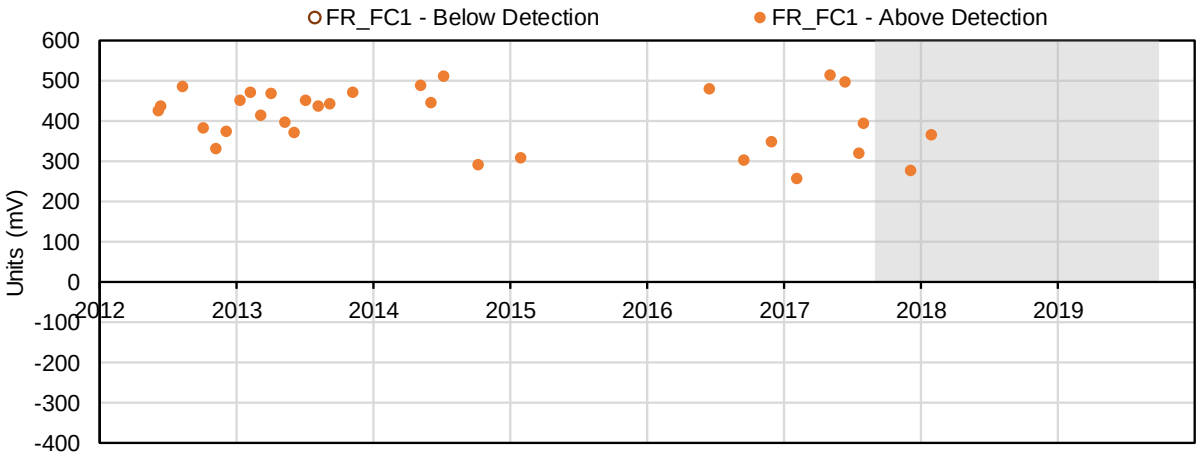
(7) pH (-); Conventional Parameters



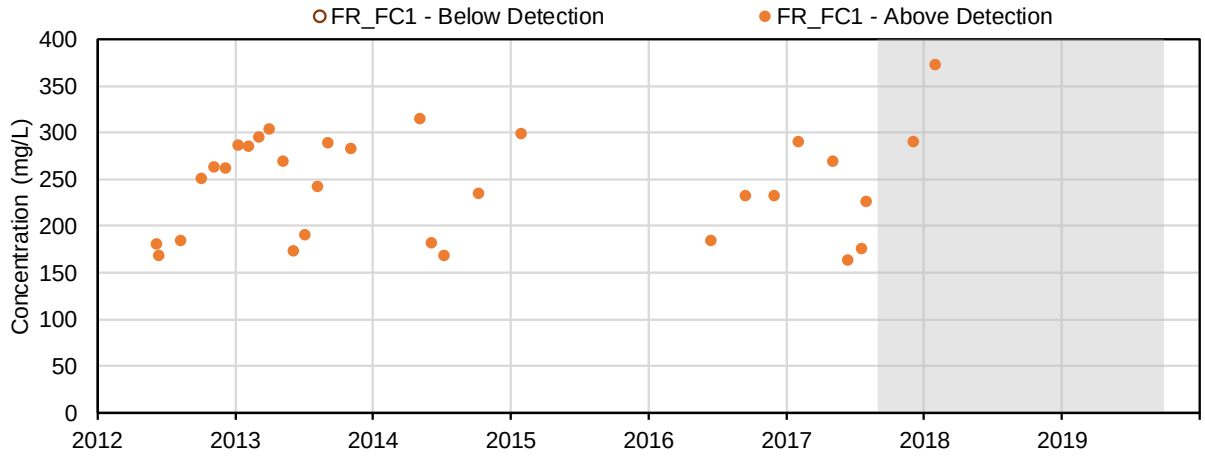
(8) Conductivity (µS/cm); Conventional Parameters



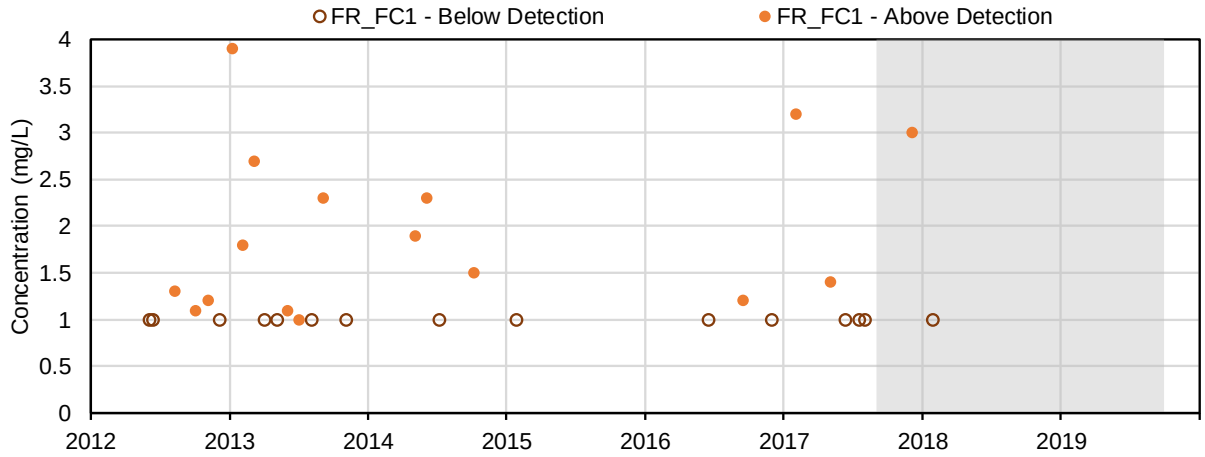
(9) Oxidation-Reduction Potential (mV); Conventional Parameters



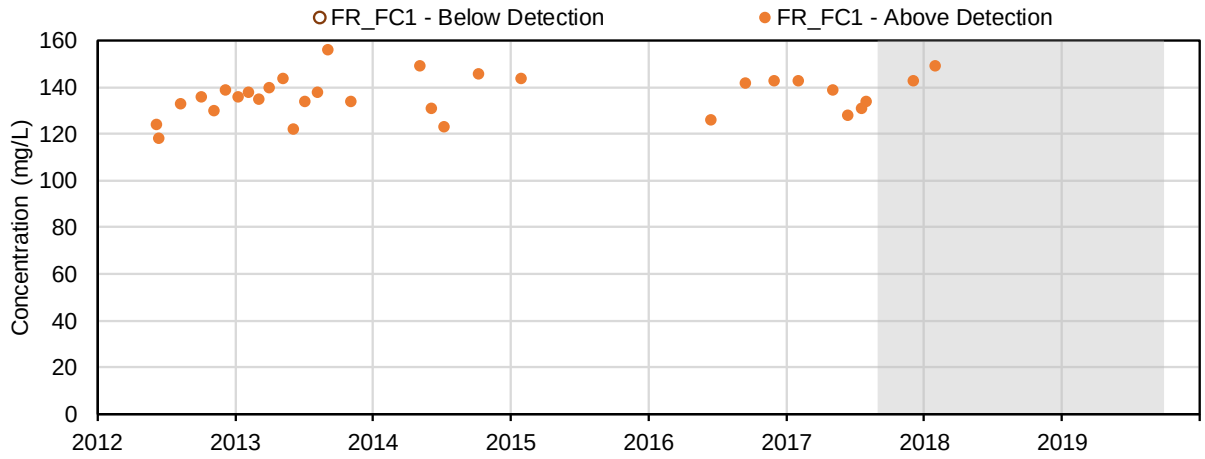
(10) Hardness, as CaCO3 (mg/L); Conventional Parameters



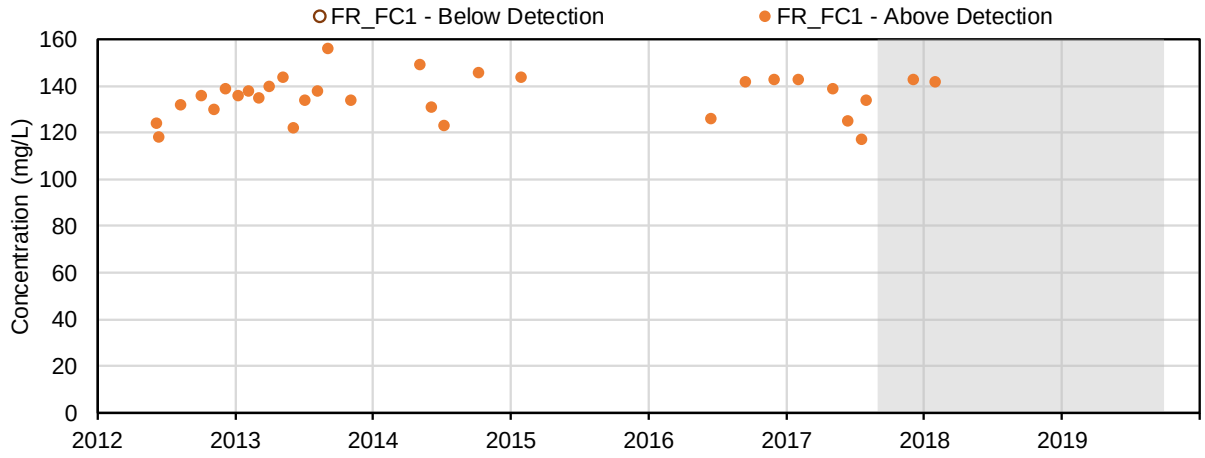
(11) Acidity, CaCO3 (mg/L); Conventional Parameters



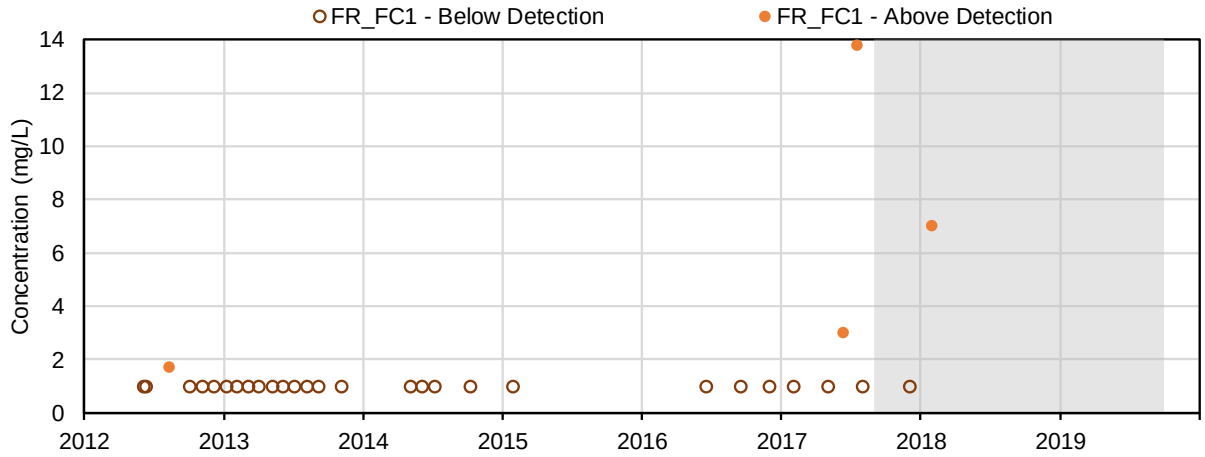
(12) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



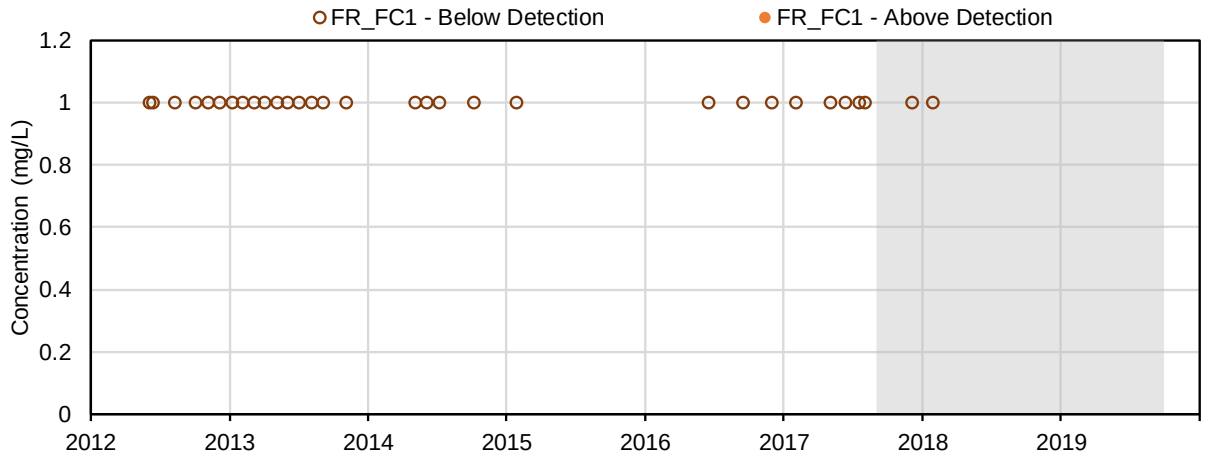
(13) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



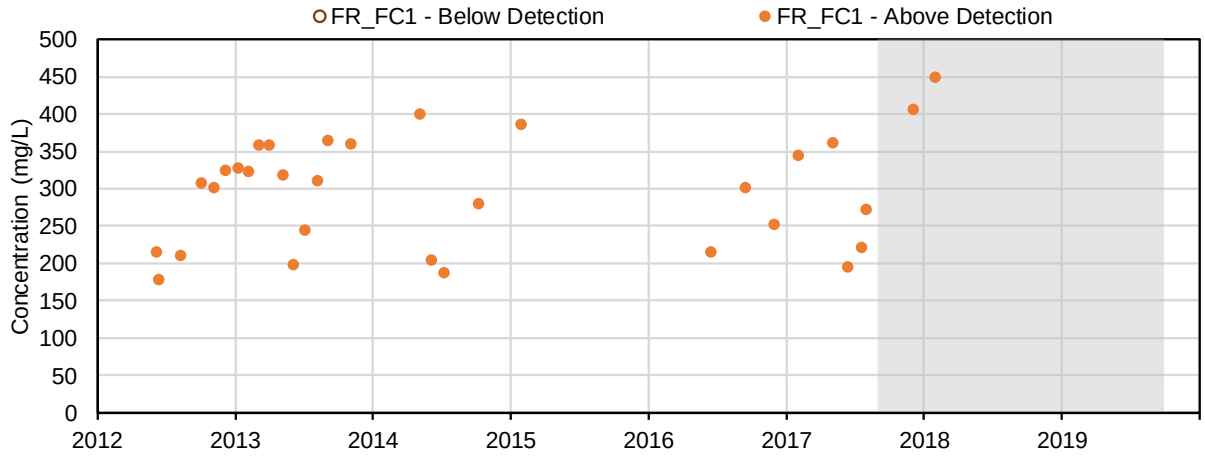
(14) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



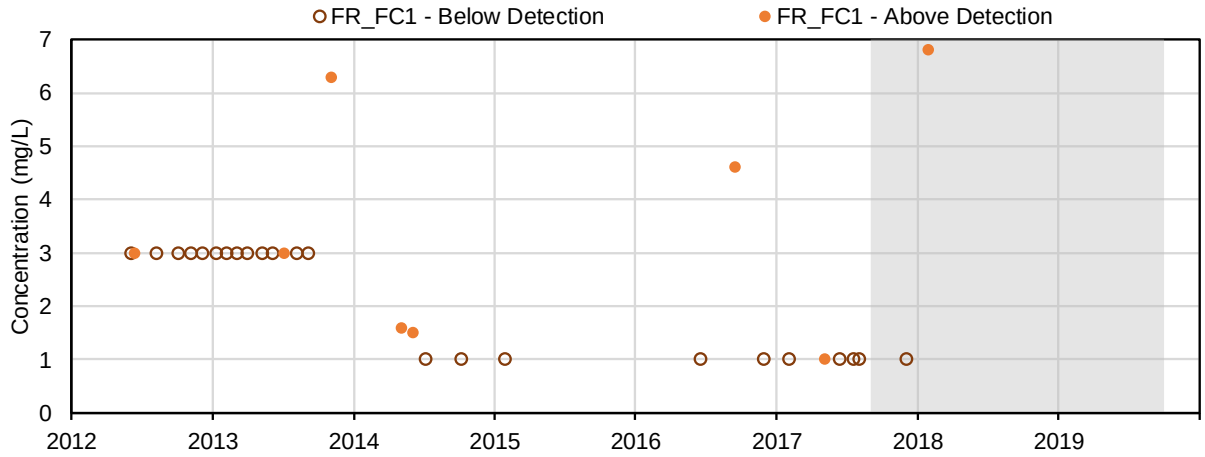
(15) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



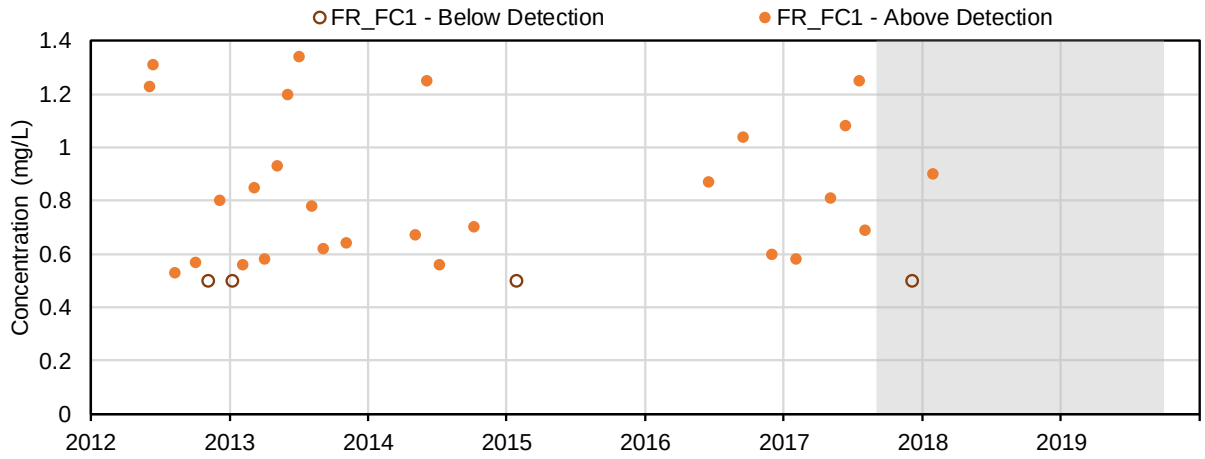
(16) Total dissolved solids (mg/L); Conventional Parameters



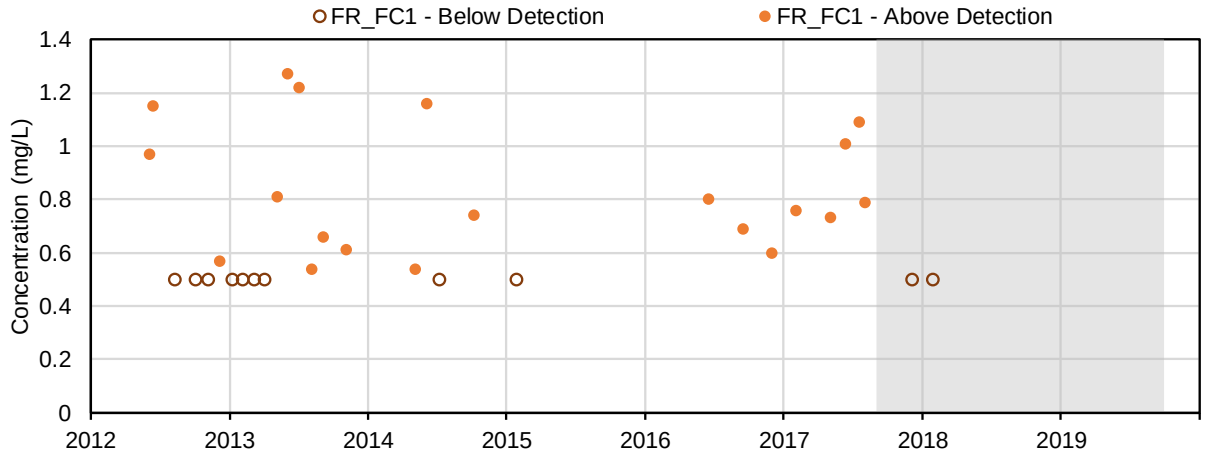
(17) Total suspended solids (mg/L); Conventional Parameters



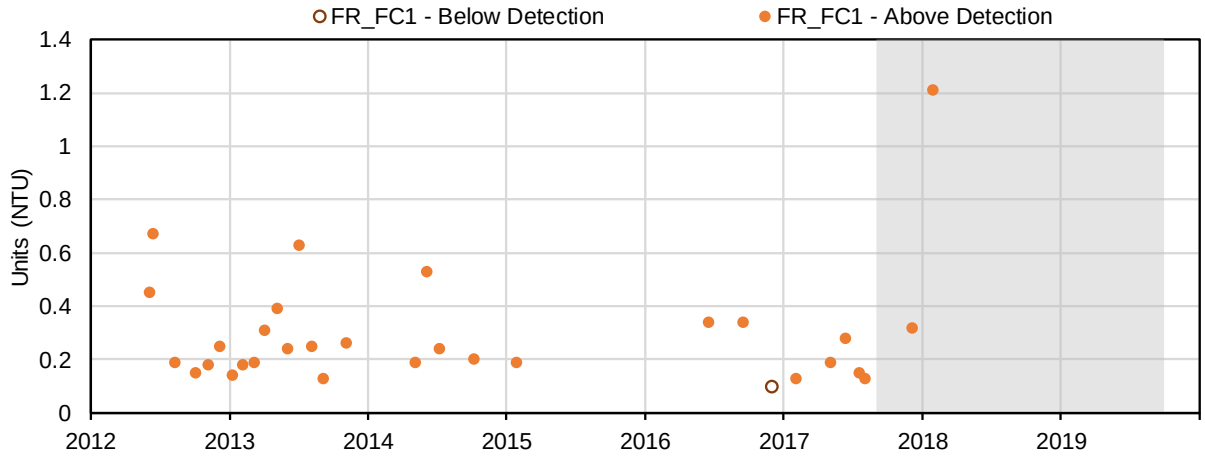
(18) Total organic carbon (mg/L); Conventional Parameters



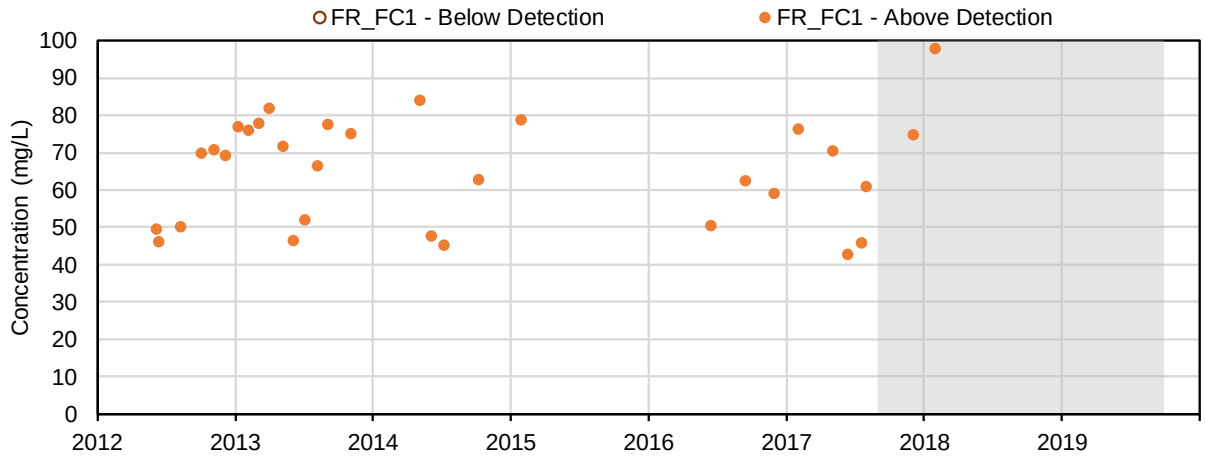
(19) Dissolved organic carbon (mg/L); Conventional Parameters



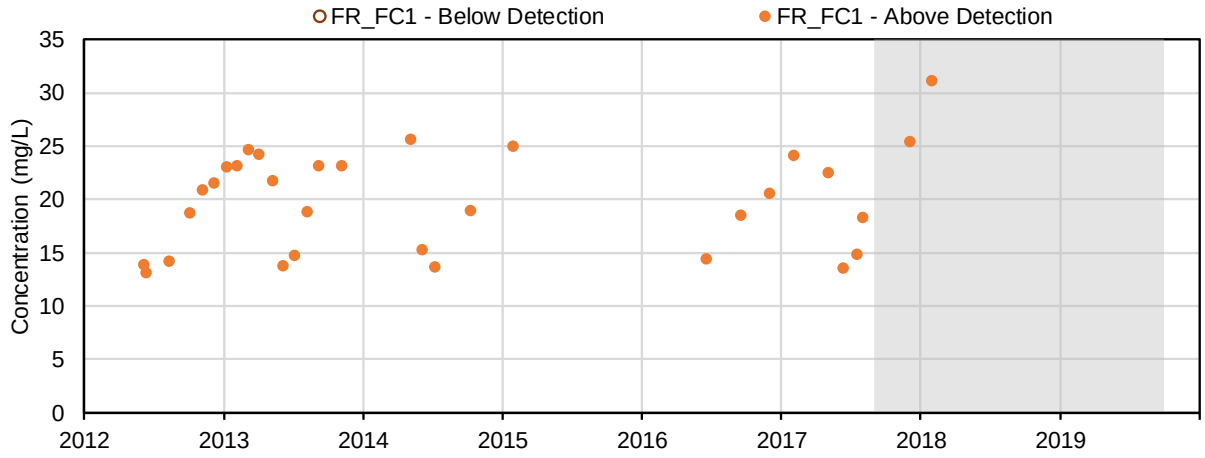
(20) Turbidity (NTU); Conventional Parameters



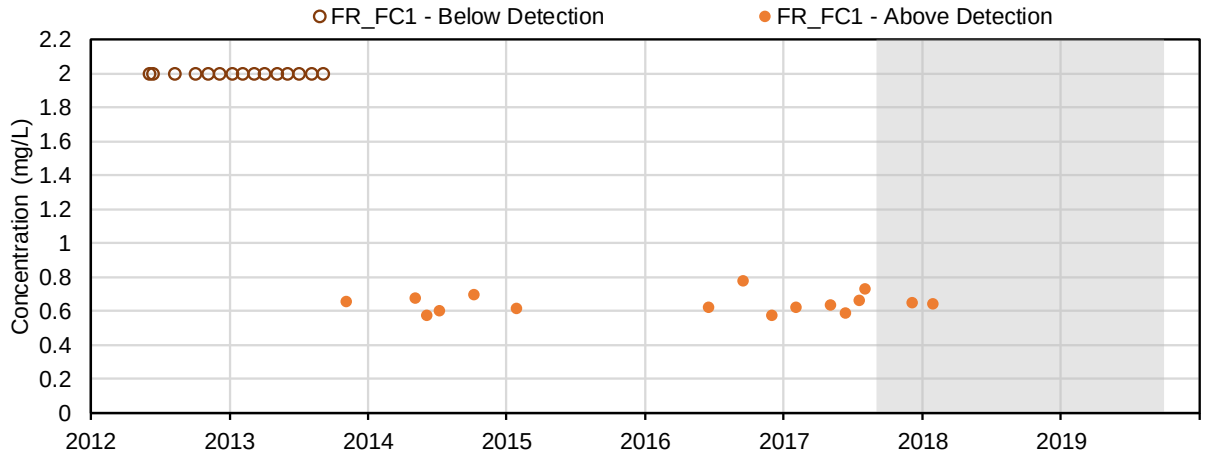
(21) Calcium (mg/L); Major Ions



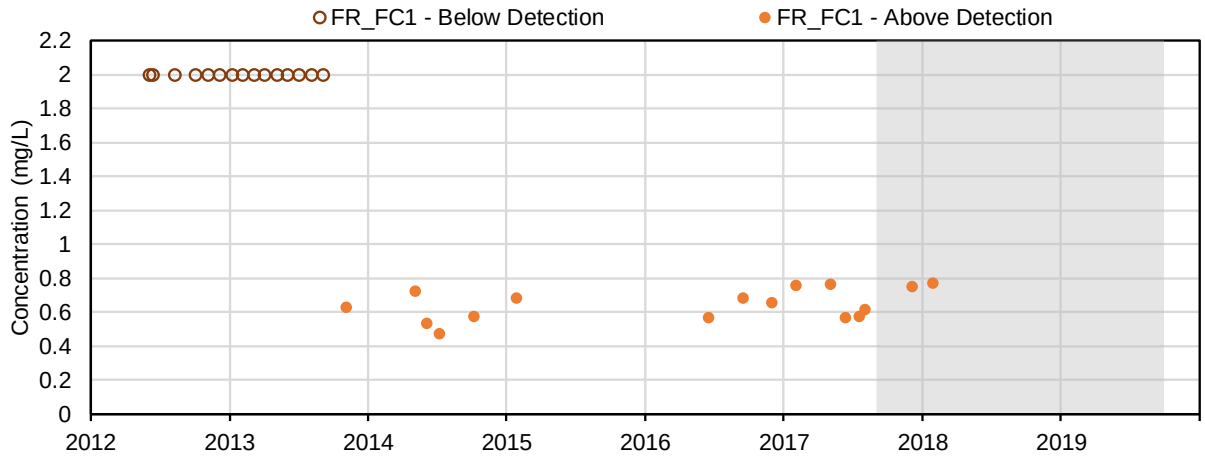
(22) Magnesium (mg/L); Major Ions



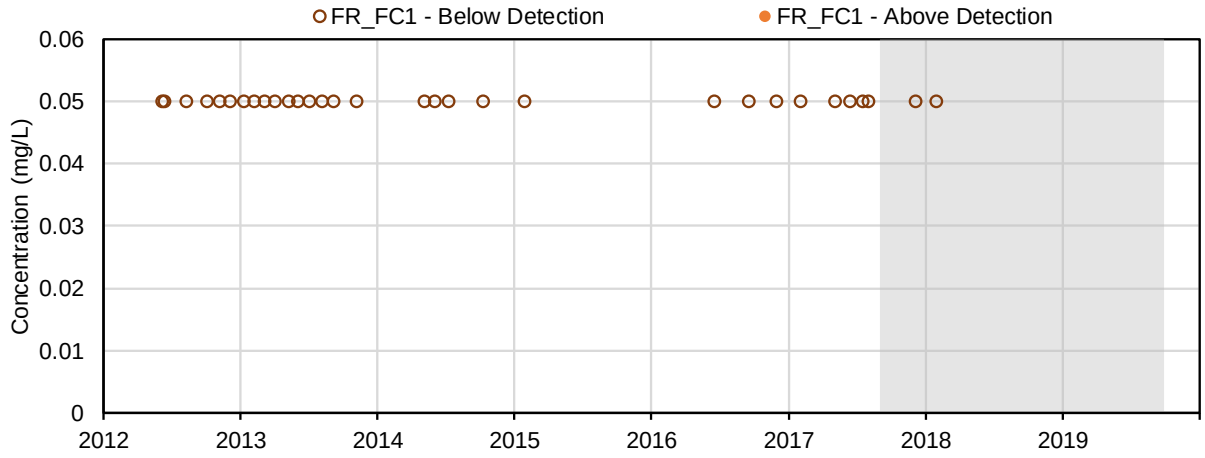
(23) Potassium (mg/L); Major Ions



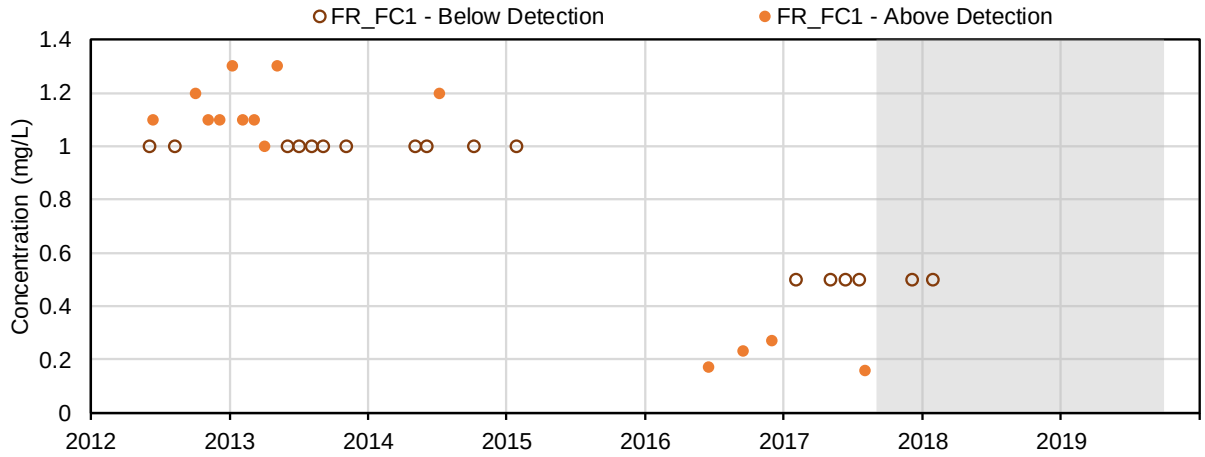
(24) Sodium (mg/L); Major Ions



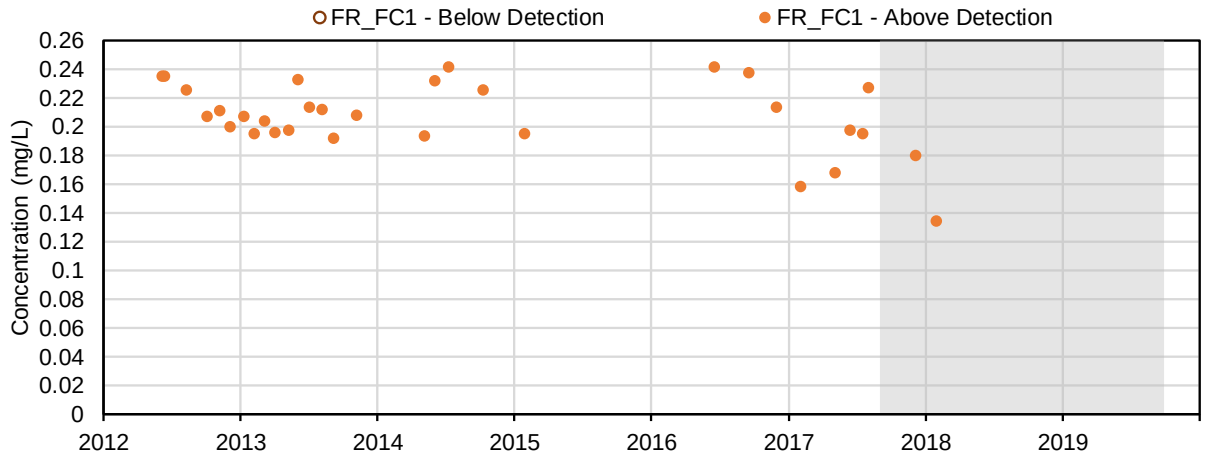
(25) Bromide (mg/L); Major Ions



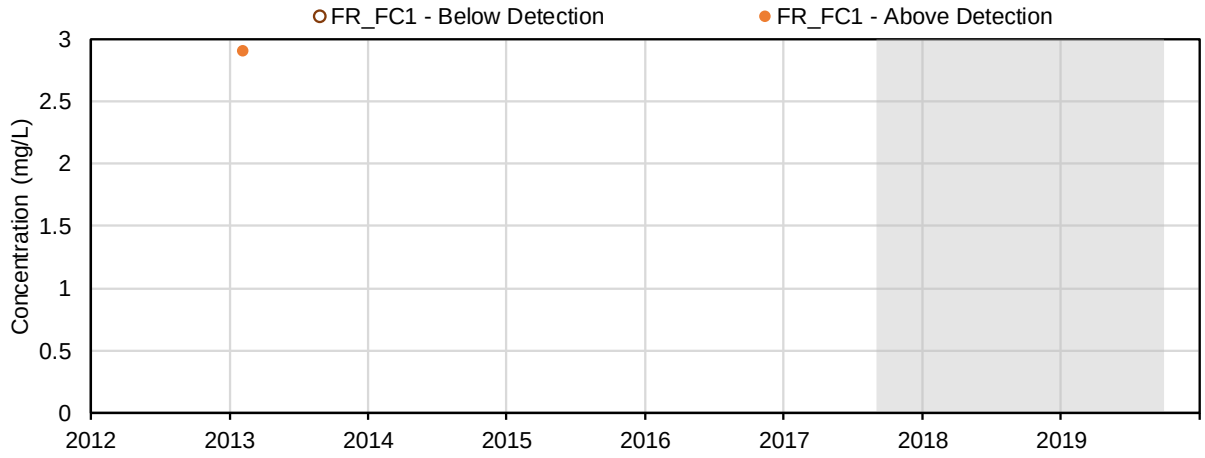
(26) Chloride (mg/L); Major Ions



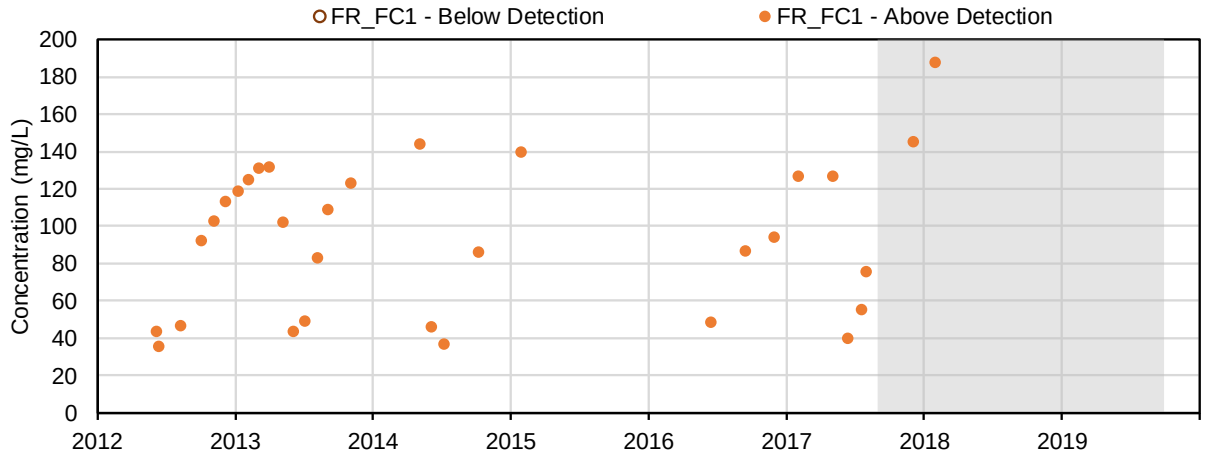
(27) Fluoride (mg/L); Major Ions



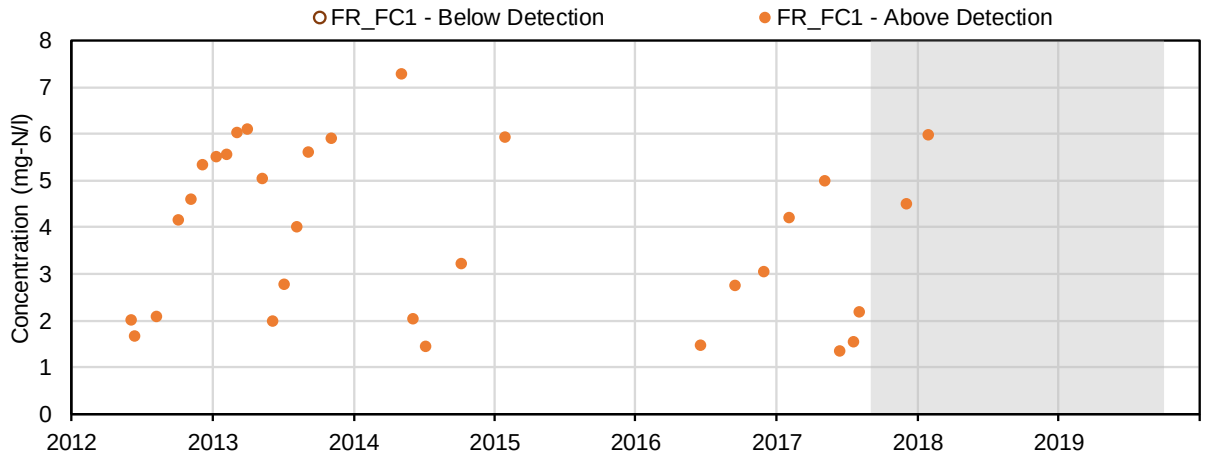
(28) Silica (mg/L); Major Ions



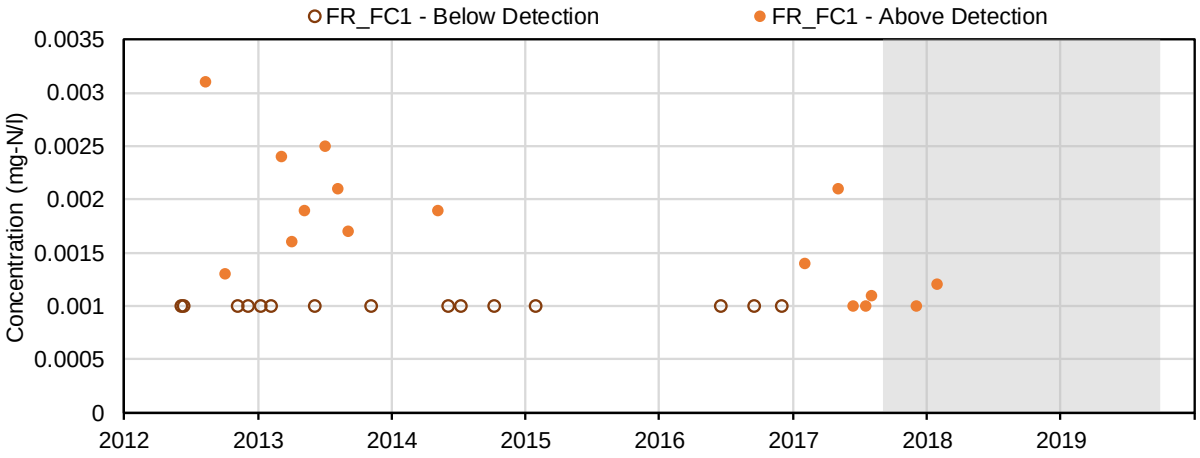
(29) Sulphate (mg/L); Major Ions



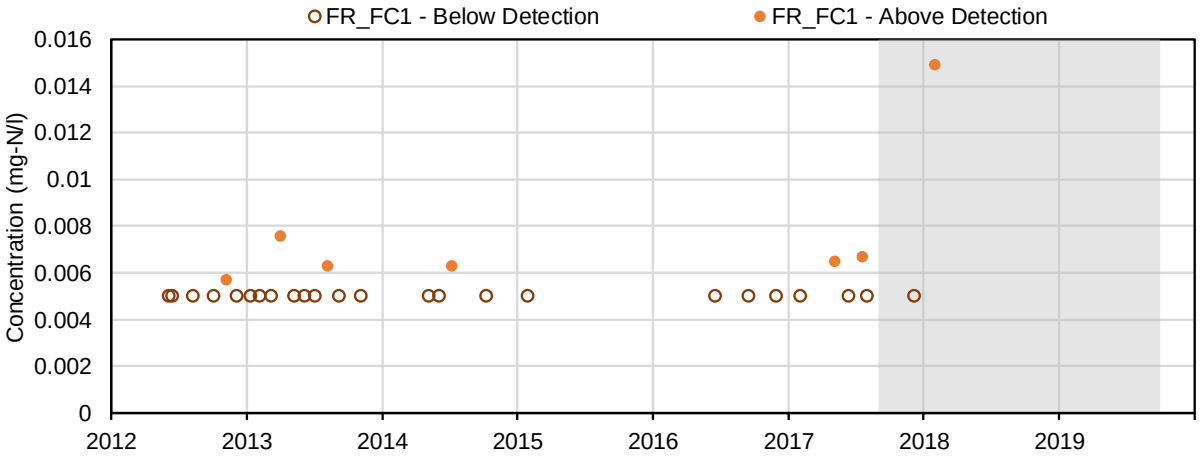
(30) Nitrate (mg-N/l); Nutrients and Biological Indicators



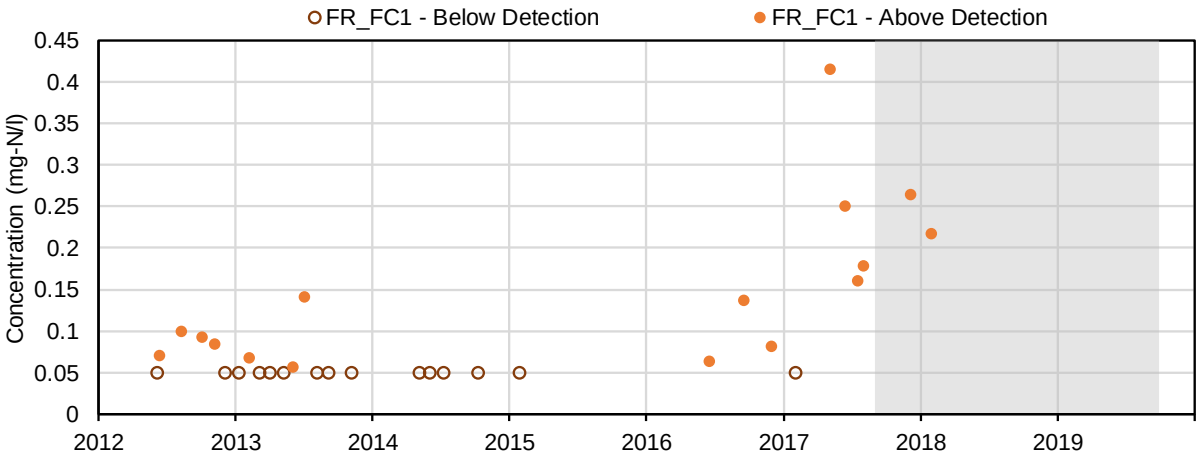
(31) Nitrite (mg-N/l); Nutrients and Biological Indicators



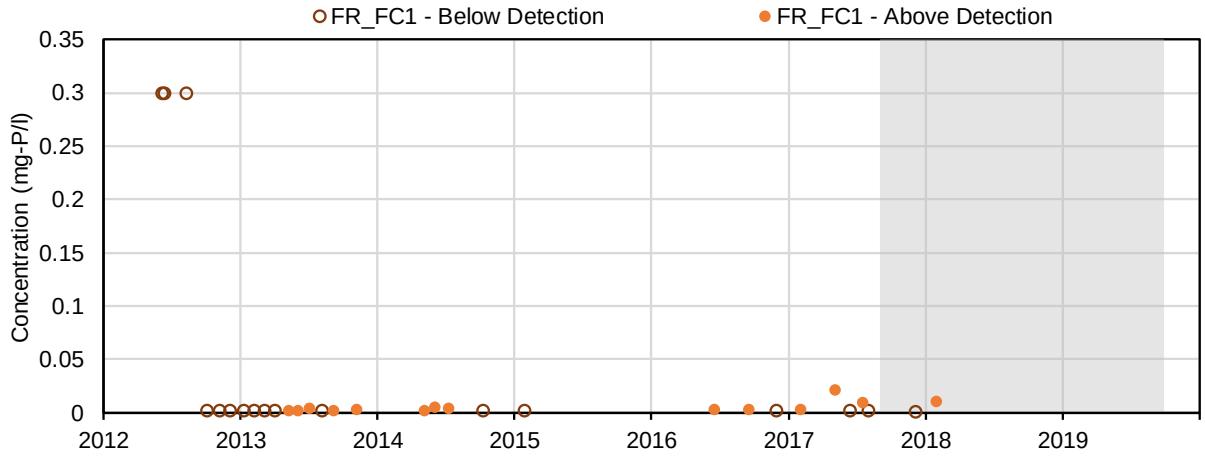
(32) Total ammonia (mg-N/l); Nutrients and Biological Indicators



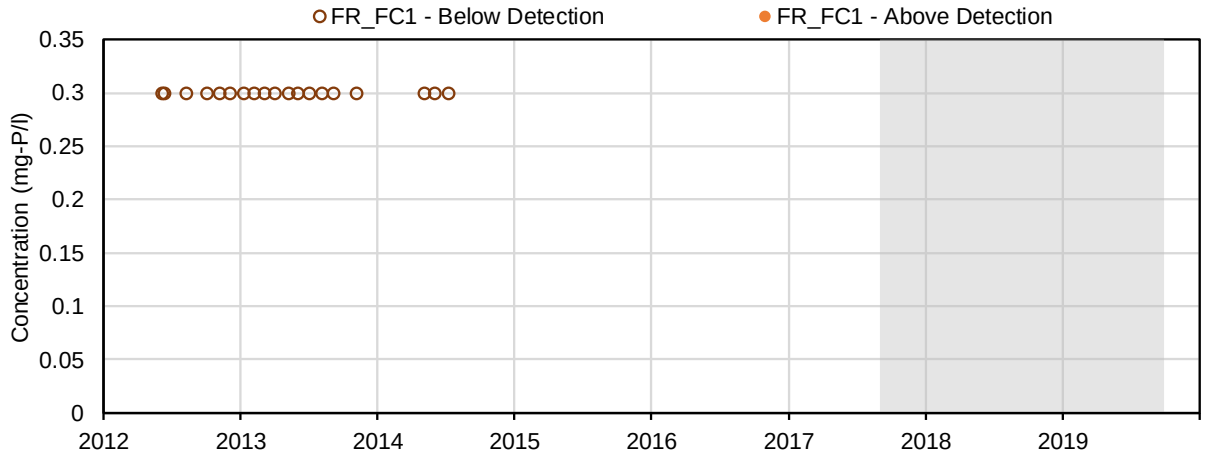
(33) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



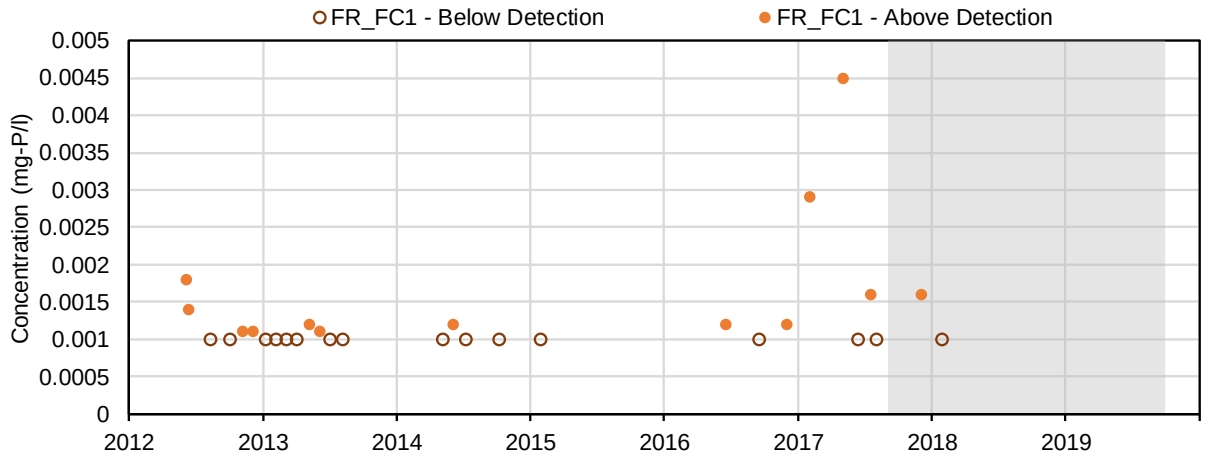
(34) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



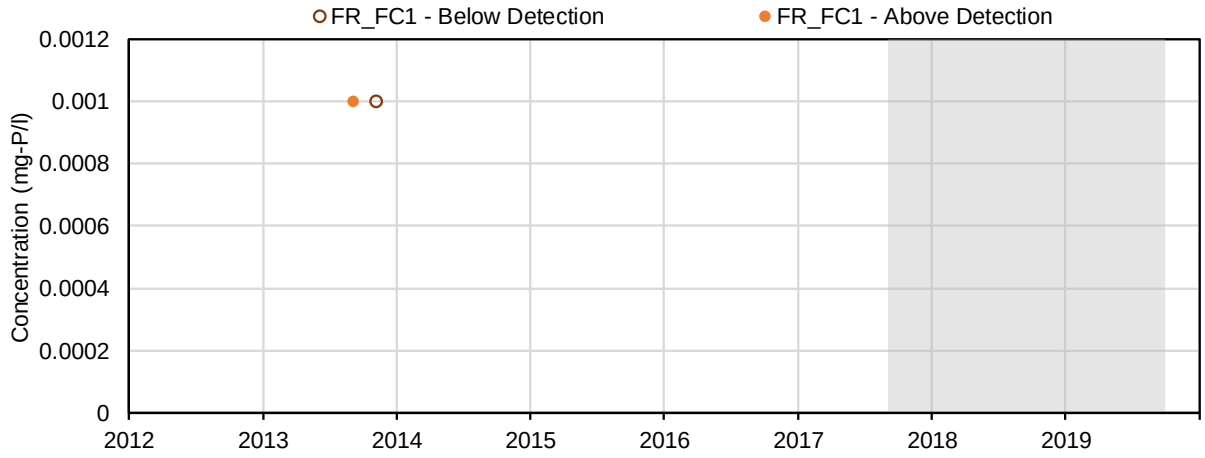
(35) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



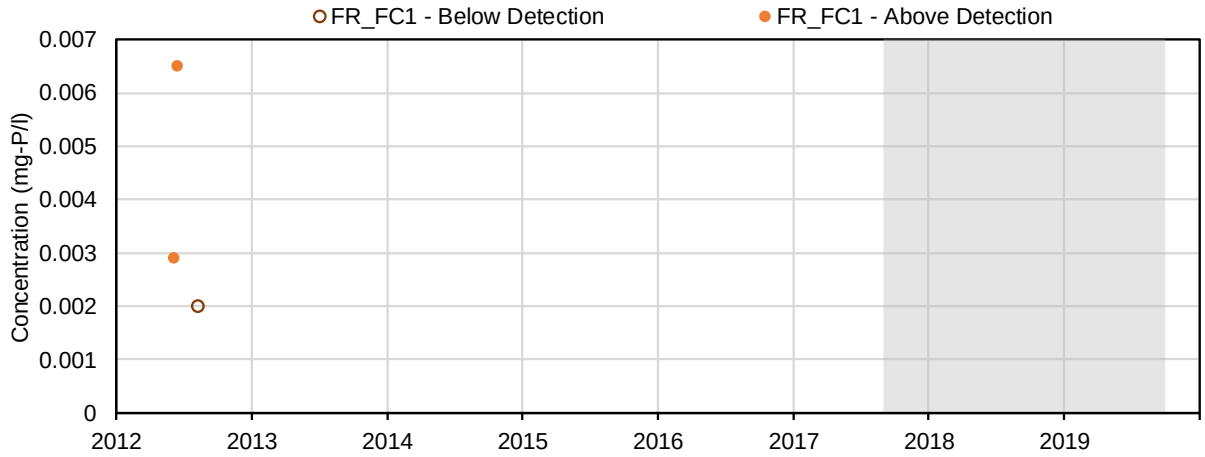
(36) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



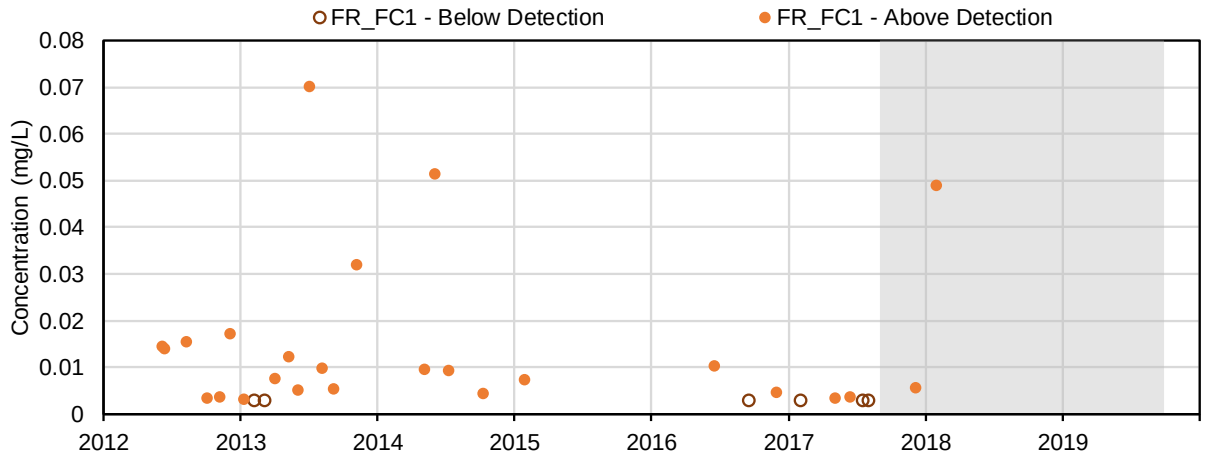
(37) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



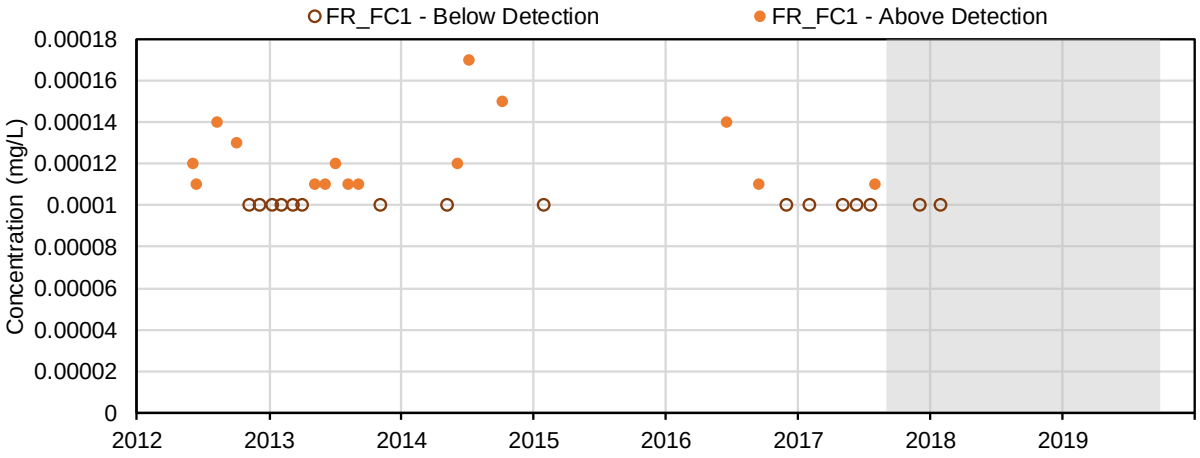
(38) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



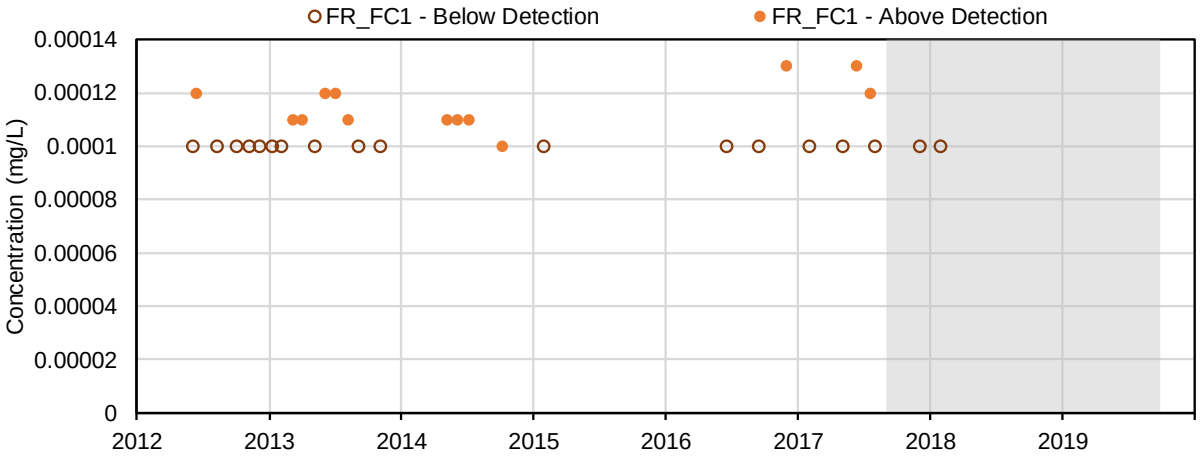
(39) Aluminum (mg/L); Total Metals



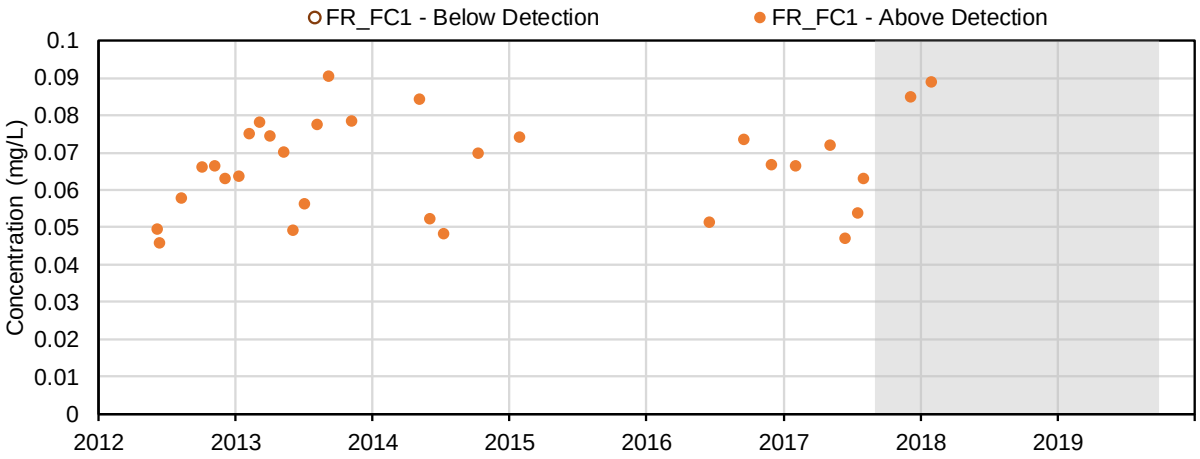
(40) Antimony (mg/L); Total Metals



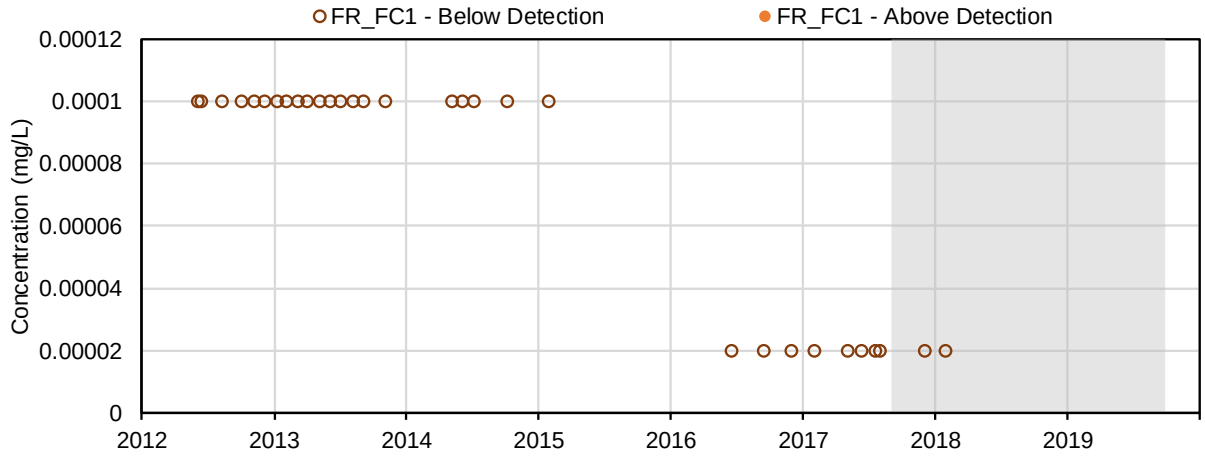
(41) Arsenic (mg/L); Total Metals



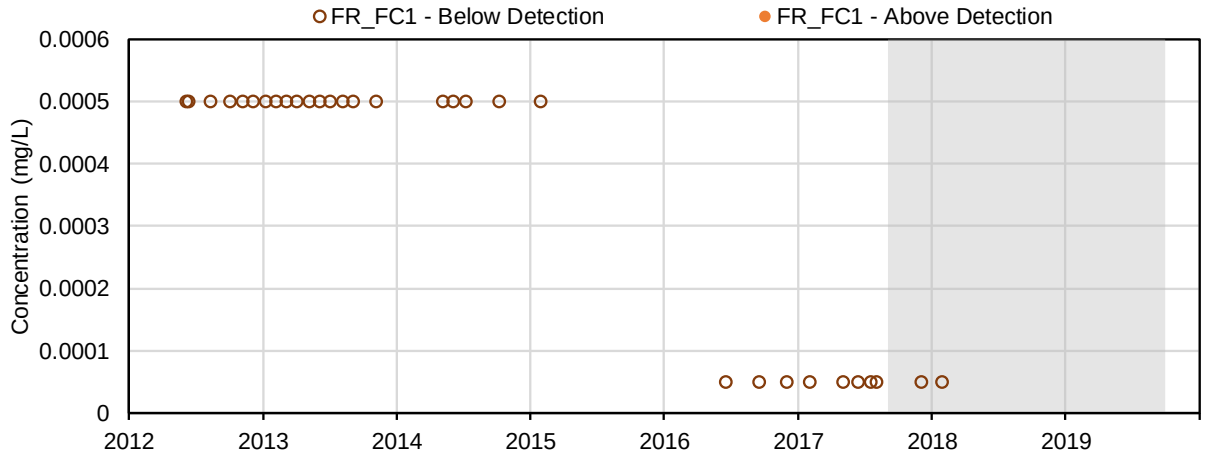
(42) Barium (mg/L); Total Metals



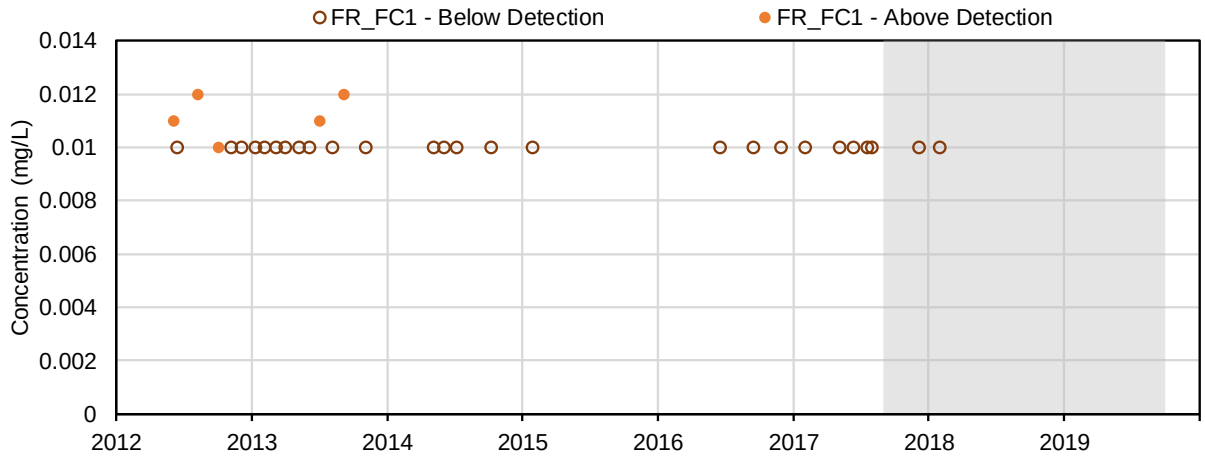
(43) Beryllium (mg/L); Total Metals



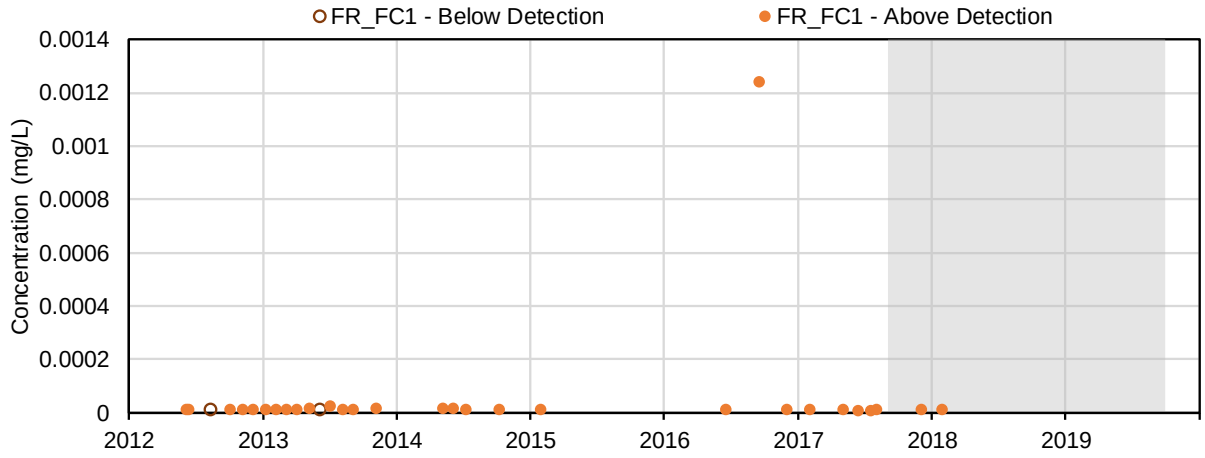
(44) Bismuth (mg/L); Total Metals



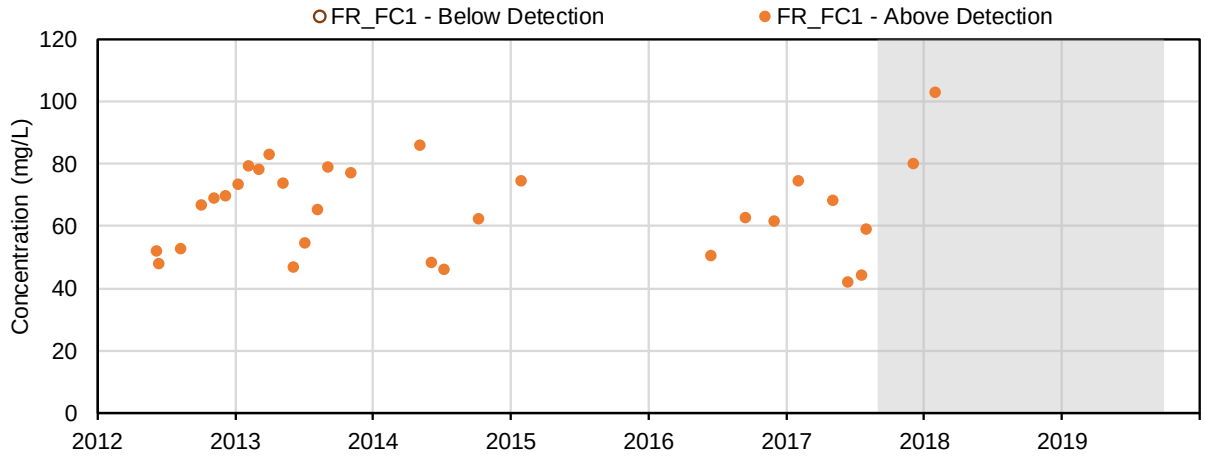
(45) Boron (mg/L); Total Metals



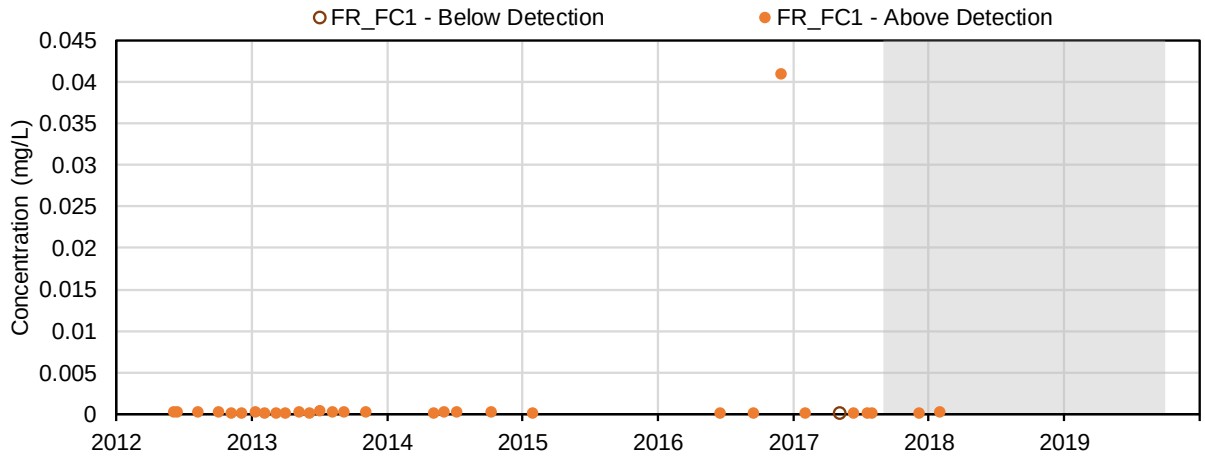
(46) Cadmium (mg/L); Total Metals



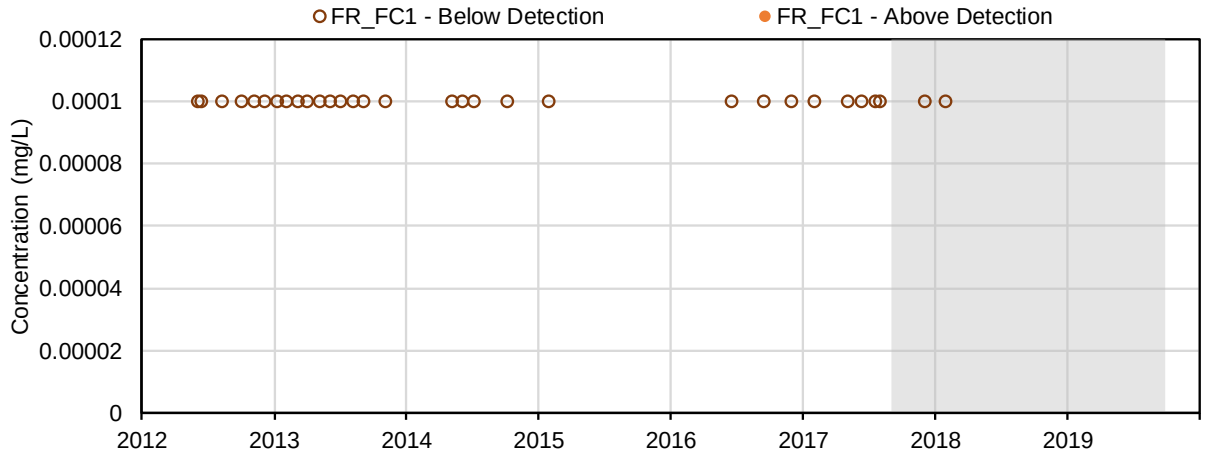
(47) Calcium (mg/L); Total Metals



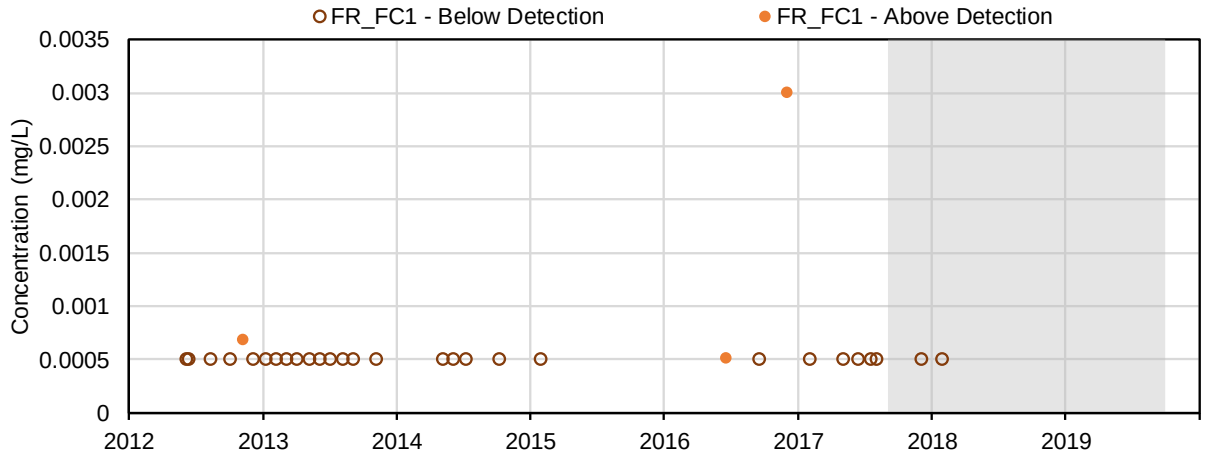
(48) Chromium (mg/L); Total Metals



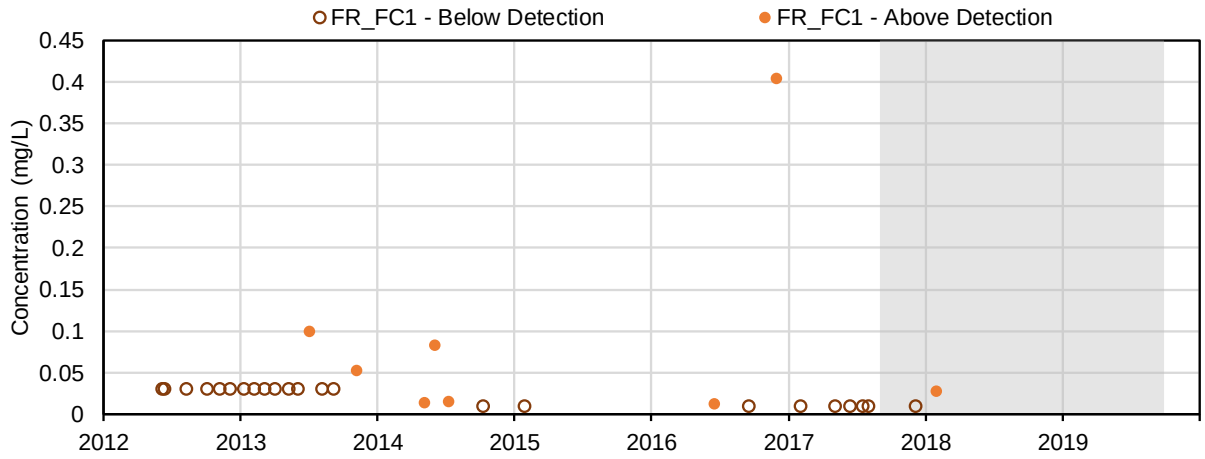
(49) Cobalt (mg/L); Total Metals



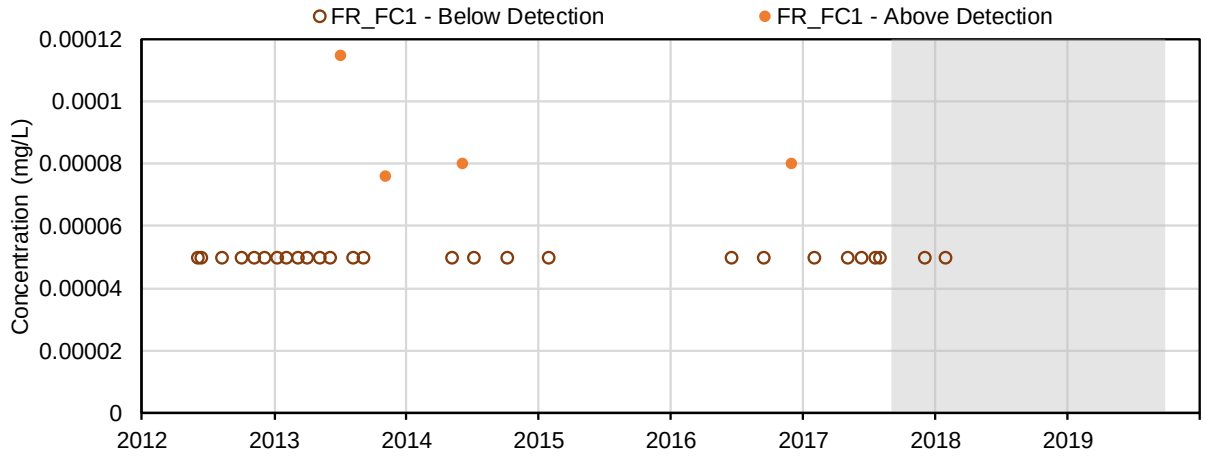
(50) Copper (mg/L); Total Metals



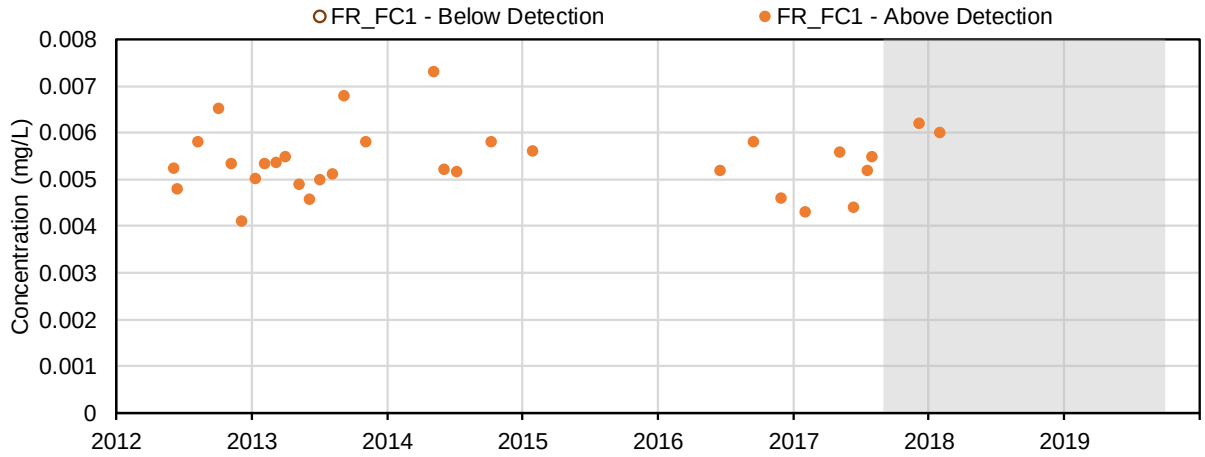
(51) Iron (mg/L); Total Metals



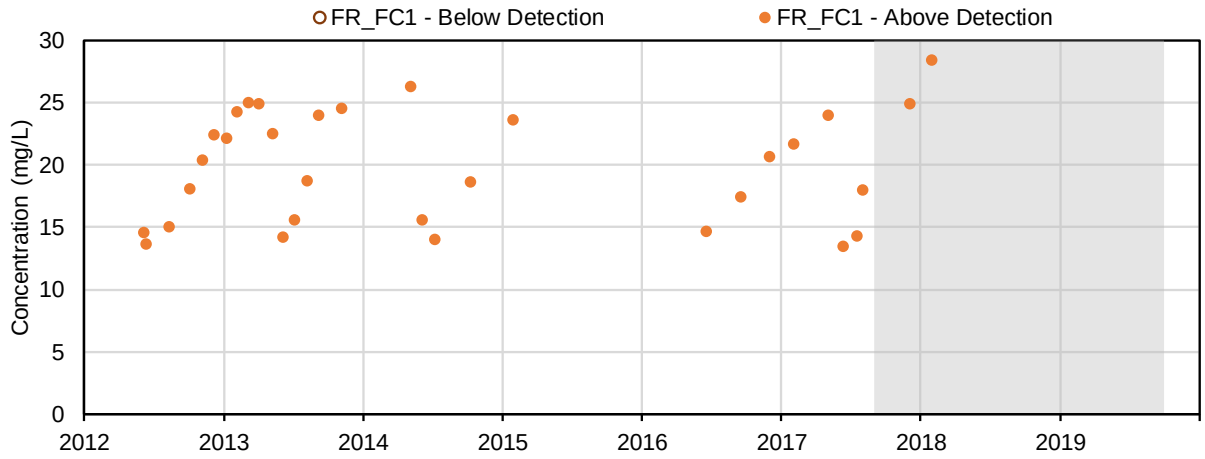
(52) Lead (mg/L); Total Metals



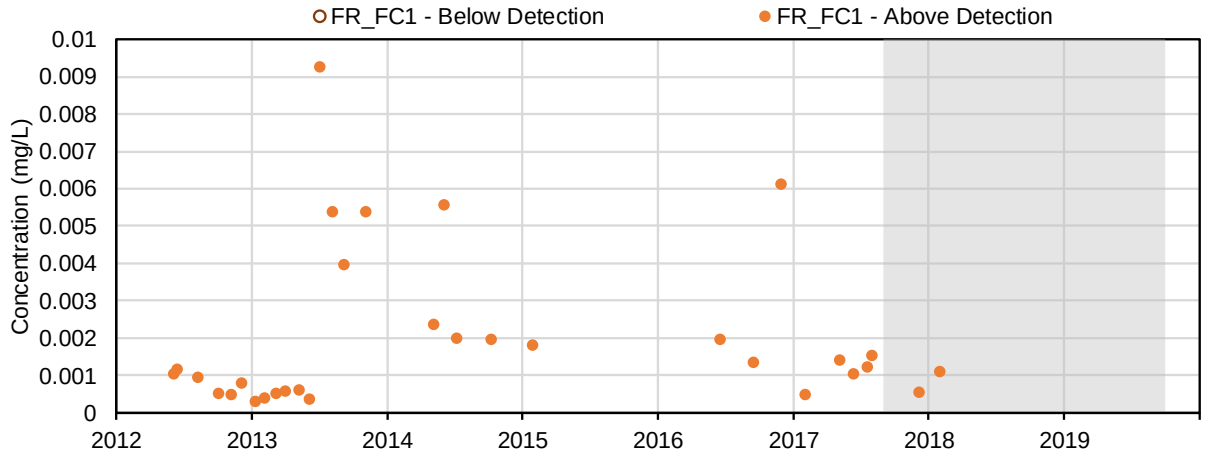
(53) Lithium (mg/L); Total Metals



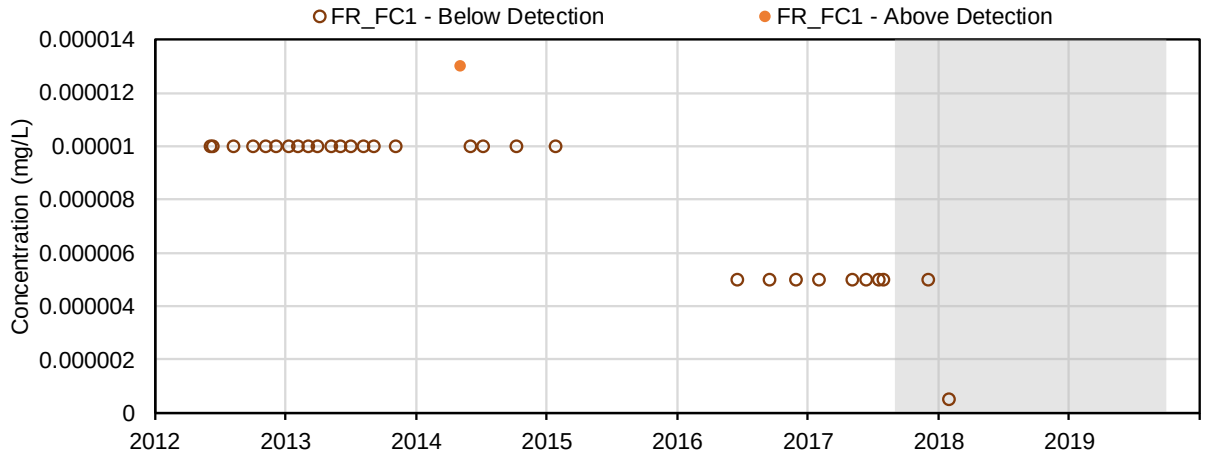
(54) Magnesium (mg/L); Total Metals



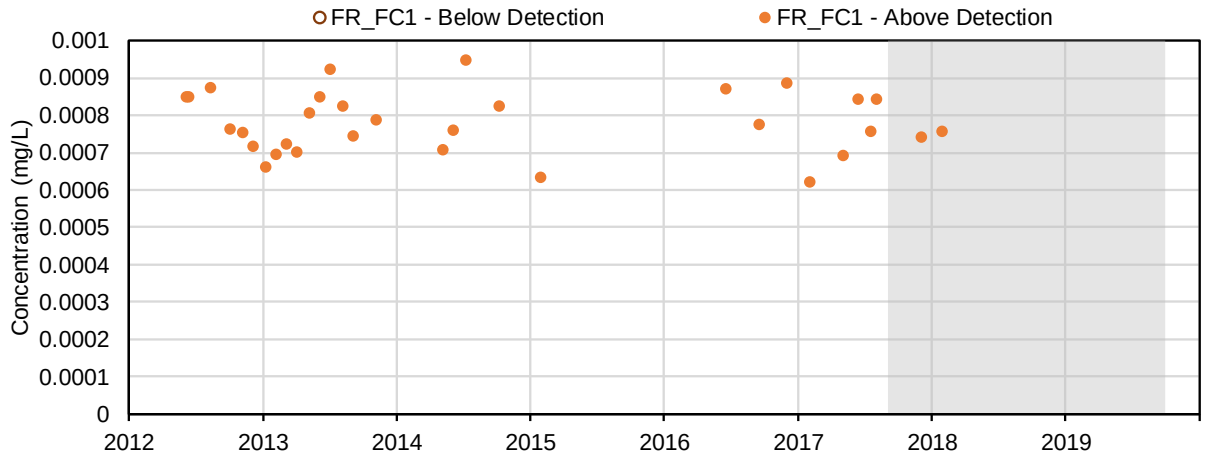
(55) Manganese (mg/L); Total Metals



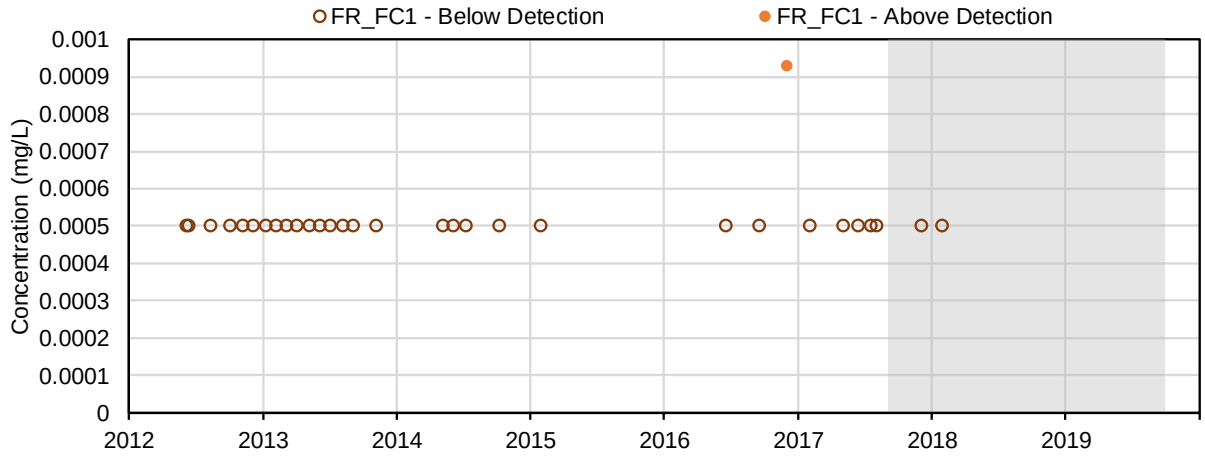
(56) Mercury (mg/L); Total Metals



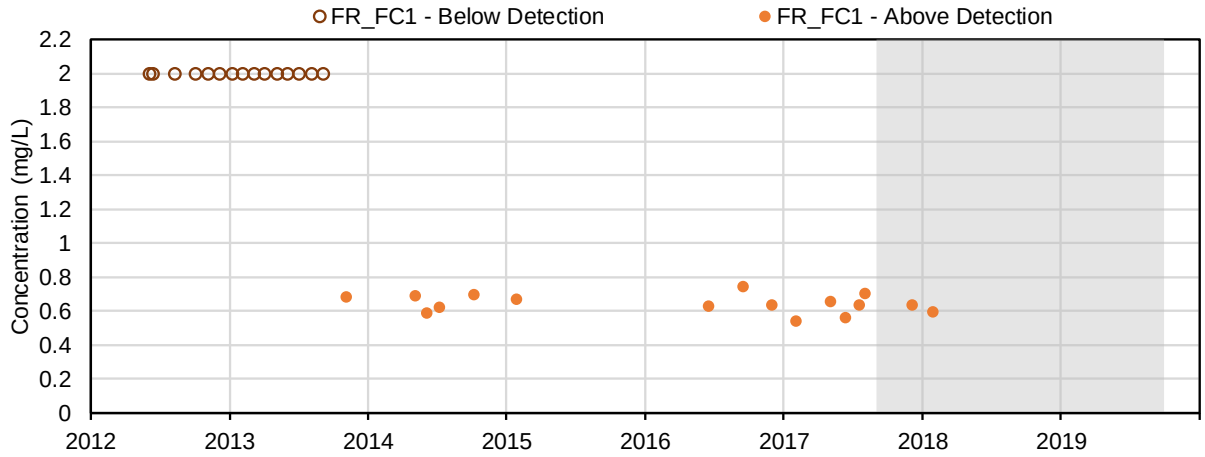
(57) Molybdenum (mg/L); Total Metals



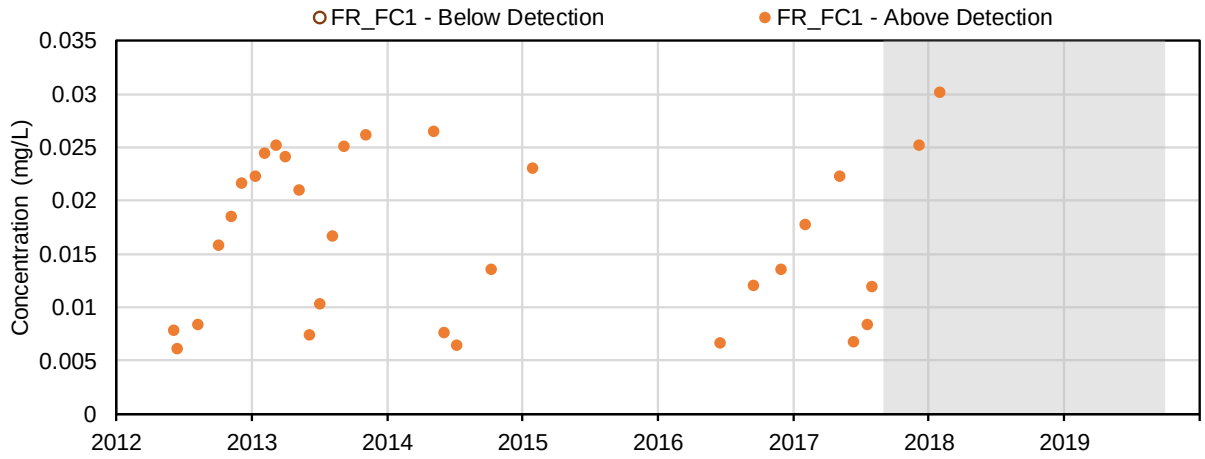
(58) Nickel (mg/L); Total Metals



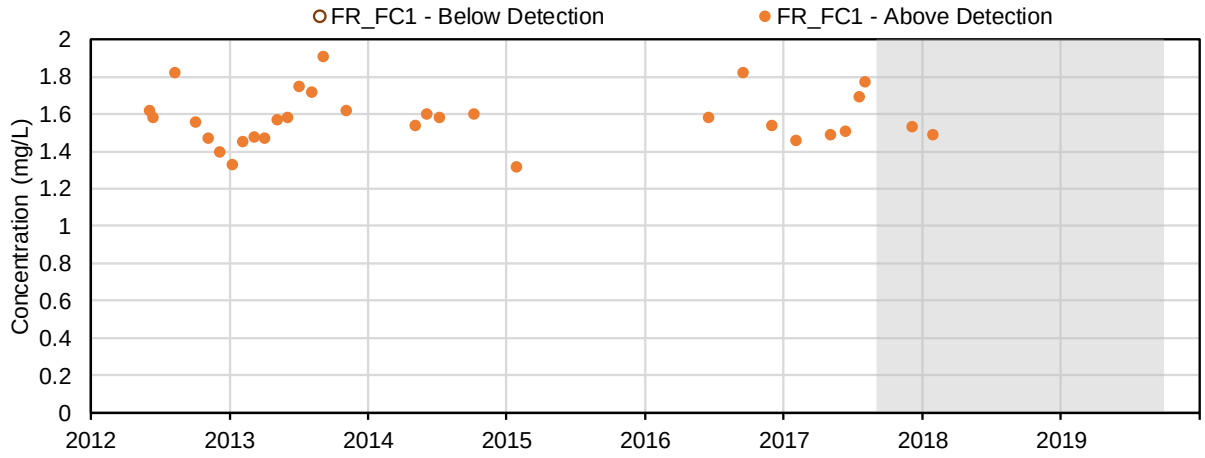
(59) Potassium (mg/L); Total Metals



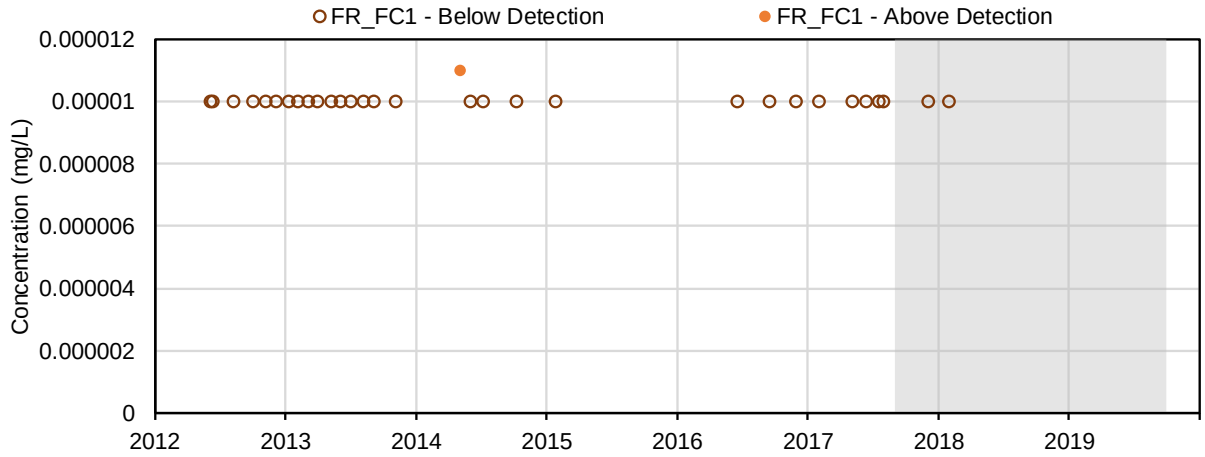
(60) Selenium (mg/L); Total Metals



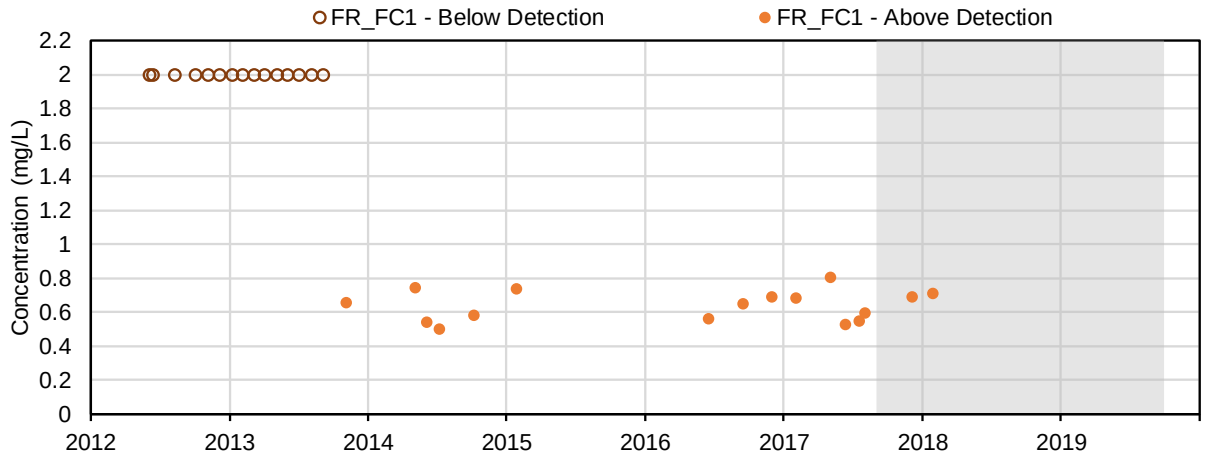
(61) Silicon (mg/L); Total Metals



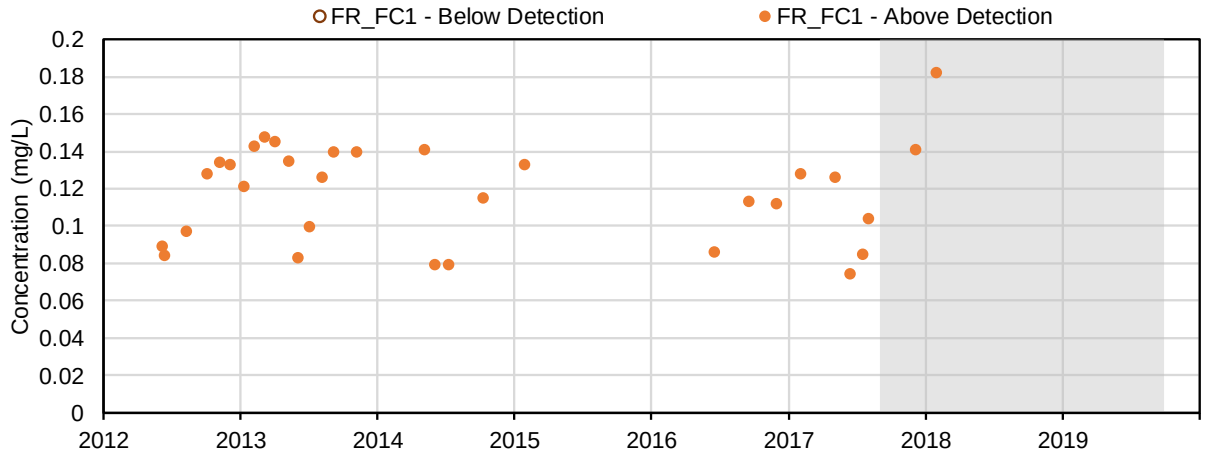
(62) Silver (mg/L); Total Metals



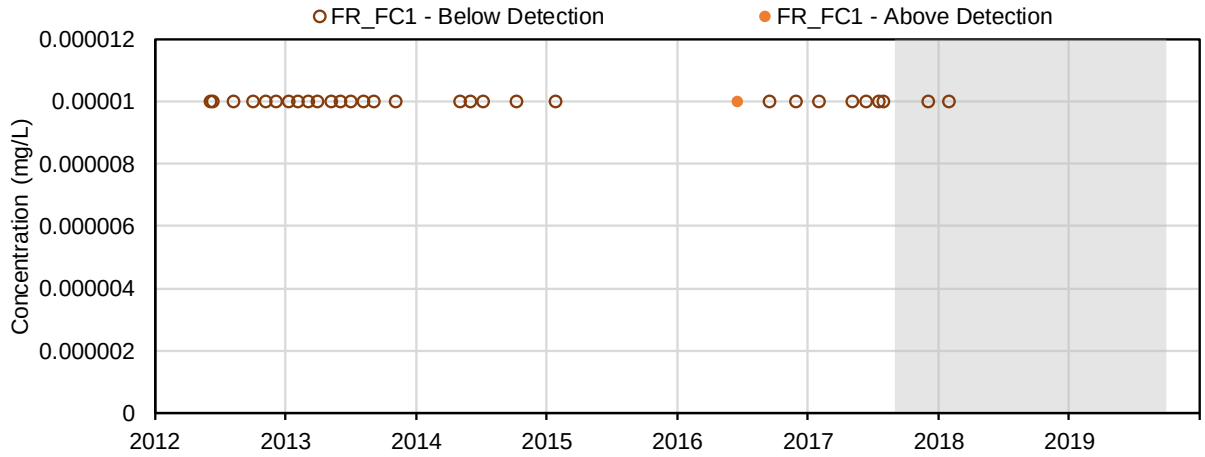
(63) Sodium (mg/L); Total Metals



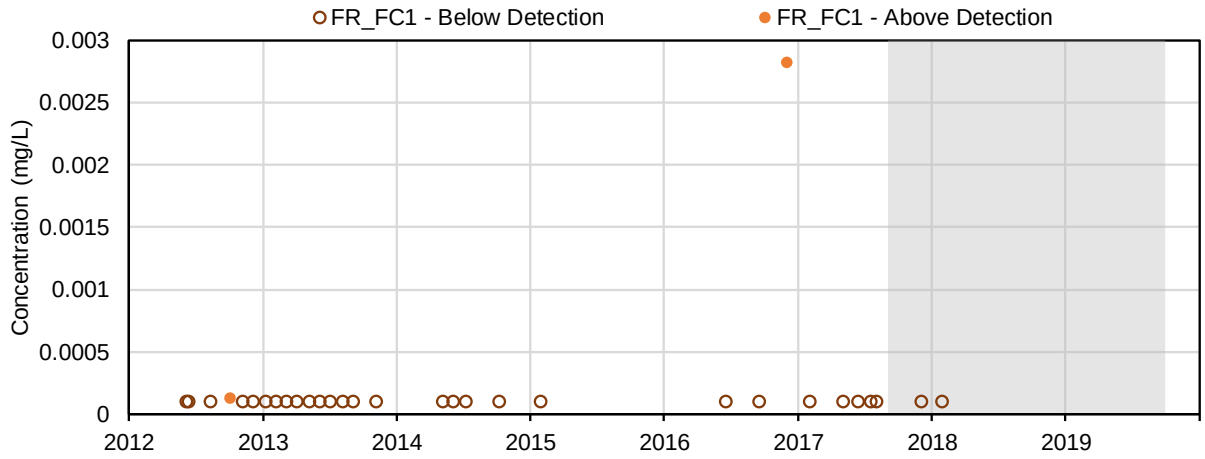
(64) Strontium (mg/L); Total Metals



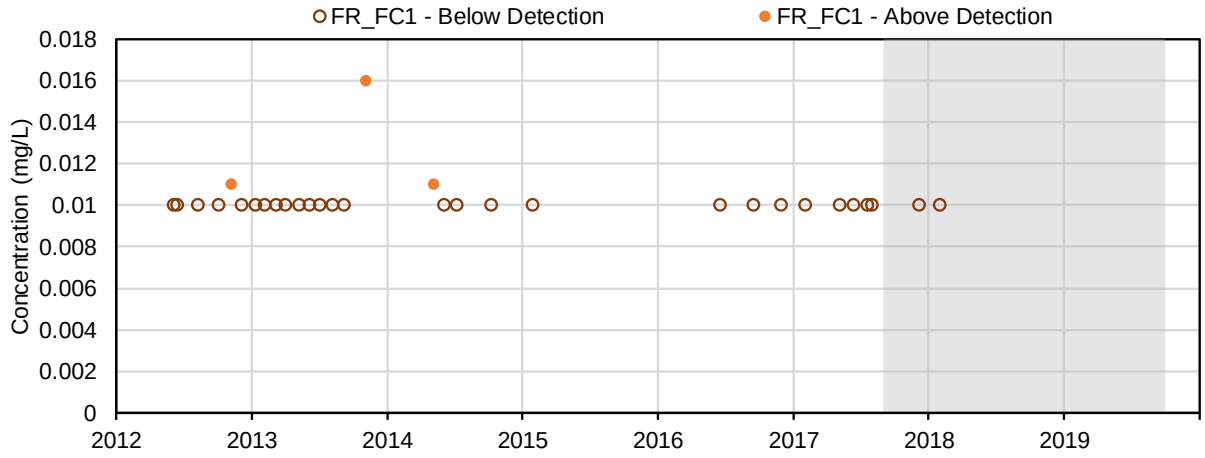
(65) Thallium (mg/L); Total Metals



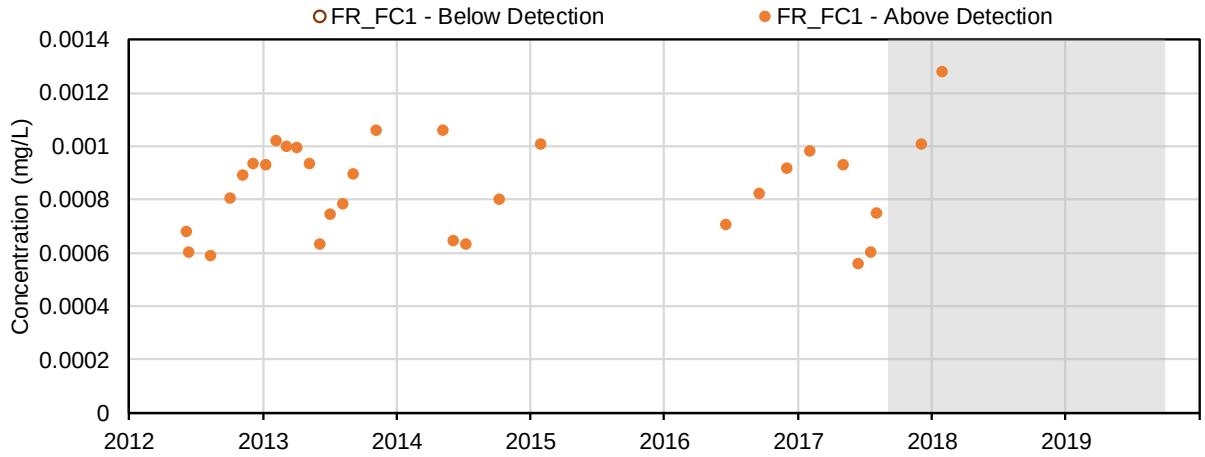
(66) Tin (mg/L); Total Metals



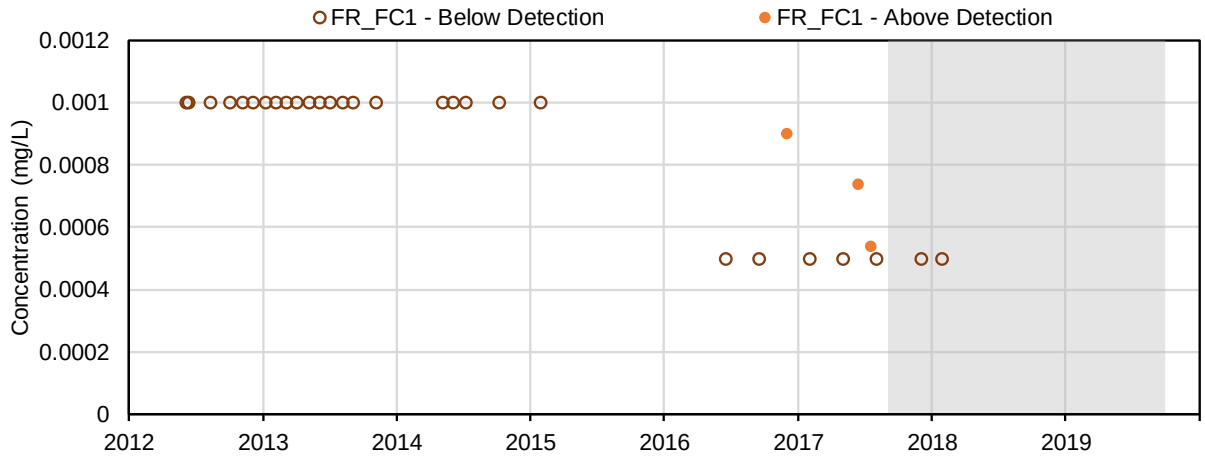
(67) Titanium (mg/L); Total Metals



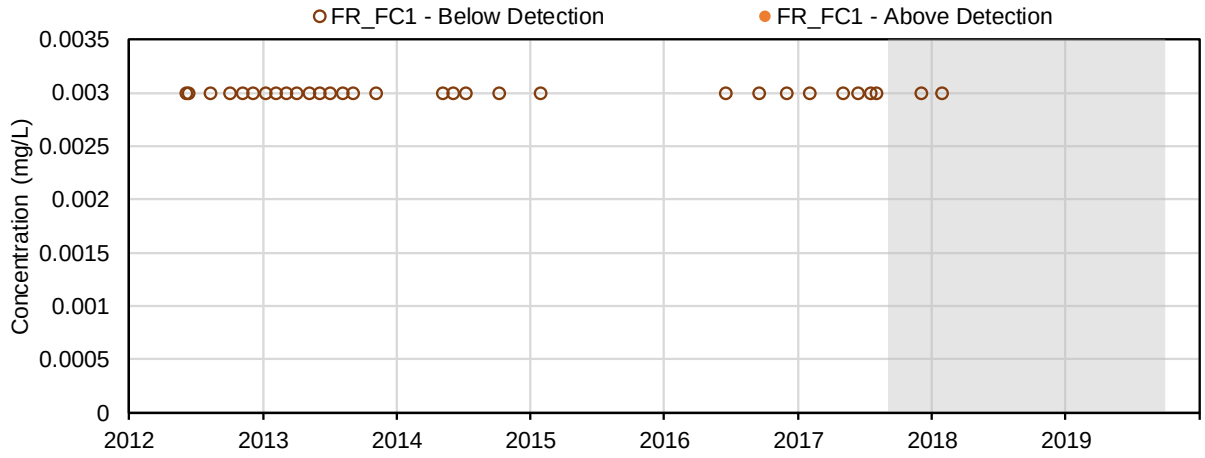
(68) Uranium (mg/L); Total Metals



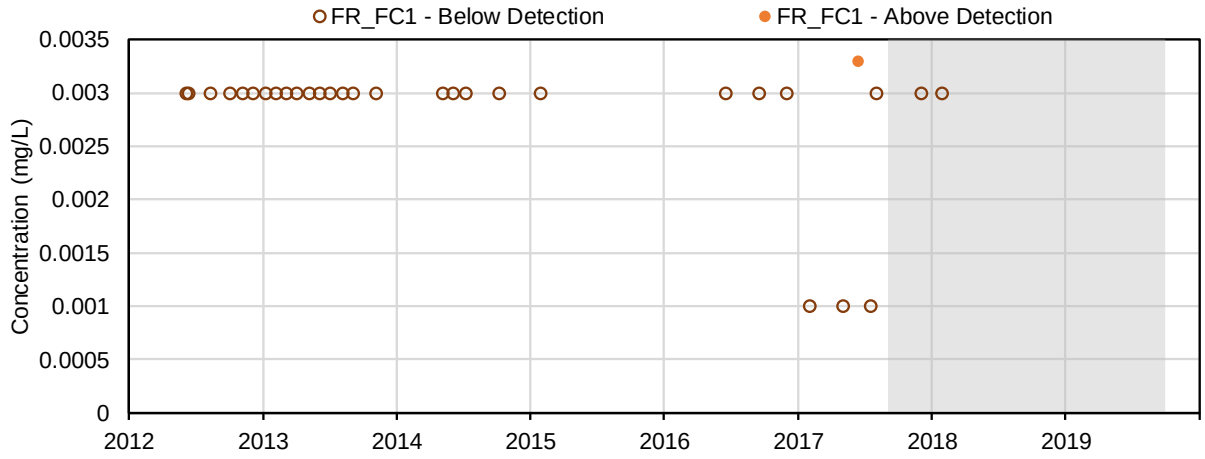
(69) Vanadium (mg/L); Total Metals



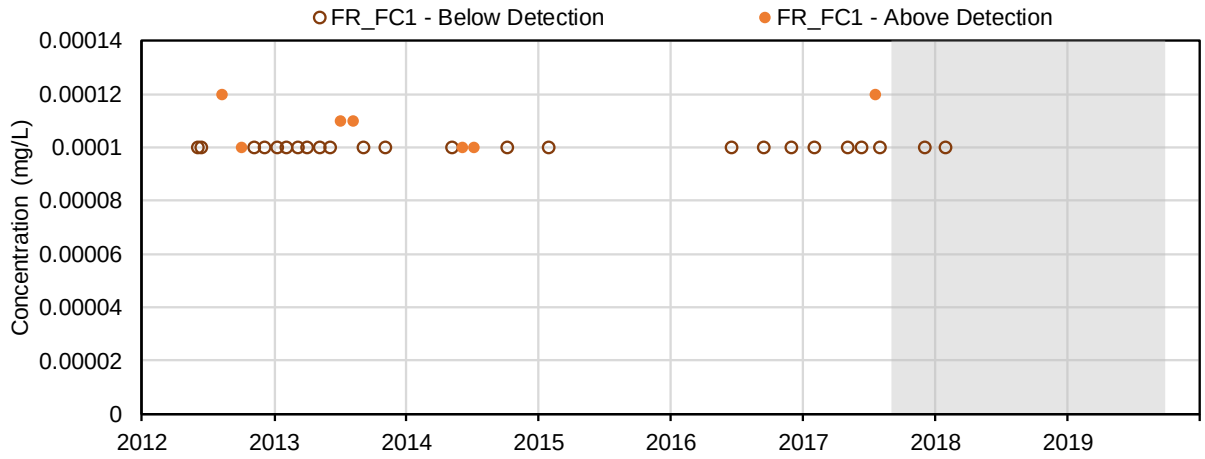
(70) Zinc (mg/L); Total Metals



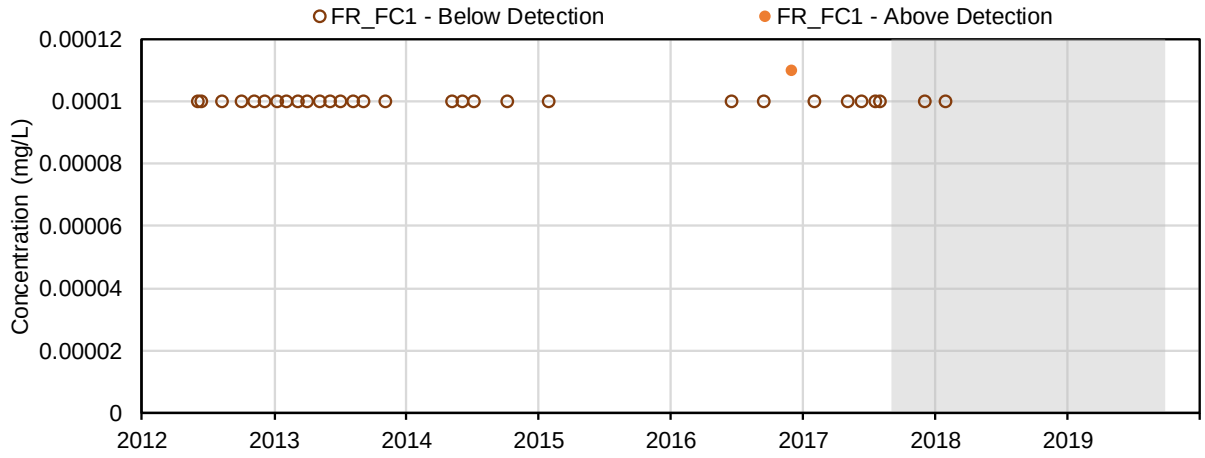
(71) Aluminum (mg/L); Dissolved Metals



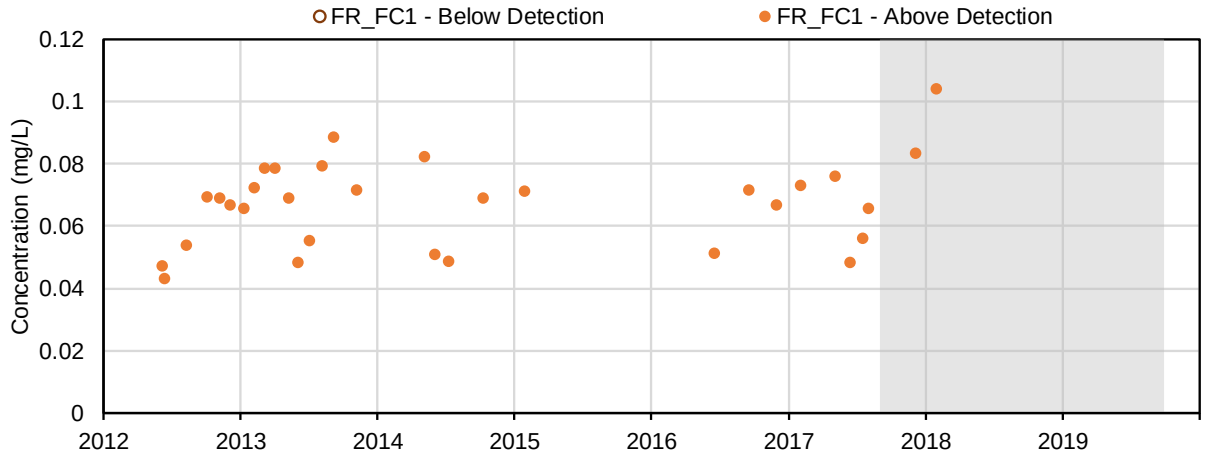
(72) Antimony (mg/L); Dissolved Metals



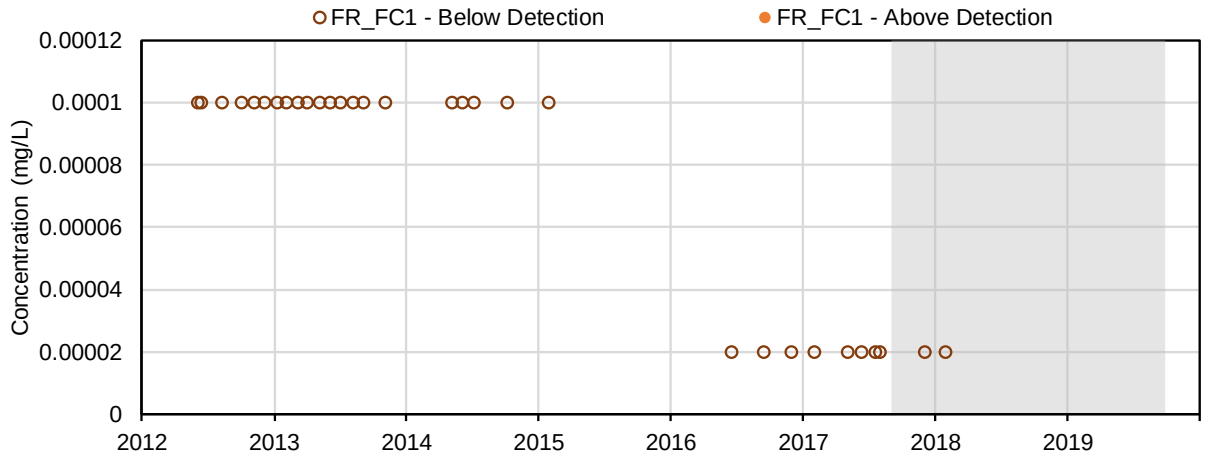
(73) Arsenic (mg/L); Dissolved Metals



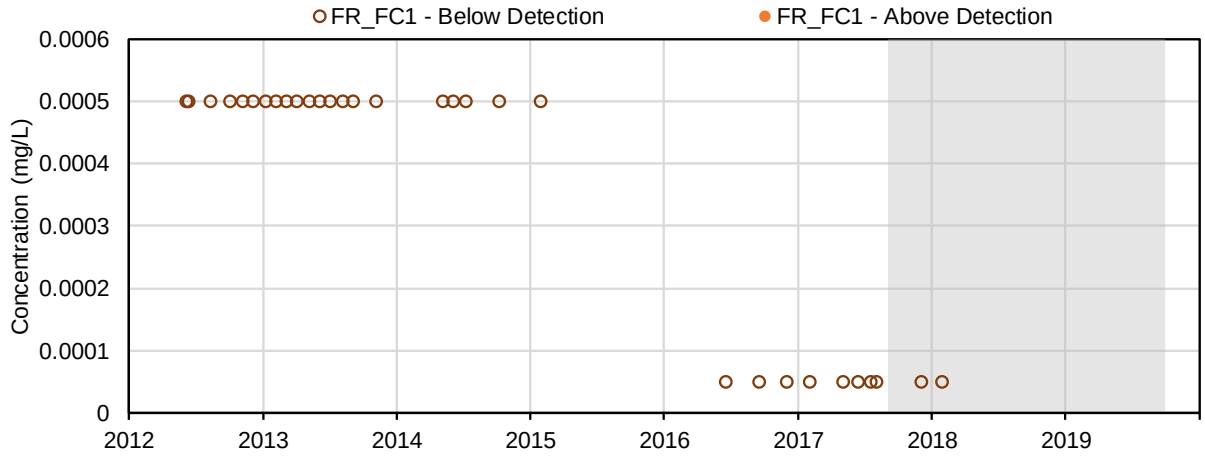
(74) Barium (mg/L); Dissolved Metals



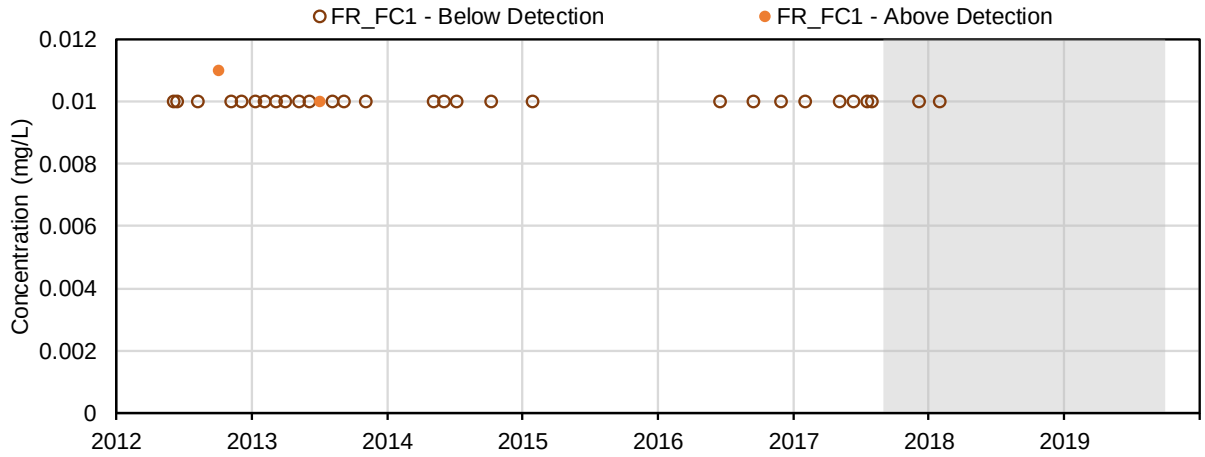
(75) Beryllium (mg/L); Dissolved Metals



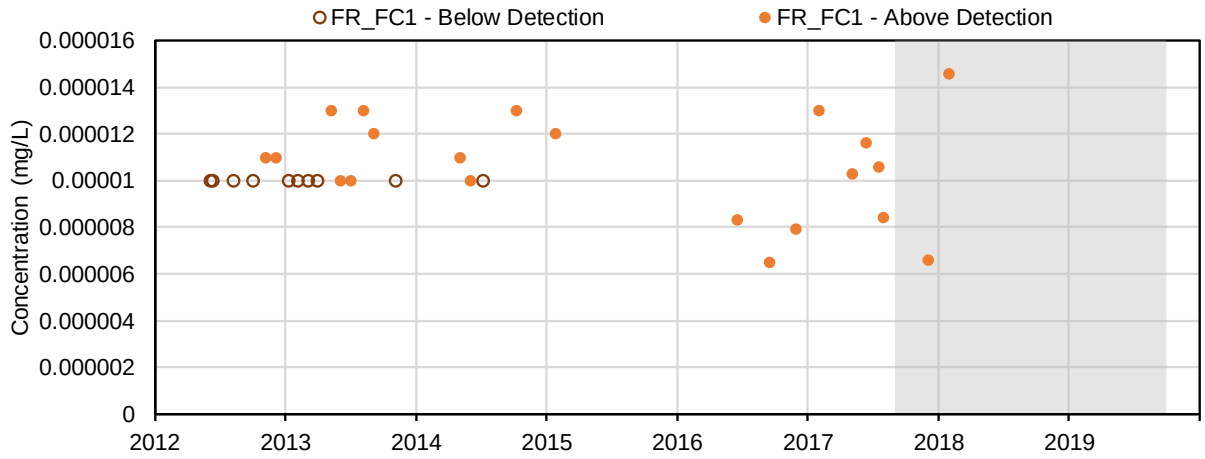
(76) Bismuth (mg/L); Dissolved Metals



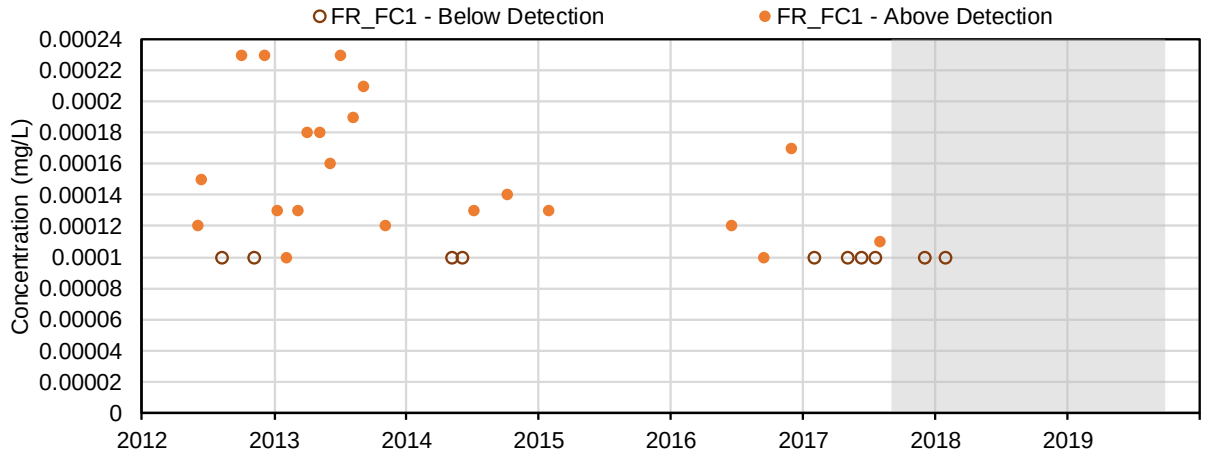
(77) Boron (mg/L); Dissolved Metals



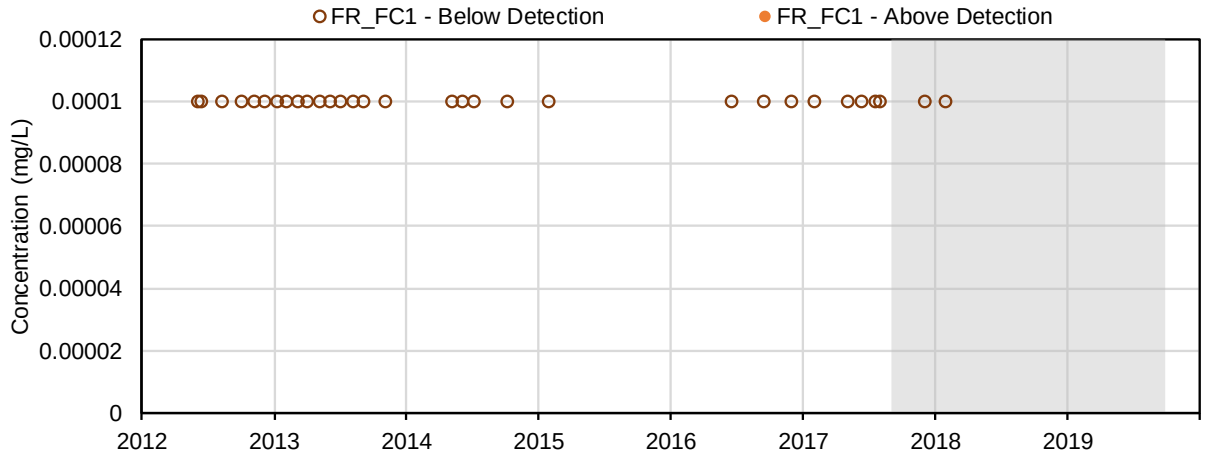
(78) Cadmium (mg/L); Dissolved Metals



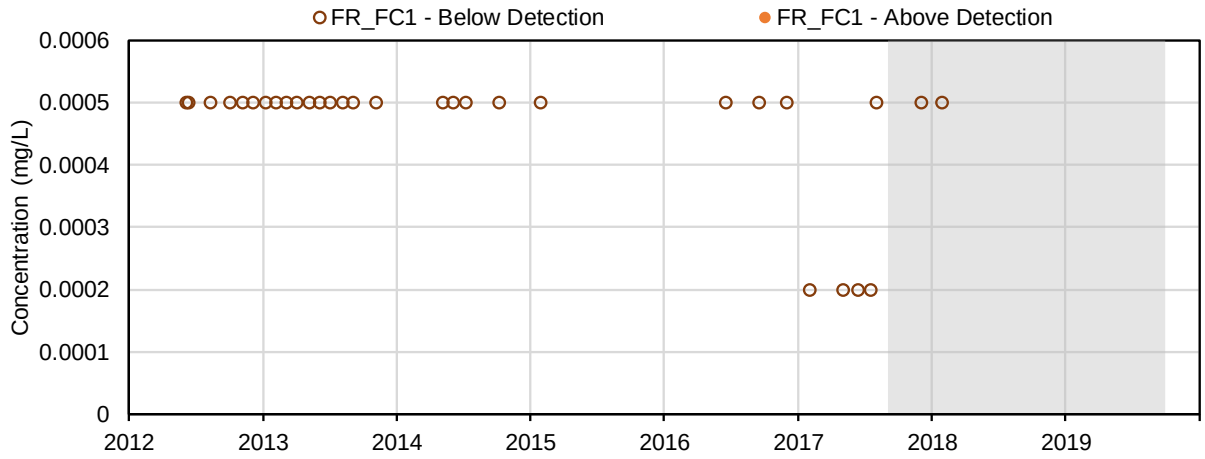
(79) Chromium (mg/L); Dissolved Metals



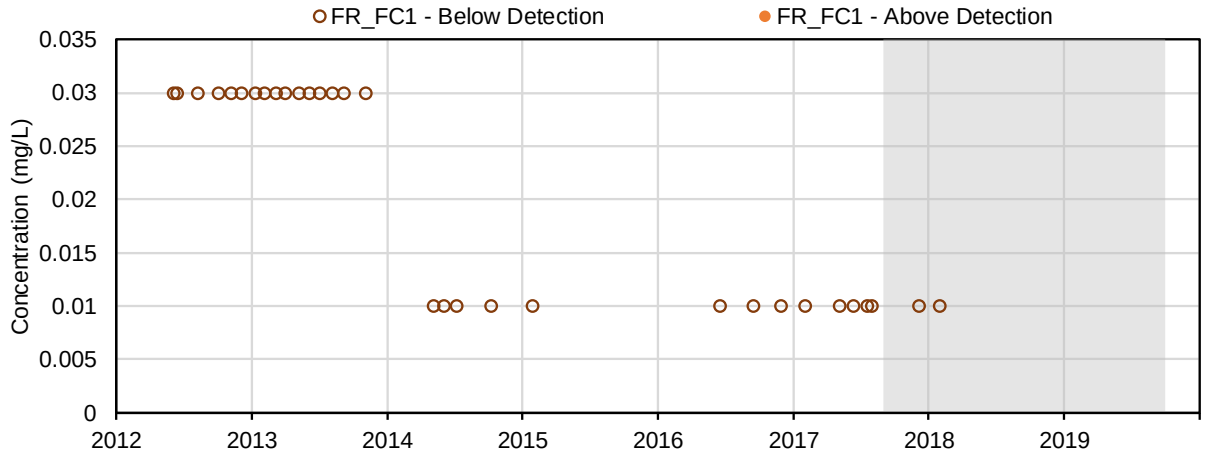
(80) Cobalt (mg/L); Dissolved Metals



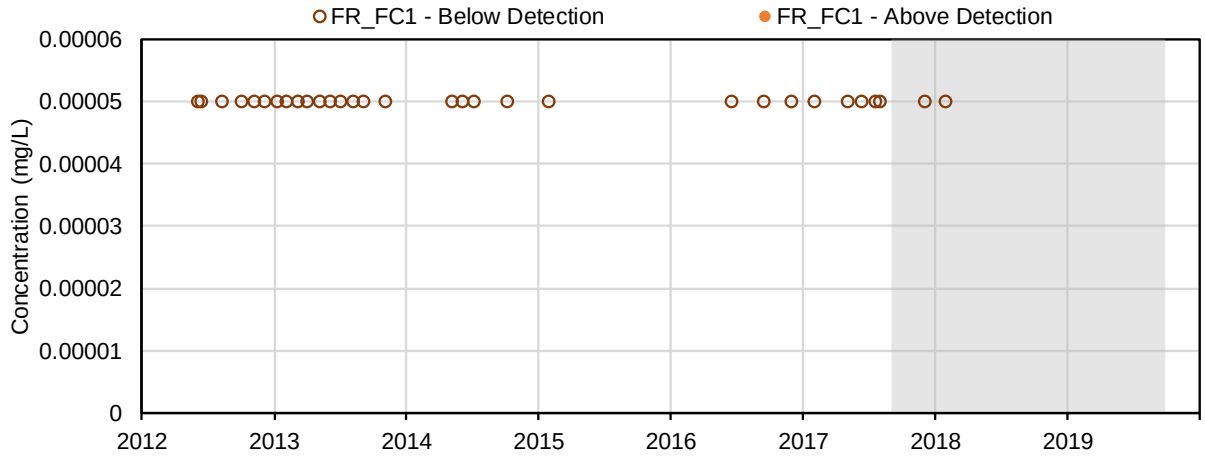
(81) Copper (mg/L); Dissolved Metals



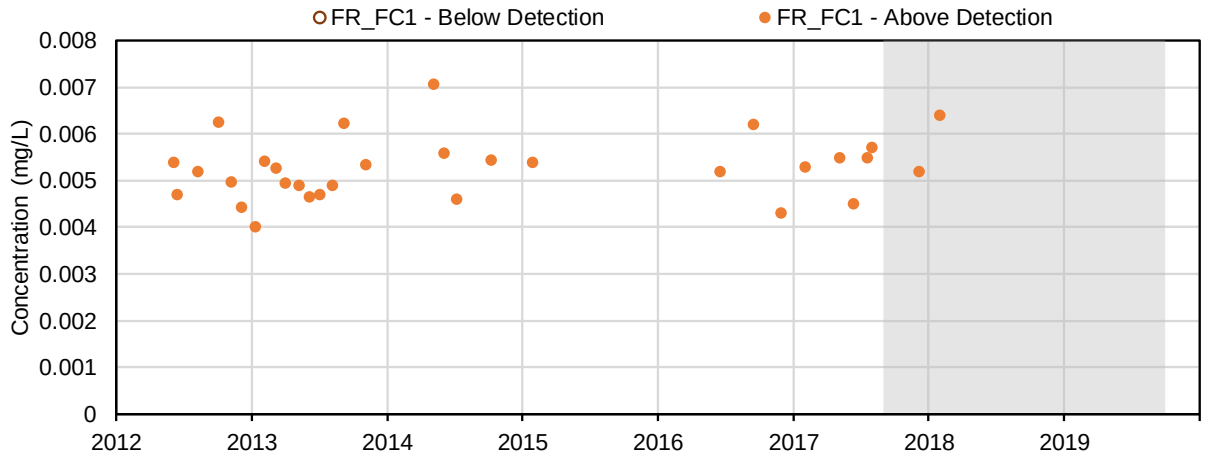
(82) Iron (mg/L); Dissolved Metals



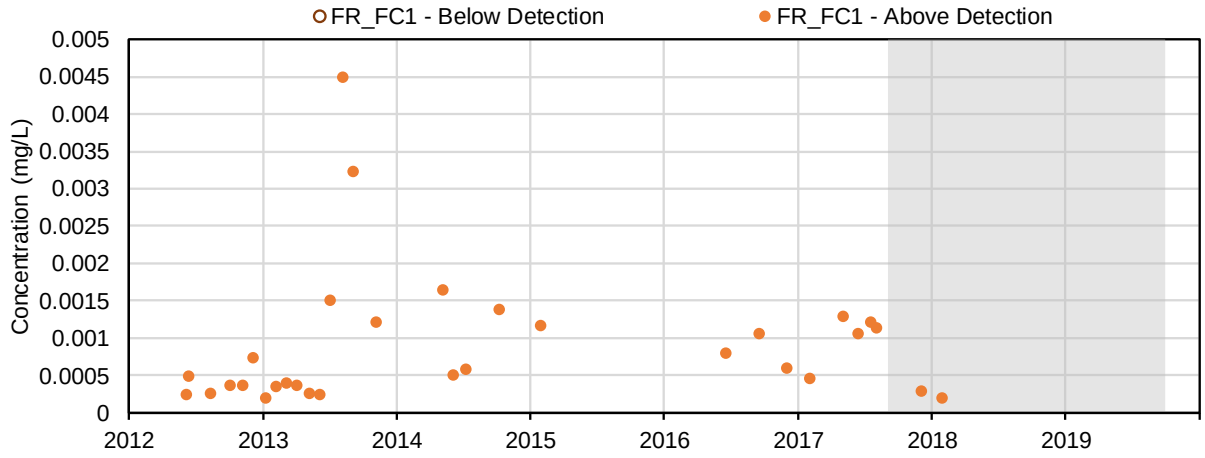
(83) Lead (mg/L); Dissolved Metals



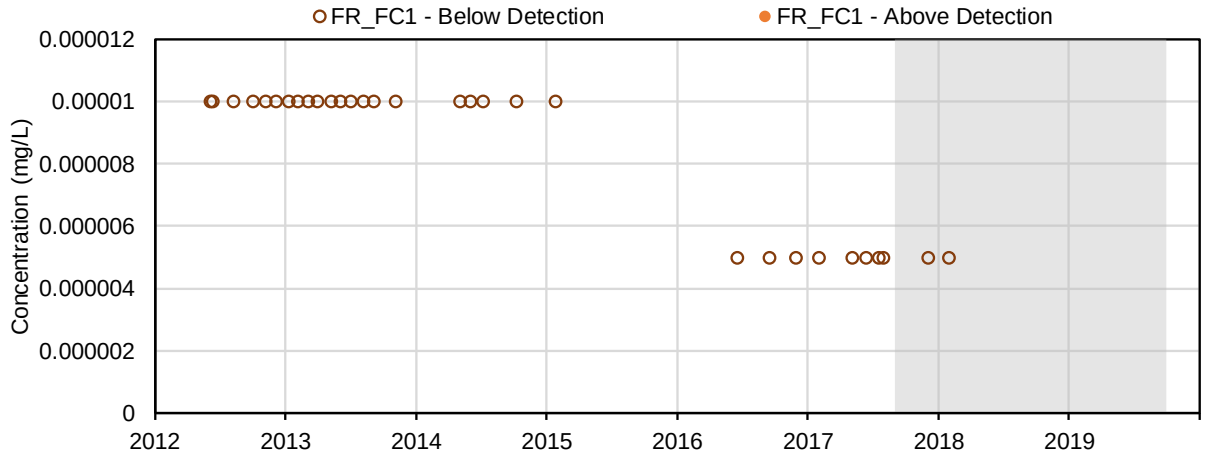
(84) Lithium (mg/L); Dissolved Metals



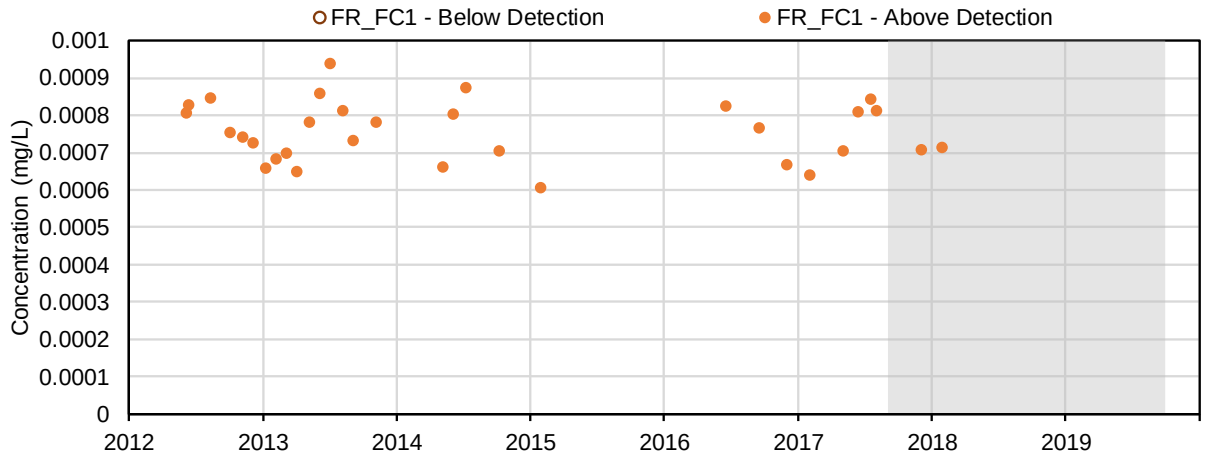
(85) Manganese (mg/L); Dissolved Metals



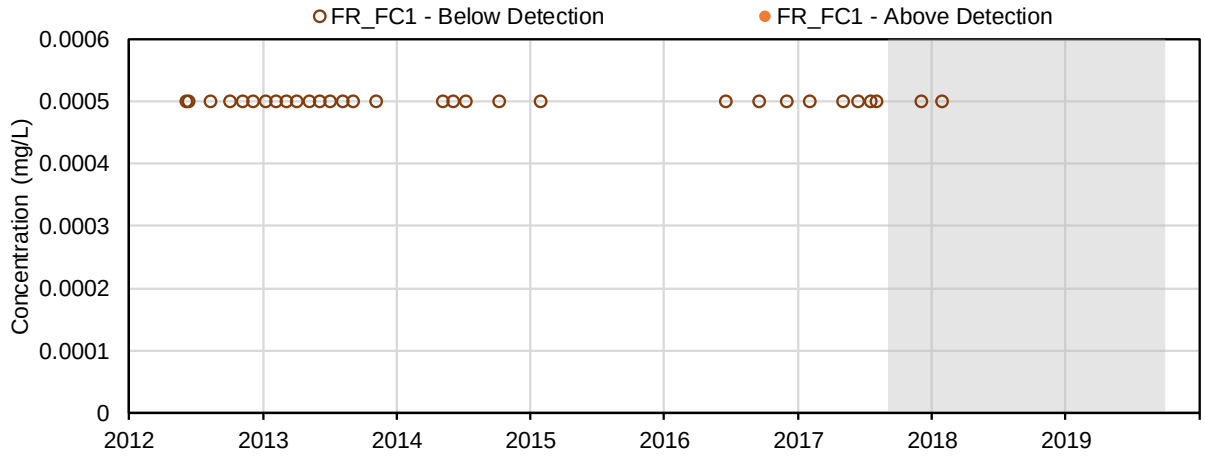
(86) Mercury (mg/L); Dissolved Metals



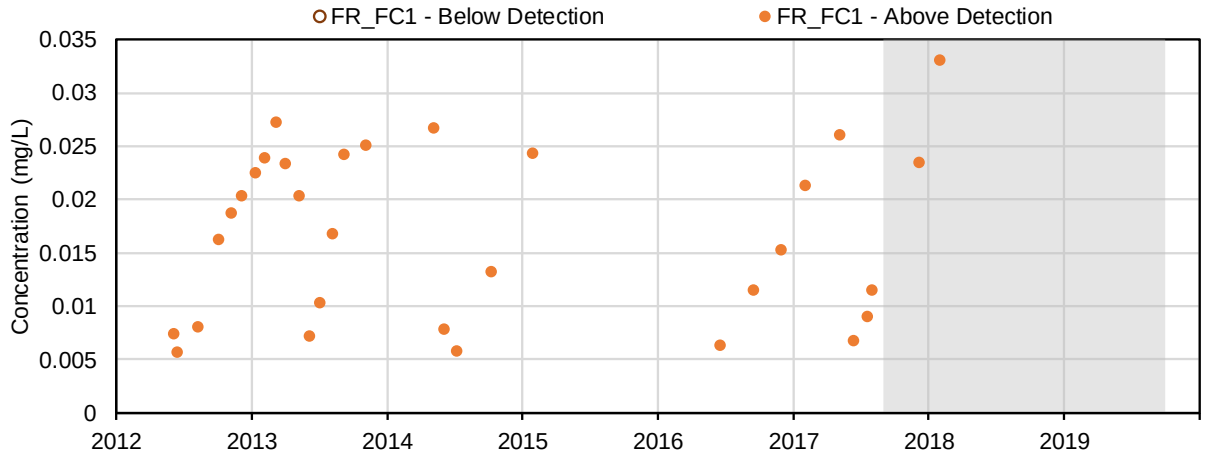
(87) Molybdenum (mg/L); Dissolved Metals



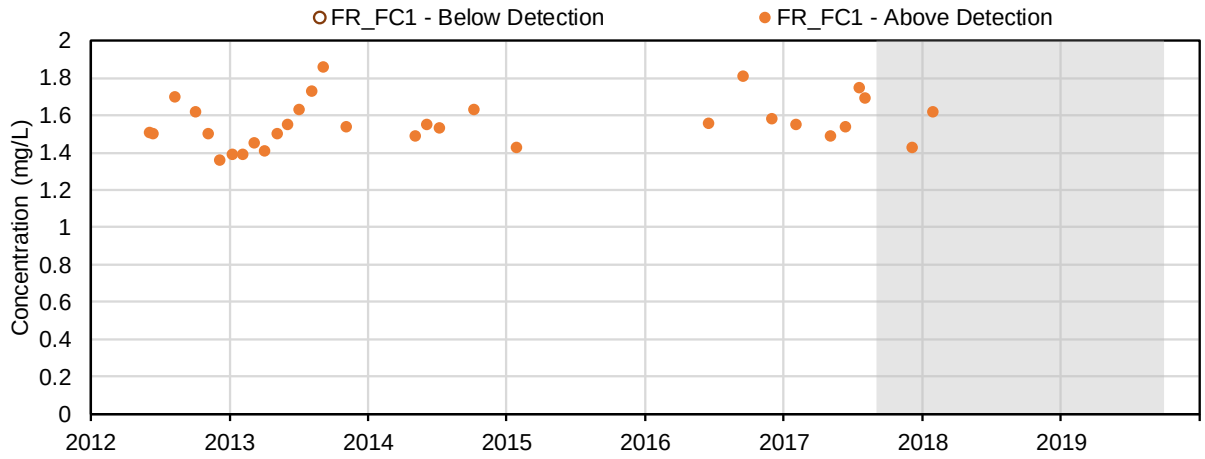
(88) Nickel (mg/L); Dissolved Metals



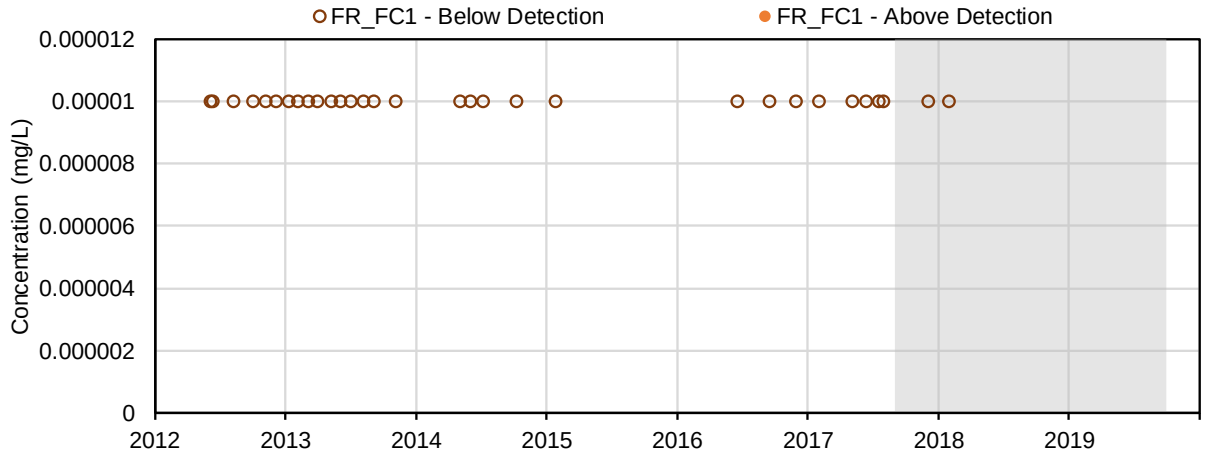
(89) Selenium (mg/L); Dissolved Metals



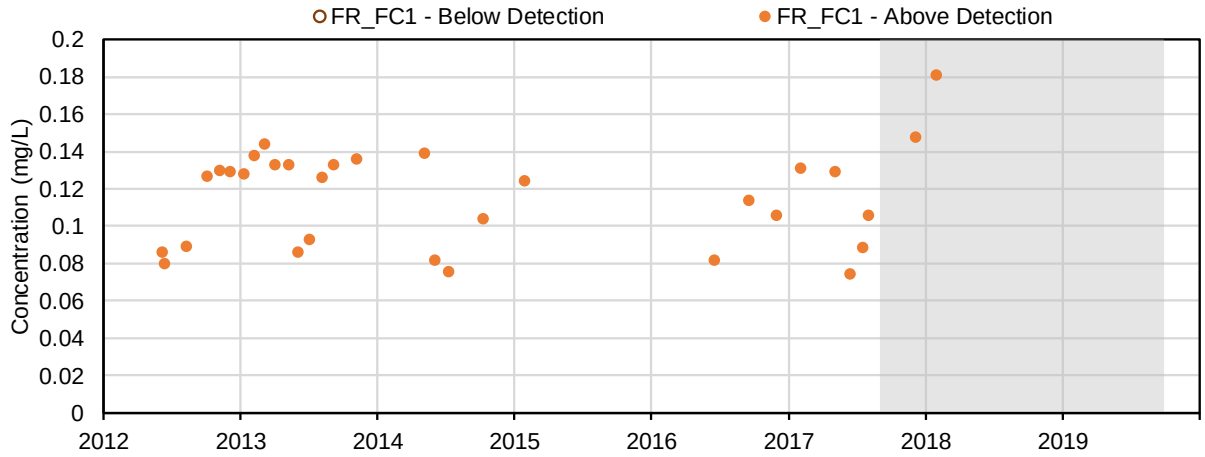
(90) Silicon (mg/L); Dissolved Metals



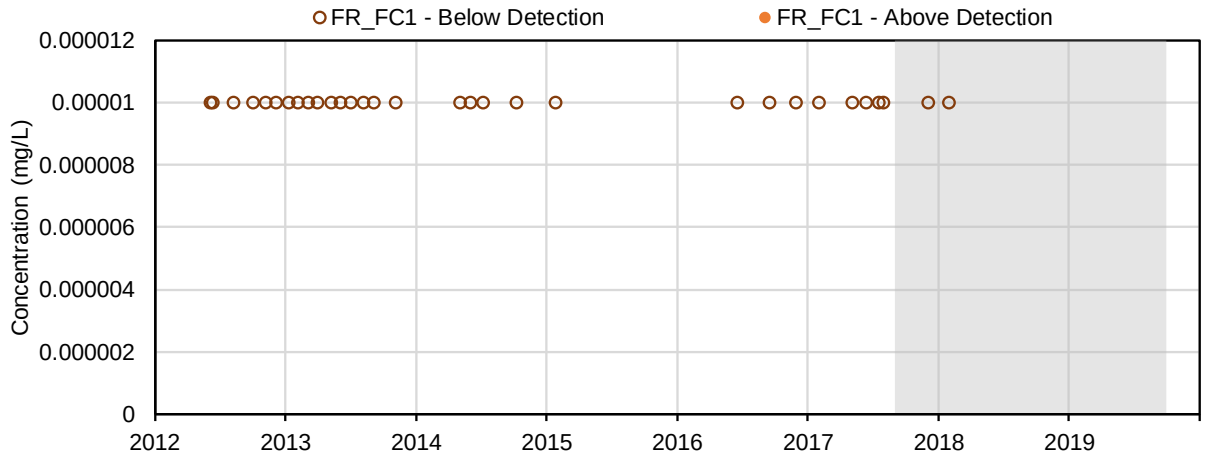
(91) Silver (mg/L); Dissolved Metals



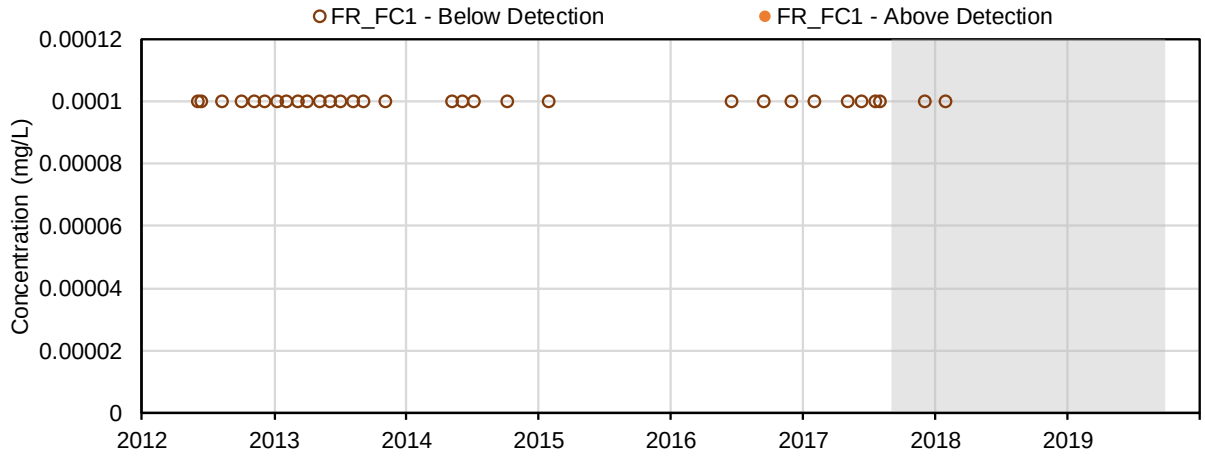
(92) Strontium (mg/L); Dissolved Metals



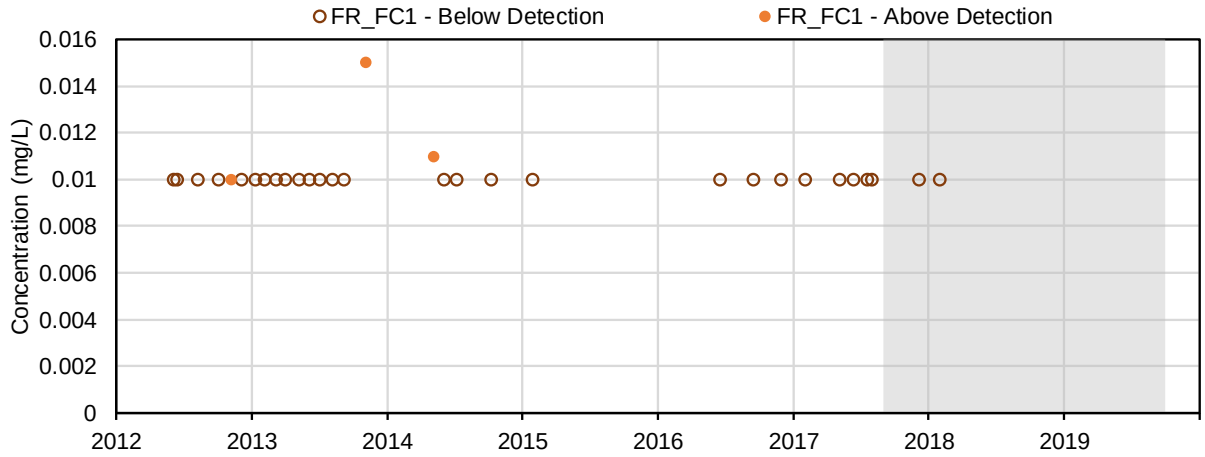
(93) Thallium (mg/L); Dissolved Metals



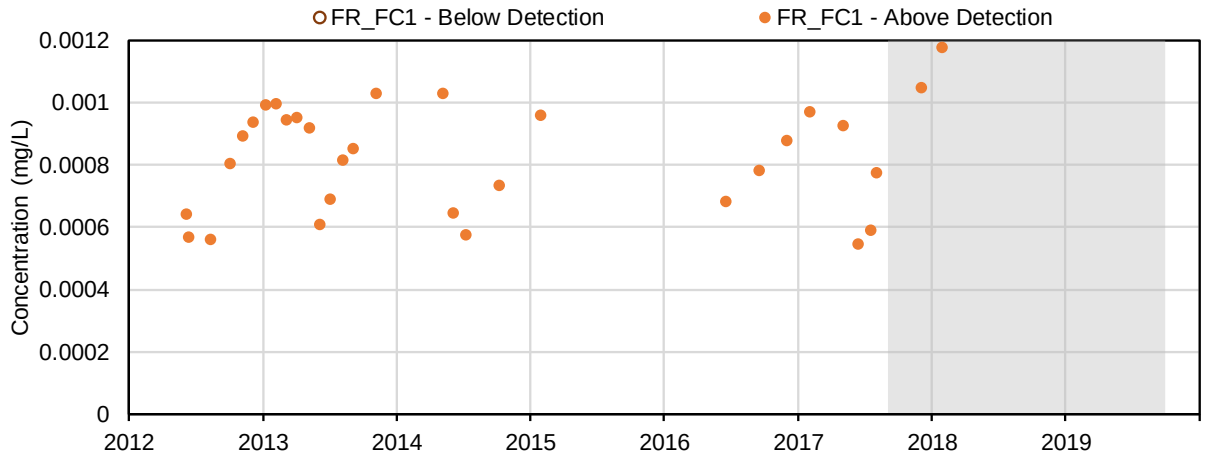
(94) Tin (mg/L); Dissolved Metals



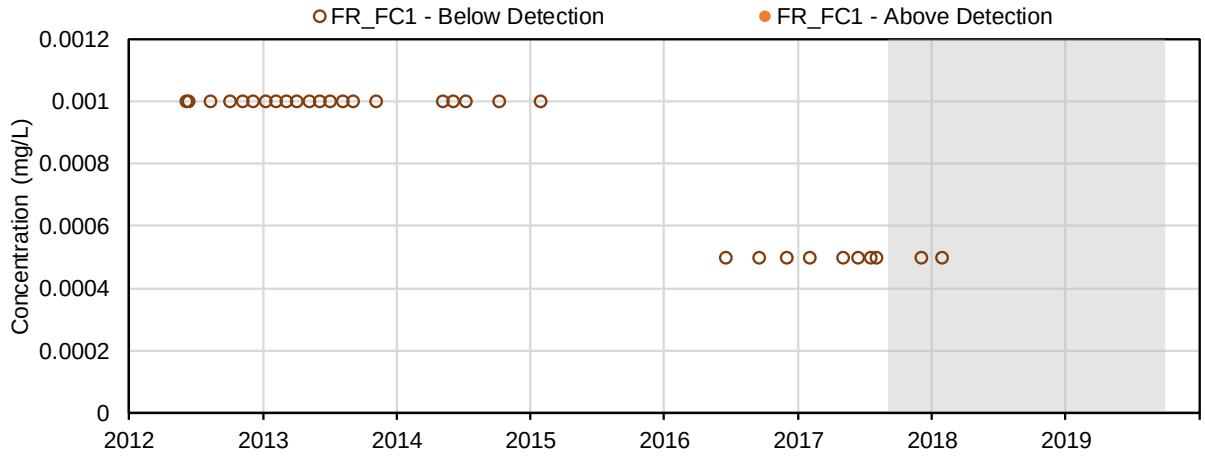
(95) Titanium (mg/L); Dissolved Metals



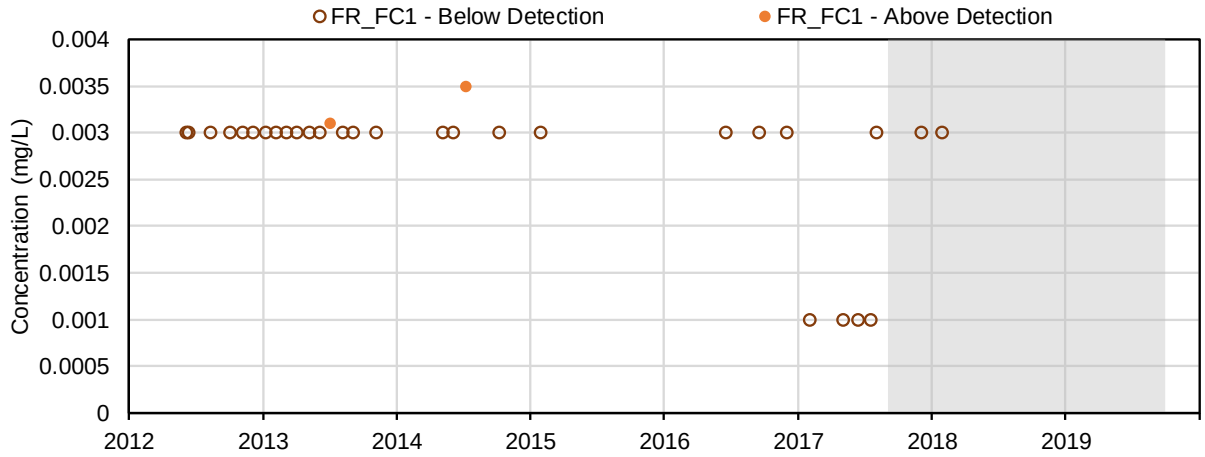
(96) Uranium (mg/L); Dissolved Metals



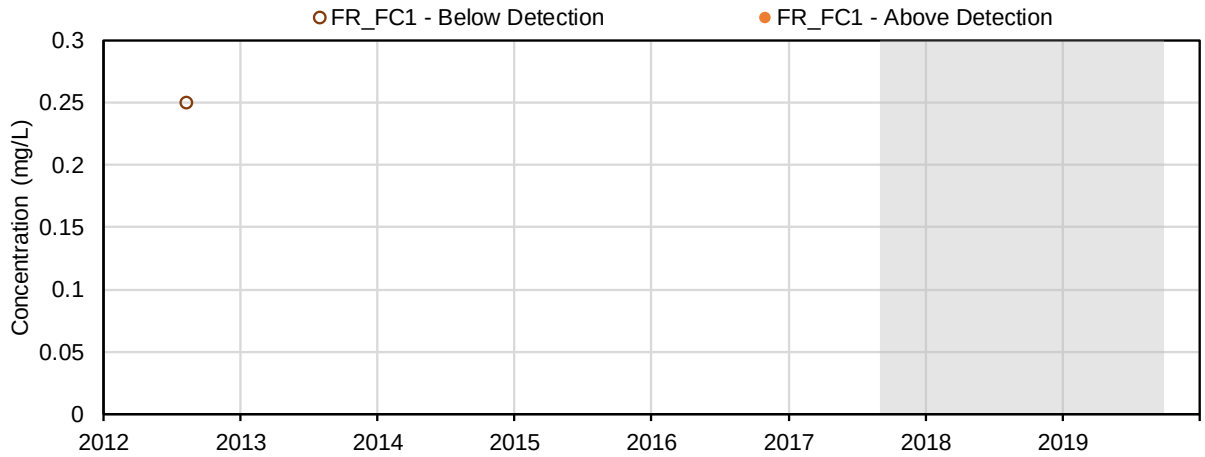
(97) Vanadium (mg/L); Dissolved Metals



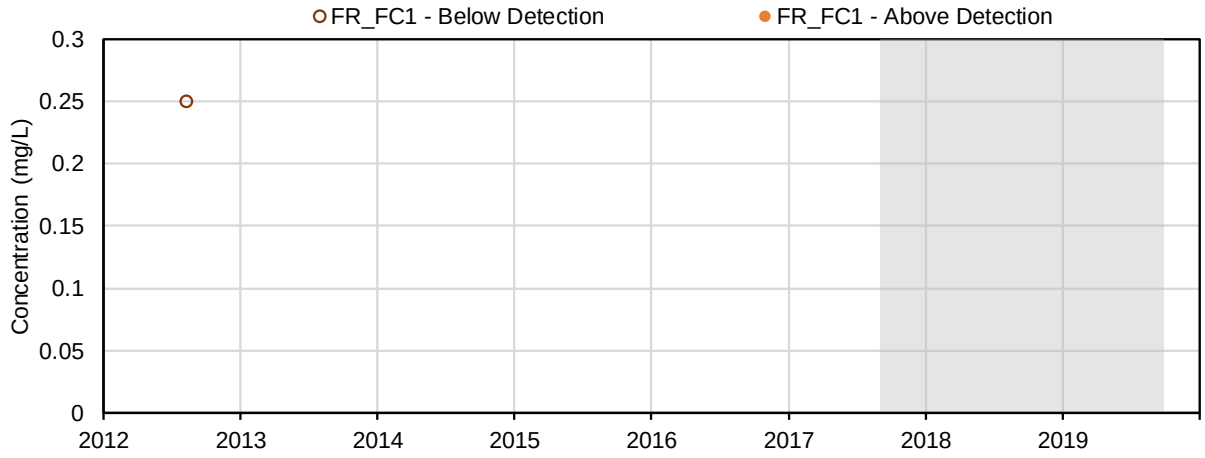
(98) Zinc (mg/L); Dissolved Metals



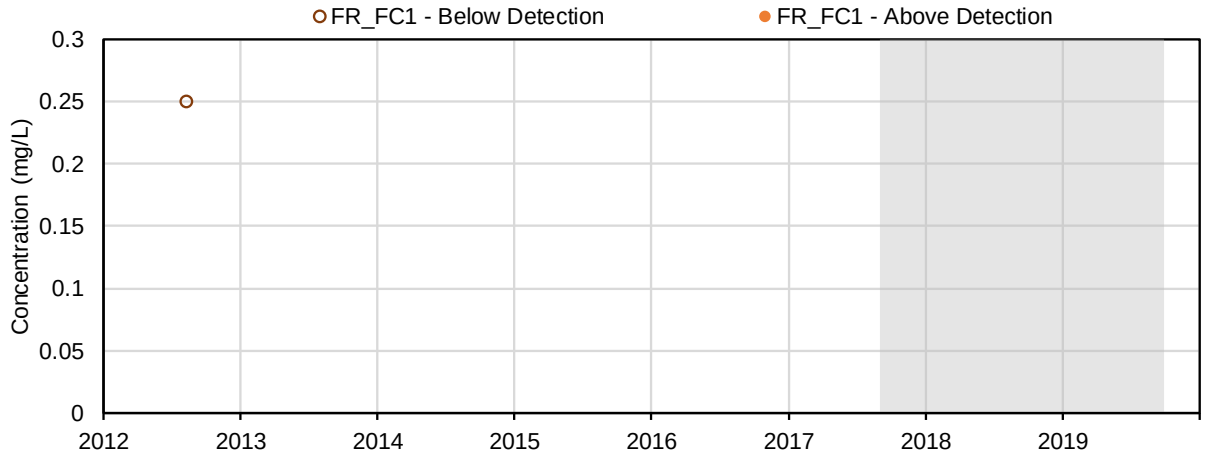
(99) Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics

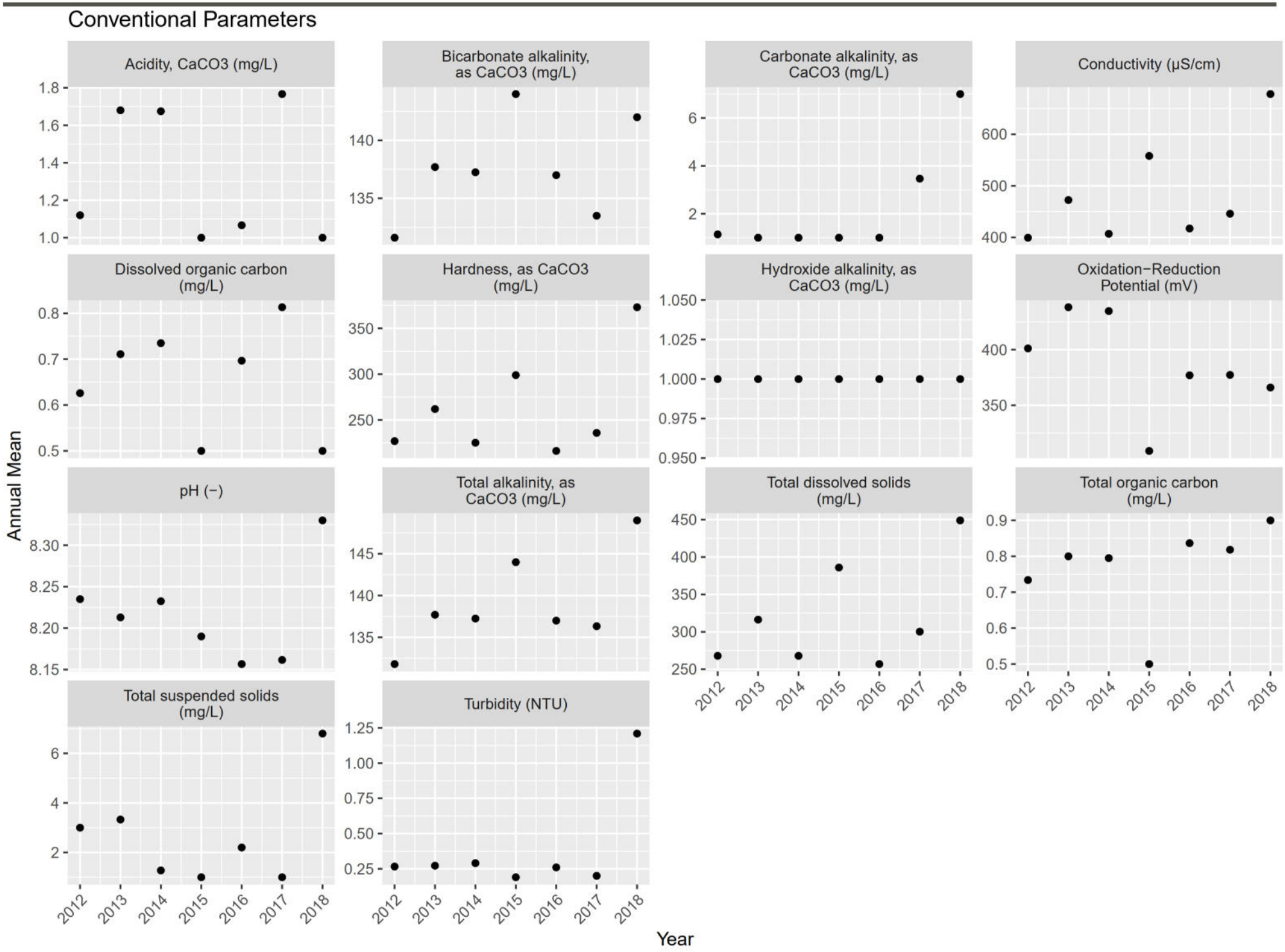


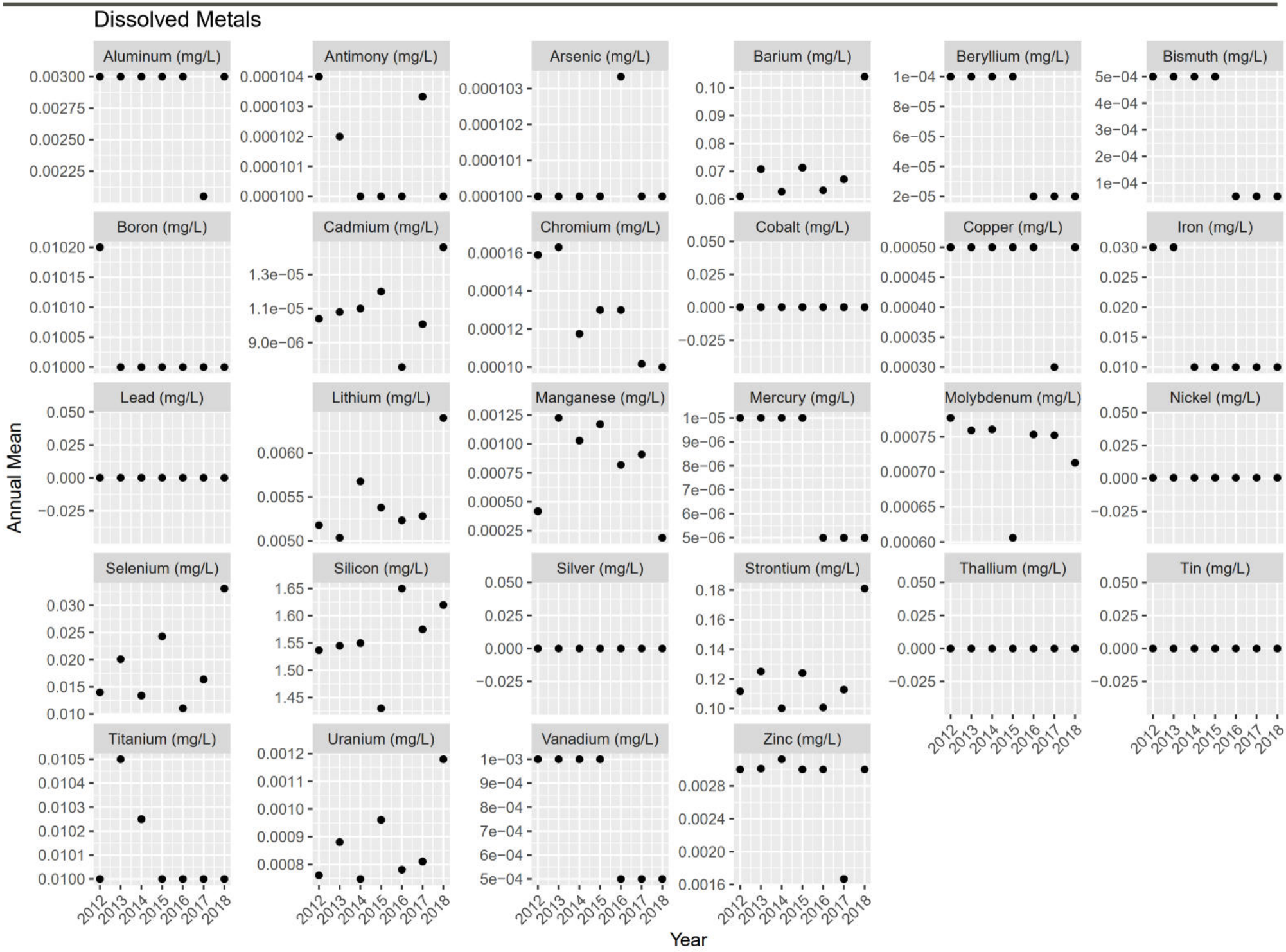
(100) Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L); Volatile Organics

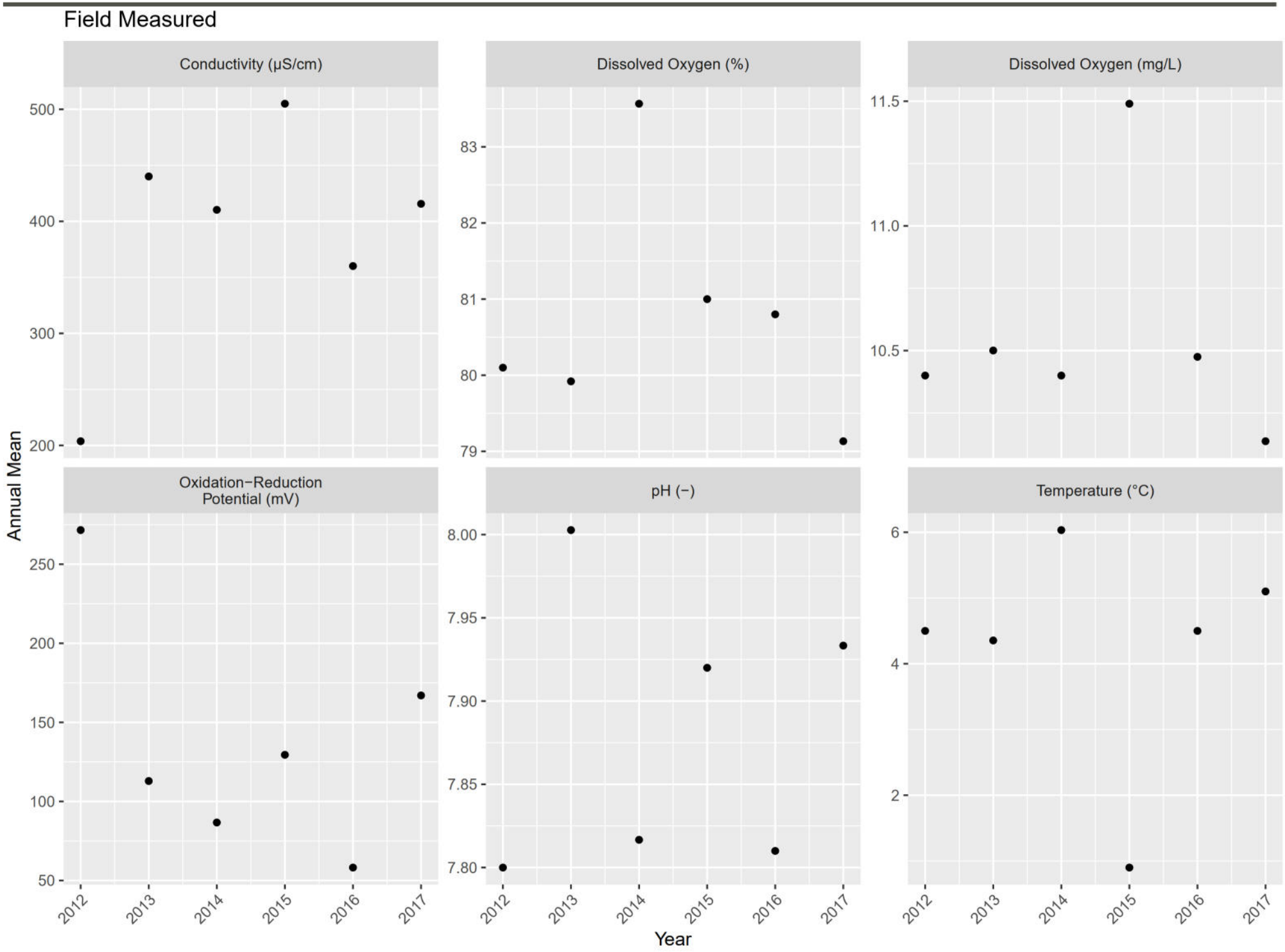


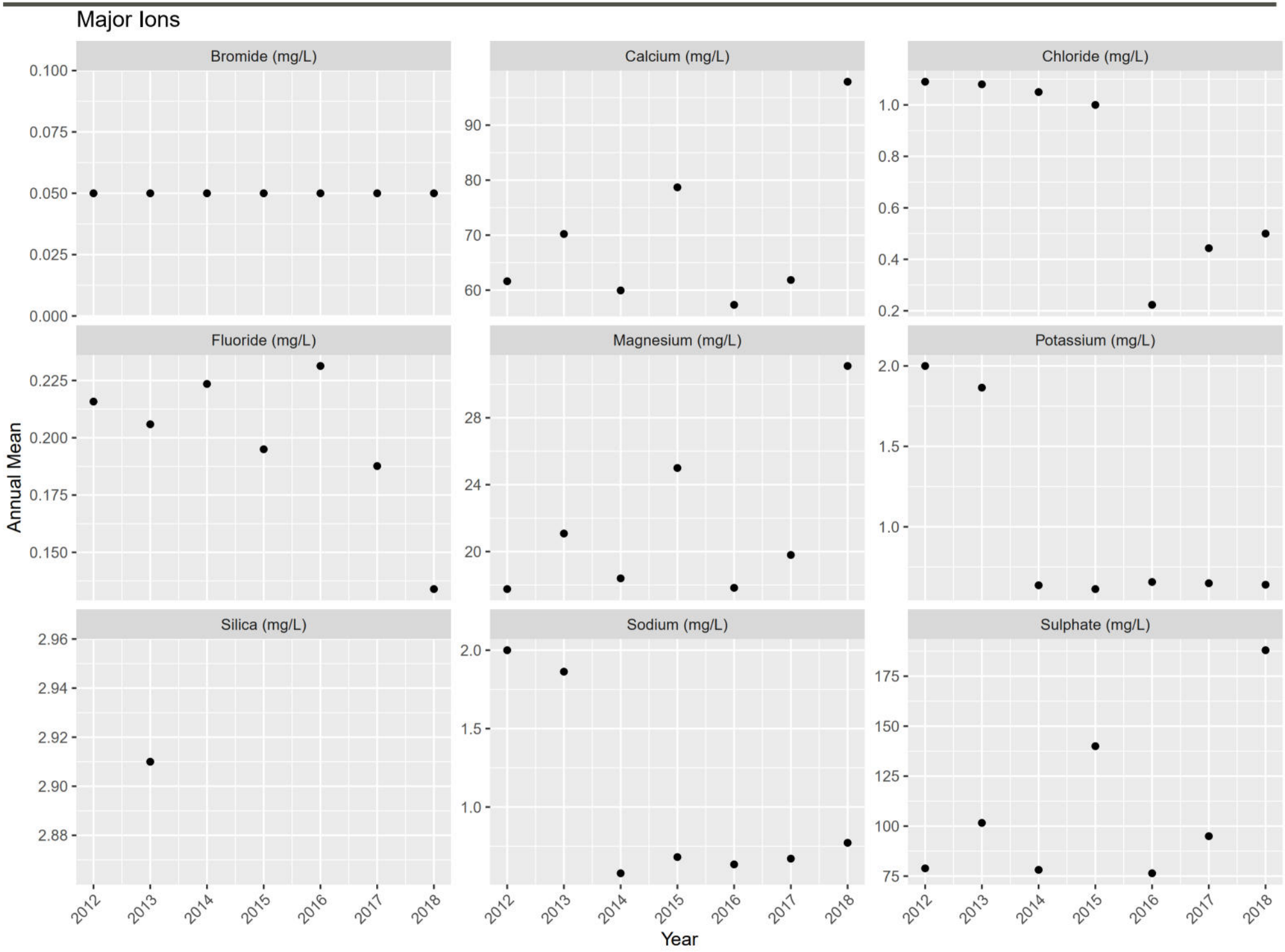
(101) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics

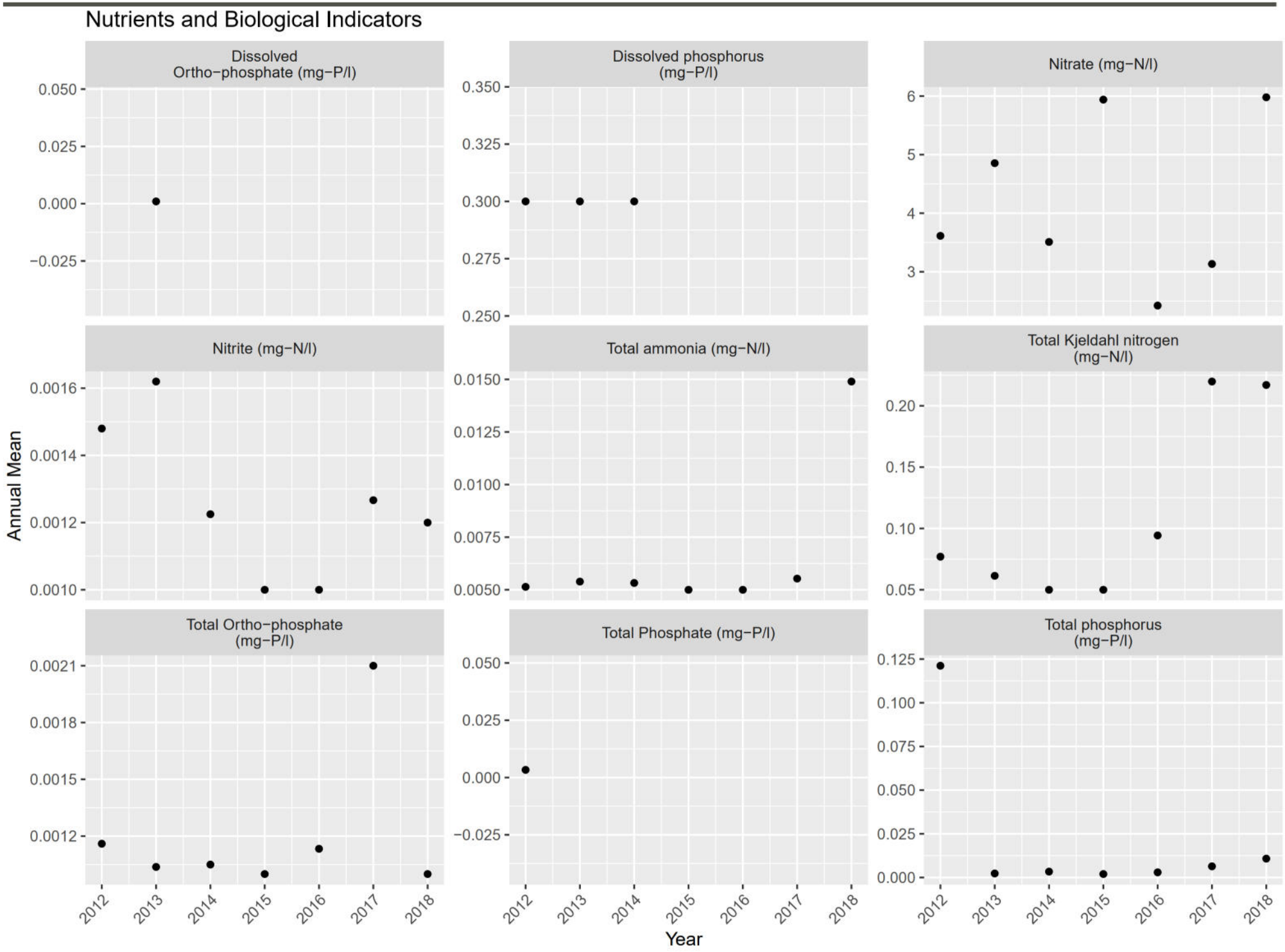


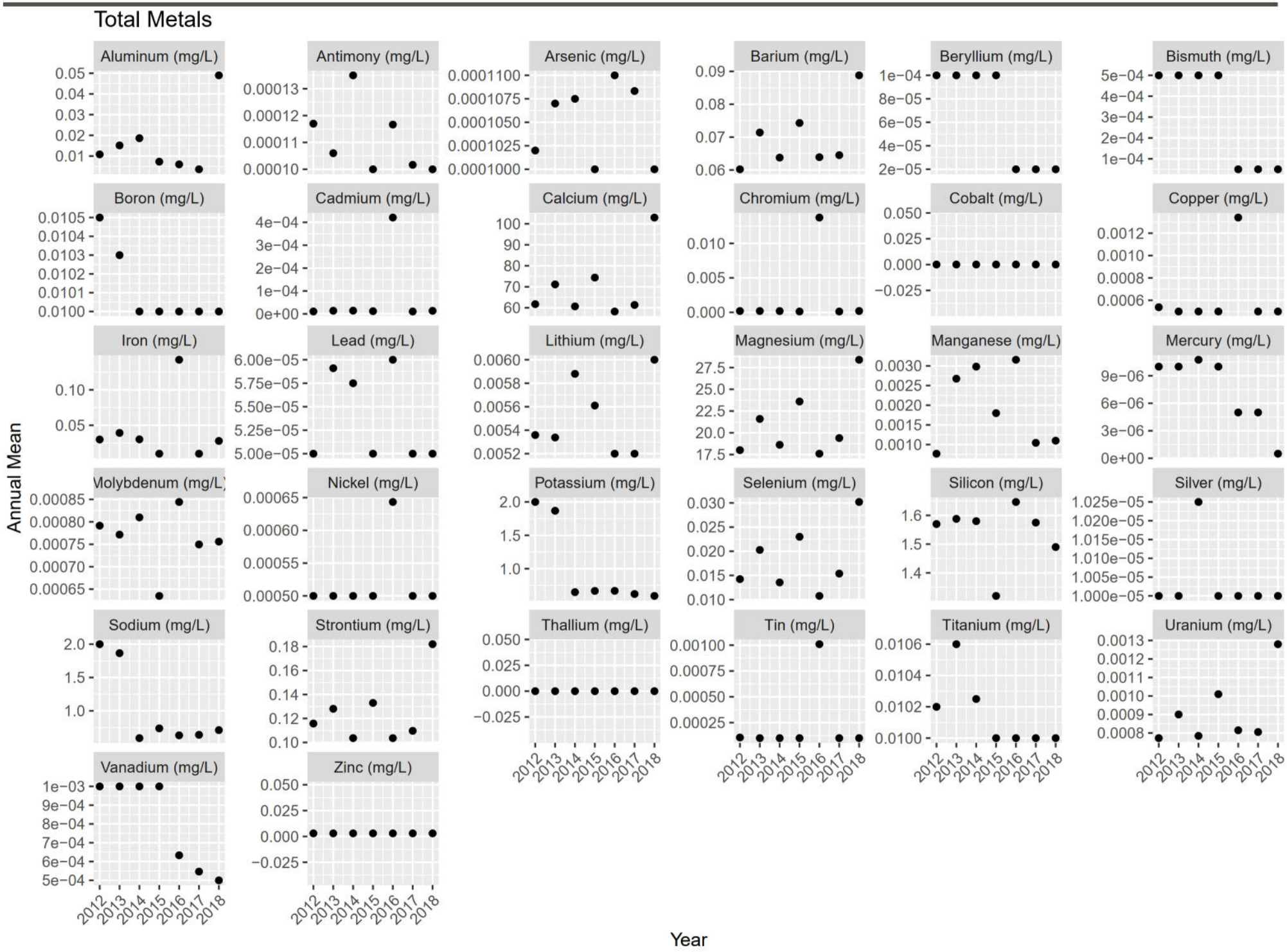

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018

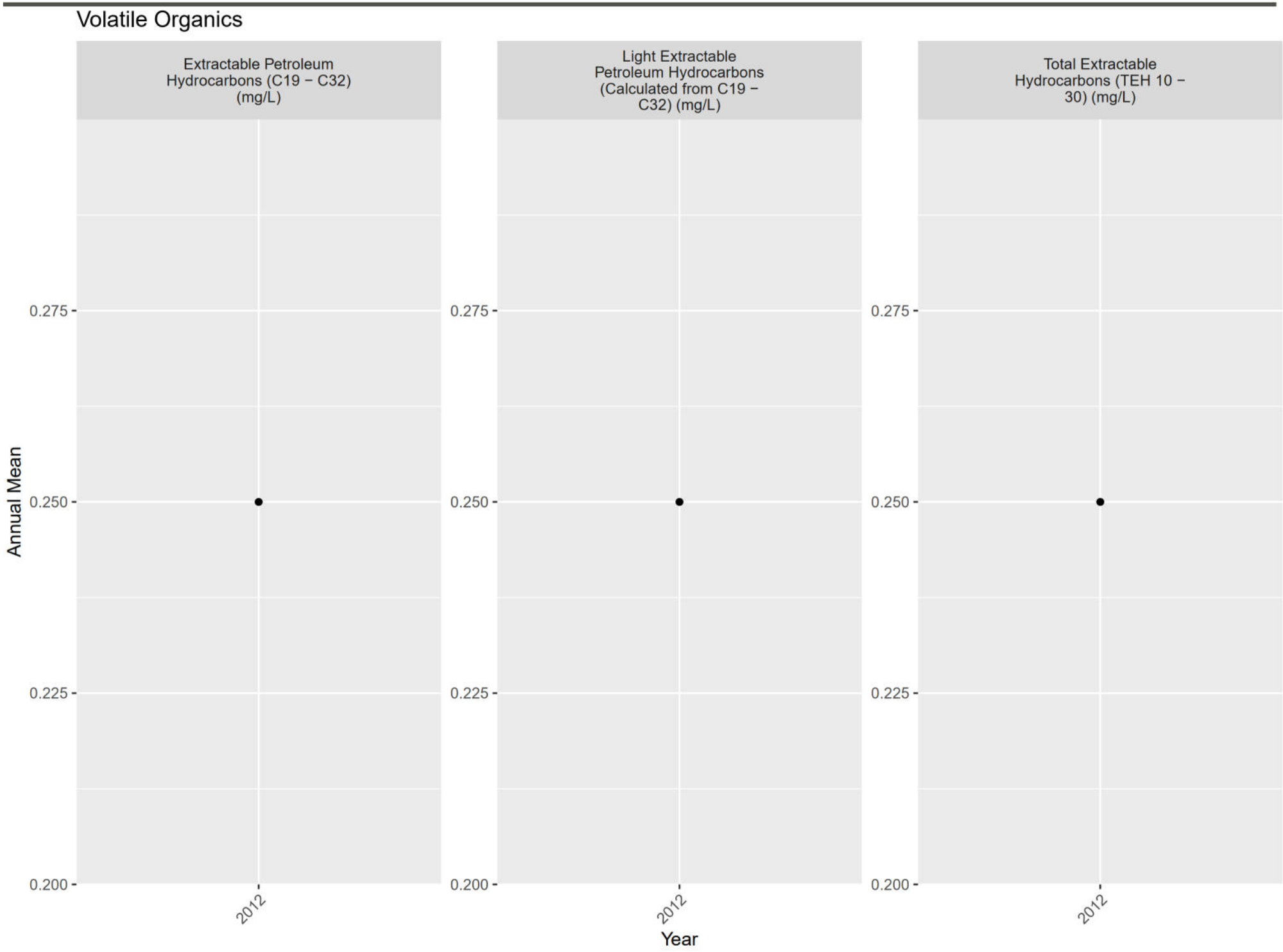

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018


Field Measured
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Temperature (°C)
Annual Mean
Year
500
400
300
200
83
82
81
80
79
11.5
11.0
10.5
250
200
150
100
50
8.00
7.95
7.90
7.85
7.80
6
4
2
2012
2013
2014
2015
2016
2017


Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Silica (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018


Nutrients and Biological Indicators
Dissolved Ortho−phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018

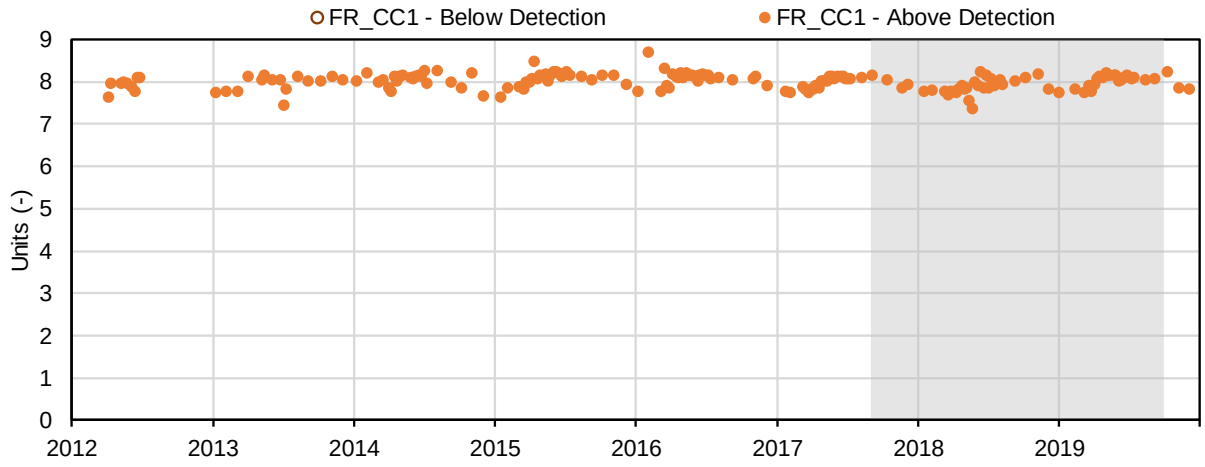

Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018


Volatile Organics
Extractable Petroleum Hydrocarbons (C19 − C32) (mg/L)
Light Extractable Petroleum Hydrocarbons (Calculated from C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
0.275
0.250
0.225
0.200
2012
Year

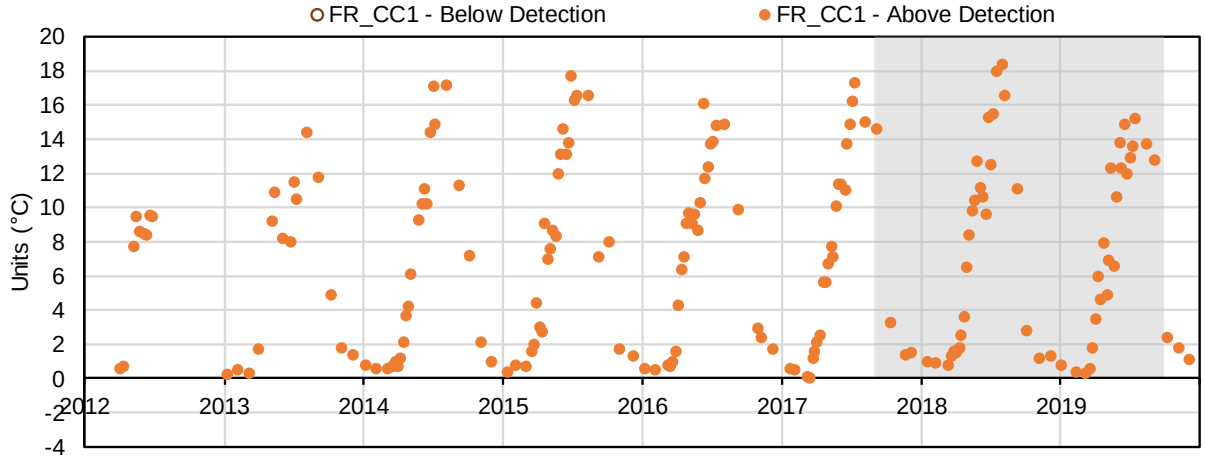
ATTACHMENT F21

FR_CC1 Plots

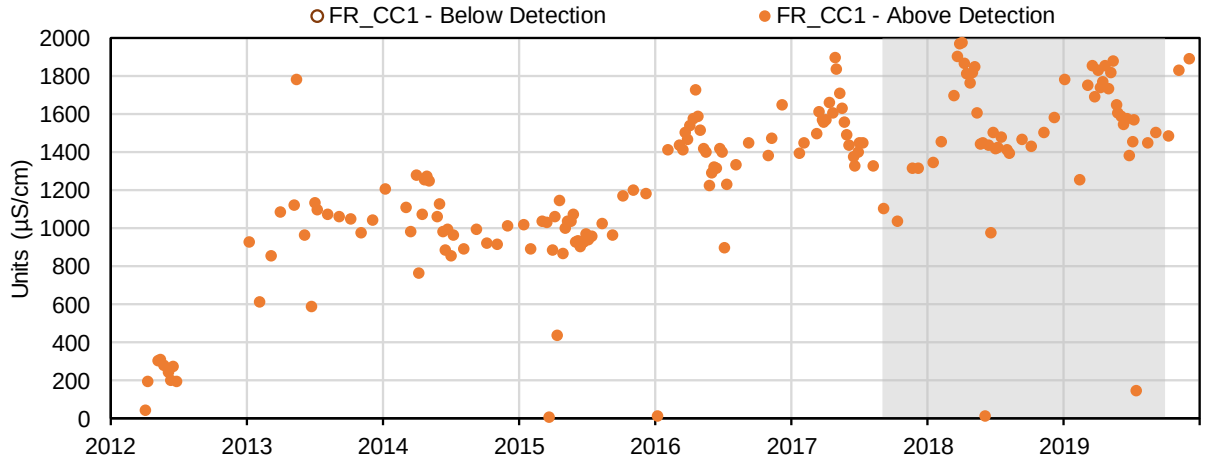
(1) pH (-); Field Measured



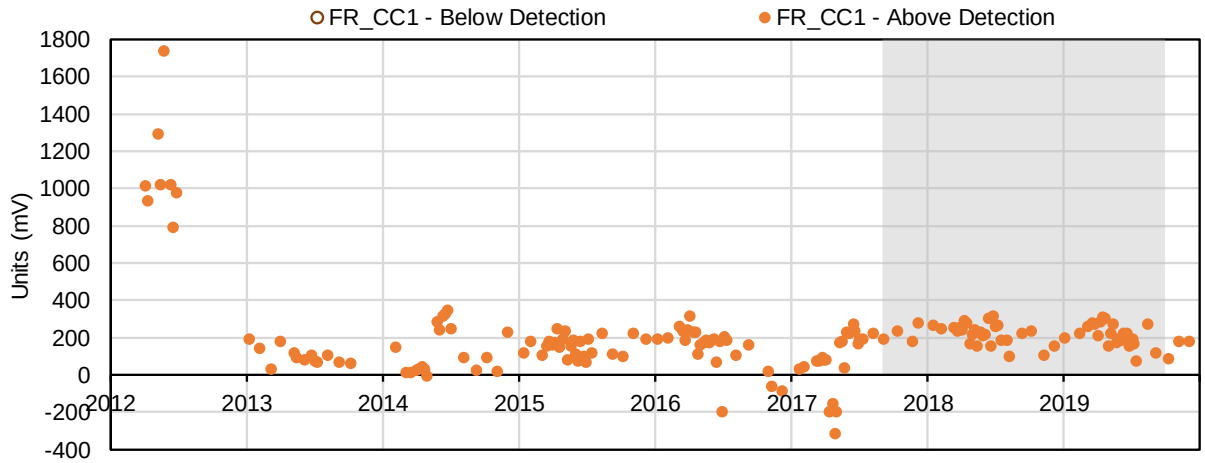
(2) Temperature (°C); Field Measured



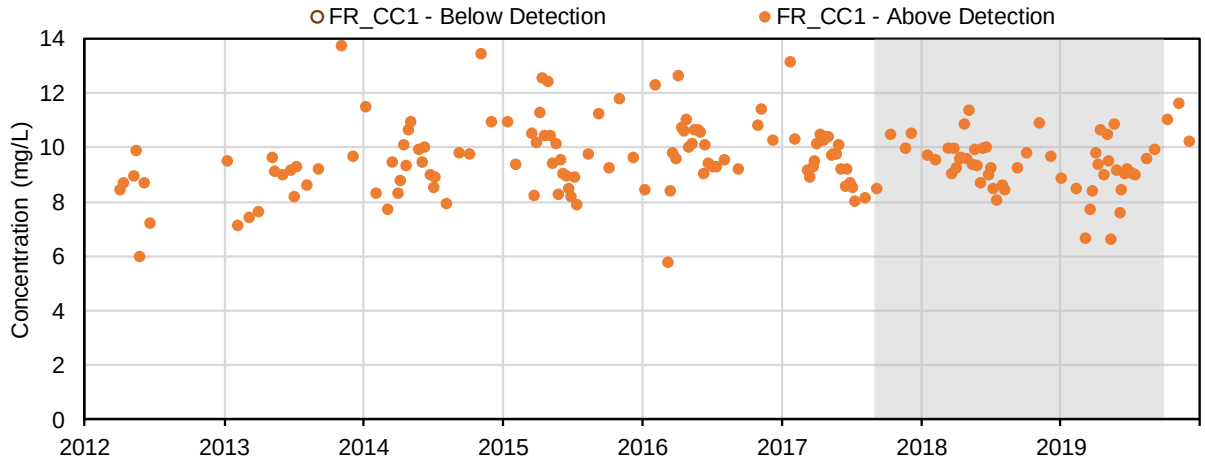
(3) Conductivity (µS/cm); Field Measured



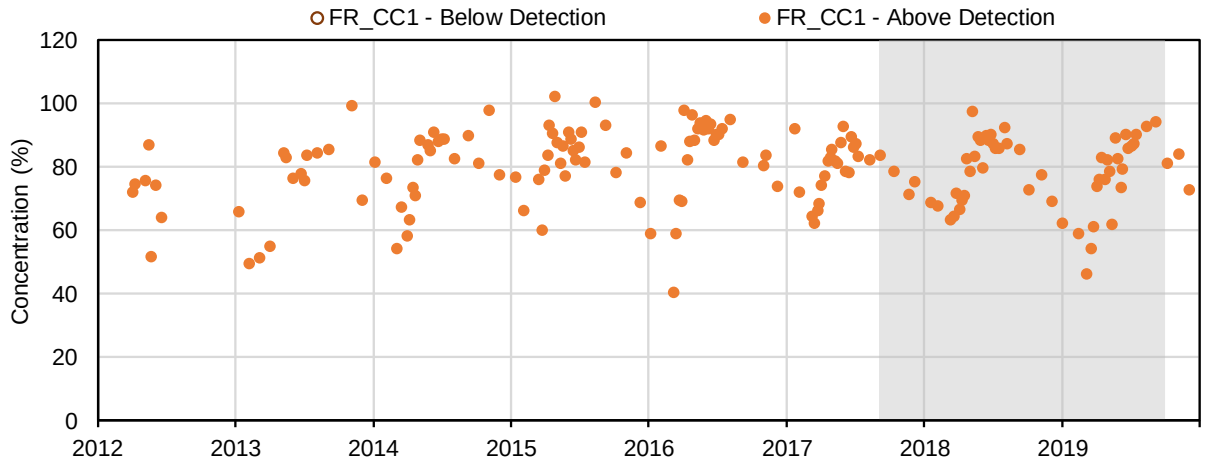
(4) Oxidation-Reduction Potential (mV); Field Measured



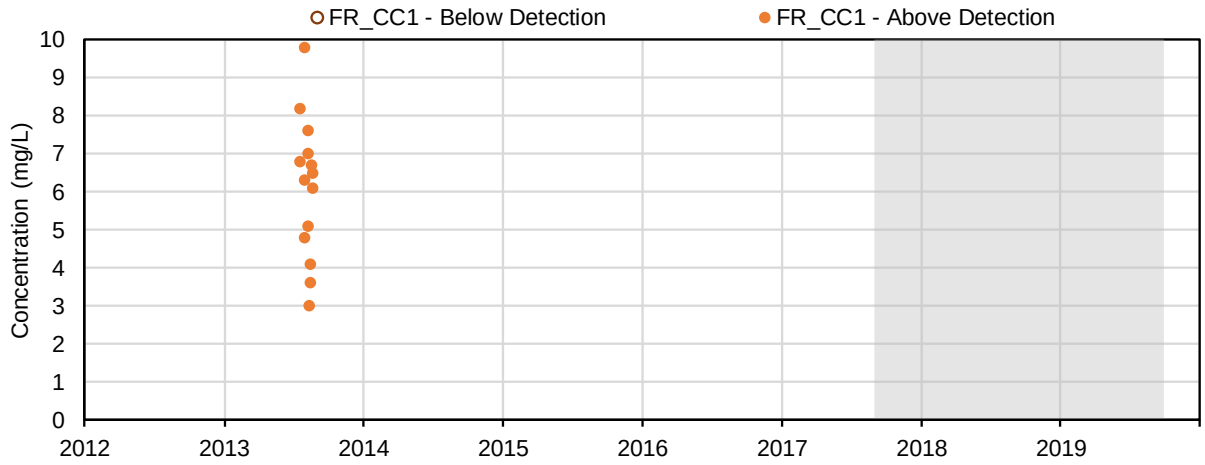
(5) Dissolved Oxygen (mg/L); Field Measured



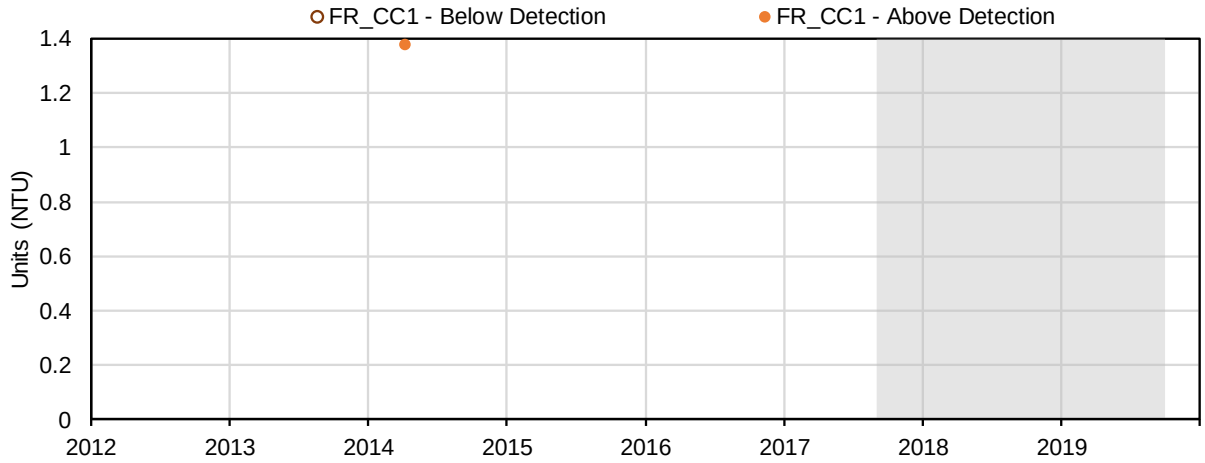
(6) Dissolved Oxygen (%); Field Measured



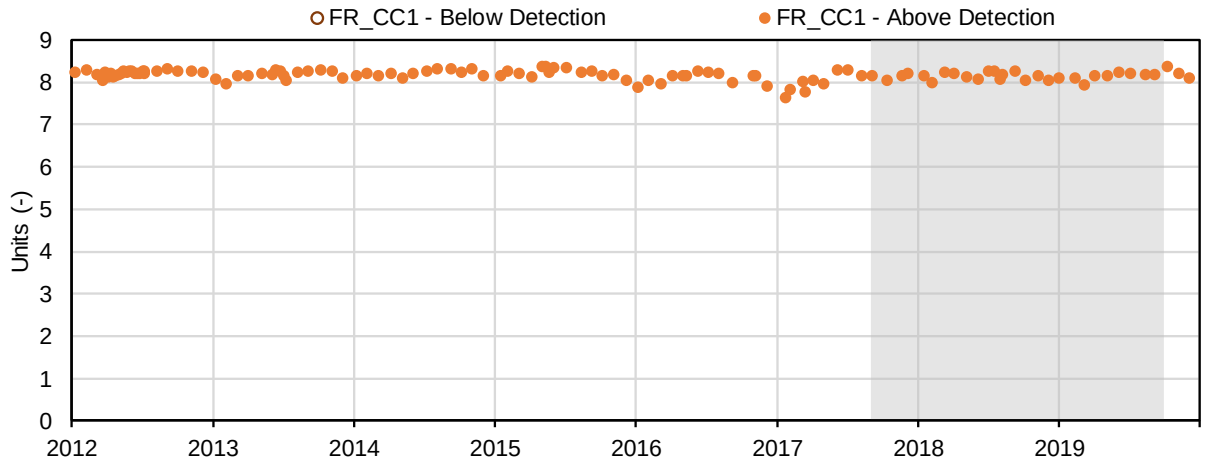
(7) Total Suspended Solids (mg/L); Field Measured



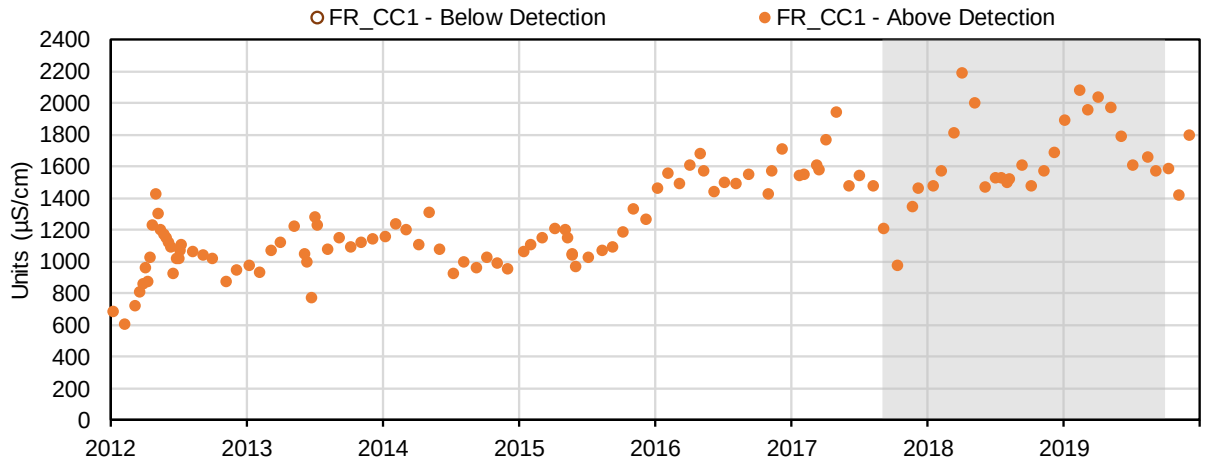
(8) Turbidity (NTU); Field Measured



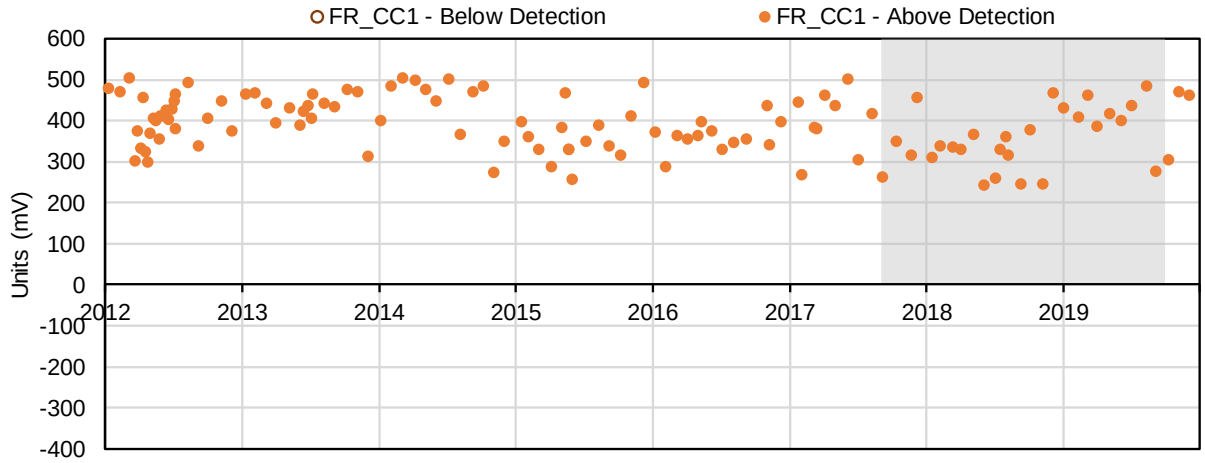
(9) pH (-); Conventional Parameters



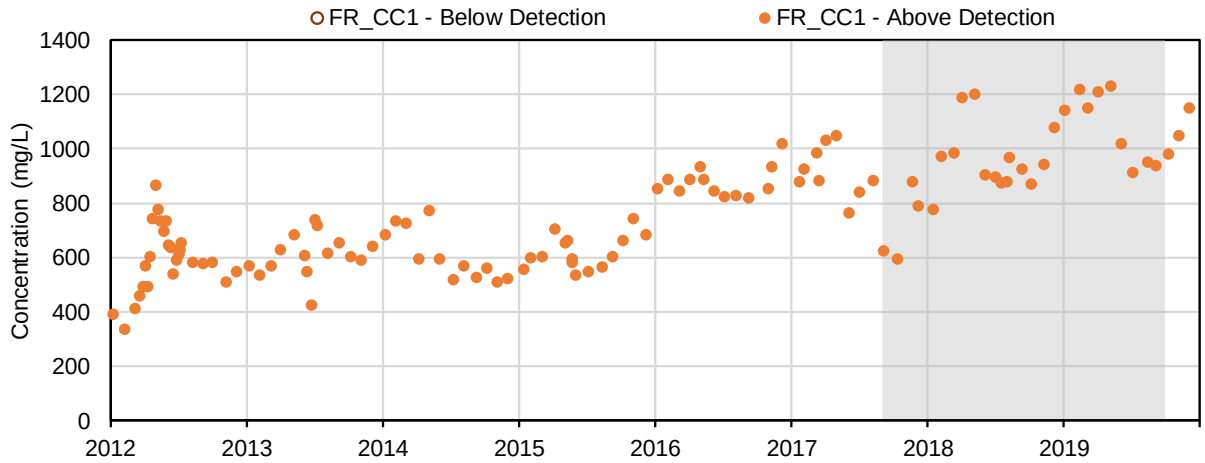
(10) Conductivity (µS/cm); Conventional Parameters



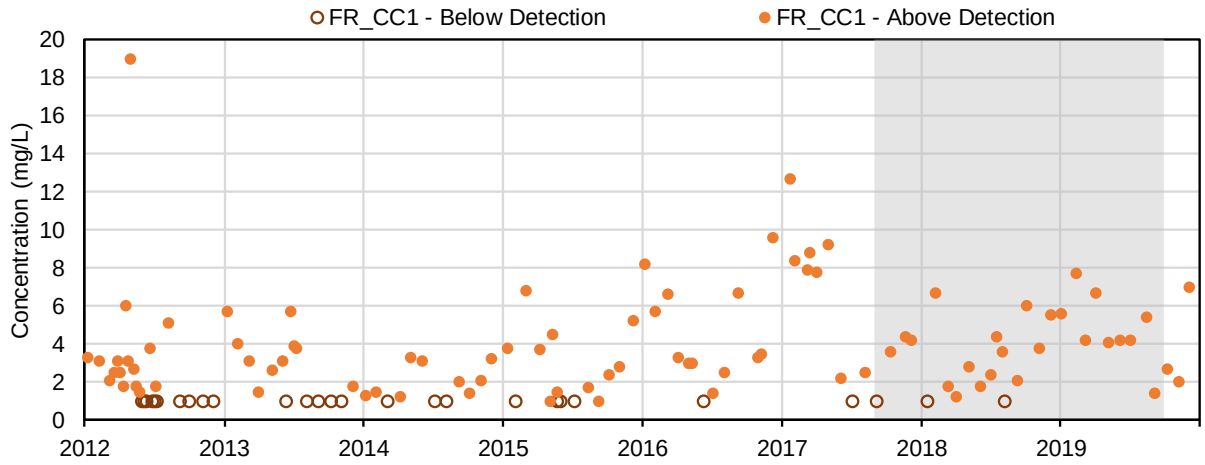
(11) Oxidation-Reduction Potential (mV); Conventional Parameters



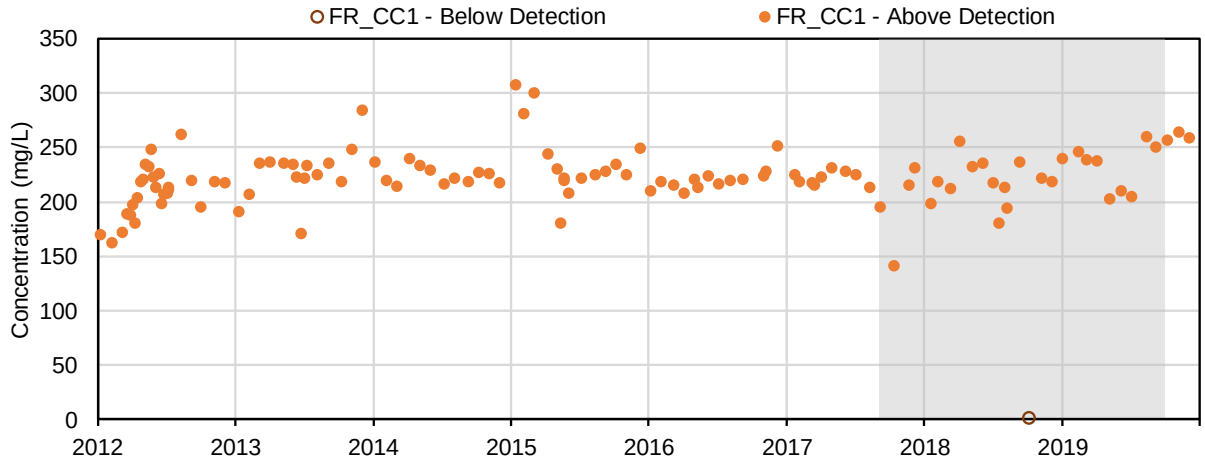
(12) Hardness, as CaCO3 (mg/L); Conventional Parameters



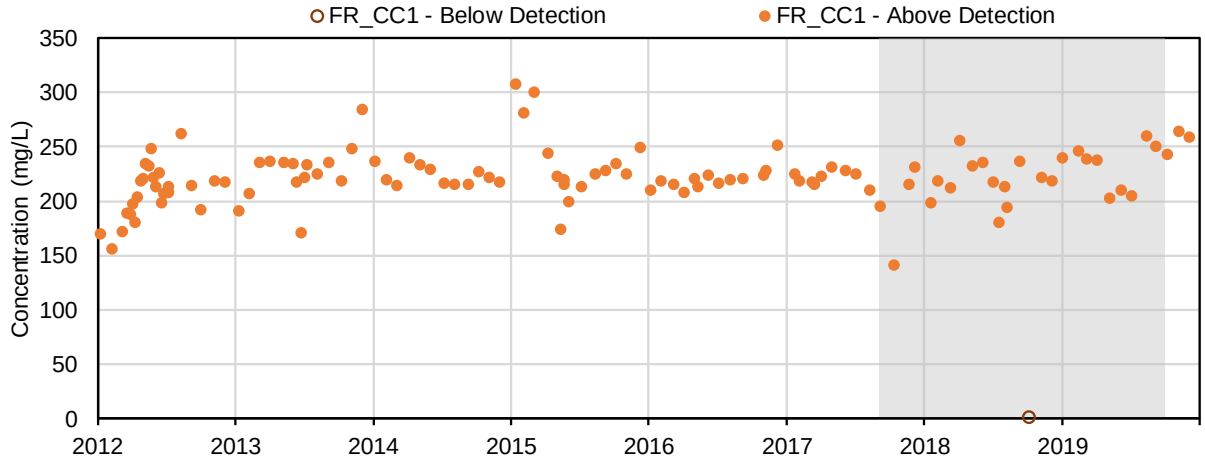
(13) Acidity, CaCO3 (mg/L); Conventional Parameters



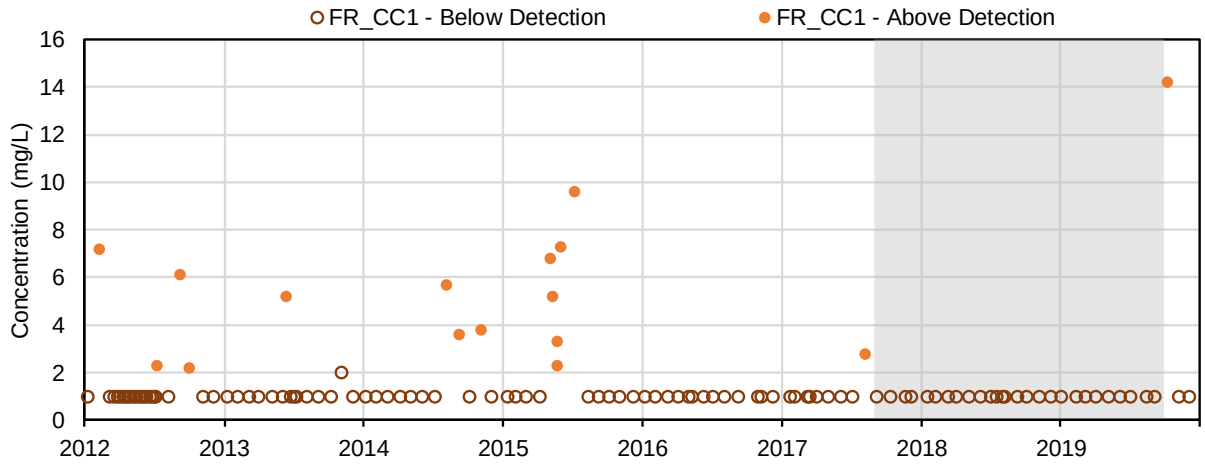
(14) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



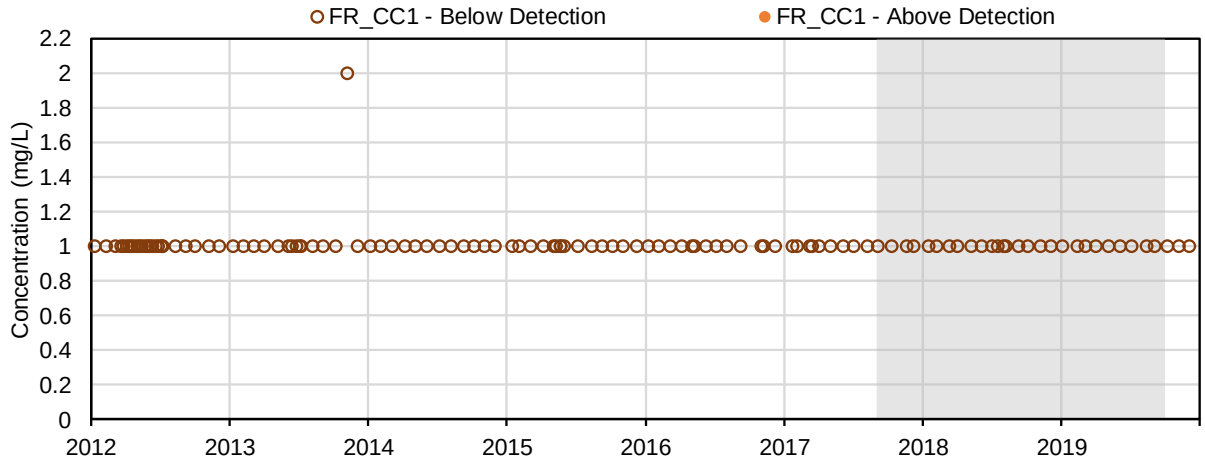
(15) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



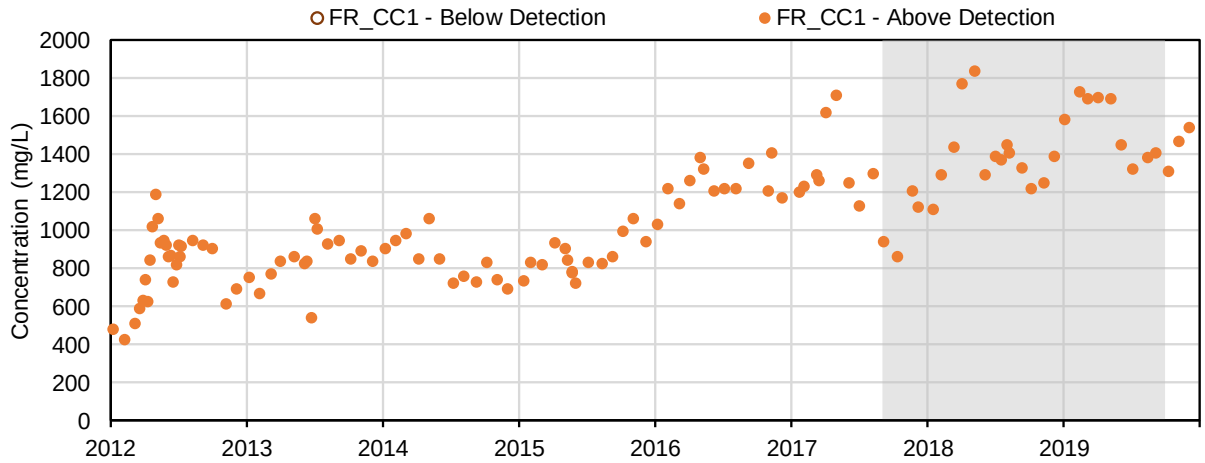
(16) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



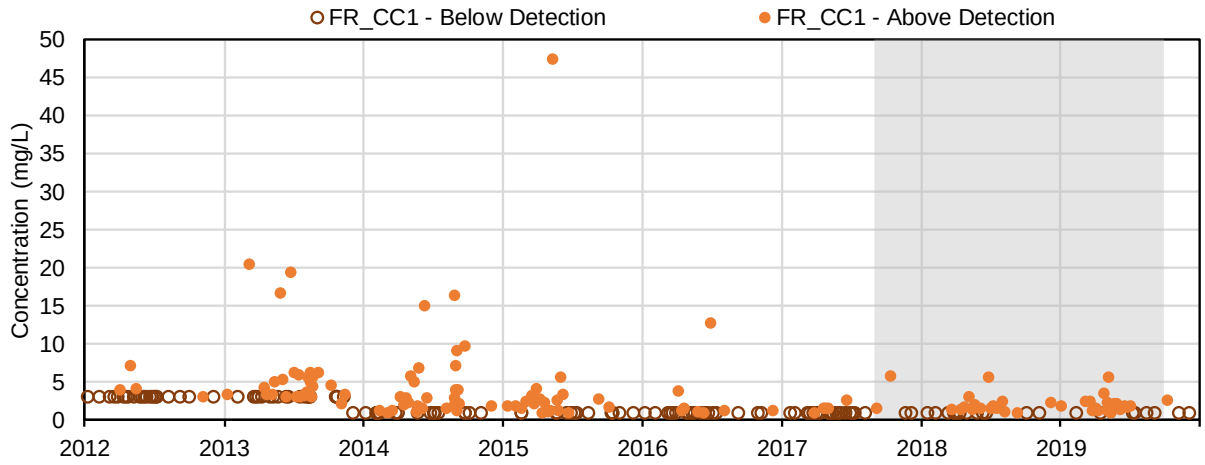
(17) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



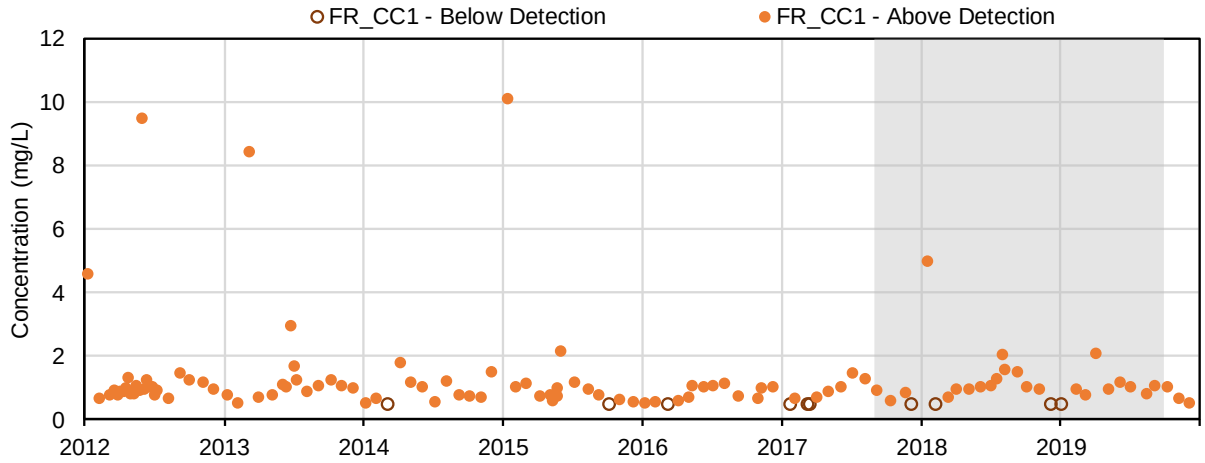
(18) Total dissolved solids (mg/L); Conventional Parameters



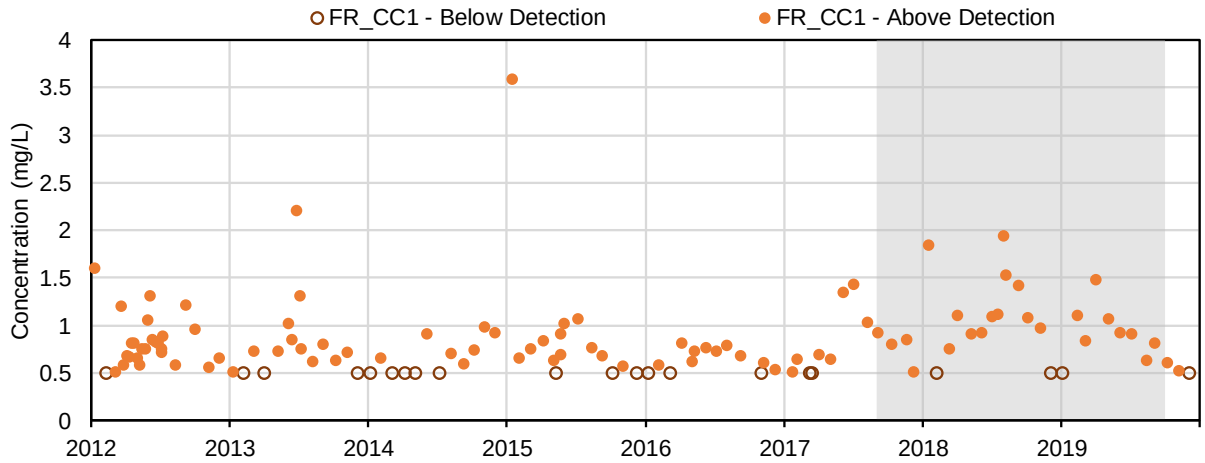
(19) Total suspended solids (mg/L); Conventional Parameters



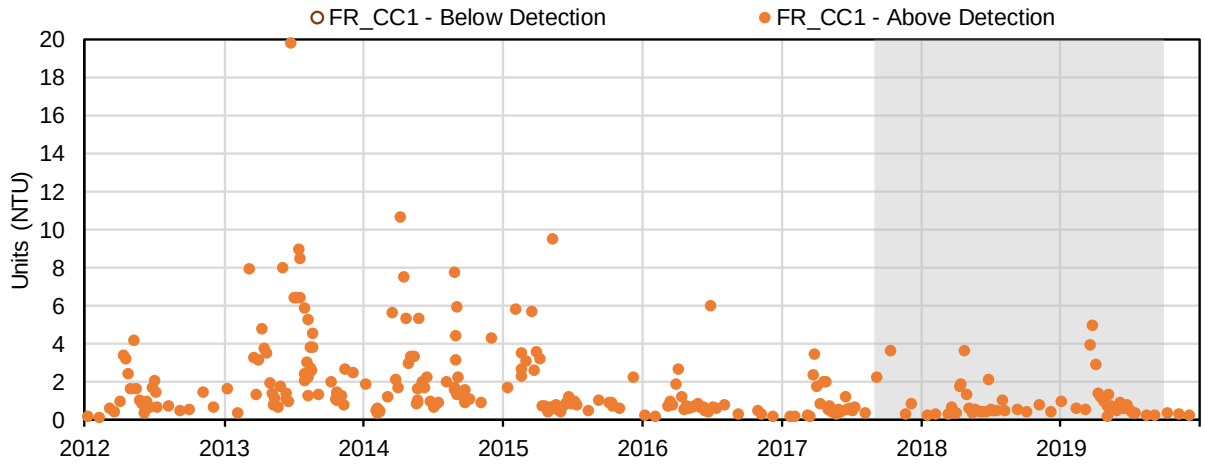
(20) Total organic carbon (mg/L); Conventional Parameters



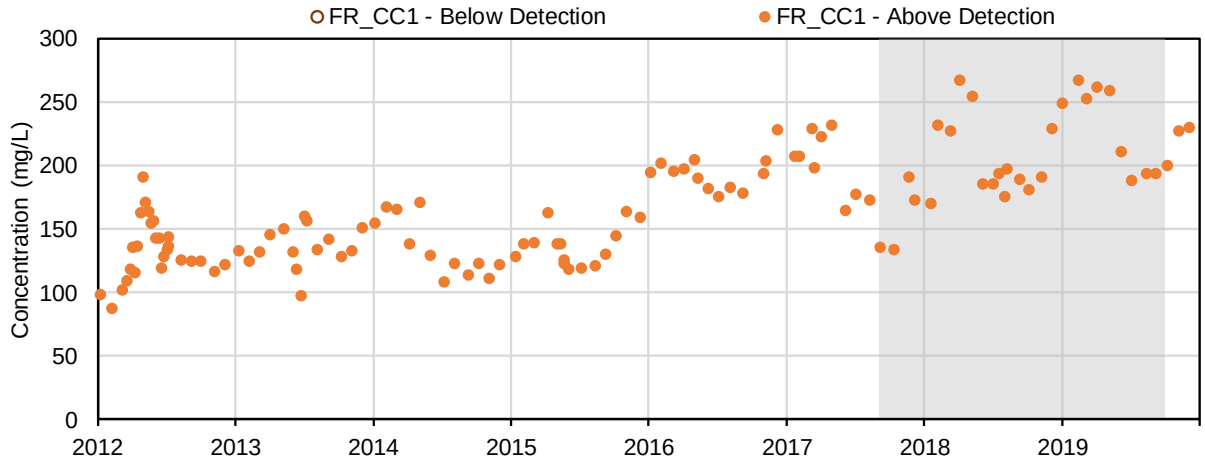
(21) Dissolved organic carbon (mg/L); Conventional Parameters



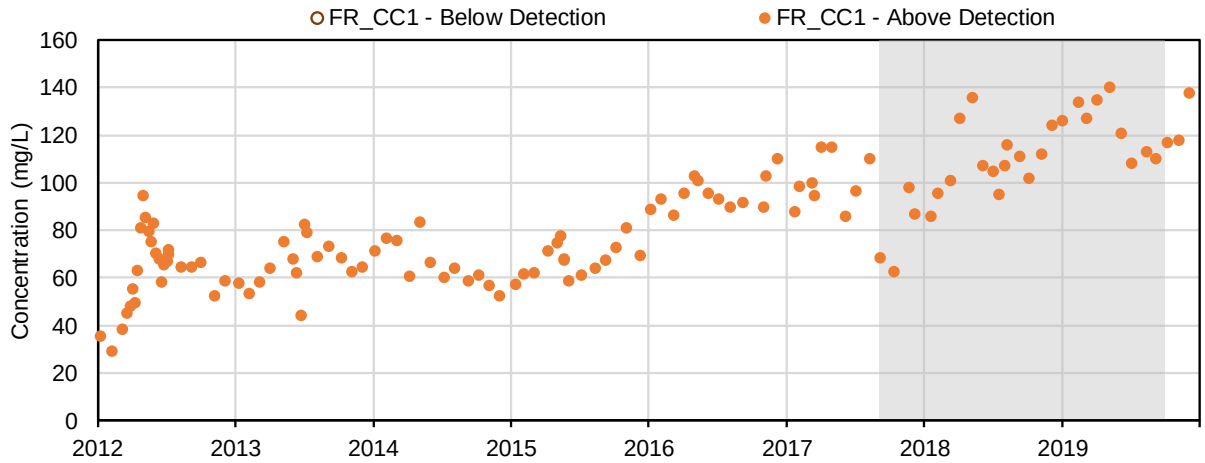
(22) Turbidity (NTU); Conventional Parameters



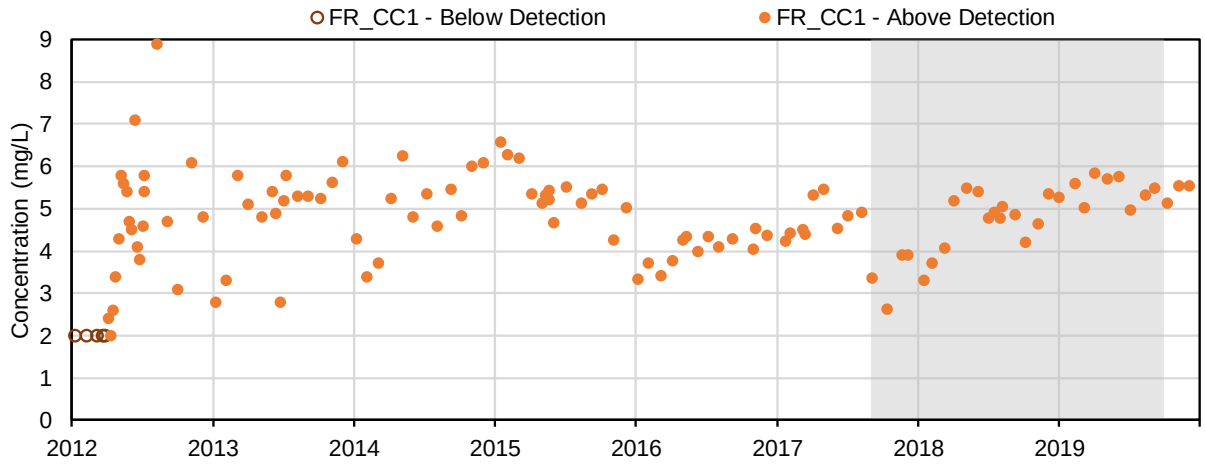
(23) Calcium (mg/L); Major Ions



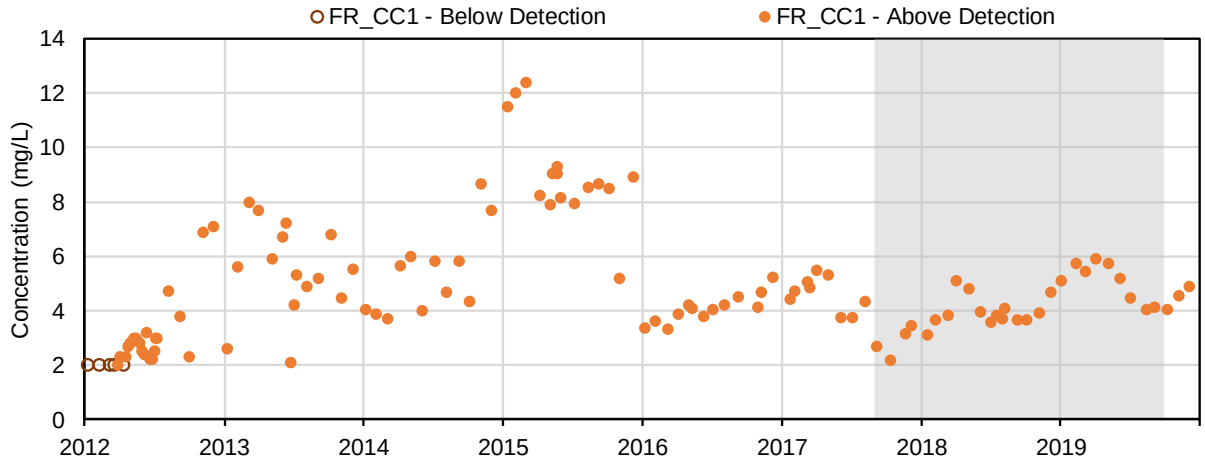
(24) Magnesium (mg/L); Major Ions



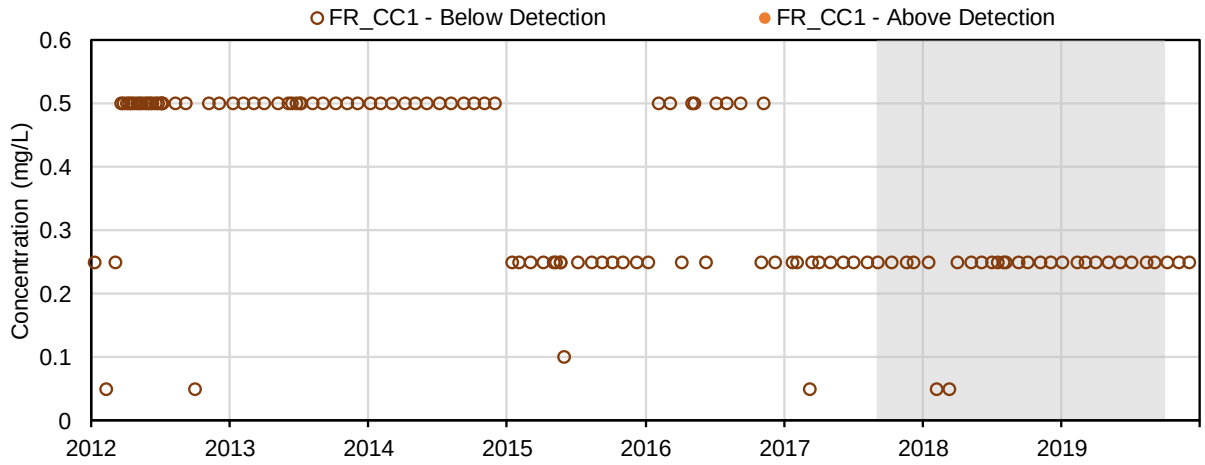
(25) Potassium (mg/L); Major Ions



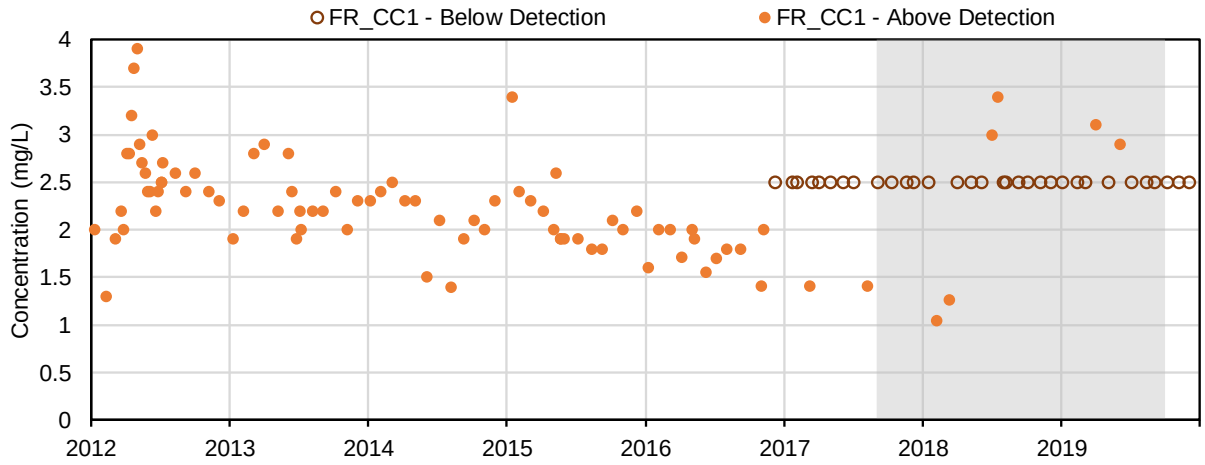
(26) Sodium (mg/L); Major Ions



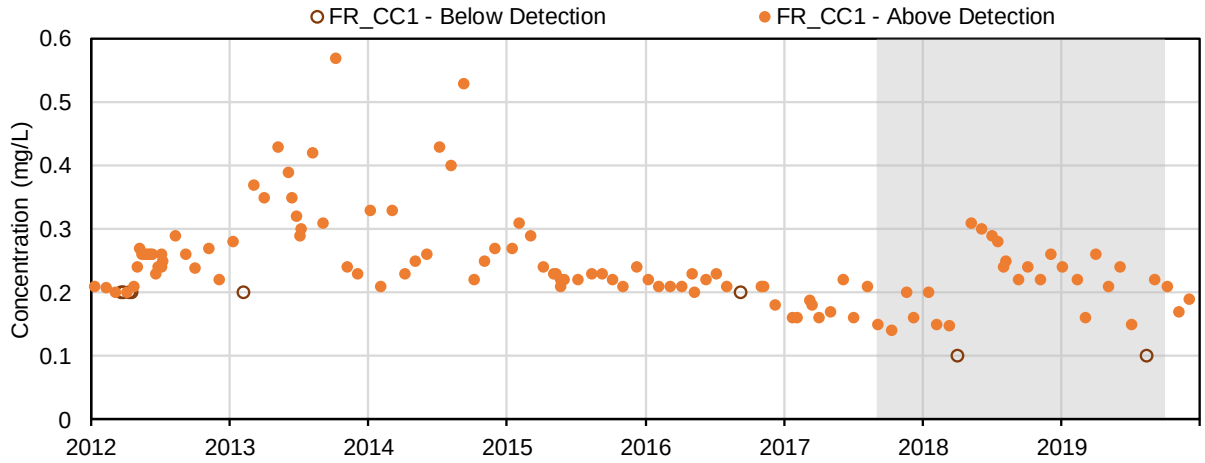
(27) Bromide (mg/L); Major Ions



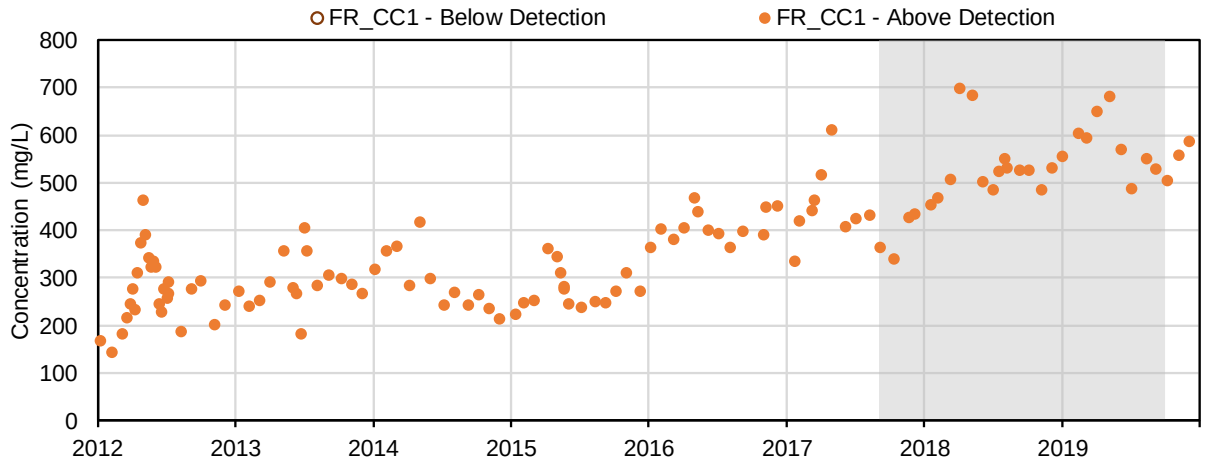
(28) Chloride (mg/L); Major Ions



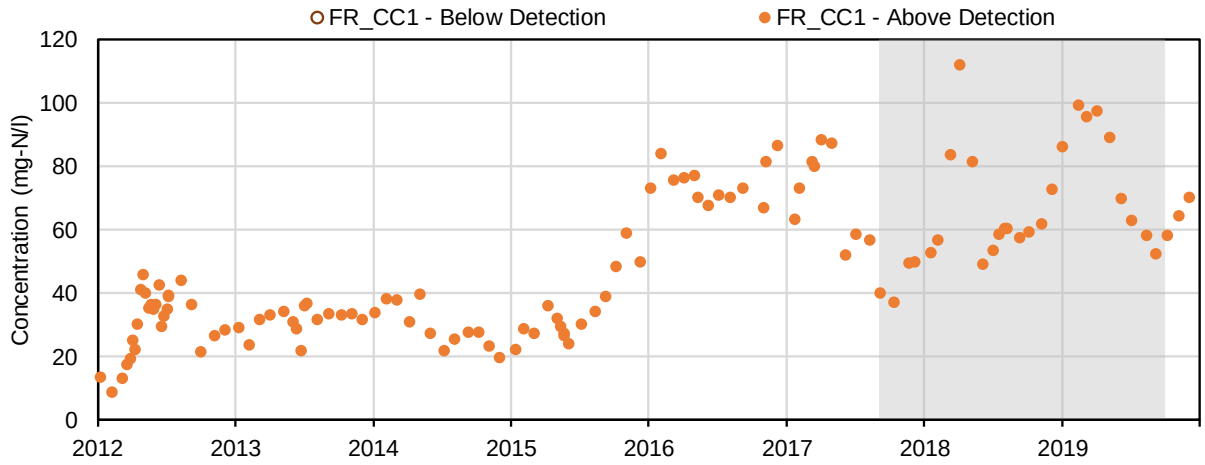
(29) Fluoride (mg/L); Major Ions



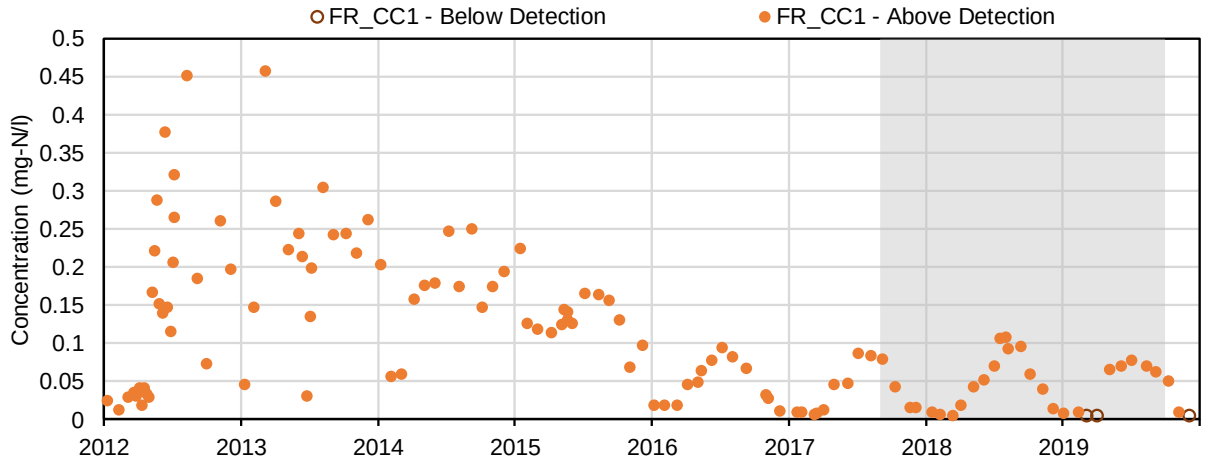
(30) Sulphate (mg/L); Major Ions



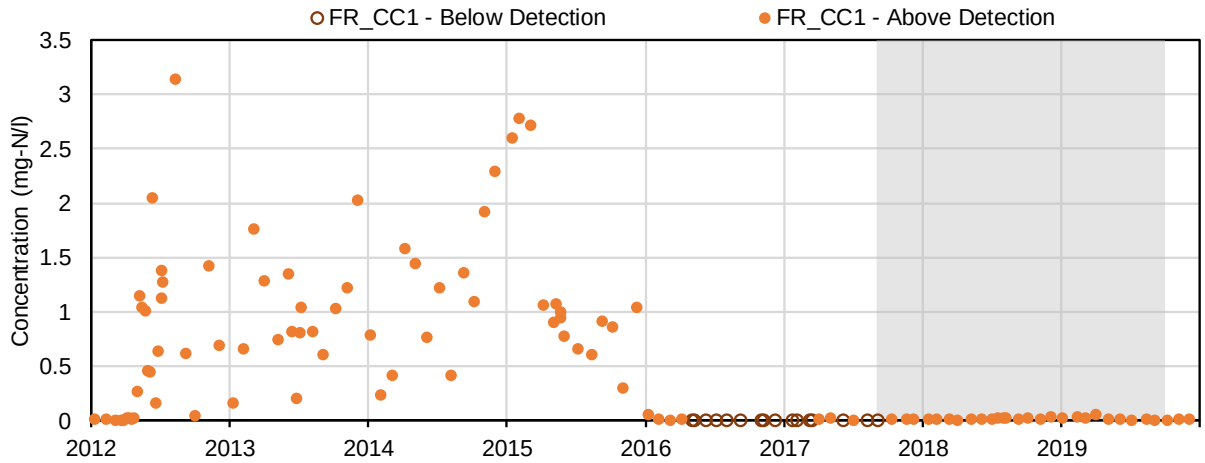
(31) Nitrate (mg-N/l); Nutrients and Biological Indicators



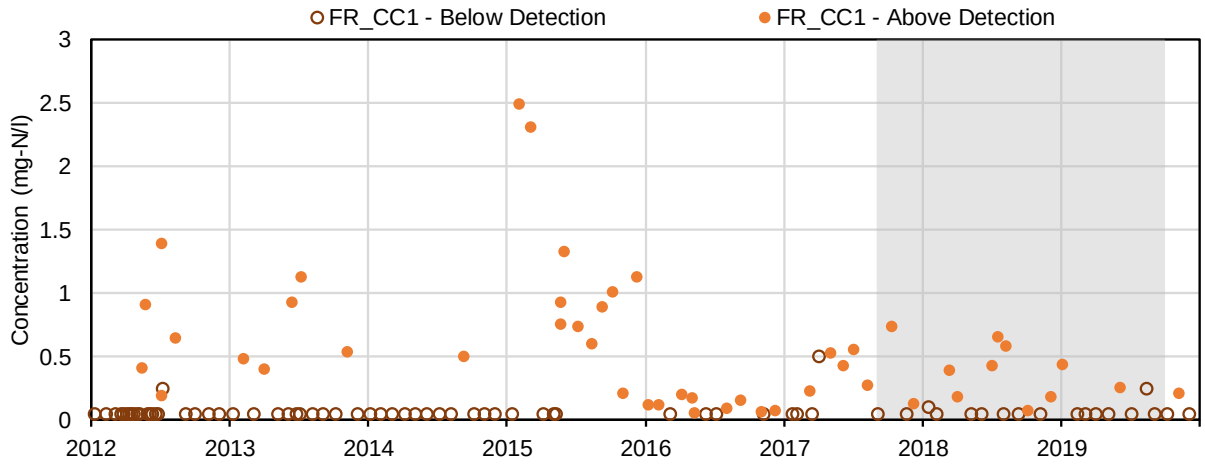
(32) Nitrite (mg-N/l); Nutrients and Biological Indicators



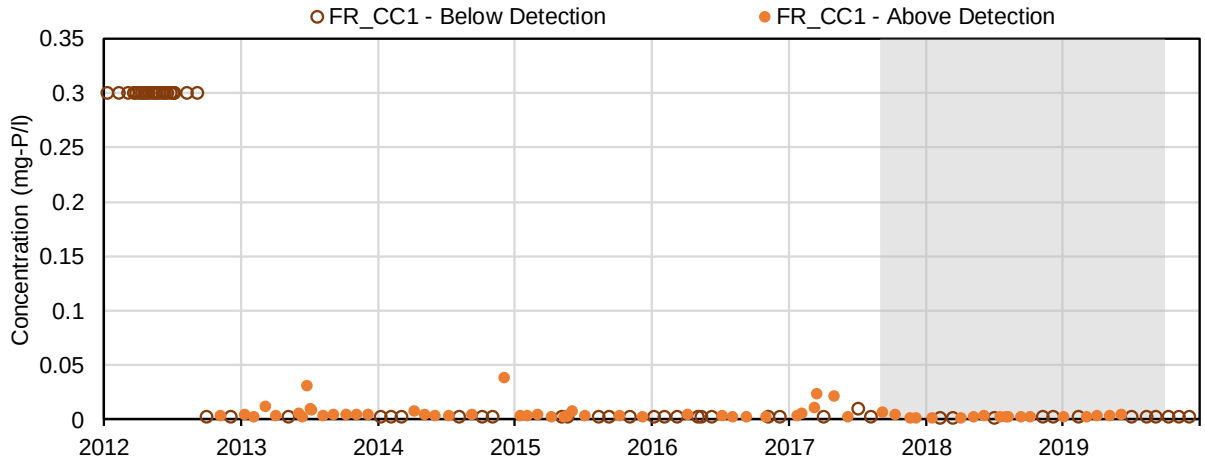
(33) Total ammonia (mg-N/l); Nutrients and Biological Indicators



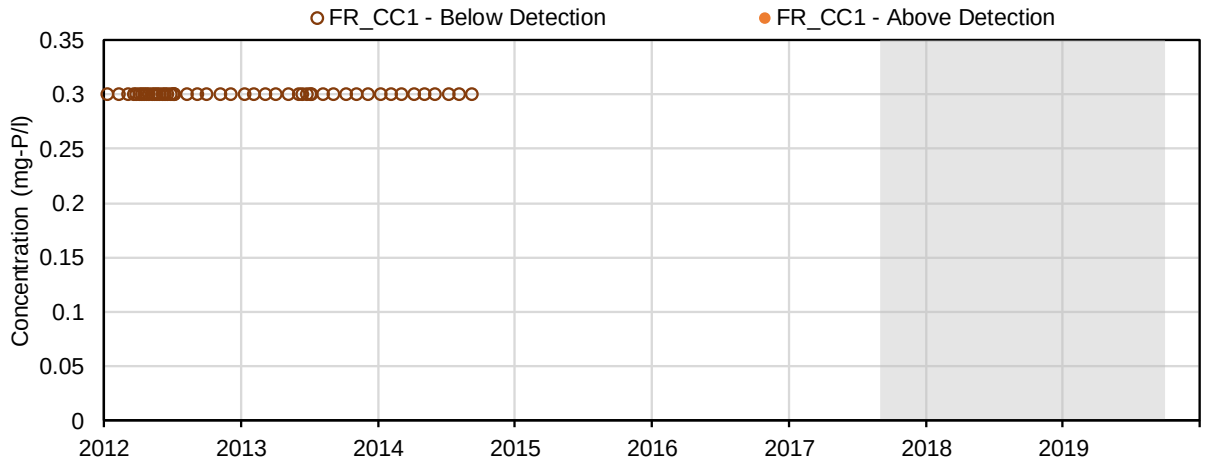
(34) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



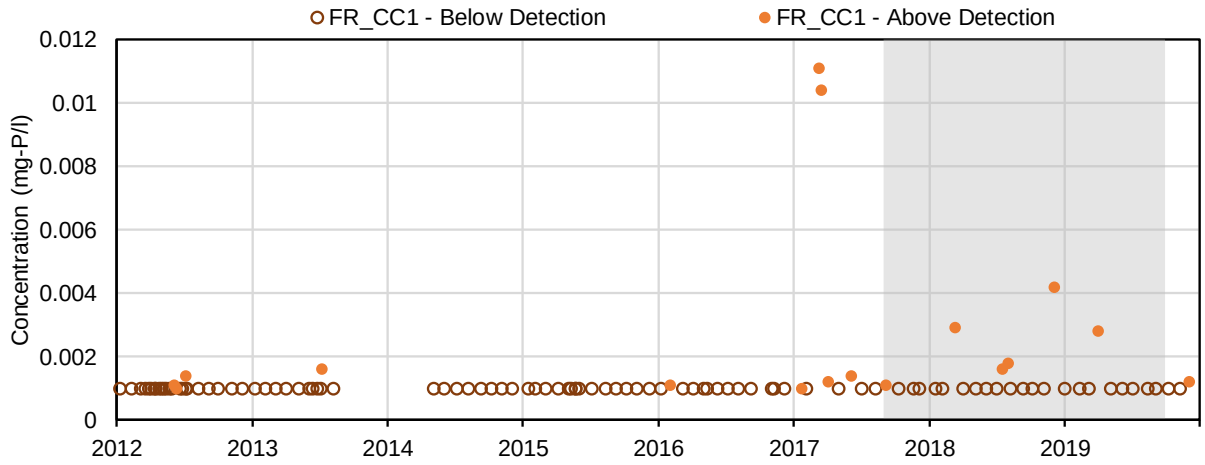
(35) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



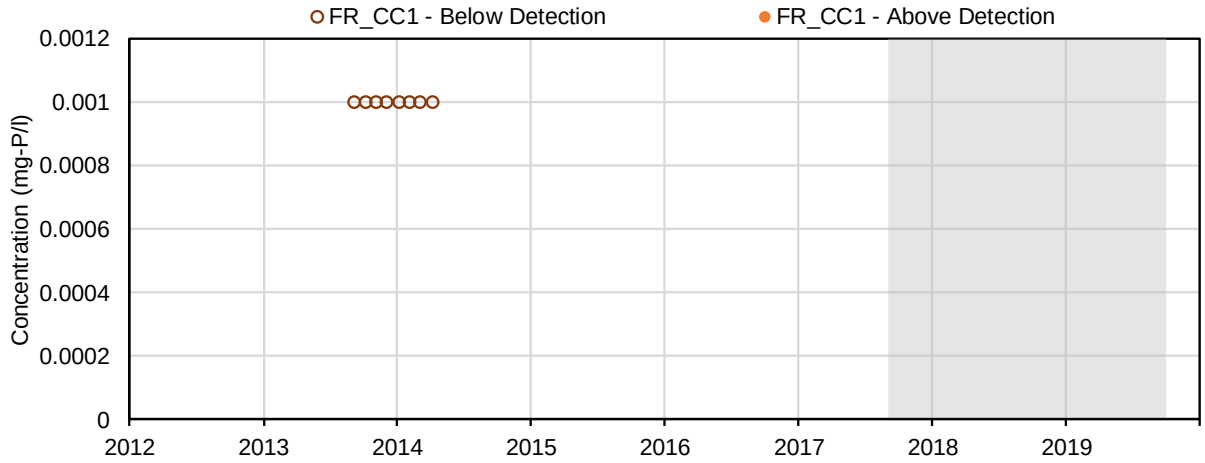
(36) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



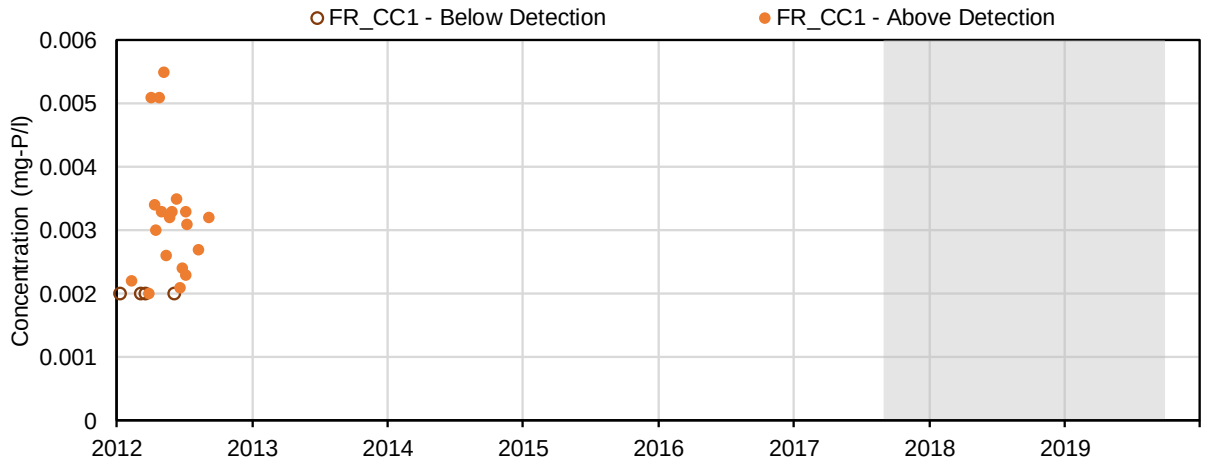
(37) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



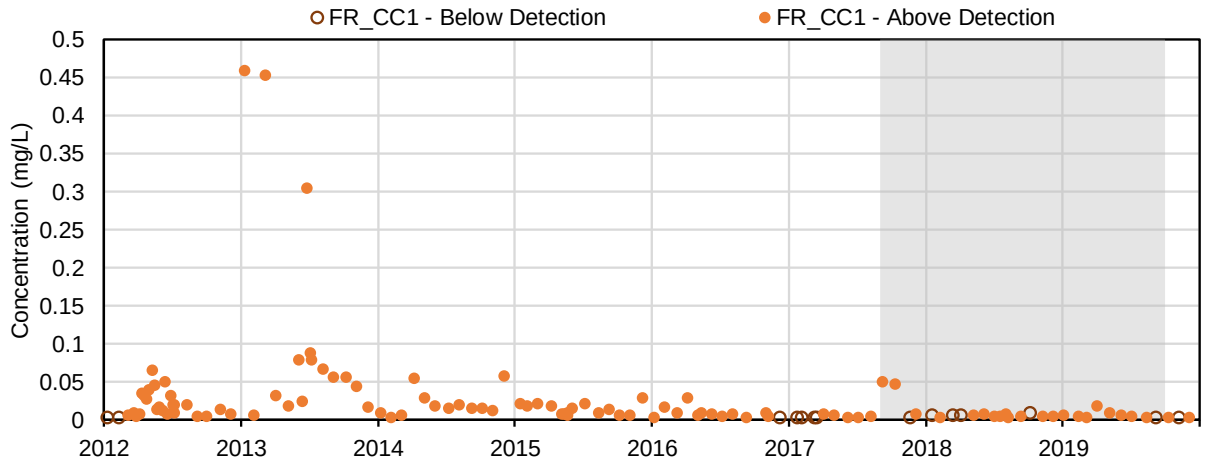
(38) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



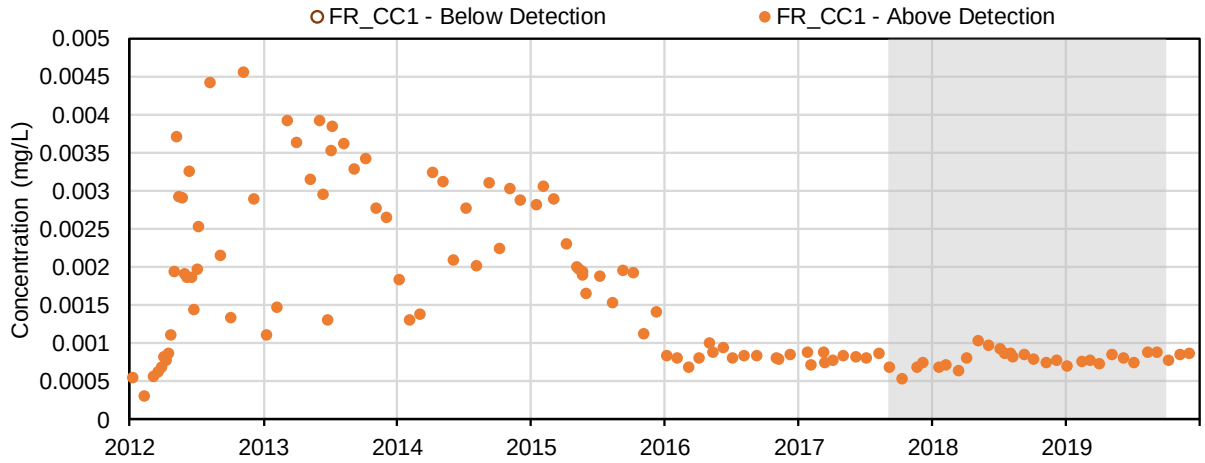
(39) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



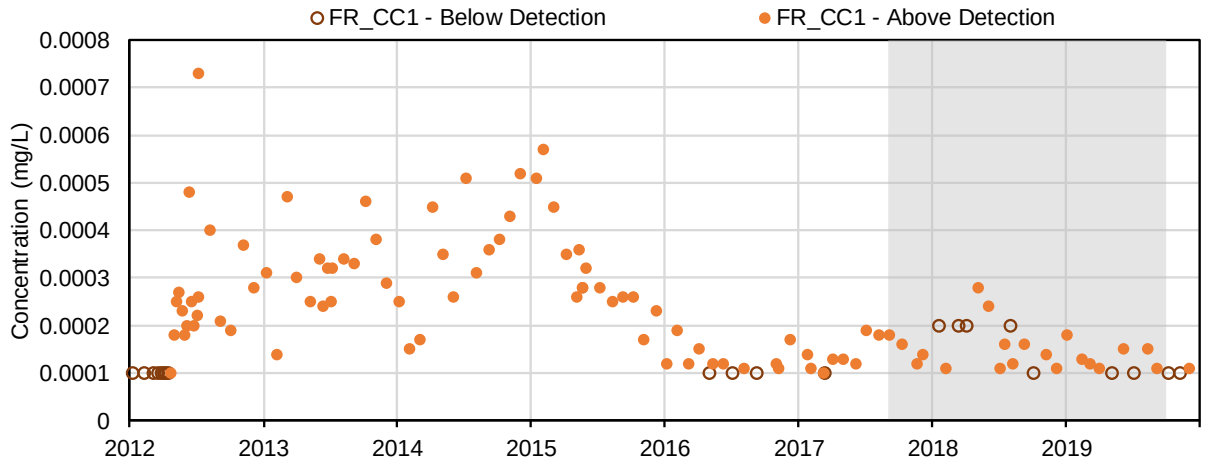
(40) Aluminum (mg/L); Total Metals



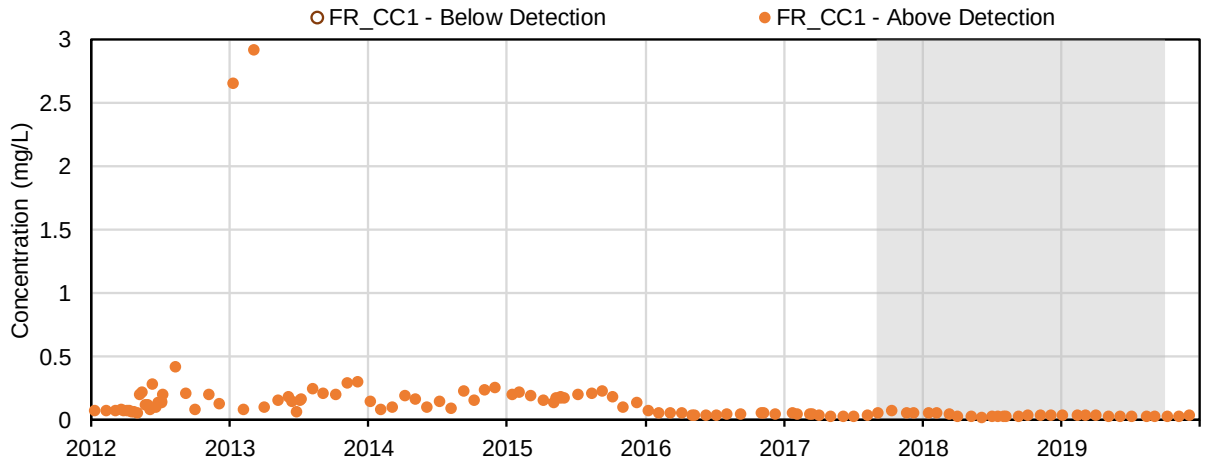
(41) Antimony (mg/L); Total Metals



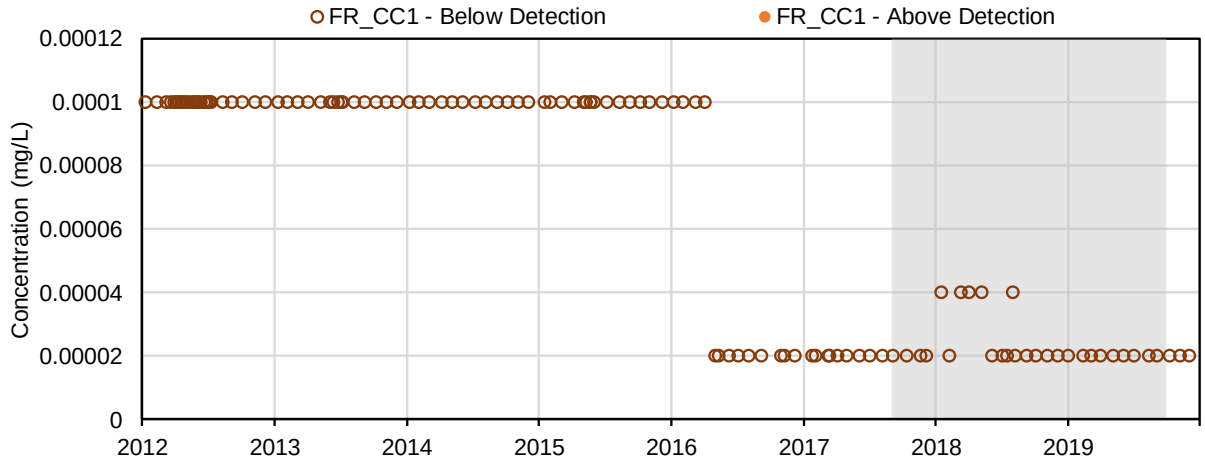
(42) Arsenic (mg/L); Total Metals



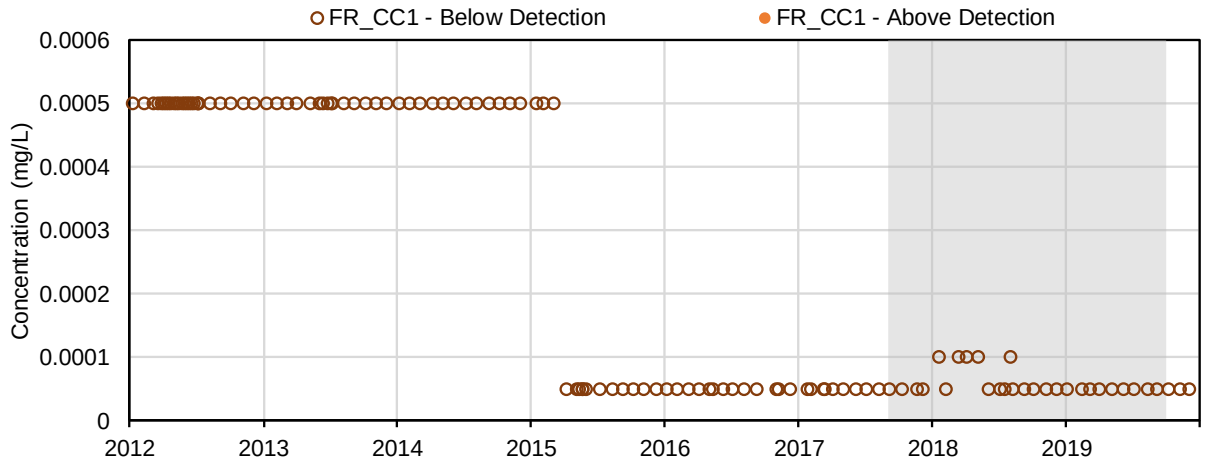
(43) Barium (mg/L); Total Metals



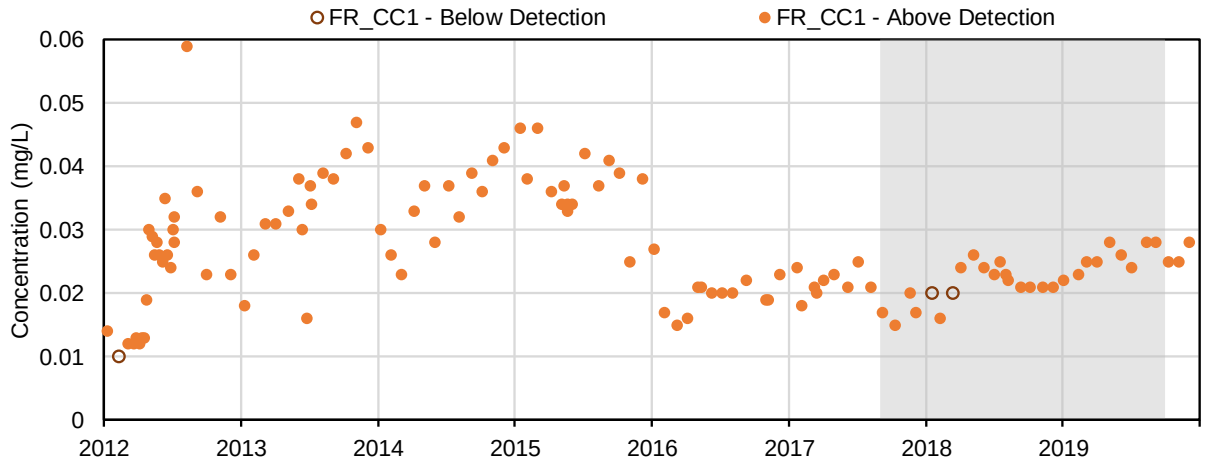
(44) Beryllium (mg/L); Total Metals



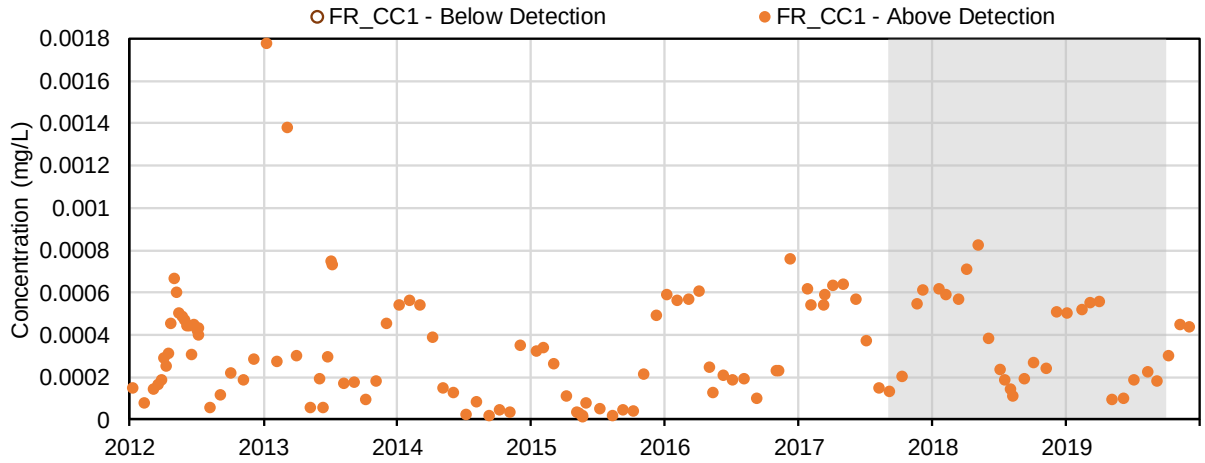
(45) Bismuth (mg/L); Total Metals



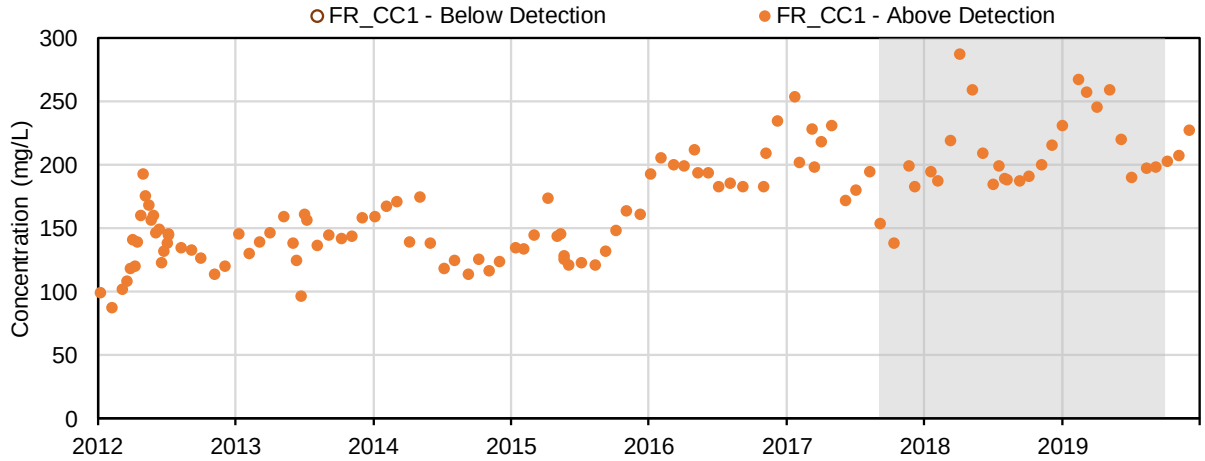
(46) Boron (mg/L); Total Metals



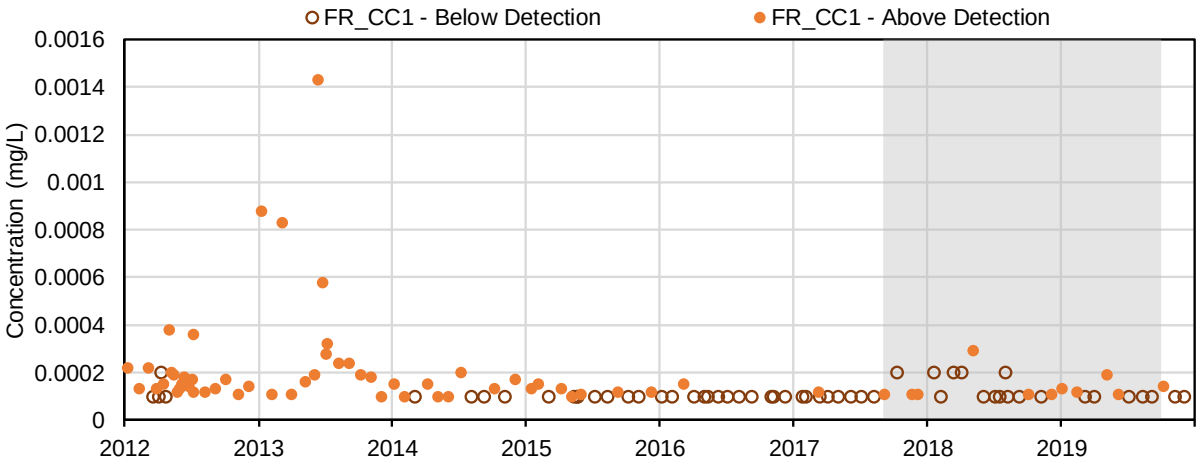
(47) Cadmium (mg/L); Total Metals



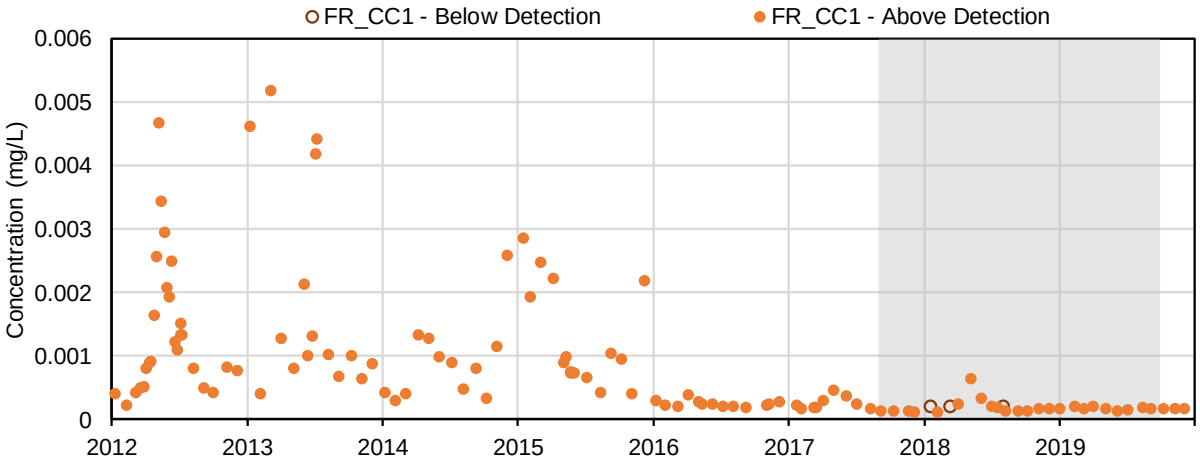
(48) Calcium (mg/L); Total Metals



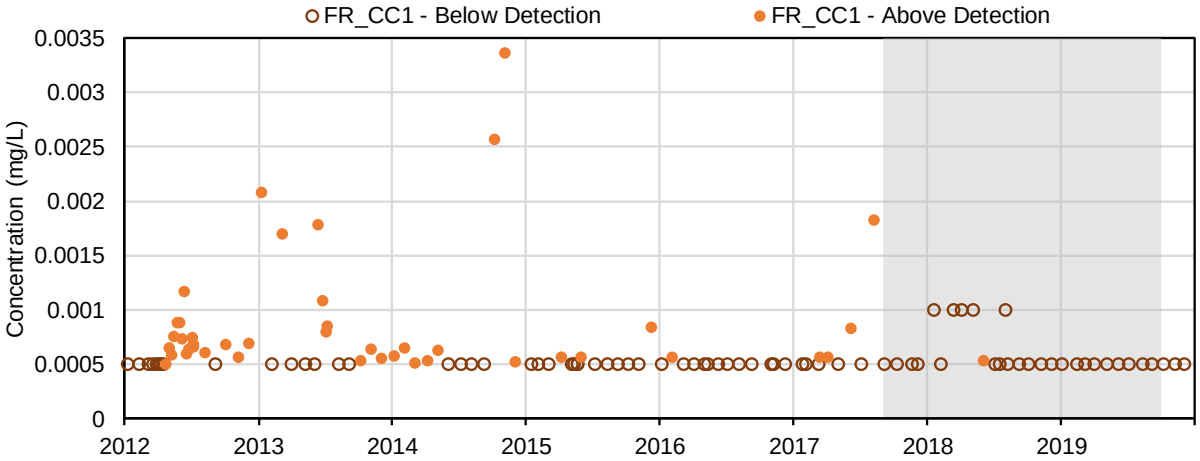
(49) Chromium (mg/L); Total Metals



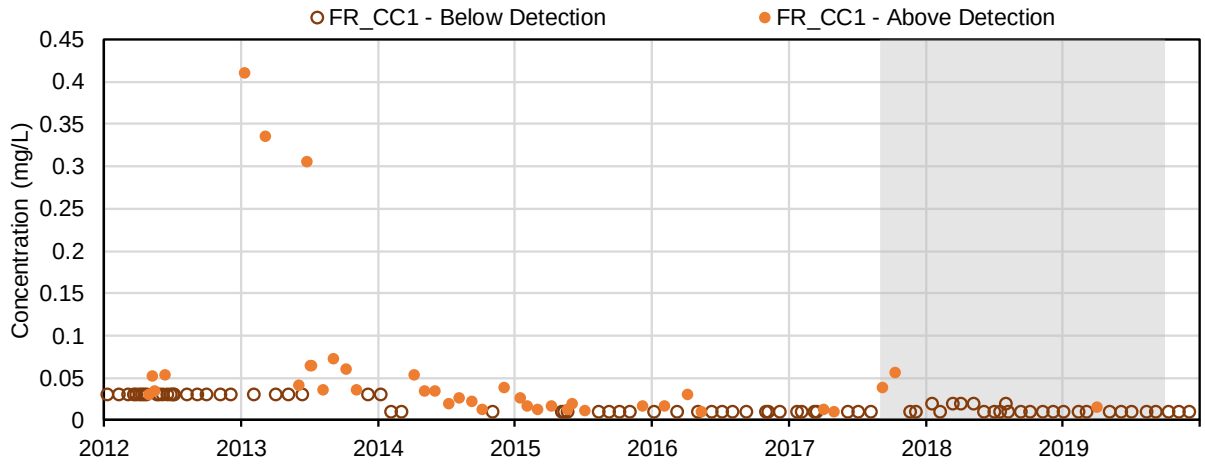
(50) Cobalt (mg/L); Total Metals



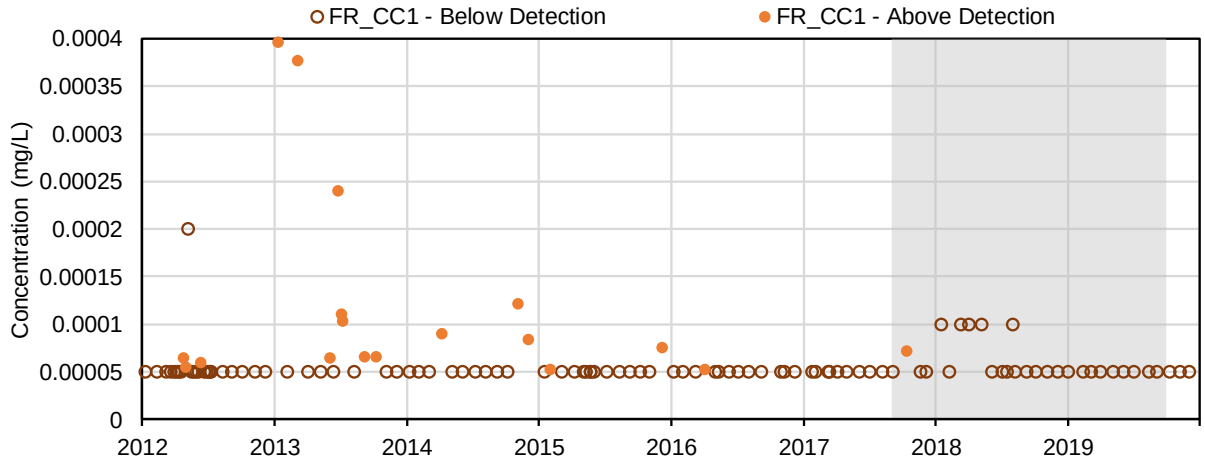
(51) Copper (mg/L); Total Metals



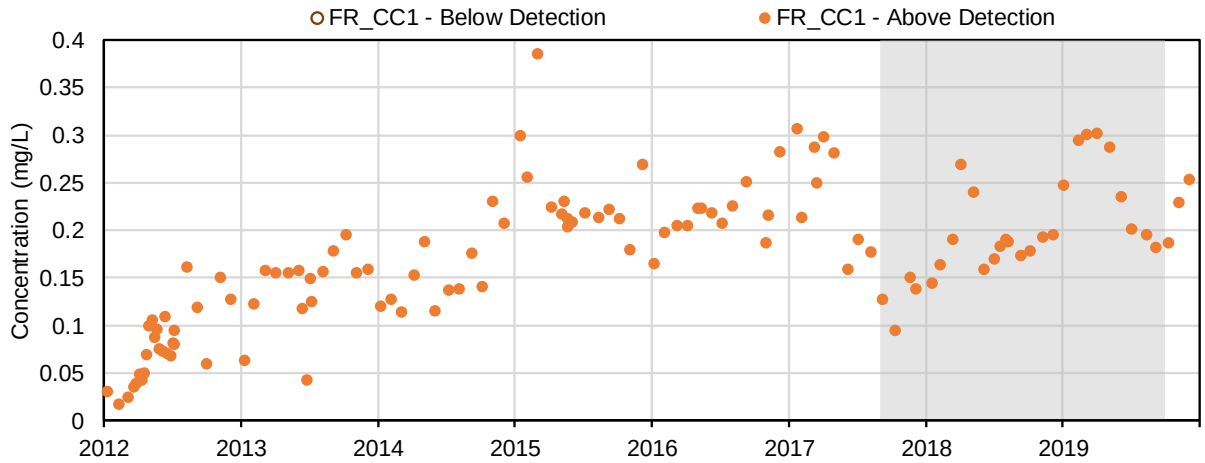
(52) Iron (mg/L); Total Metals



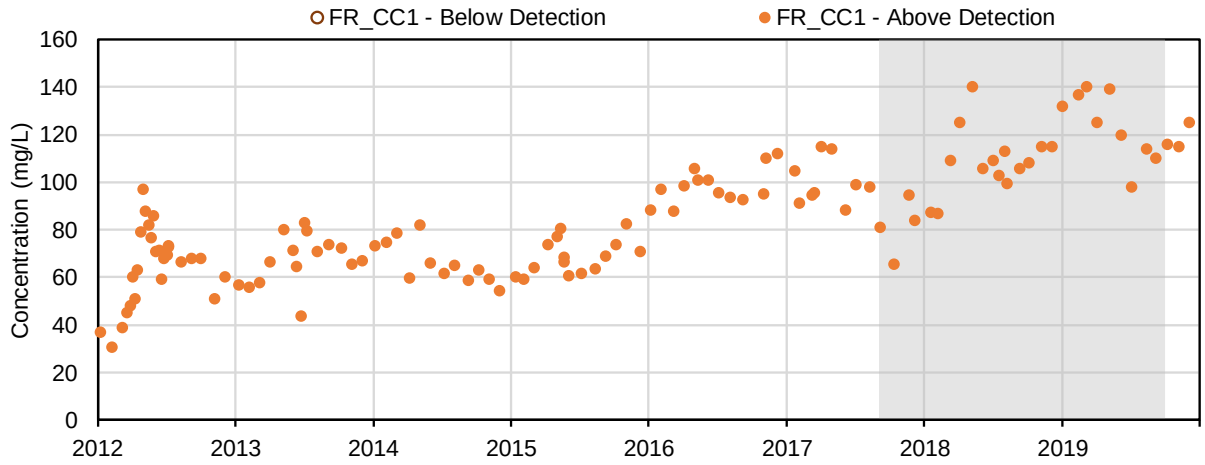
(53) Lead (mg/L); Total Metals



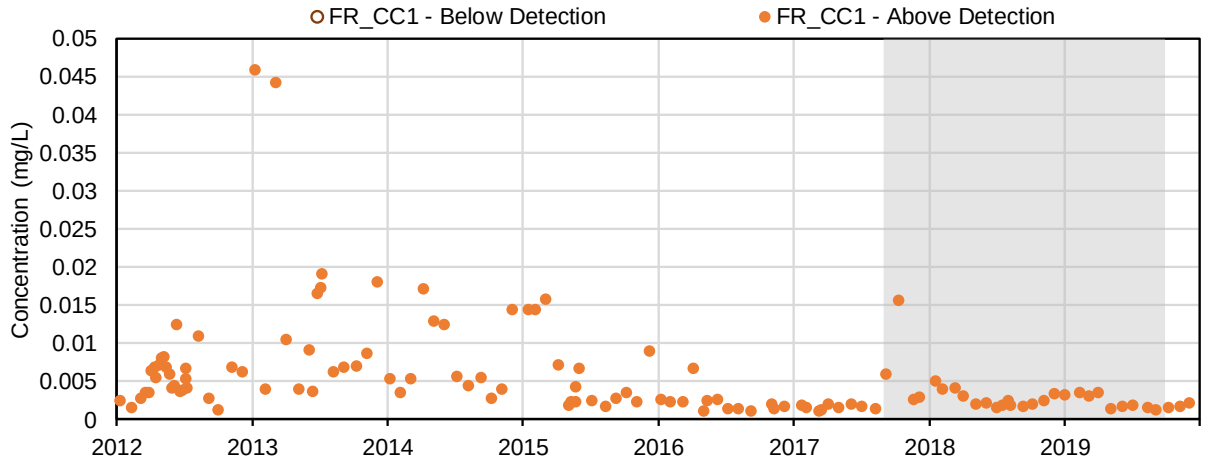
(54) Lithium (mg/L); Total Metals



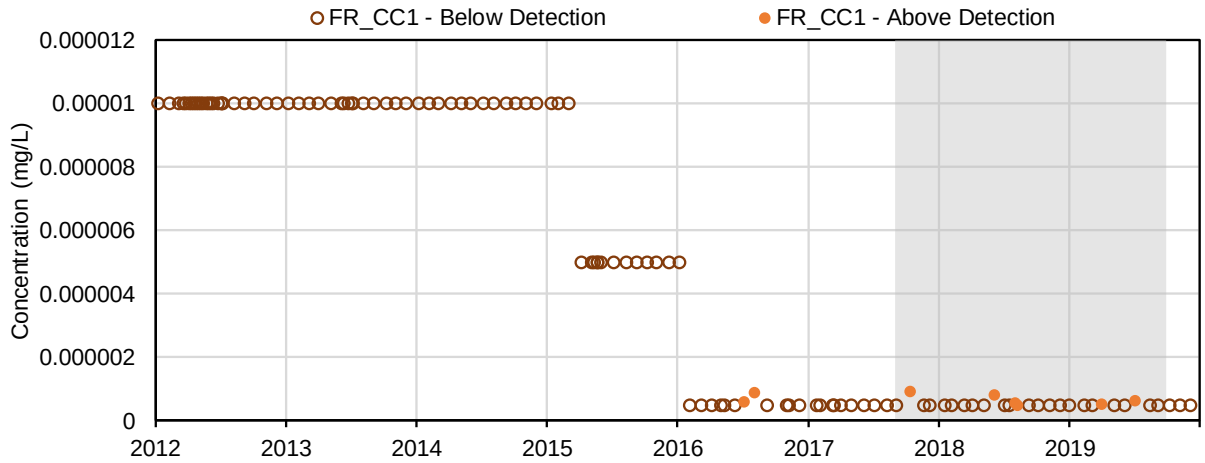
(55) Magnesium (mg/L); Total Metals



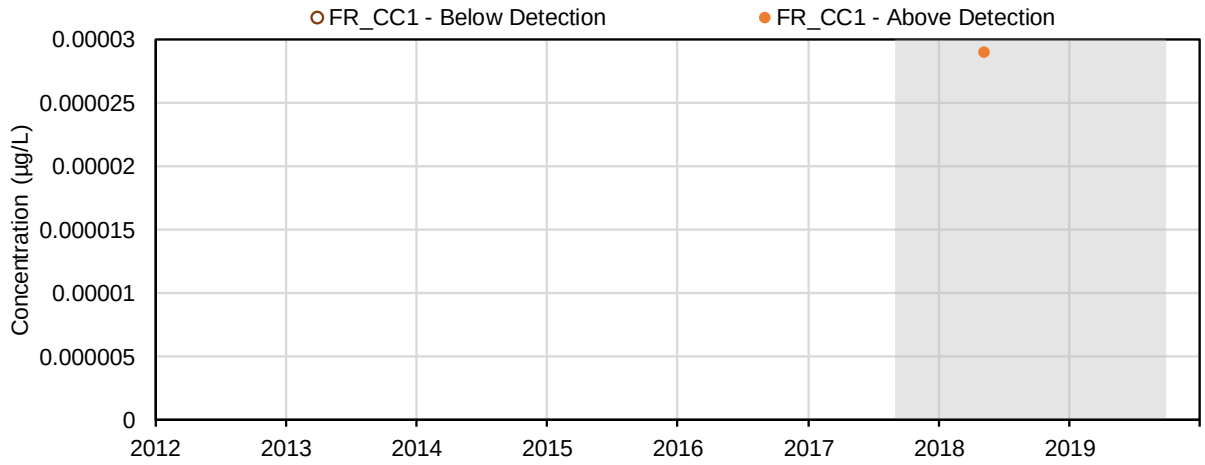
(56) Manganese (mg/L); Total Metals



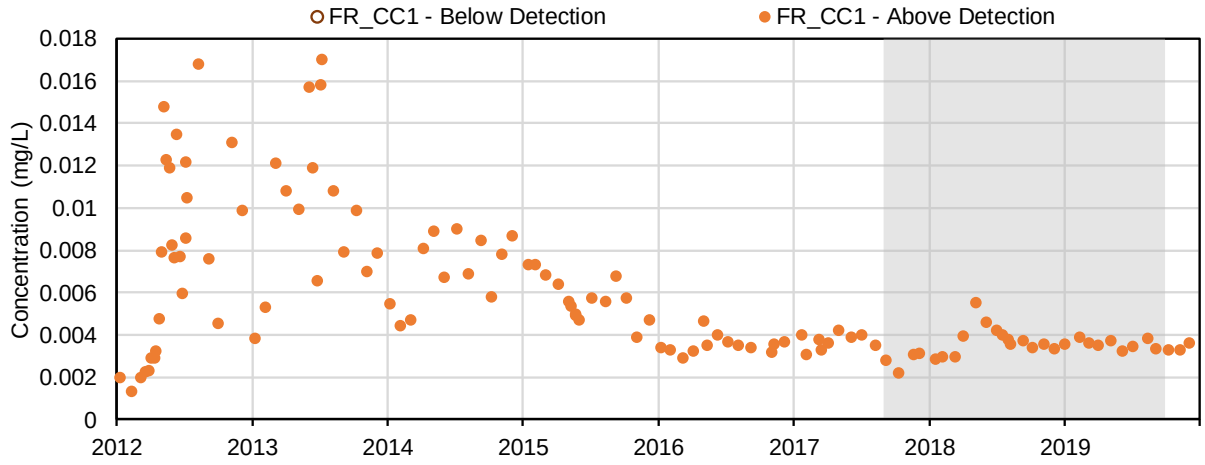
(57) Mercury (mg/L); Total Metals



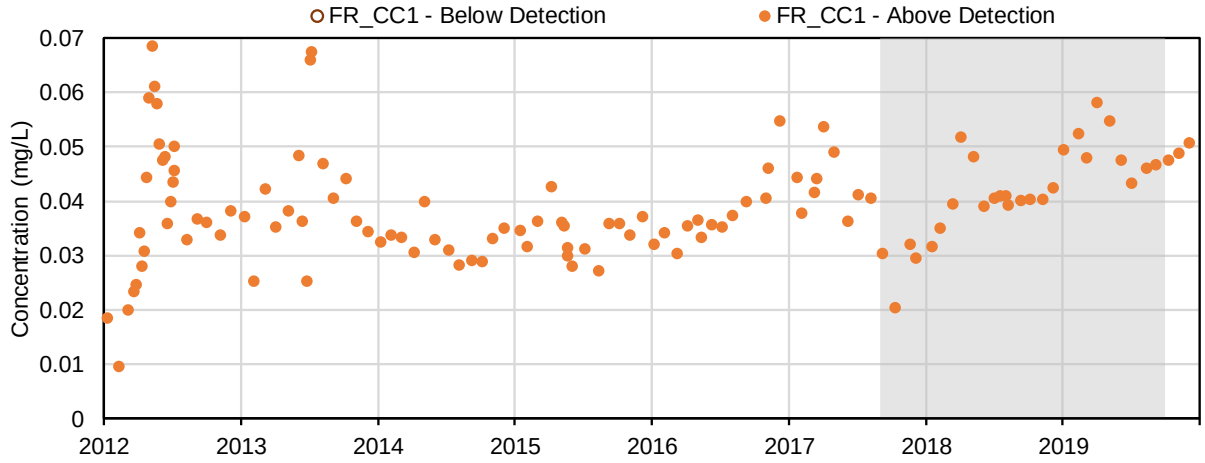
(58) Methyl mercury (µg/L); Total Metals



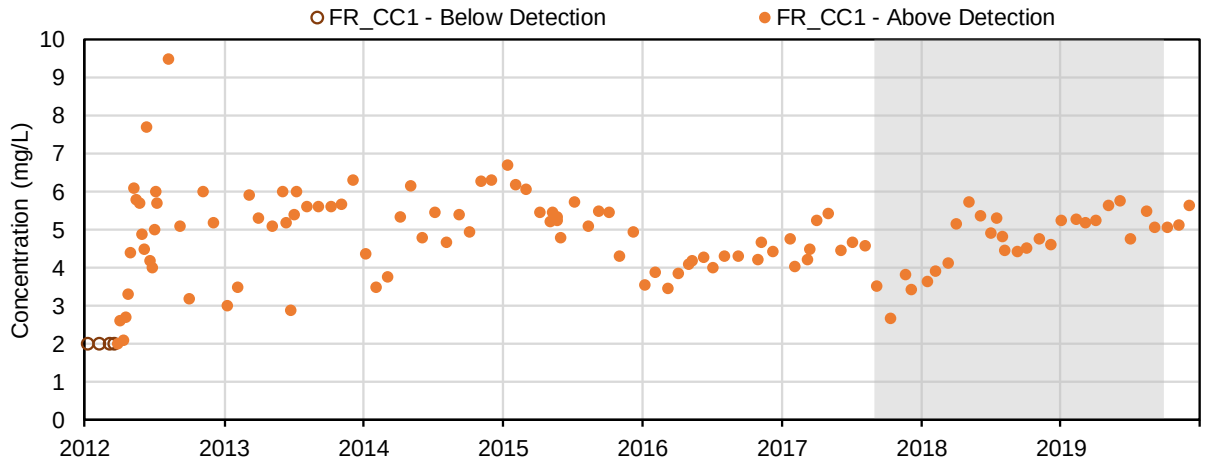
(59) Molybdenum (mg/L); Total Metals



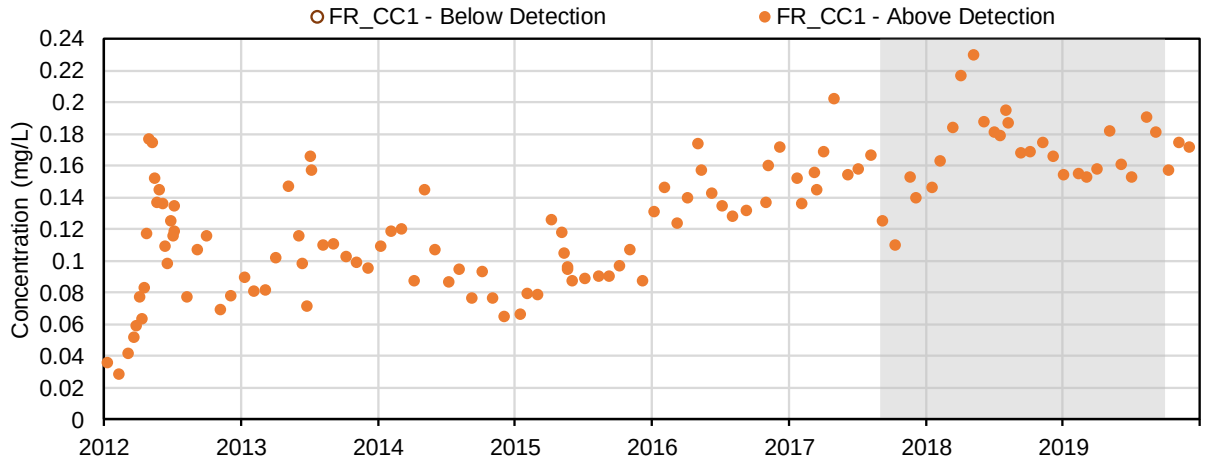
(60) Nickel (mg/L); Total Metals



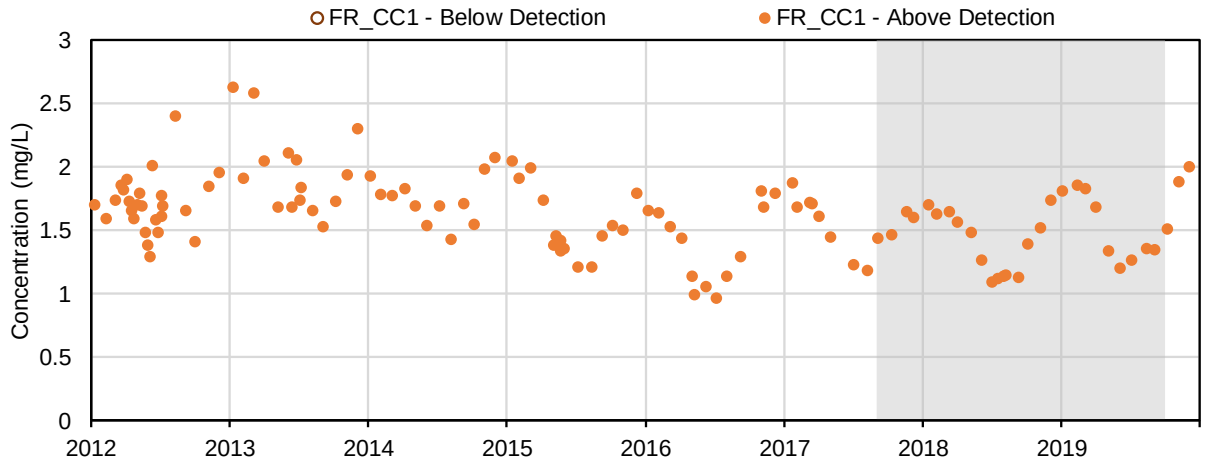
(61) Potassium (mg/L); Total Metals



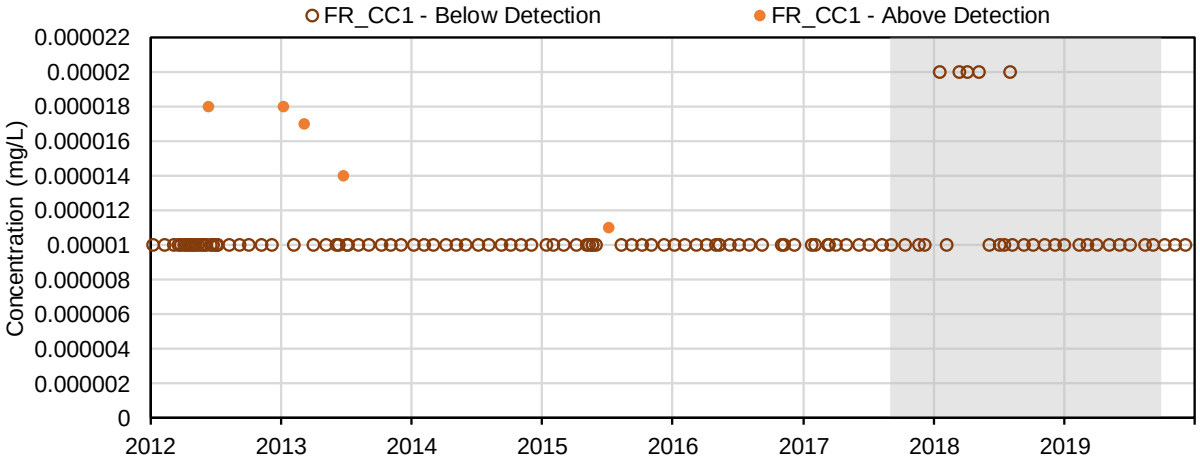
(62) Selenium (mg/L); Total Metals



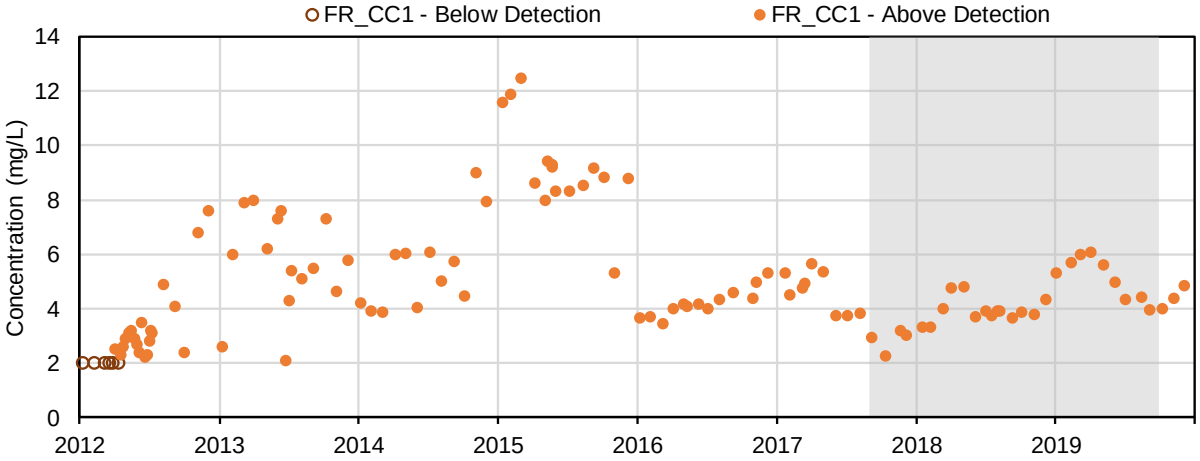
(63) Silicon (mg/L); Total Metals



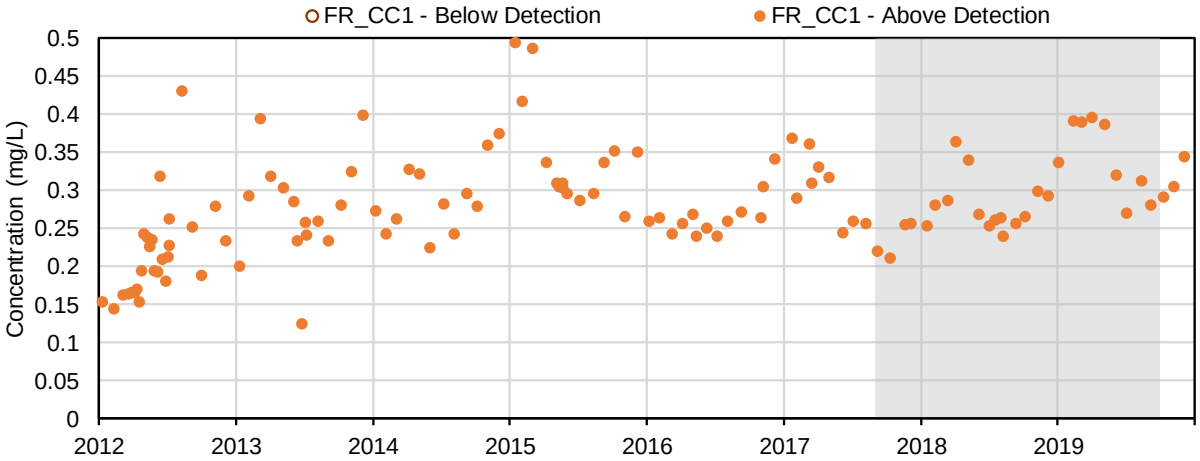
(64) Silver (mg/L); Total Metals



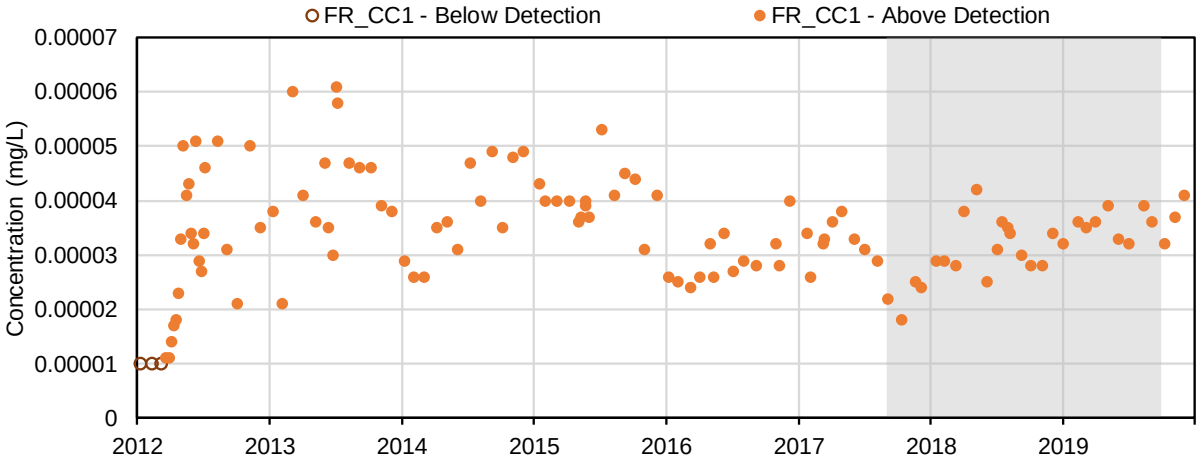
(65) Sodium (mg/L); Total Metals



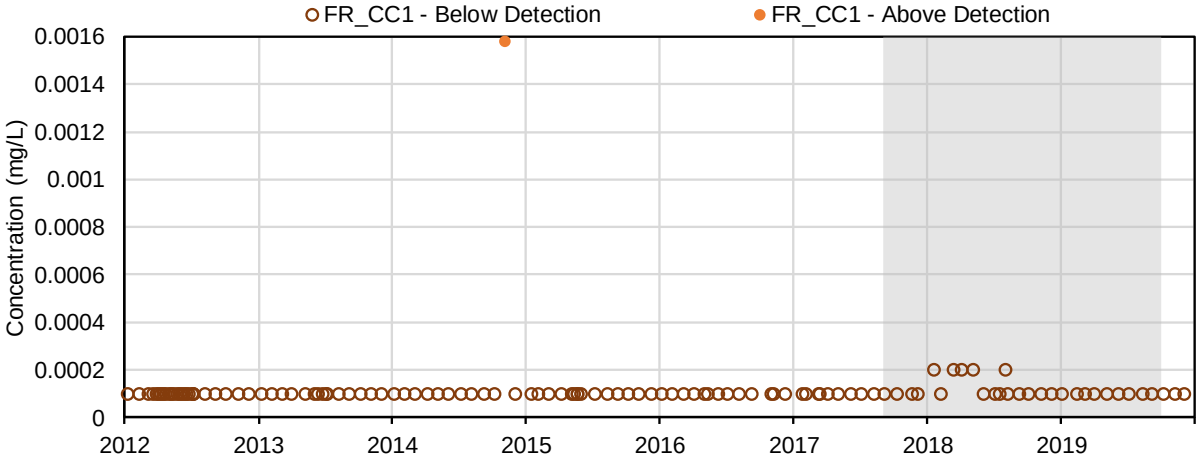
(66) Strontium (mg/L); Total Metals



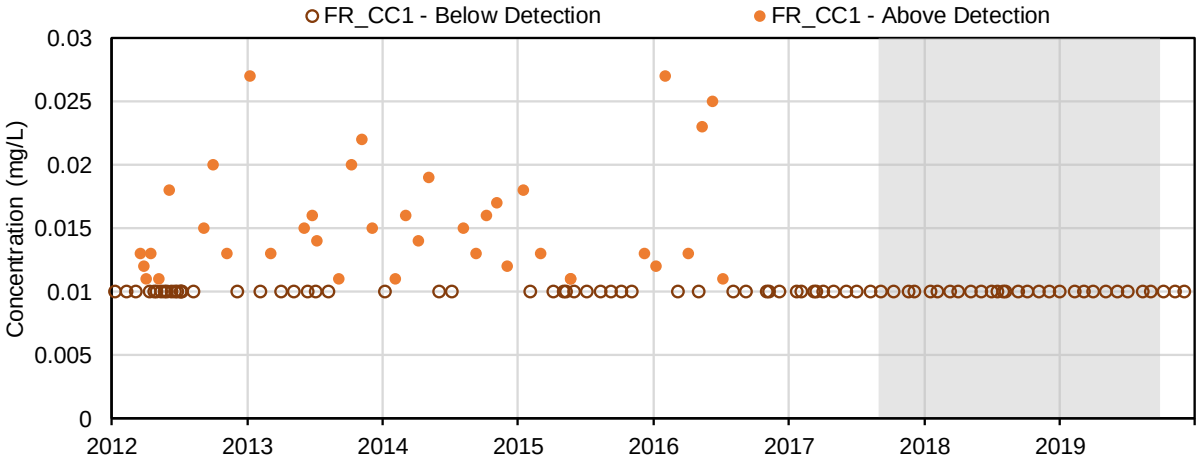
(67) Thallium (mg/L); Total Metals



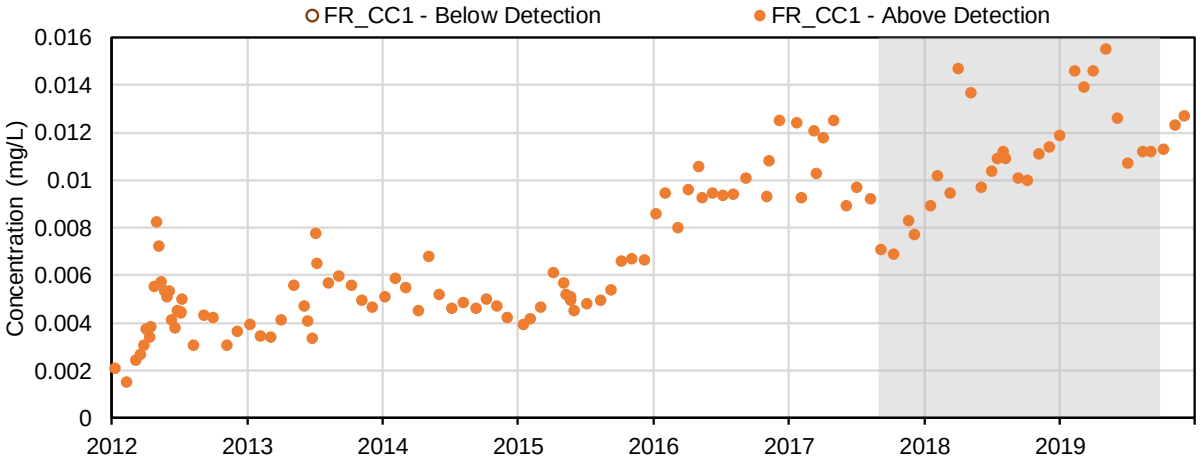
(68) Tin (mg/L); Total Metals



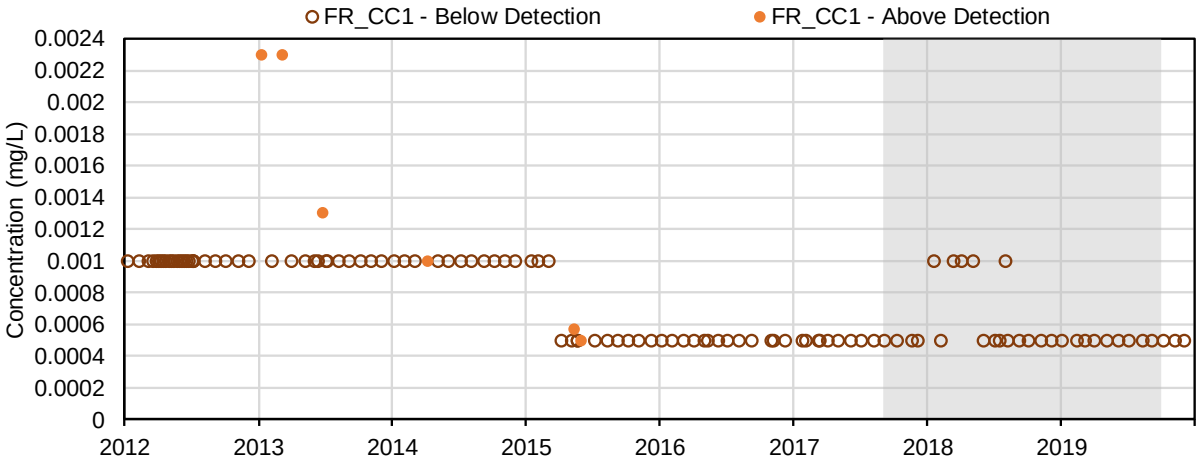
(69) Titanium (mg/L); Total Metals



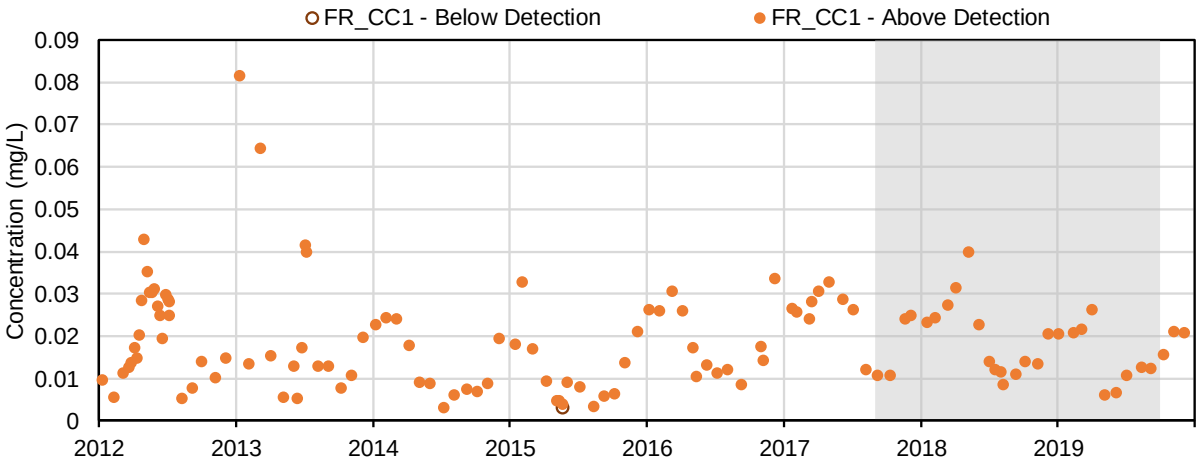
(70) Uranium (mg/L); Total Metals



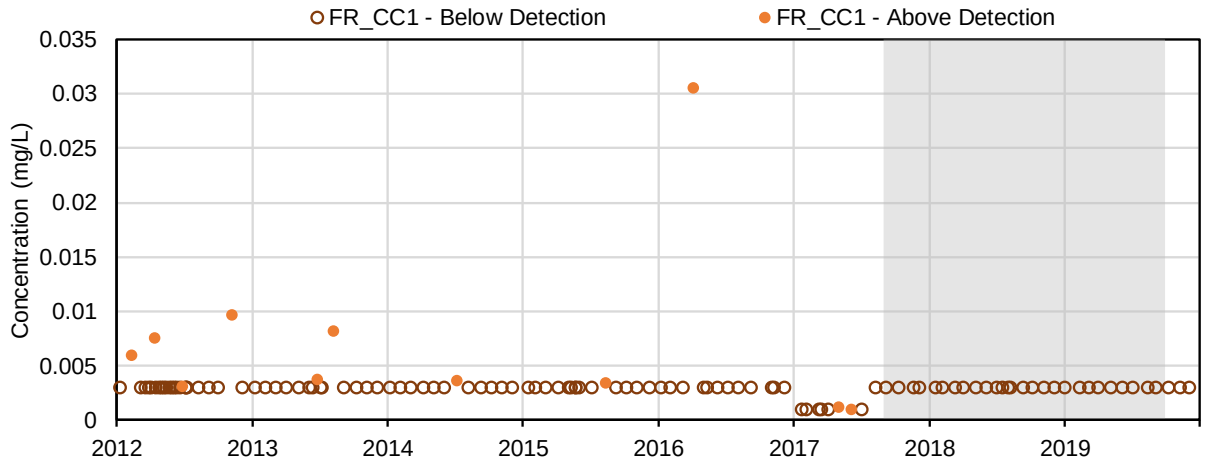
(71) Vanadium (mg/L); Total Metals



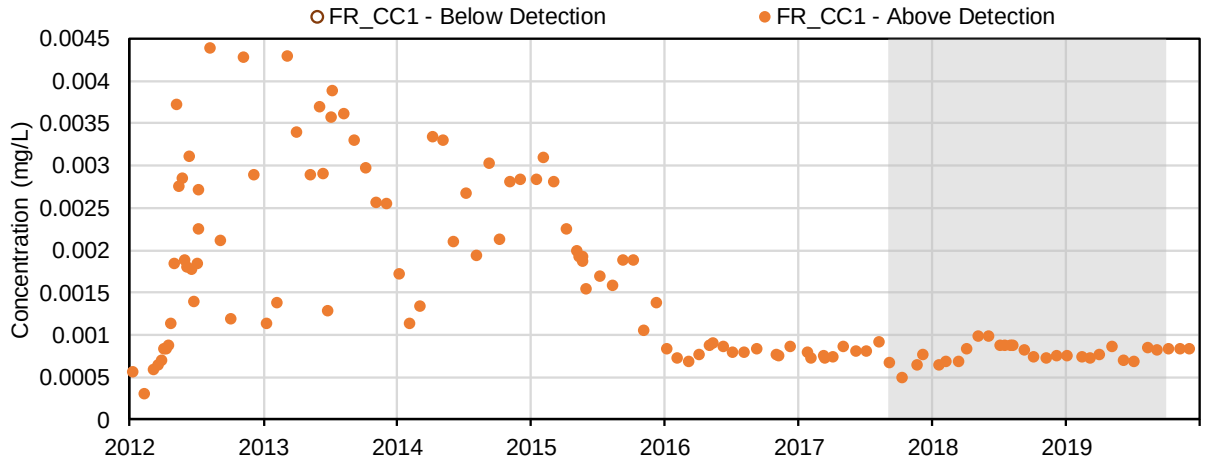
(72) Zinc (mg/L); Total Metals



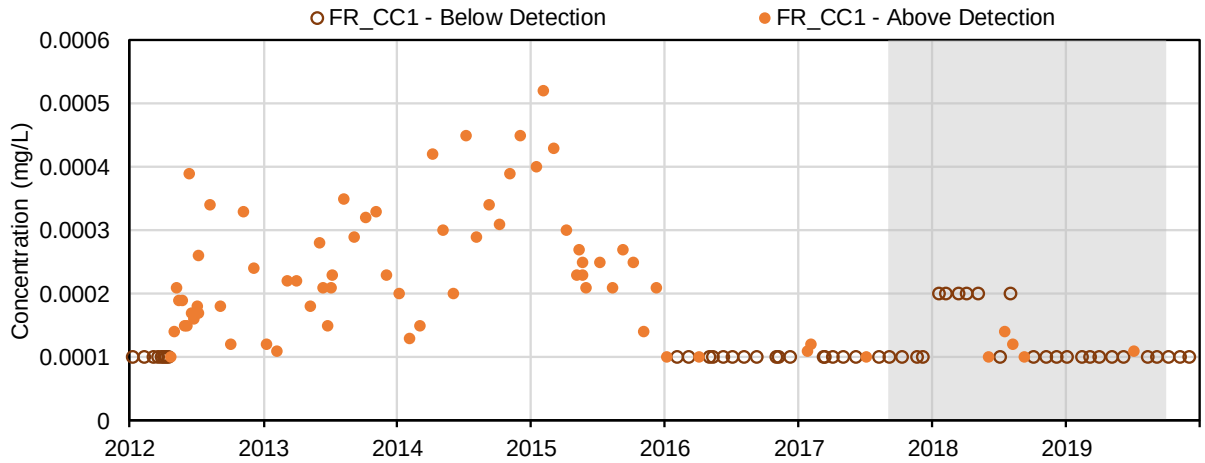
(73) Aluminum (mg/L); Dissolved Metals



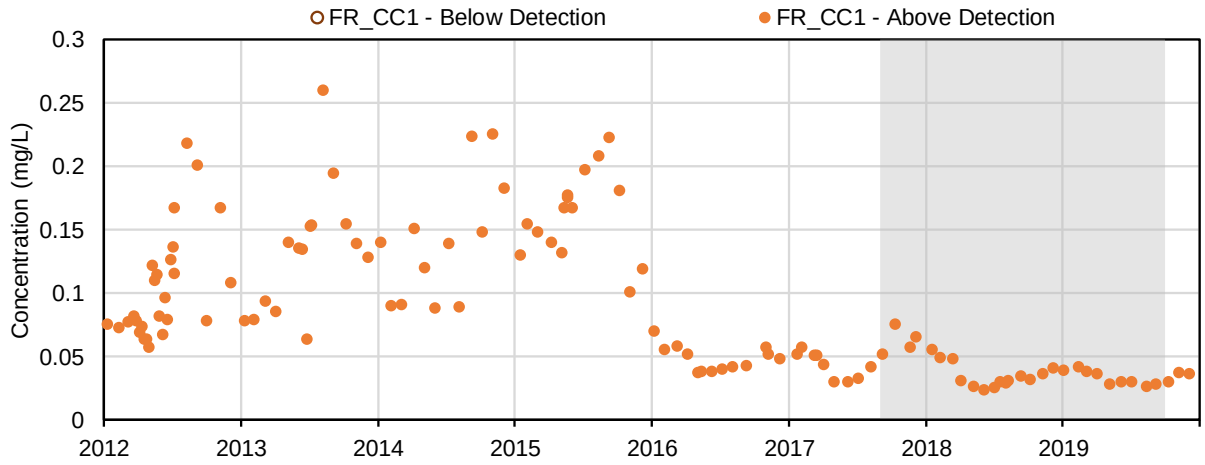
(74) Antimony (mg/L); Dissolved Metals



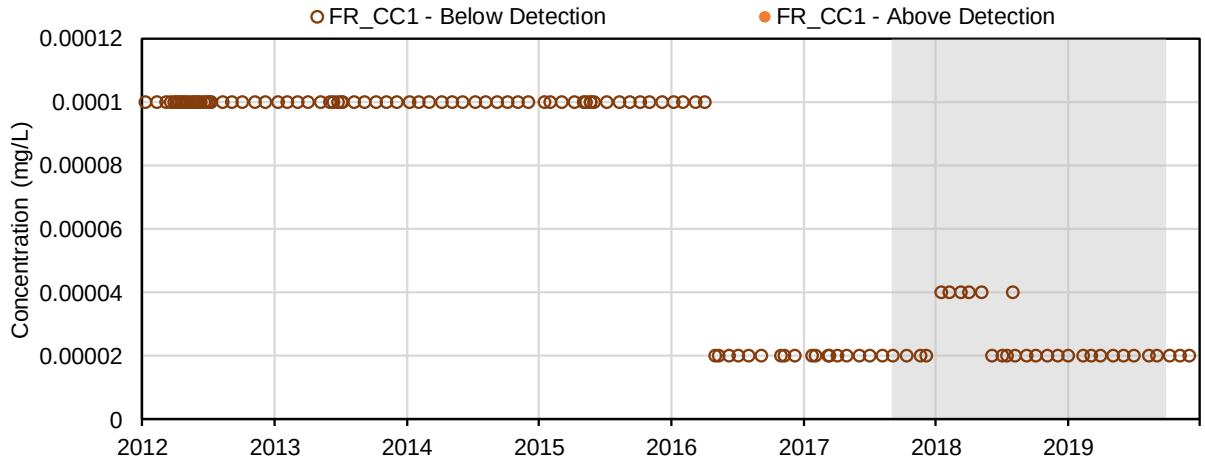
(75) Arsenic (mg/L); Dissolved Metals



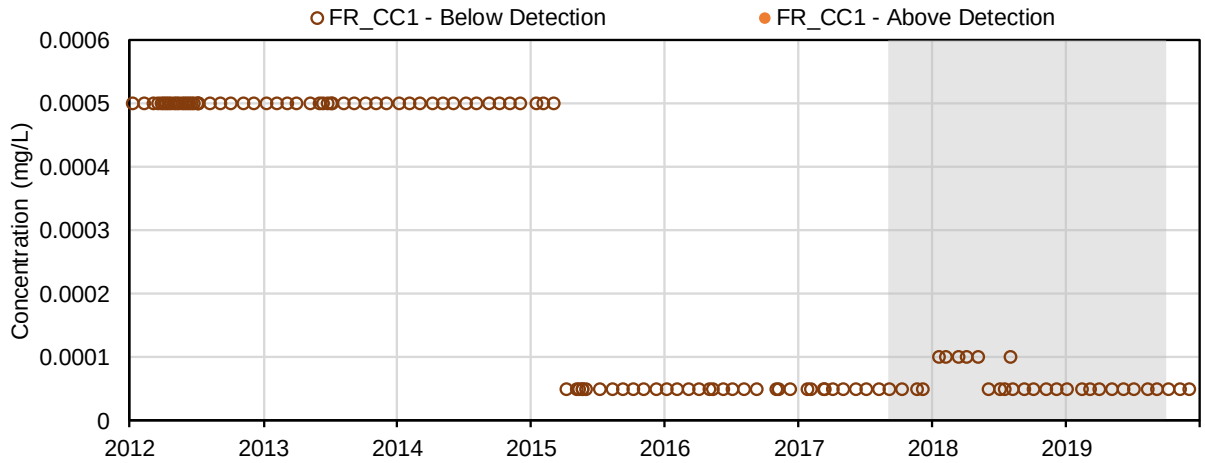
(76) Barium (mg/L); Dissolved Metals



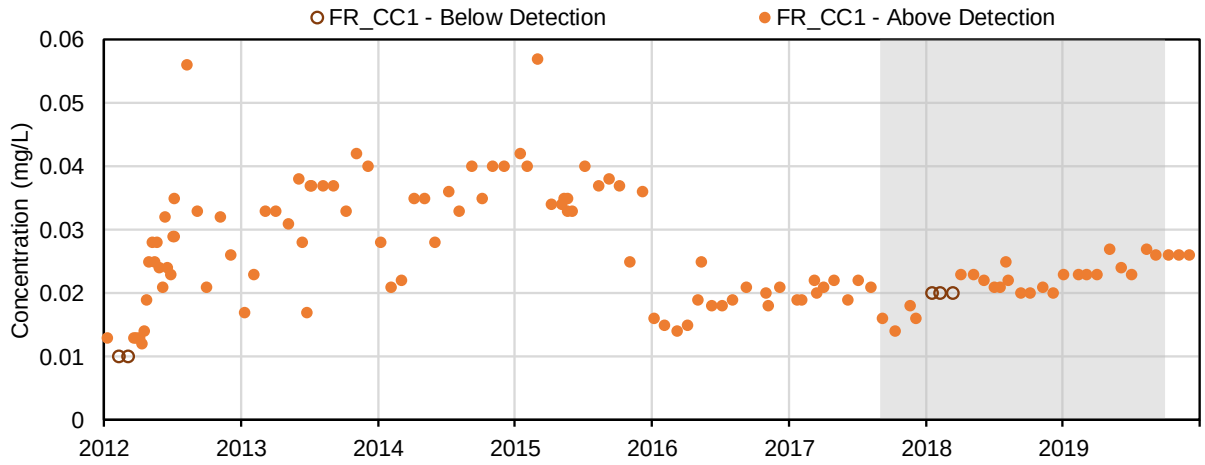
(77) Beryllium (mg/L); Dissolved Metals



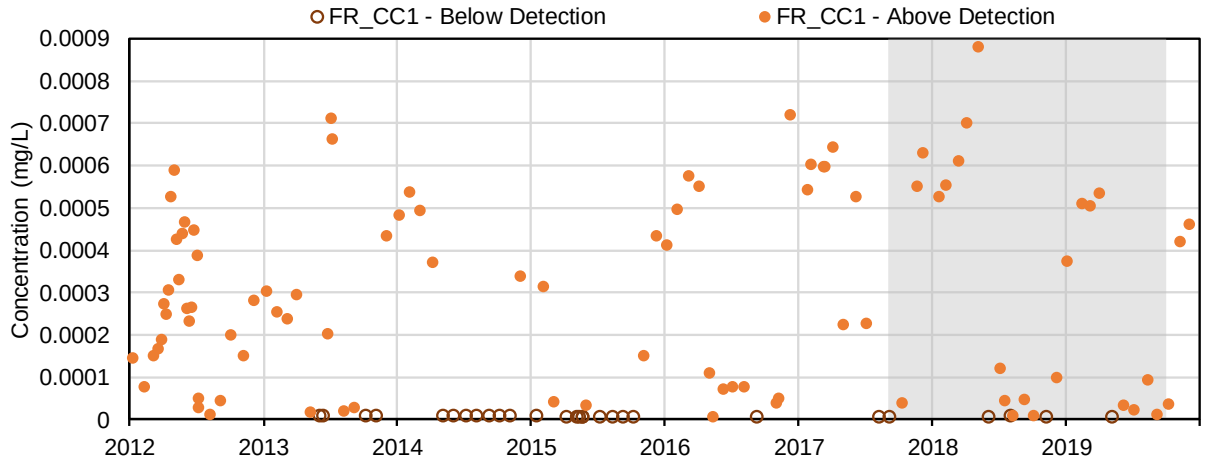
(78) Bismuth (mg/L); Dissolved Metals



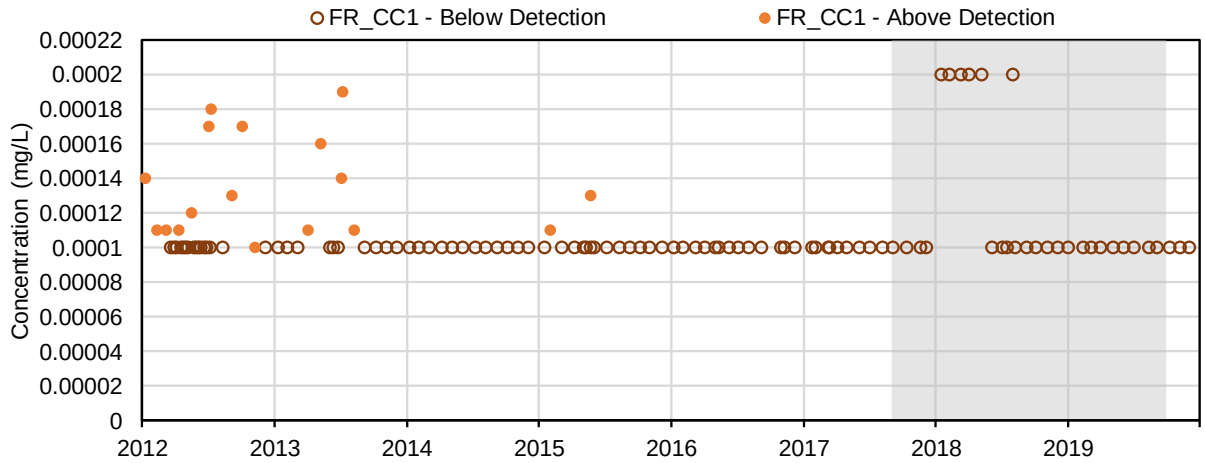
(79) Boron (mg/L); Dissolved Metals



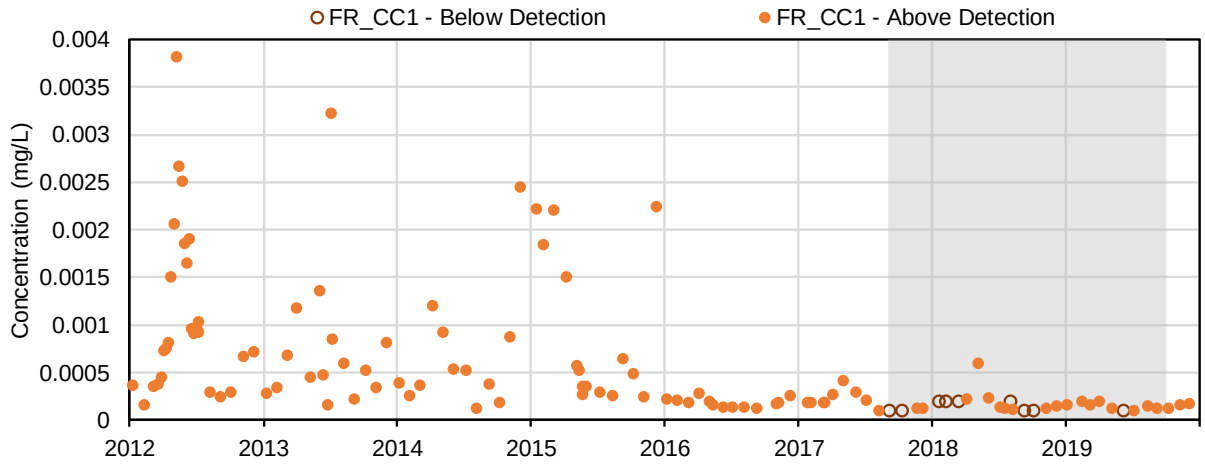
(80) Cadmium (mg/L); Dissolved Metals



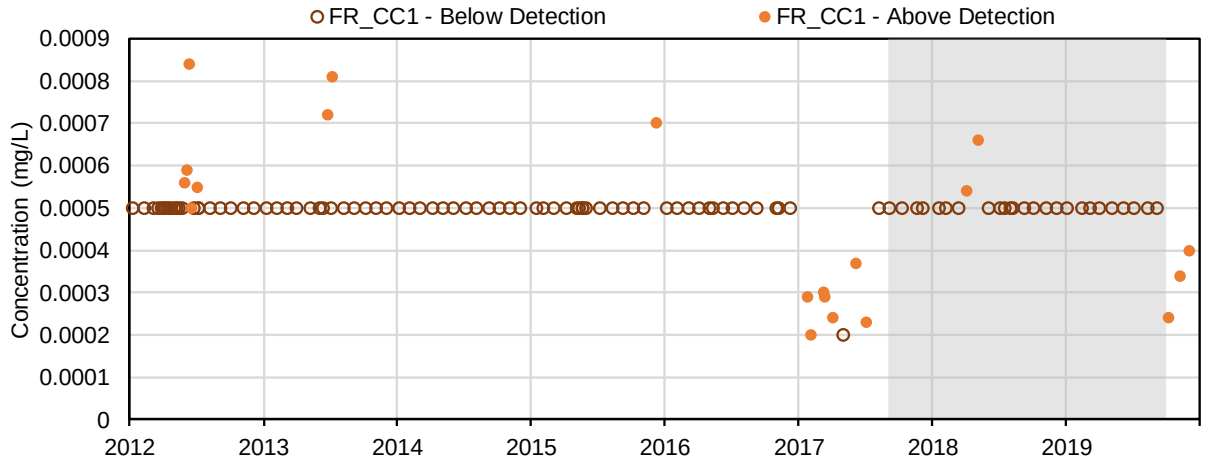
(81) Chromium (mg/L); Dissolved Metals



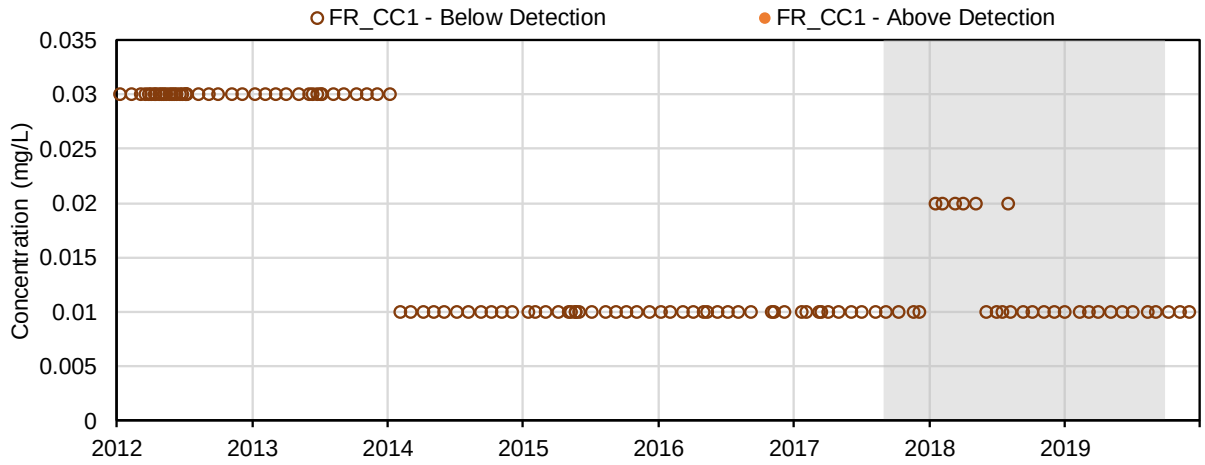
(82) Cobalt (mg/L); Dissolved Metals



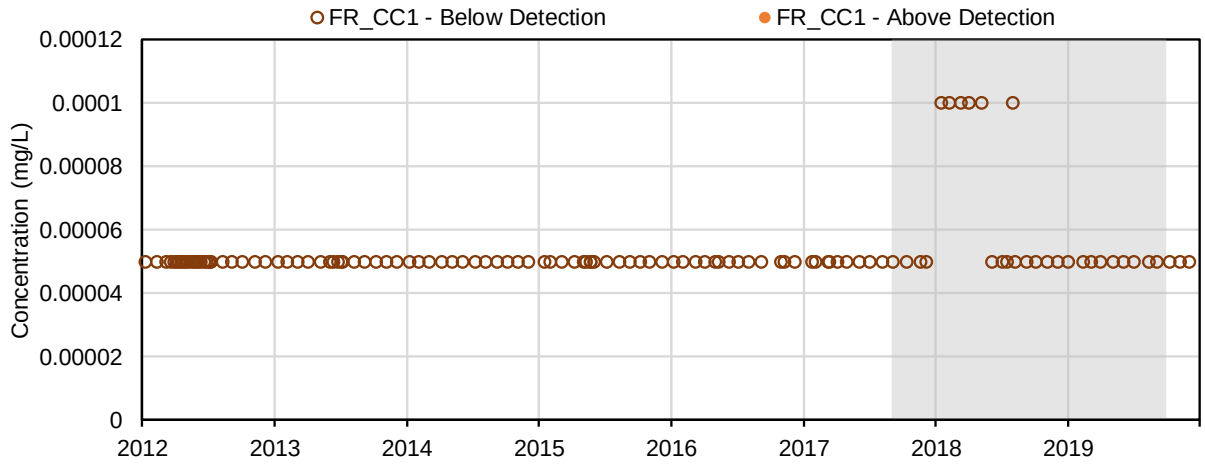
(83) Copper (mg/L); Dissolved Metals



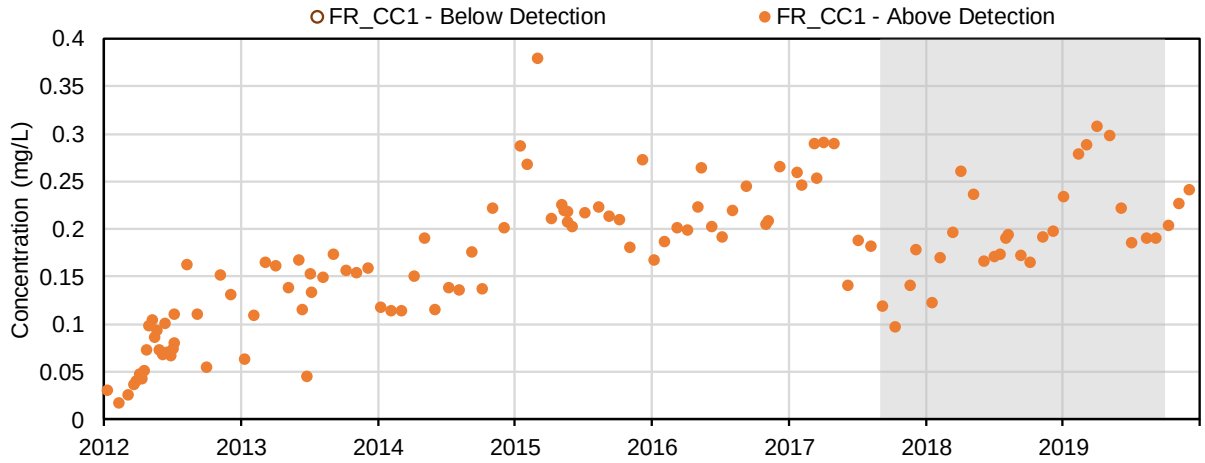
(84) Iron (mg/L); Dissolved Metals



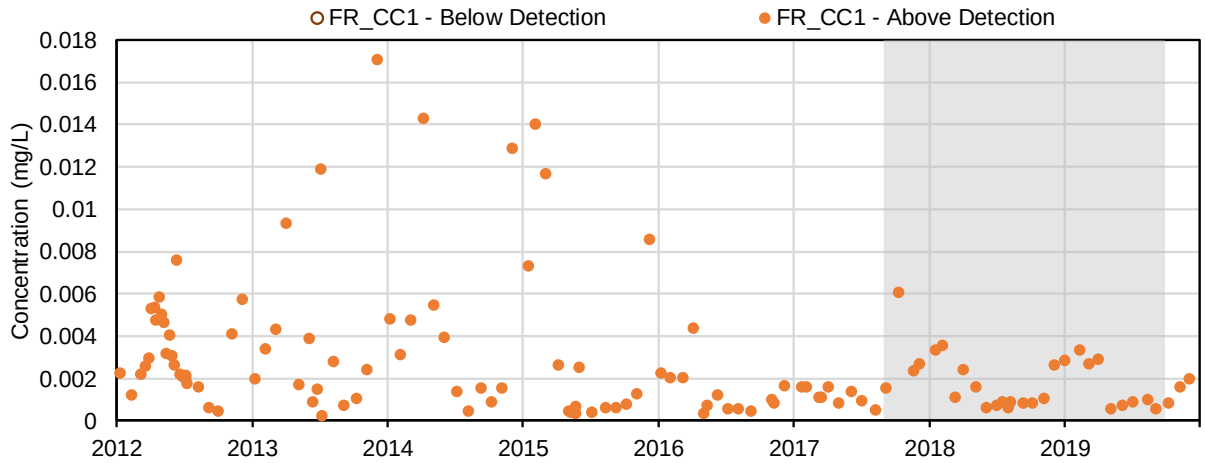
(85) Lead (mg/L); Dissolved Metals



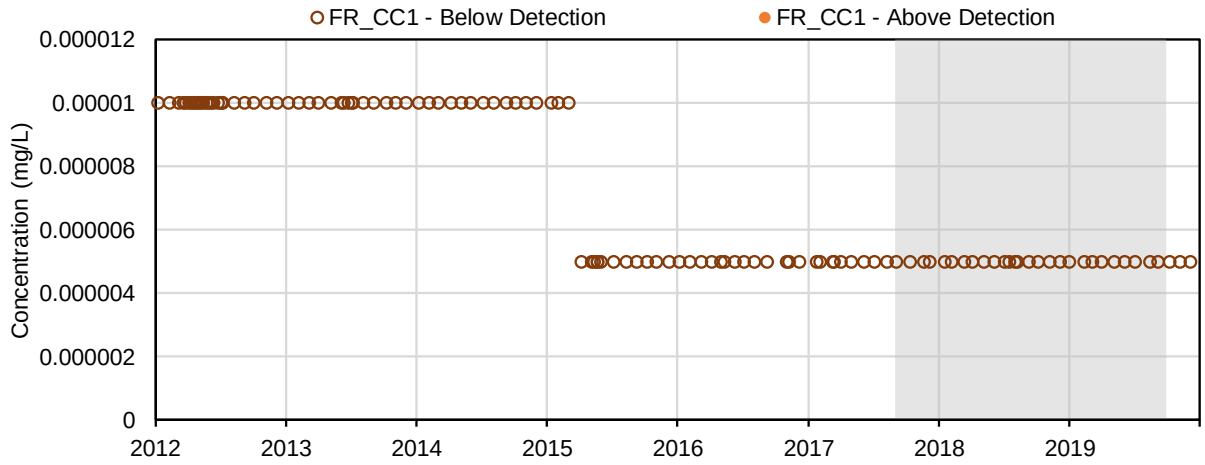
(86) Lithium (mg/L); Dissolved Metals



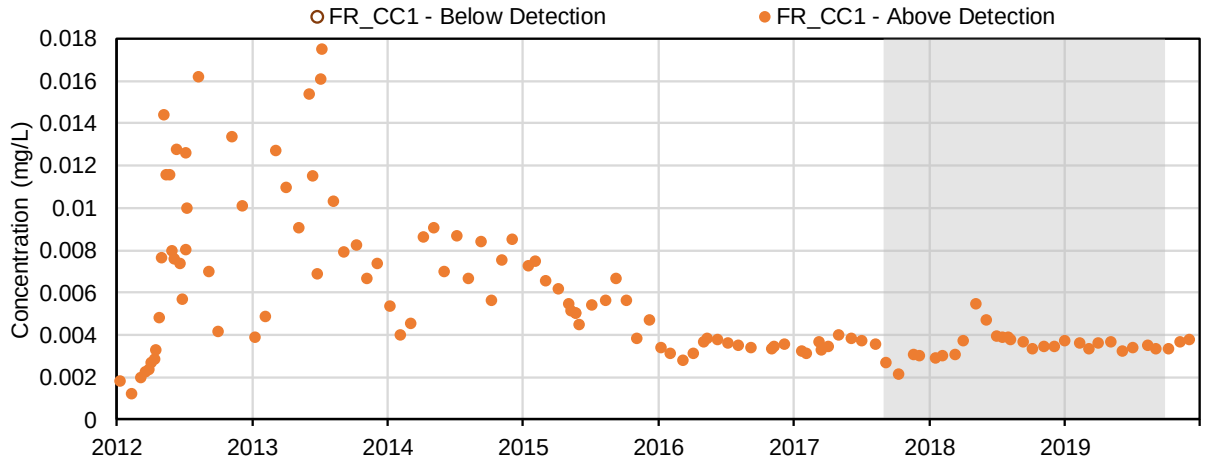
(87) Manganese (mg/L); Dissolved Metals



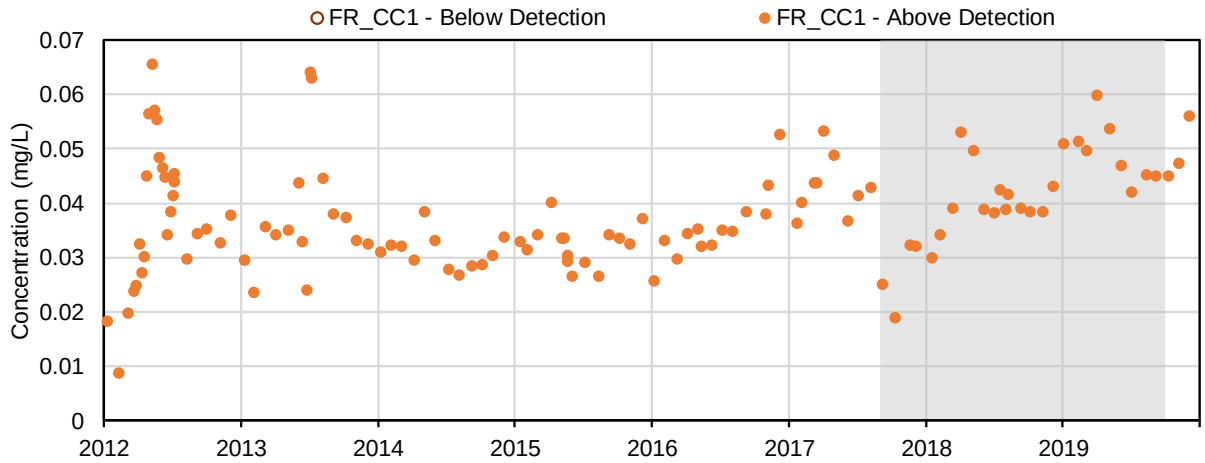
(88) Mercury (mg/L); Dissolved Metals



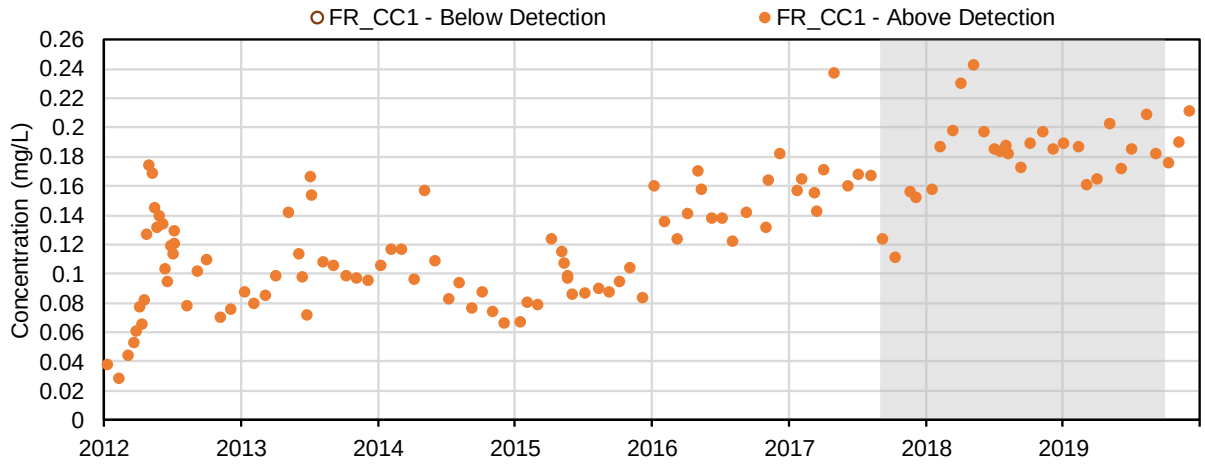
(89) Molybdenum (mg/L); Dissolved Metals



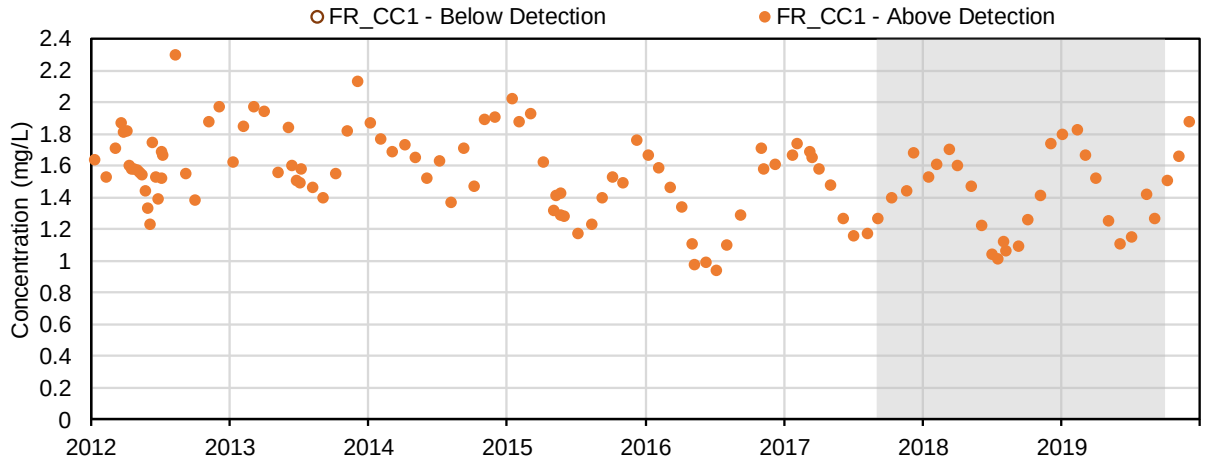
(90) Nickel (mg/L); Dissolved Metals



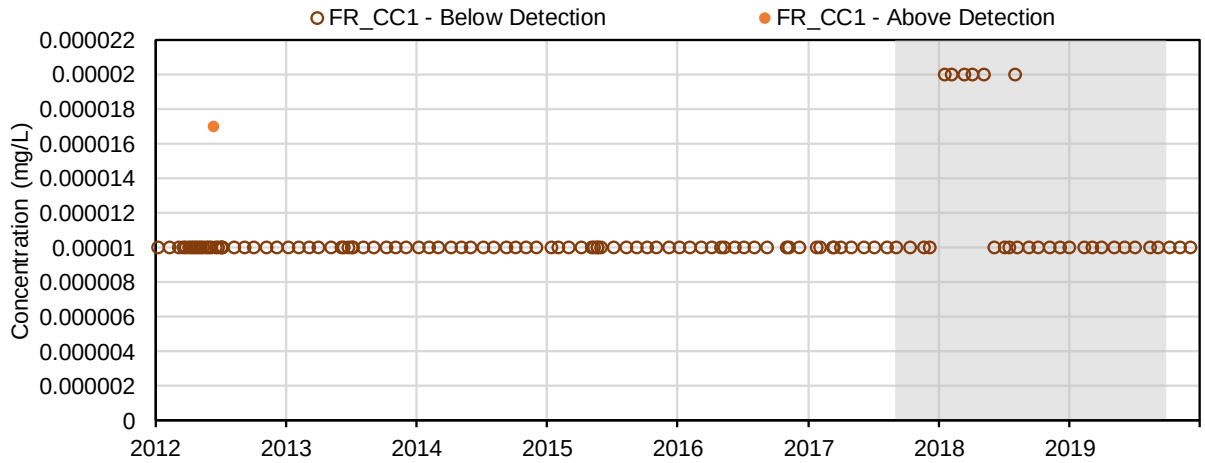
(91) Selenium (mg/L); Dissolved Metals



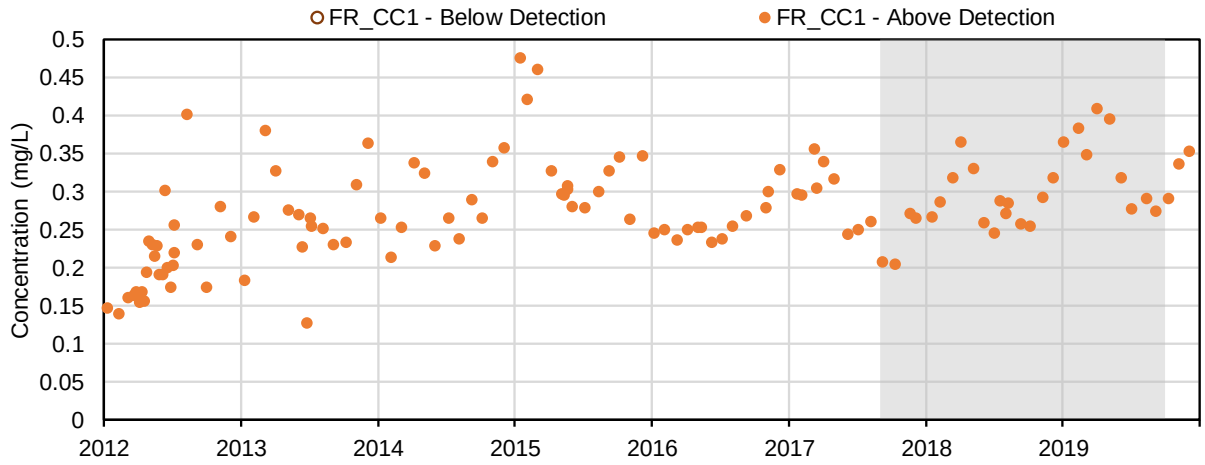
(92) Silicon (mg/L); Dissolved Metals



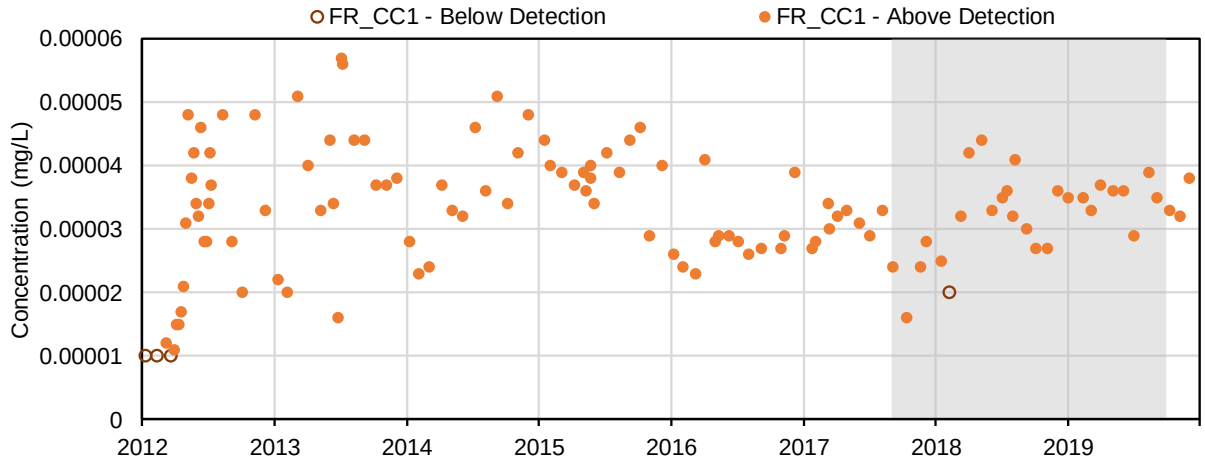
(93) Silver (mg/L); Dissolved Metals



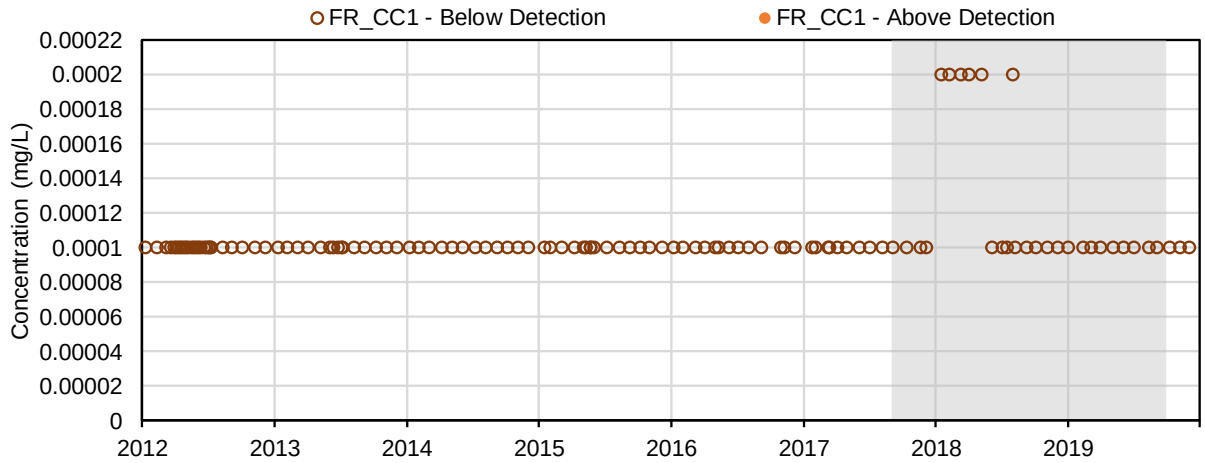
(94) Strontium (mg/L); Dissolved Metals



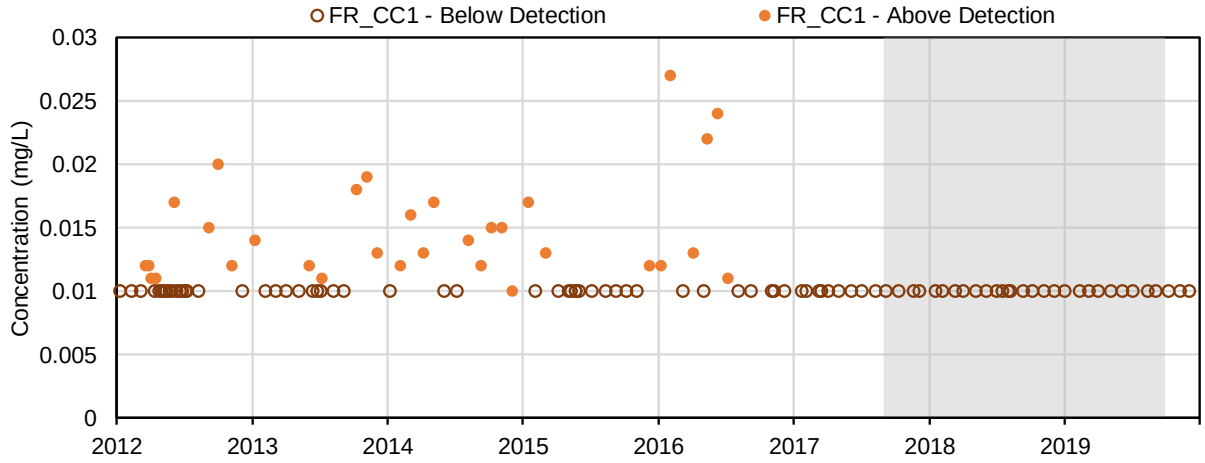
(95) Thallium (mg/L); Dissolved Metals



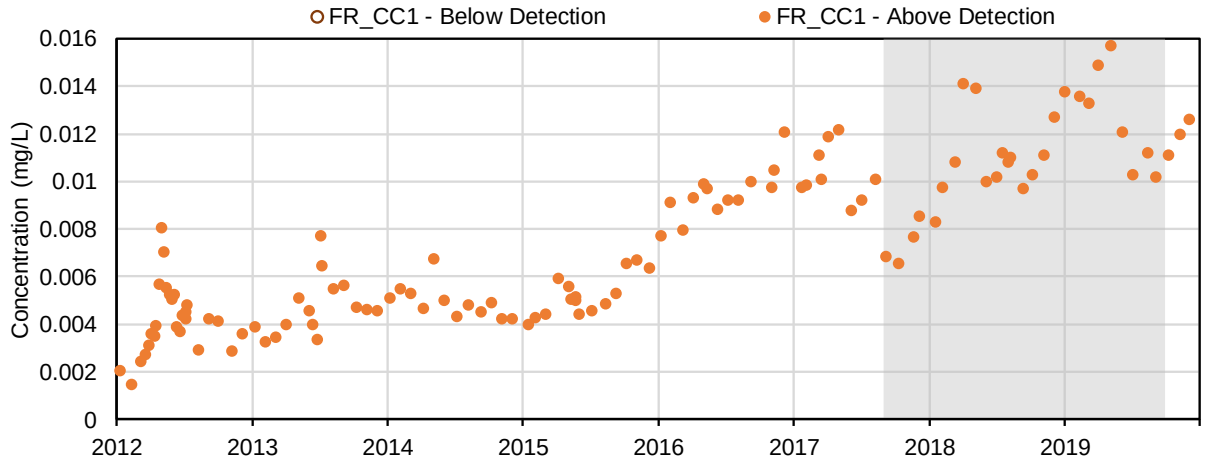
(96) Tin (mg/L); Dissolved Metals



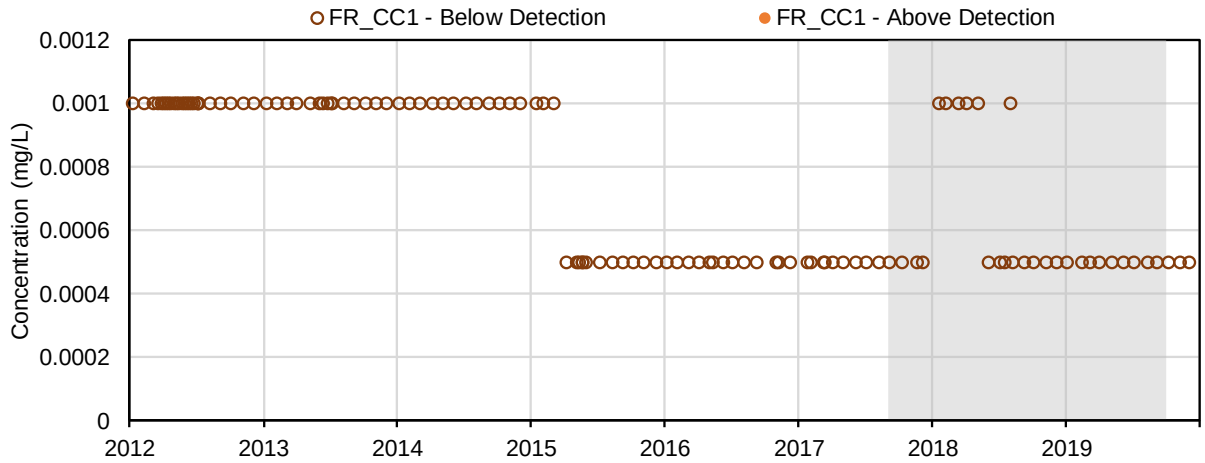
(97) Titanium (mg/L); Dissolved Metals



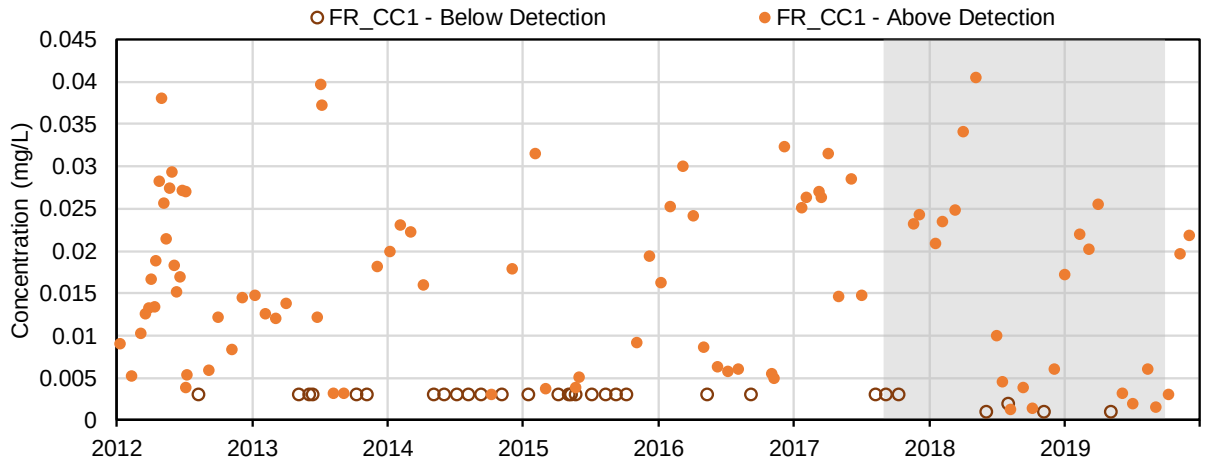
(98) Uranium (mg/L); Dissolved Metals



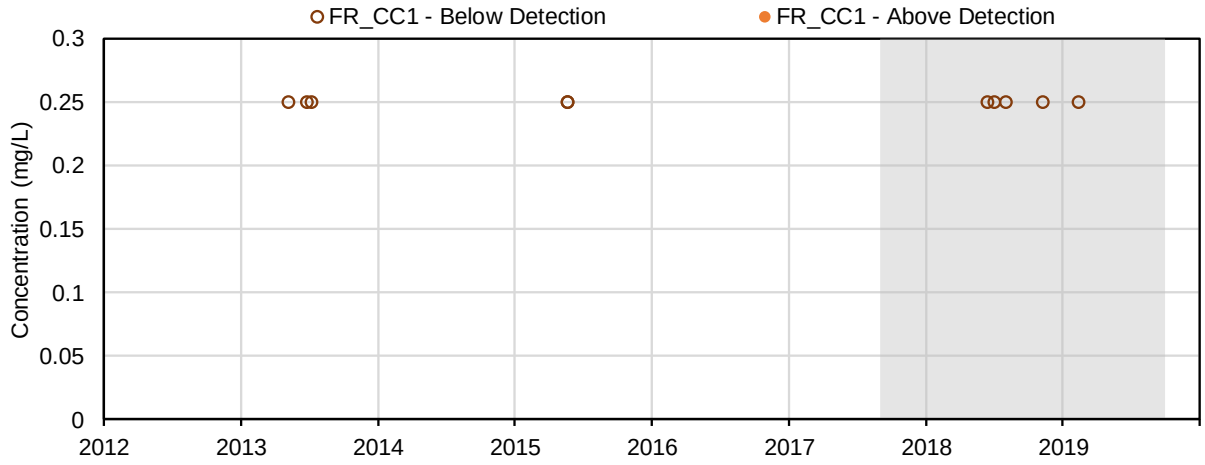
(99) Vanadium (mg/L); Dissolved Metals



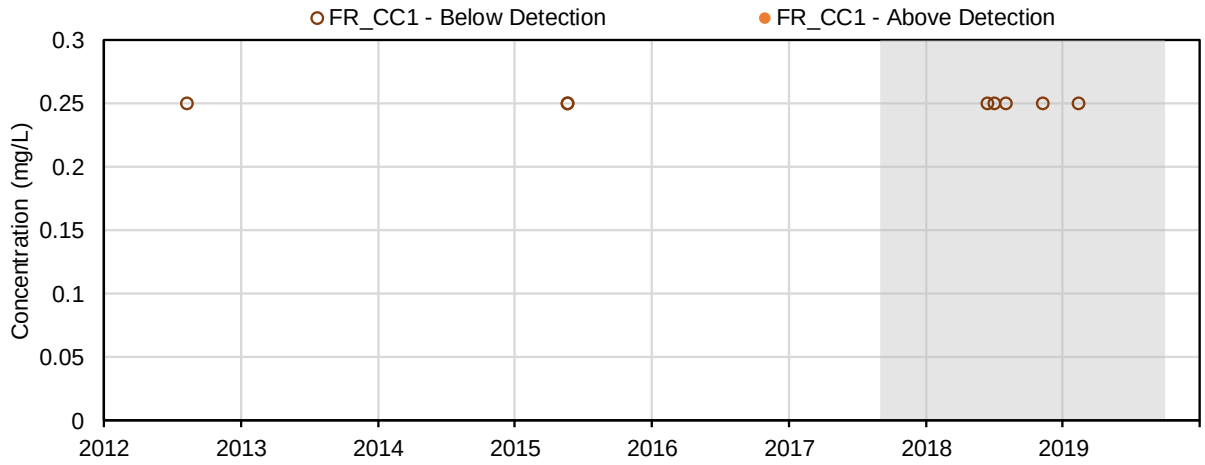
(100) Zinc (mg/L); Dissolved Metals



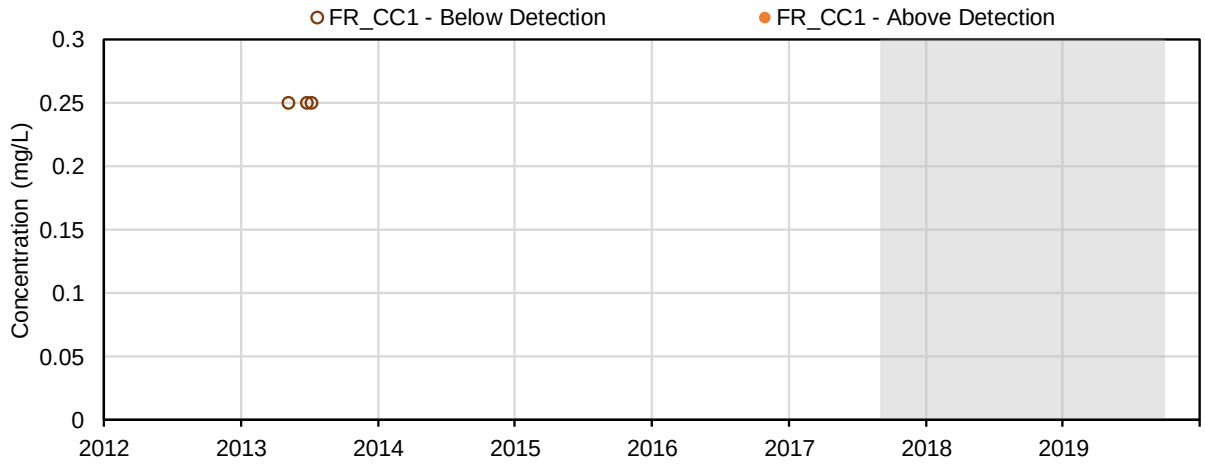
(101) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



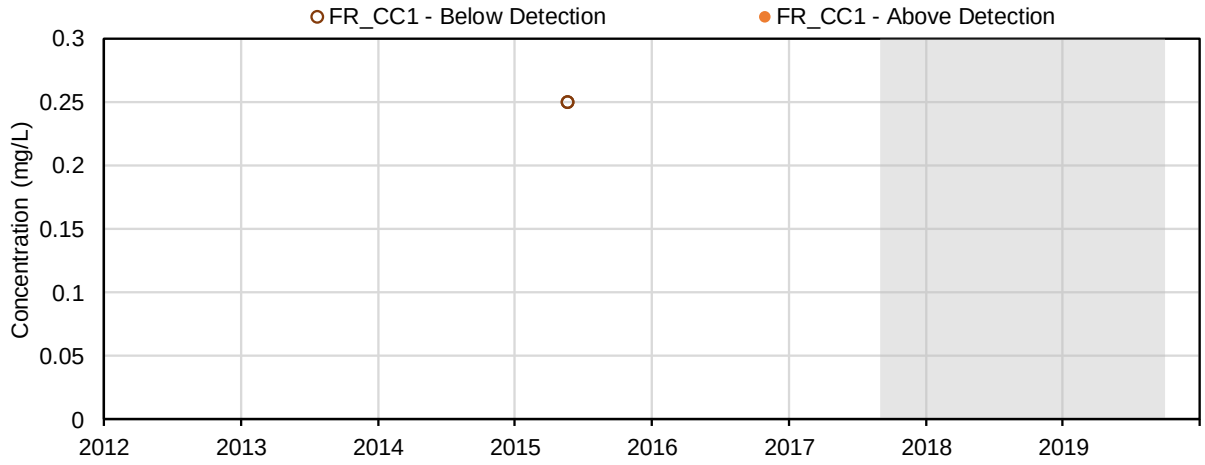
(102) Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



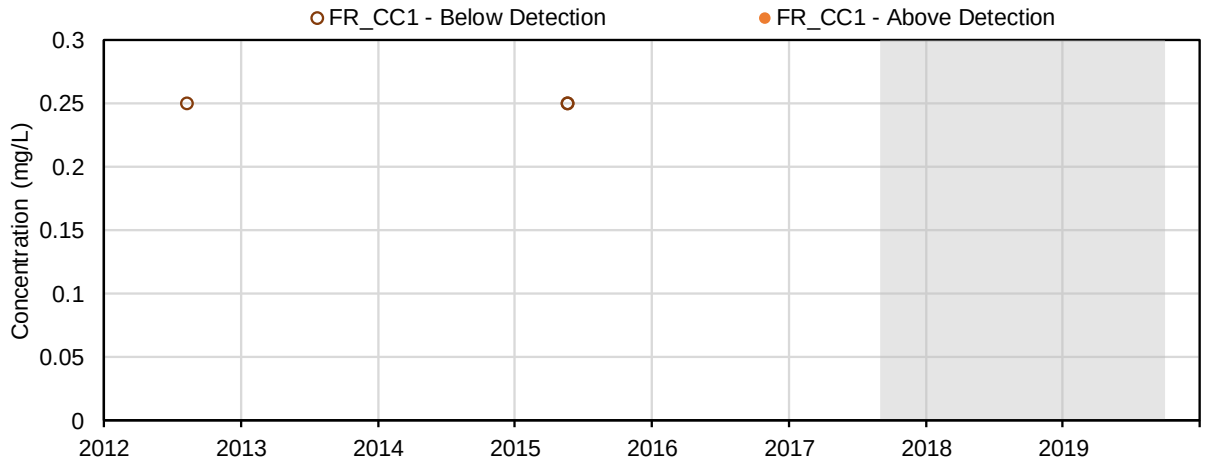
(103) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



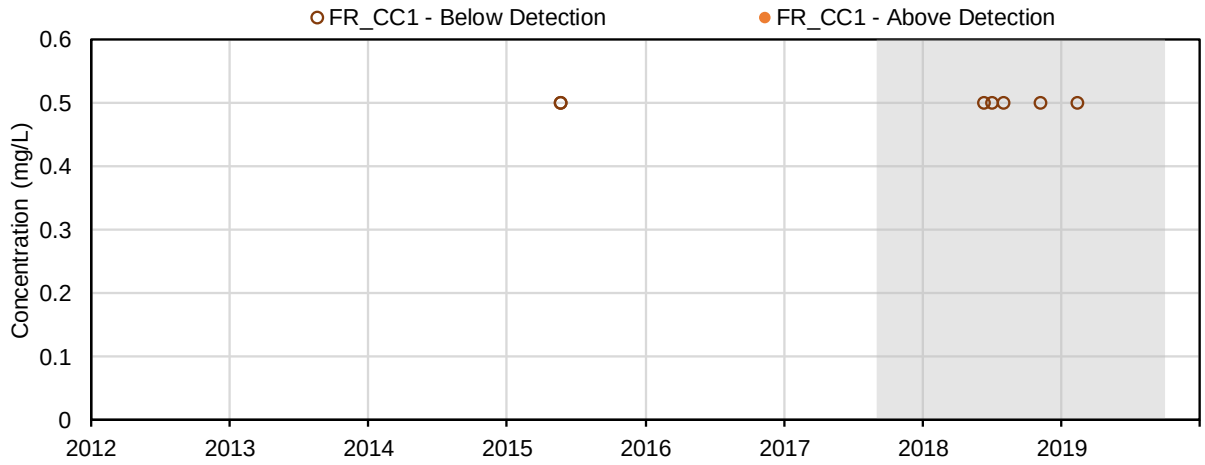
(104) Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L); Volatile Organics



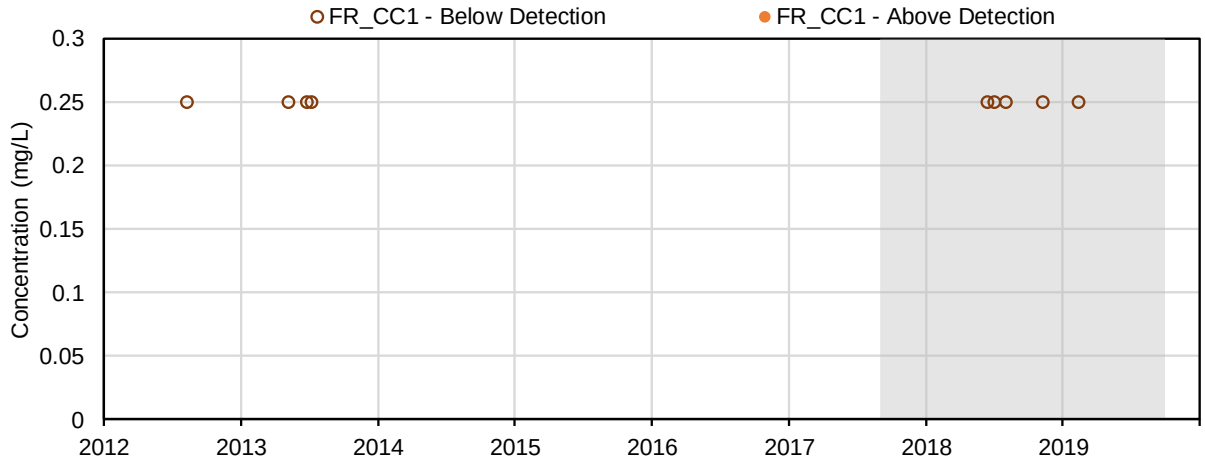
(105) Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L); Volatile Organics



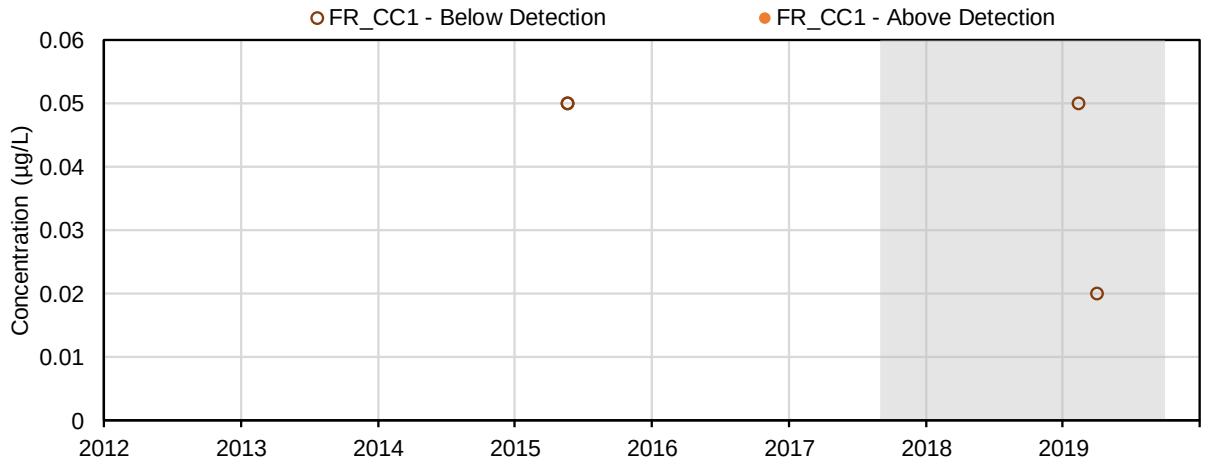
(106) Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L); Volatile Organics



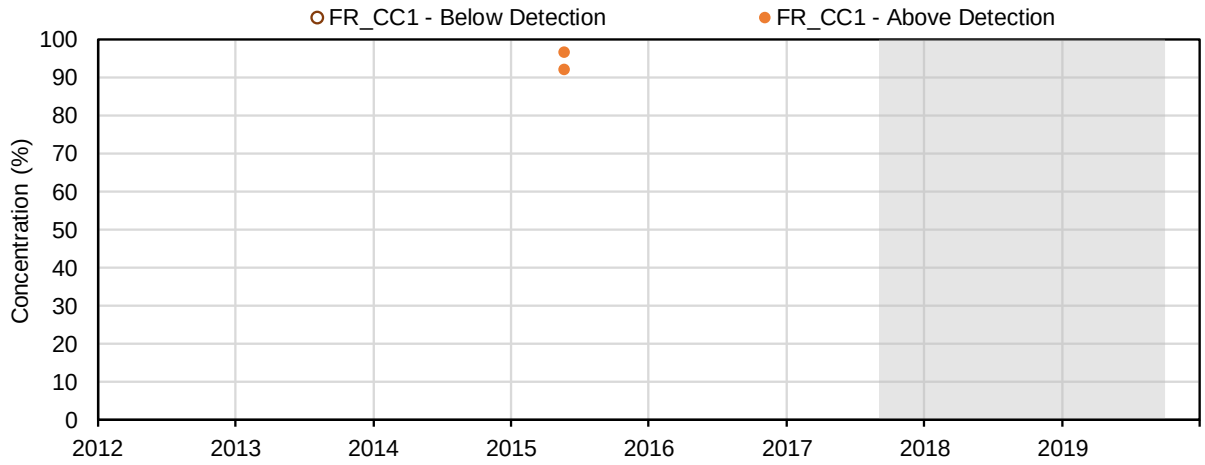
(107) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics



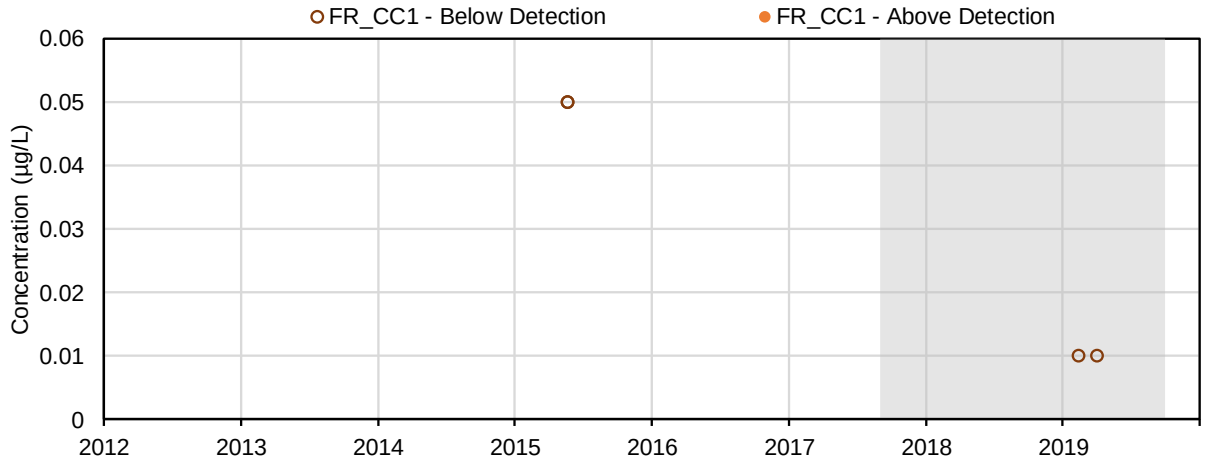
(108) Naphthalene (µg/L); Parent PAHs



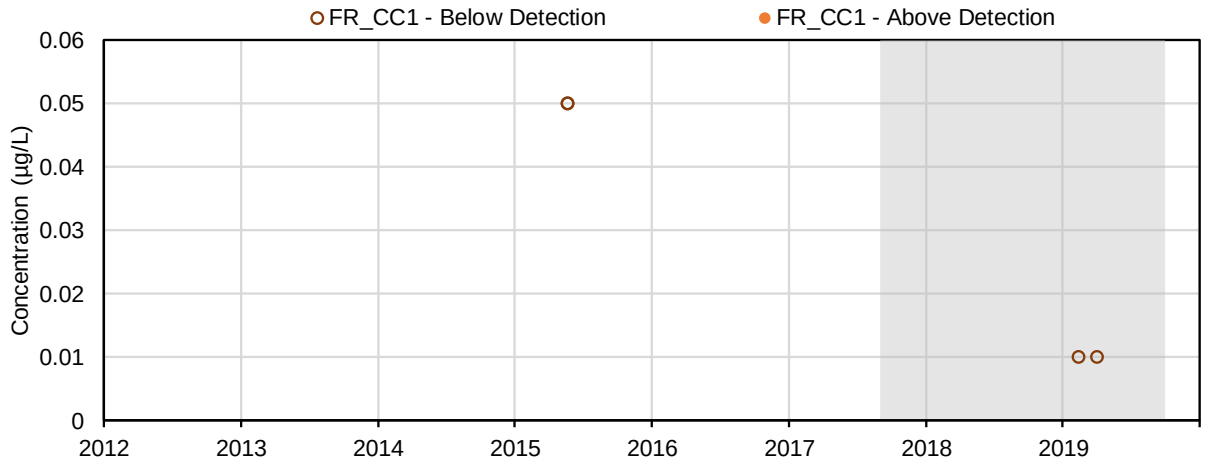
(109) Naphthalene (%); Parent PAHs



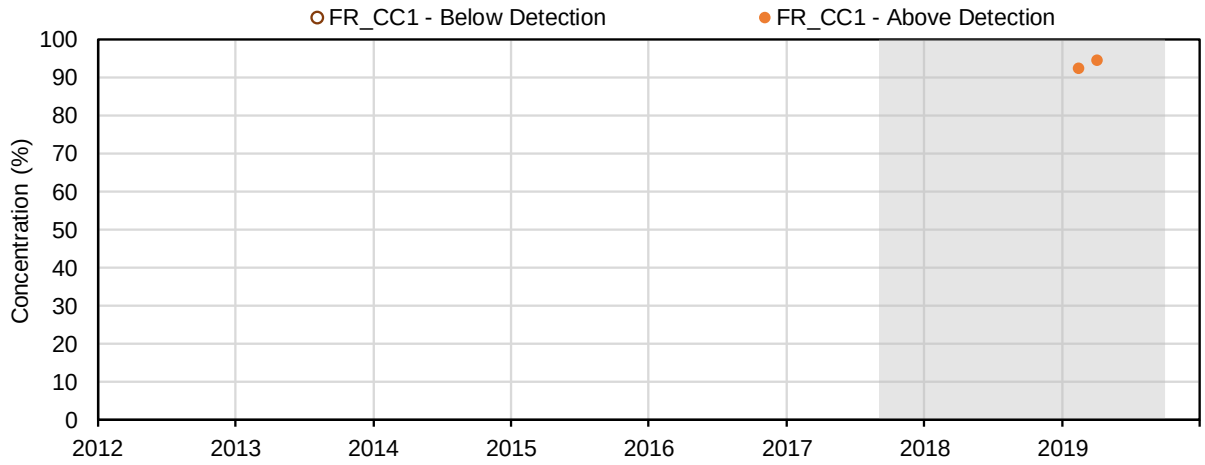
(110) Acenaphthylene (µg/L); Parent PAHs



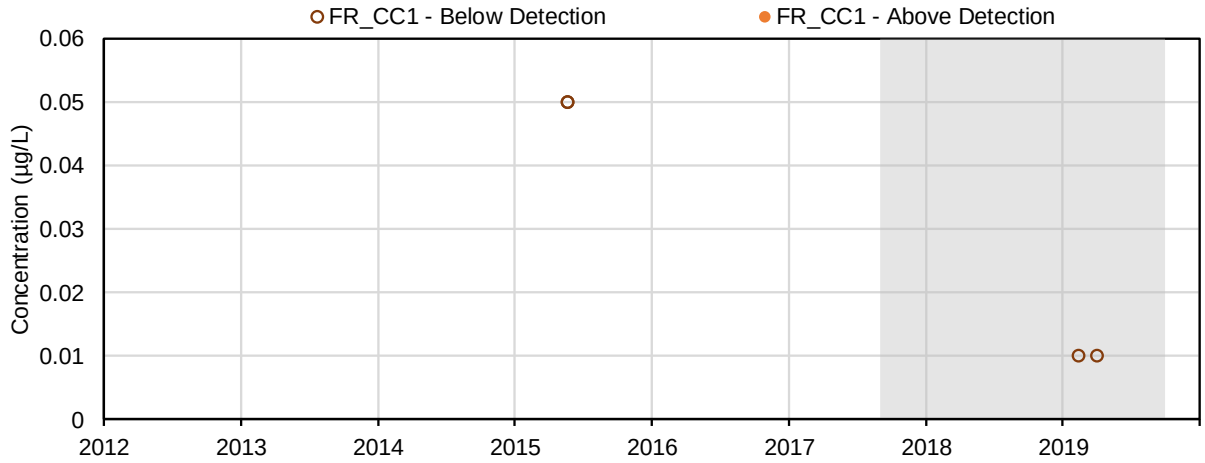
(111) Acenaphthene (µg/L); Parent PAHs



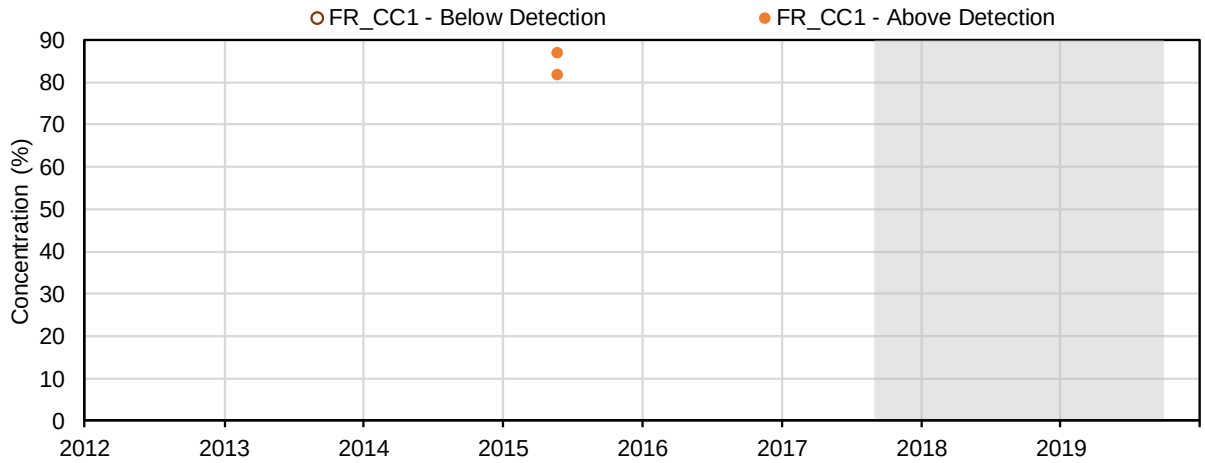
(112) Acenaphthene (%); Parent PAHs



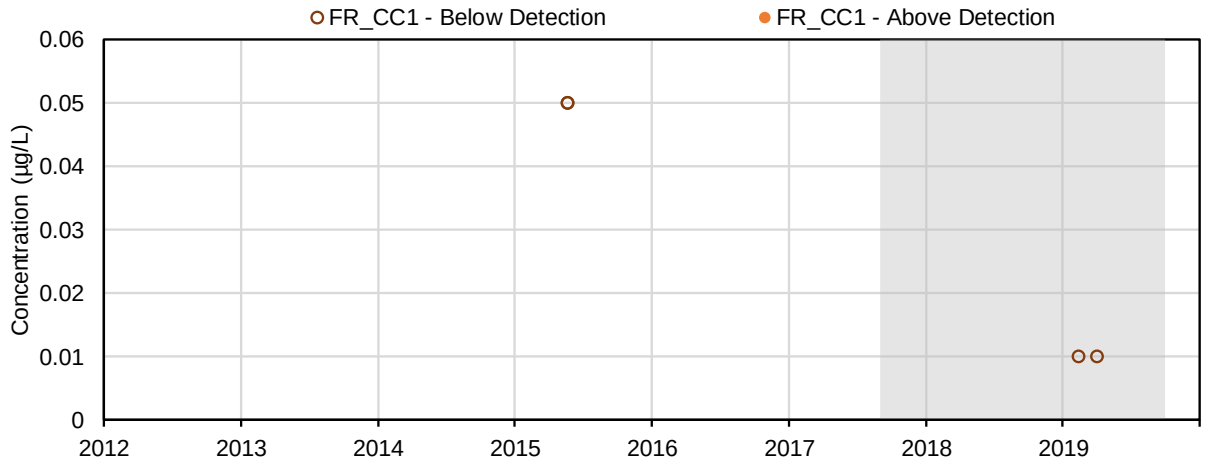
(113) Acridine (µg/L); Parent PAHs



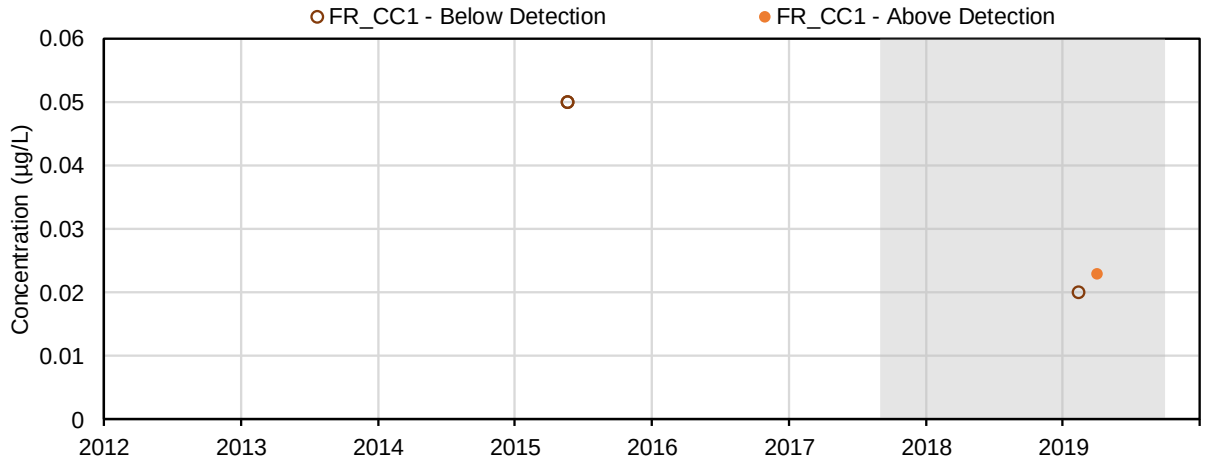
(114) Acridine (%); Parent PAHs



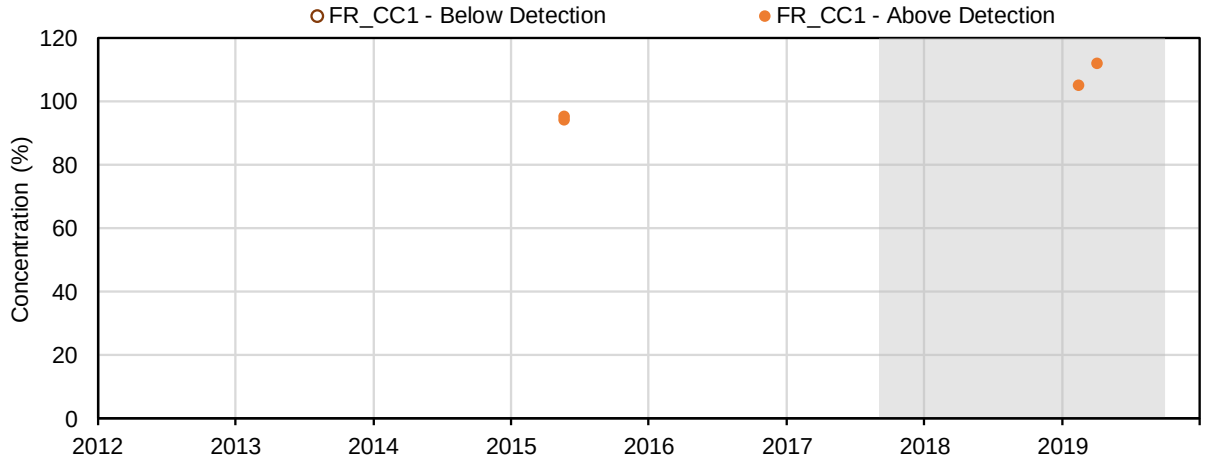
(115) Fluorene (µg/L); Parent PAHs



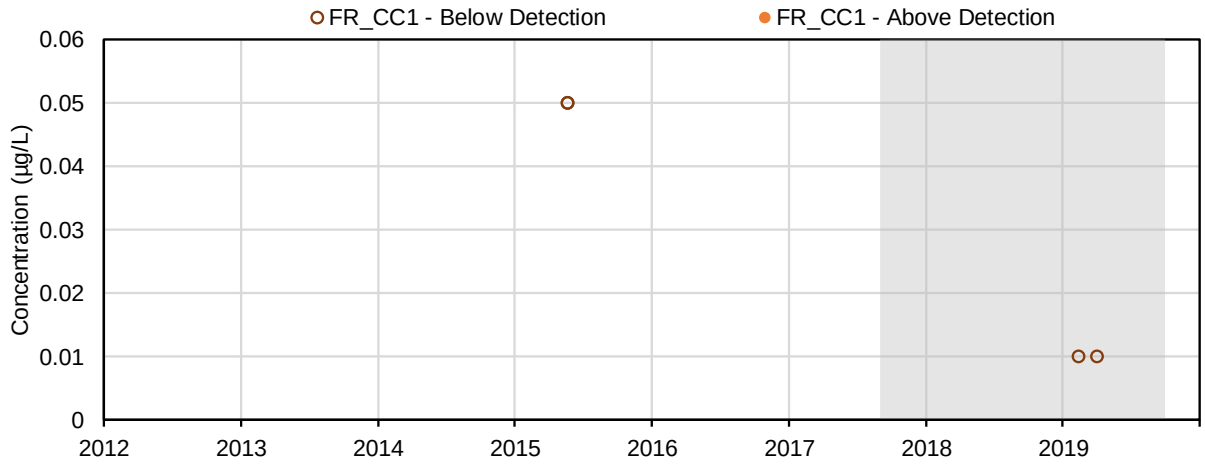
(116) Phenanthrene (µg/L); Parent PAHs



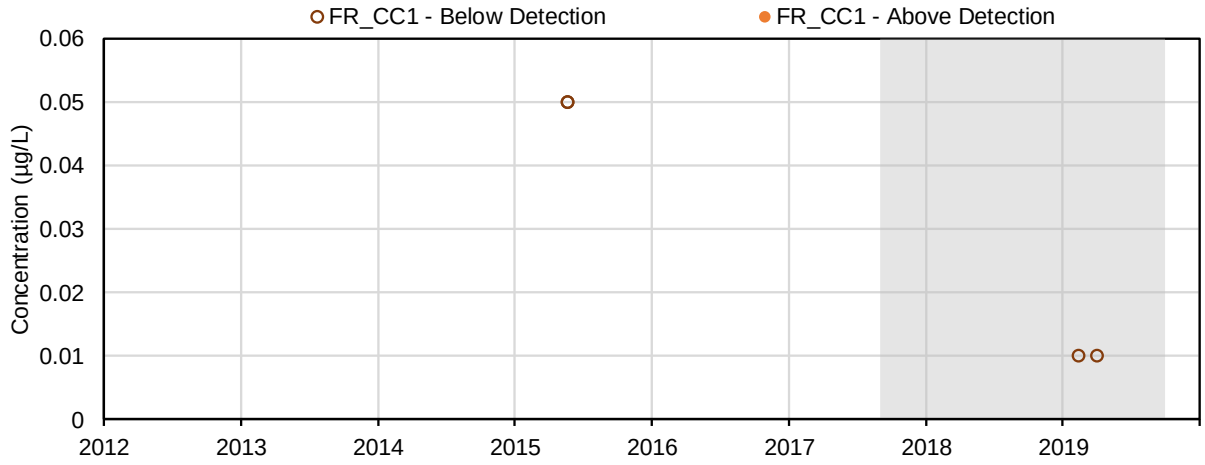
(117) Phenanthrene (%); Parent PAHs



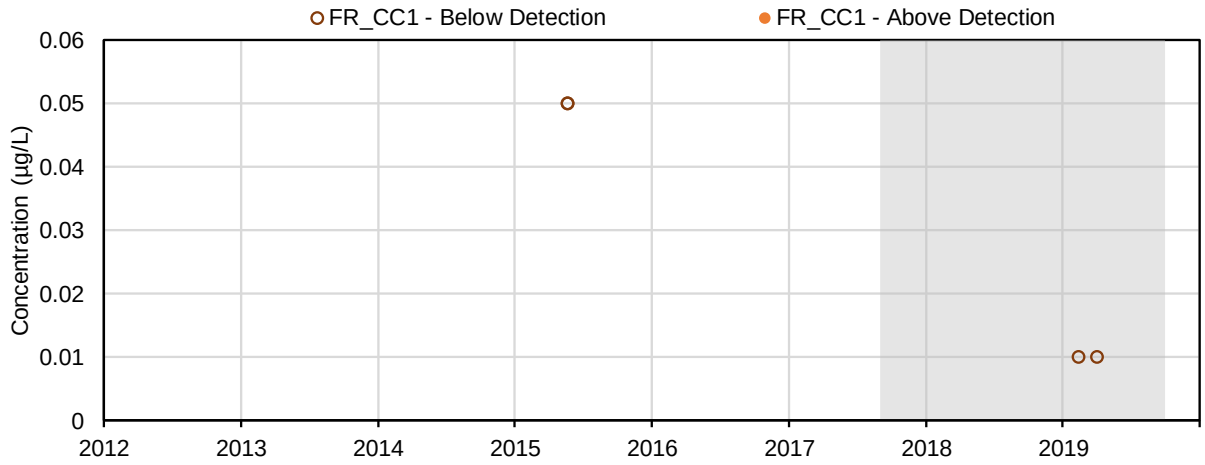
(118) Anthracene (µg/L); Parent PAHs



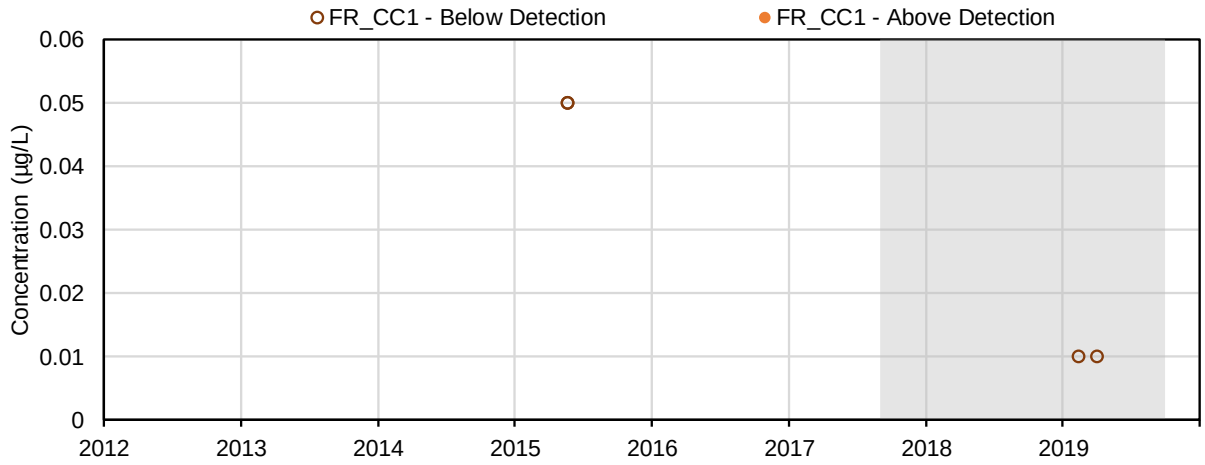
(119) Pyrene (µg/L); Parent PAHs



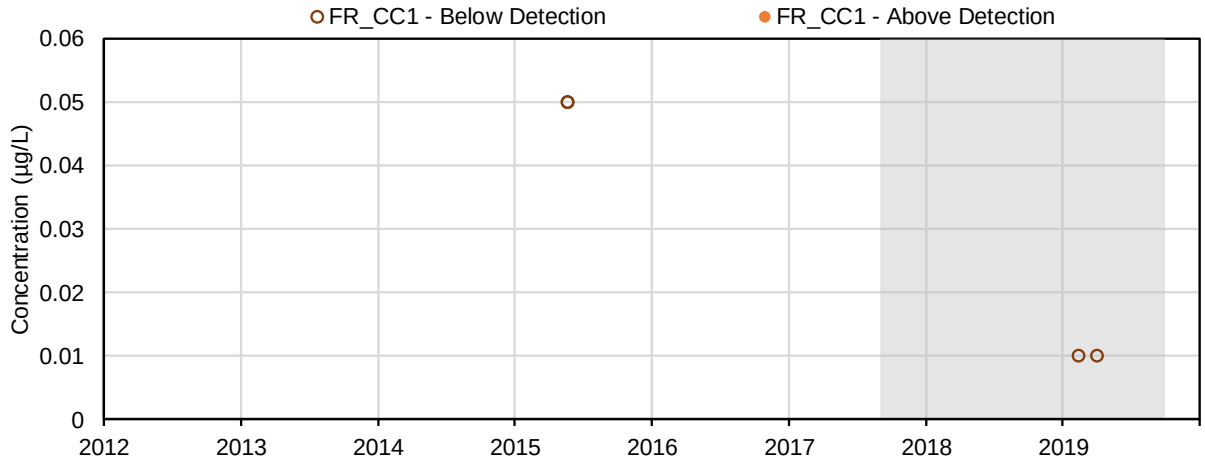
(120) Fluoranthene (µg/L); Parent PAHs



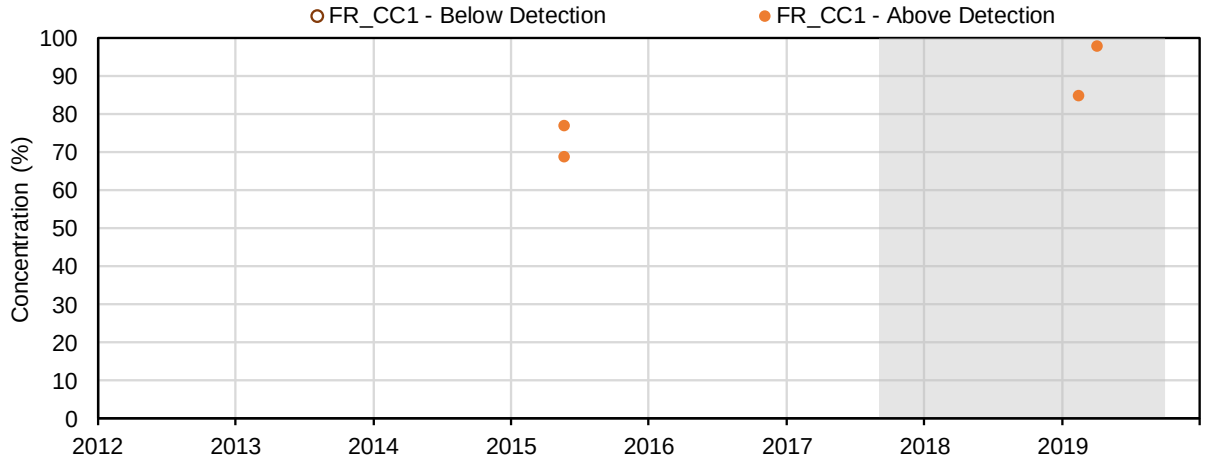
(121) Benzo(a)anthracene (µg/L); Parent PAHs



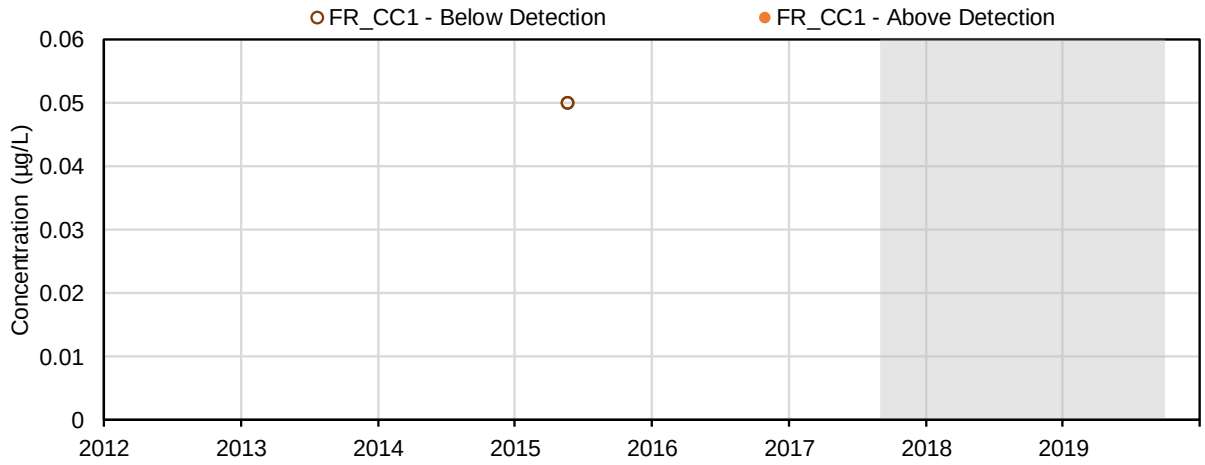
(122) Chrysene (µg/L); Parent PAHs



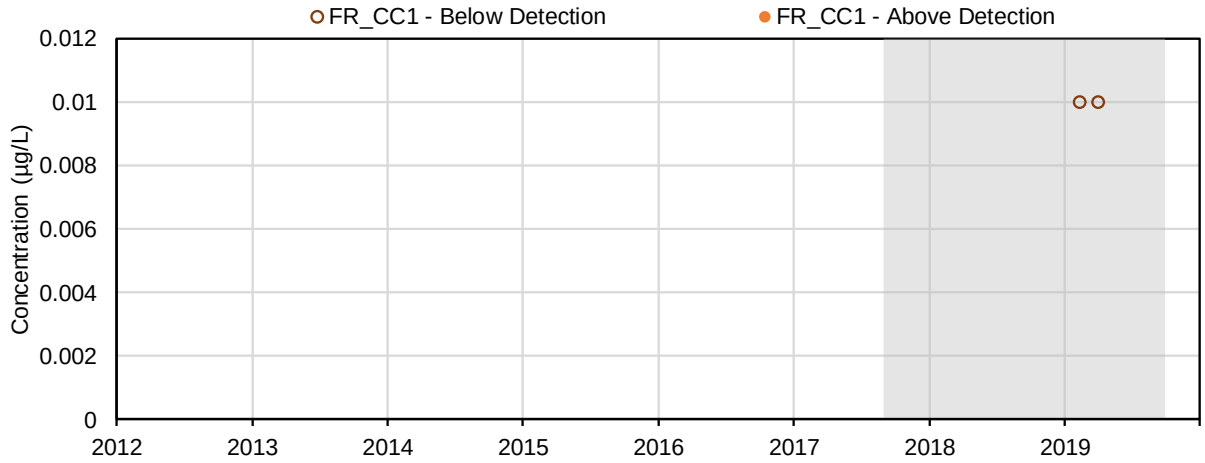
(123) Chrysene (%); Parent PAHs



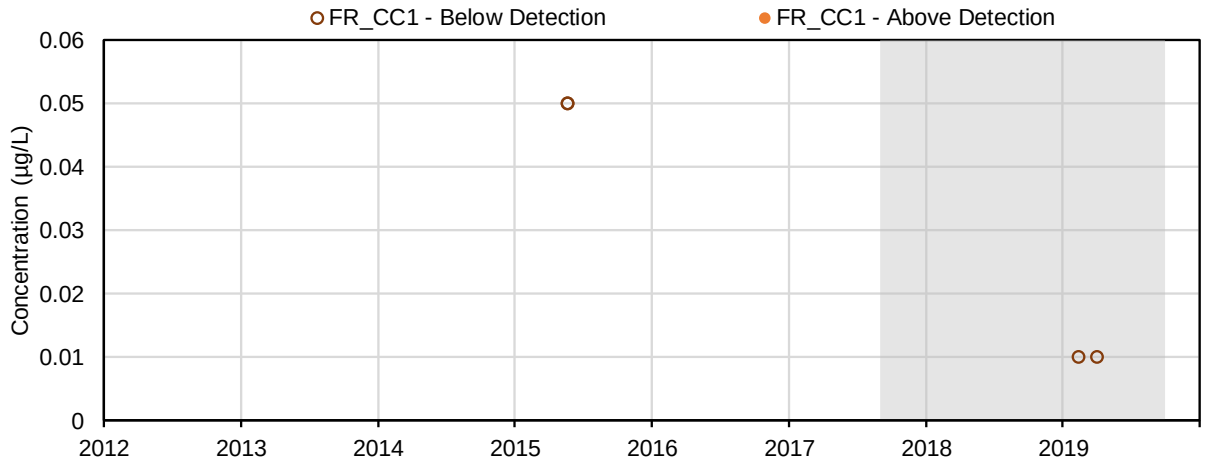
(124) Benzo(b)fluoranthene (µg/L); Parent PAHs



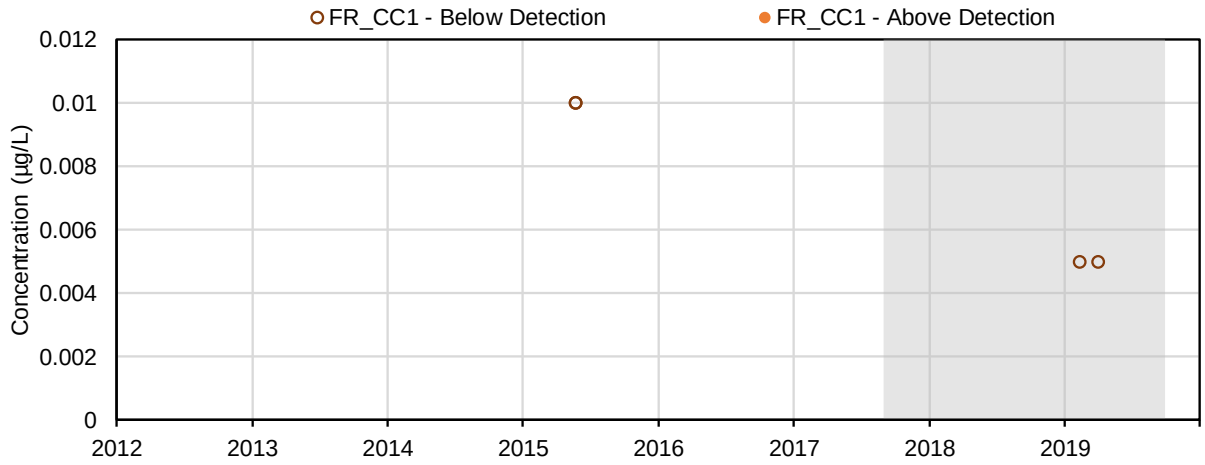
(125) Benzo(b,j)fluoranthene (µg/L); Parent PAHs



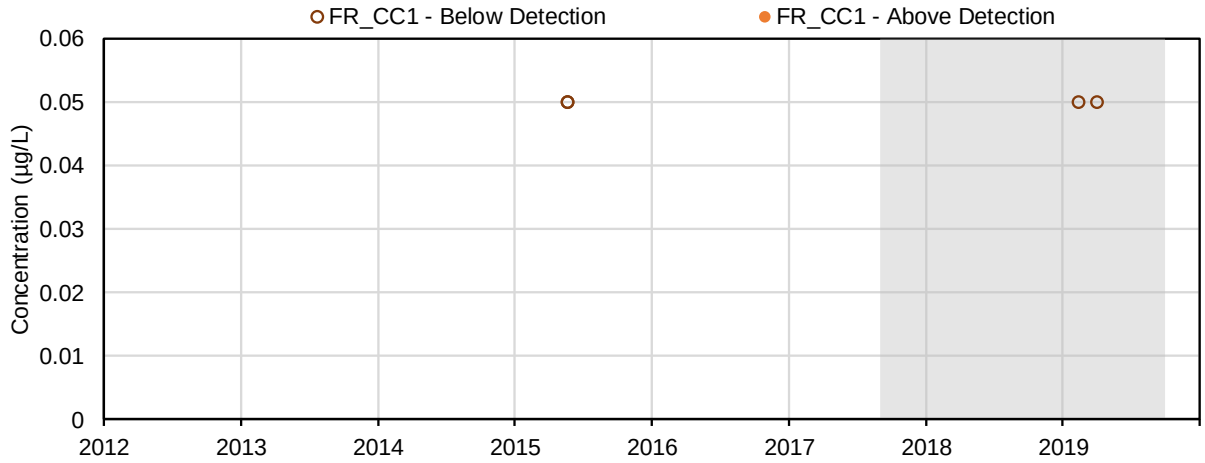
(126) Benzo(k)fluoranthene (µg/L); Parent PAHs



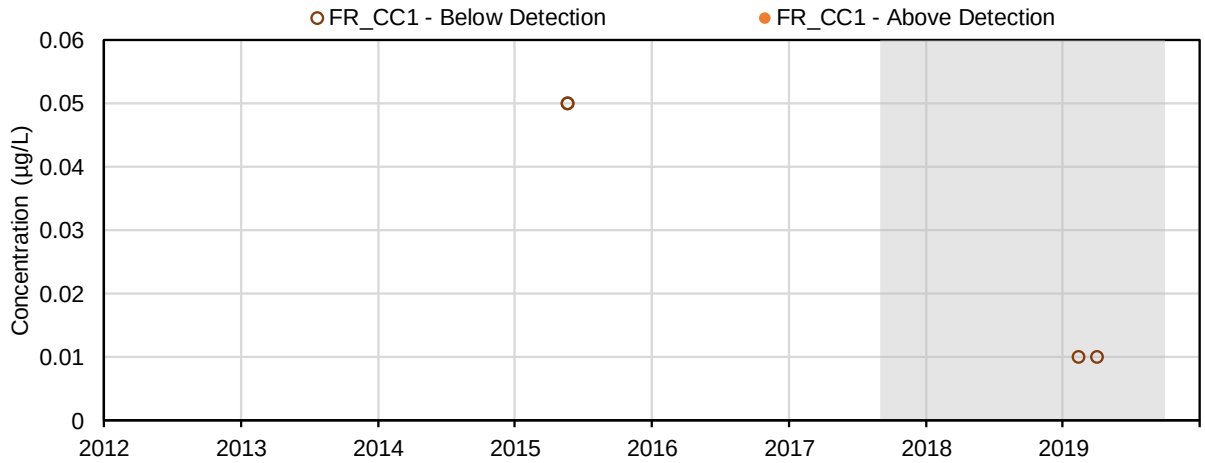
(127) Benzo(a)pyrene (µg/L); Parent PAHs



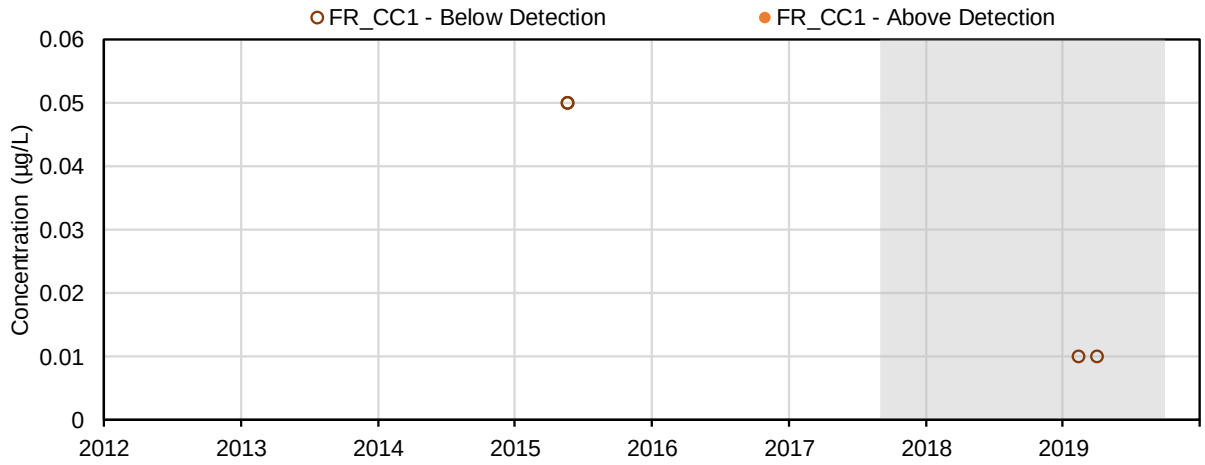
(128) Quinoline (µg/L); Parent PAHs



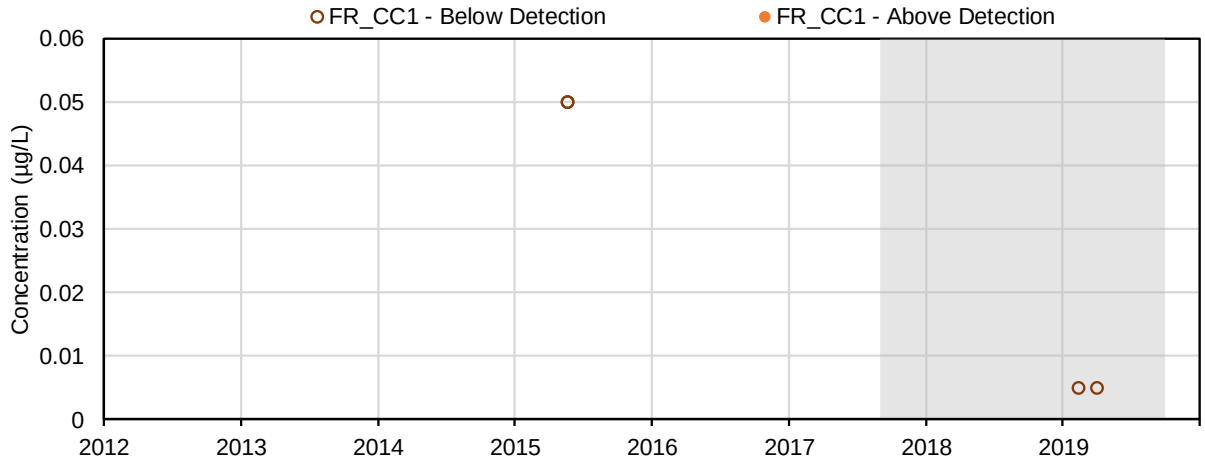
(129) Benzo(g,h,i)perylene (µg/L); Parent PAHs



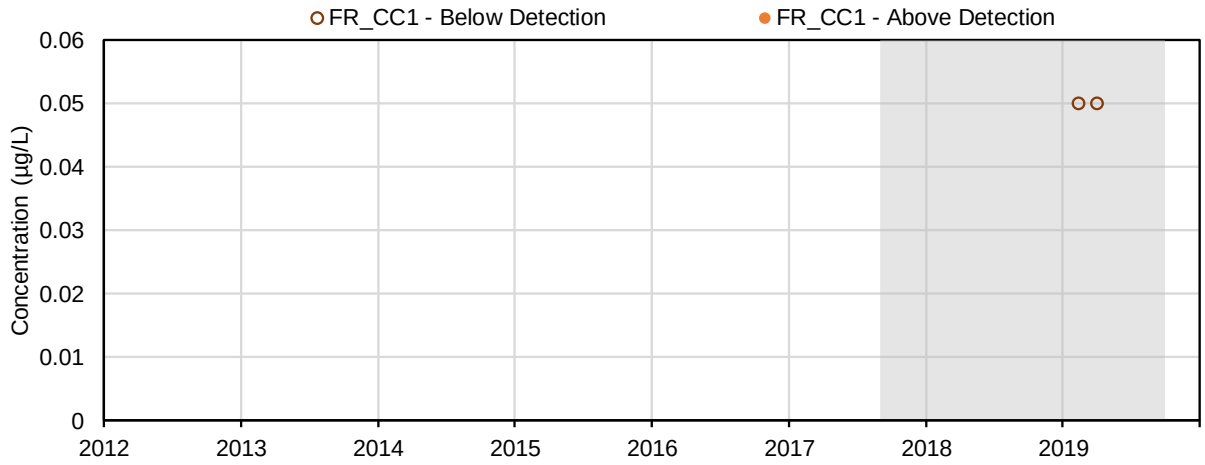
(130) Indeno(c,d-123)pyrene (µg/L); Parent PAHs



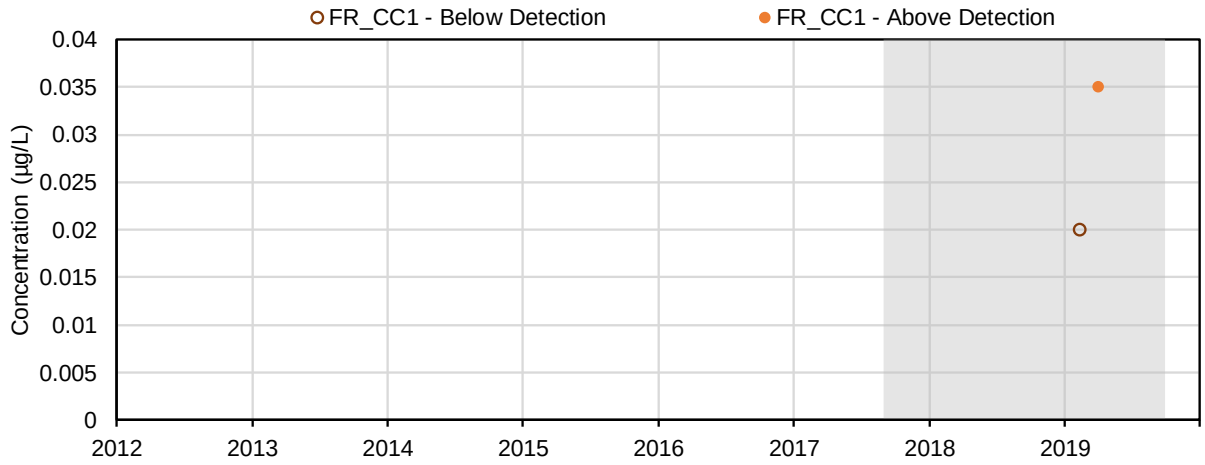
(131) Dibenzo(a,h)anthracene (µg/L); Parent PAHs



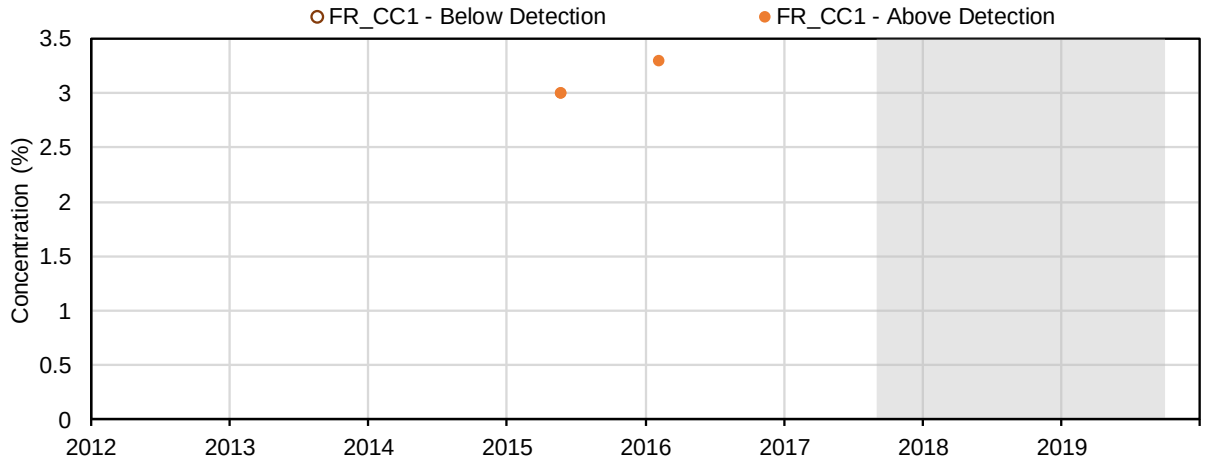
(132) 1-Methylnaphthalene (µg/L); Alkylated PAHs



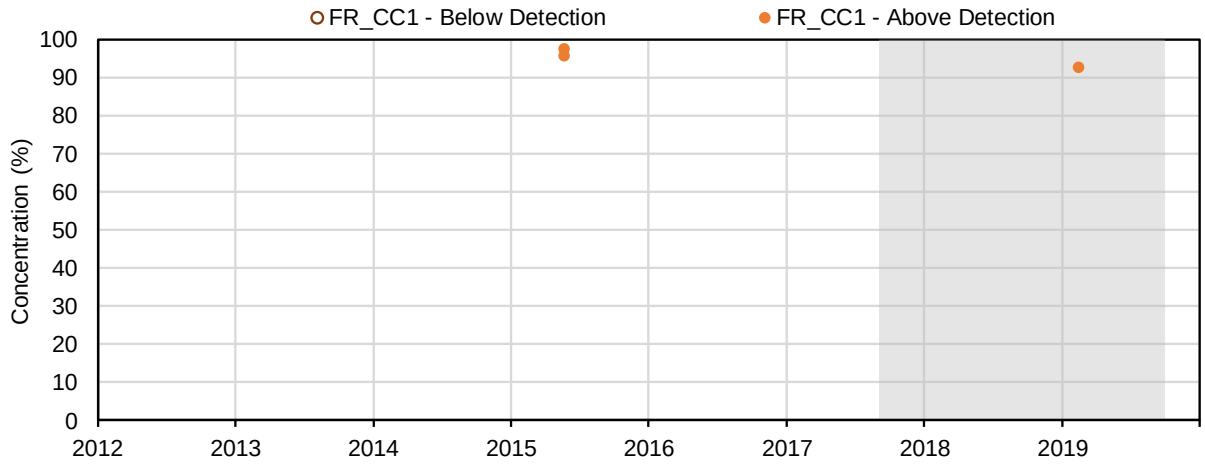
(133) 2-Methylnaphthalene (µg/L); Alkylated PAHs

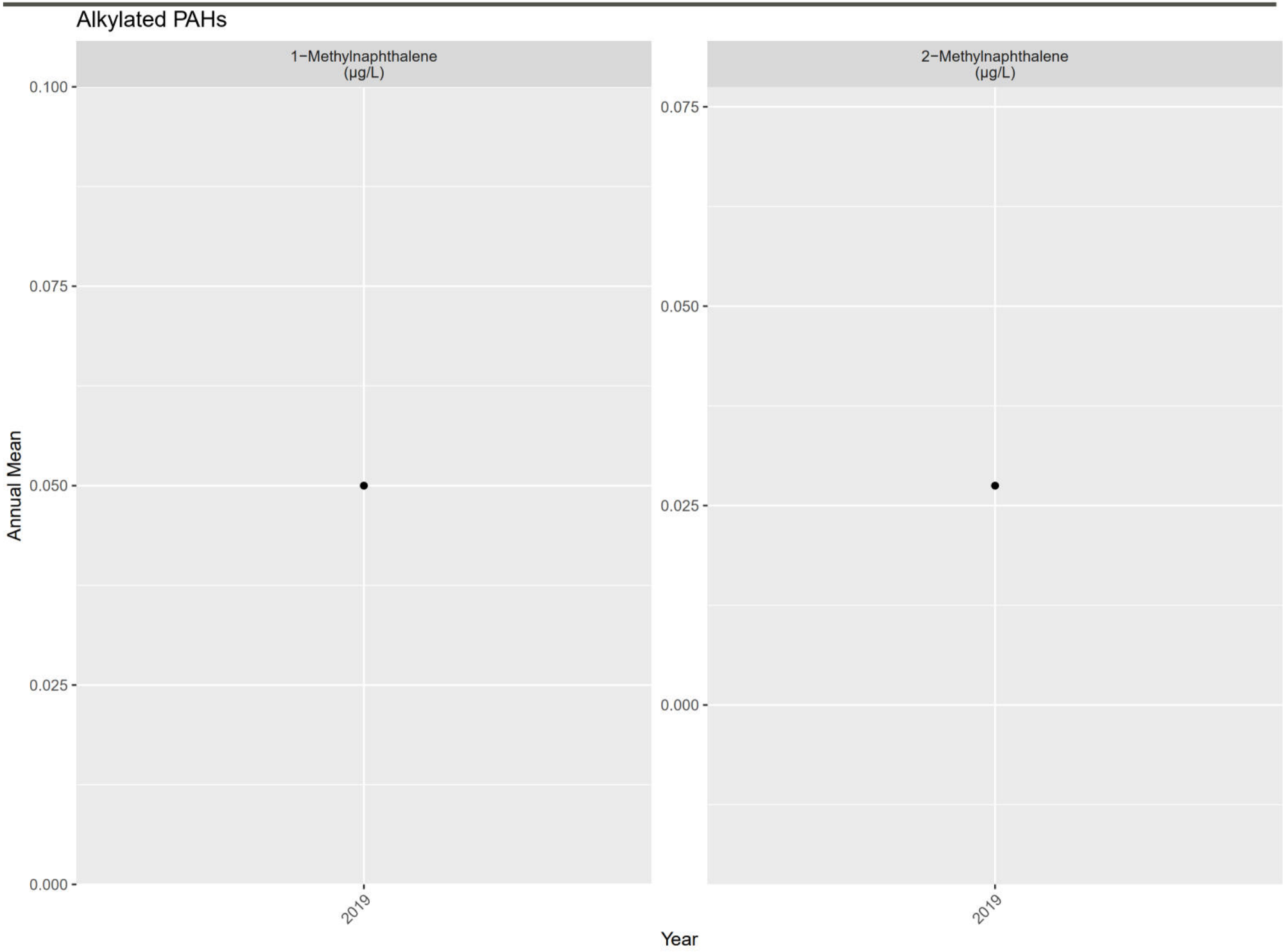


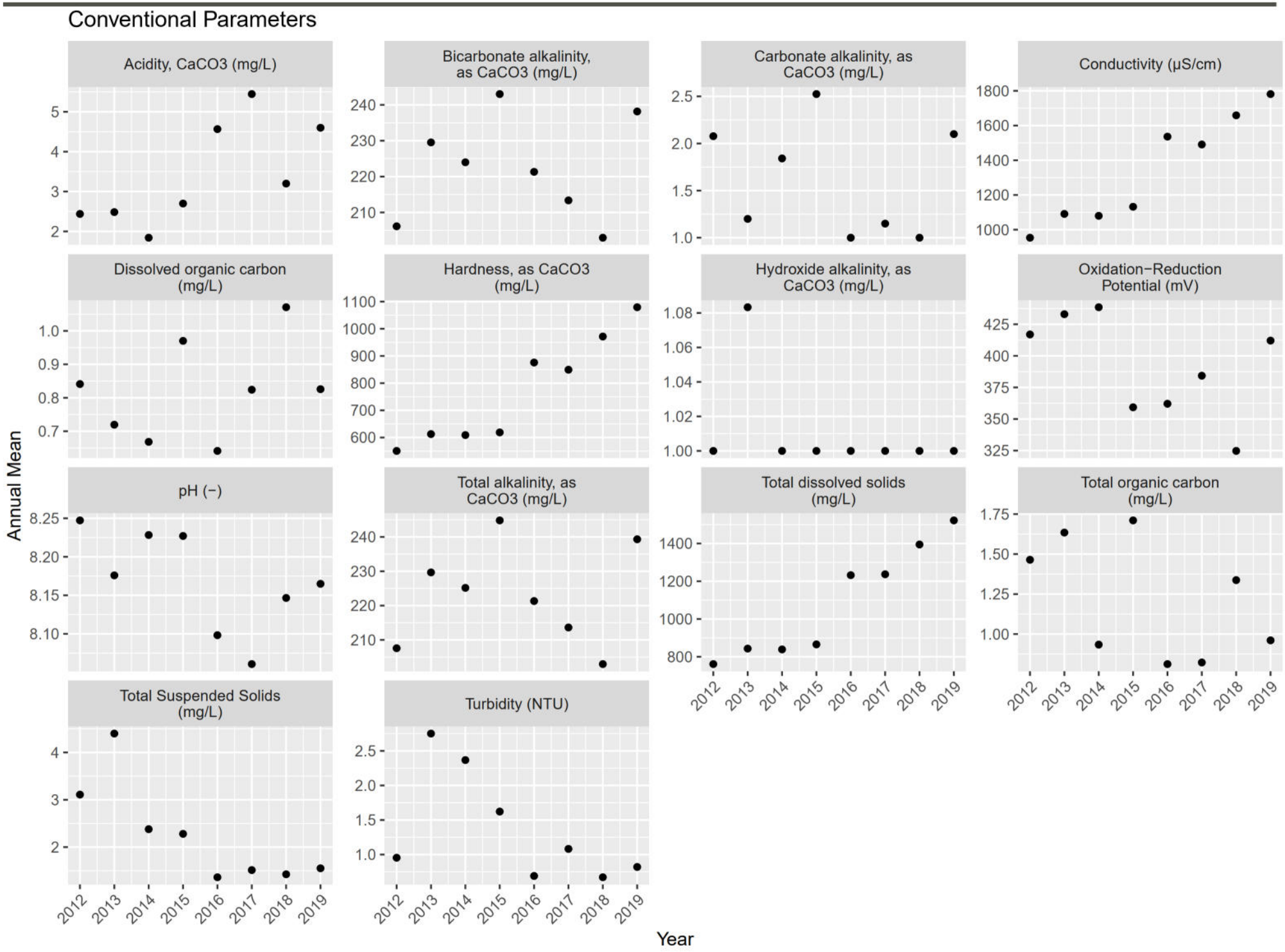
(134) Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%); Toxicity

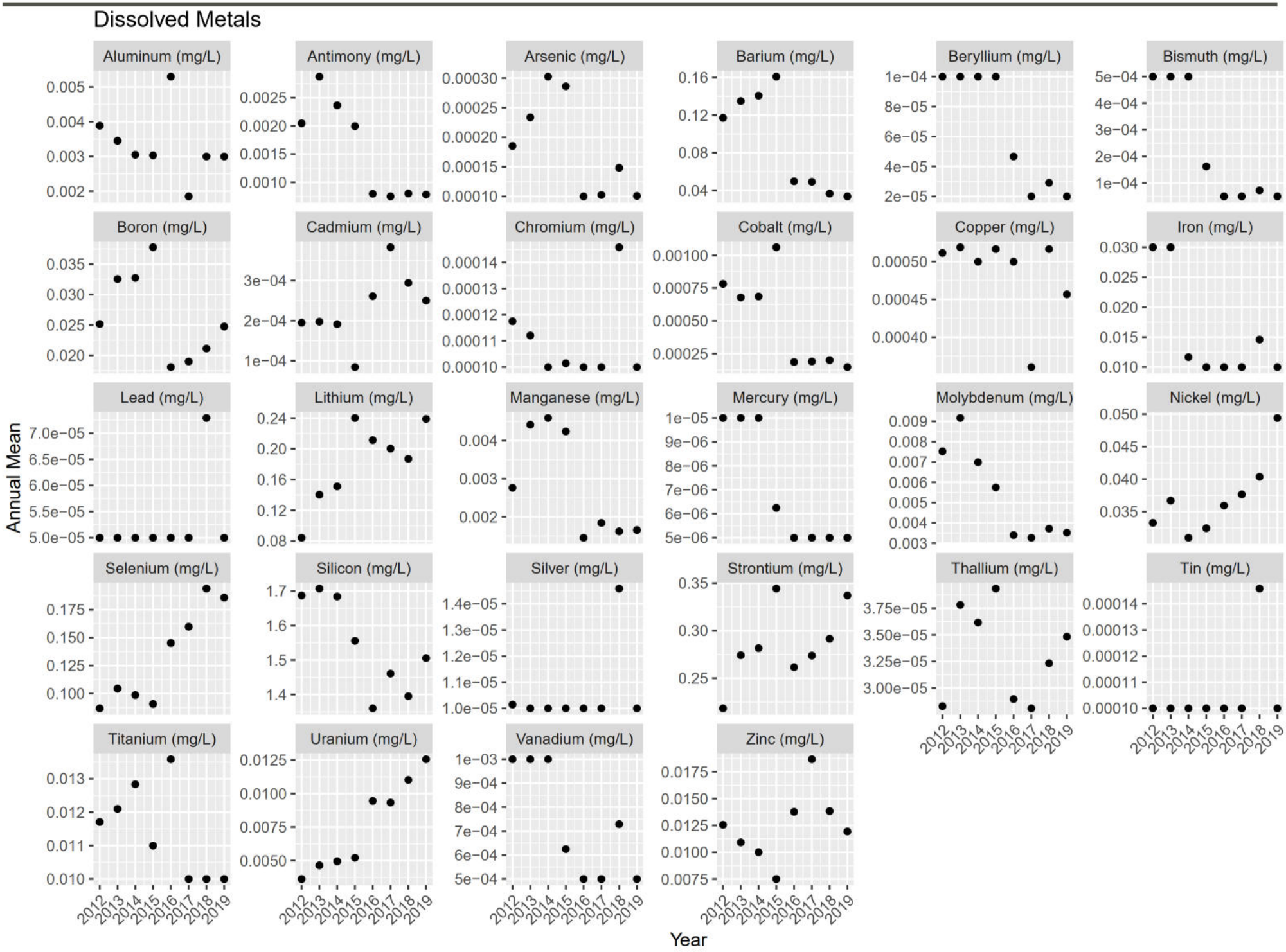


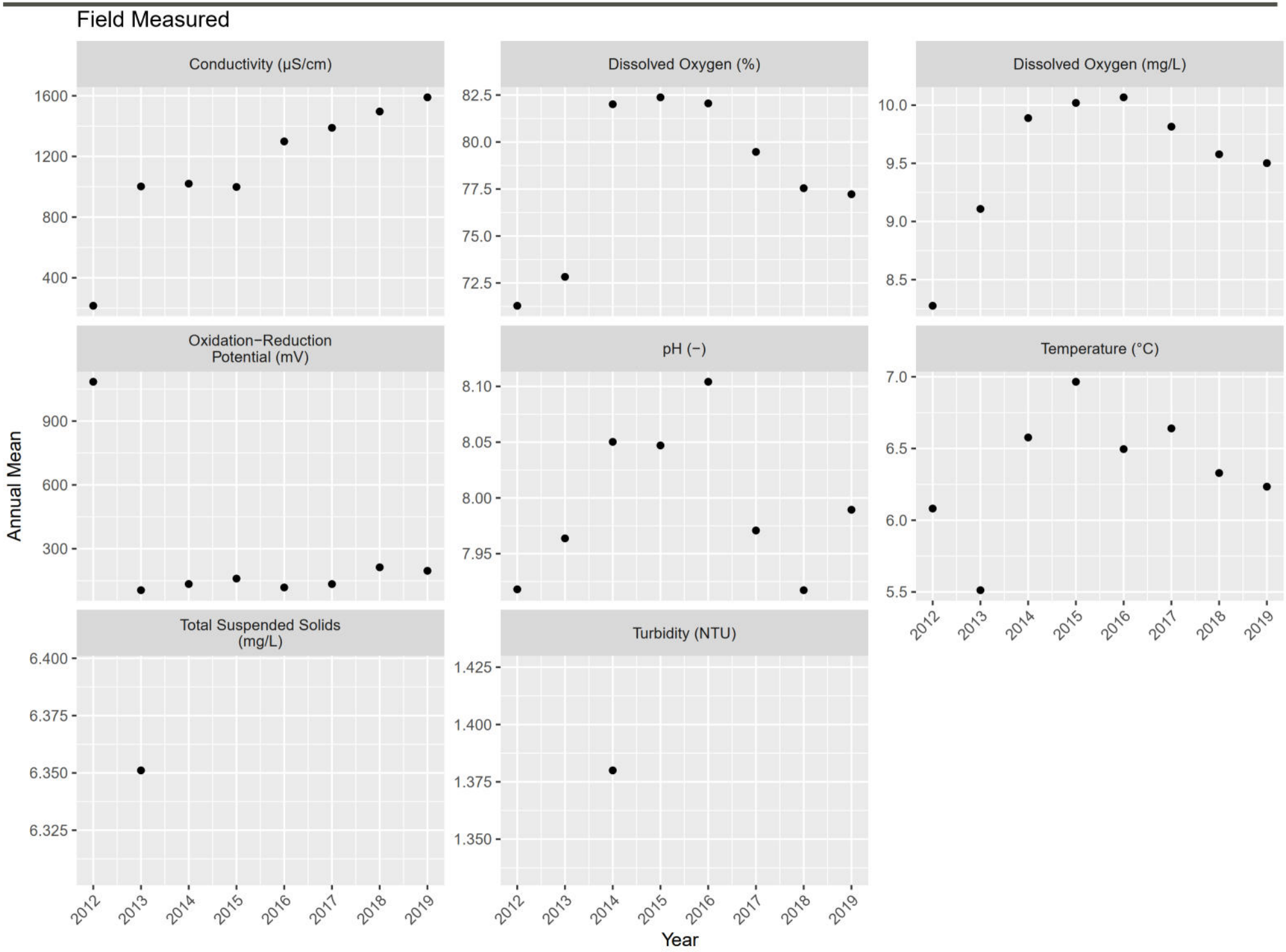
(135) 2-Bromobenzotrifluoride (%); Unknown

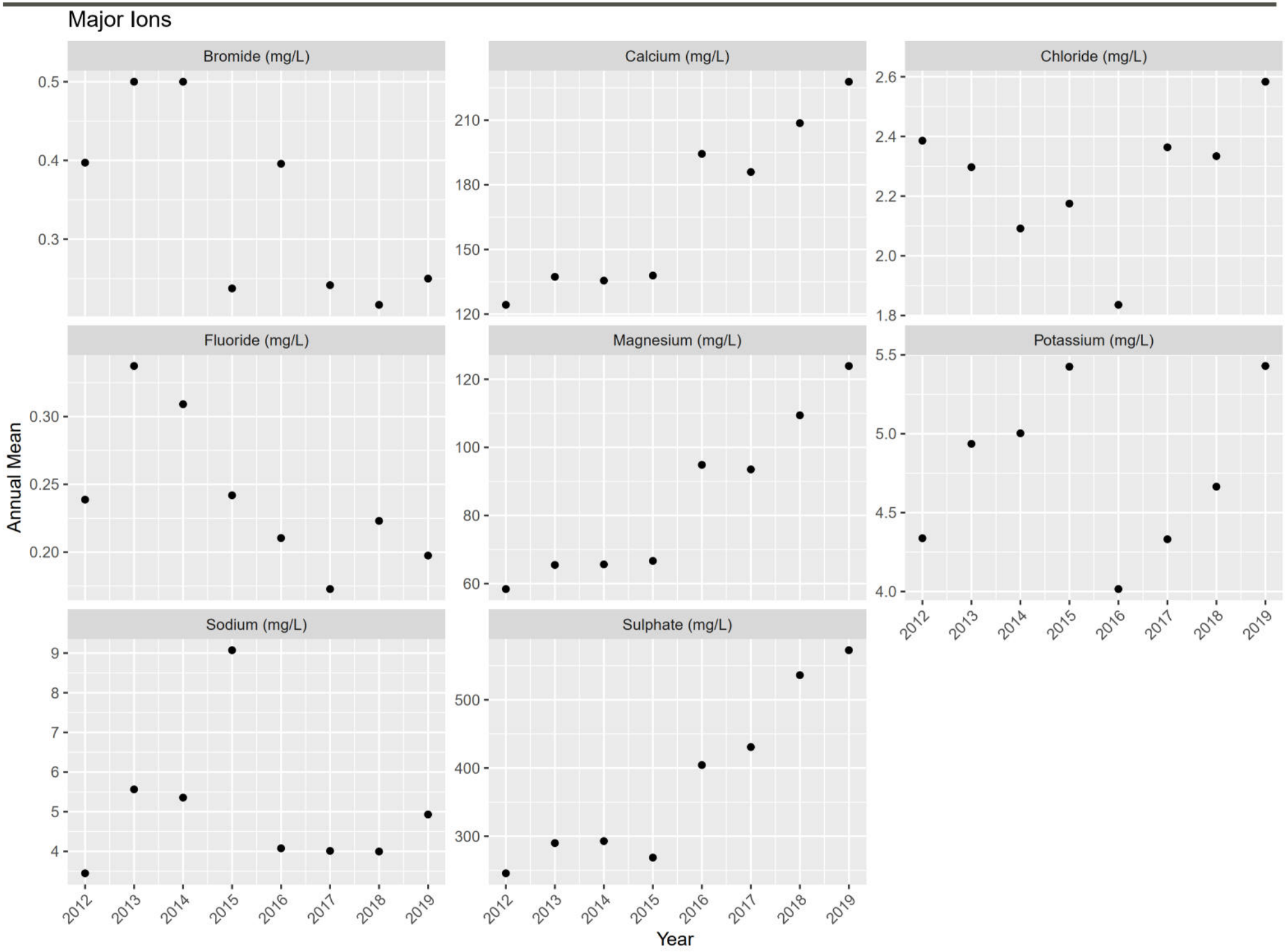


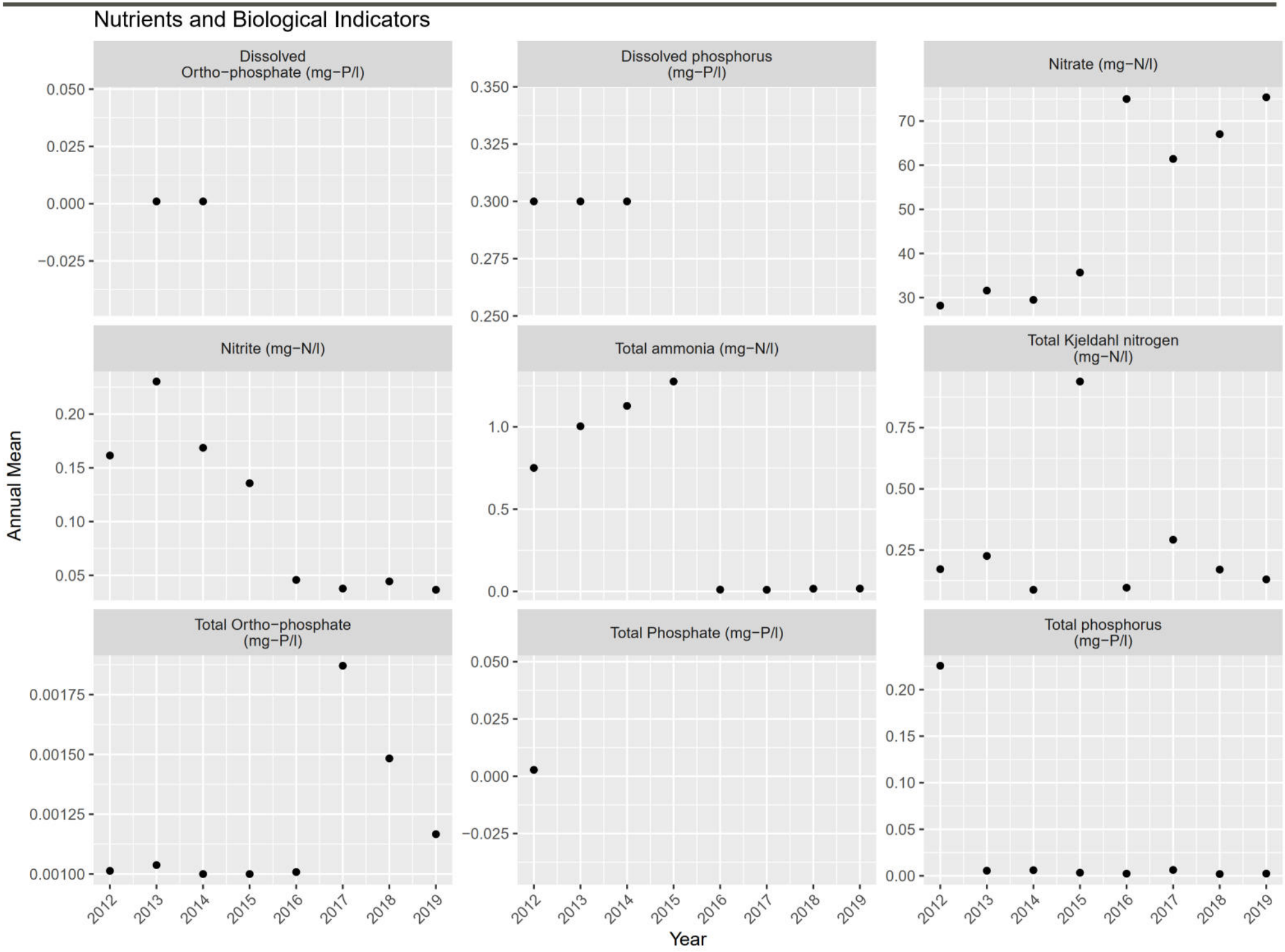

Alkylated PAHs
1−Methylnaphthalene (µg/L)
2−Methylnaphthalene (µg/L)
Annual Mean
0.100
0.075
0.050
0.025
0.000
0.075
0.050
0.025
0.000
2019
2019
Year

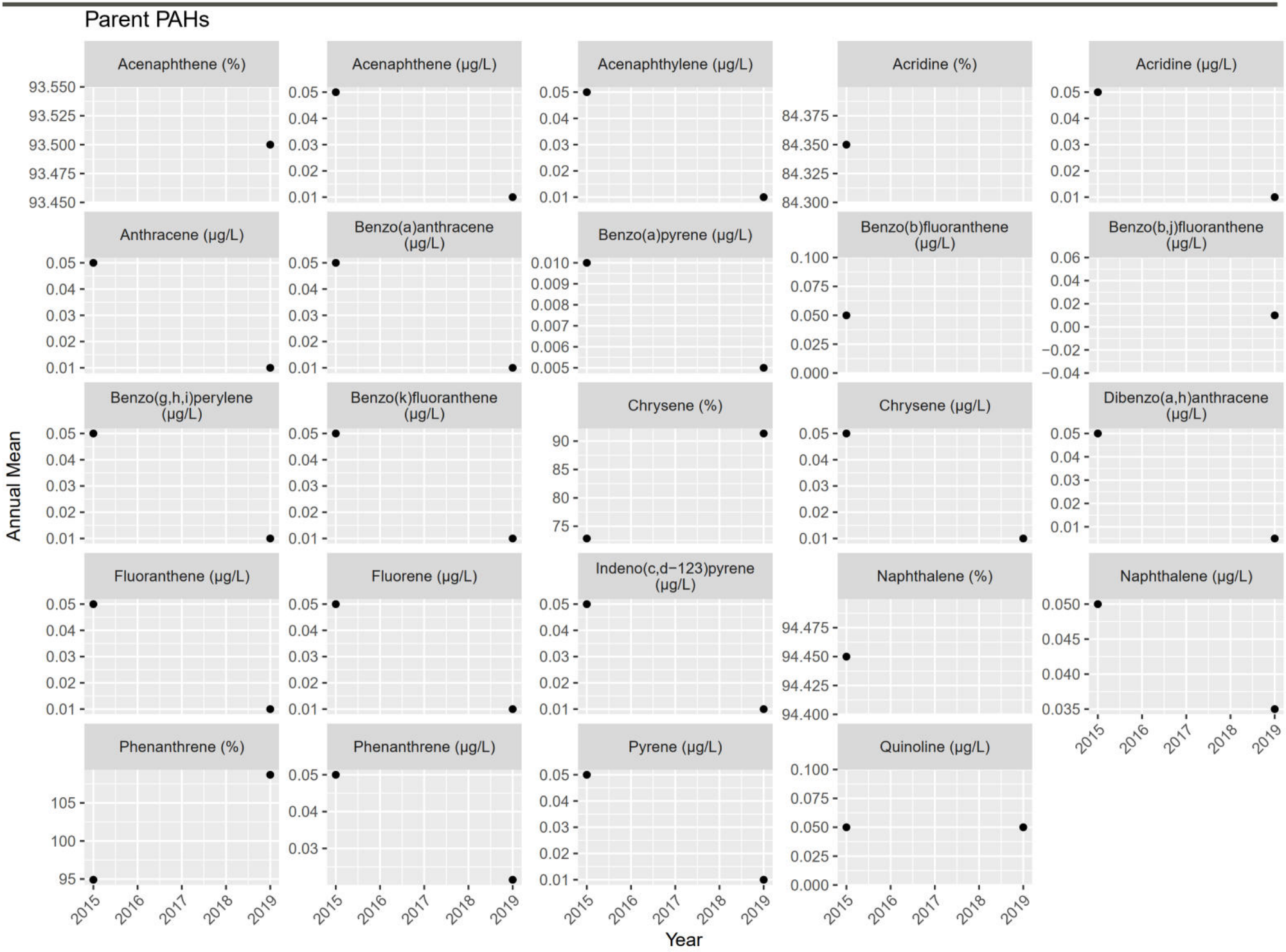

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total Suspended Solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

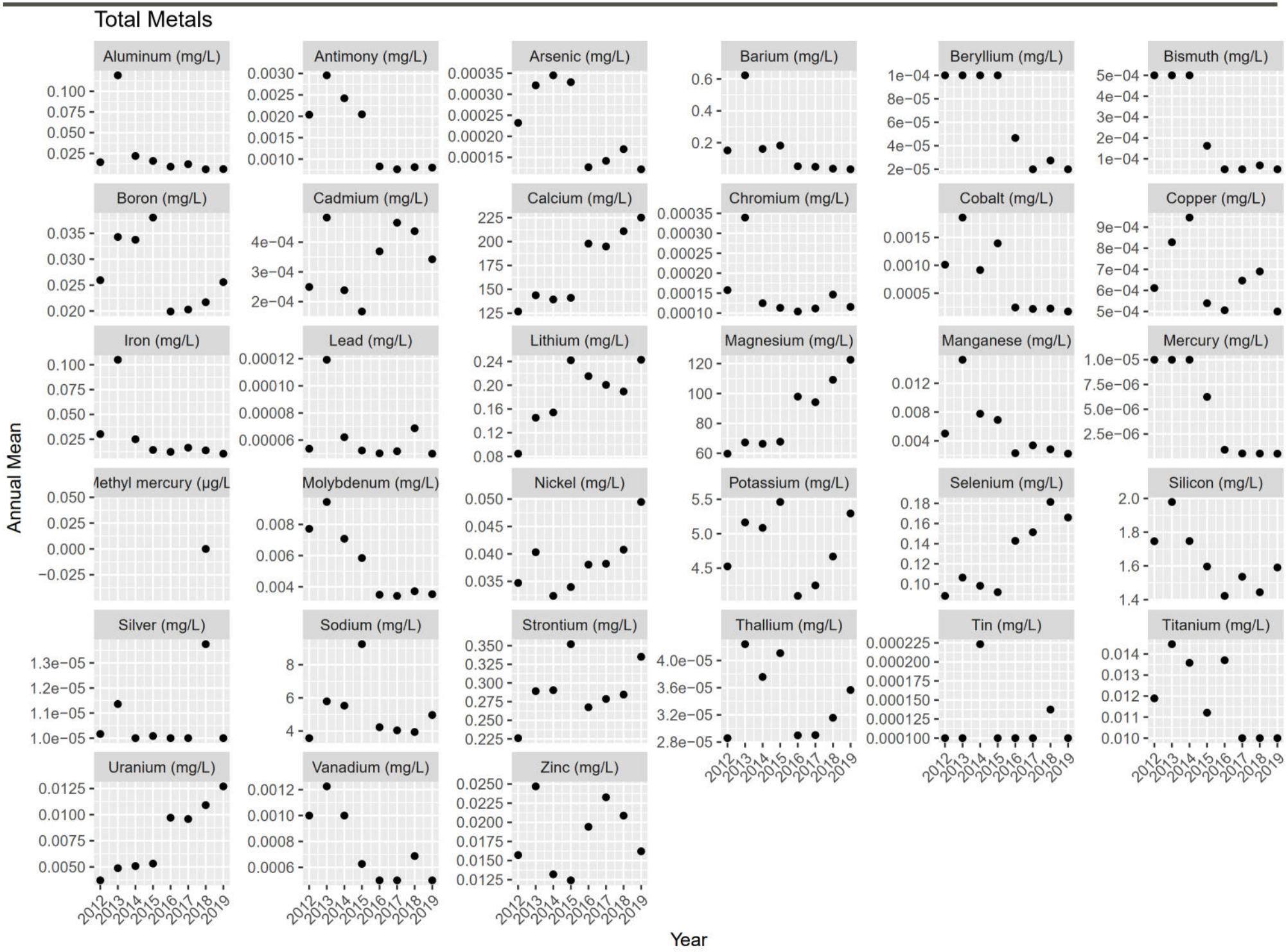

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

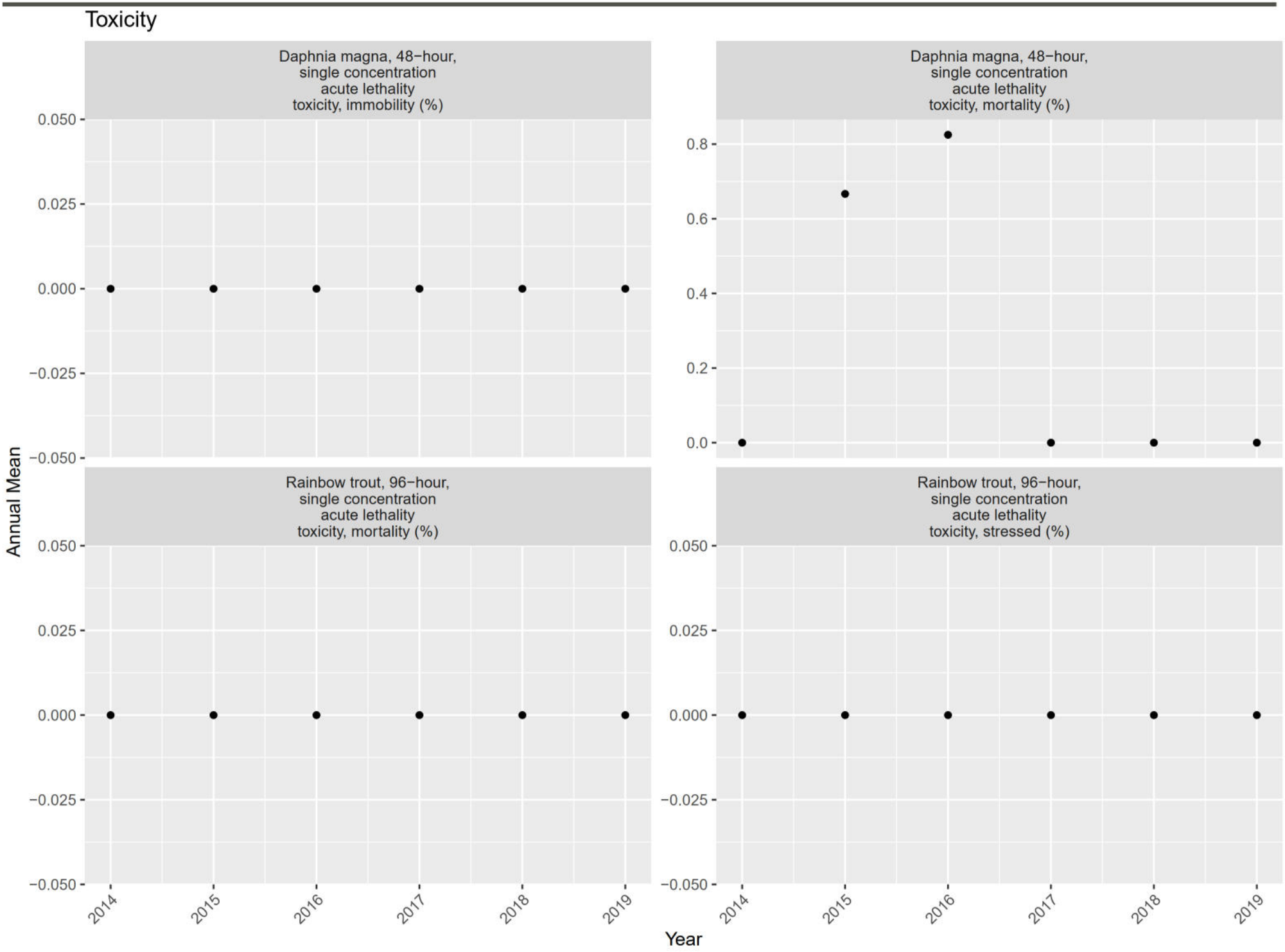

Field Measured
Conductivity (µS/cm)
1600
1200
800
400
Dissolved Oxygen (%)
82.5
80.0
77.5
75.0
72.5
Dissolved Oxygen (mg/L)
10.0
9.5
9.0
8.5
Oxidation−Reduction Potential (mV)
900
600
300
pH (−)
8.10
8.05
8.00
7.95
Temperature (°C)
7.0
6.5
6.0
5.5
Total Suspended Solids (mg/L)
6.400
6.375
6.350
6.325
Turbidity (NTU)
1.425
1.400
1.375
1.350
2012
2013
2014
2015
2016
2017
2018
2019
Annual Mean
Year

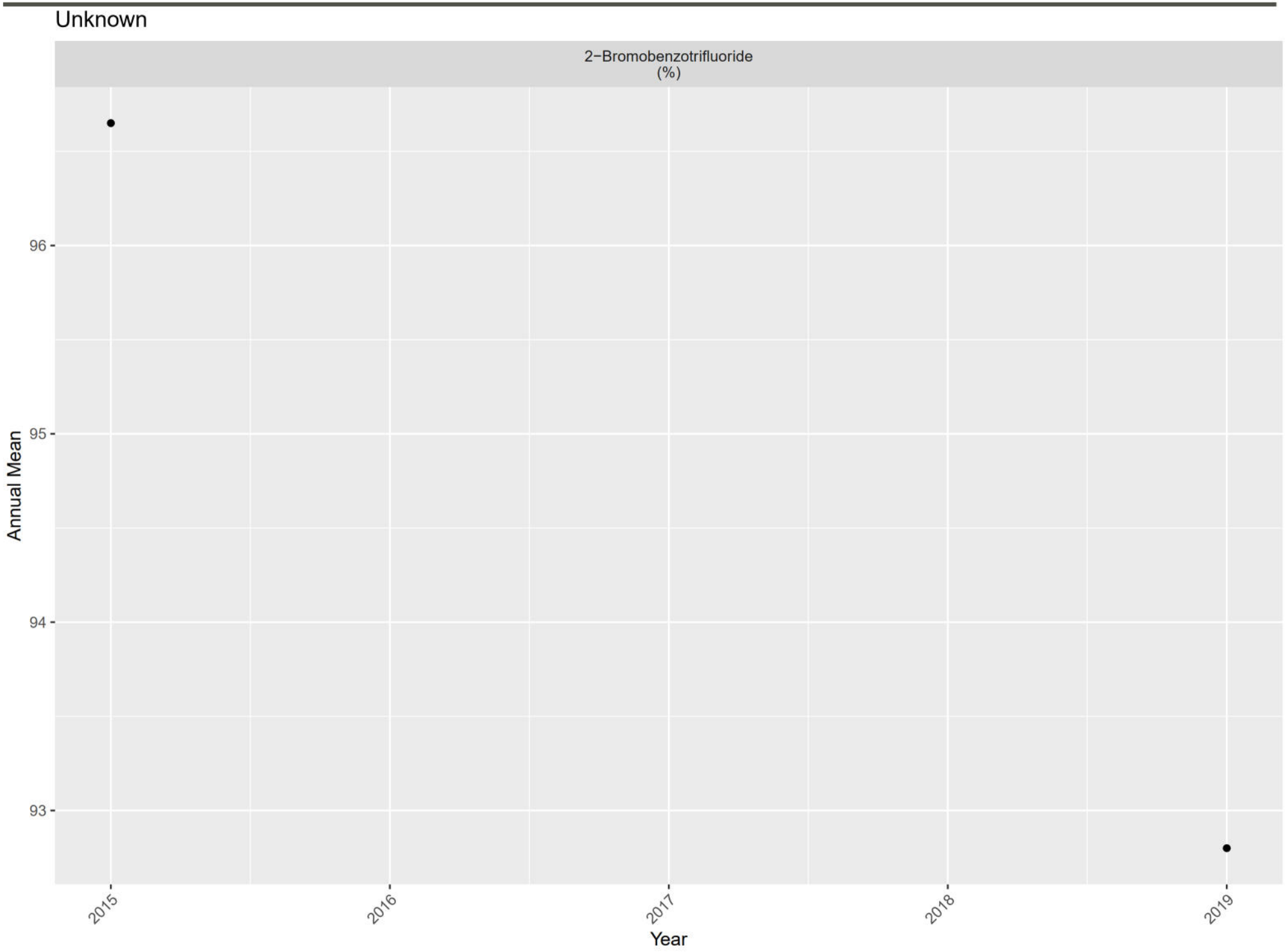

Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

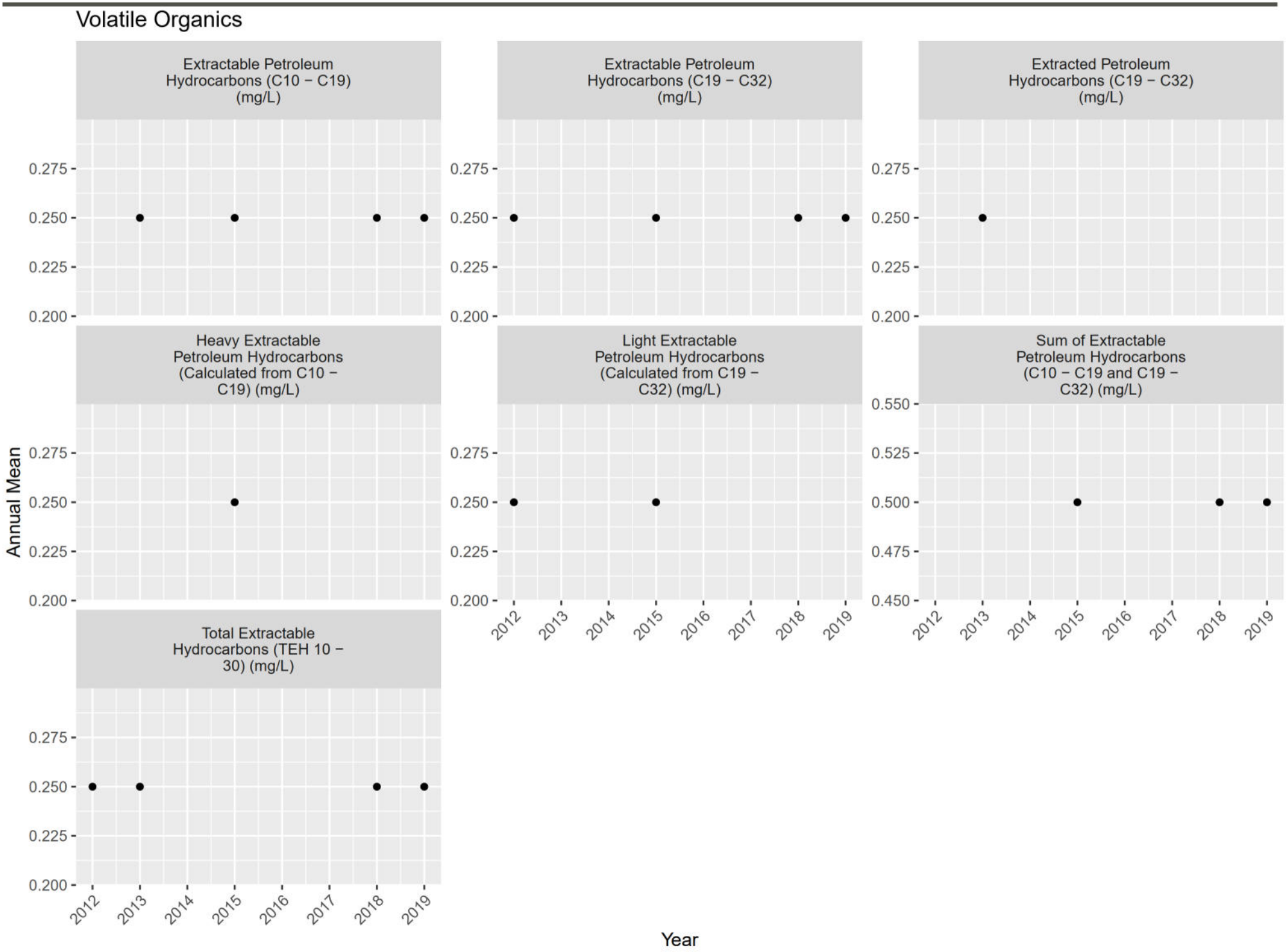

Nutrients and Biological Indicators
Dissolved Ortho−phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Parent PAHs
Acenaphthene (%)
Acenaphthene (µg/L)
Acenaphthylene (µg/L)
Acridine (%)
Acridine (µg/L)
Anthracene (µg/L)
Benzo(a)anthracene (µg/L)
Benzo(a)pyrene (µg/L)
Benzo(b)fluoranthene (µg/L)
Benzo(b,j)fluoranthene (µg/L)
Benzo(g,h,i)perylene (µg/L)
Benzo(k)fluoranthene (µg/L)
Chrysene (%)
Chrysene (µg/L)
Dibenzo(a,h)anthracene (µg/L)
Fluoranthene (µg/L)
Fluorene (µg/L)
Indeno(c,d−123)pyrene (µg/L)
Naphthalene (%)
Naphthalene (µg/L)
Phenanthrene (%)
Phenanthrene (µg/L)
Pyrene (µg/L)
Quinoline (µg/L)
Annual Mean
Year
2015
2016
2017
2018
2019


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Methyl mercury (µg/L
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year


Toxicity
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, immobility (%)
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, stressed (%)
Annual Mean
0.050
0.025
0.000
−0.025
−0.050
0.8
0.6
0.4
0.2
0.0
2014
2015
2016
2017
2018
2019
Year

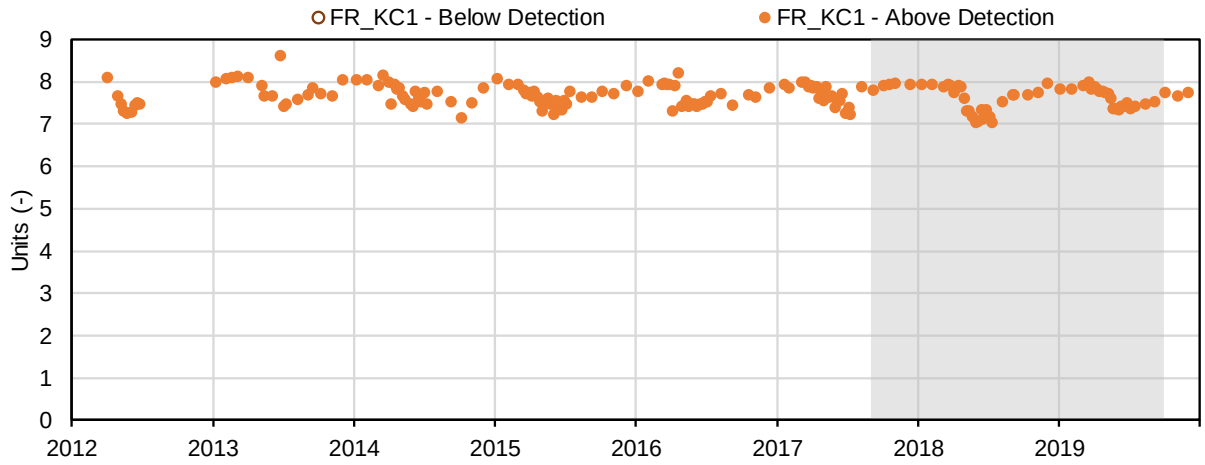

Unknown
2−Bromobenzotrifluoride
(%)
Annual Mean
96
95
94
93
2015
2016
2017
2018
2019
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extractable Petroleum Hydrocarbons (C19 − C32) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 − C19) (mg/L)
Light Extractable Petroleum Hydrocarbons (Calculated from C19 − C32) (mg/L)
Sum of Extractable Petroleum Hydrocarbons (C10 − C19 and C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
Year
0.200
0.225
0.250
0.275
0.450
0.475
0.500
0.525
0.550
2012
2013
2014
2015
2016
2017
2018
2019

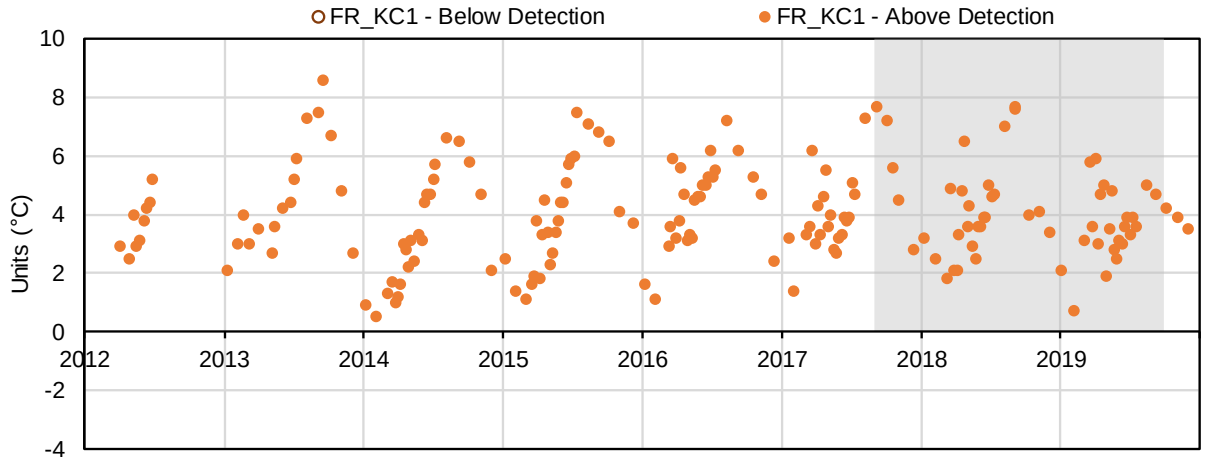
ATTACHMENT F22

FR_KC1 Plots

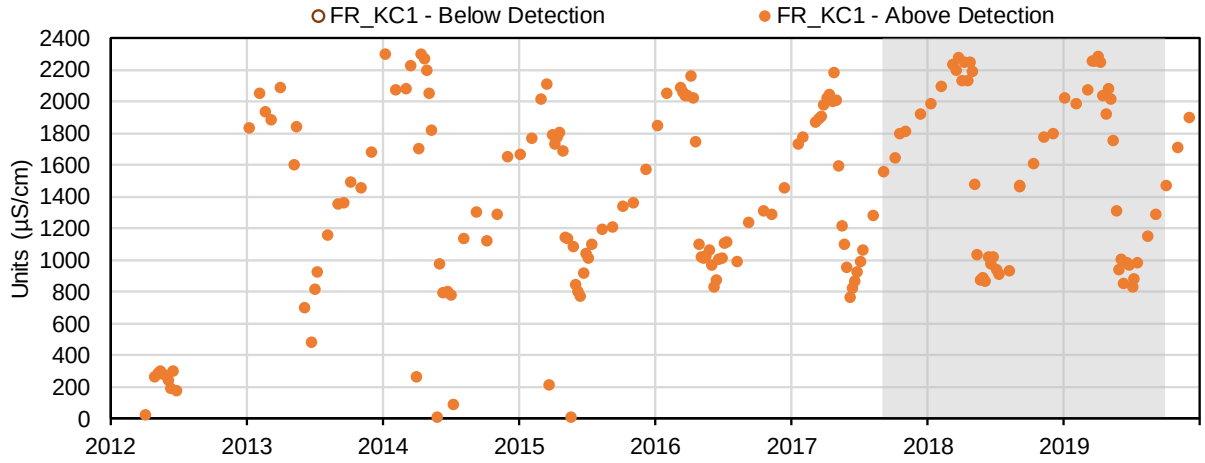
(1) pH (-); Field Measured



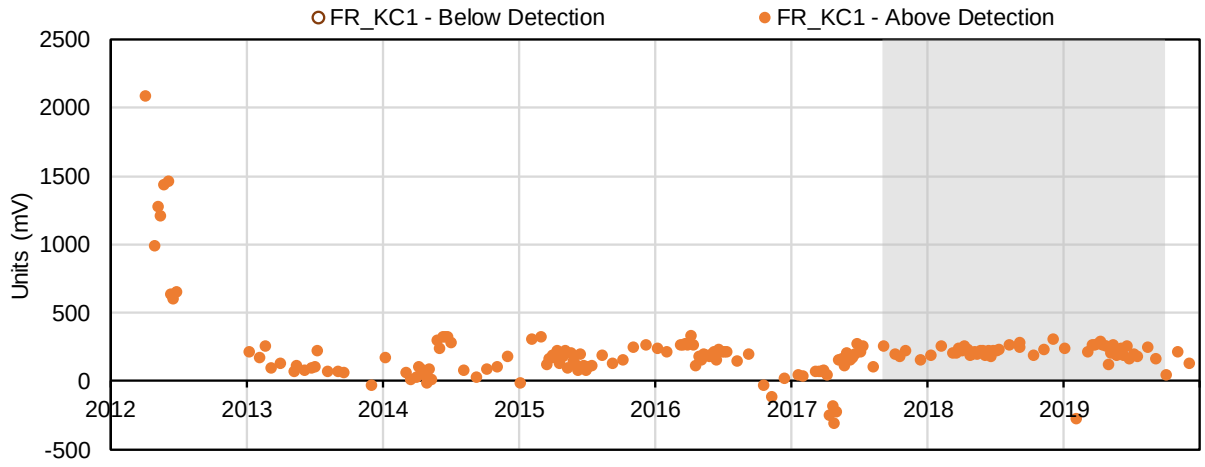
(2) Temperature (°C); Field Measured



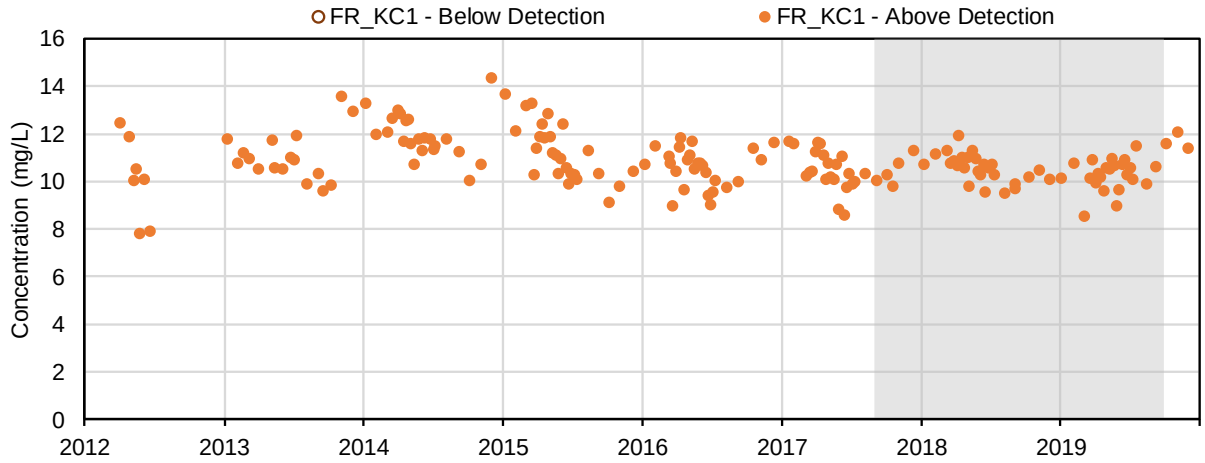
(3) Conductivity (µS/cm); Field Measured



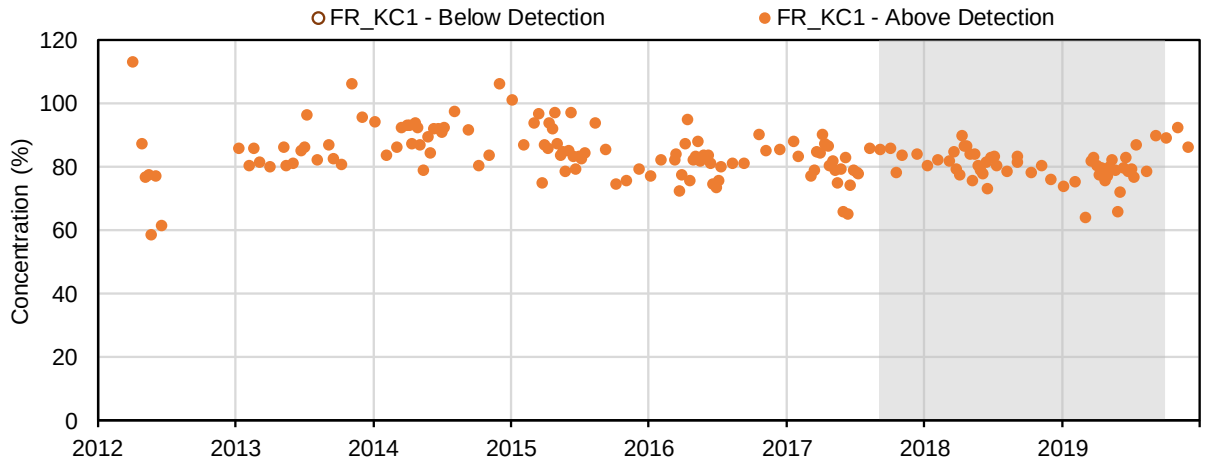
(4) Oxidation-Reduction Potential (mV); Field Measured



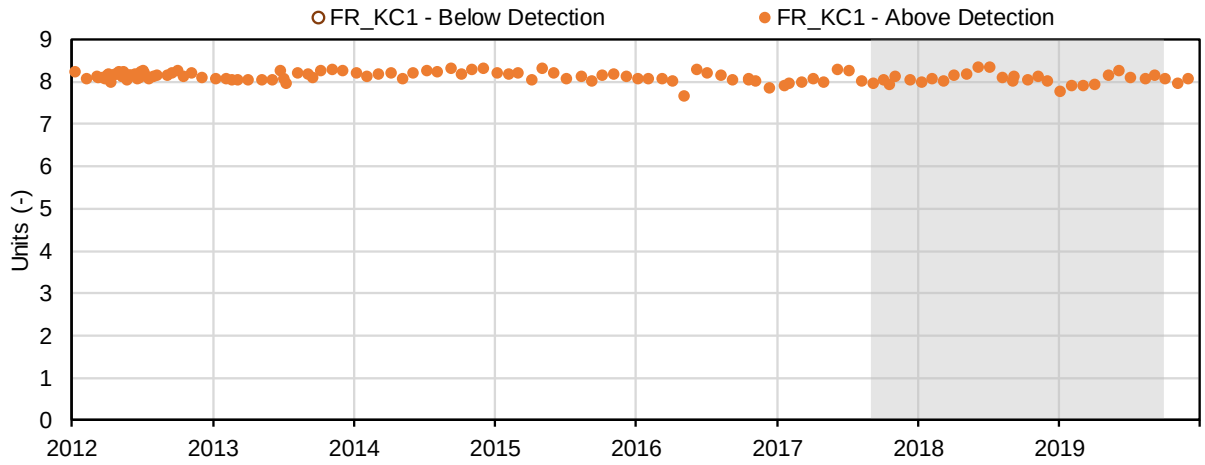
(5) Dissolved Oxygen (mg/L); Field Measured



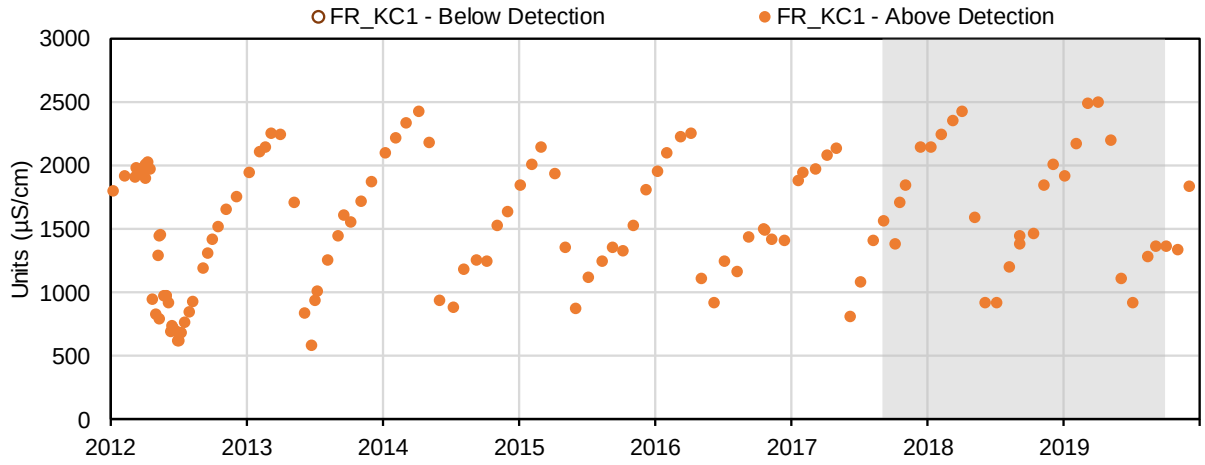
(6) Dissolved Oxygen (%); Field Measured



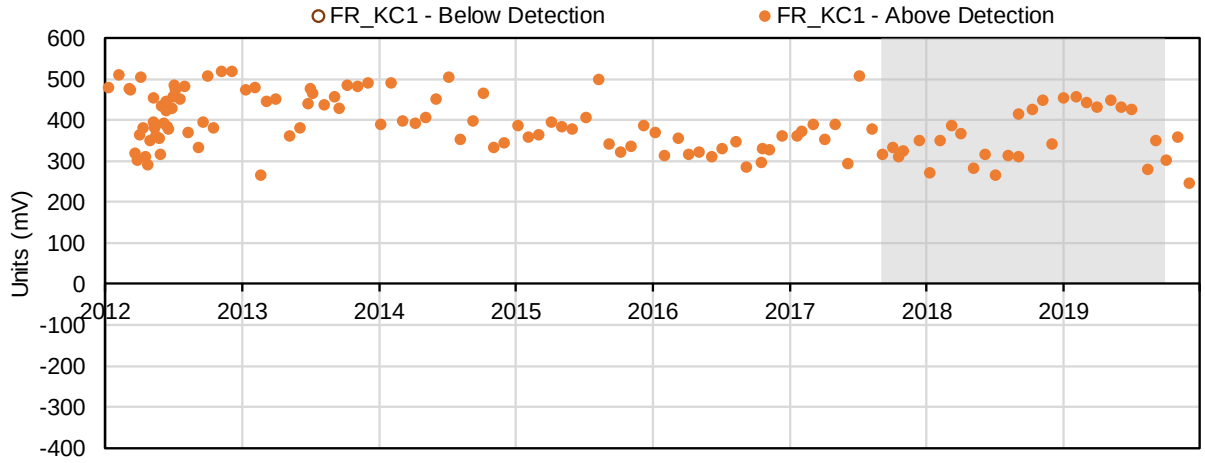
(7) pH (-); Conventional Parameters



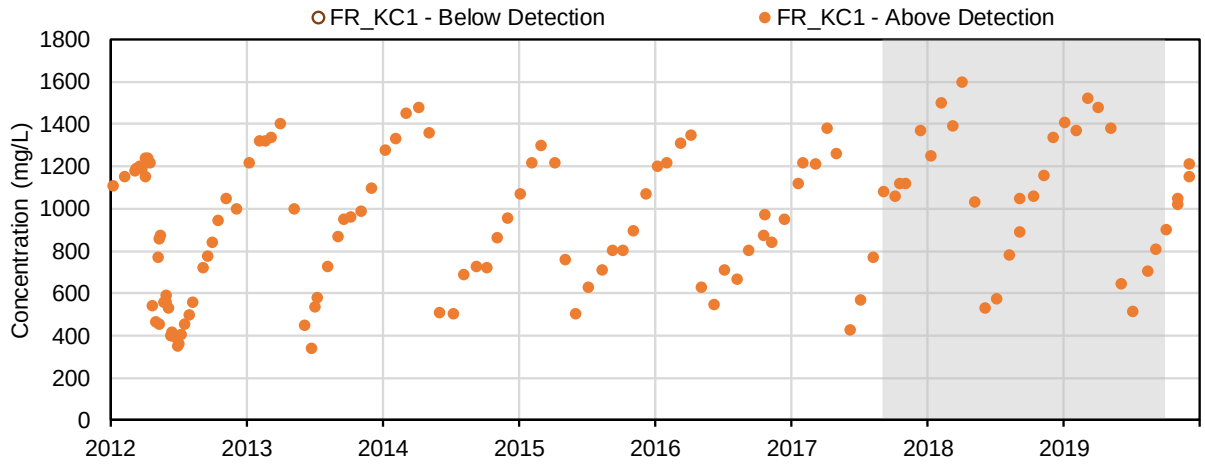
(8) Conductivity (µS/cm); Conventional Parameters



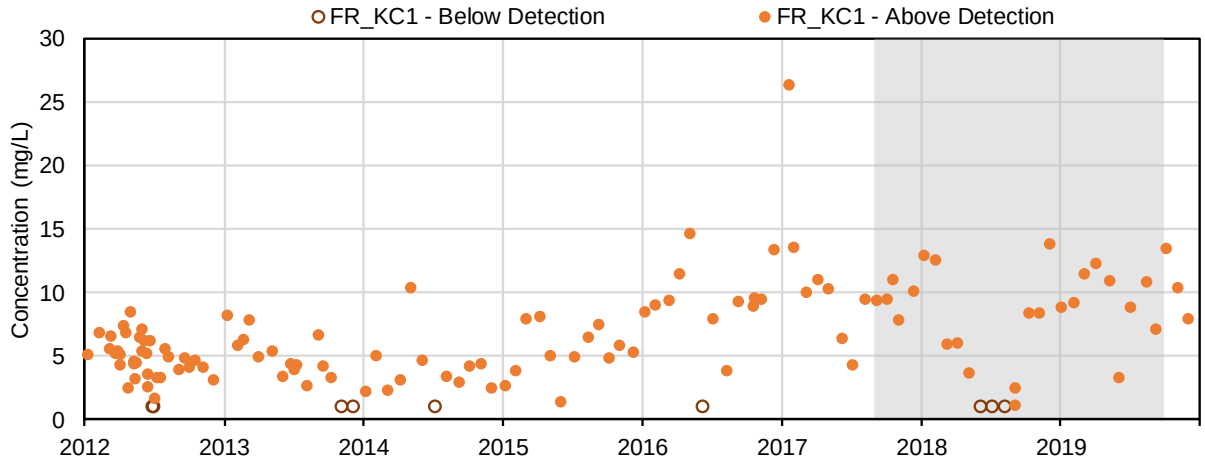
(9) Oxidation-Reduction Potential (mV); Conventional Parameters



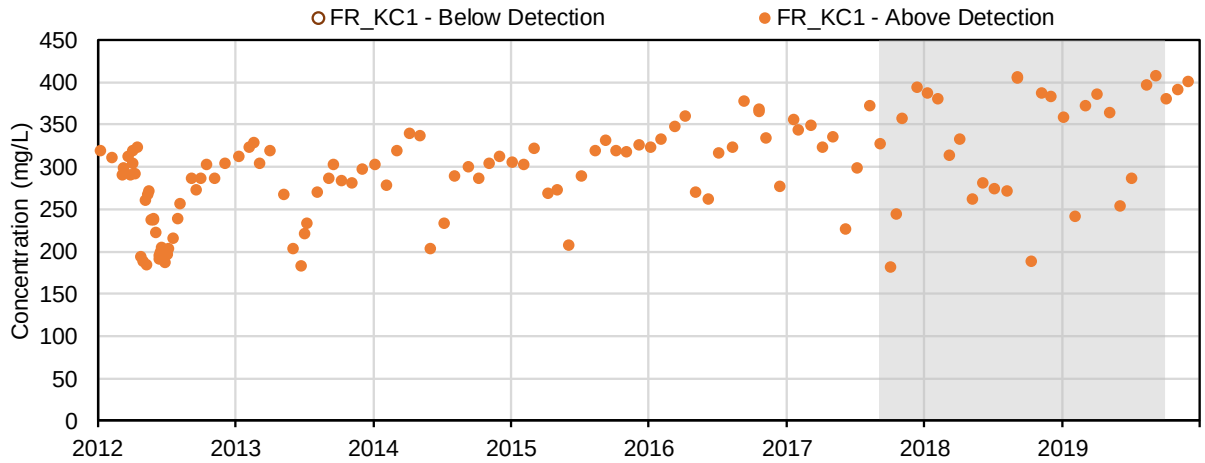
(10) Hardness, as CaCO3 (mg/L); Conventional Parameters



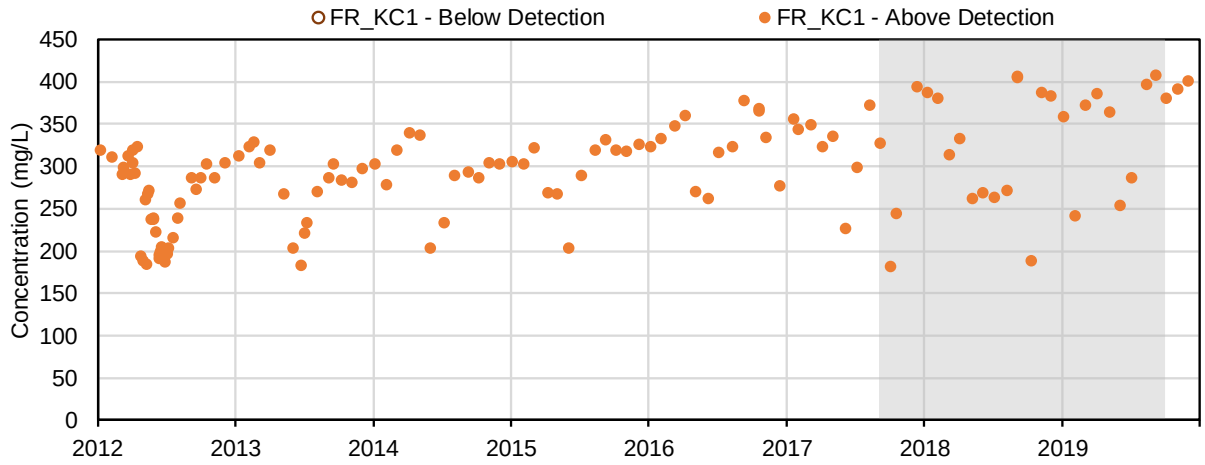
(11) Acidity, CaCO3 (mg/L); Conventional Parameters



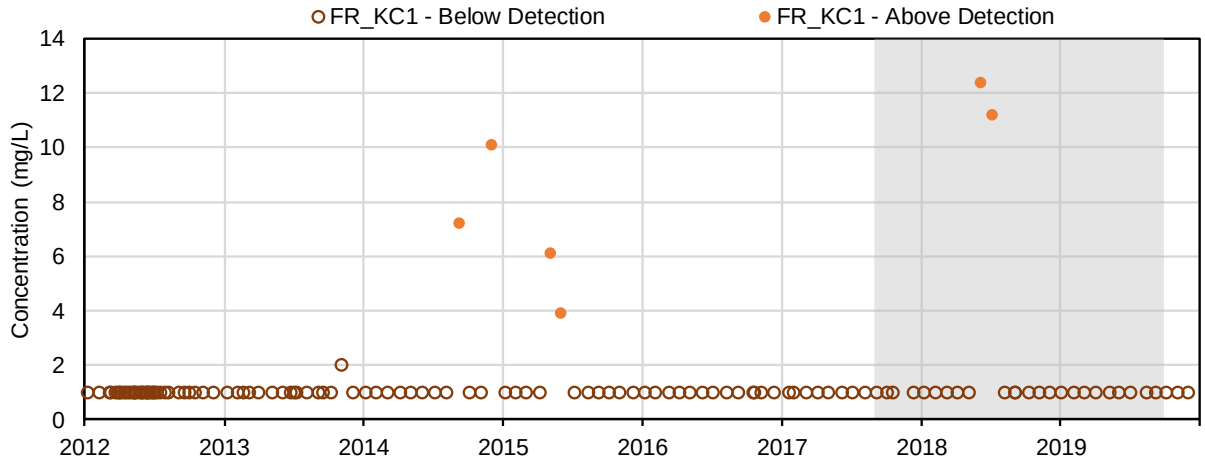
(12) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



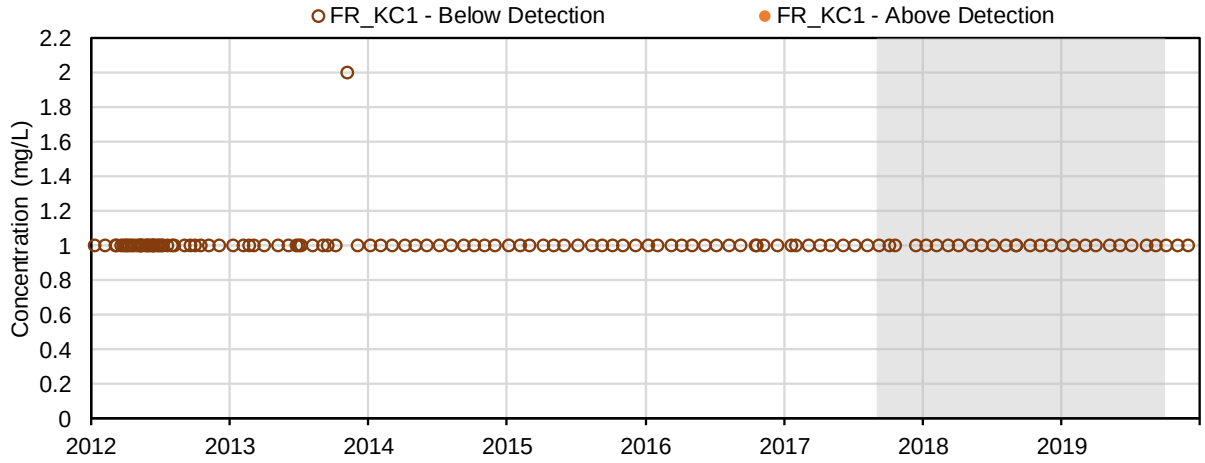
(13) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



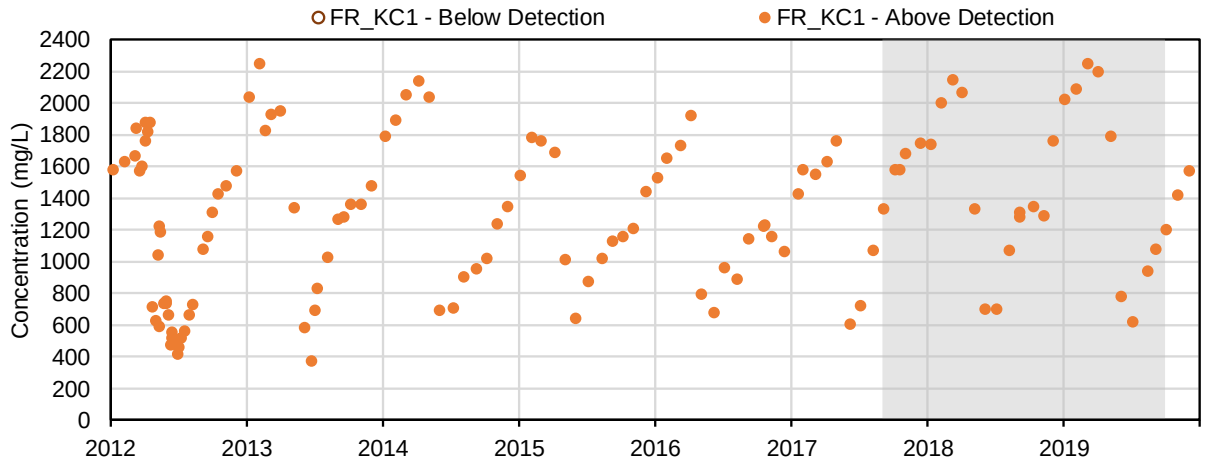
(14) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



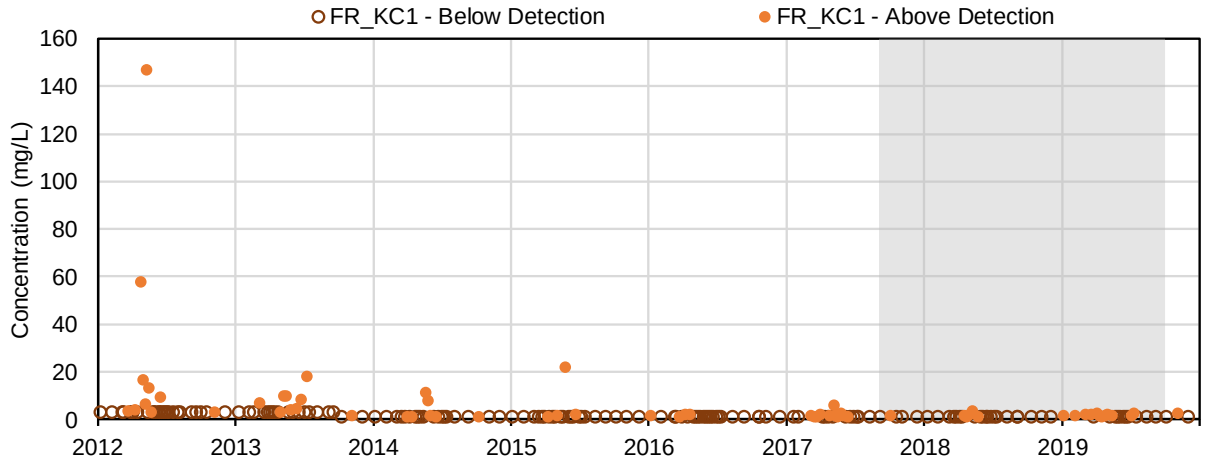
(15) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



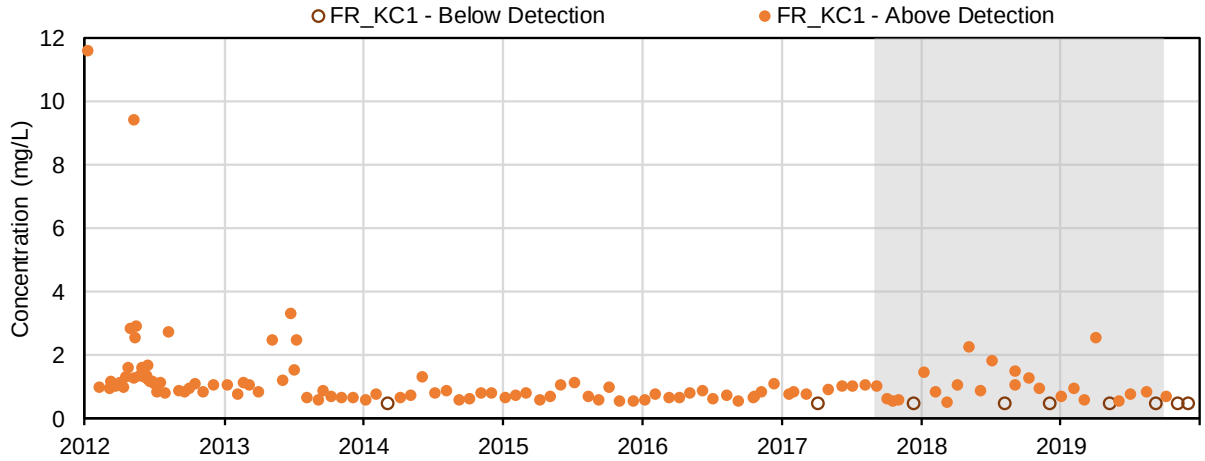
(16) Total dissolved solids (mg/L); Conventional Parameters



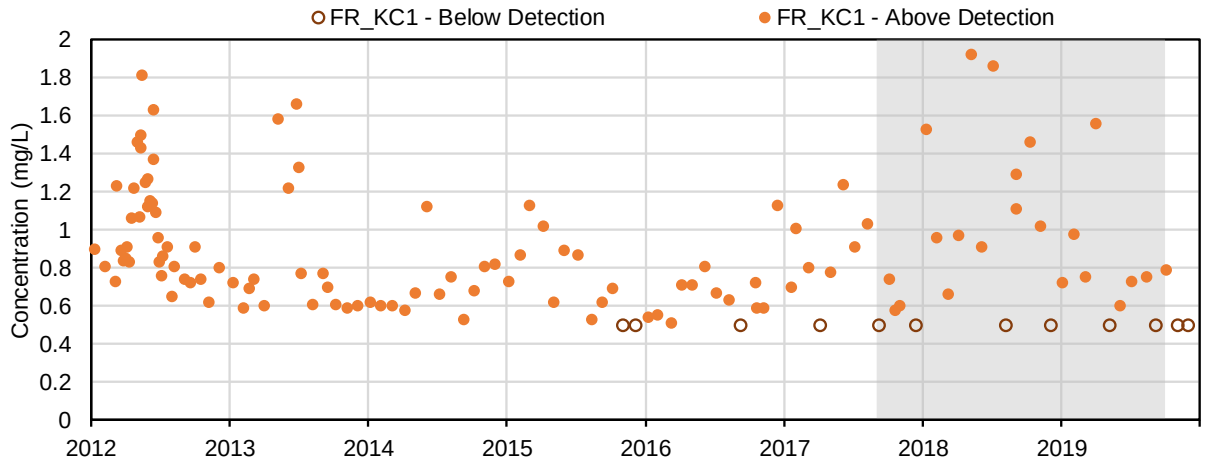
(17) Total suspended solids (mg/L); Conventional Parameters



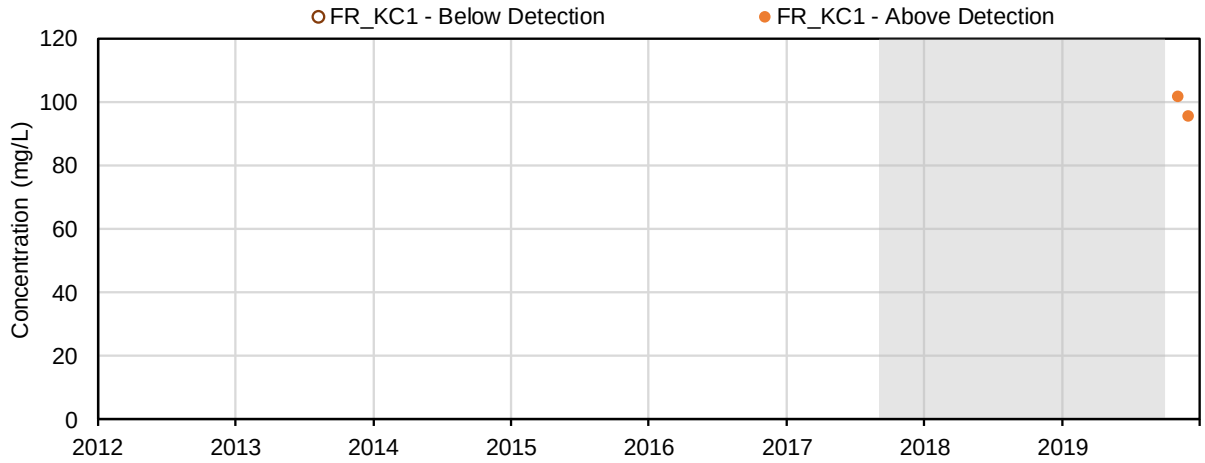
(18) Total organic carbon (mg/L); Conventional Parameters



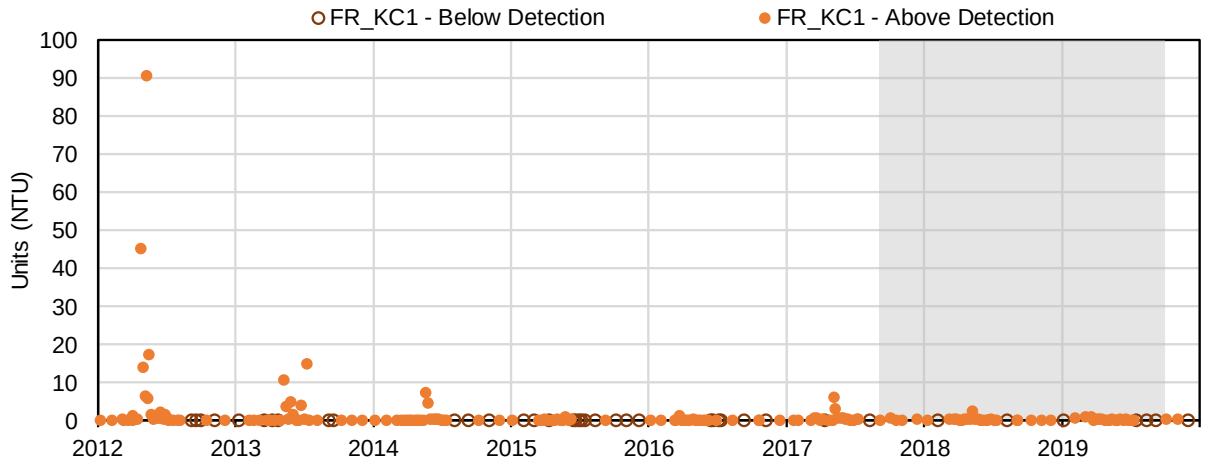
(19) Dissolved organic carbon (mg/L); Conventional Parameters



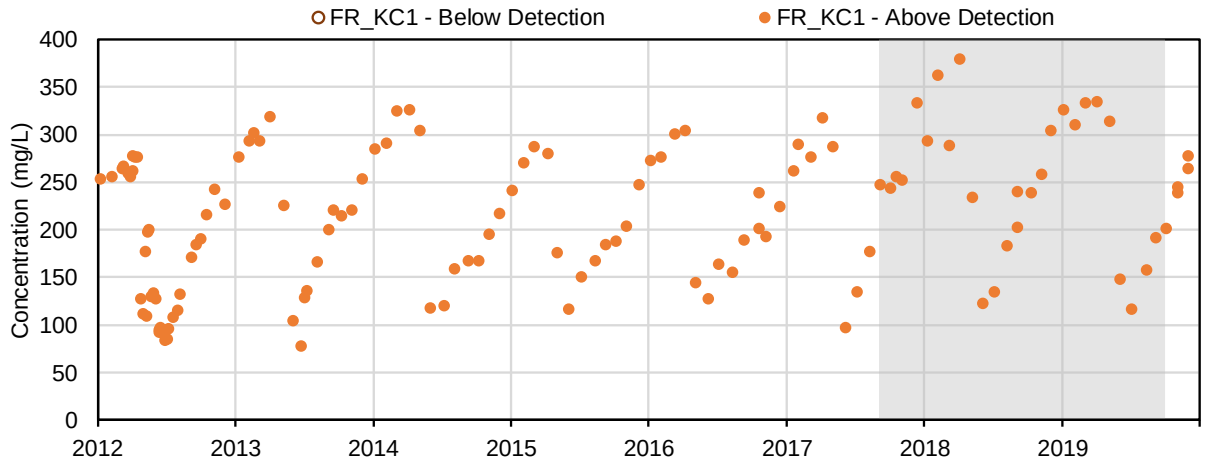
(20) Total Inorganic Carbon (mg/L); Conventional Parameters



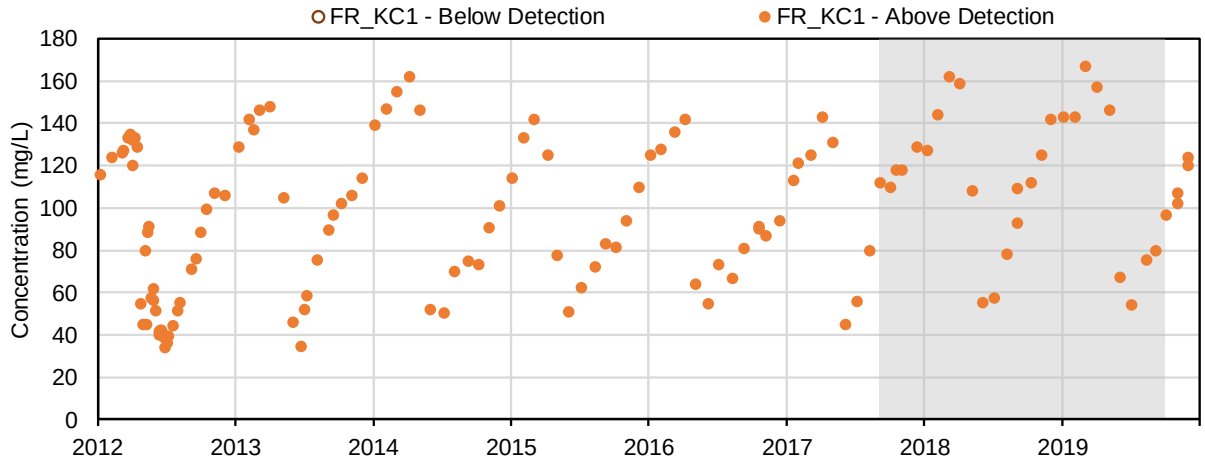
(21) Turbidity (NTU); Conventional Parameters



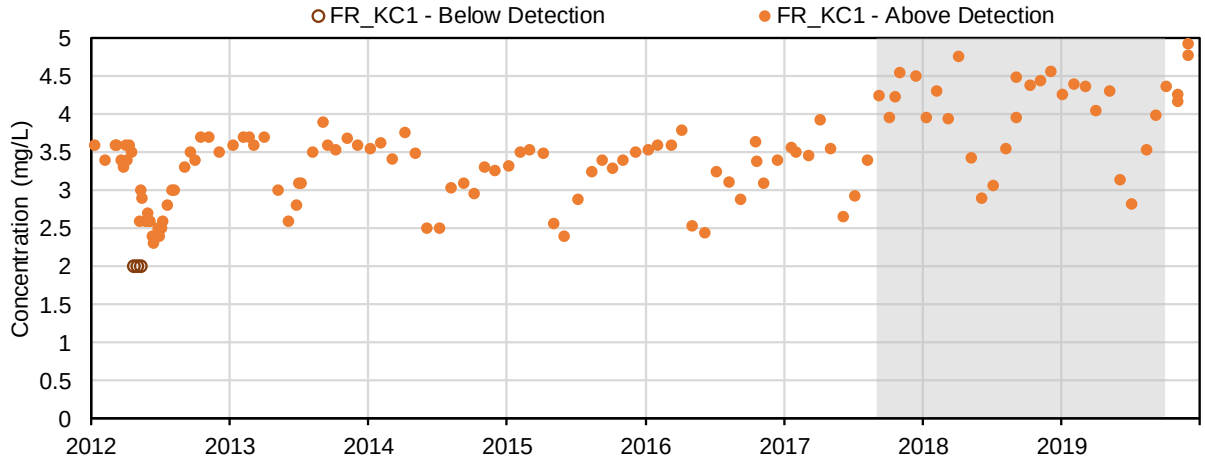
(22) Calcium (mg/L); Major Ions



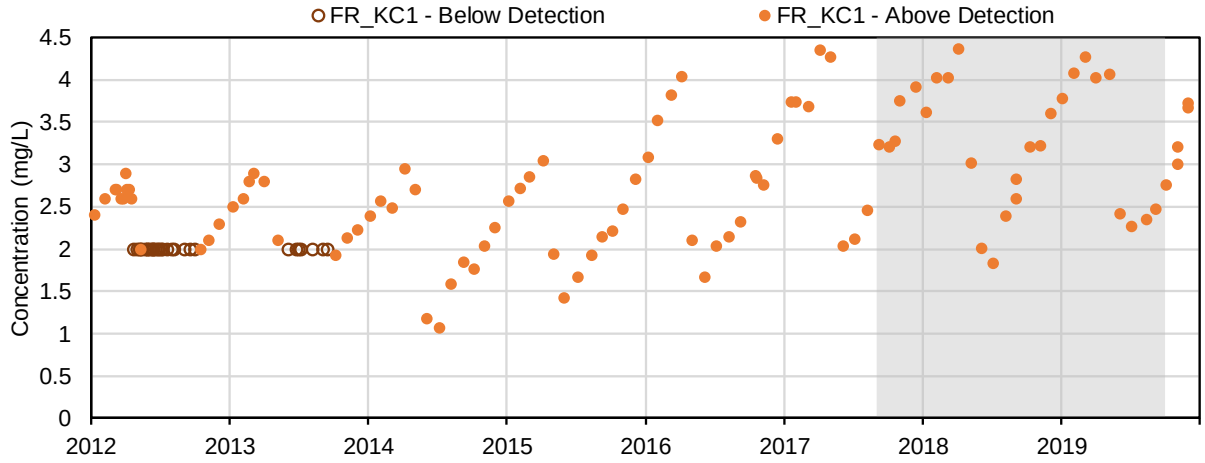
(23) Magnesium (mg/L); Major Ions



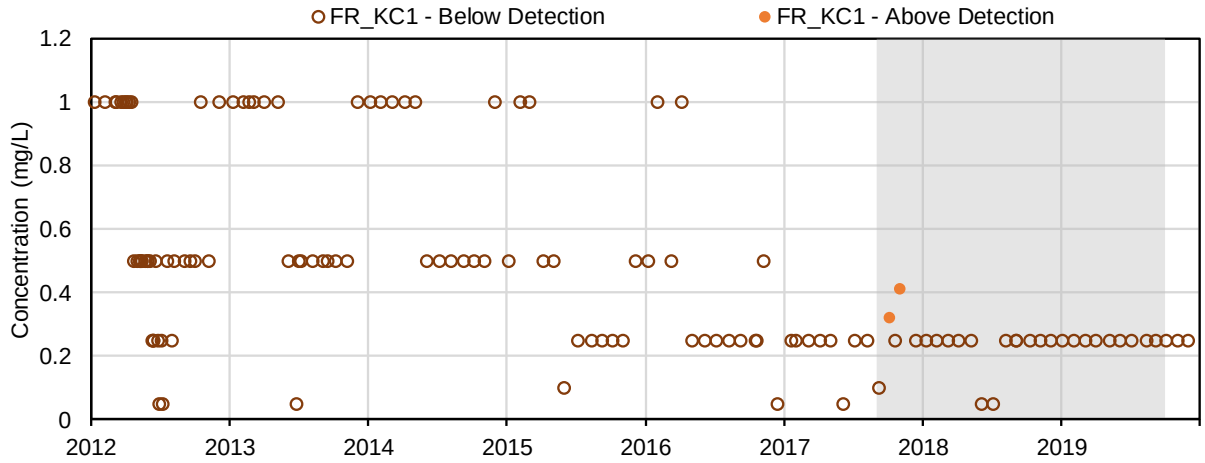
(24) Potassium (mg/L); Major Ions



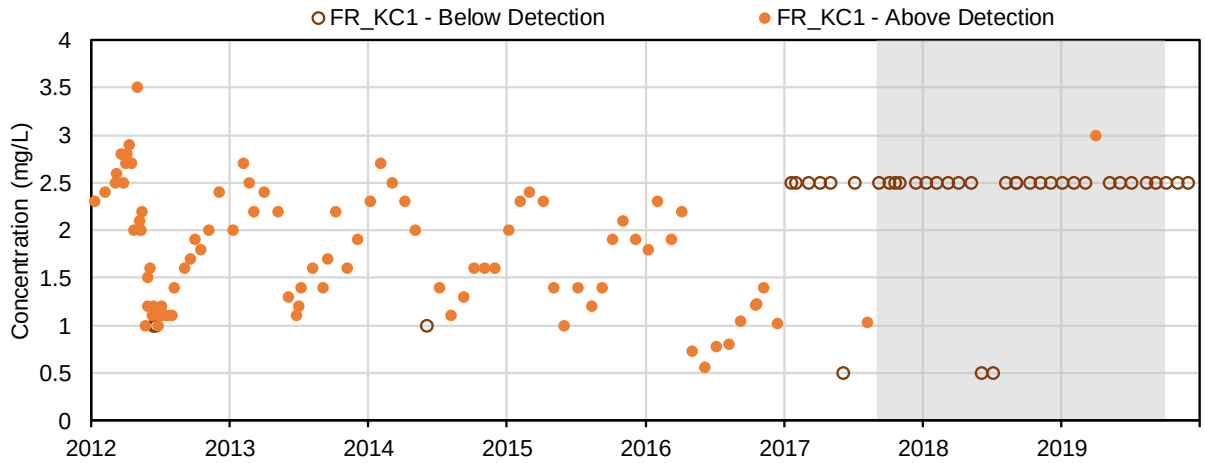
(25) Sodium (mg/L); Major Ions



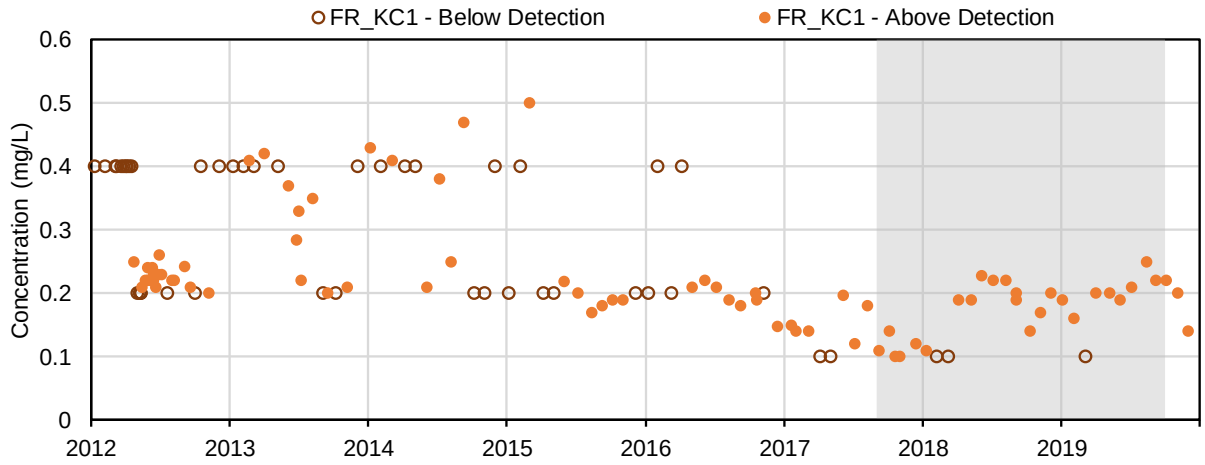
(26) Bromide (mg/L); Major Ions



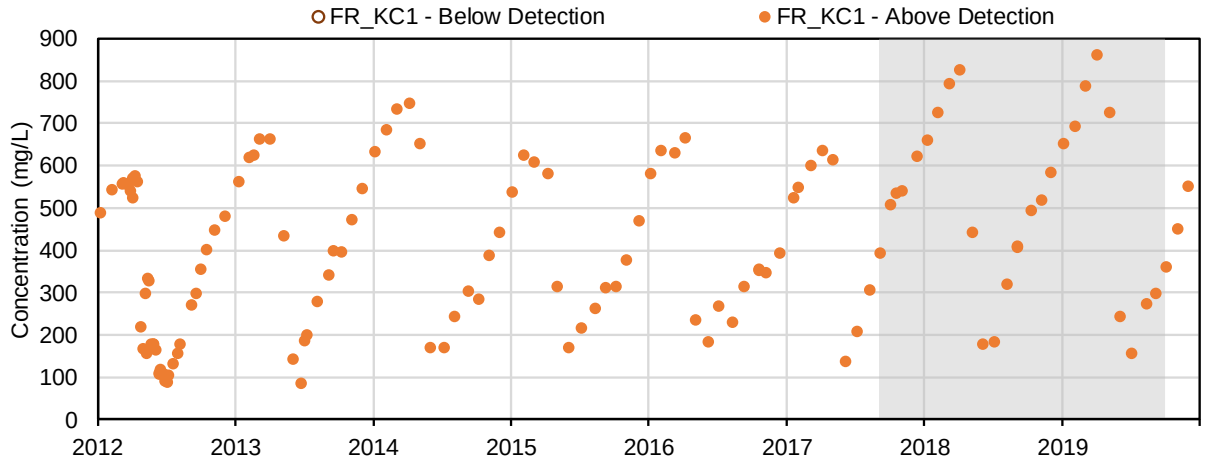
(27) Chloride (mg/L); Major Ions



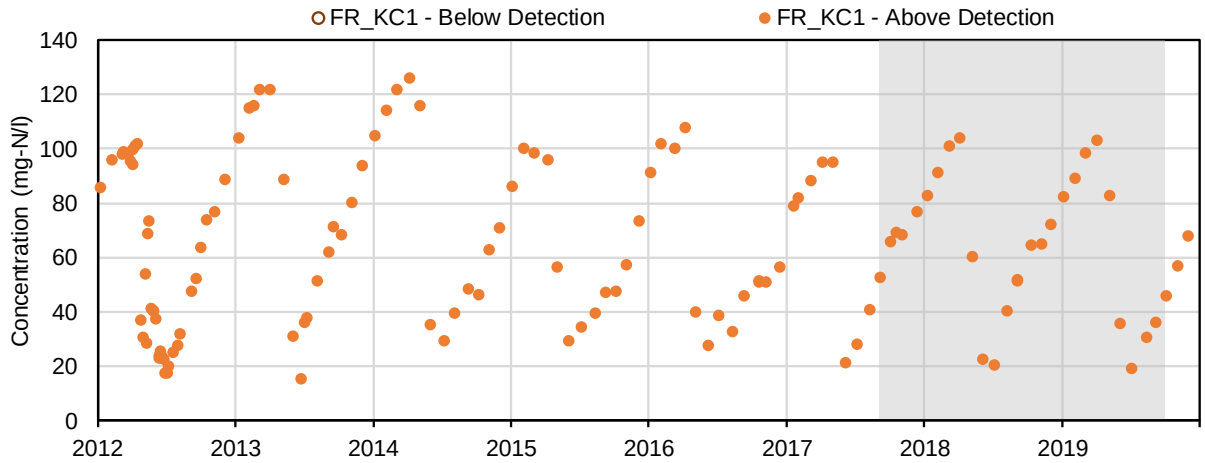
(28) Fluoride (mg/L); Major Ions



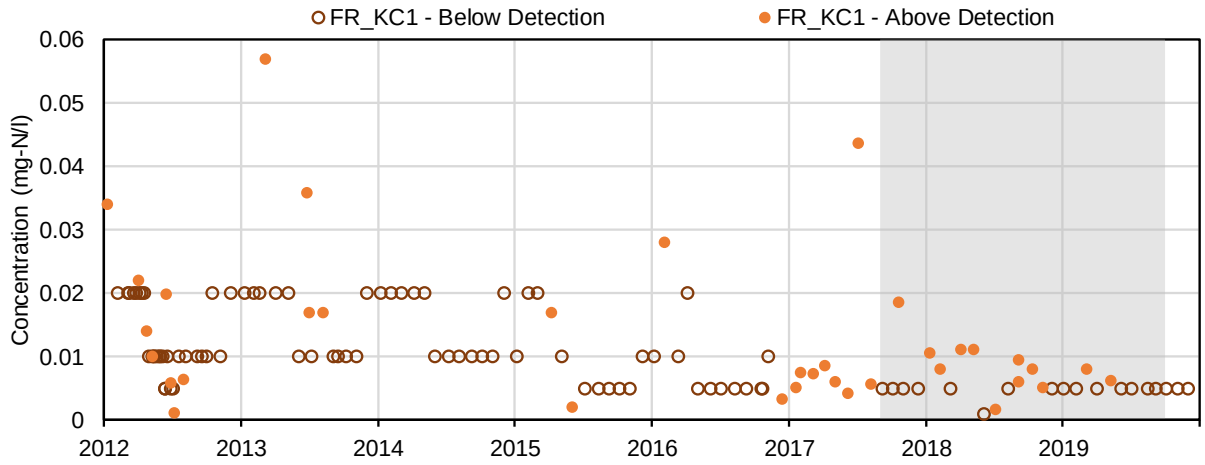
(29) Sulphate (mg/L); Major Ions



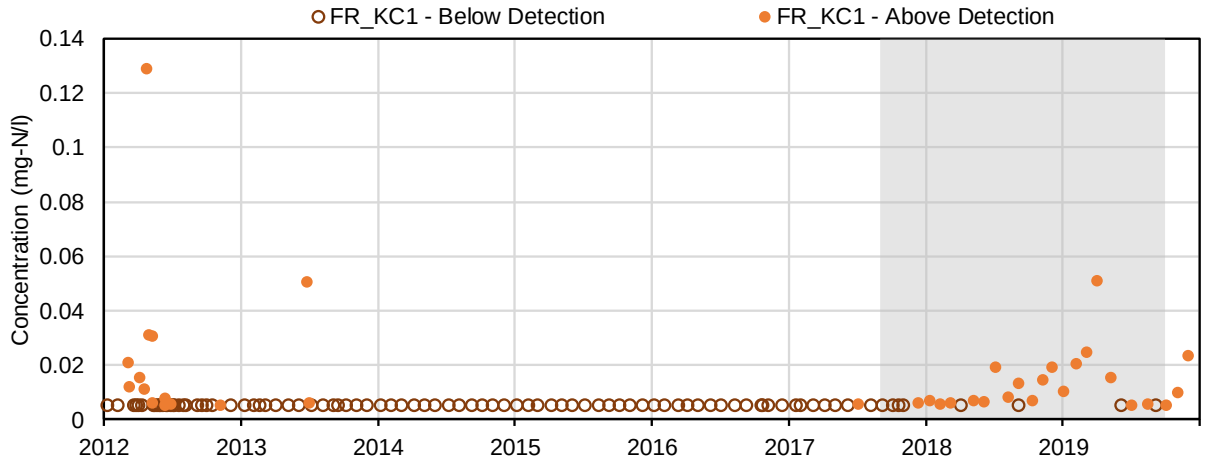
(30) Nitrate (mg-N/l); Nutrients and Biological Indicators



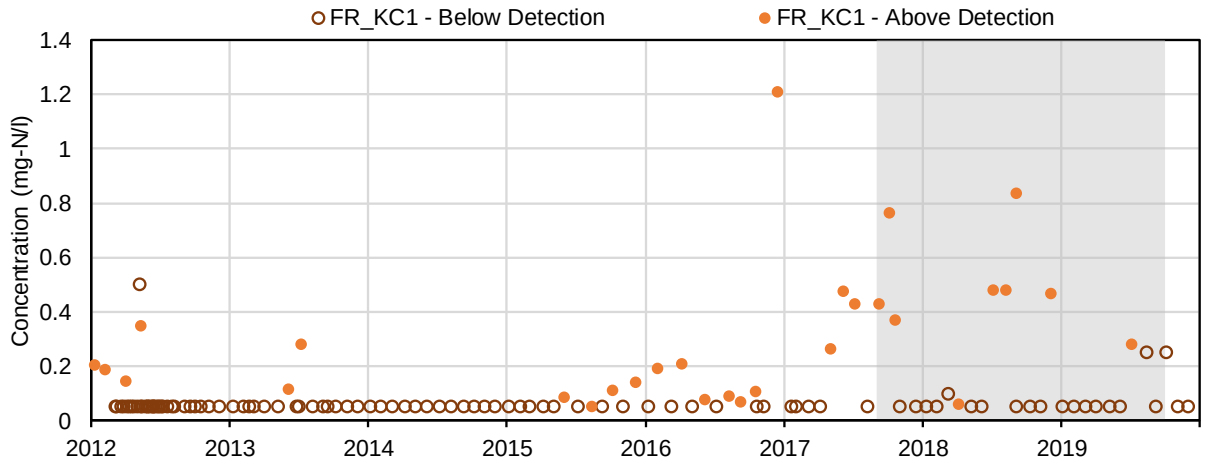
(31) Nitrite (mg-N/l); Nutrients and Biological Indicators



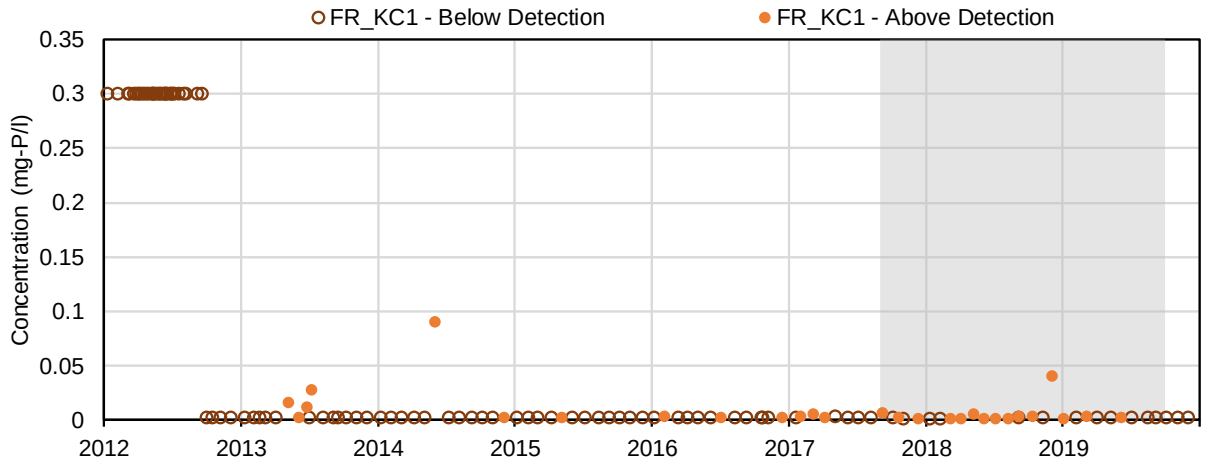
(32) Total ammonia (mg-N/l); Nutrients and Biological Indicators



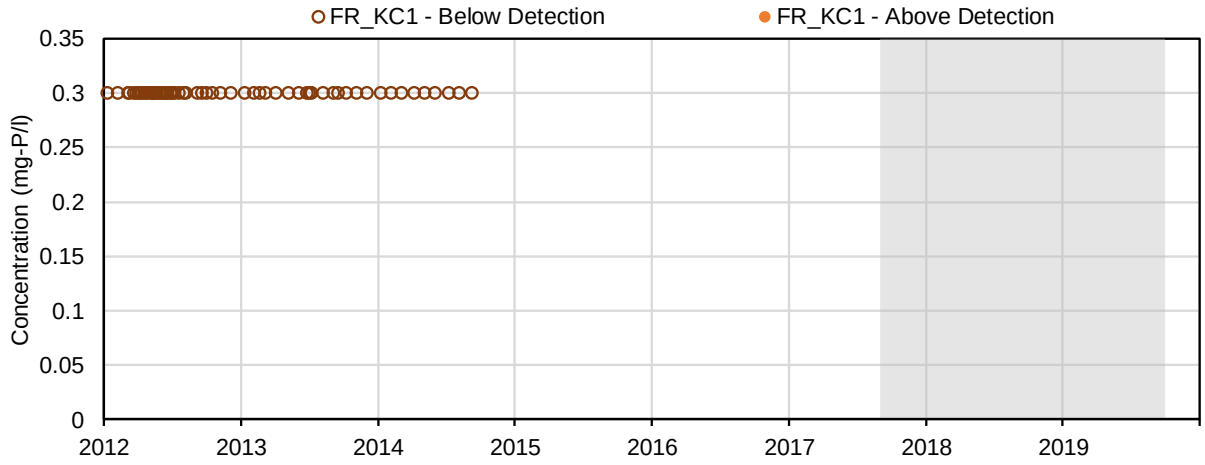
(33) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



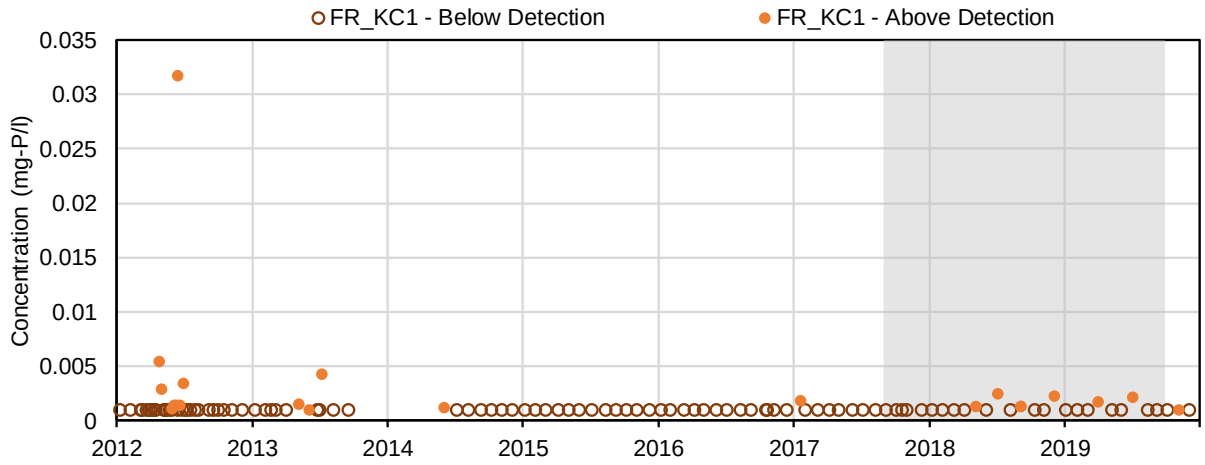
(34) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



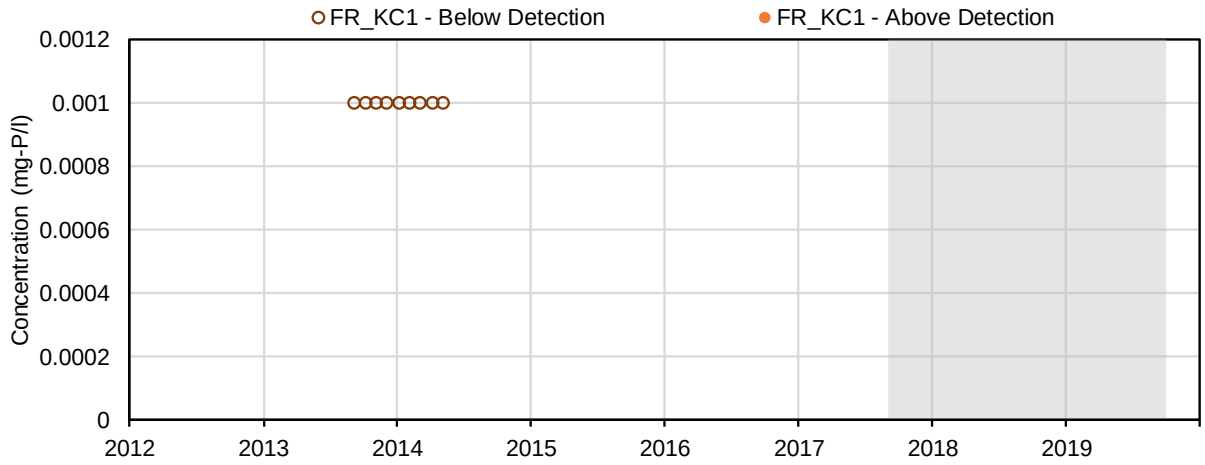
(35) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



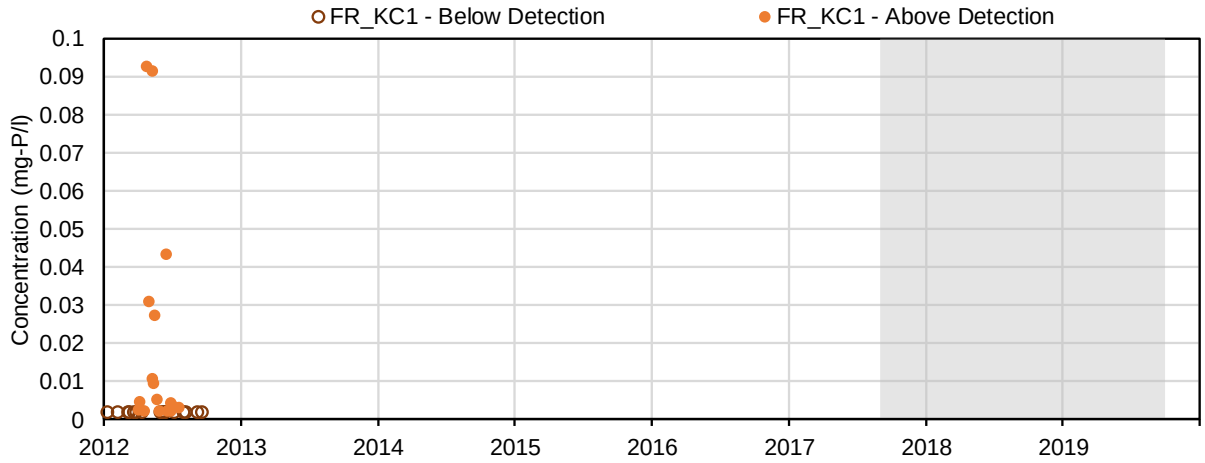
(36) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



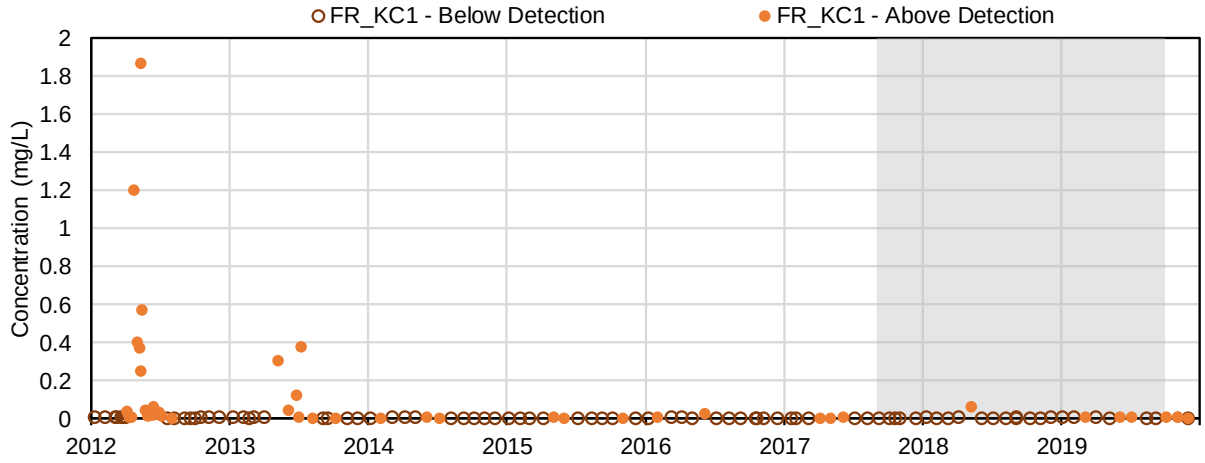
(37) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



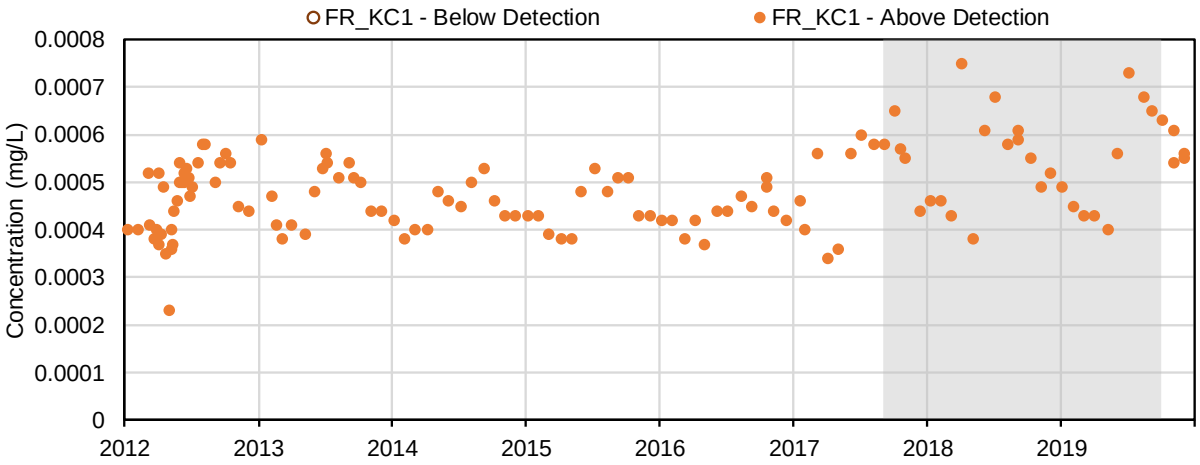
(38) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



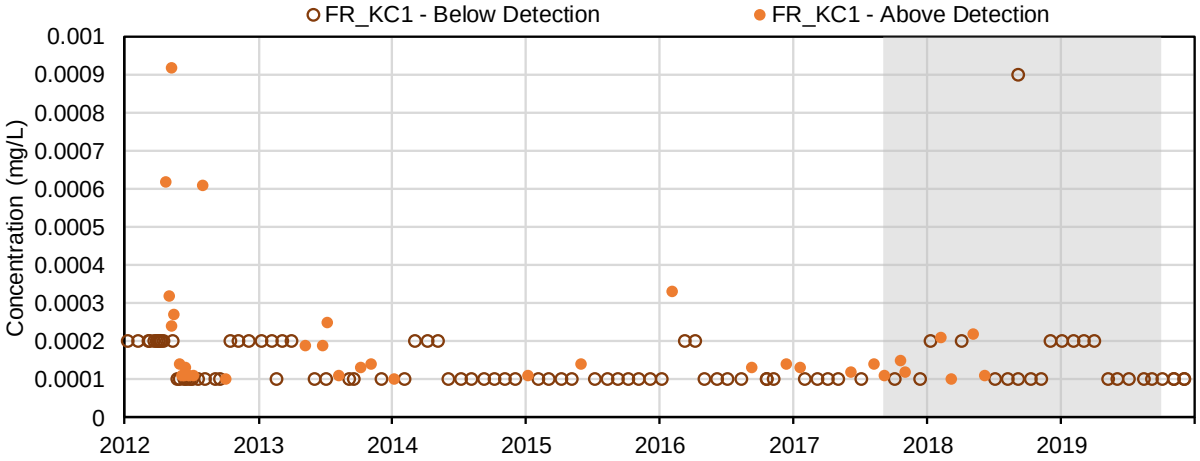
(39) Aluminum (mg/L); Total Metals



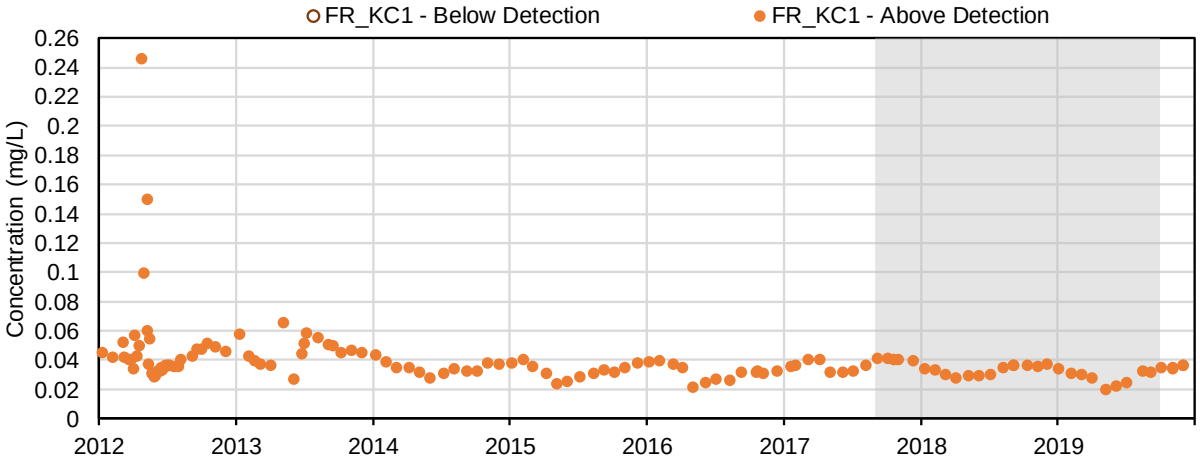
(40) Antimony (mg/L); Total Metals



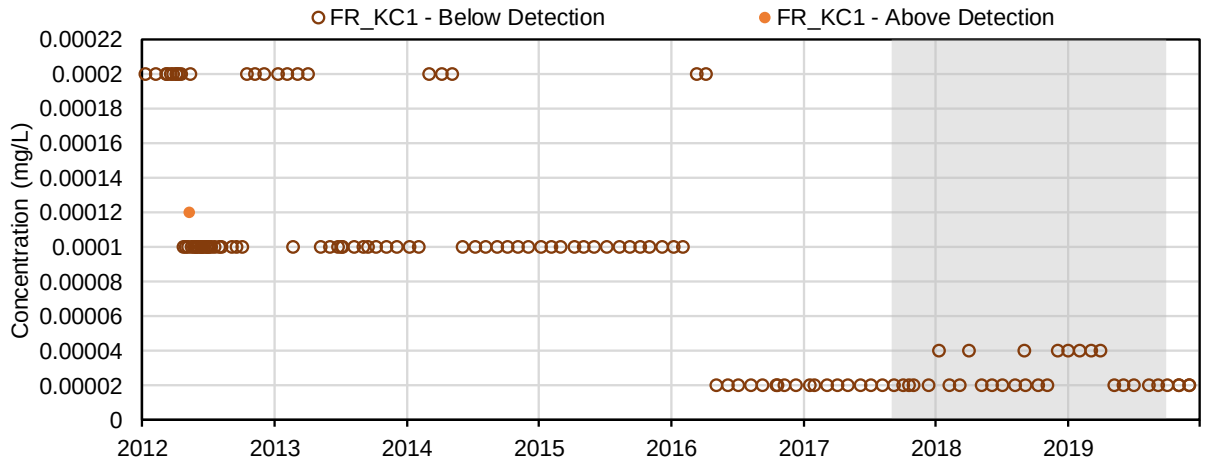
(41) Arsenic (mg/L); Total Metals



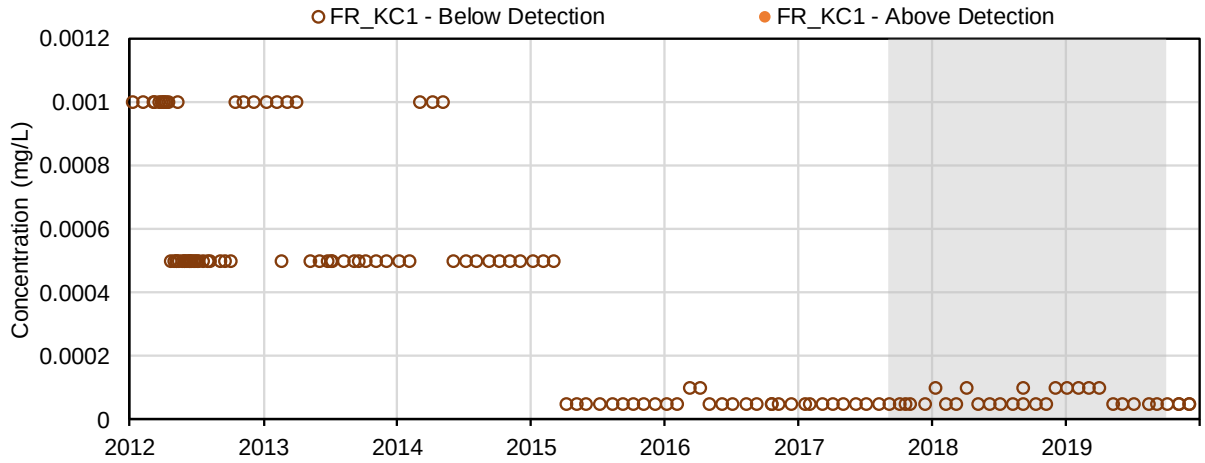
(42) Barium (mg/L); Total Metals



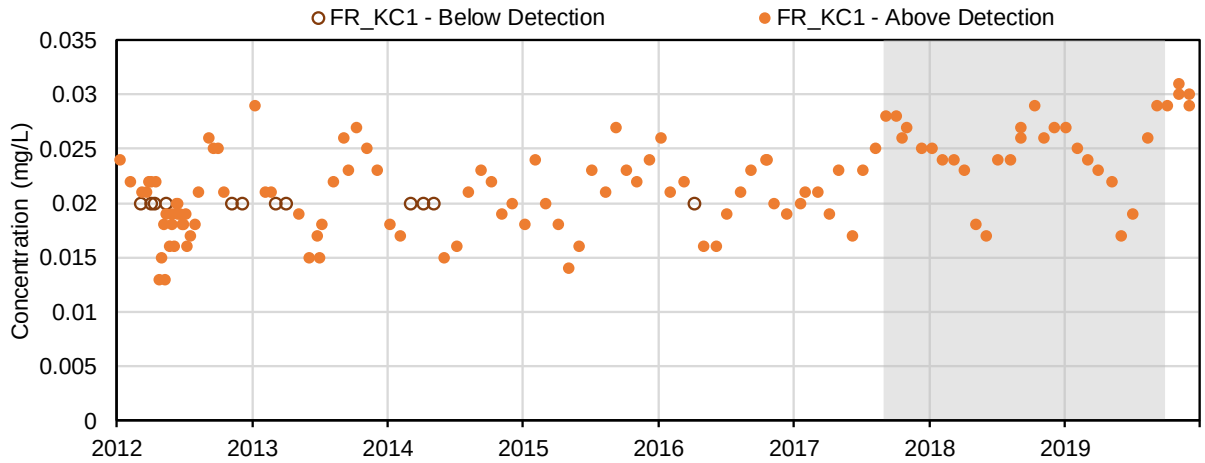
(43) Beryllium (mg/L); Total Metals



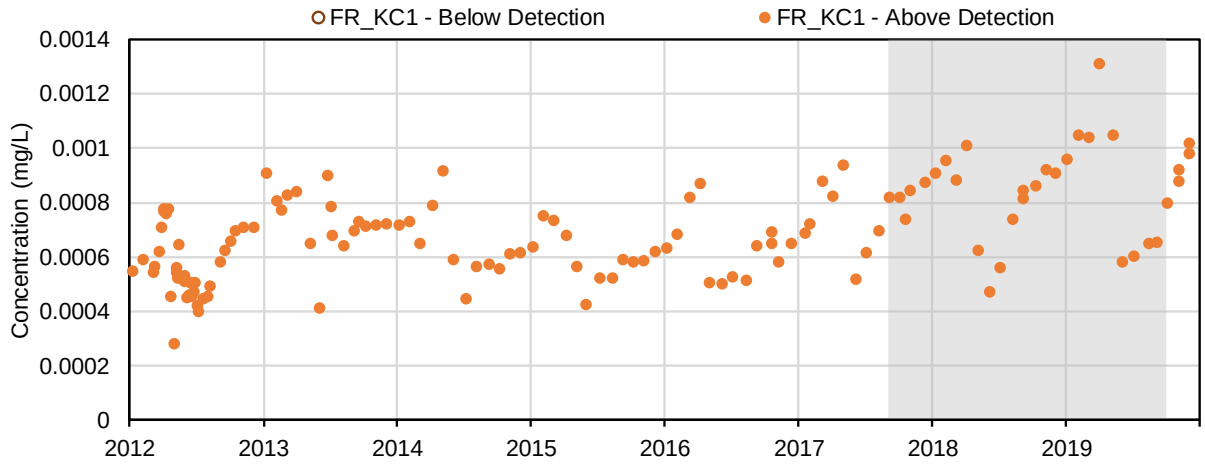
(44) Bismuth (mg/L); Total Metals



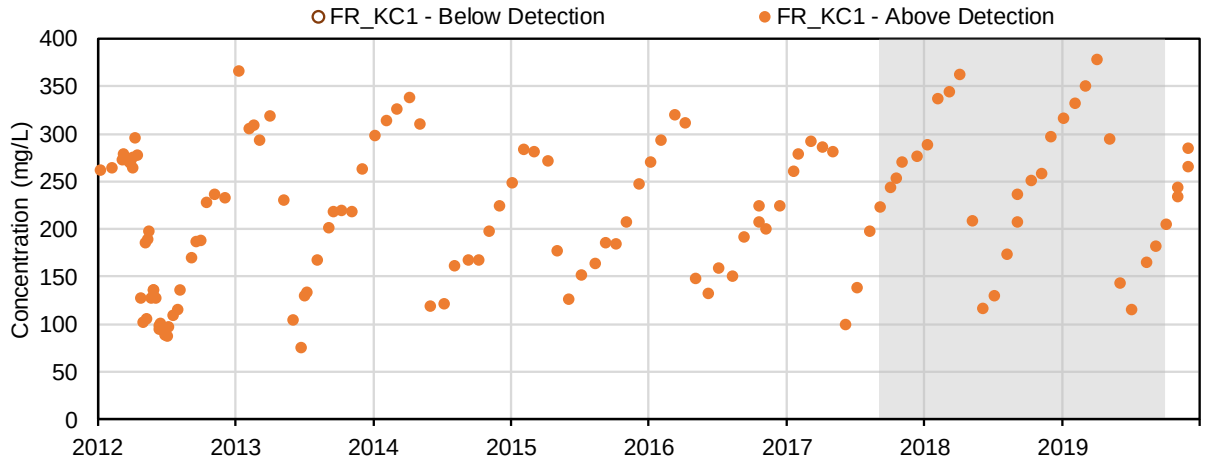
(45) Boron (mg/L); Total Metals



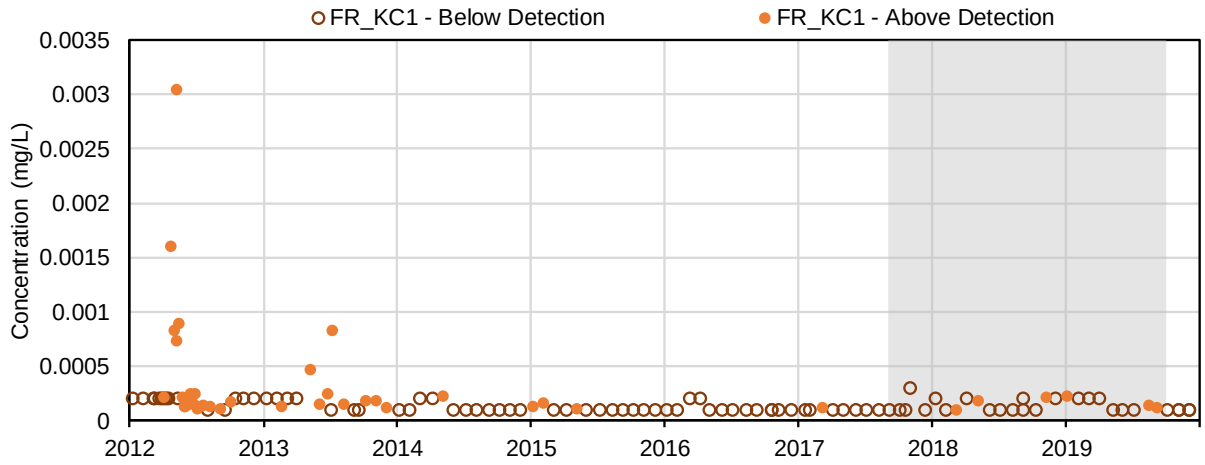
(46) Cadmium (mg/L); Total Metals



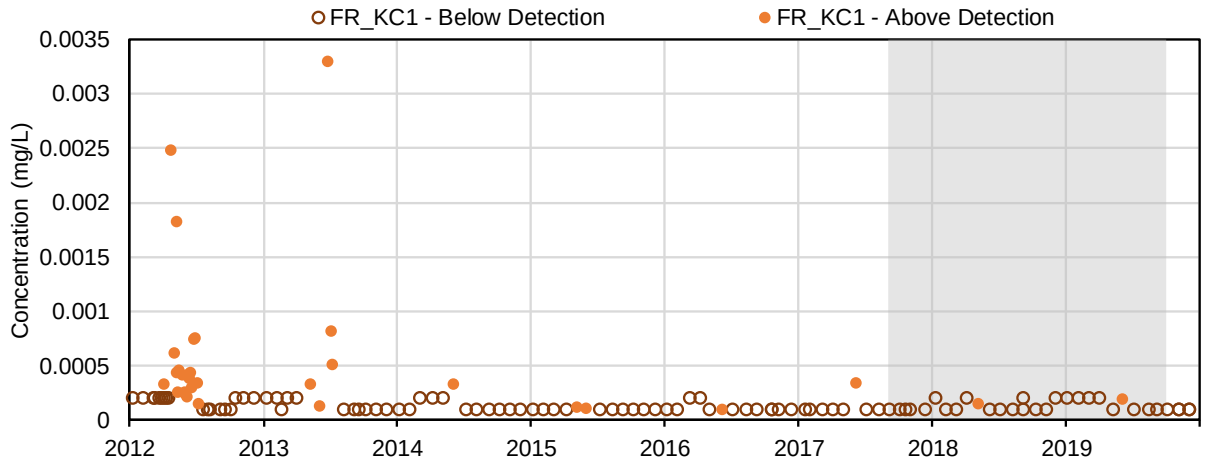
(47) Calcium (mg/L); Total Metals



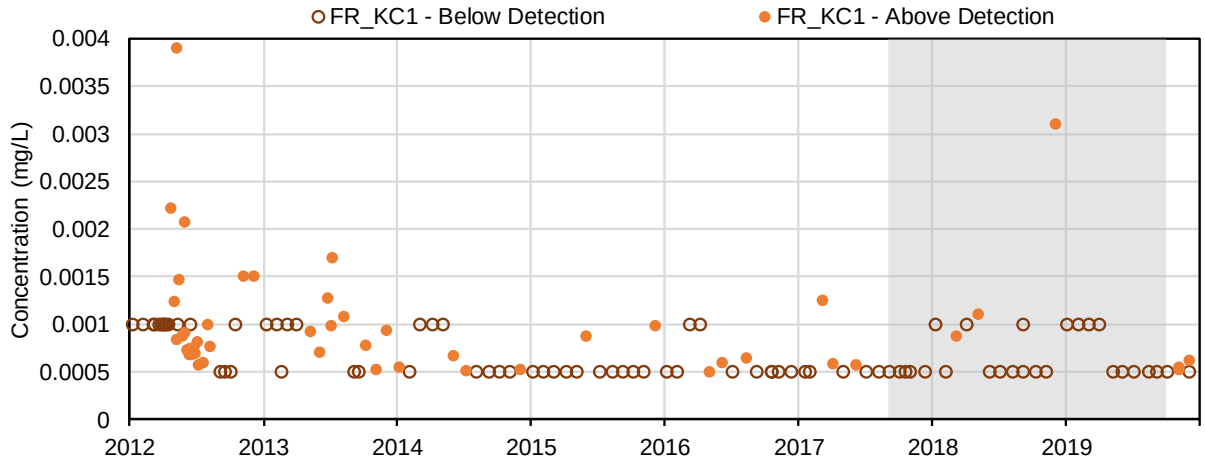
(48) Chromium (mg/L); Total Metals



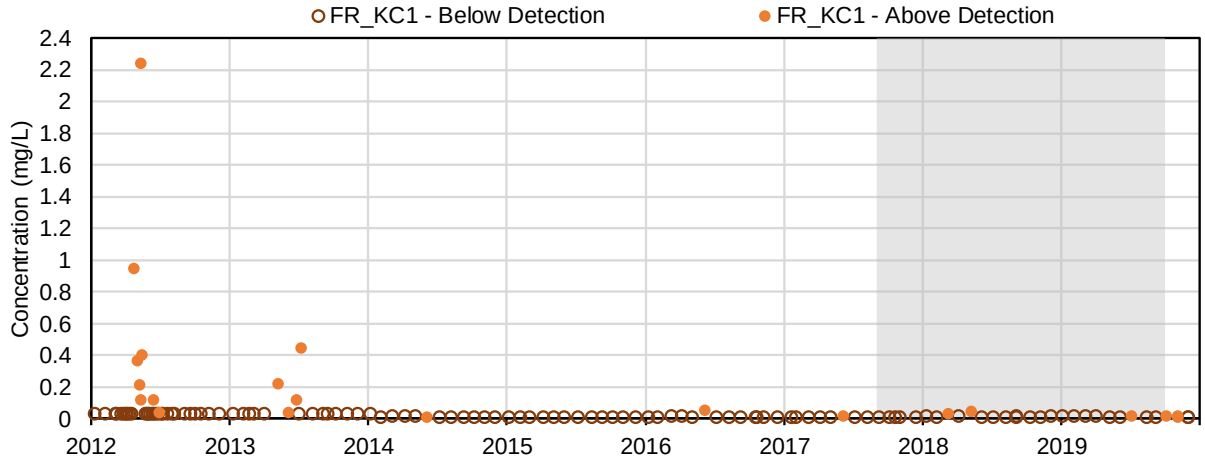
(49) Cobalt (mg/L); Total Metals



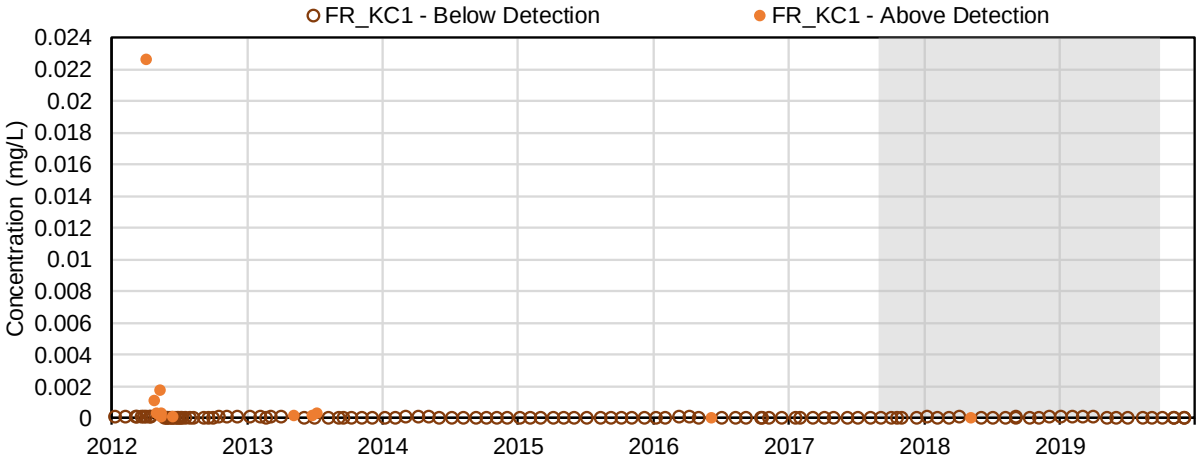
(50) Copper (mg/L); Total Metals



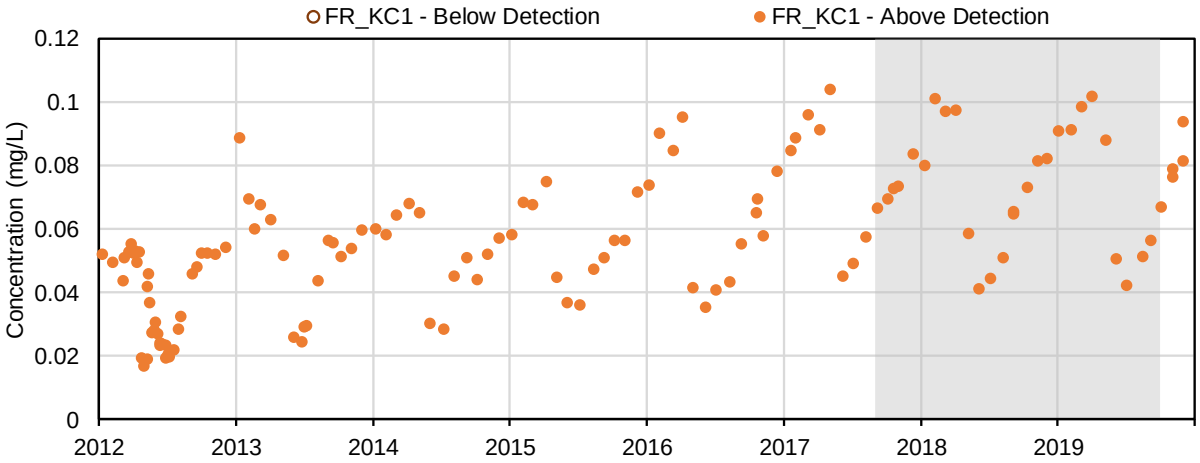
(51) Iron (mg/L); Total Metals



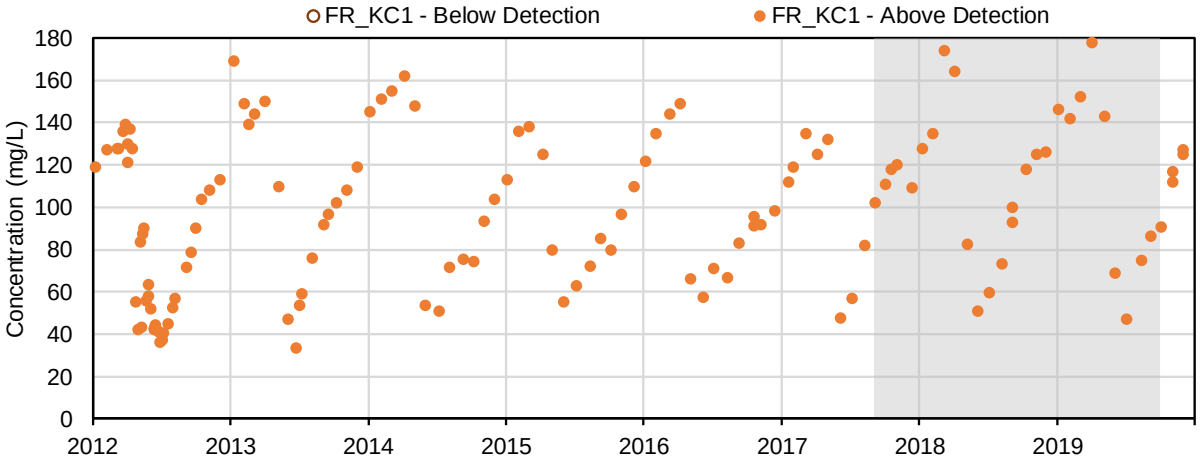
(52) Lead (mg/L); Total Metals



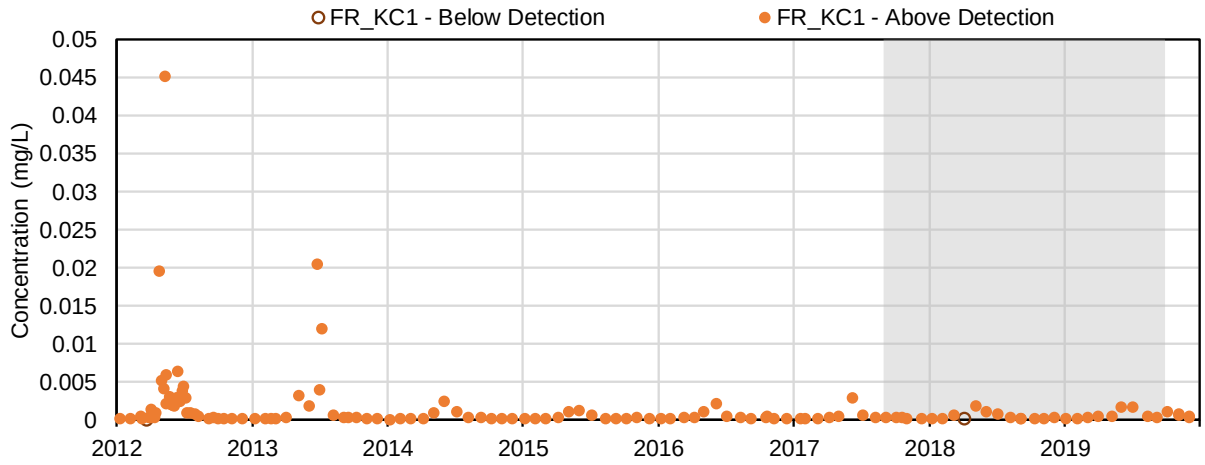
(53) Lithium (mg/L); Total Metals



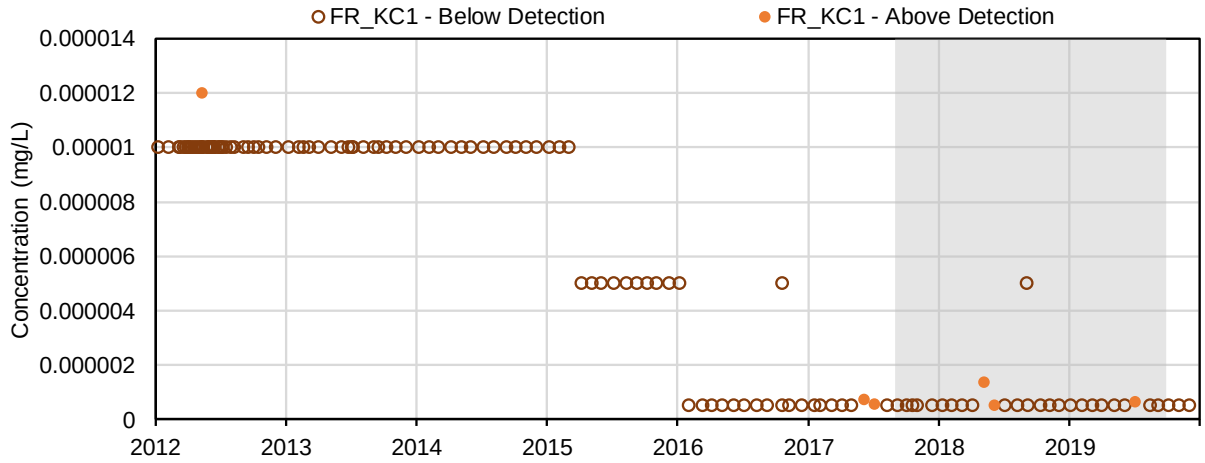
(54) Magnesium (mg/L); Total Metals



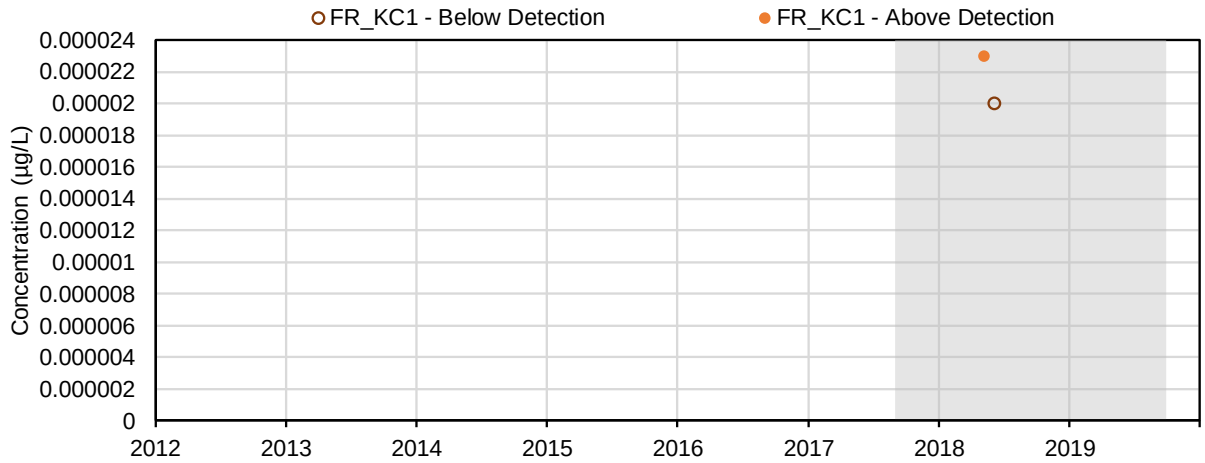
(55) Manganese (mg/L); Total Metals



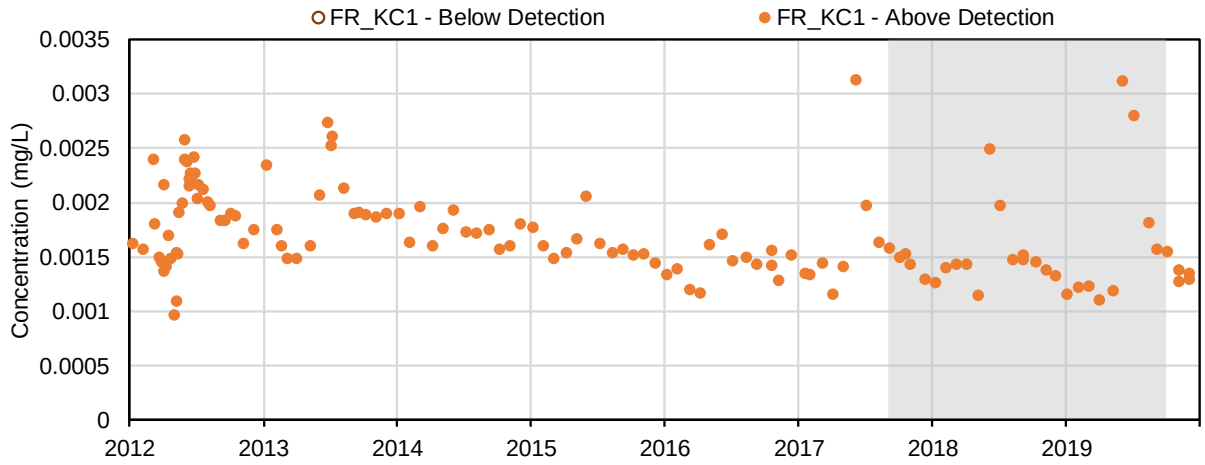
(56) Mercury (mg/L); Total Metals



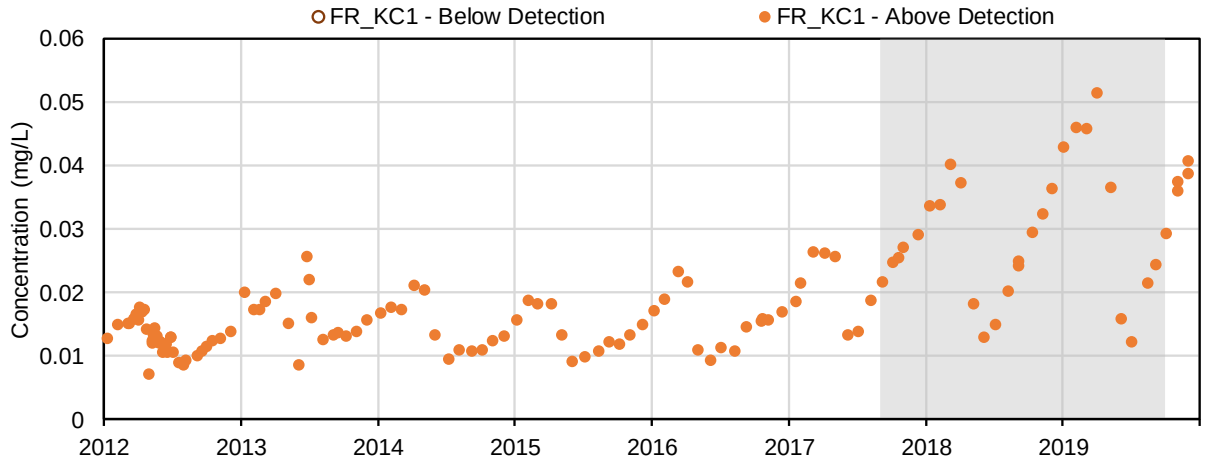
(57) Methyl mercury (µg/L); Total Metals



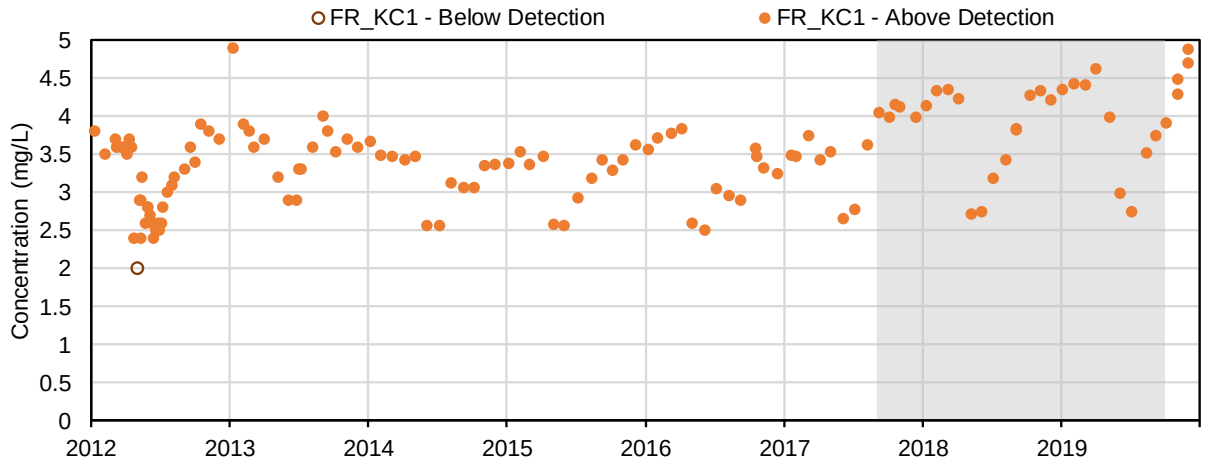
(58) Molybdenum (mg/L); Total Metals



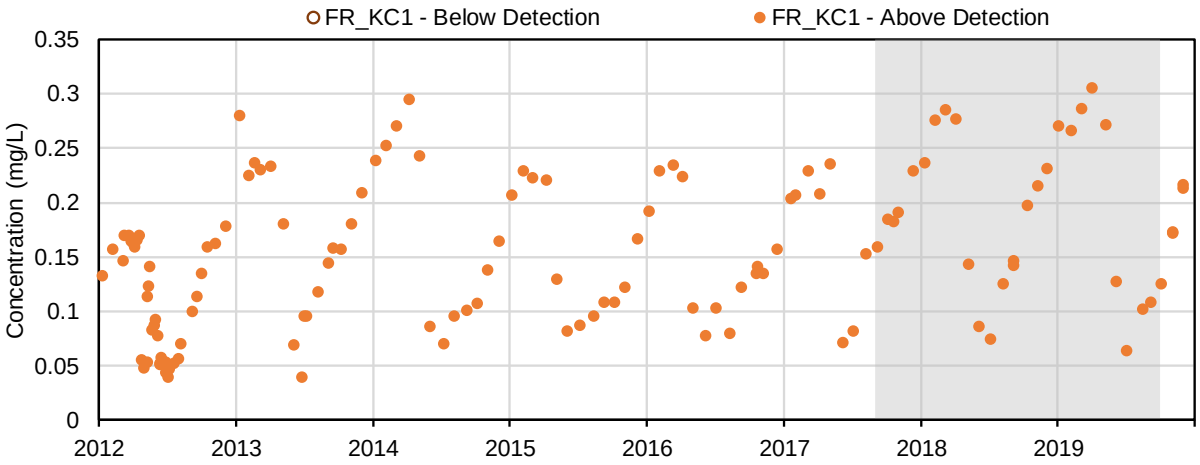
(59) Nickel (mg/L); Total Metals



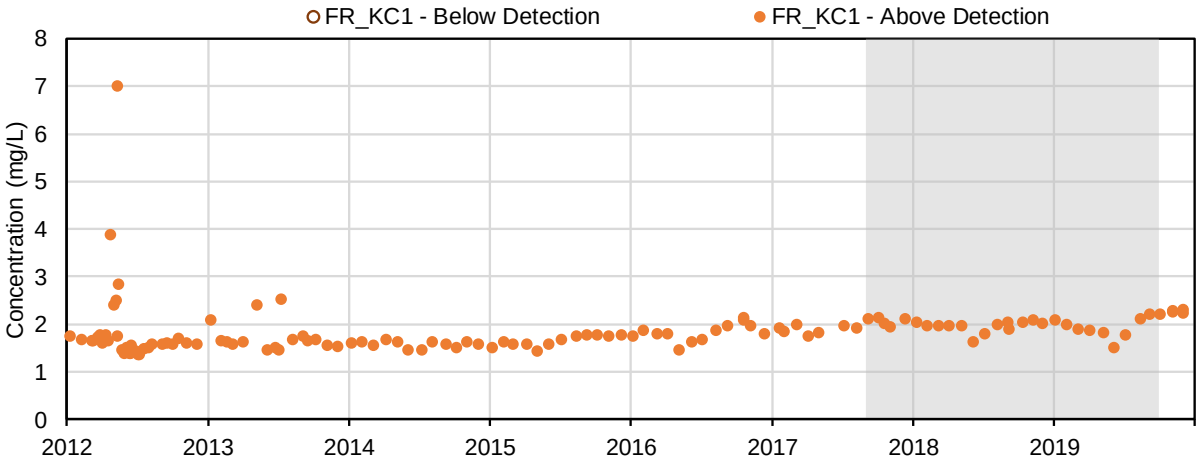
(60) Potassium (mg/L); Total Metals



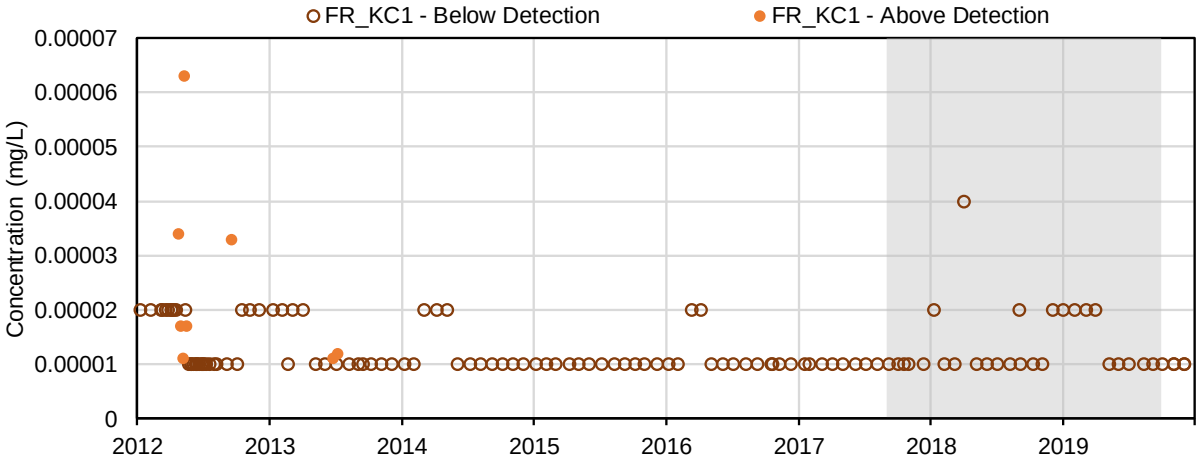
(61) Selenium (mg/L); Total Metals



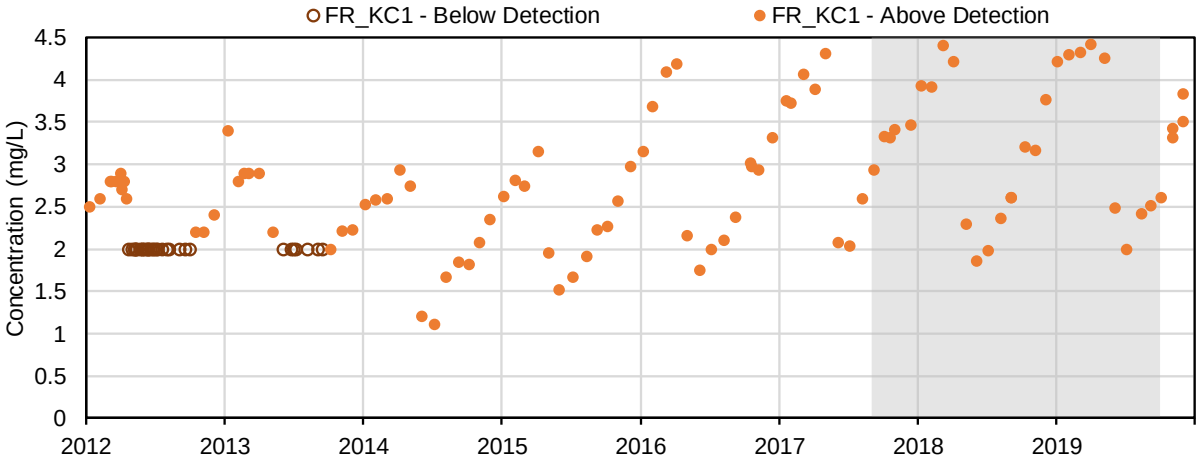
(62) Silicon (mg/L); Total Metals



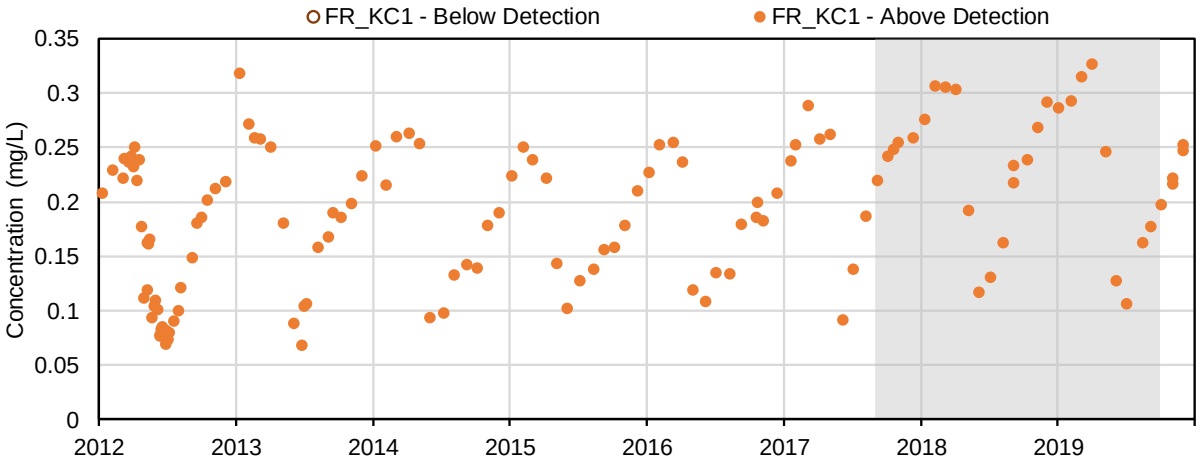
(63) Silver (mg/L); Total Metals



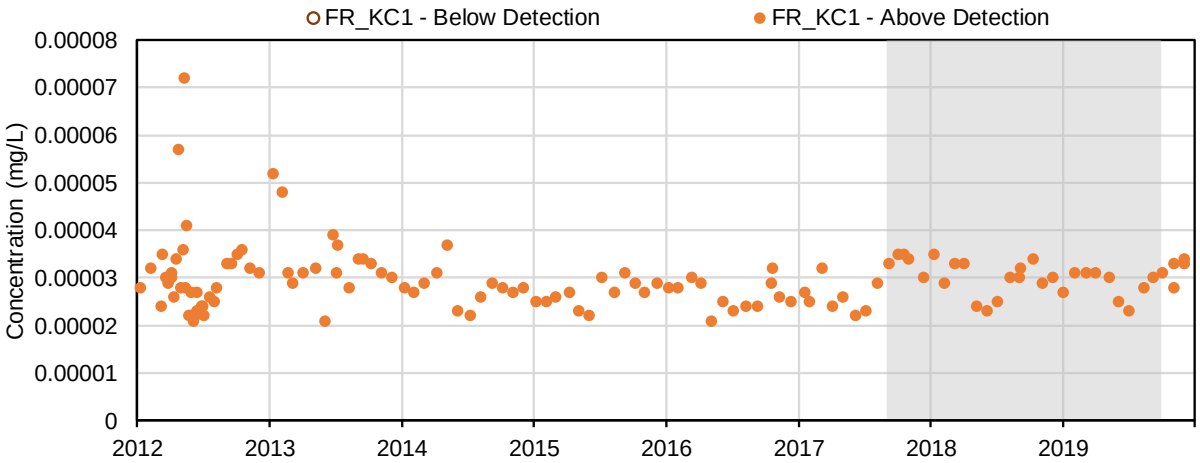
(64) Sodium (mg/L); Total Metals



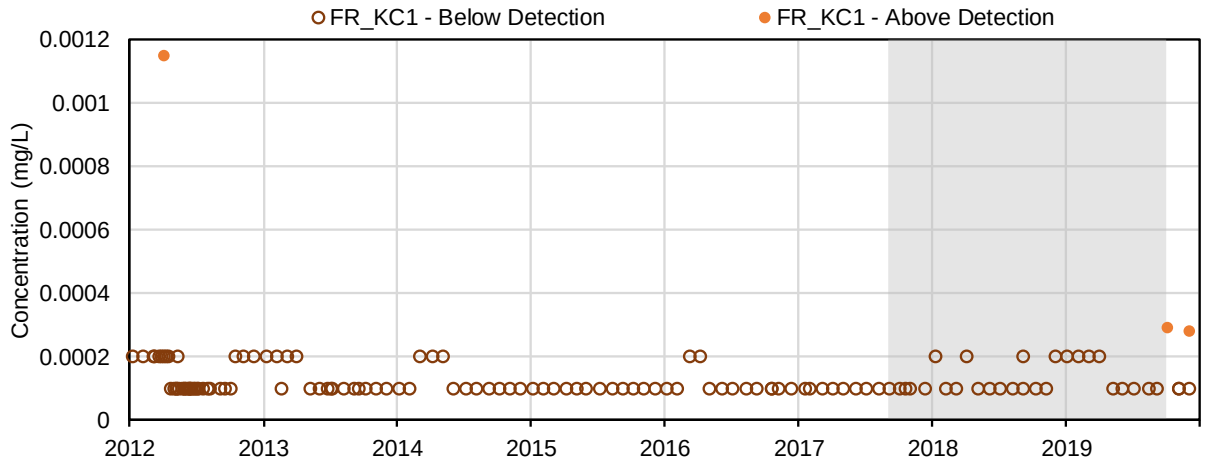
(65) Strontium (mg/L); Total Metals



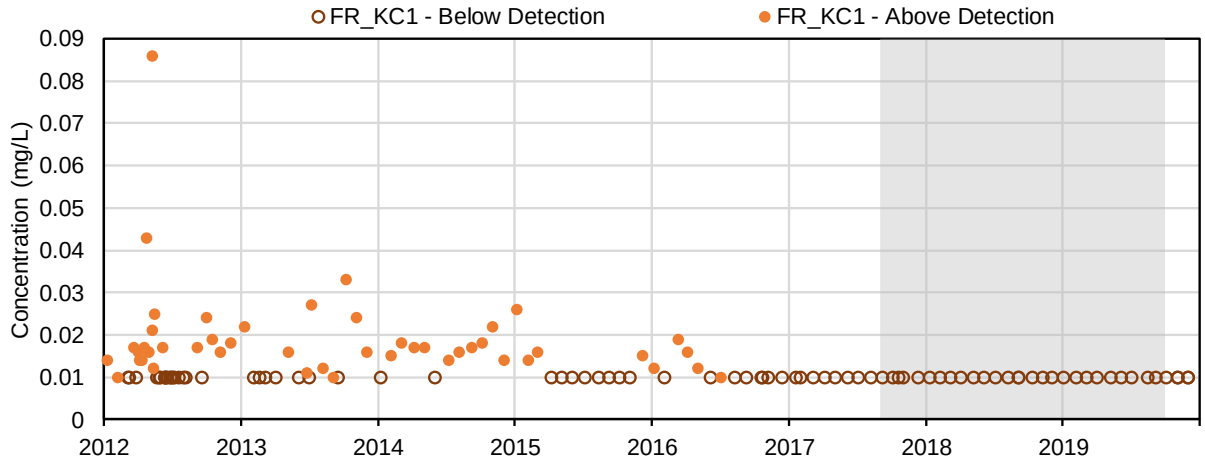
(66) Thallium (mg/L); Total Metals



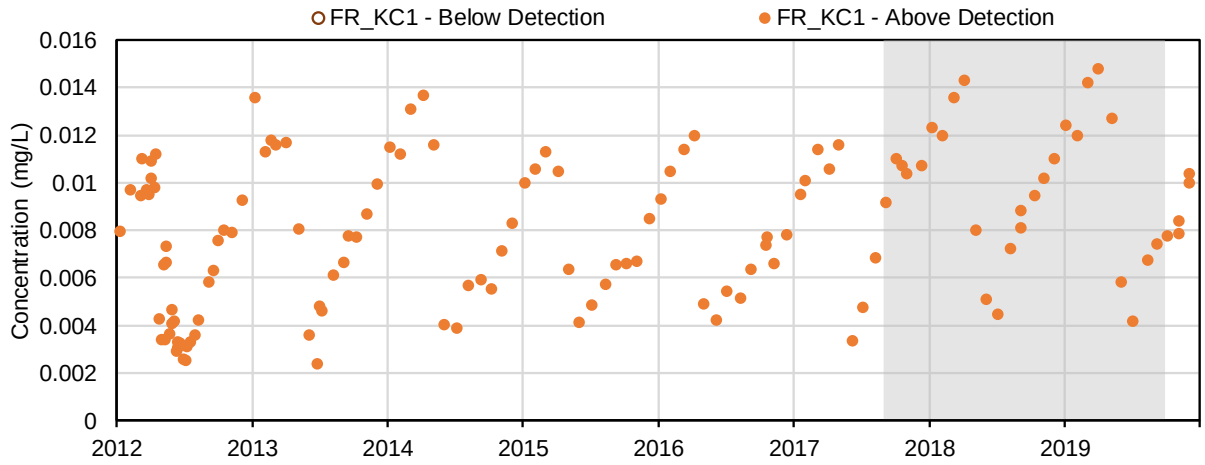
(67) Tin (mg/L); Total Metals



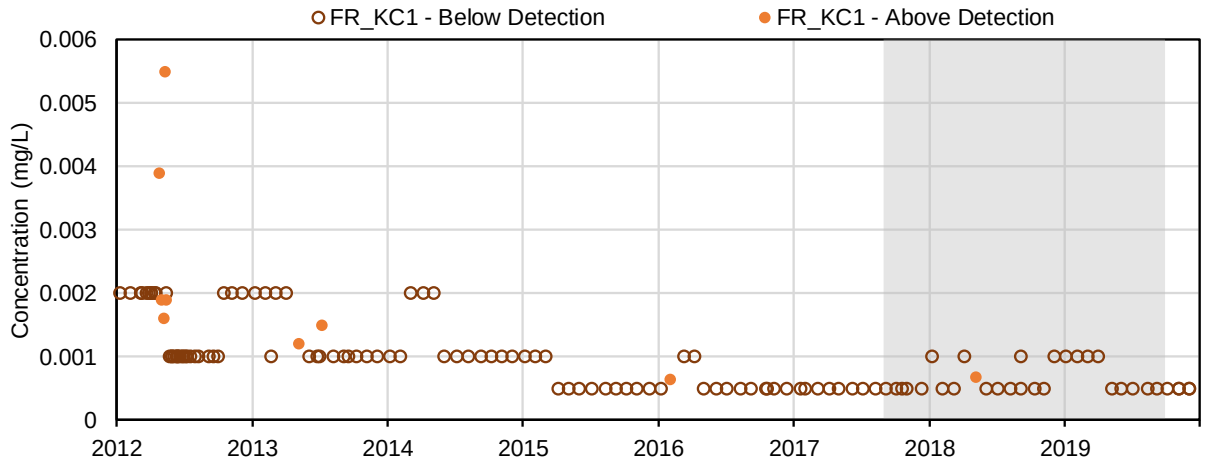
(68) Titanium (mg/L); Total Metals



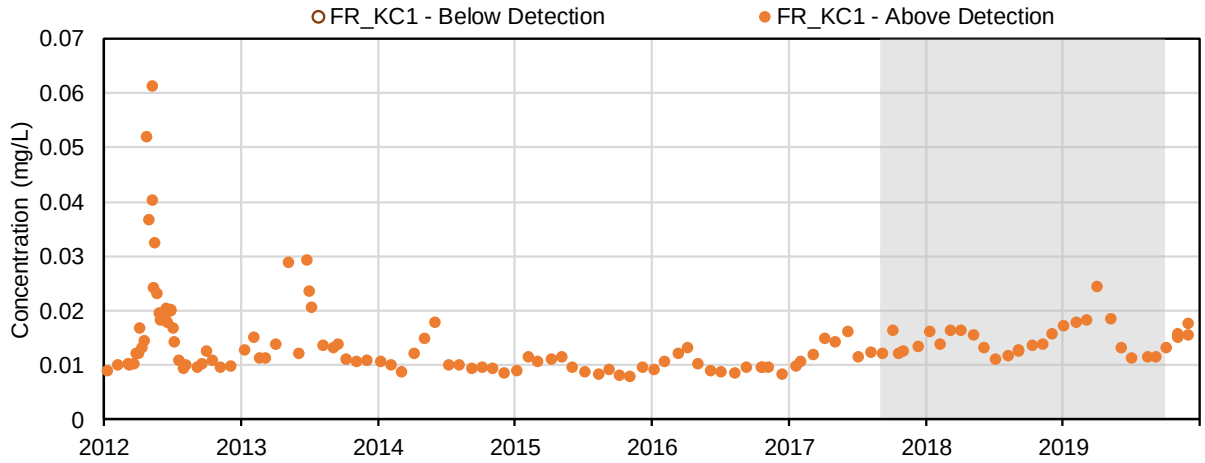
(69) Uranium (mg/L); Total Metals



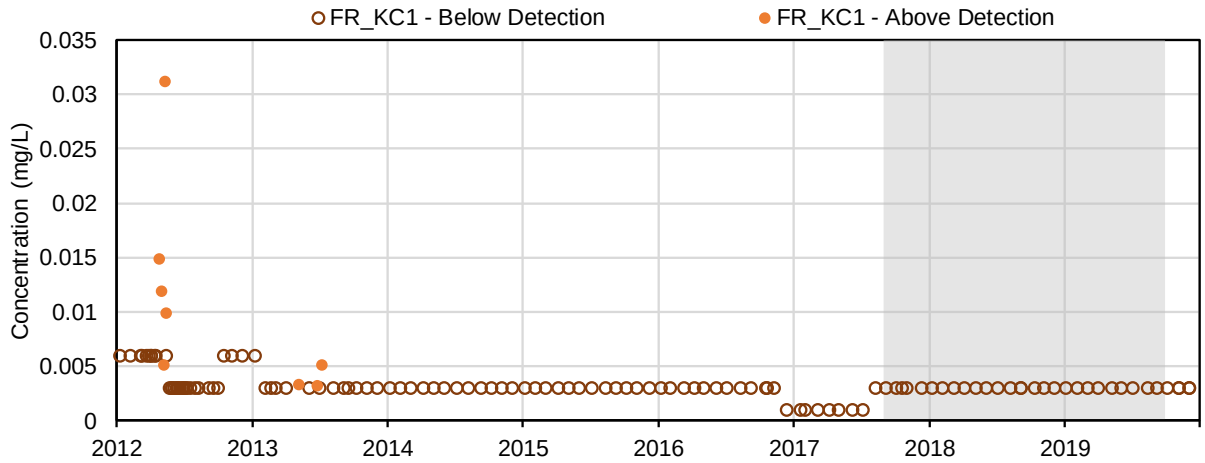
(70) Vanadium (mg/L); Total Metals



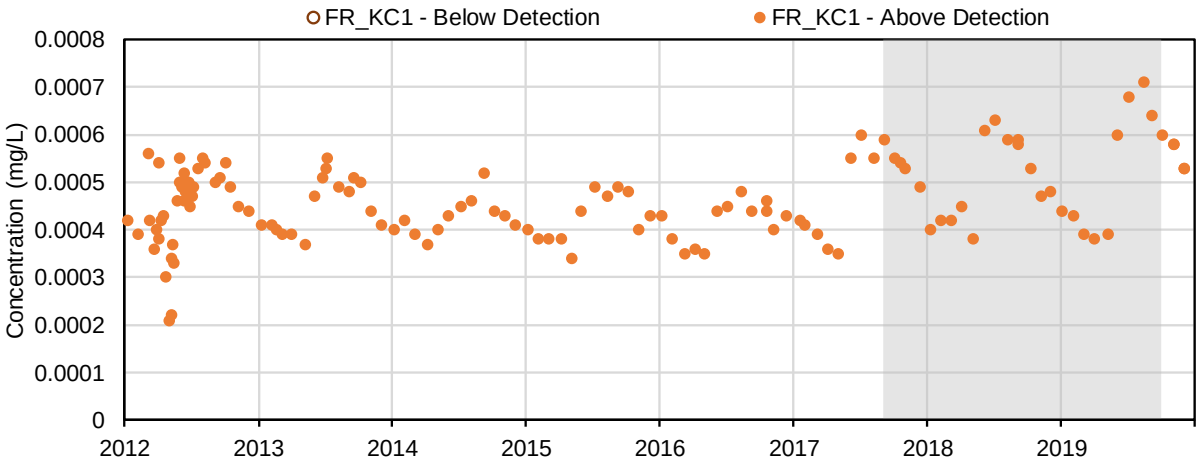
(71) Zinc (mg/L); Total Metals



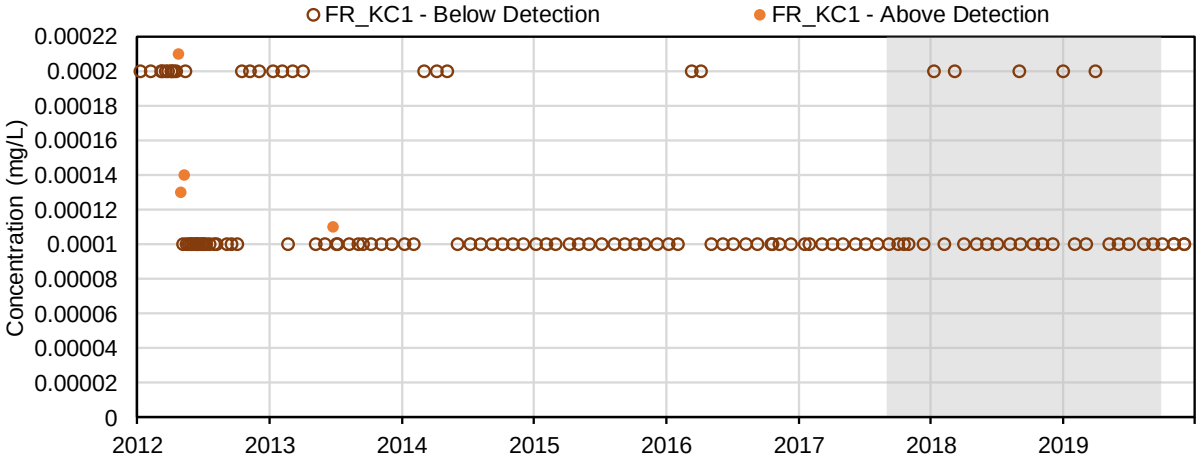
(72) Aluminum (mg/L); Dissolved Metals



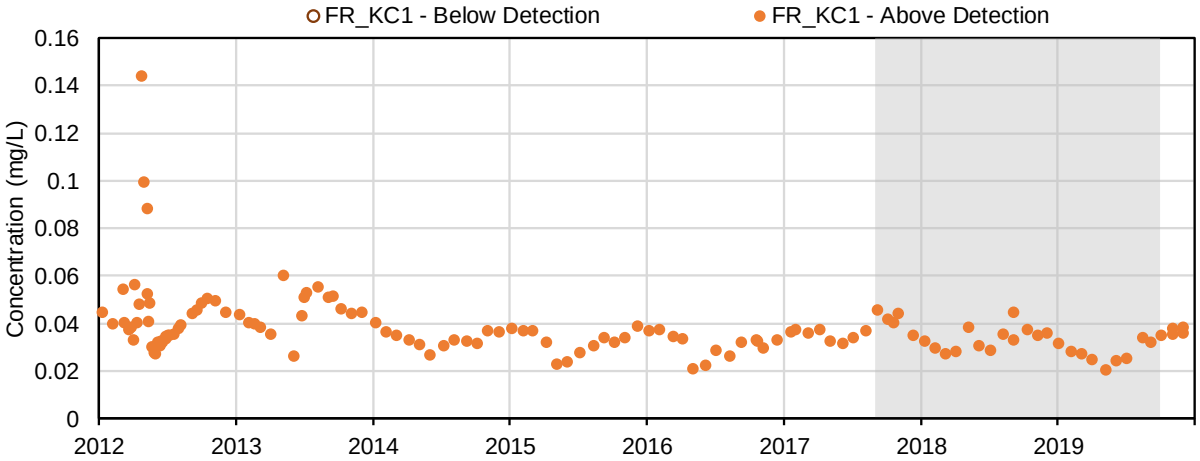
(73) Antimony (mg/L); Dissolved Metals



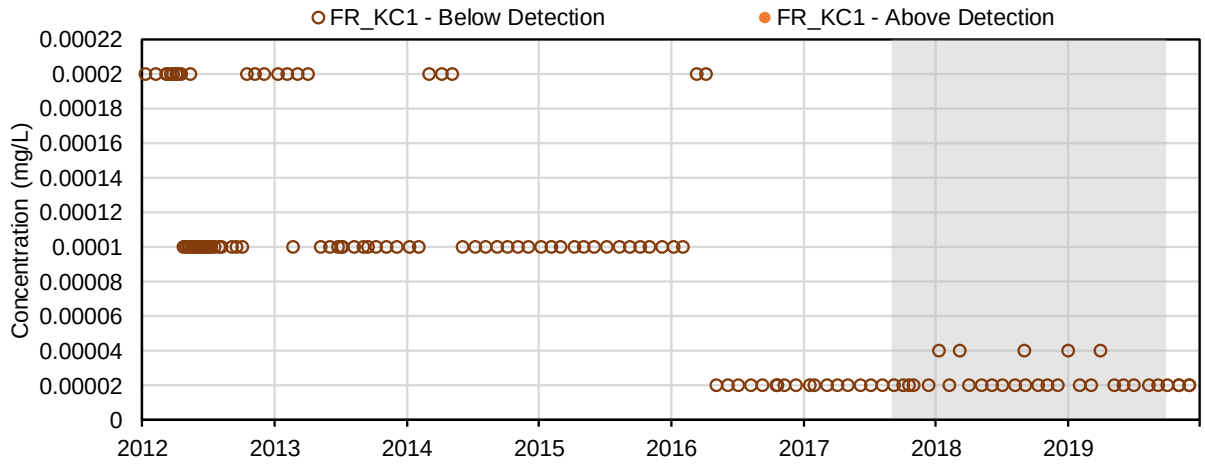
(74) Arsenic (mg/L); Dissolved Metals



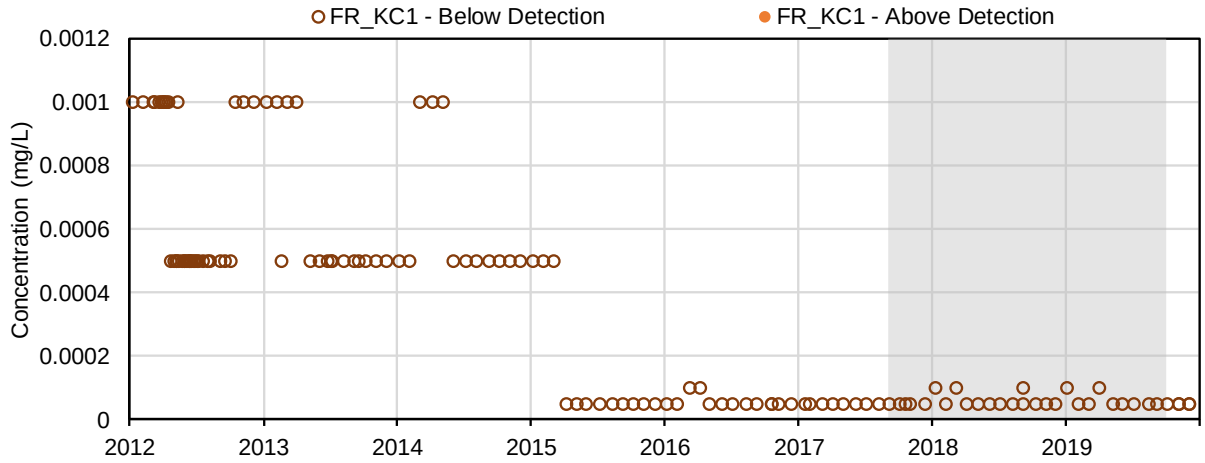
(75) Barium (mg/L); Dissolved Metals



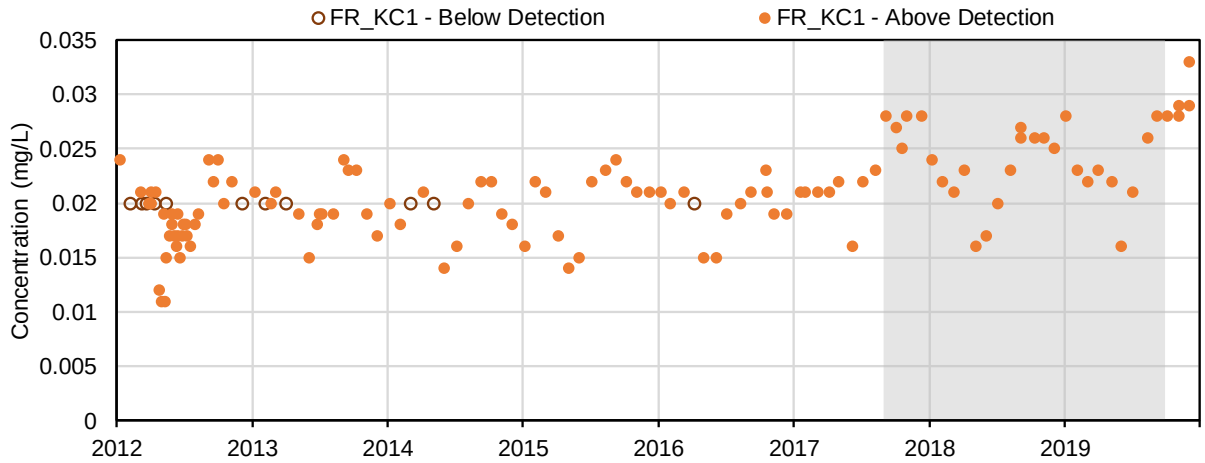
(76) Beryllium (mg/L); Dissolved Metals



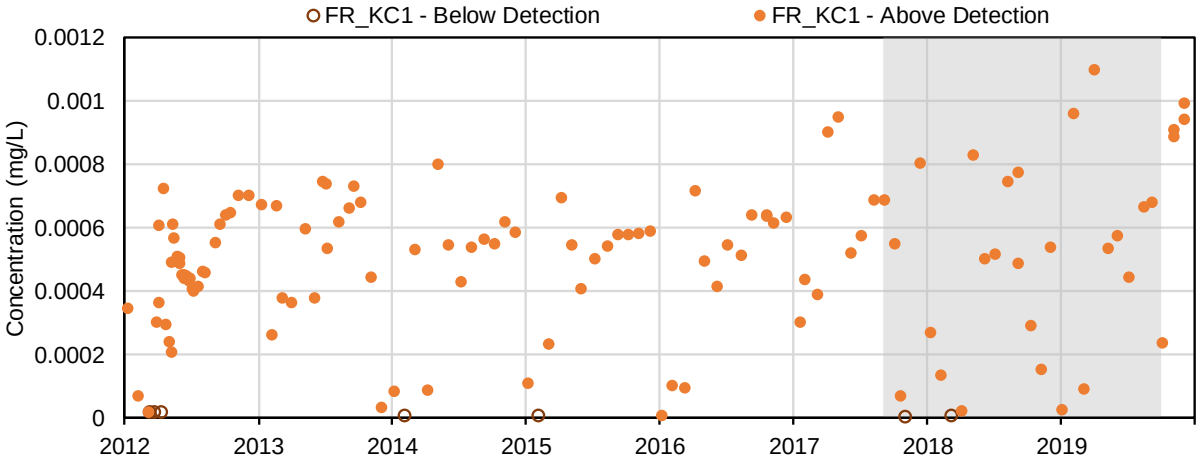
(77) Bismuth (mg/L); Dissolved Metals



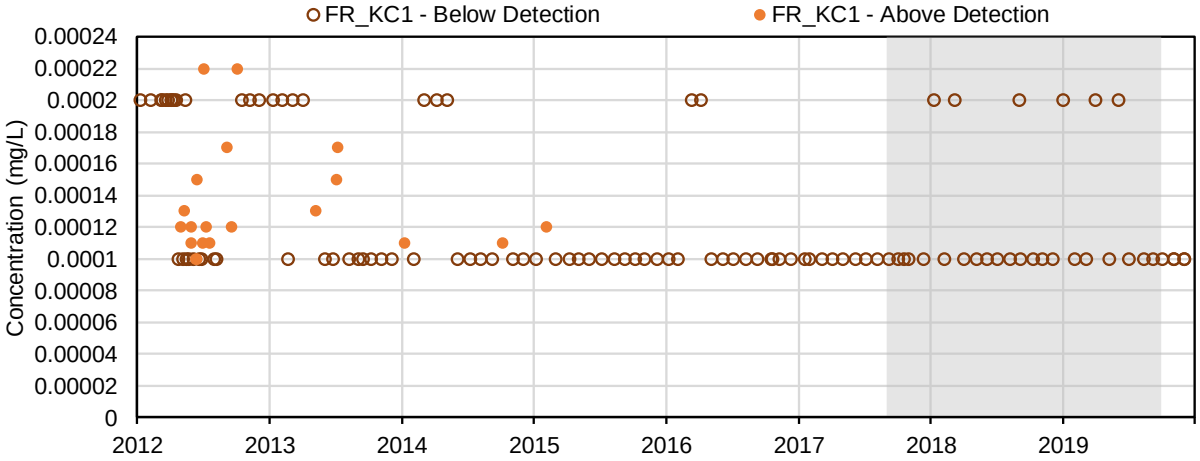
(78) Boron (mg/L); Dissolved Metals



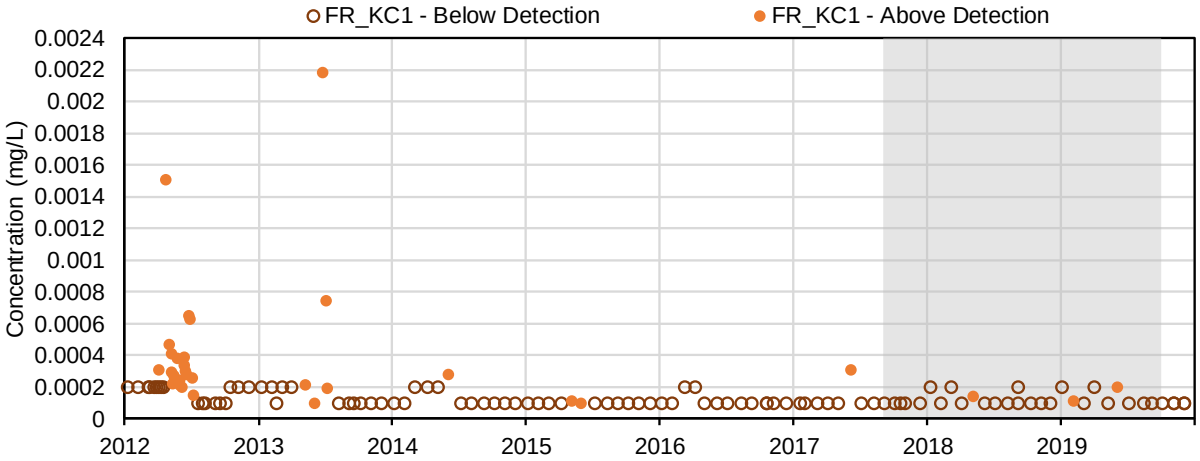
(79) Cadmium (mg/L); Dissolved Metals



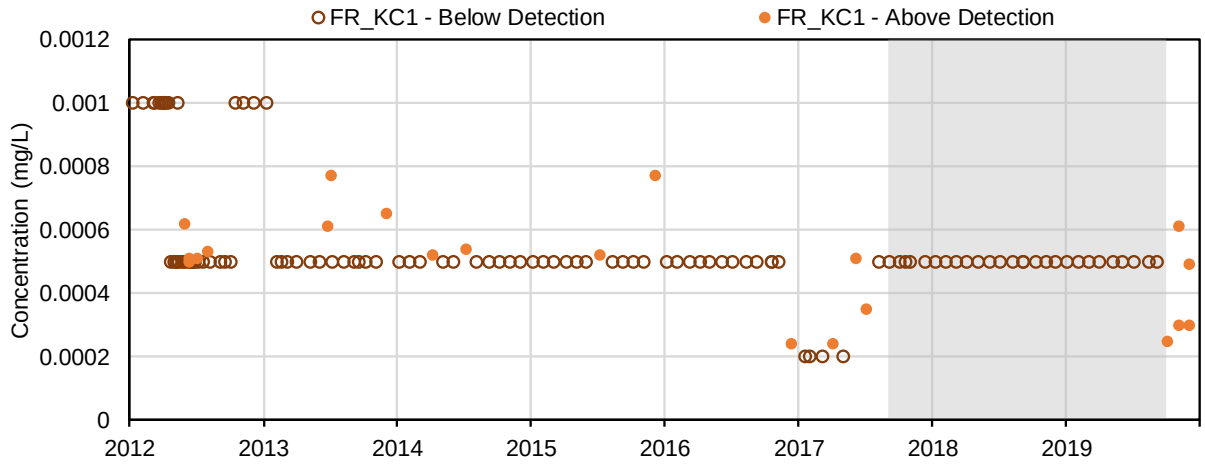
(80) Chromium (mg/L); Dissolved Metals



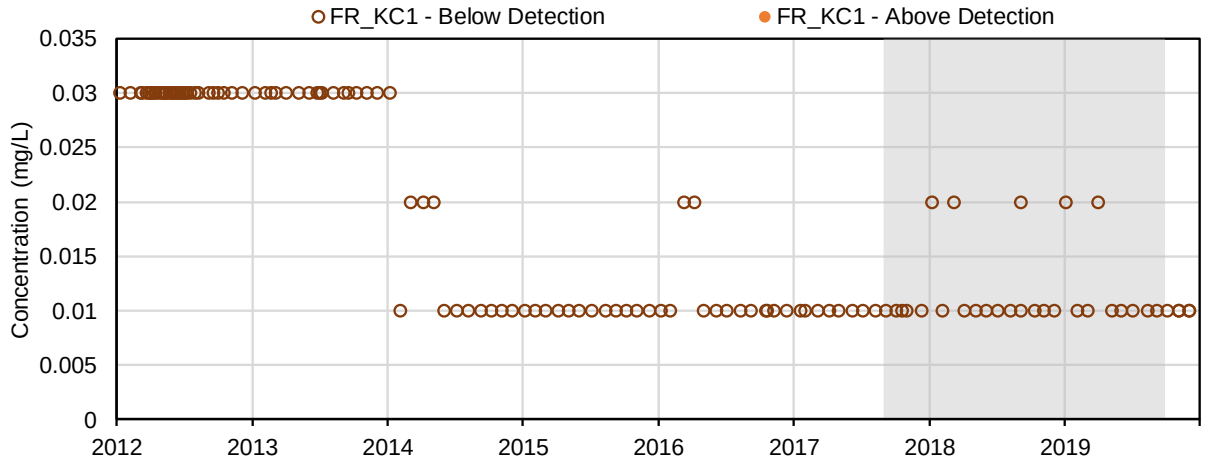
(81) Cobalt (mg/L); Dissolved Metals



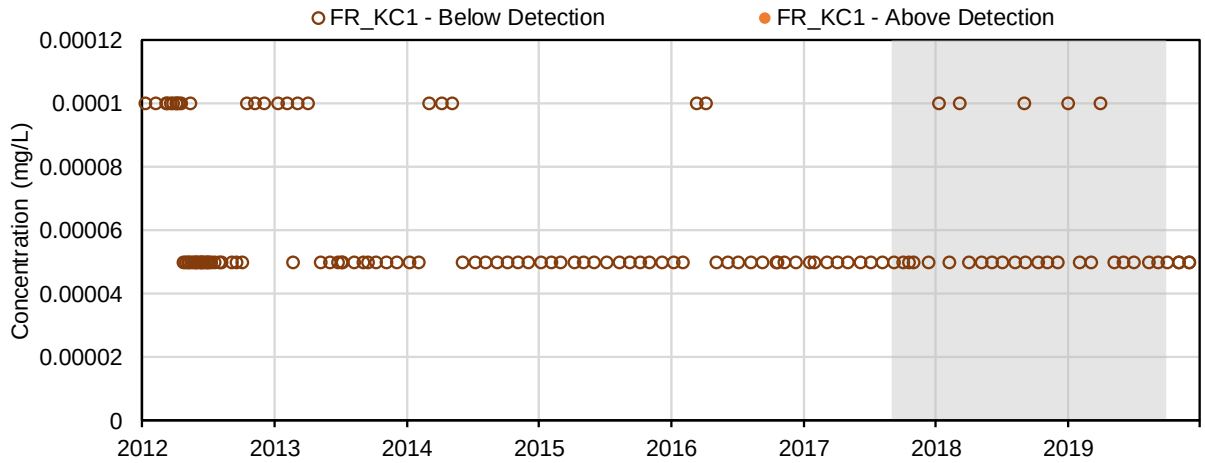
(82) Copper (mg/L); Dissolved Metals



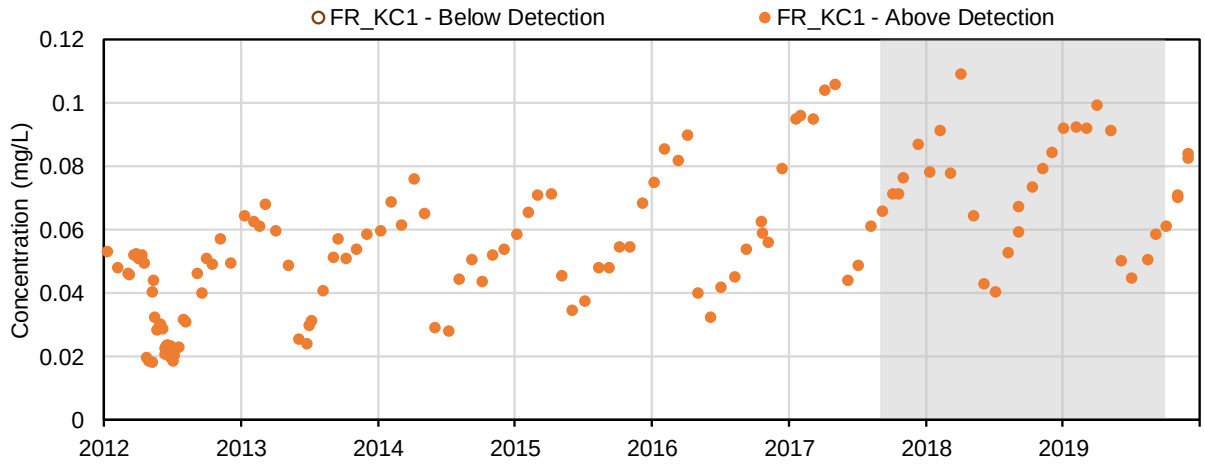
(83) Iron (mg/L); Dissolved Metals



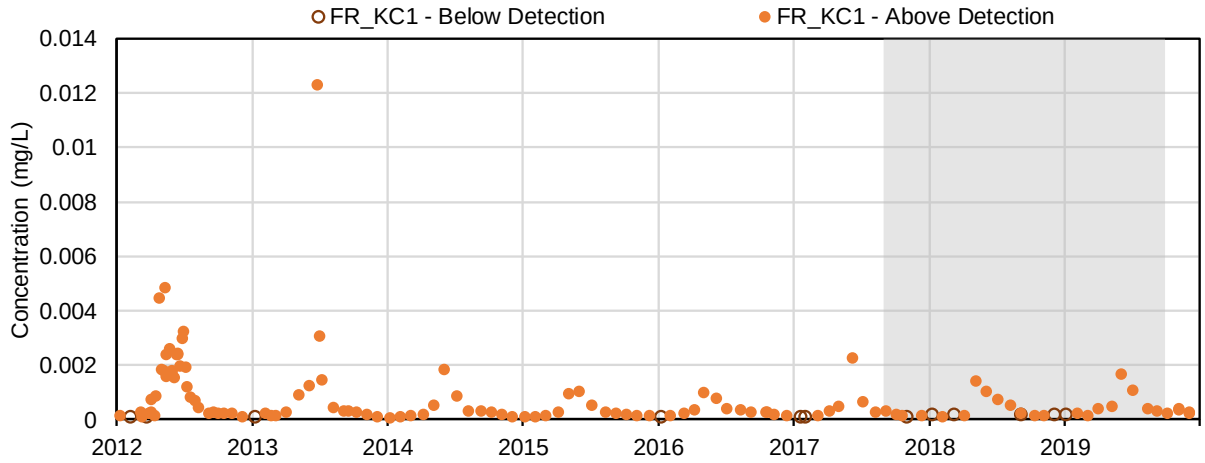
(84) Lead (mg/L); Dissolved Metals



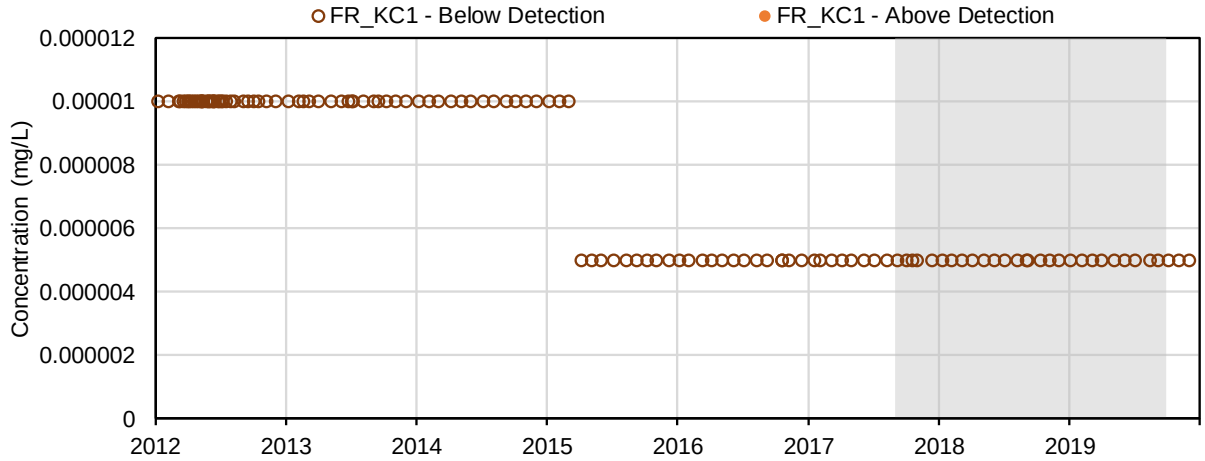
(85) Lithium (mg/L); Dissolved Metals



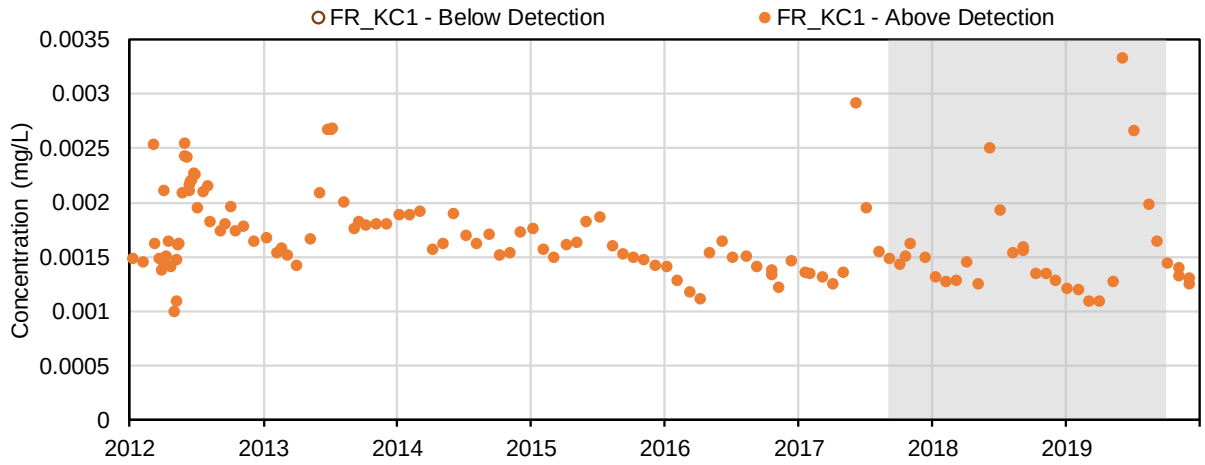
(86) Manganese (mg/L); Dissolved Metals



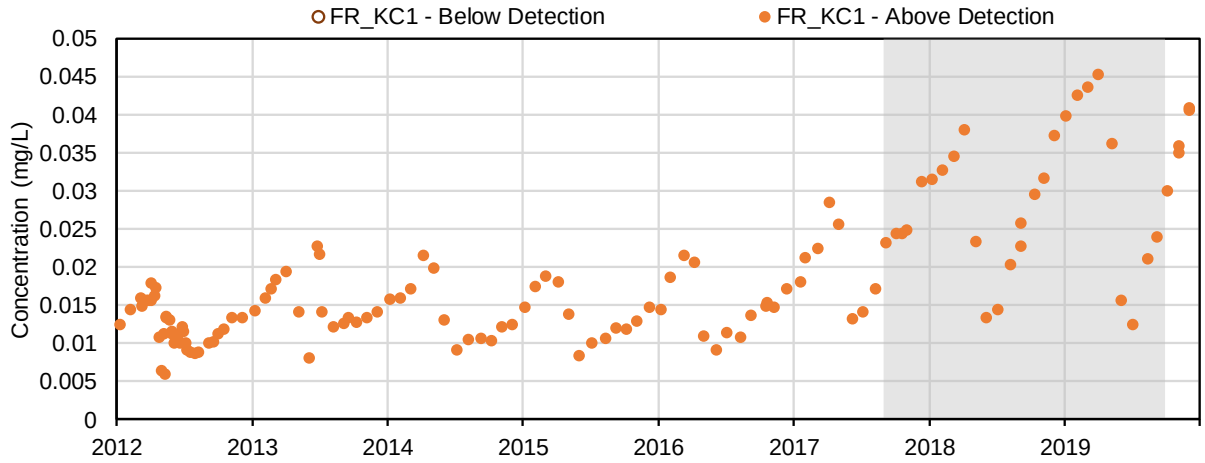
(87) Mercury (mg/L); Dissolved Metals



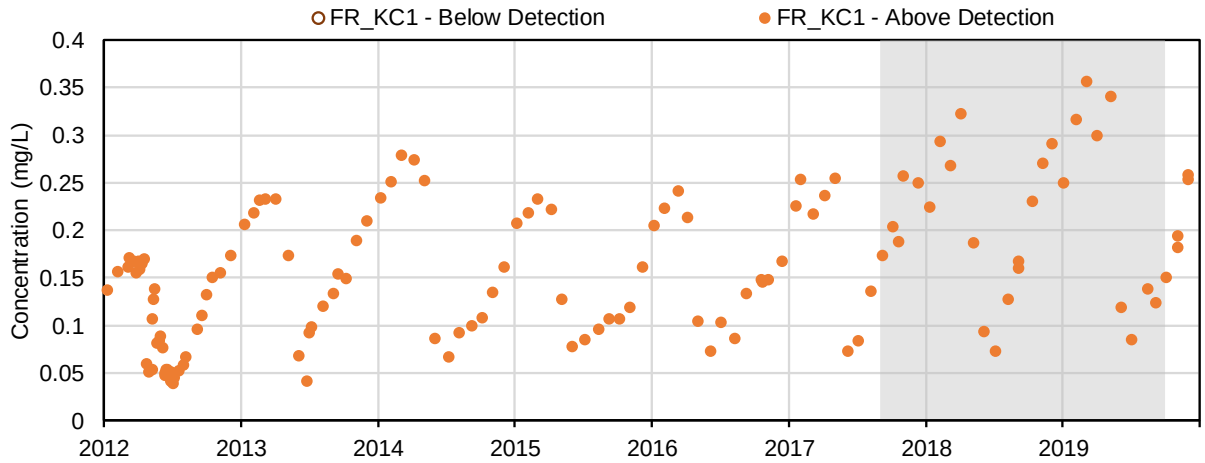
(88) Molybdenum (mg/L); Dissolved Metals



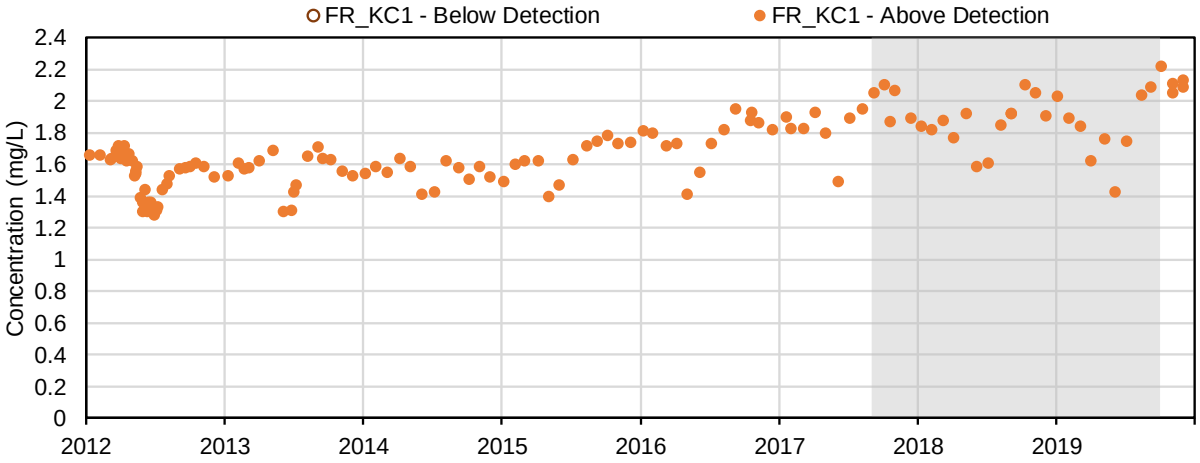
(89) Nickel (mg/L); Dissolved Metals



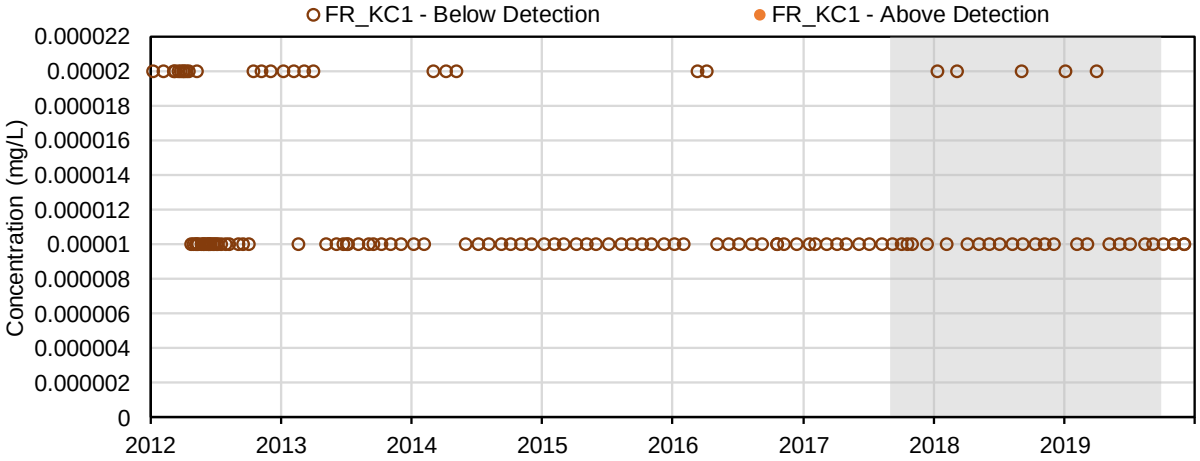
(90) Selenium (mg/L); Dissolved Metals



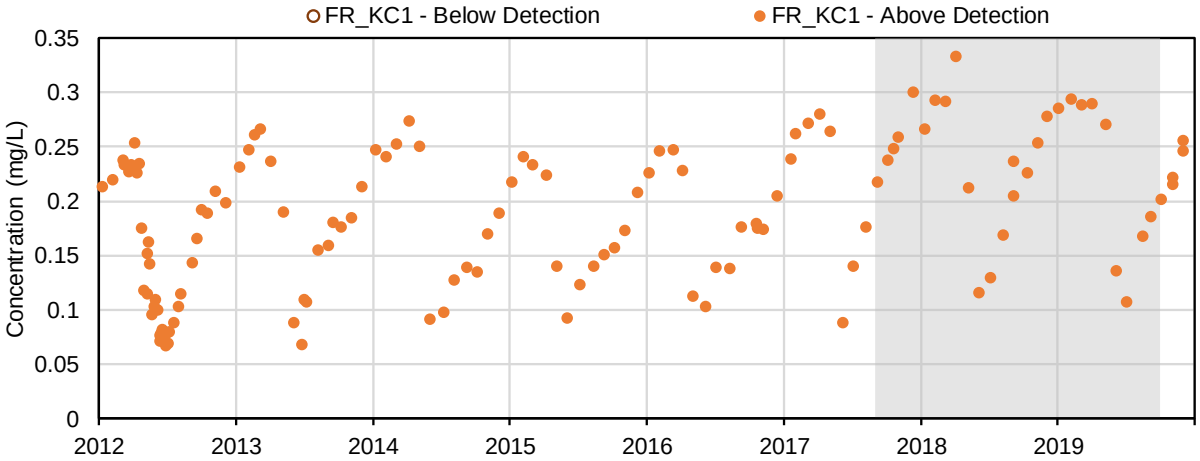
(91) Silicon (mg/L); Dissolved Metals



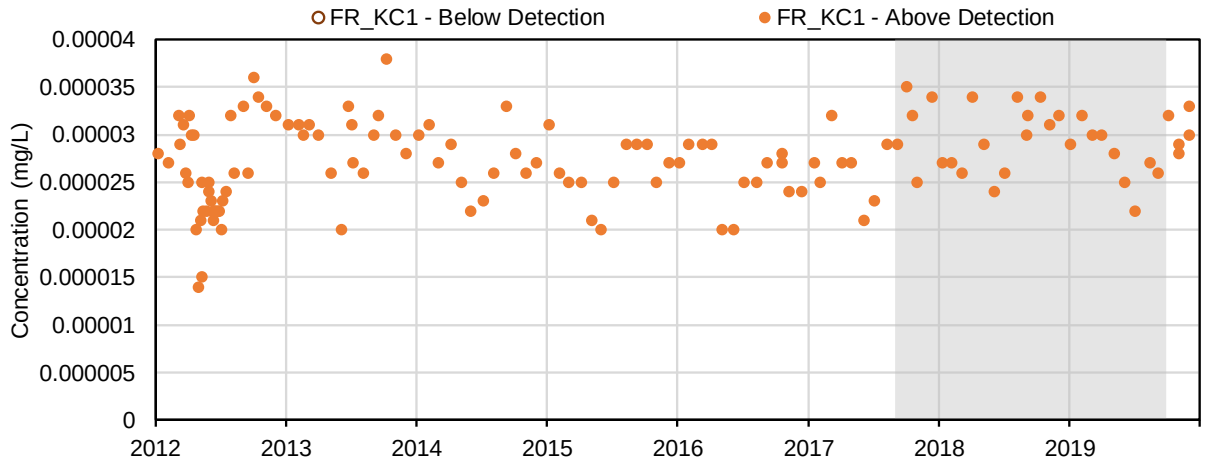
(92) Silver (mg/L); Dissolved Metals



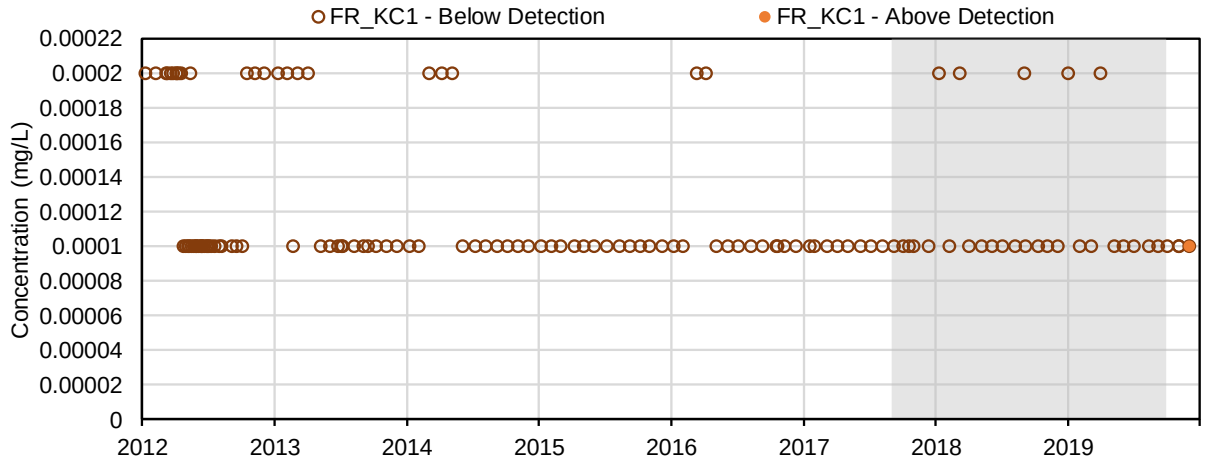
(93) Strontium (mg/L); Dissolved Metals



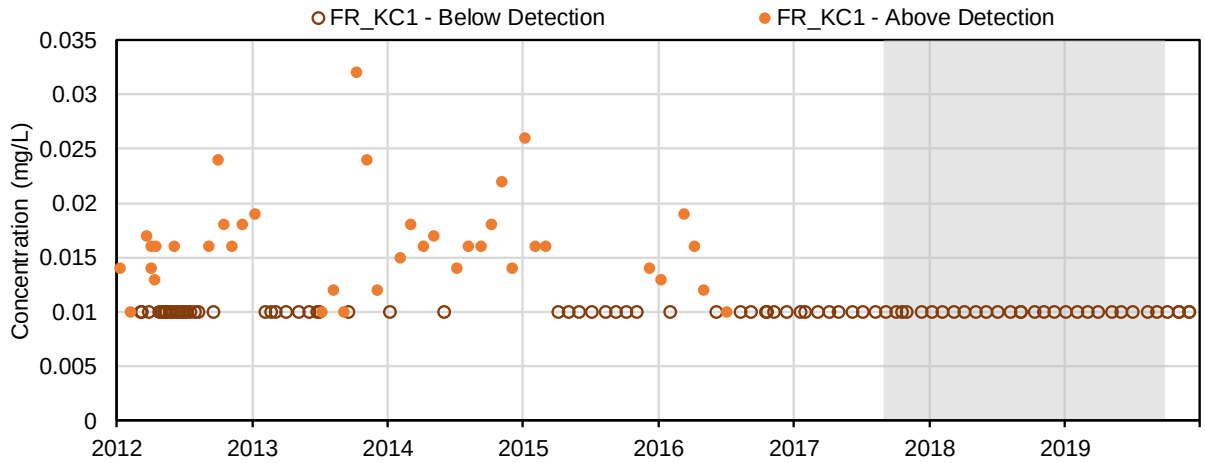
(94) Thallium (mg/L); Dissolved Metals



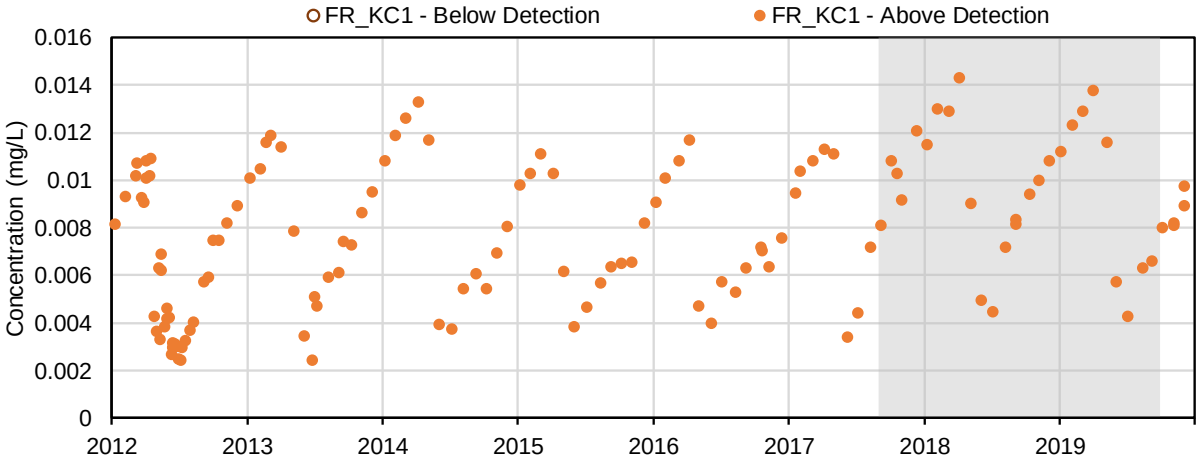
(95) Tin (mg/L); Dissolved Metals



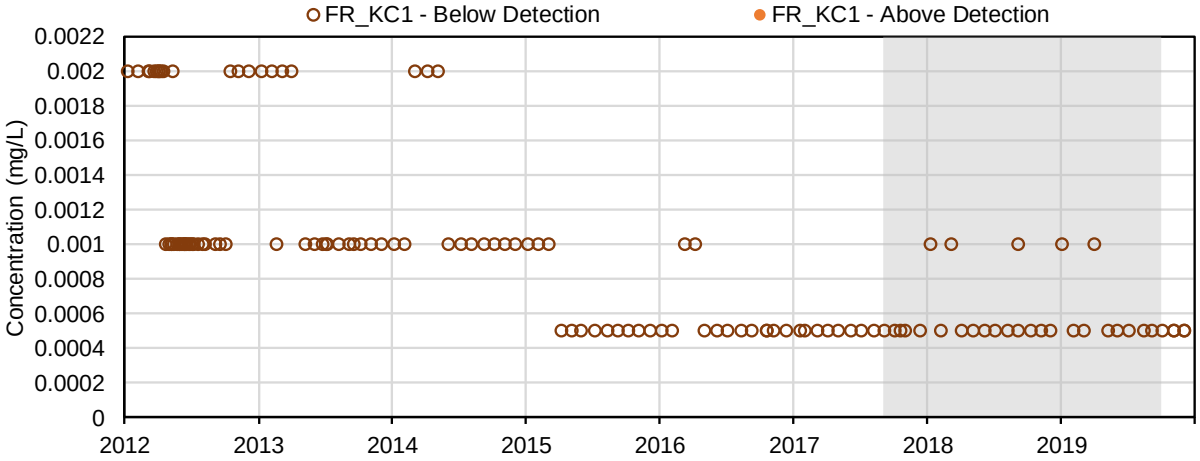
(96) Titanium (mg/L); Dissolved Metals



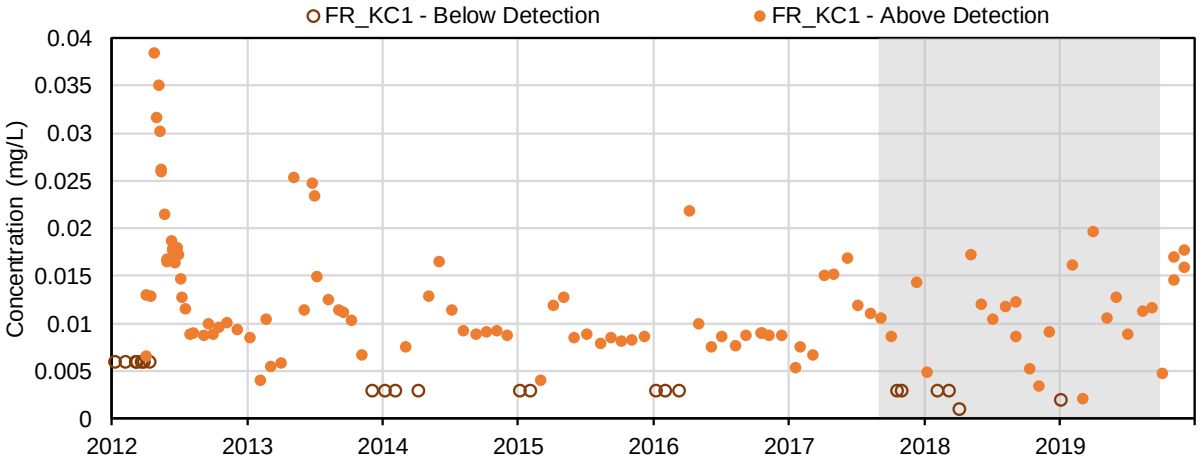
(97) Uranium (mg/L); Dissolved Metals



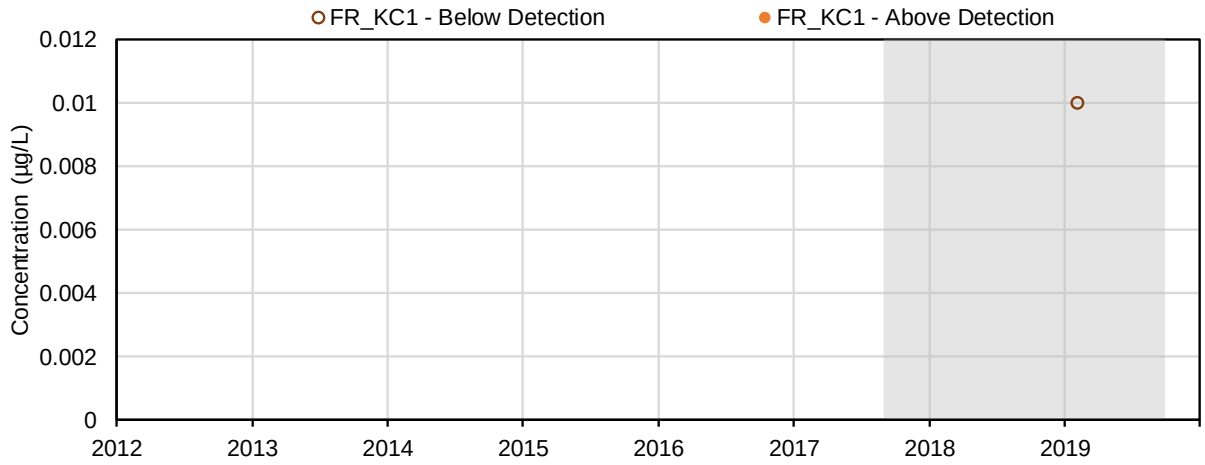
(98) Vanadium (mg/L); Dissolved Metals



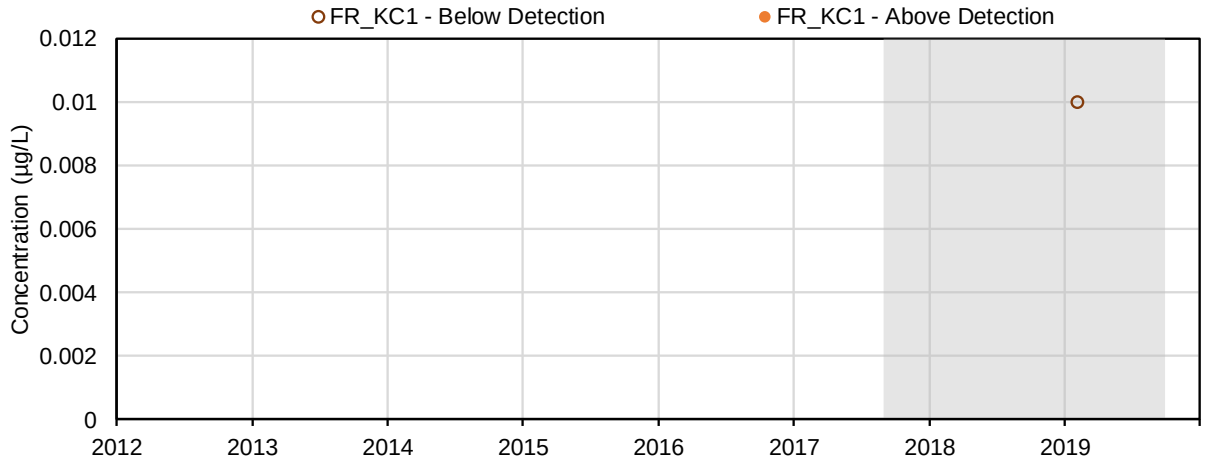
(99) Zinc (mg/L); Dissolved Metals



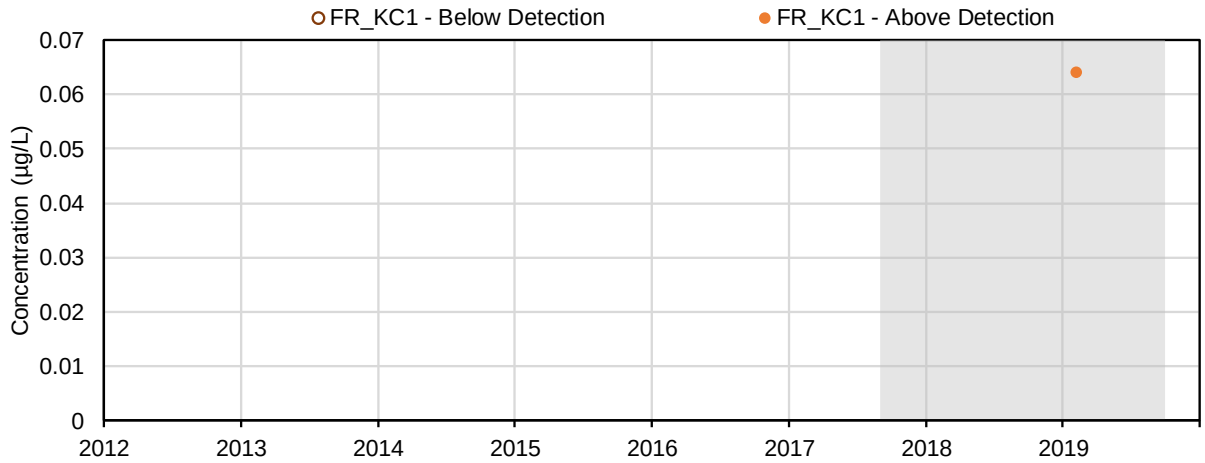
(100) Dissolved Dimethylseleneoxide (µg/L); Speciation of Selenium



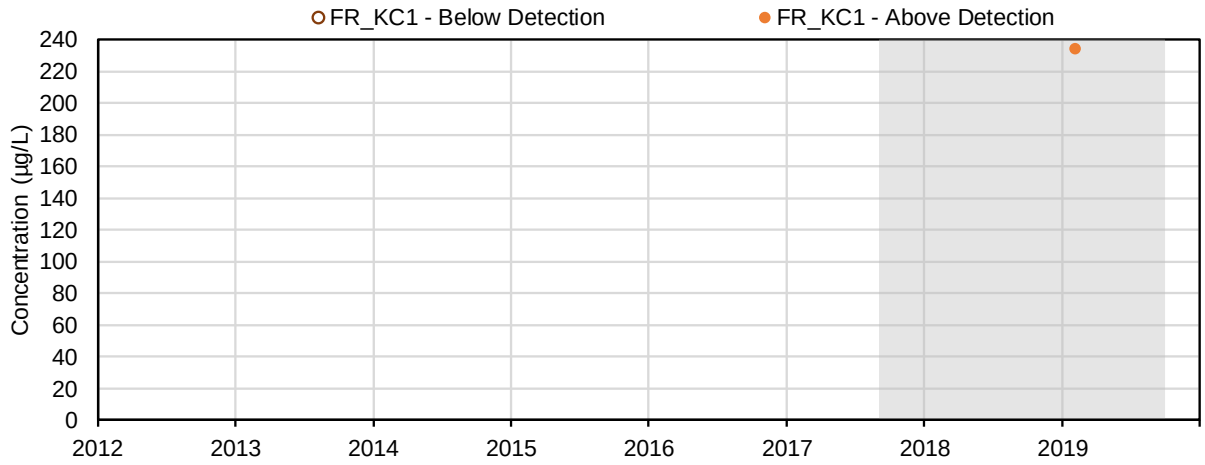
(101) Dissolved Methylseleninic Acid (µg/L); Speciation of Selenium



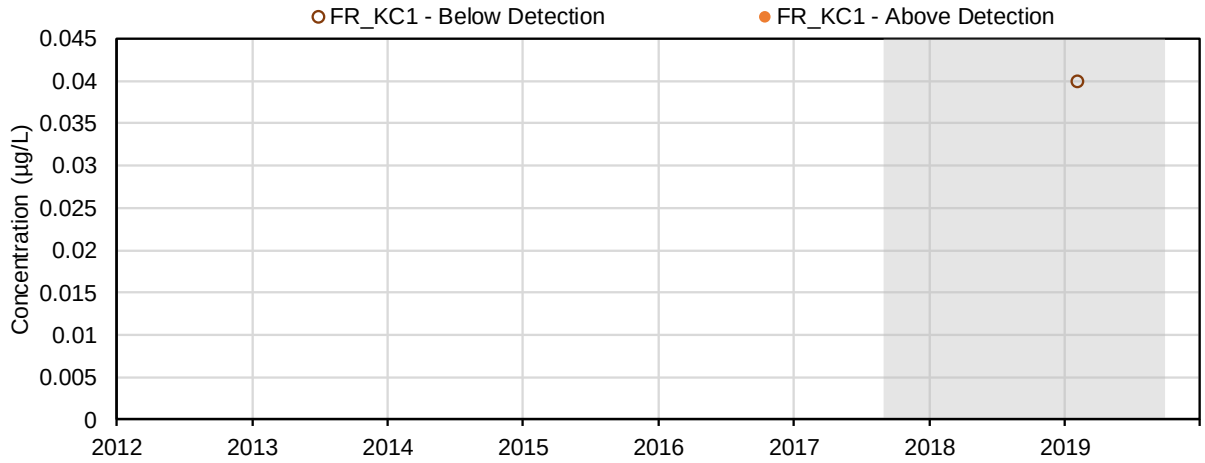
(102) Dissolved Selenite (µg/L); Speciation of Selenium



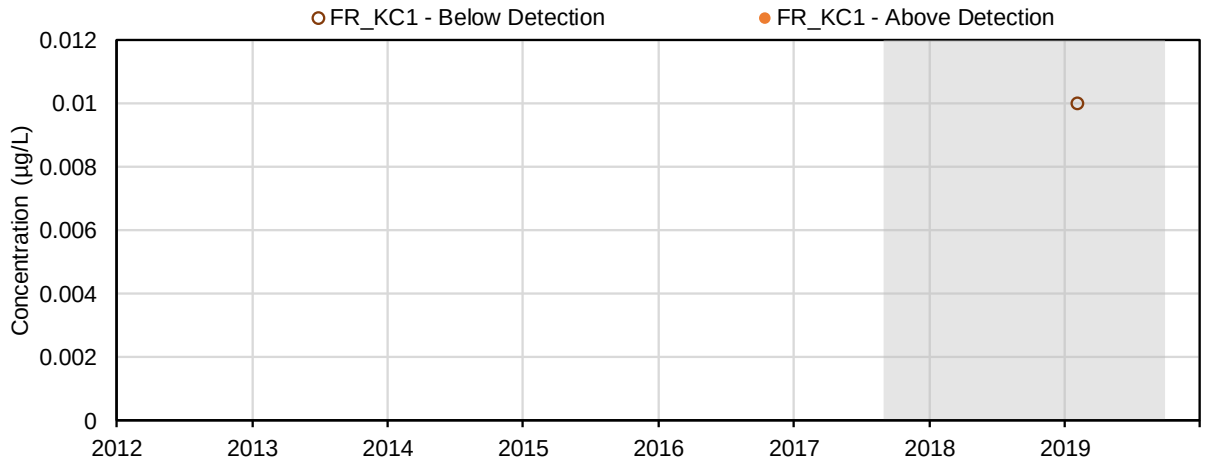
(103) Dissolved Selenate (µg/L); Speciation of Selenium



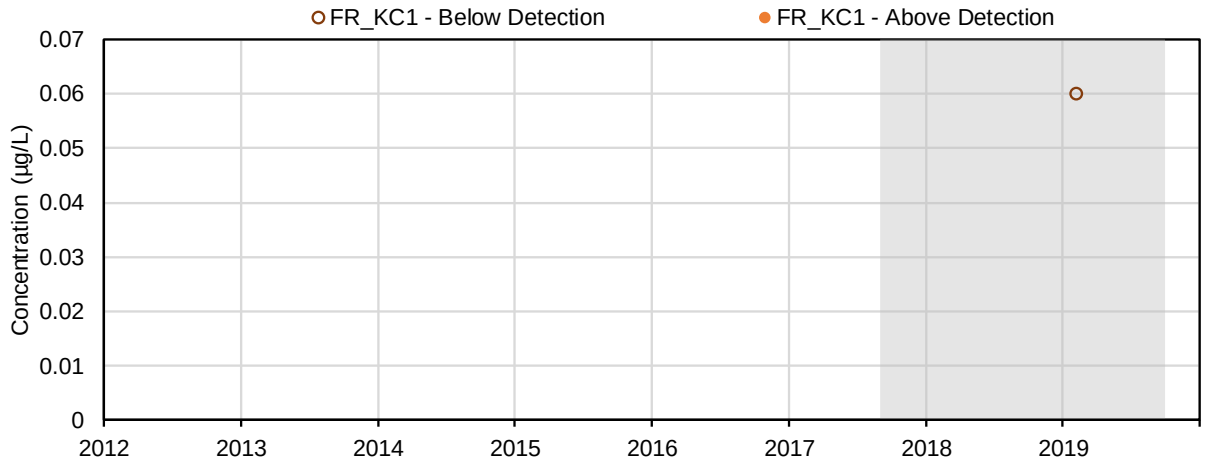
(104) Dissolved Selenocyanate (µg/L); Speciation of Selenium



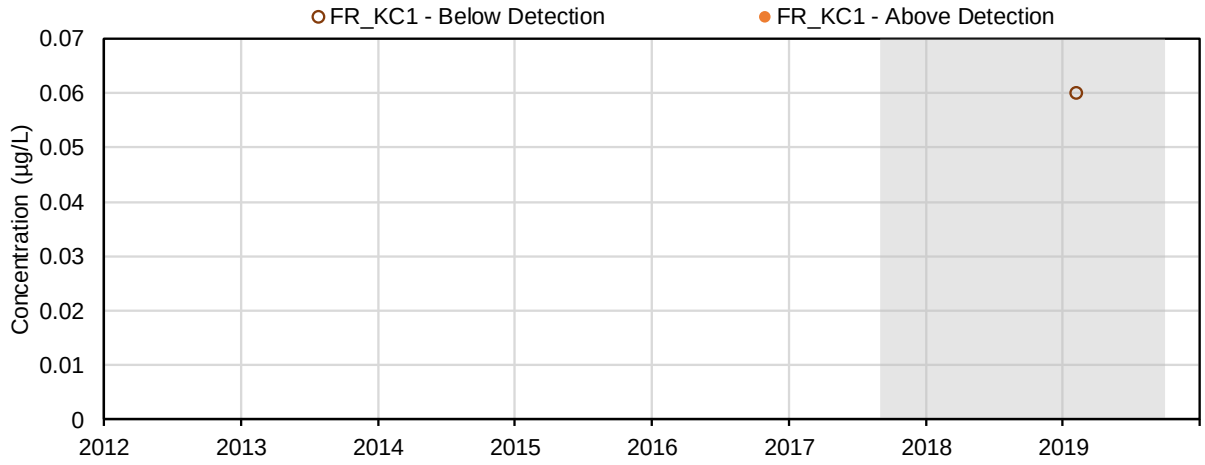
(105) Dissolved Selenomethionine (µg/L); Speciation of Selenium



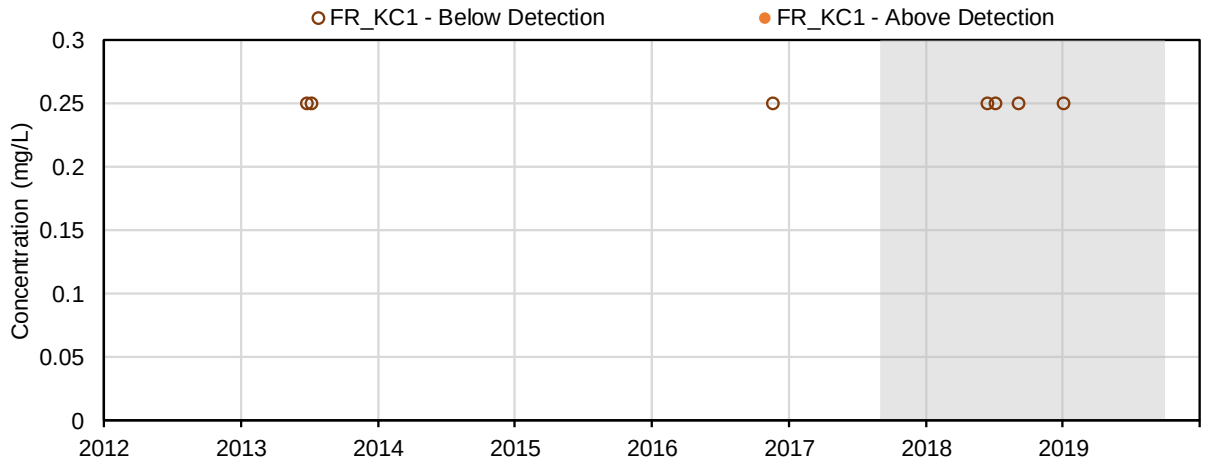
(106) Dissolved Selenosulphate (µg/L); Speciation of Selenium



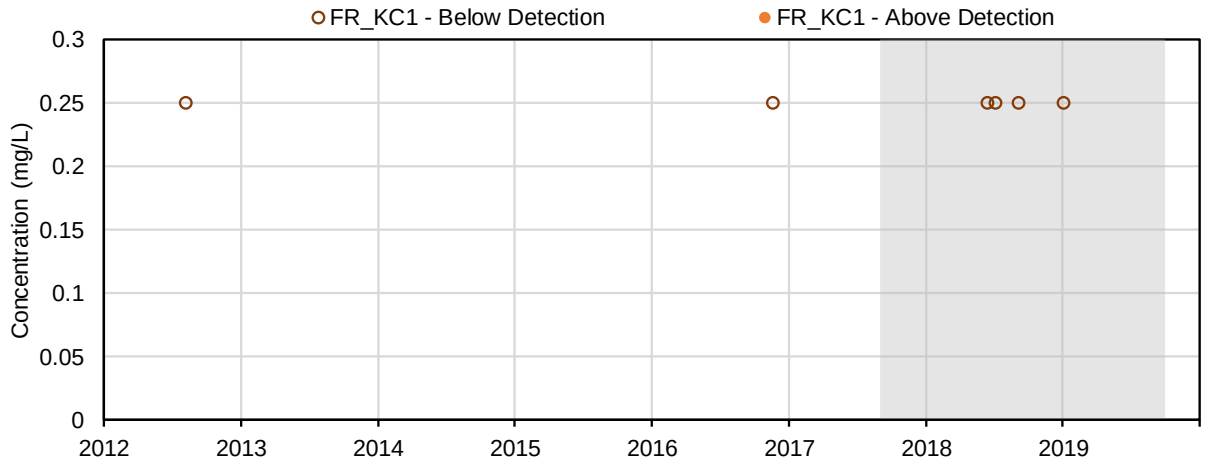
(107) Unknown Dissolved Selenium Species (µg/L); Speciation of Selenium



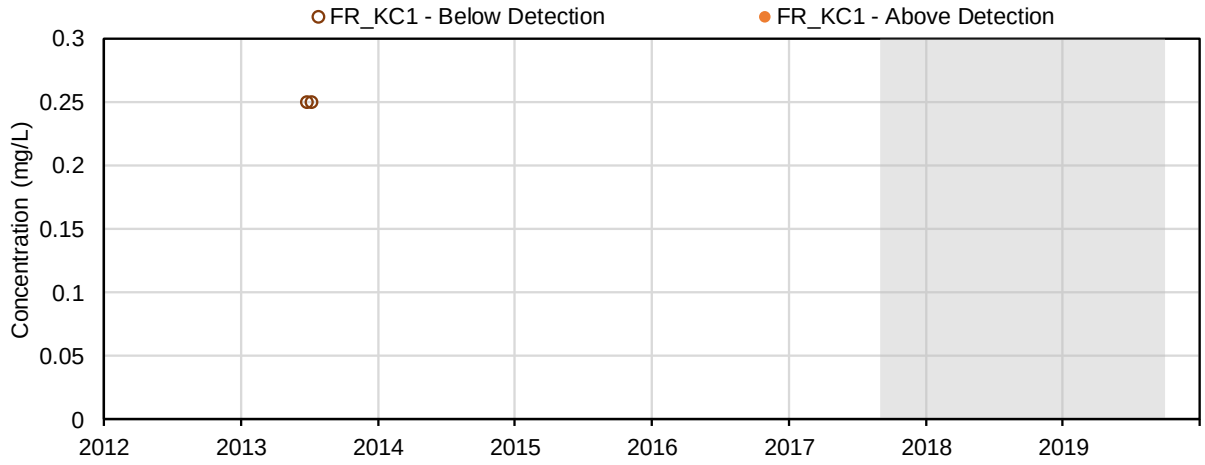
(108) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



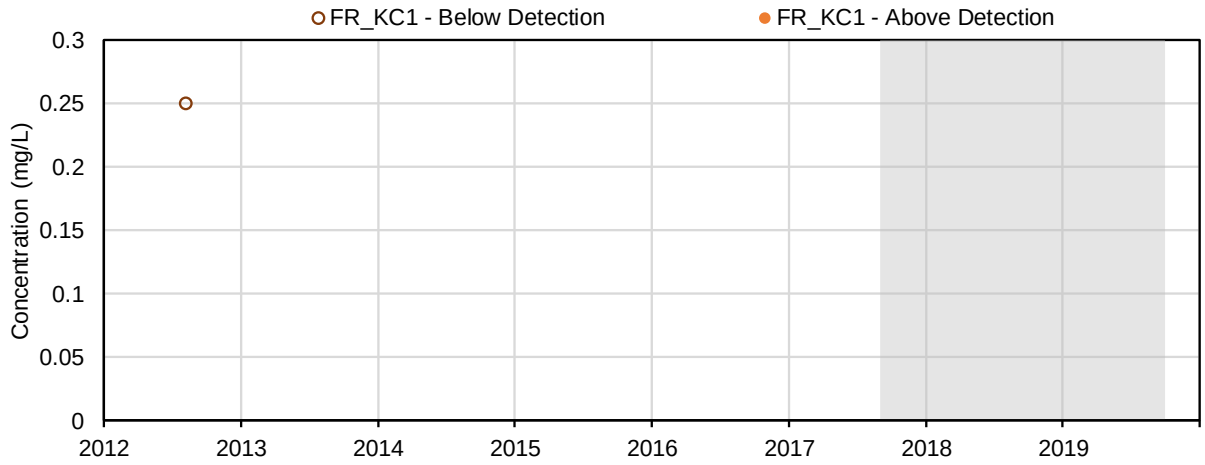
(109) Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



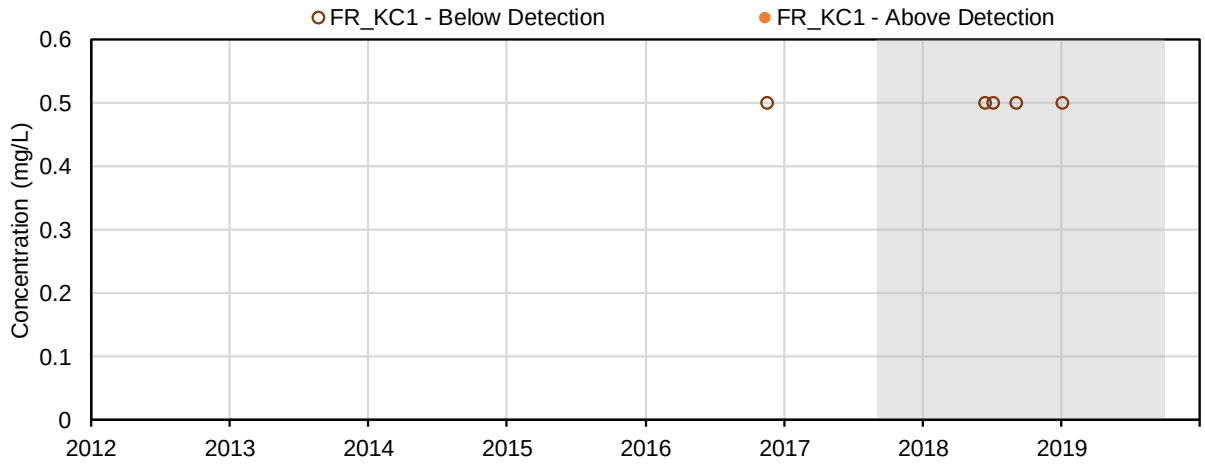
(110) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



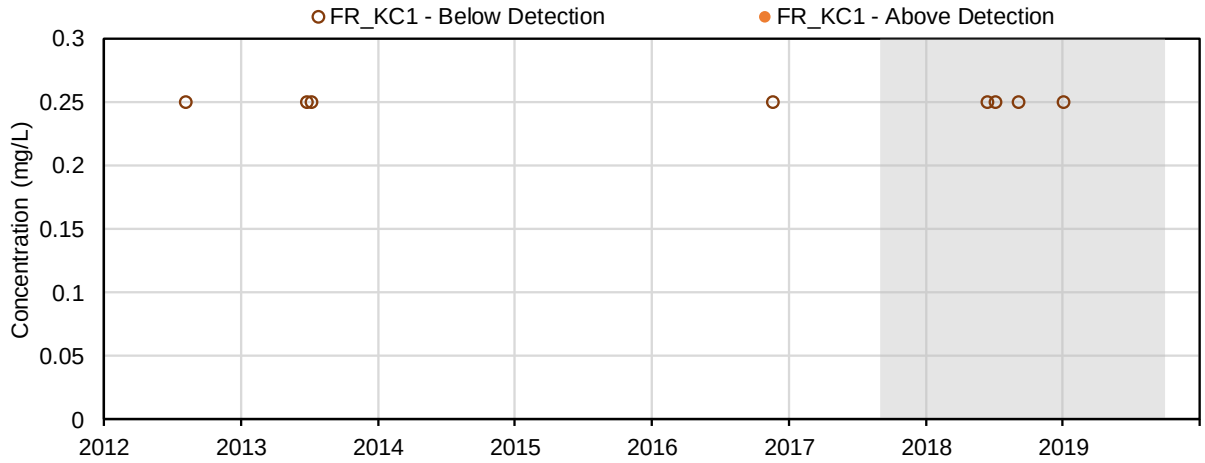
(111) Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L); Volatile Organics



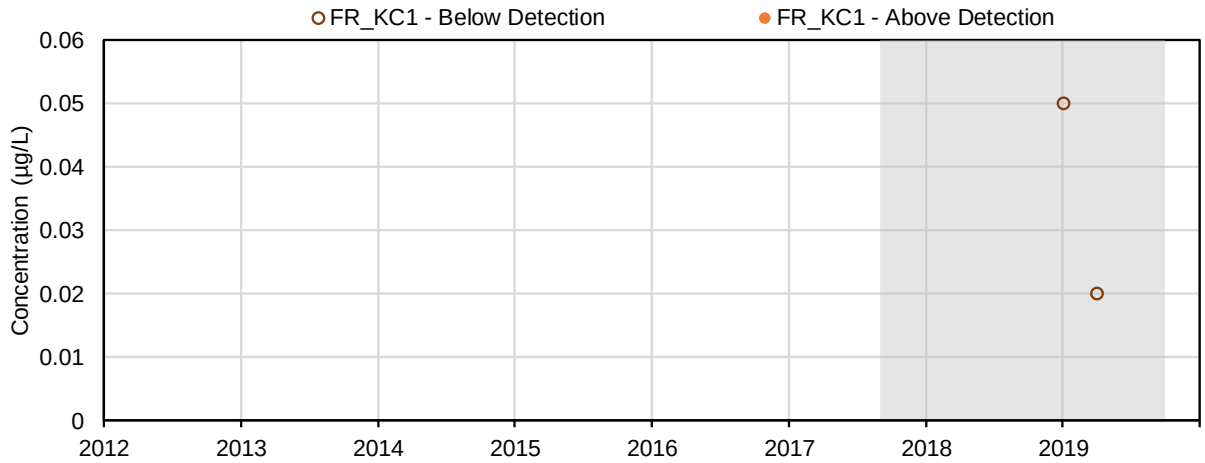
(112) Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L); Volatile Organics



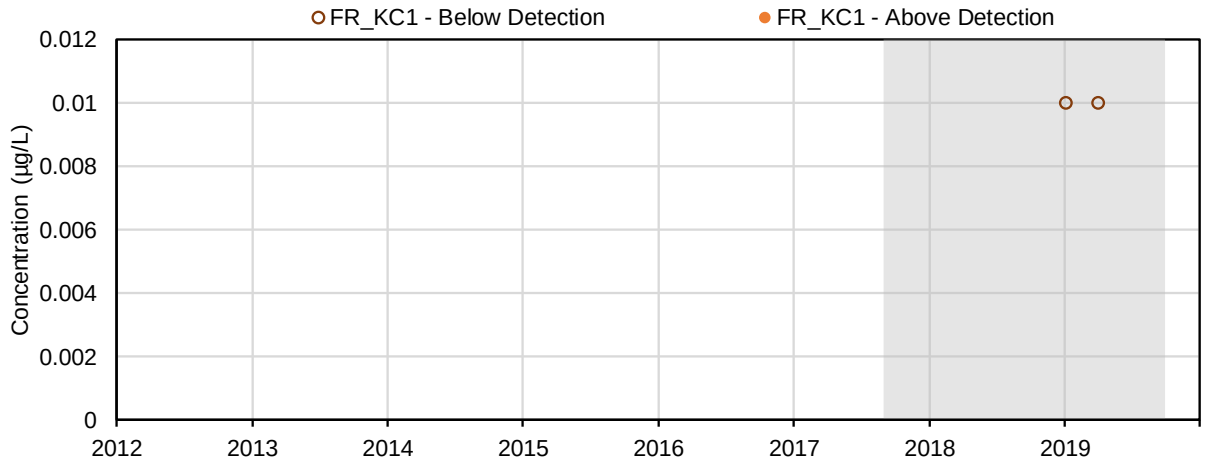
(113) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics



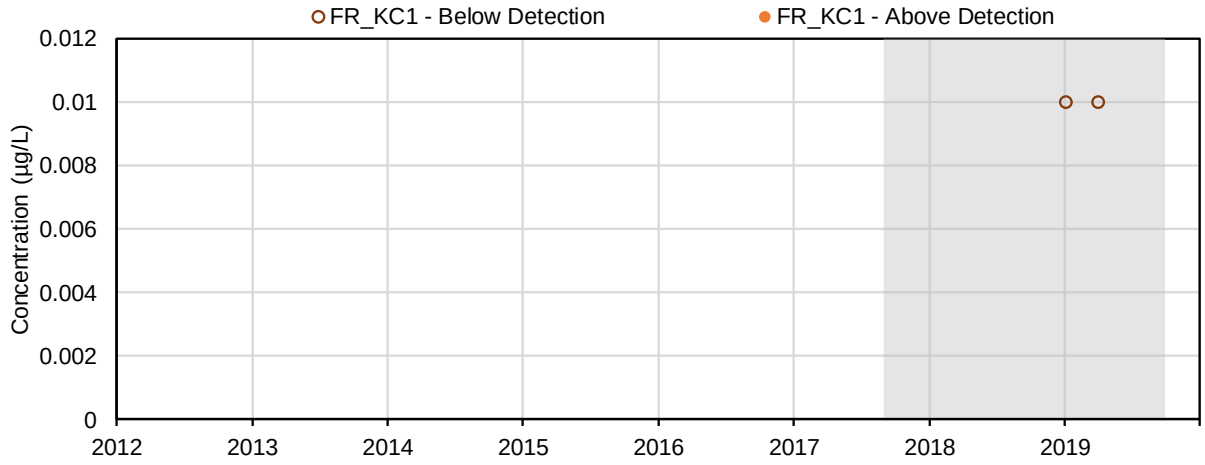
(114) Naphthalene (µg/L); Parent PAHs



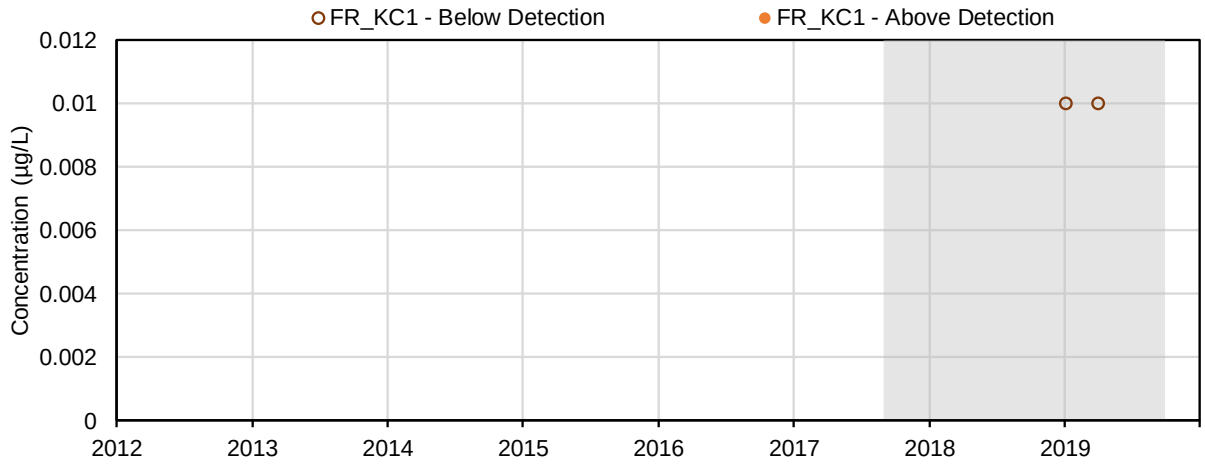
(115) Acenaphthylene (µg/L); Parent PAHs



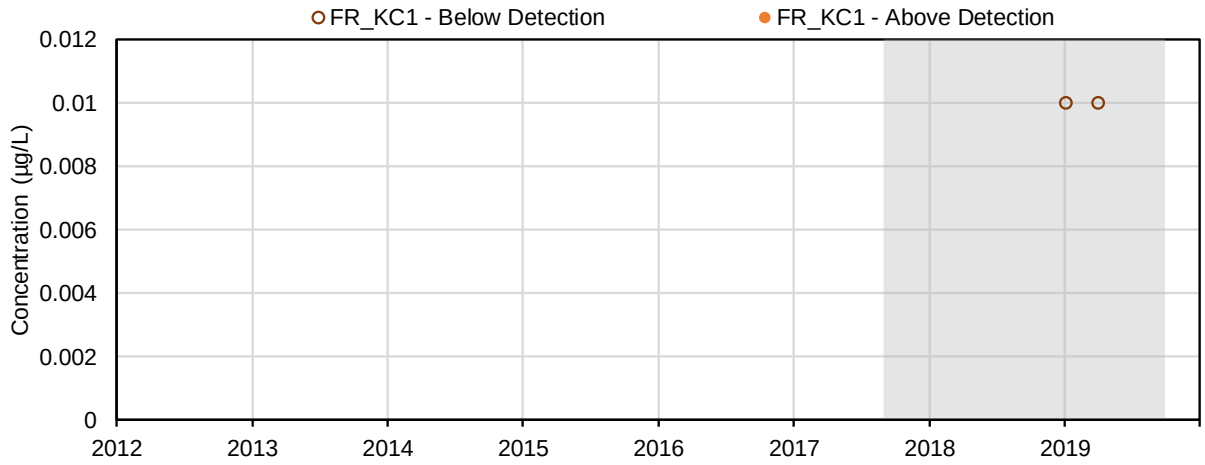
(116) Acenaphthene (µg/L); Parent PAHs



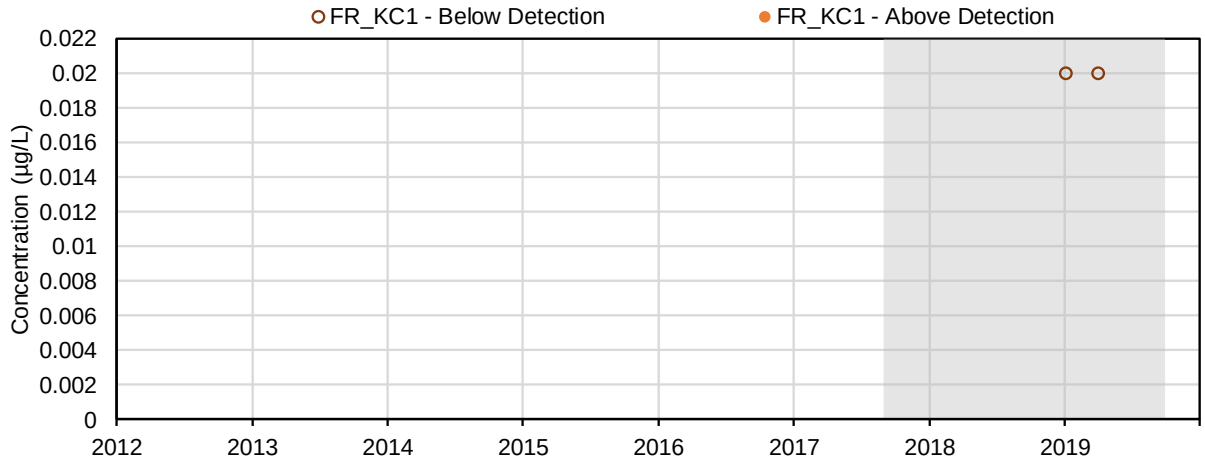
(117) Acridine (µg/L); Parent PAHs



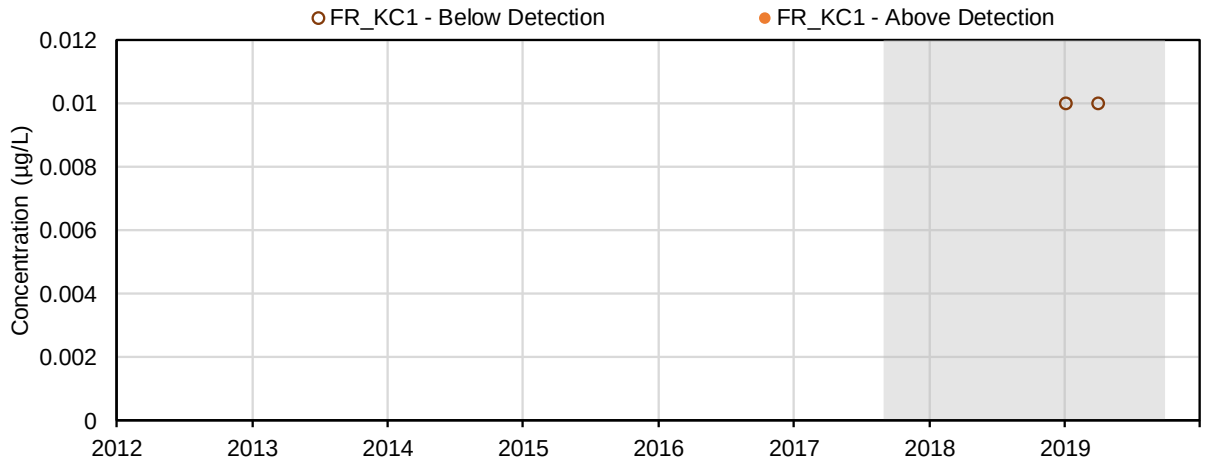
(118) Fluorene (µg/L); Parent PAHs



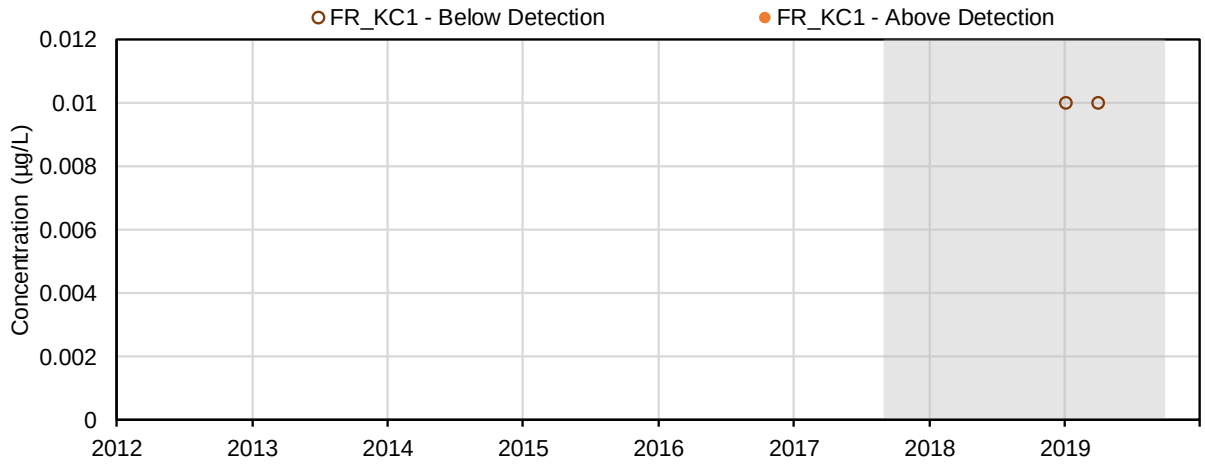
(119) Phenanthrene (µg/L); Parent PAHs



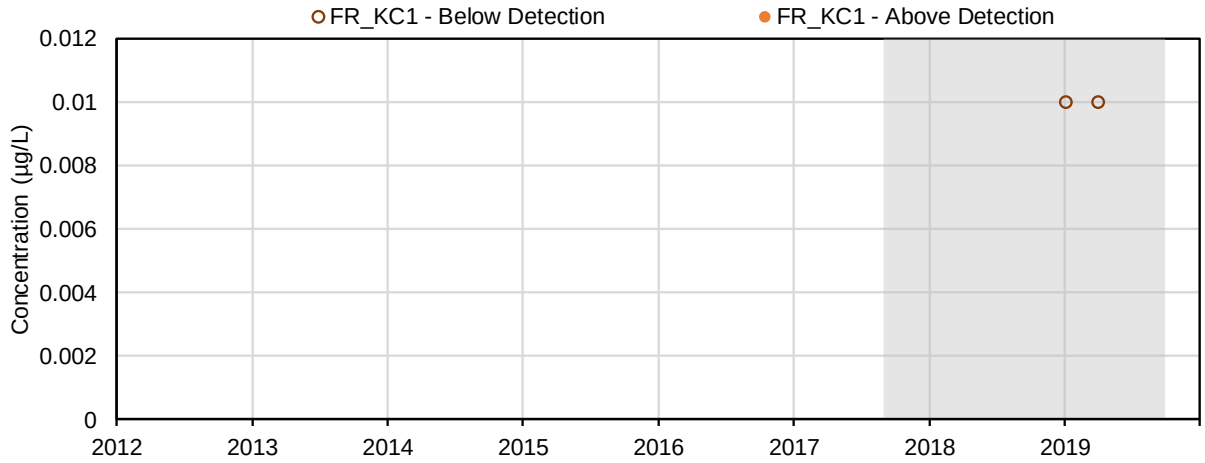
(120) Anthracene (µg/L); Parent PAHs



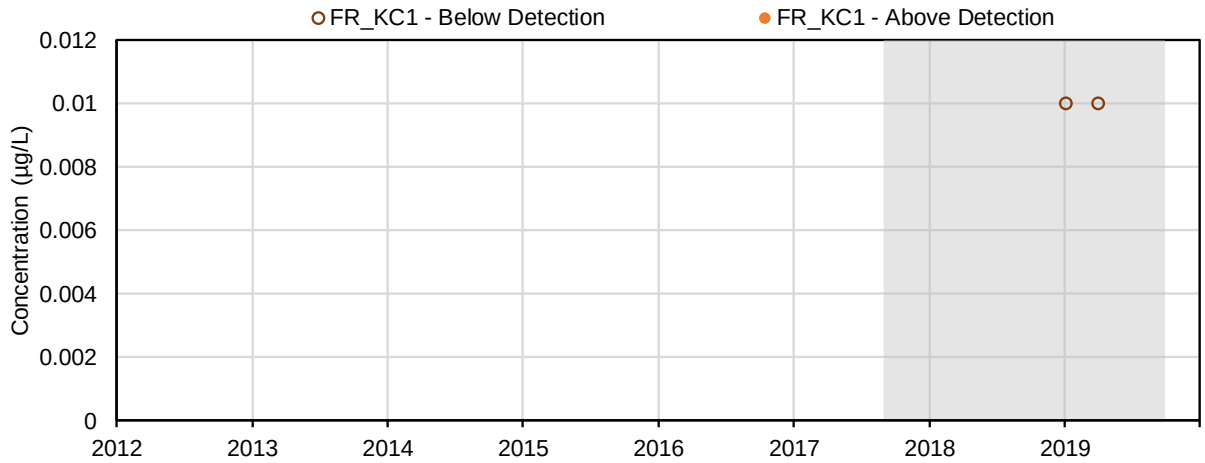
(121) Pyrene (µg/L); Parent PAHs



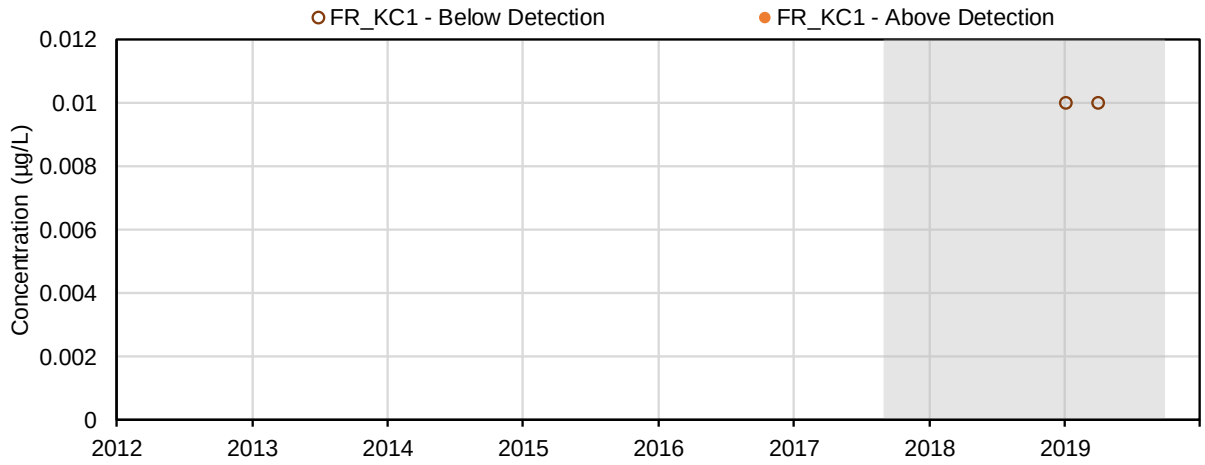
(122) Fluoranthene (µg/L); Parent PAHs



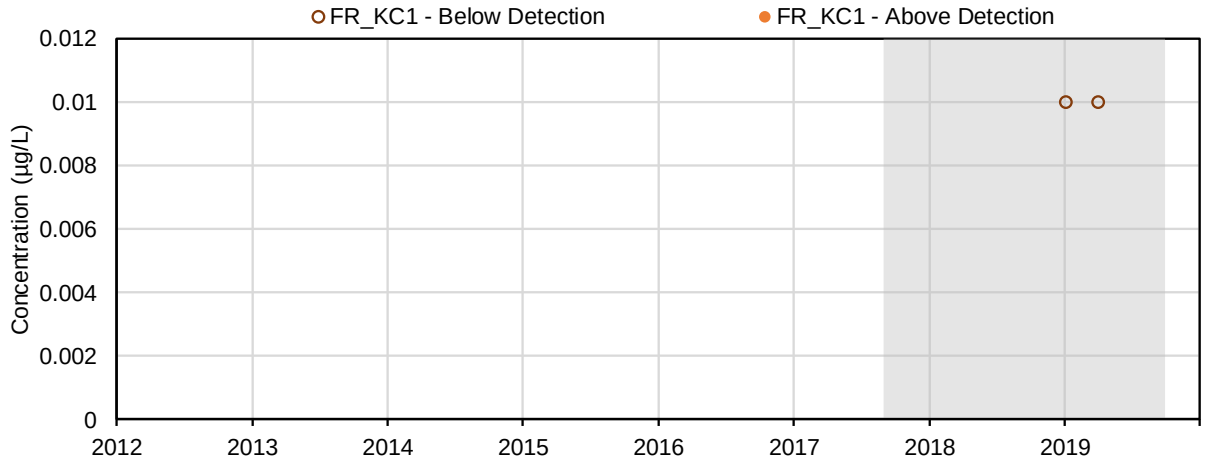
(123) Benzo(a)anthracene (µg/L); Parent PAHs



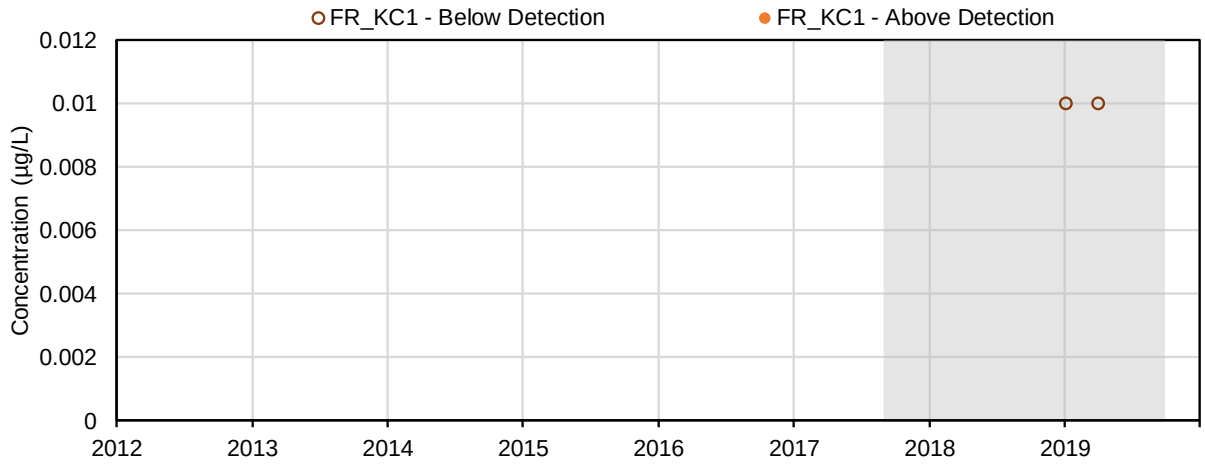
(124) Chrysene (µg/L); Parent PAHs



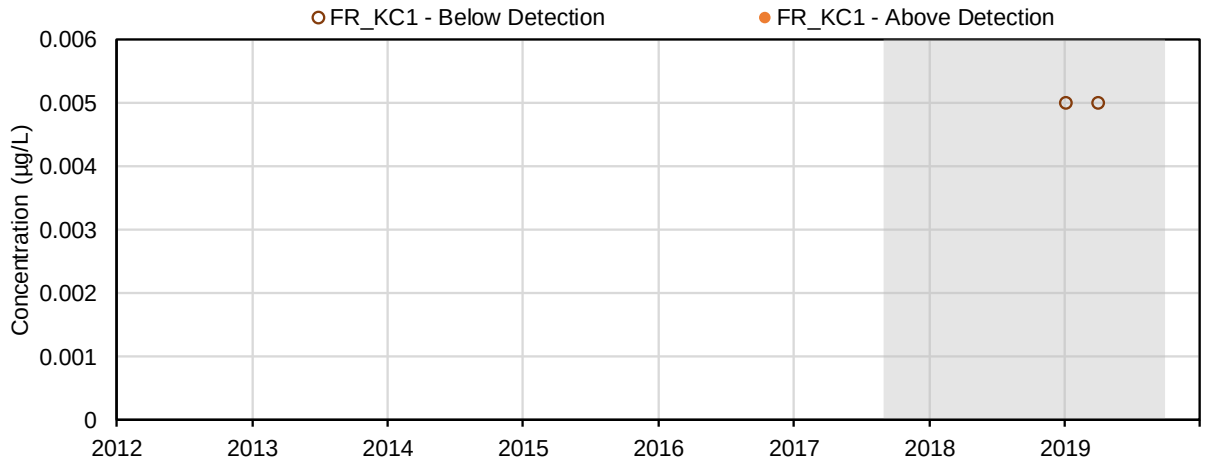
(125) Benzo(b,j)fluoranthene (µg/L); Parent PAHs



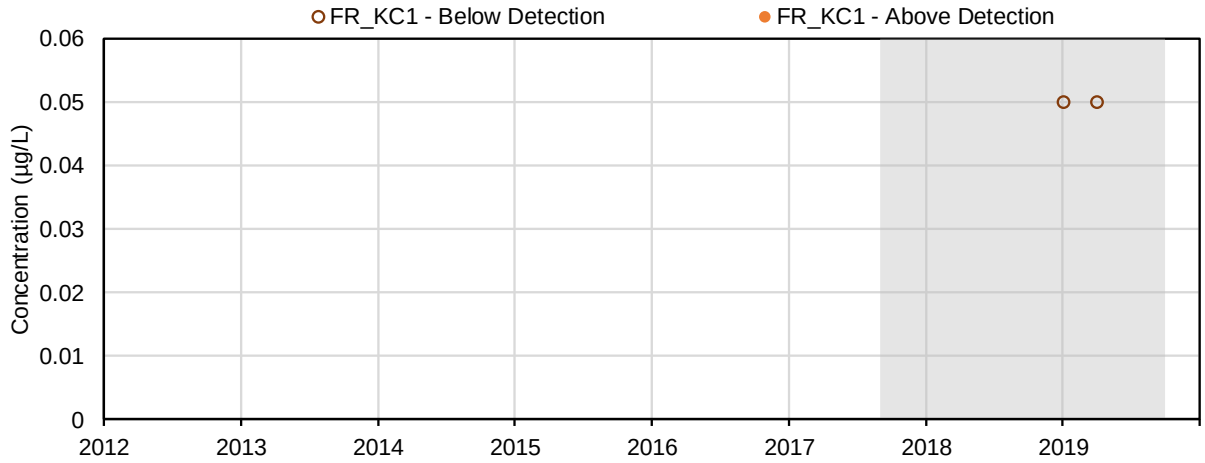
(126) Benzo(k)fluoranthene (µg/L); Parent PAHs



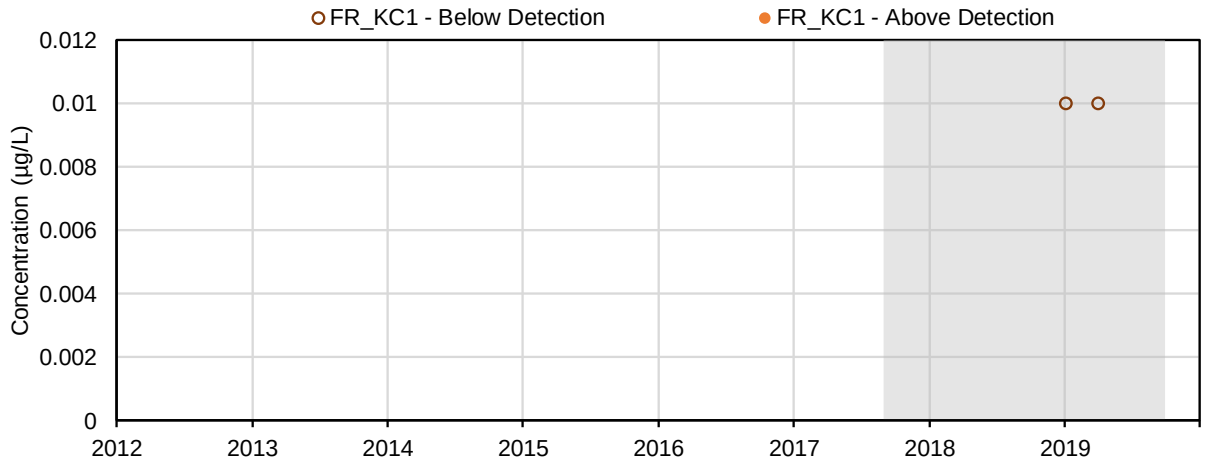
(127) Benzo(a)pyrene (µg/L); Parent PAHs



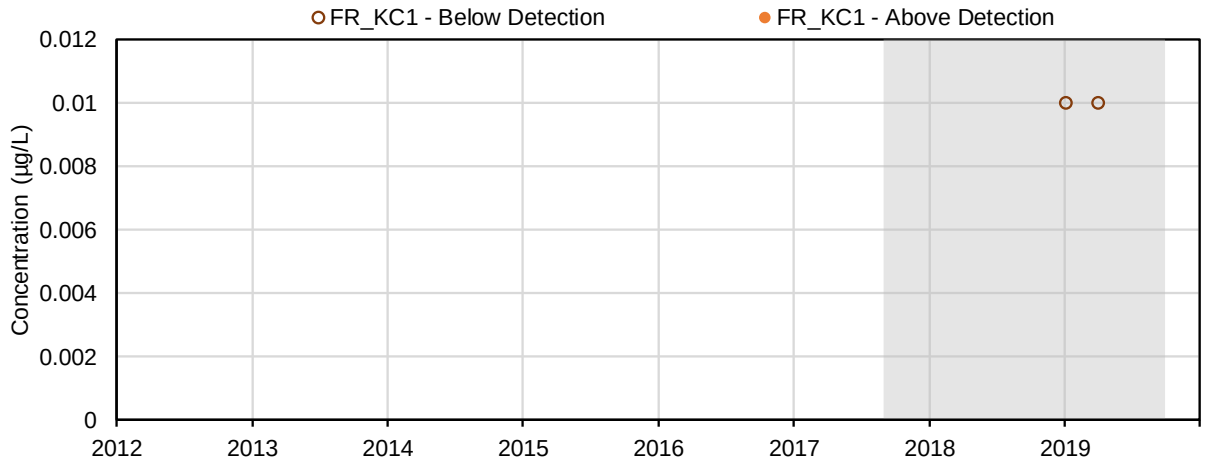
(128) Quinoline (µg/L); Parent PAHs



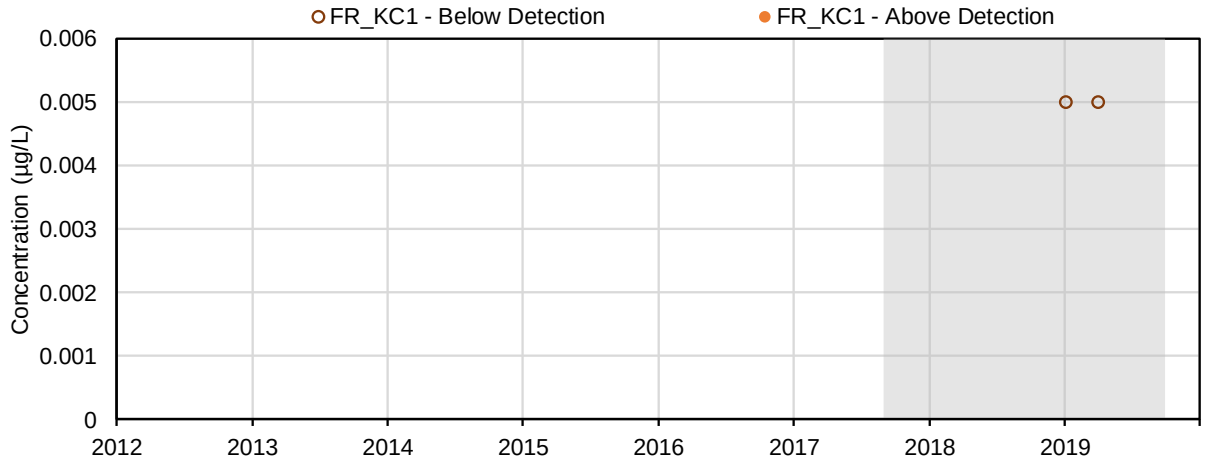
(129) Benzo(g,h,i)perylene (µg/L); Parent PAHs



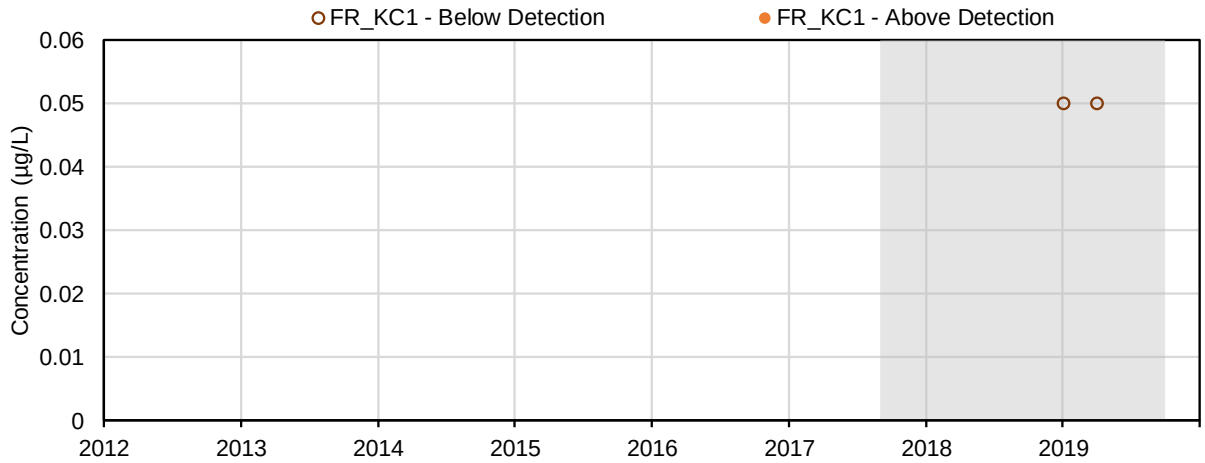
(130) Indeno(c,d-123)pyrene (µg/L); Parent PAHs



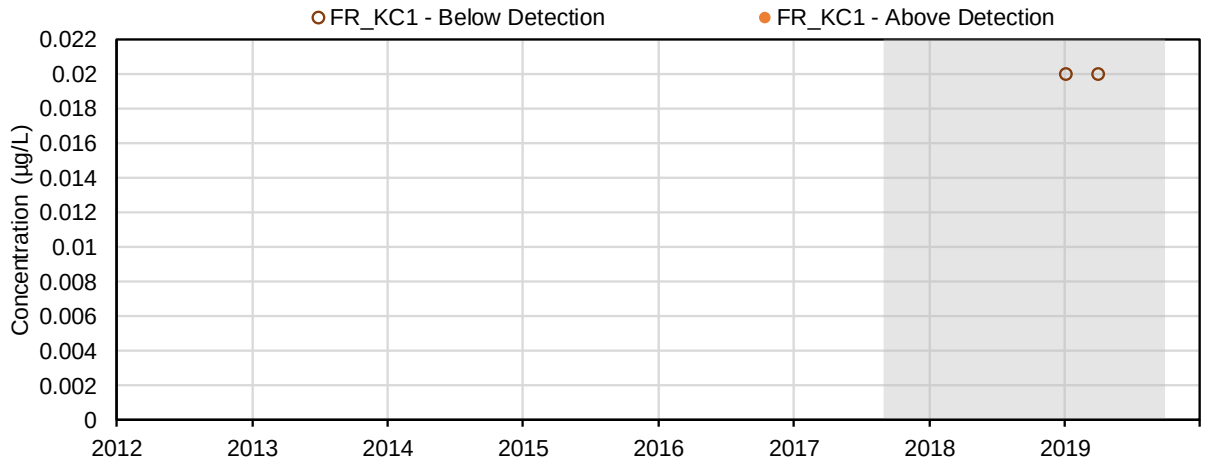
(131) Dibenzo(a,h)anthracene (µg/L); Parent PAHs



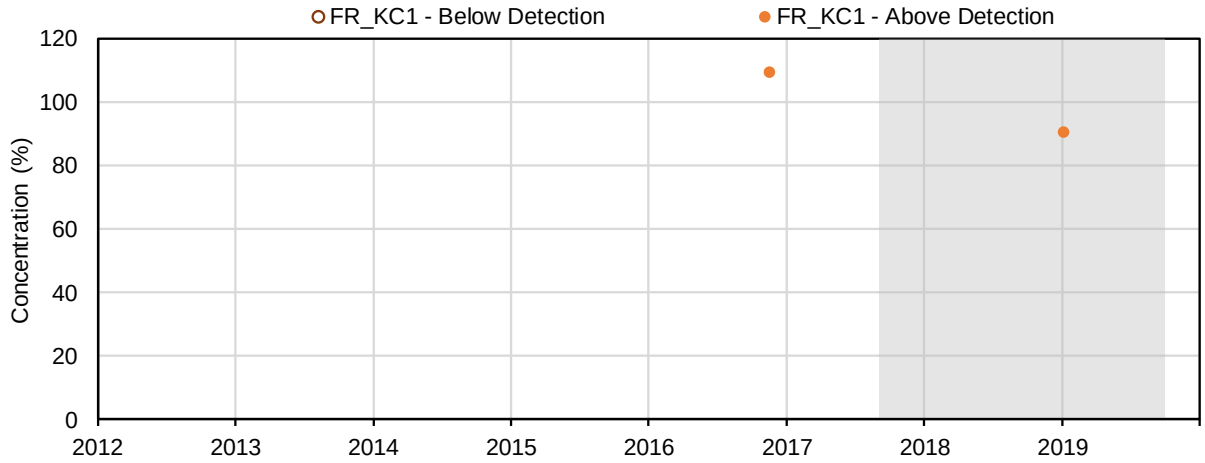
(132) 1-Methylnaphthalene (µg/L); Alkylated PAHs

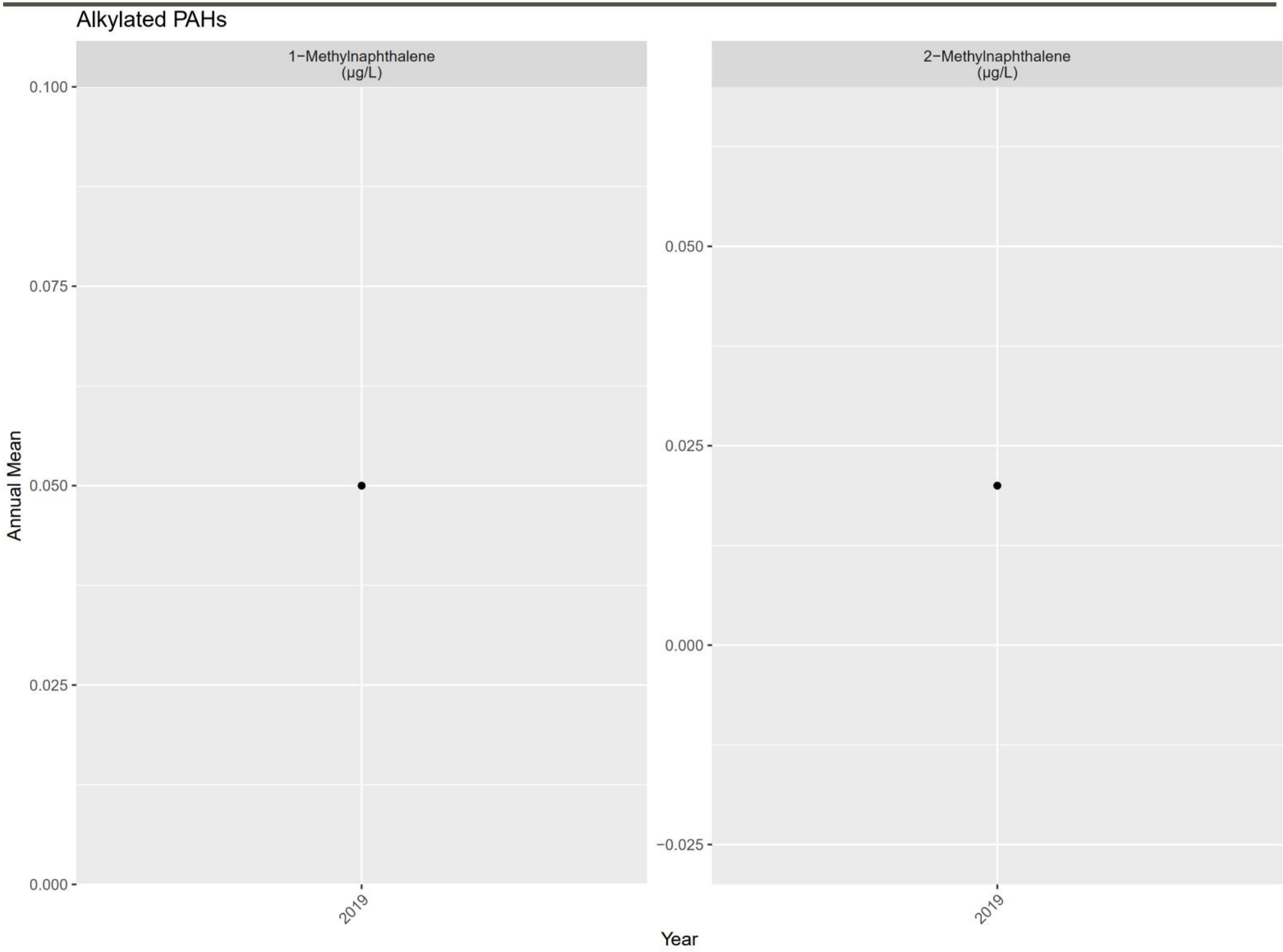


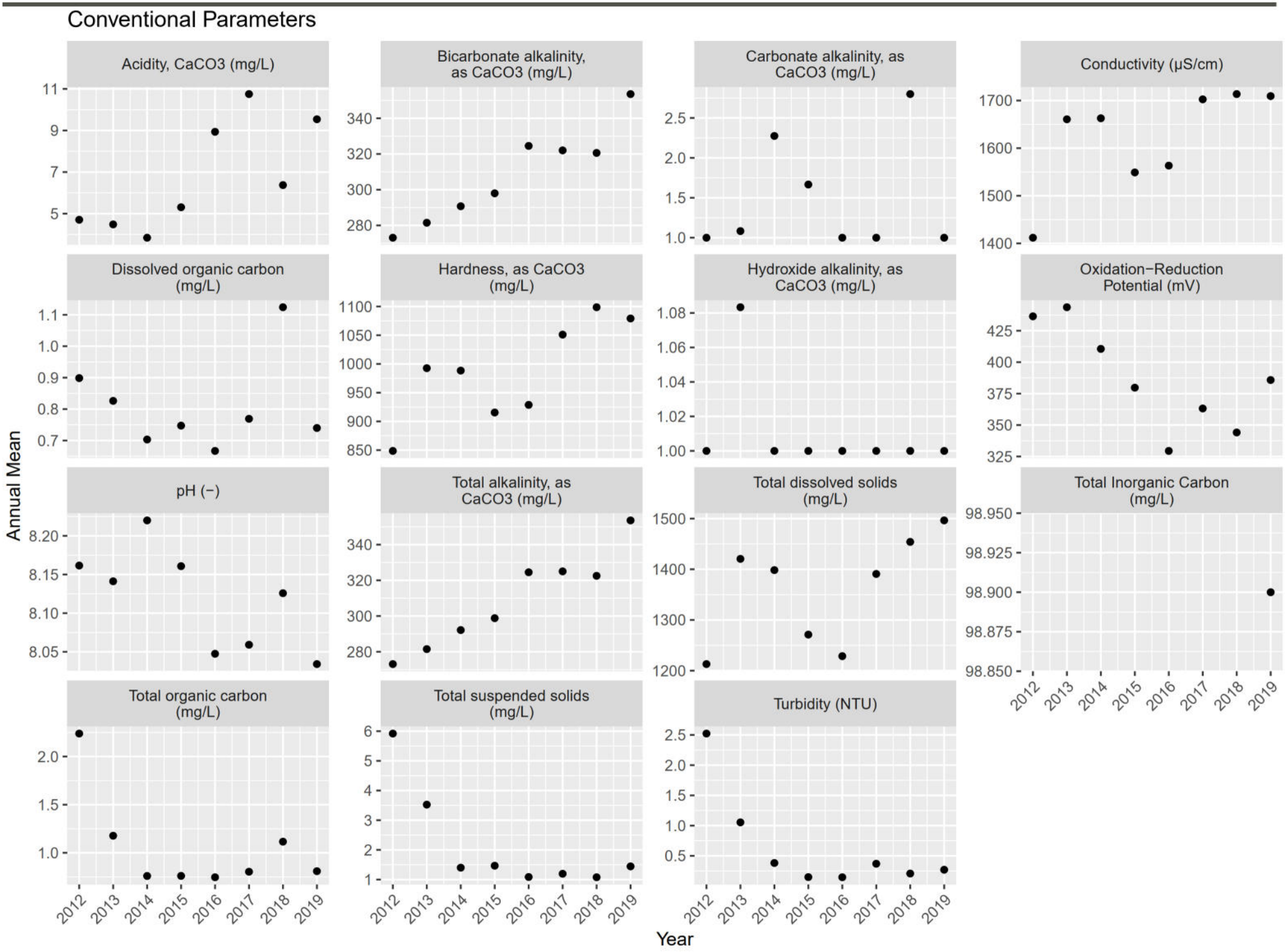
(133) 2-Methylnaphthalene (µg/L); Alkylated PAHs

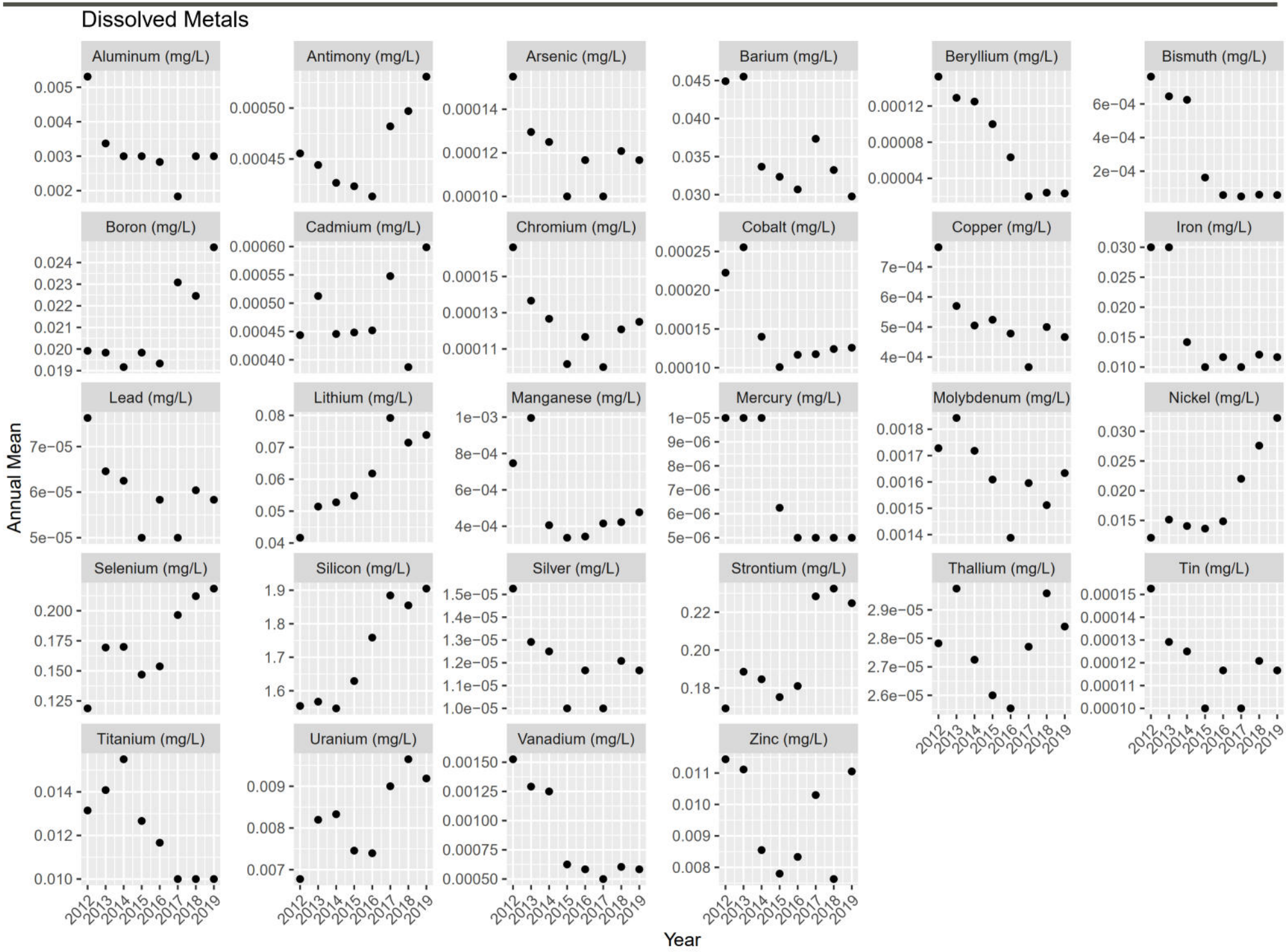


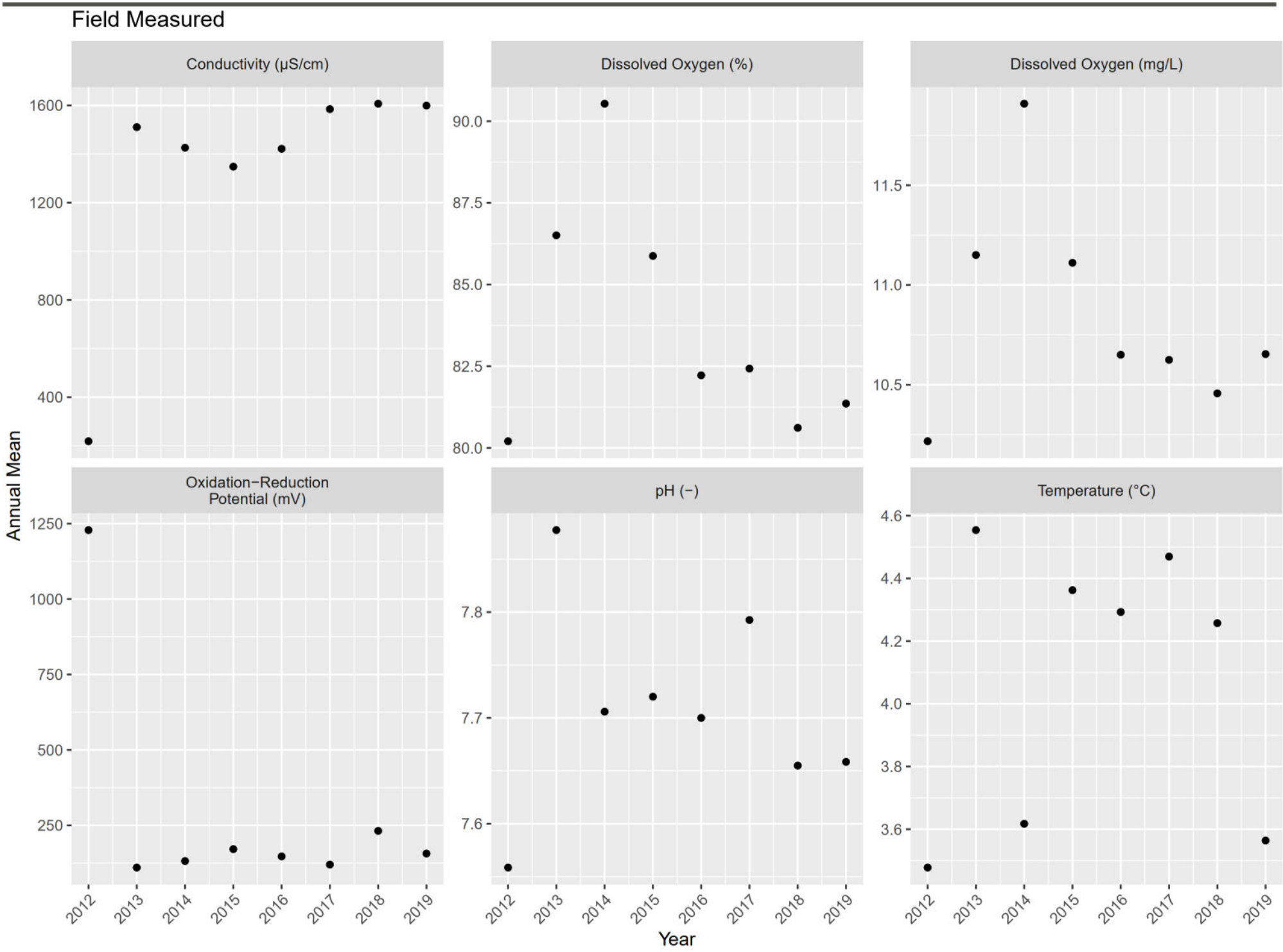
(134) 2-Bromobenzotrifluoride (%); Unknown

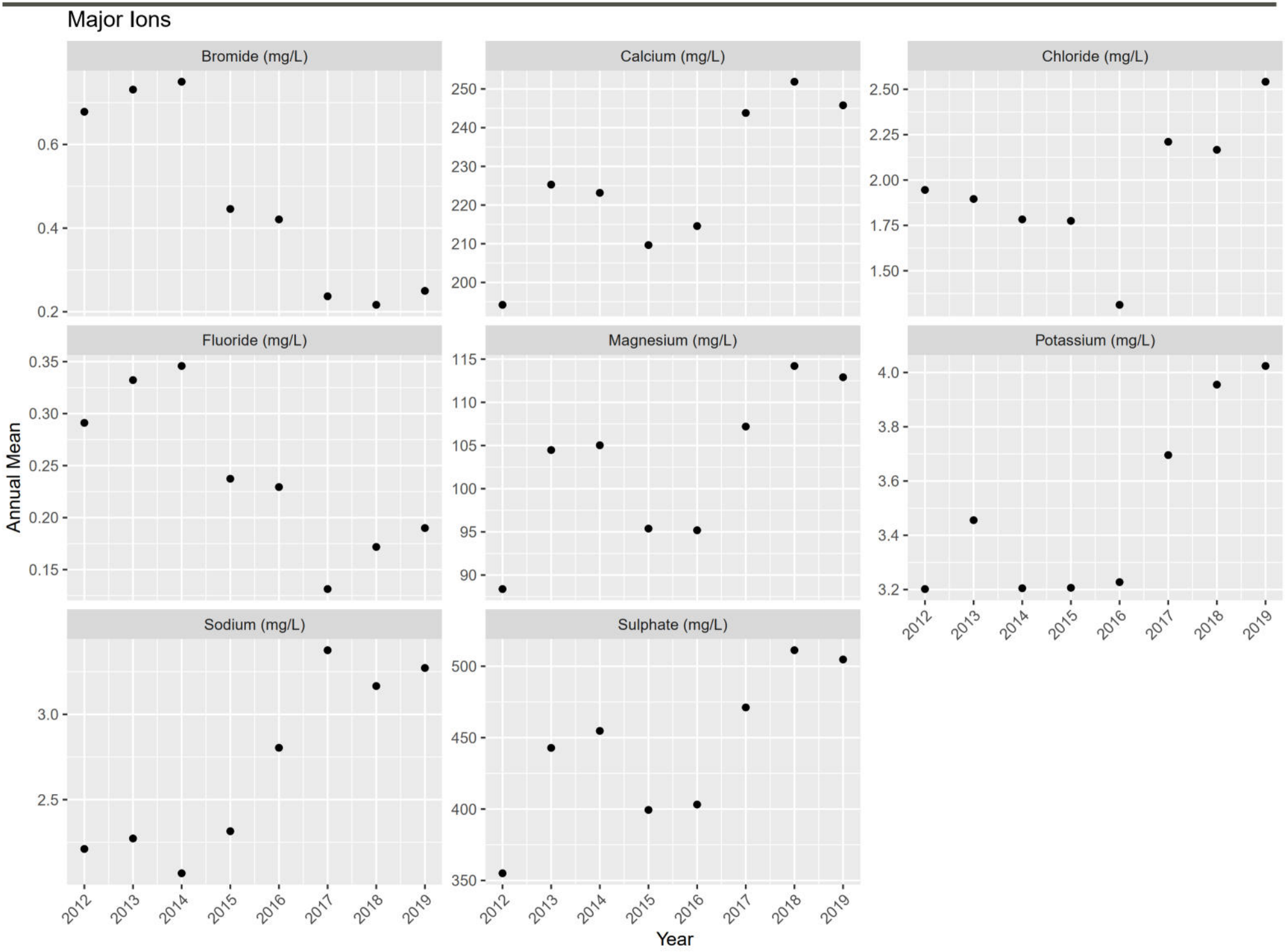


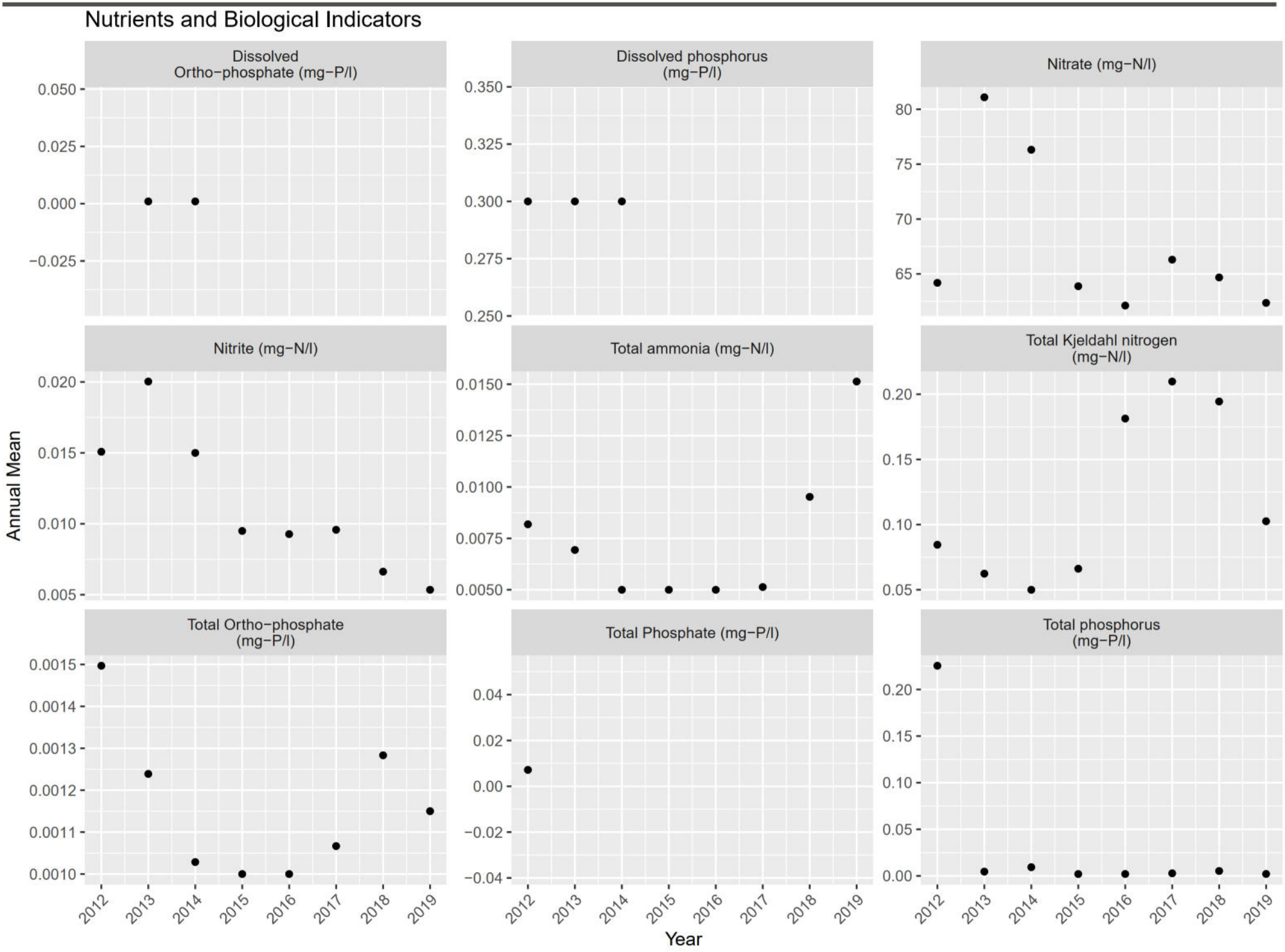

Alkylated PAHs
1−Methylnaphthalene (µg/L)
2−Methylnaphthalene (µg/L)
Annual Mean
0.100
0.075
0.050
0.025
0.000
0.050
0.025
0.000
−0.025
2019
2019
Year

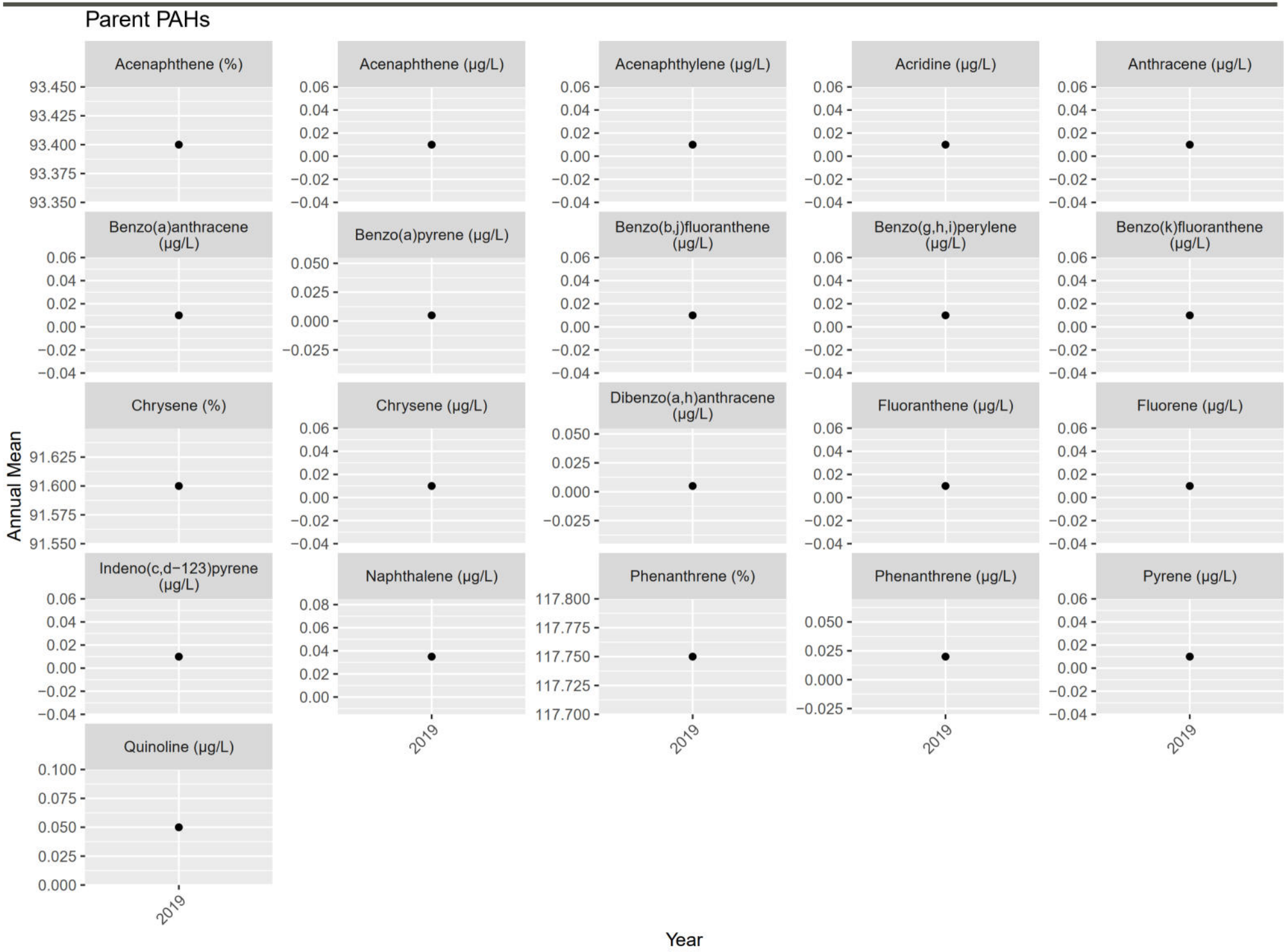

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total Inorganic Carbon (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

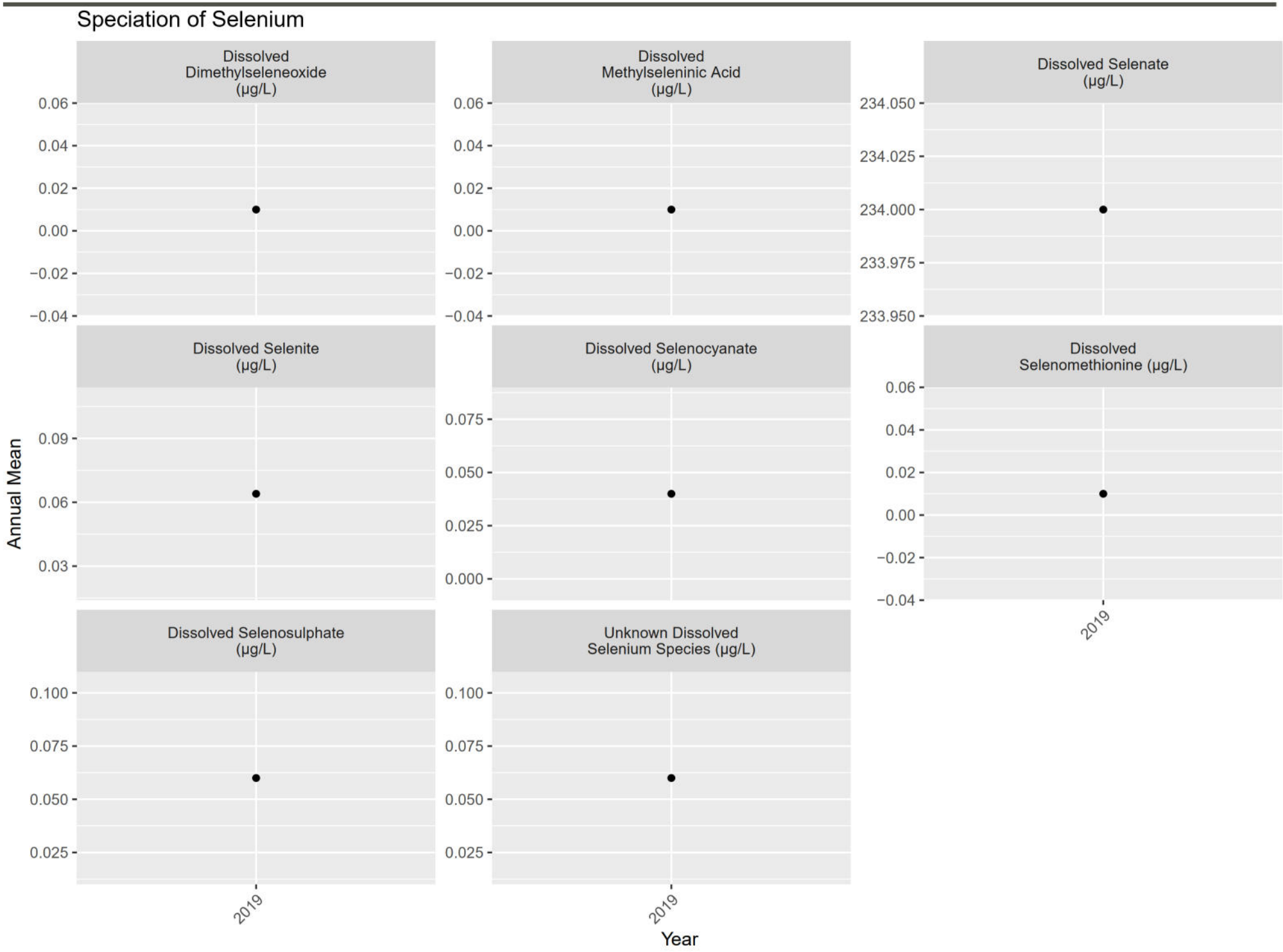

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

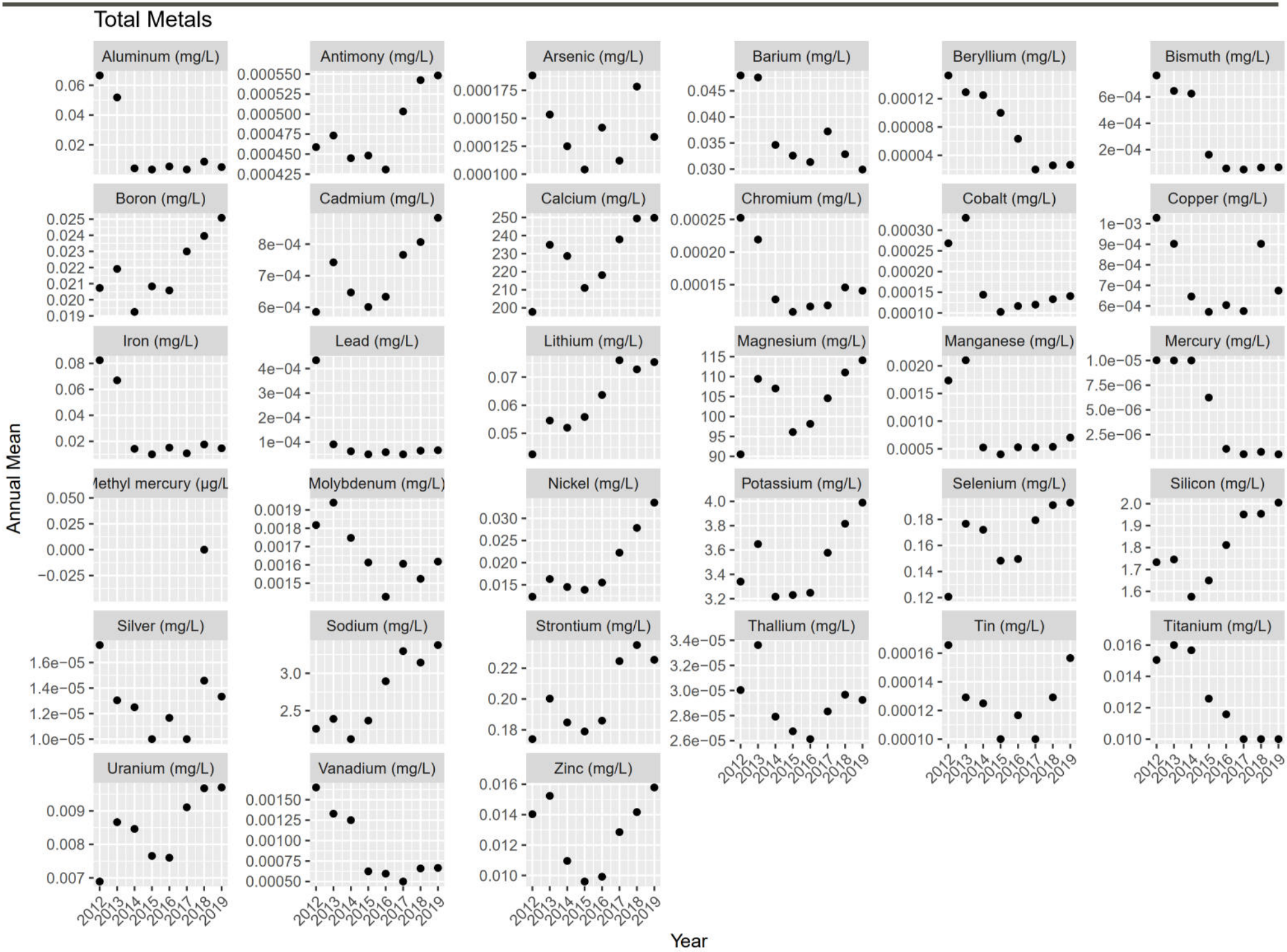

Field Measured
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Temperature (°C)
Annual Mean
Year
1600
1200
800
400
90.0
87.5
85.0
82.5
80.0
11.5
11.0
10.5
1250
1000
750
500
250
7.8
7.7
7.6
4.6
4.4
4.2
4.0
3.8
3.6
2012
2013
2014
2015
2016
2017
2018
2019

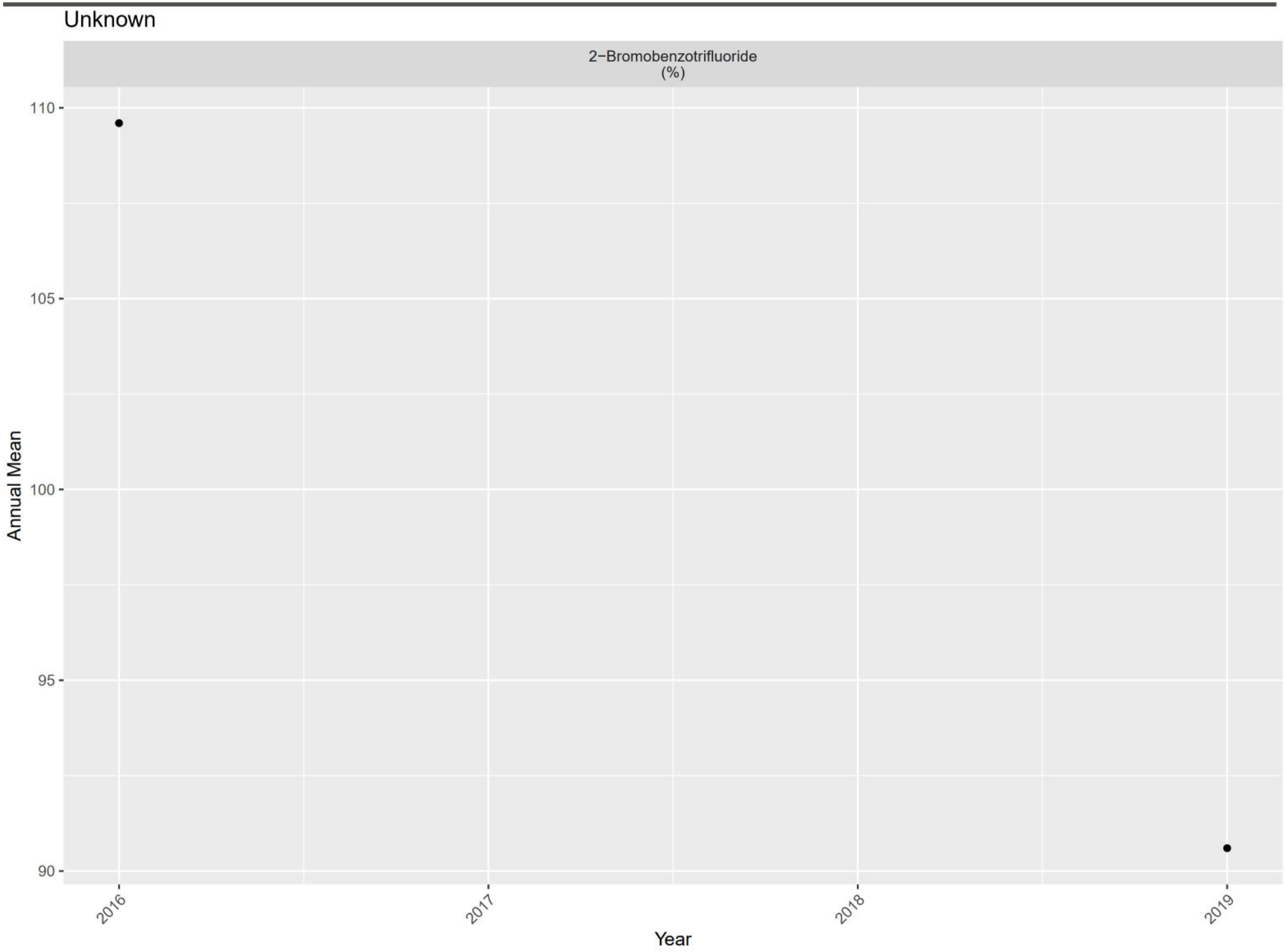

Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

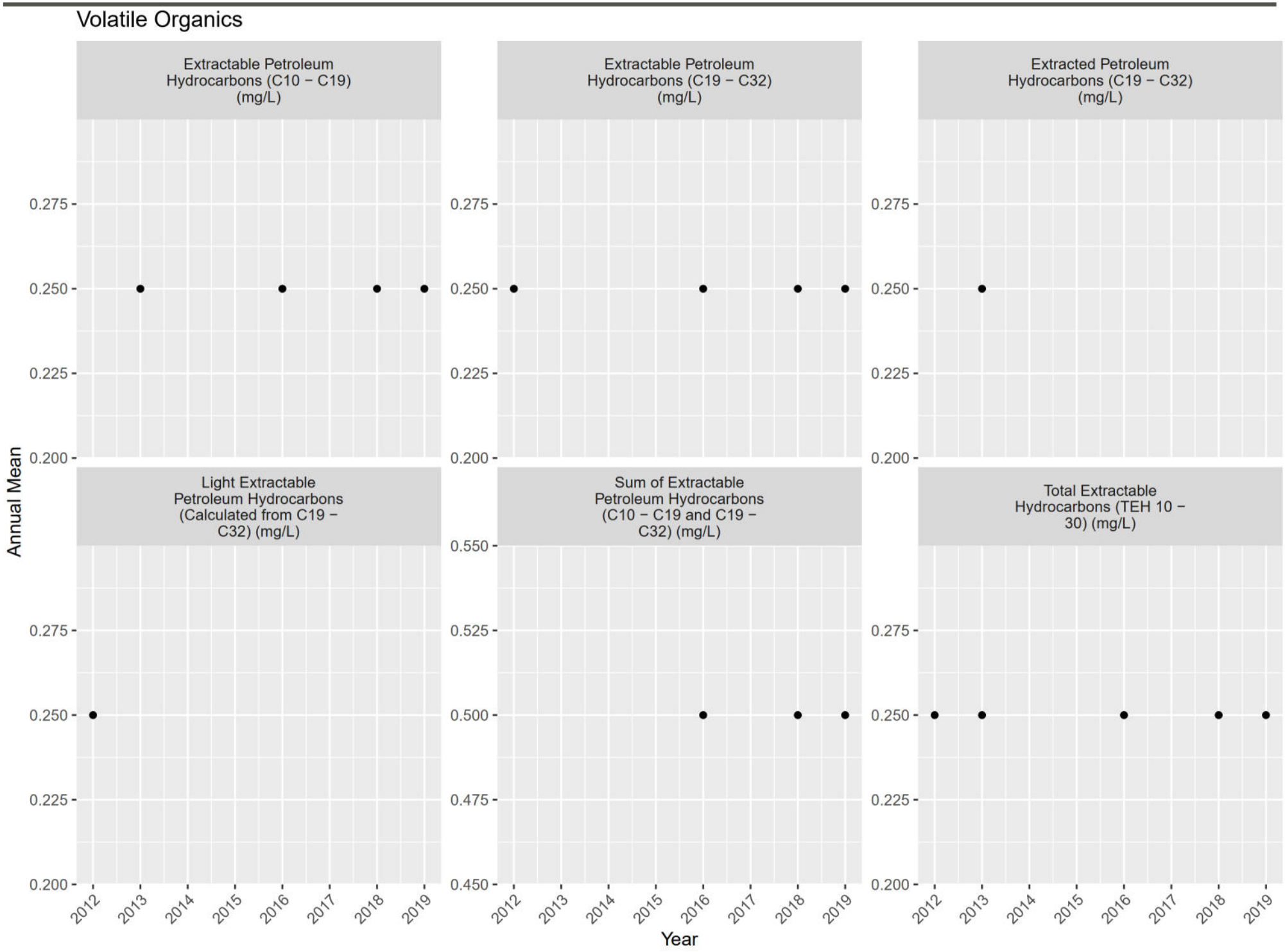

Nutrients and Biological Indicators
Dissolved Ortho−phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Parent PAHs
Acenaphthene (%)
93.450
93.425
93.400
93.375
93.350
Acenaphthene (µg/L)
Acenaphthylene (µg/L)
Acridine (µg/L)
Anthracene (µg/L)
0.06
0.04
0.02
0.00
−0.02
−0.04
Benzo(a)anthracene (µg/L)
Benzo(a)pyrene (µg/L)
0.050
0.025
0.000
−0.025
Benzo(b,j)fluoranthene (µg/L)
Benzo(g,h,i)perylene (µg/L)
Benzo(k)fluoranthene (µg/L)
Chrysene (%)
91.625
91.600
91.575
91.550
Chrysene (µg/L)
Dibenzo(a,h)anthracene (µg/L)
Fluoranthene (µg/L)
Fluorene (µg/L)
Indeno(c,d−123)pyrene (µg/L)
Naphthalene (µg/L)
0.08
Phenanthrene (%)
117.800
117.775
117.750
117.725
117.700
Phenanthrene (µg/L)
Pyrene (µg/L)
Quinoline (µg/L)
0.100
0.075
2019
Annual Mean
Year


Speciation of Selenium
Dissolved Dimethylseleneoxide (µg/L)
Dissolved Methylseleninic Acid (µg/L)
Dissolved Selenate (µg/L)
Dissolved Selenite (µg/L)
Dissolved Selenocyanate (µg/L)
Dissolved Selenomethionine (µg/L)
Dissolved Selenosulphate (µg/L)
Unknown Dissolved Selenium Species (µg/L)
Annual Mean
Year
2019


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Methyl mercury (µg/L
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year

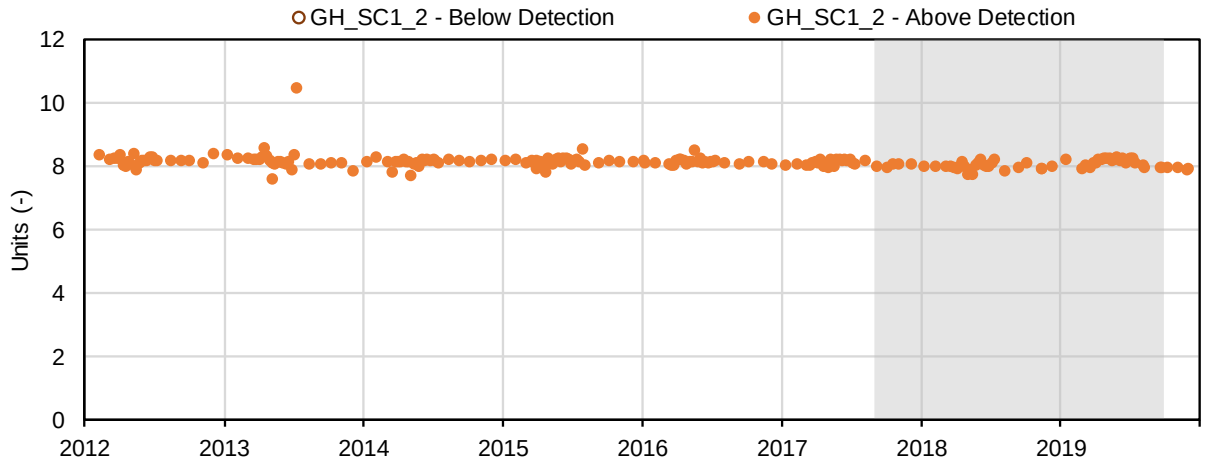

Unknown
2−Bromobenzotrifluoride
(%)
110
105
100
95
90
Annual Mean
2016
2017
2018
2019
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extractable Petroleum Hydrocarbons (C19 − C32) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Light Extractable Petroleum Hydrocarbons (Calculated from C19 − C32) (mg/L)
Sum of Extractable Petroleum Hydrocarbons (C10 − C19 and C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
Year
0.200
0.225
0.250
0.275
0.450
0.475
0.500
0.525
0.550
2012
2013
2014
2015
2016
2017
2018
2019

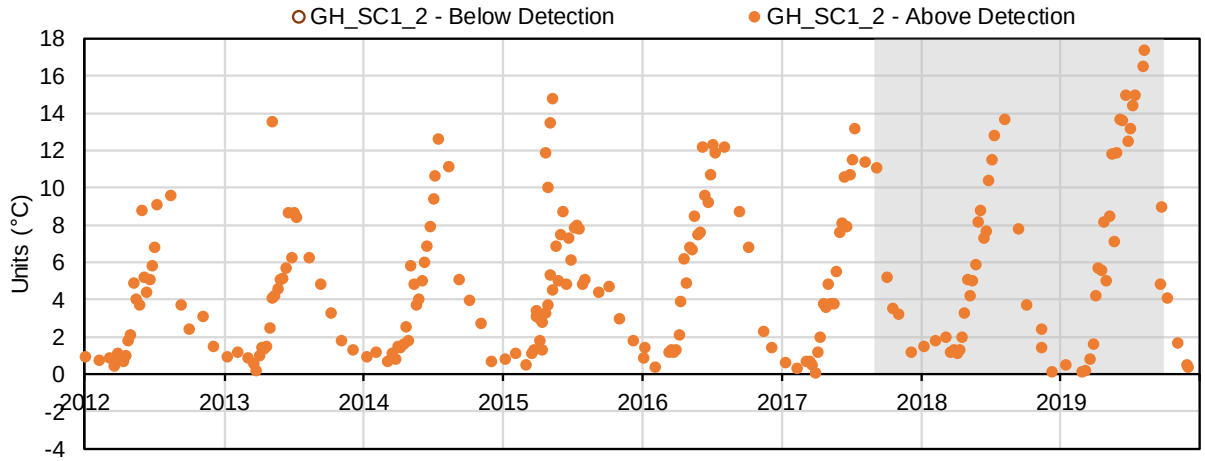
ATTACHMENT F23

GH_SC1-2 Plots

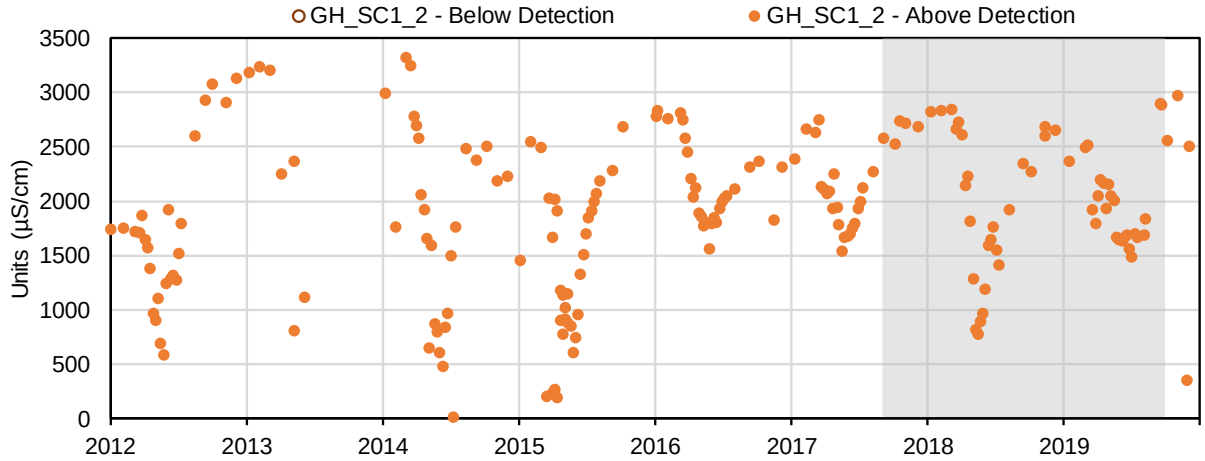
(1) pH (-); Field Measured



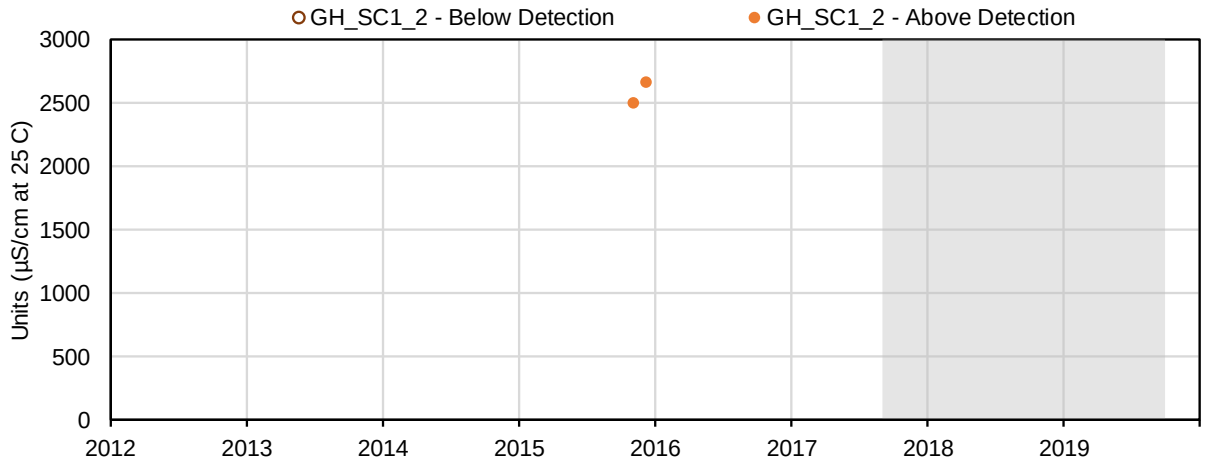
(2) Temperature (°C); Field Measured



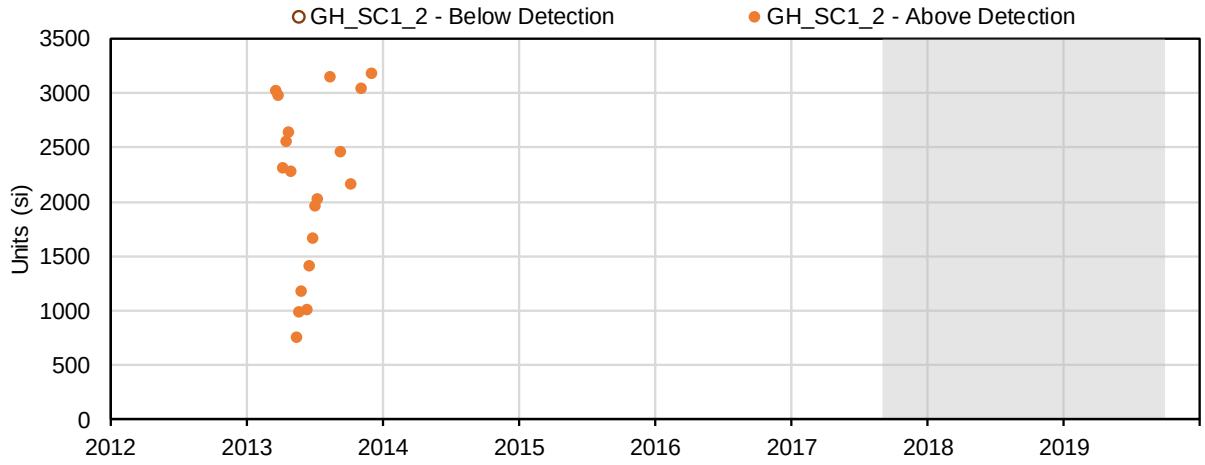
(3) Conductivity (µS/cm); Field Measured



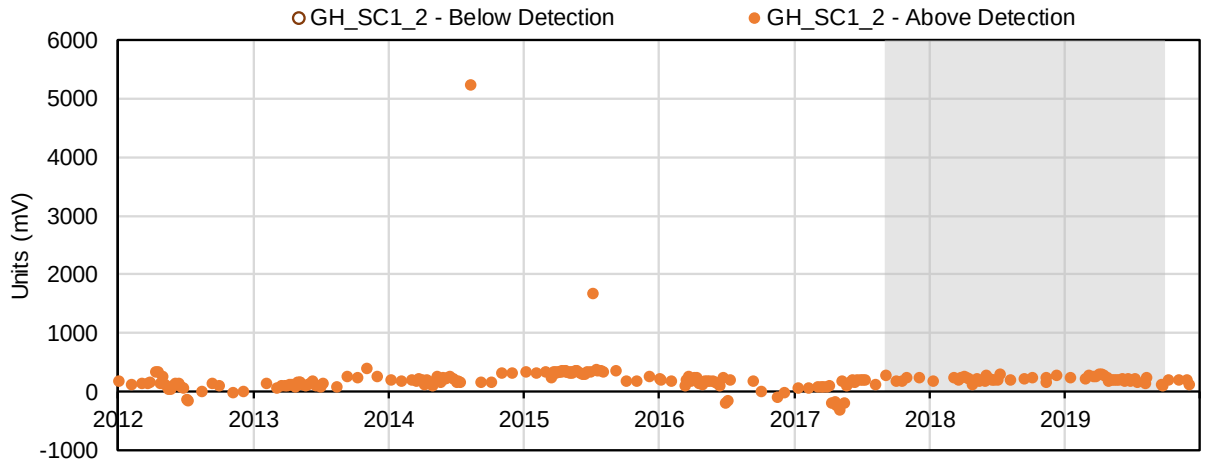
(4) Conductivity (µS/cm at 25 C); Field Measured



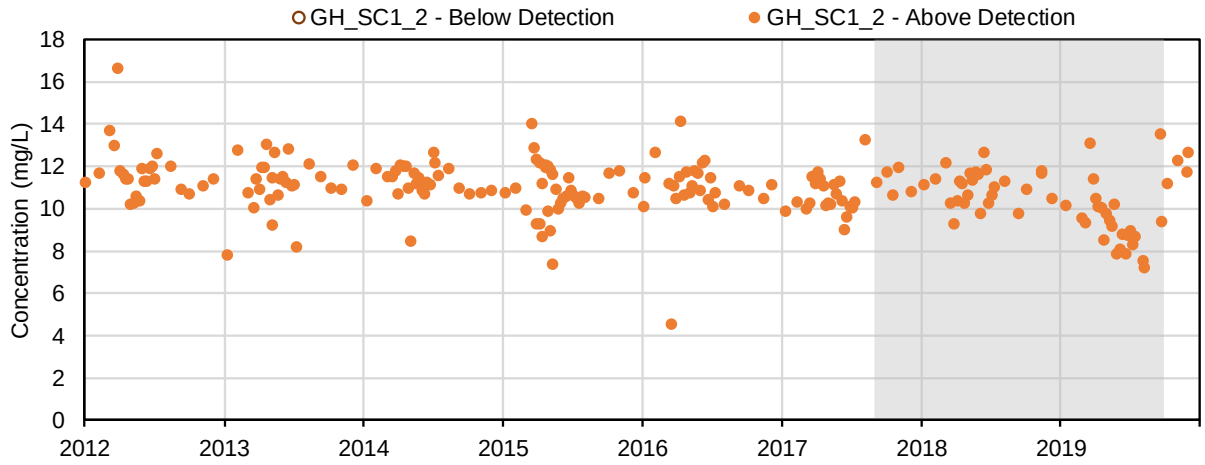
(5) Conductivity (si); Field Measured



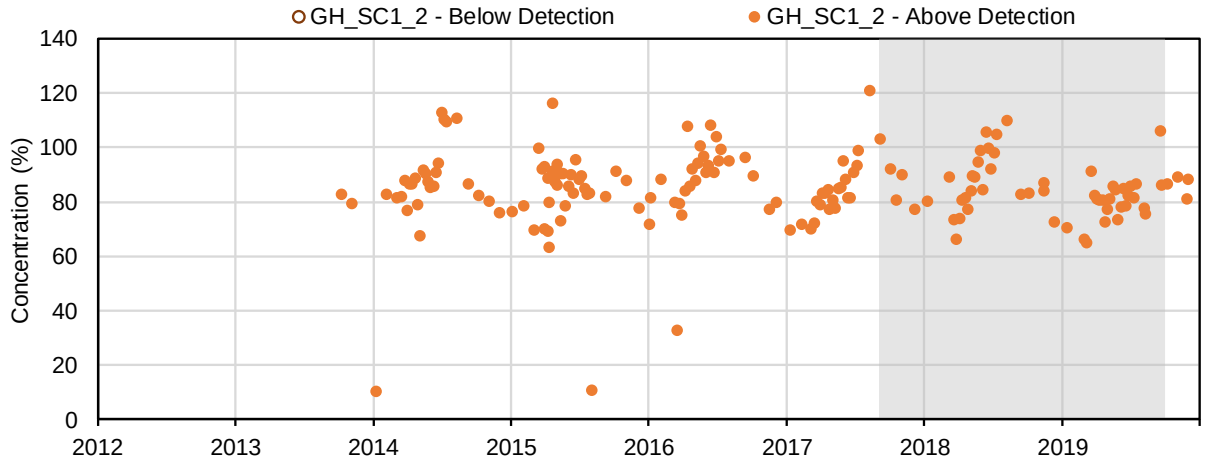
(6) Oxidation-Reduction Potential (mV); Field Measured



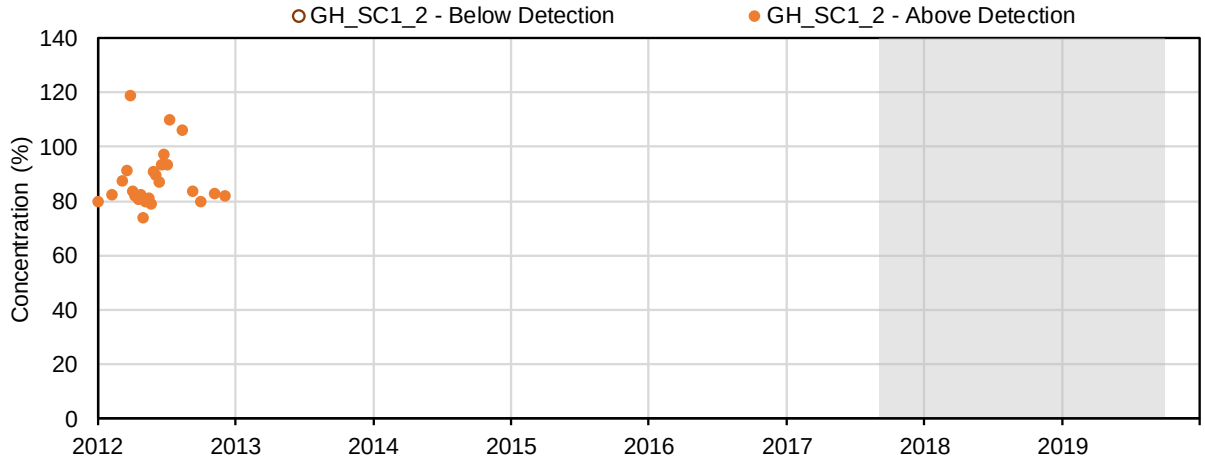
(7) Dissolved Oxygen (mg/L); Field Measured



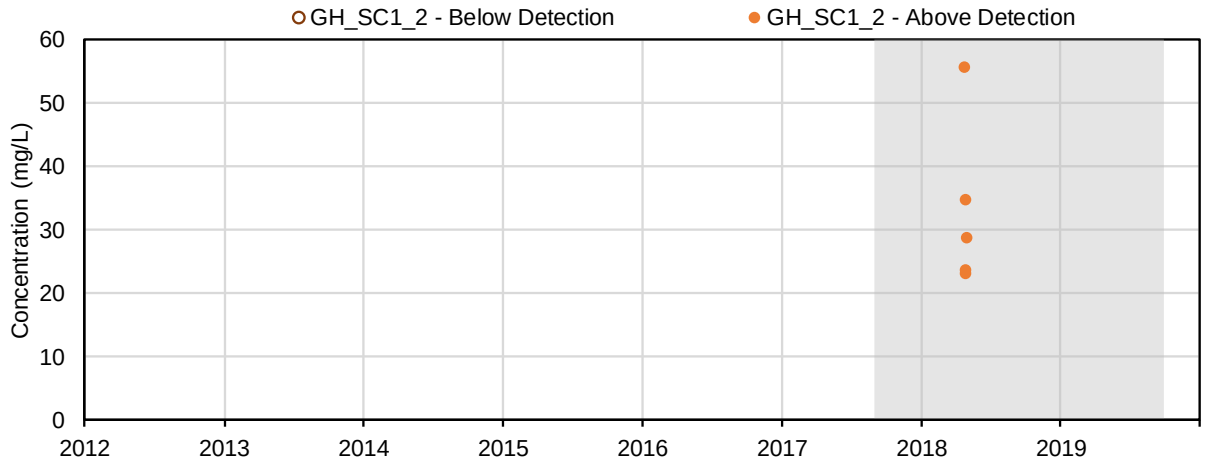
(8) Dissolved Oxygen (%); Field Measured



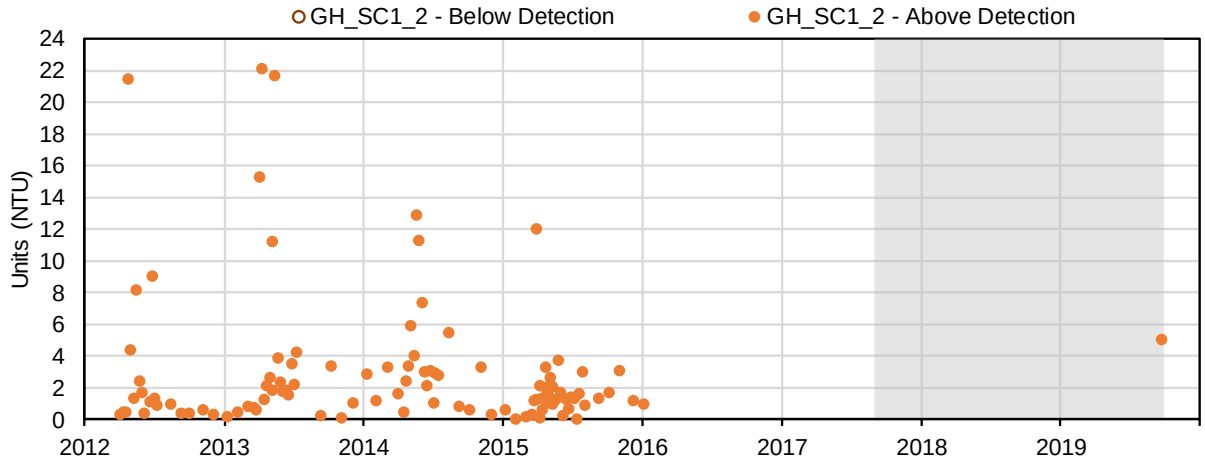
(9) Oxygen Saturation (%); Field Measured



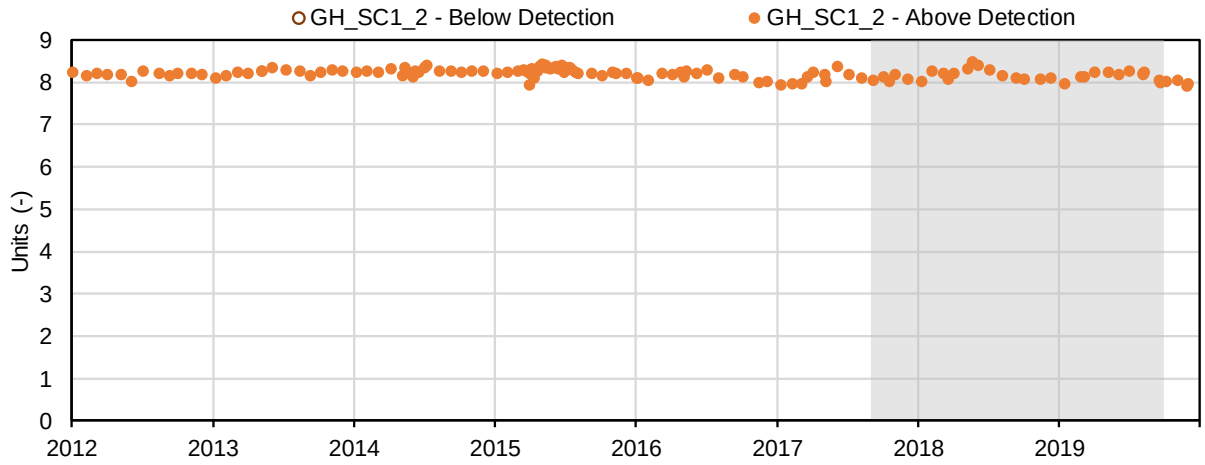
(10) Total Suspended Solids (mg/L); Field Measured



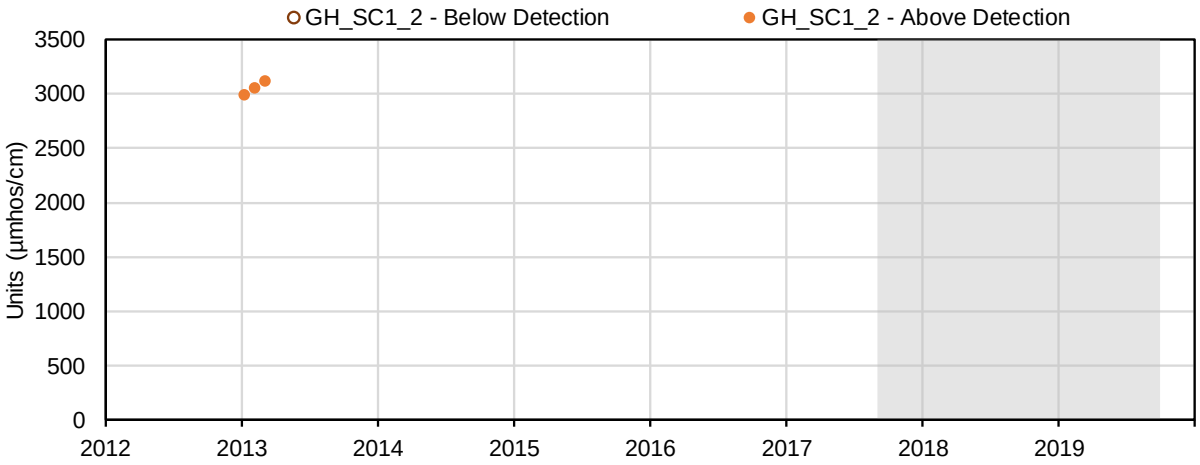
(11) Turbidity (NTU); Field Measured



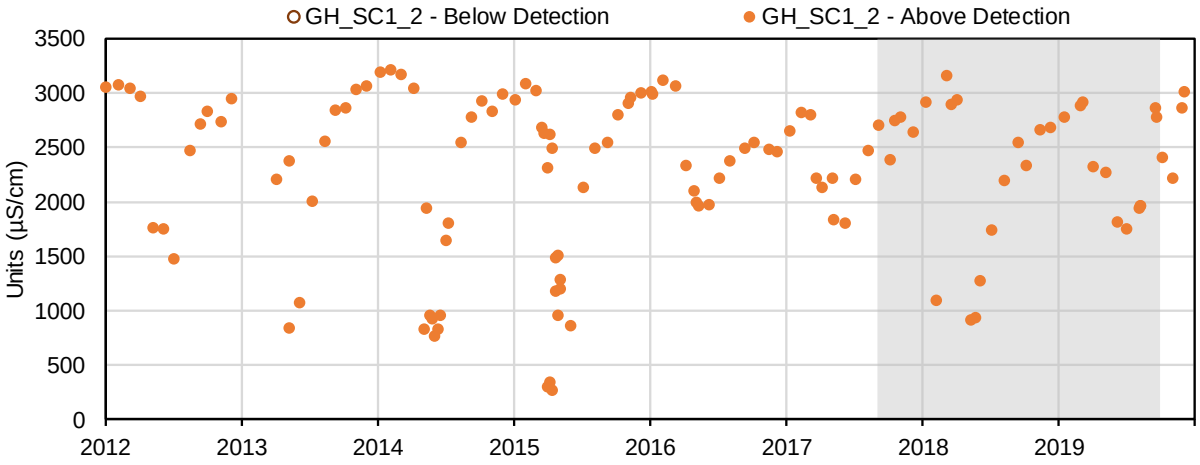
(12) pH (-); Conventional Parameters



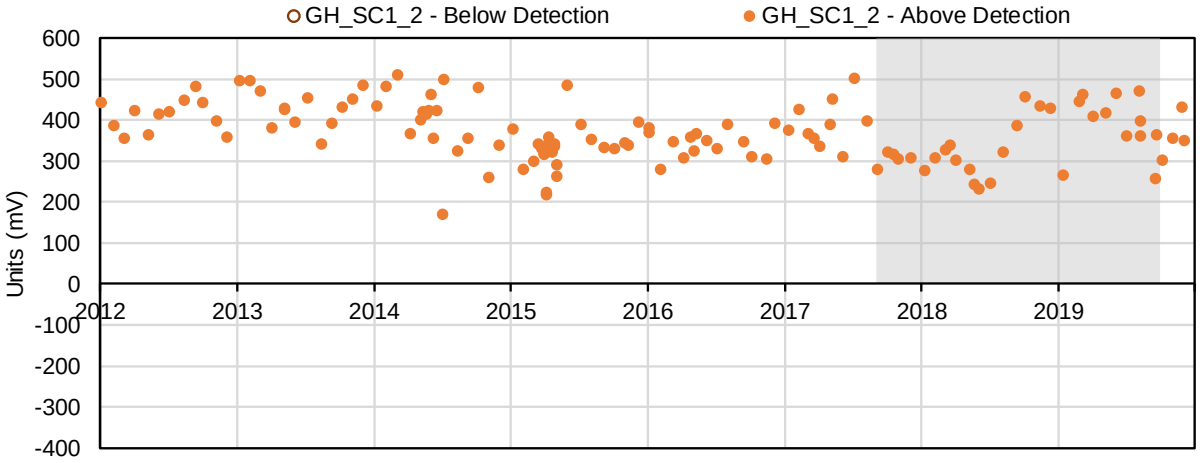
(13) Conductivity (µmhos/cm); Conventional Parameters



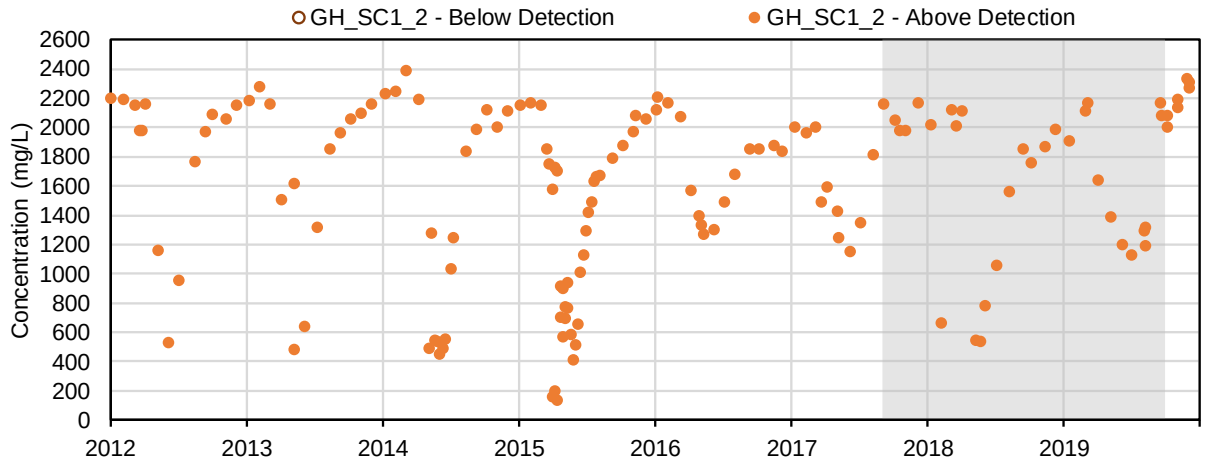
(14) Conductivity (µS/cm); Conventional Parameters



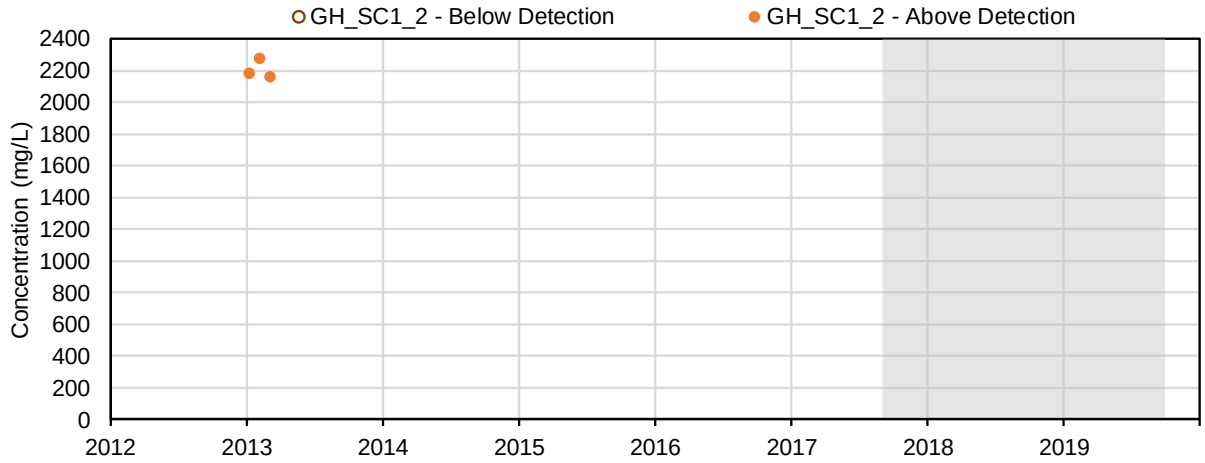
(15) Oxidation-Reduction Potential (mV); Conventional Parameters



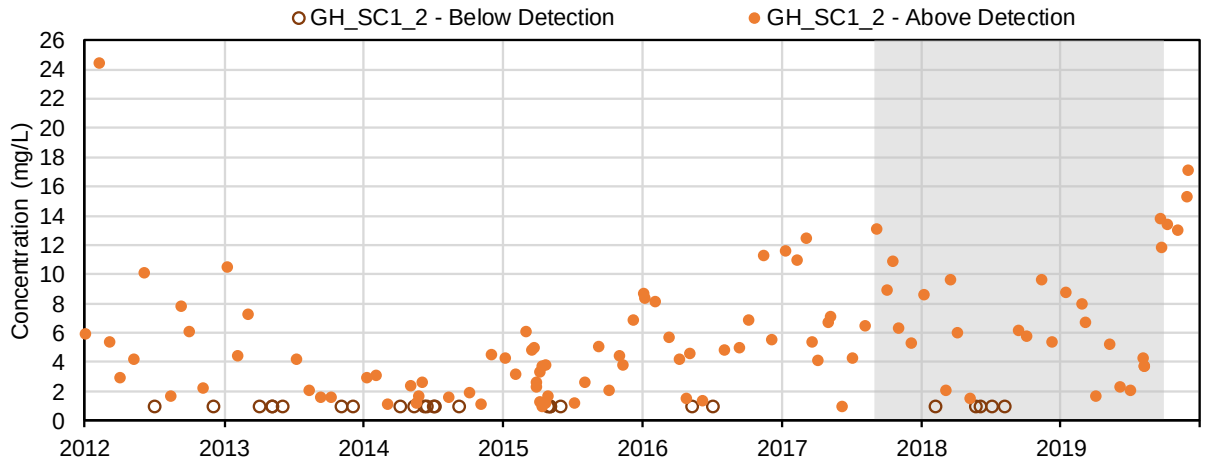
(16) Hardness, as CaCO3 (mg/L); Conventional Parameters



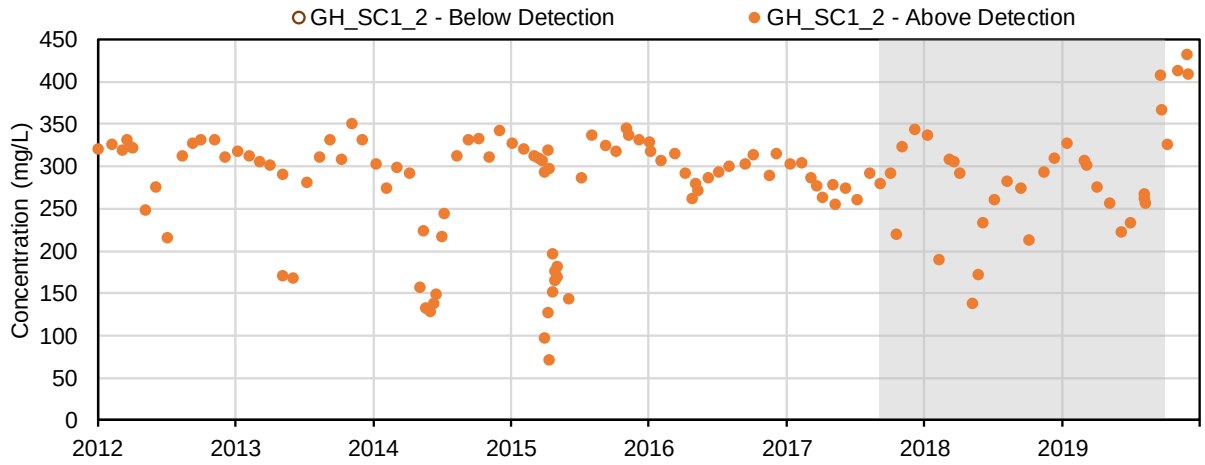
(17) Hardness, as CaCO3 (Calculated) (mg/L); Conventional Parameters



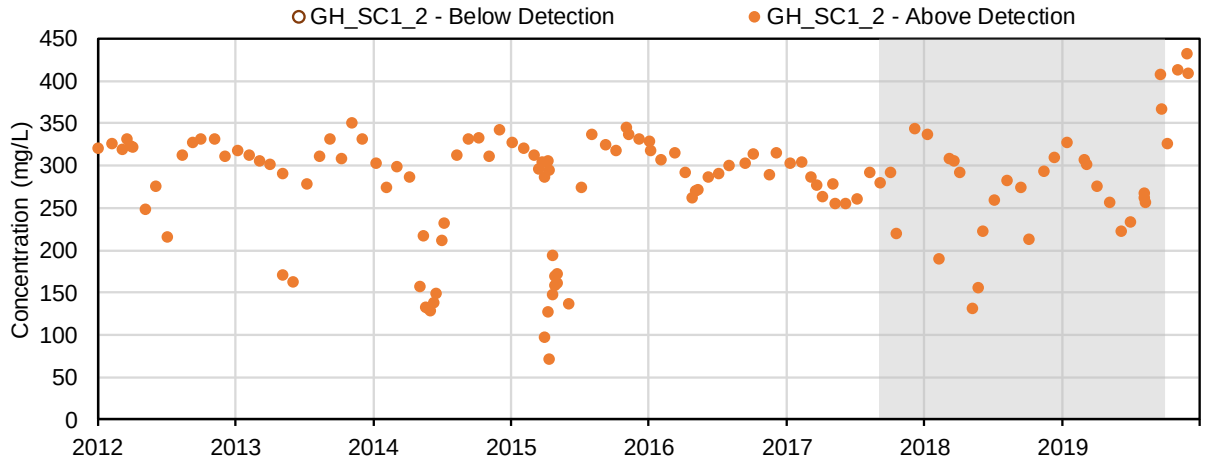
(18) Acidity, CaCO3 (mg/L); Conventional Parameters



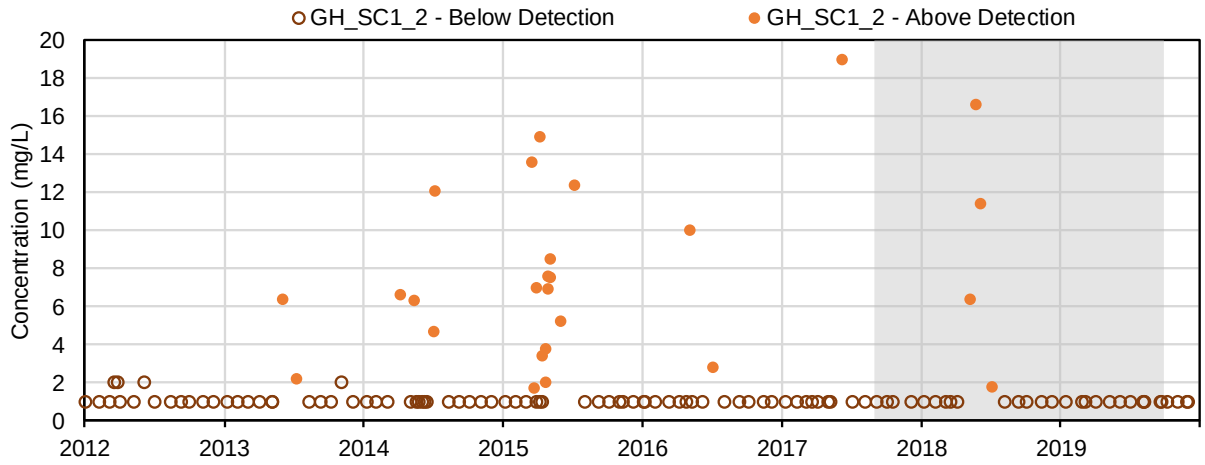
(19) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



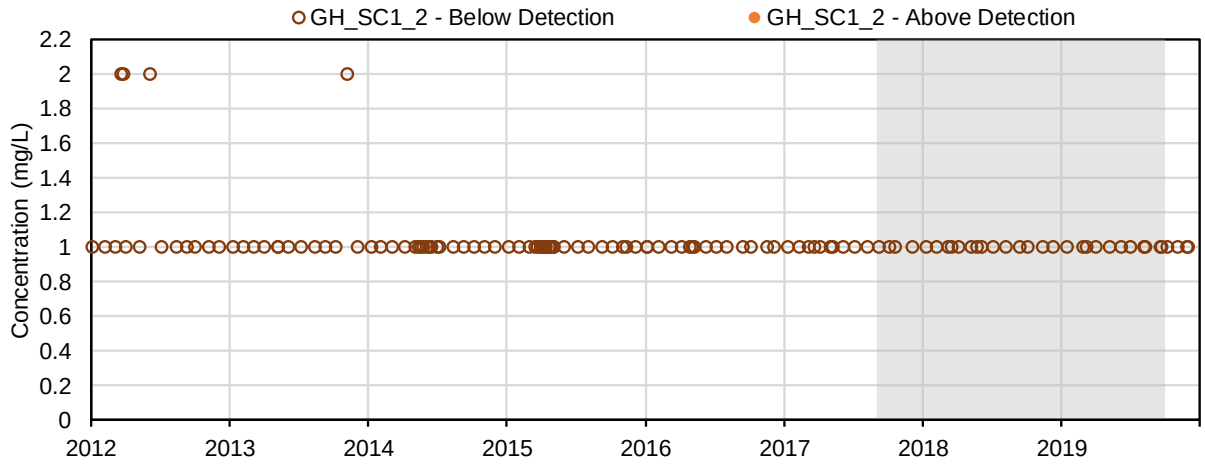
(20) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



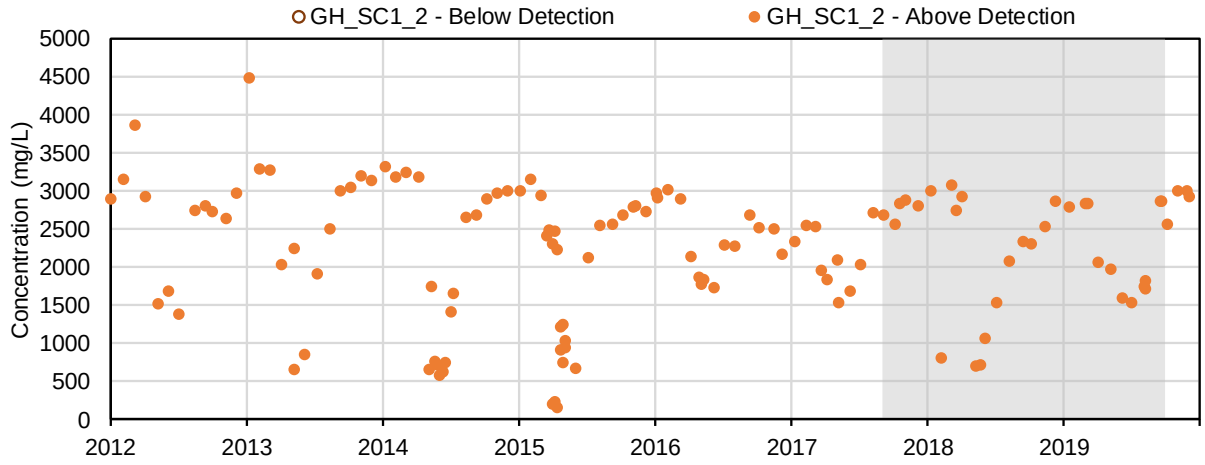
(21) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



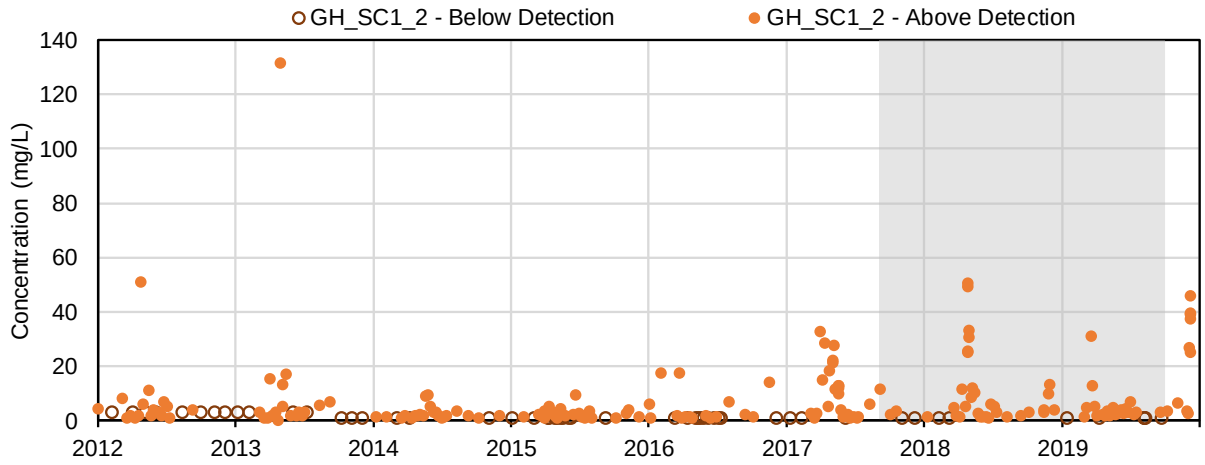
(22) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



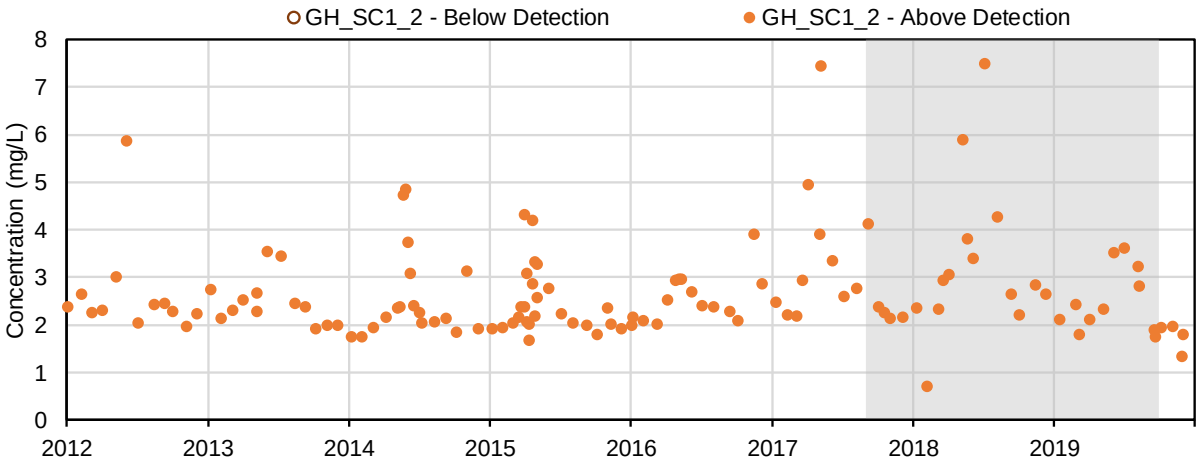
(23) Total dissolved solids (mg/L); Conventional Parameters



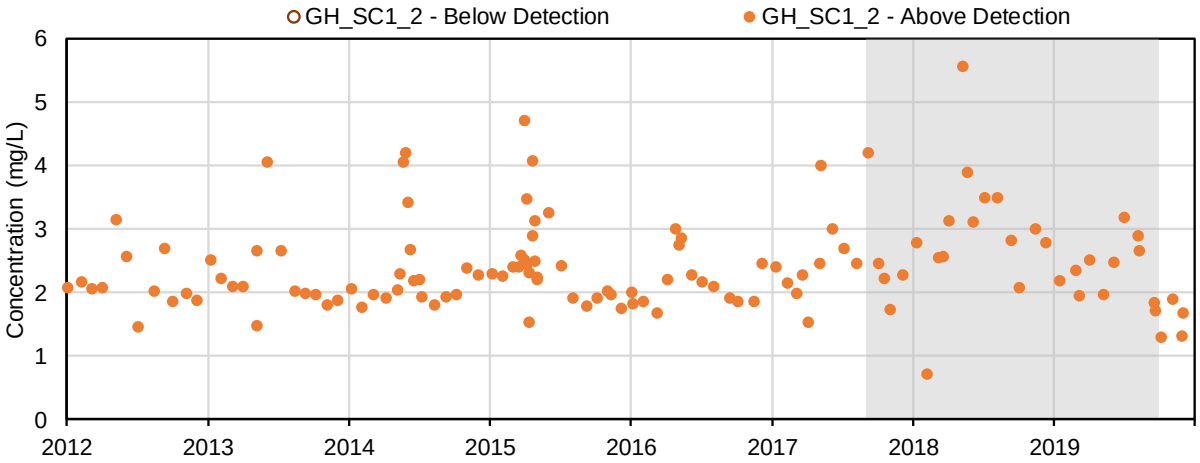
(24) Total suspended solids (mg/L); Conventional Parameters



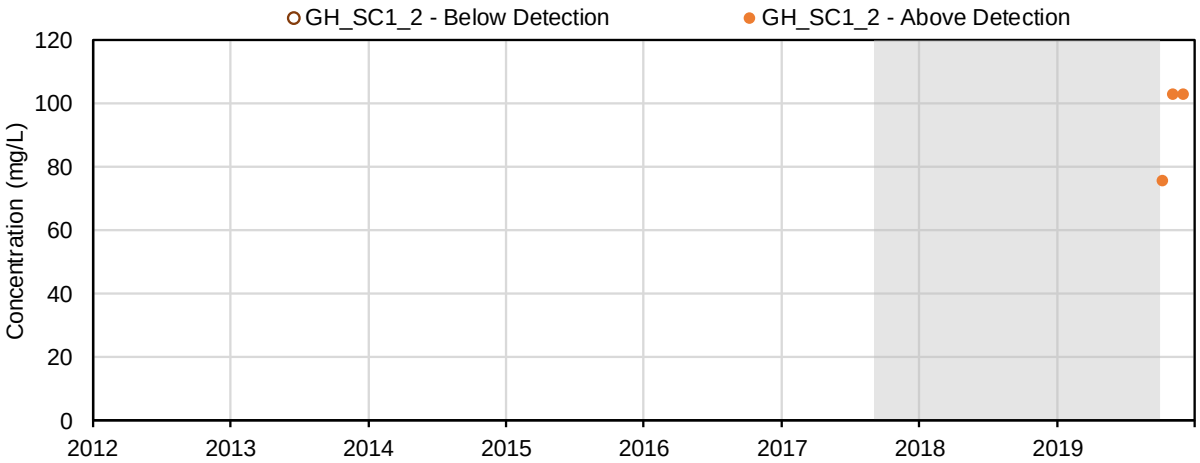
(25) Total organic carbon (mg/L); Conventional Parameters



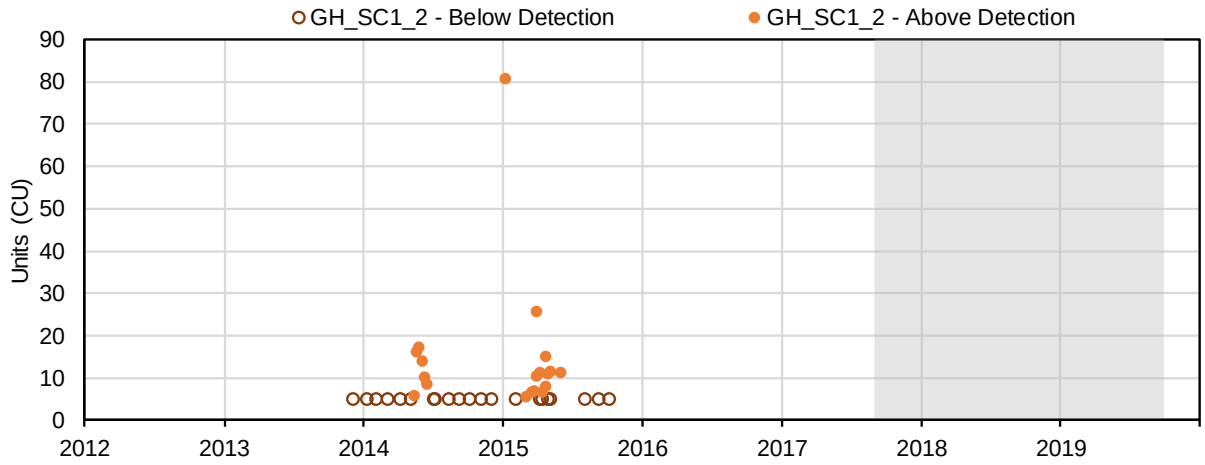
(26) Dissolved organic carbon (mg/L); Conventional Parameters



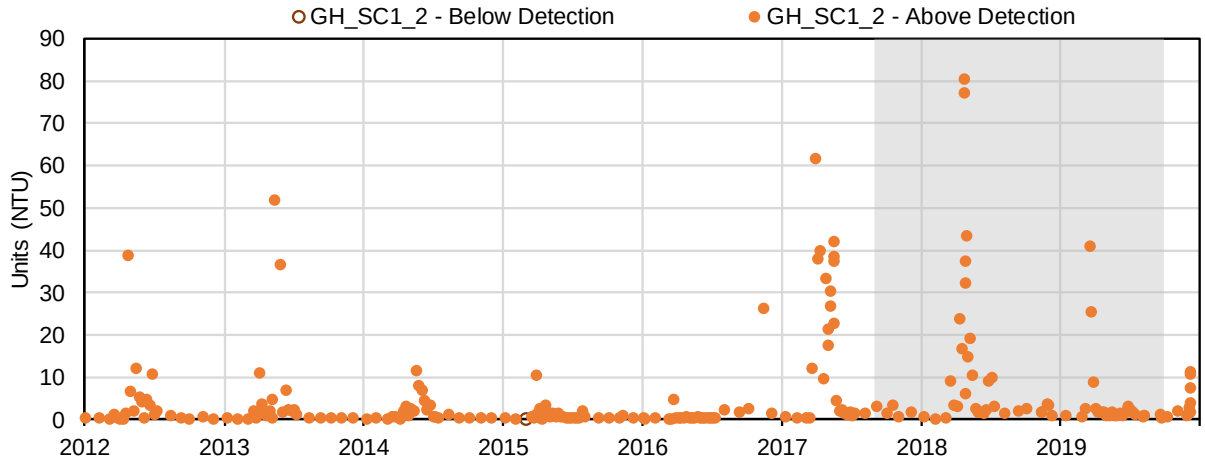
(27) Total Inorganic Carbon (mg/L); Conventional Parameters



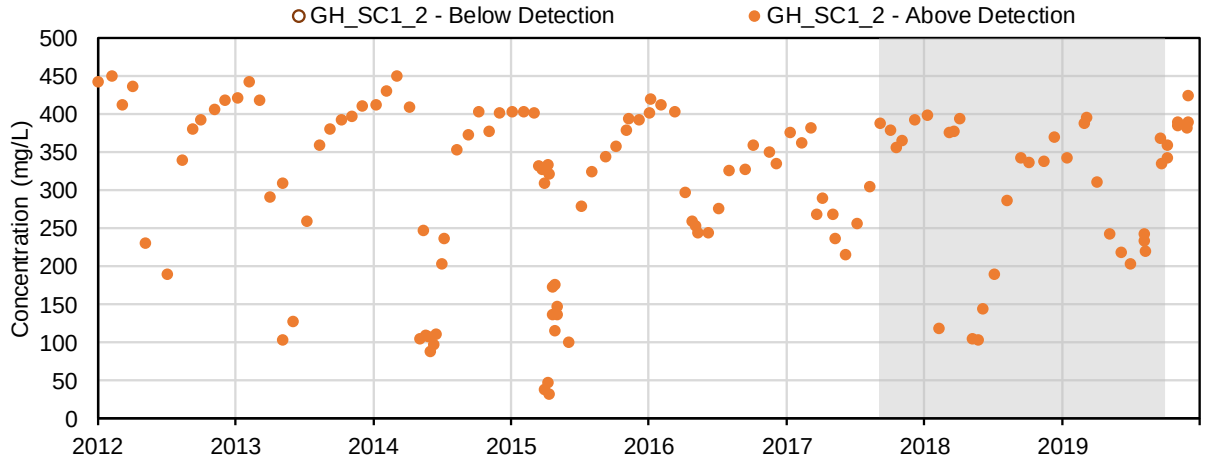
(28) Colour (CU); Conventional Parameters



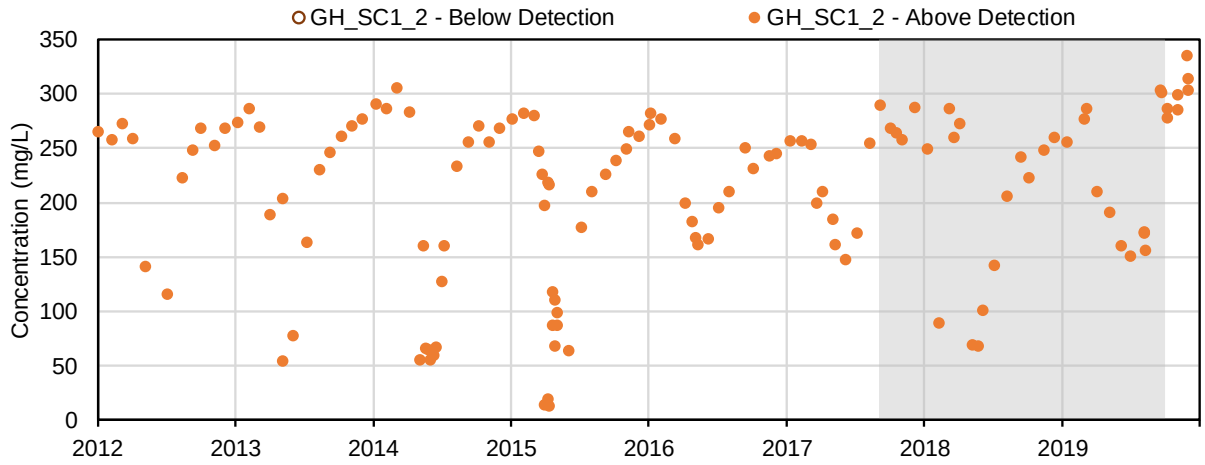
(29) Turbidity (NTU); Conventional Parameters



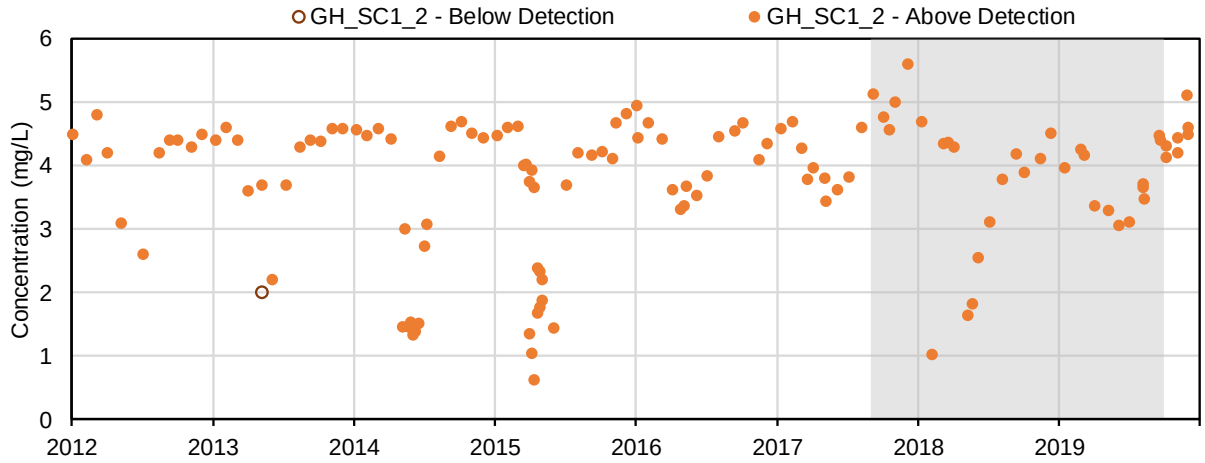
(30) Calcium (mg/L); Major Ions



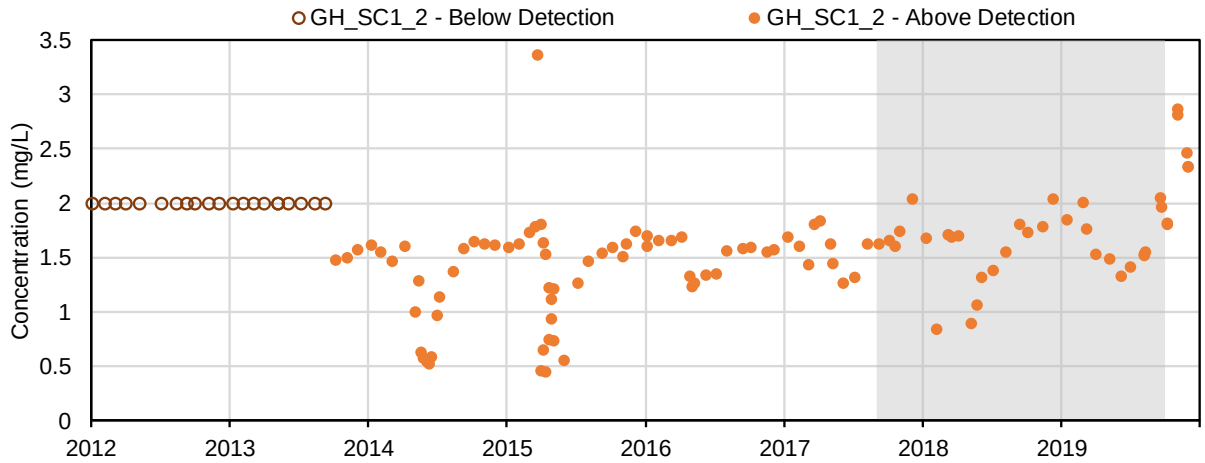
(31) Magnesium (mg/L); Major Ions



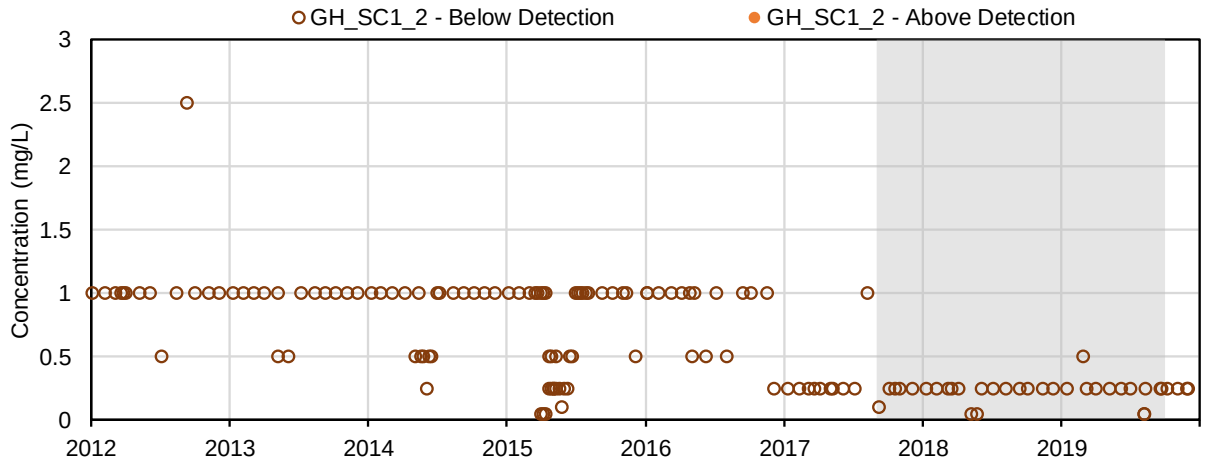
(32) Potassium (mg/L); Major Ions



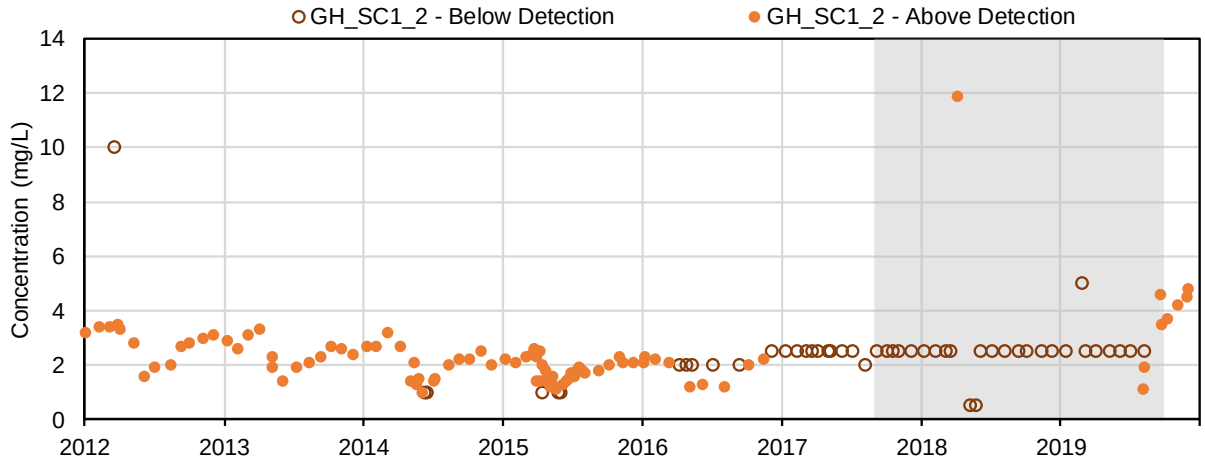
(33) Sodium (mg/L); Major Ions



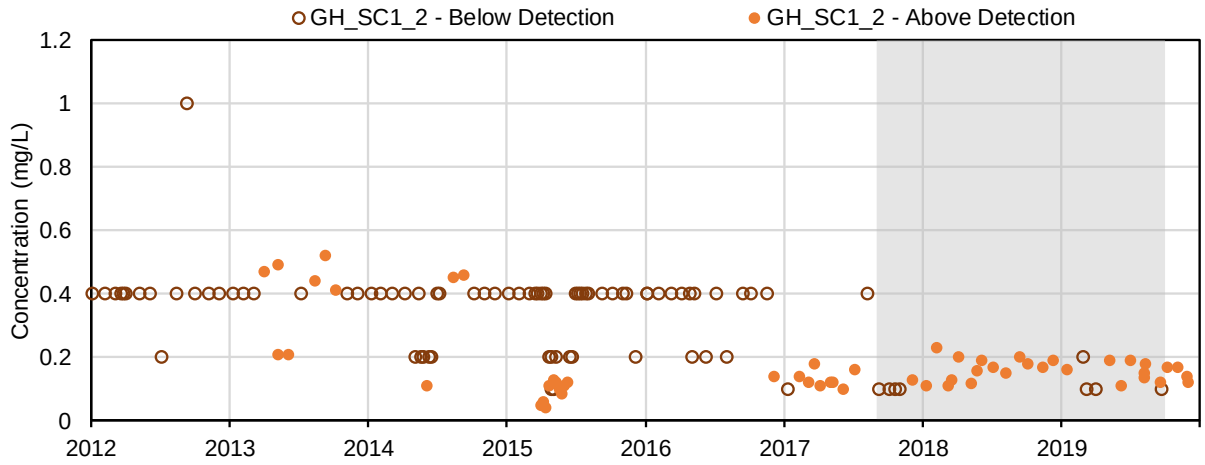
(34) Bromide (mg/L); Major Ions



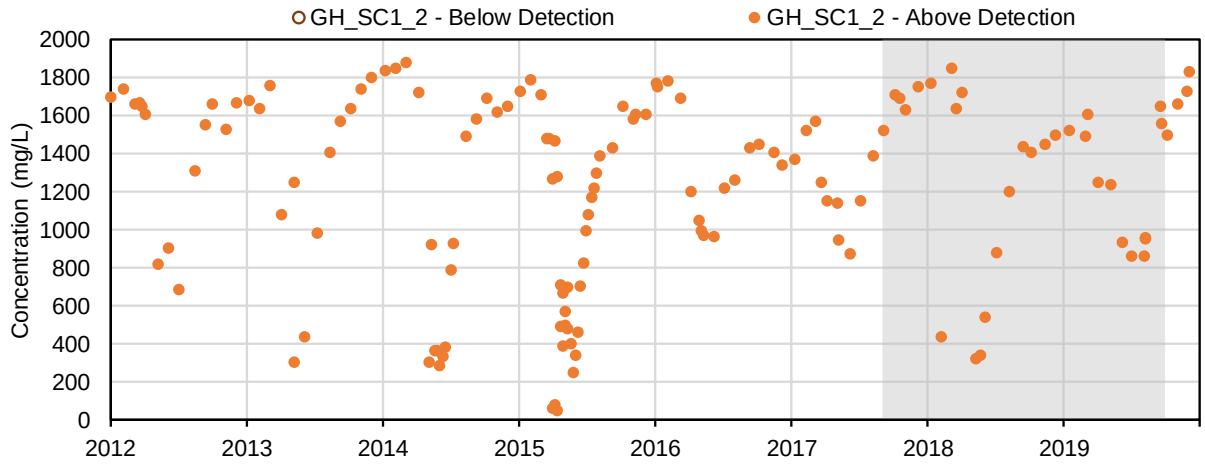
(35) Chloride (mg/L); Major Ions



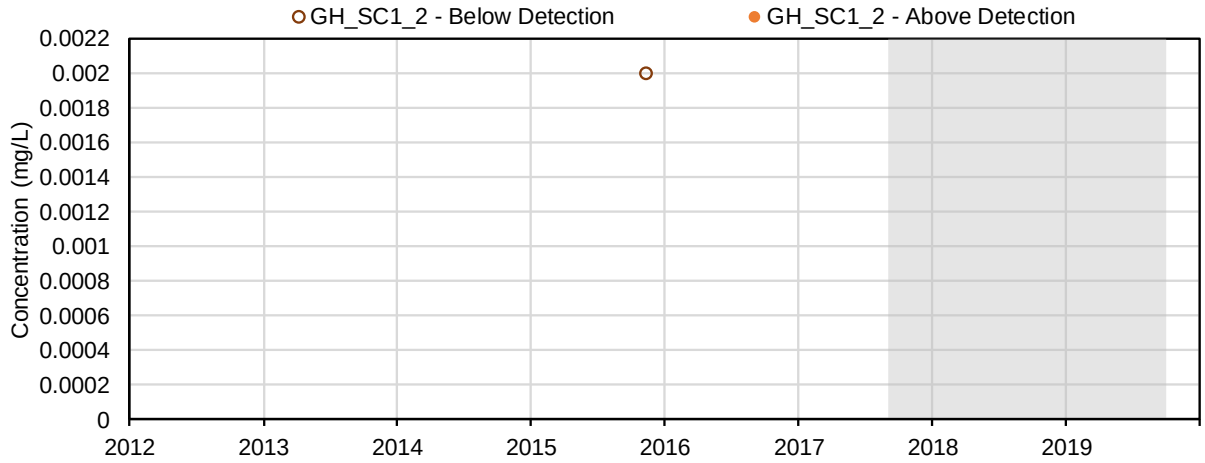
(36) Fluoride (mg/L); Major Ions



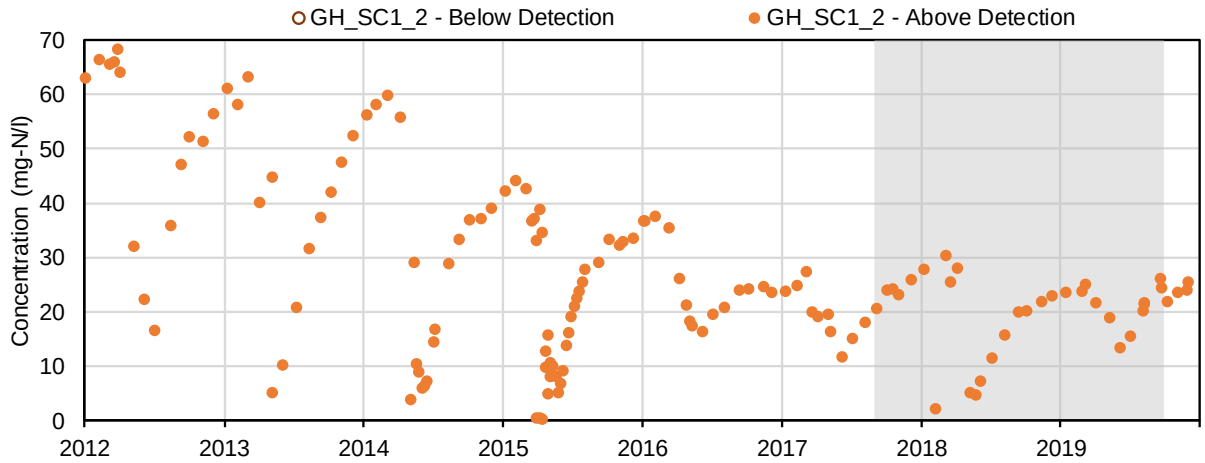
(37) Sulphate (mg/L); Major Ions



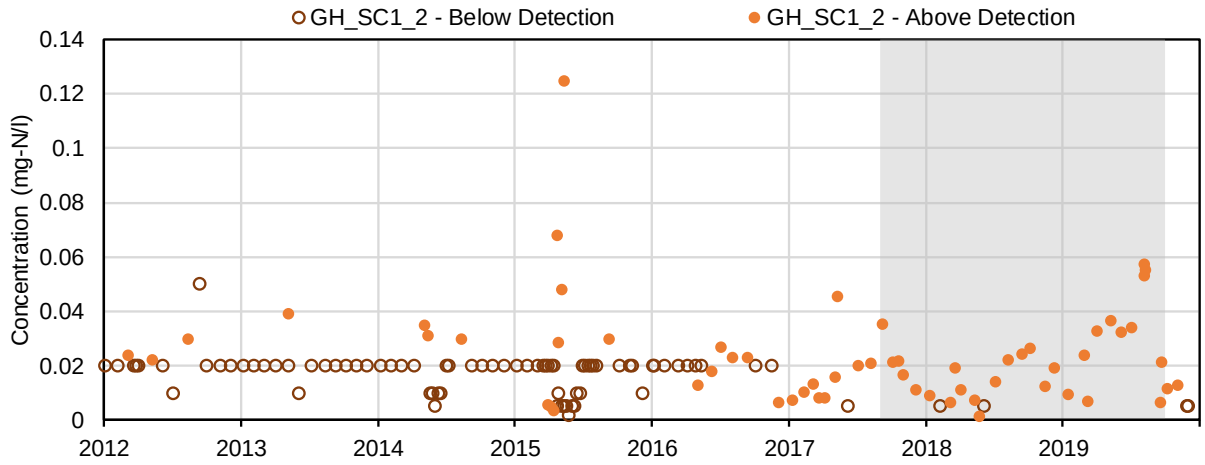
(38) Sulphide (mg/L); Major Ions



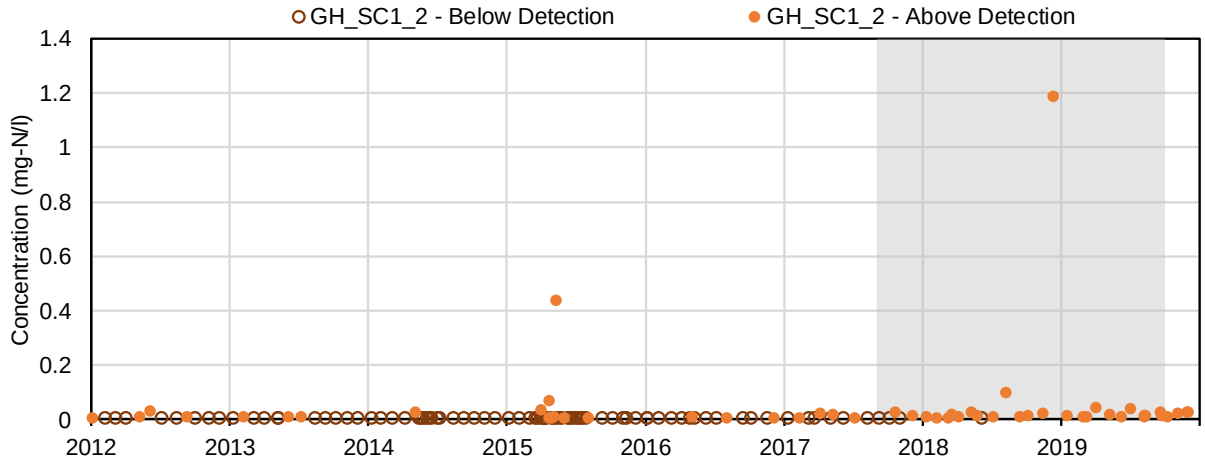
(39) Nitrate (mg-N/l); Nutrients and Biological Indicators



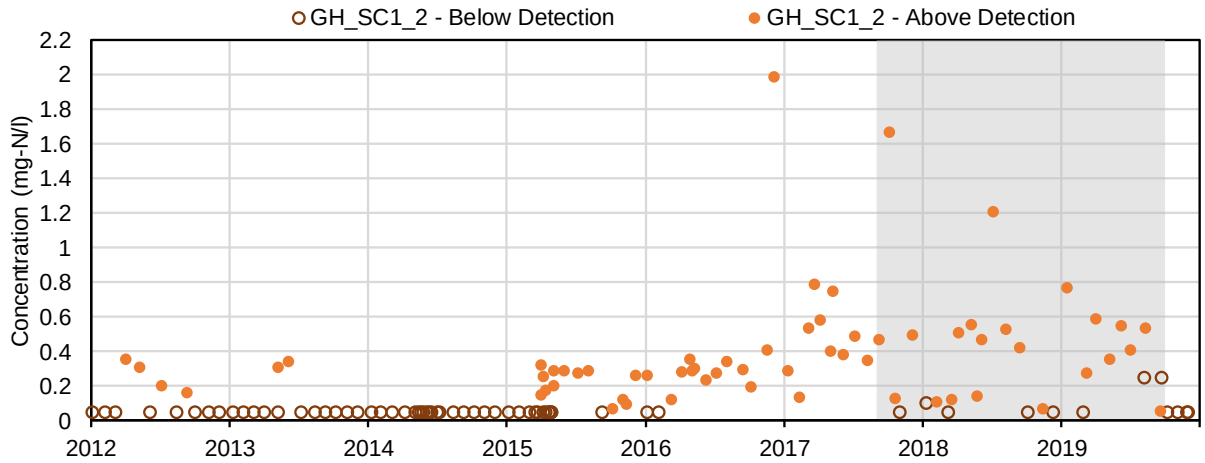
(40) Nitrite (mg-N/l); Nutrients and Biological Indicators



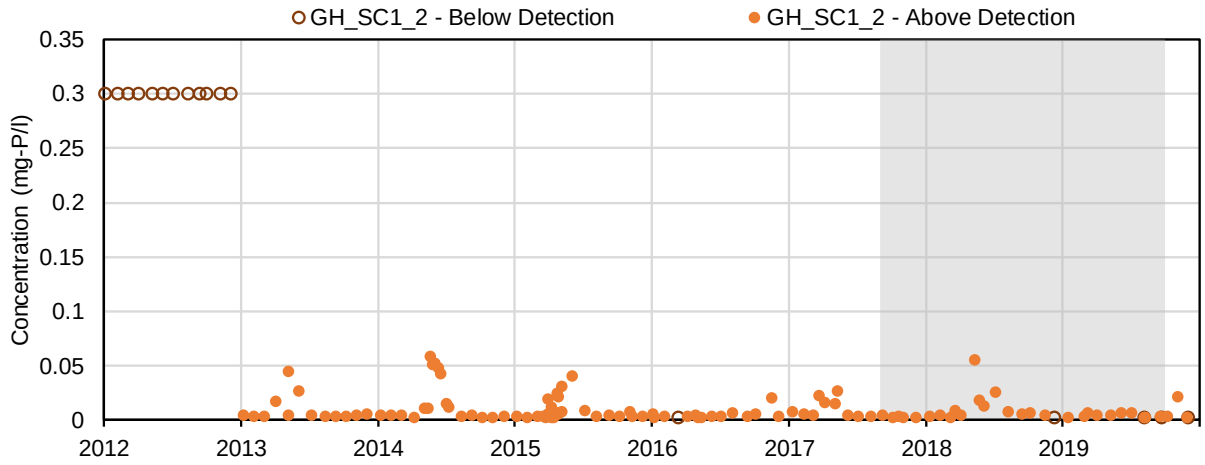
(41) Total ammonia (mg-N/l); Nutrients and Biological Indicators



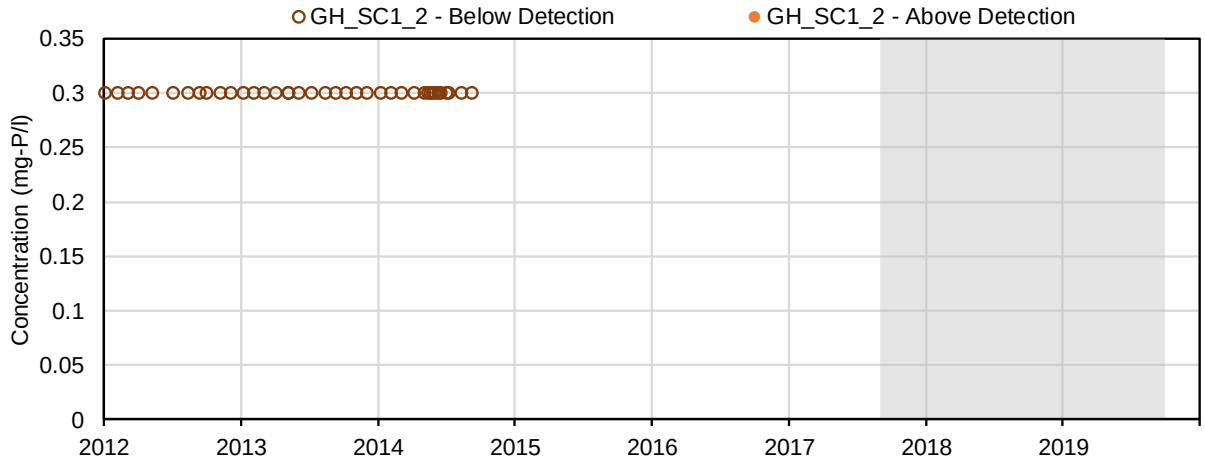
(42) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



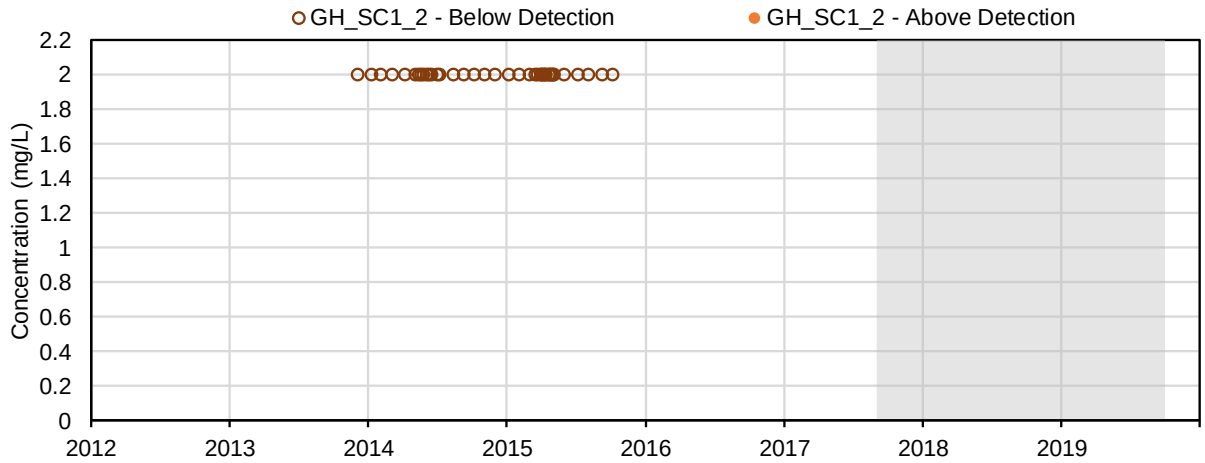
(43) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



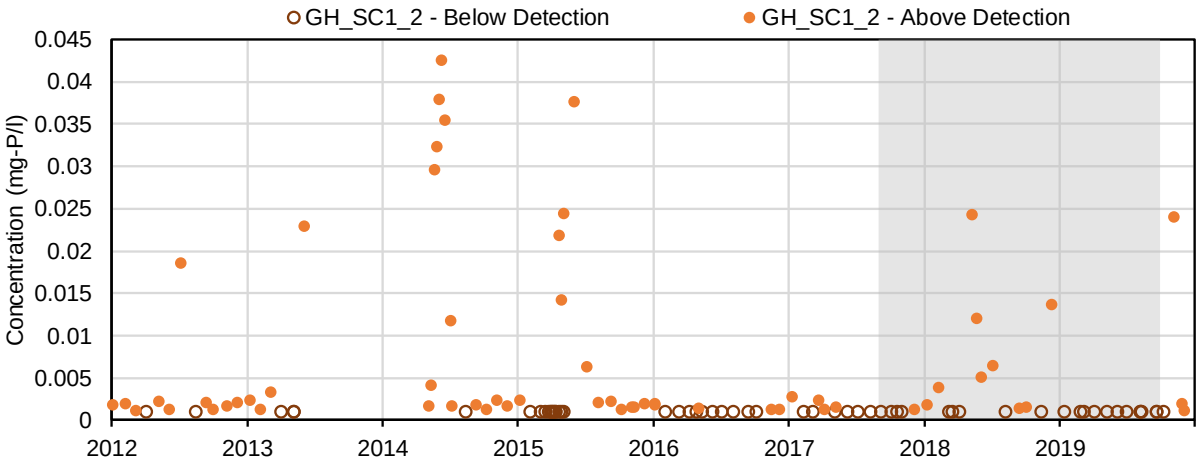
(44) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



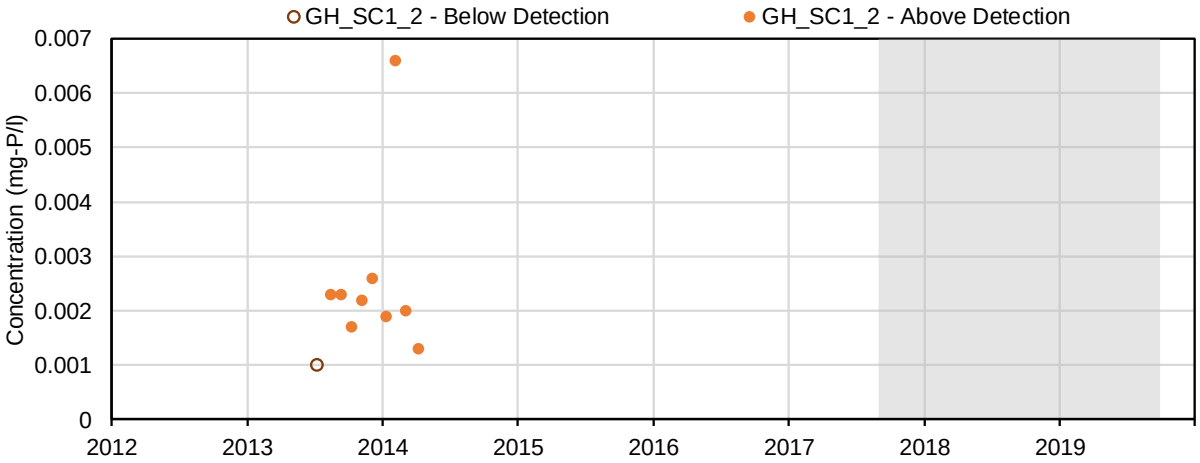
(45) Biochemical oxygen demand (mg/L); Nutrients and Biological Indicators



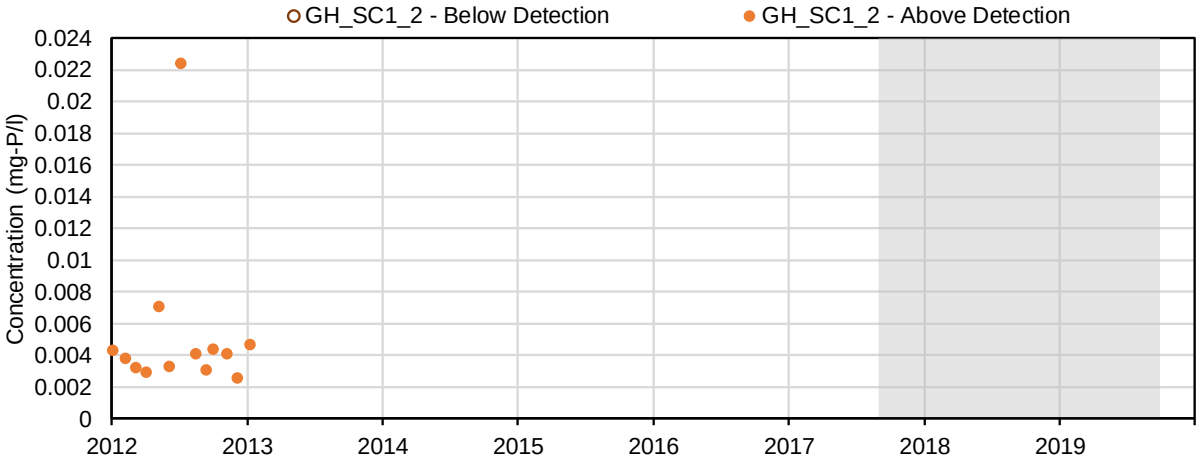
(46) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



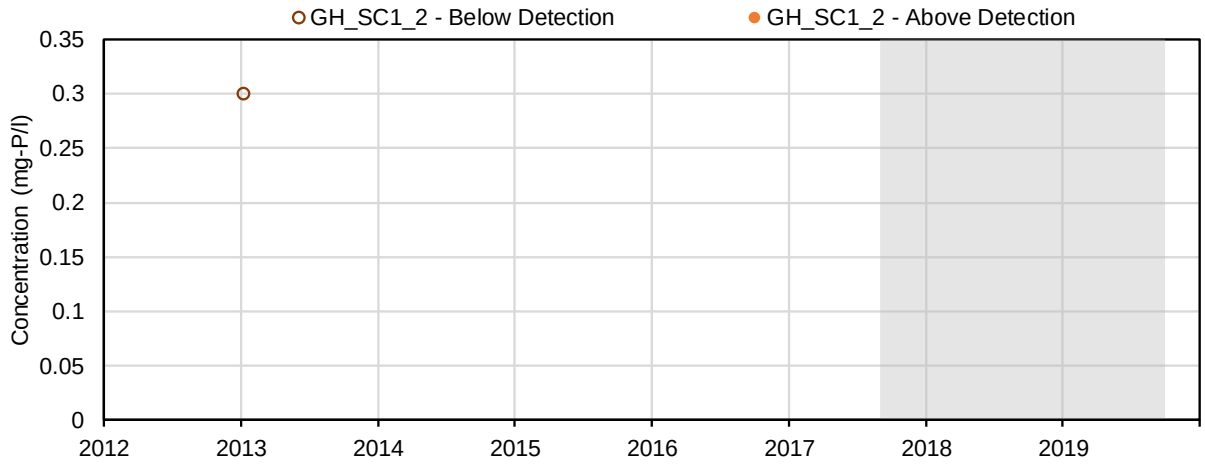
(47) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



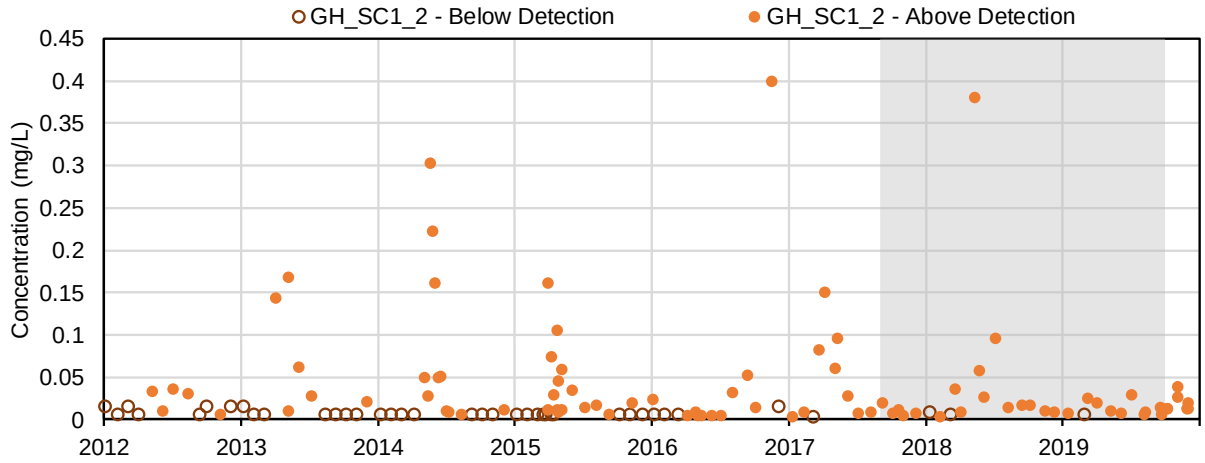
(48) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



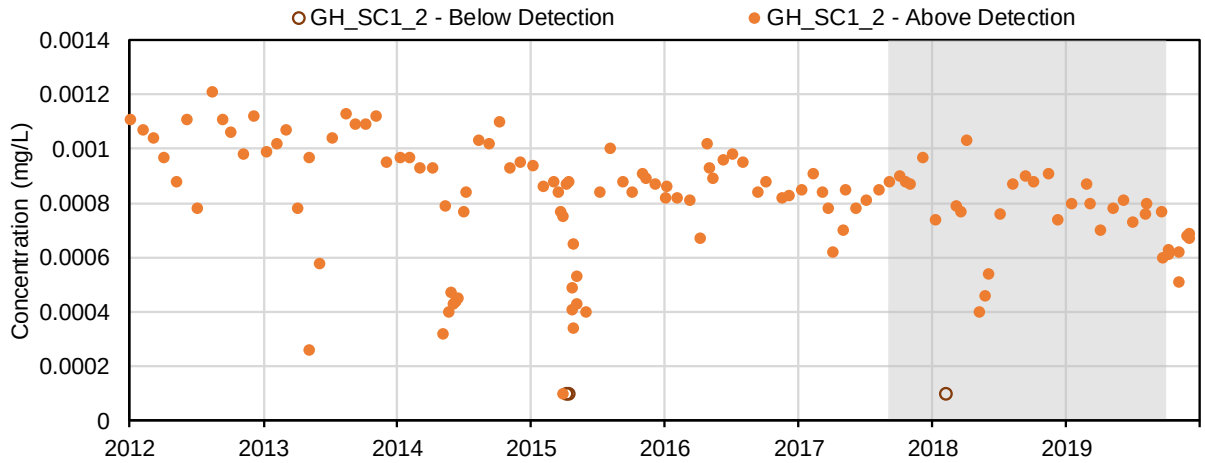
(49) Dissolved Phosphate (mg-P/l); Nutrients and Biological Indicators



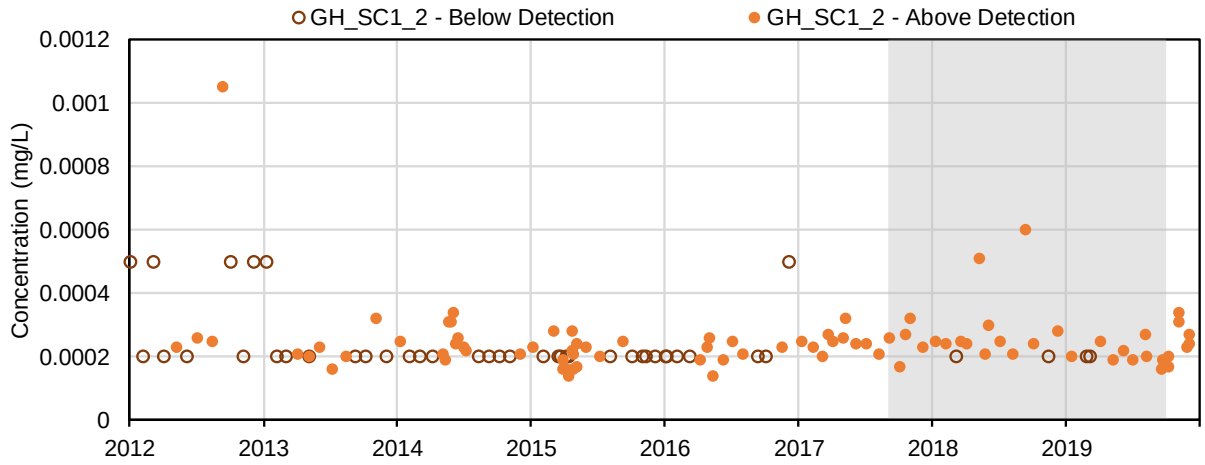
(50) Aluminum (mg/L); Total Metals



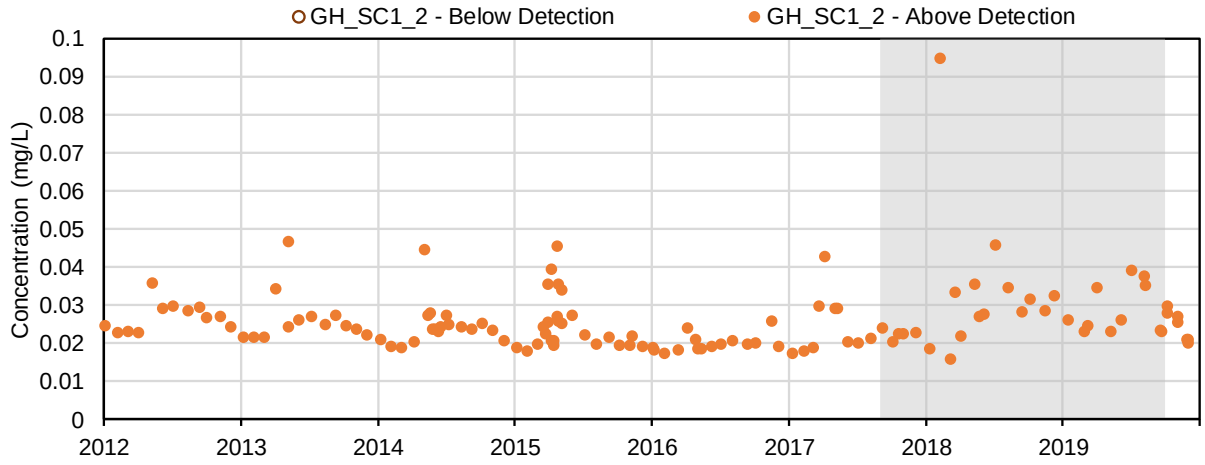
(51) Antimony (mg/L); Total Metals



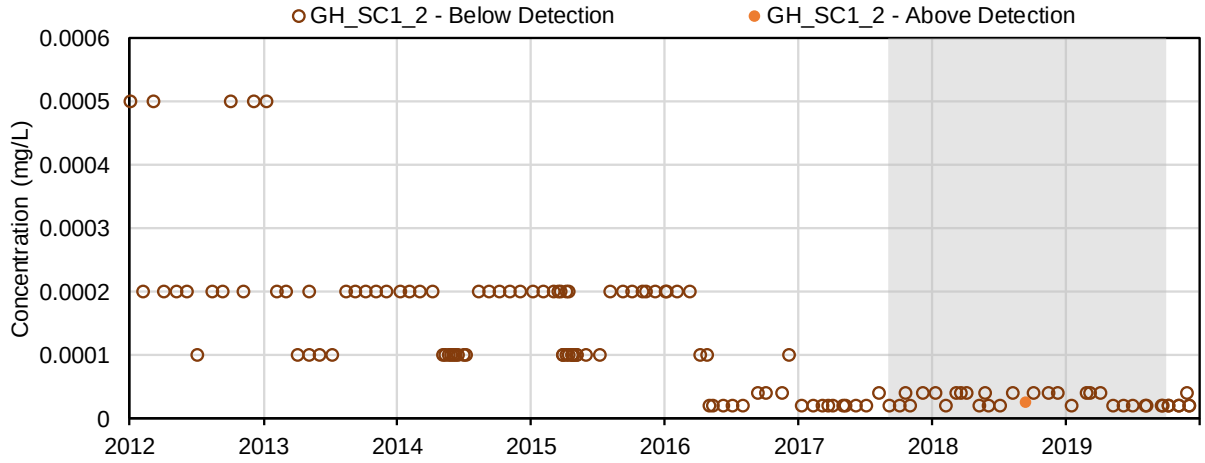
(52) Arsenic (mg/L); Total Metals



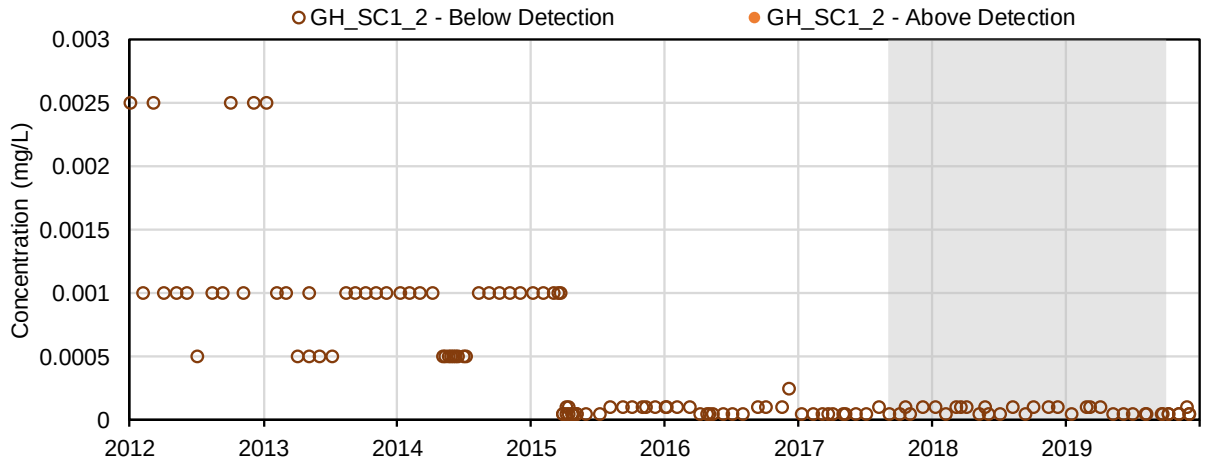
(53) Barium (mg/L); Total Metals



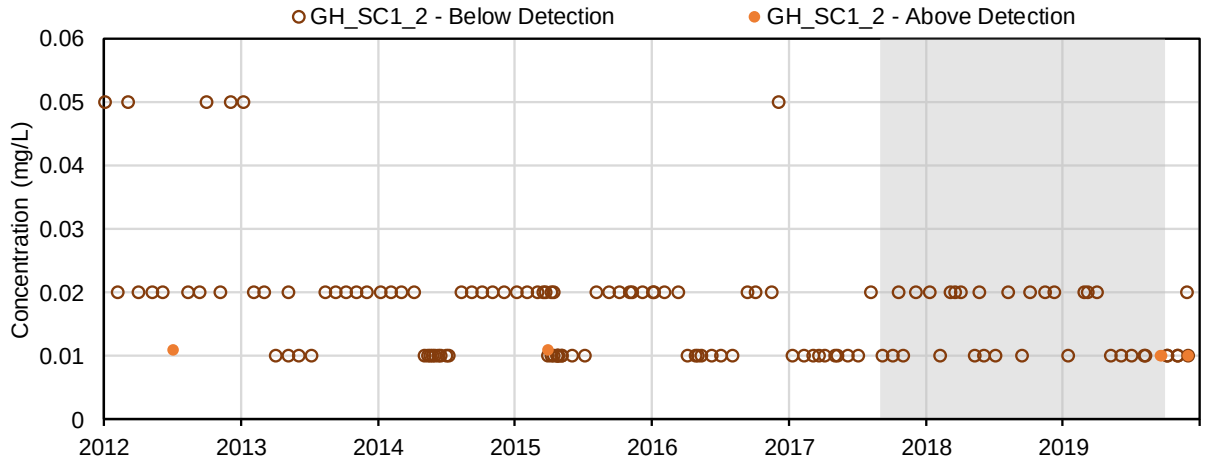
(54) Beryllium (mg/L); Total Metals



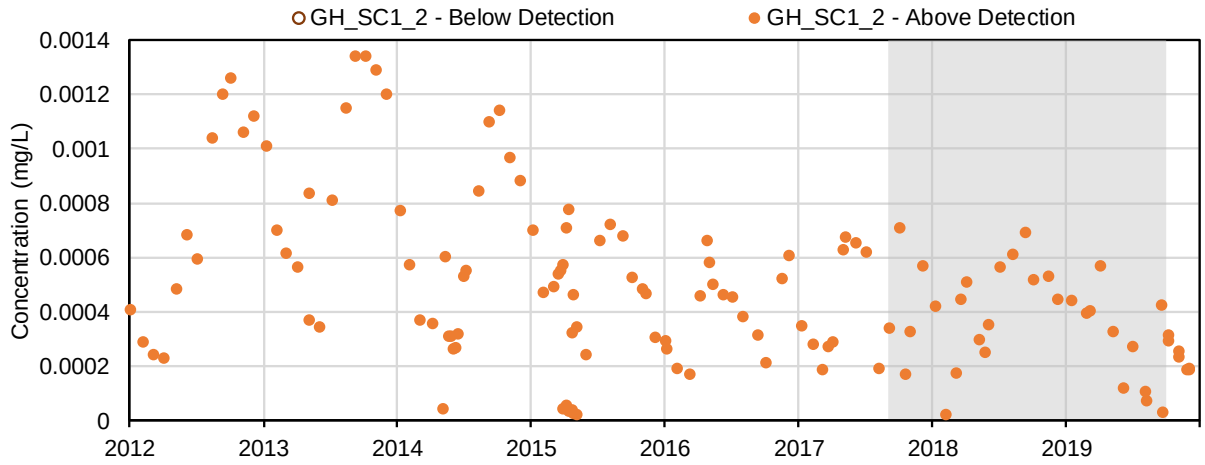
(55) Bismuth (mg/L); Total Metals



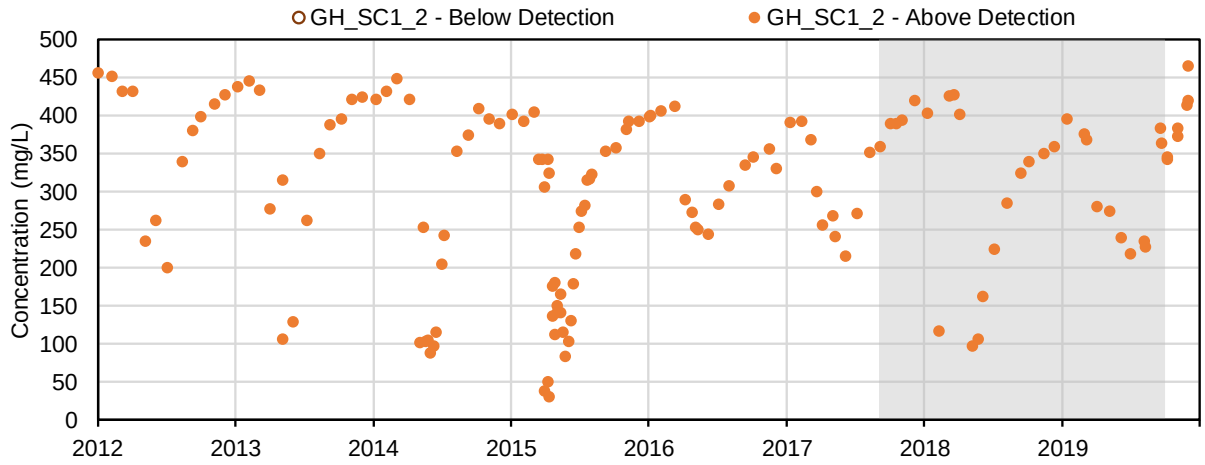
(56) Boron (mg/L); Total Metals



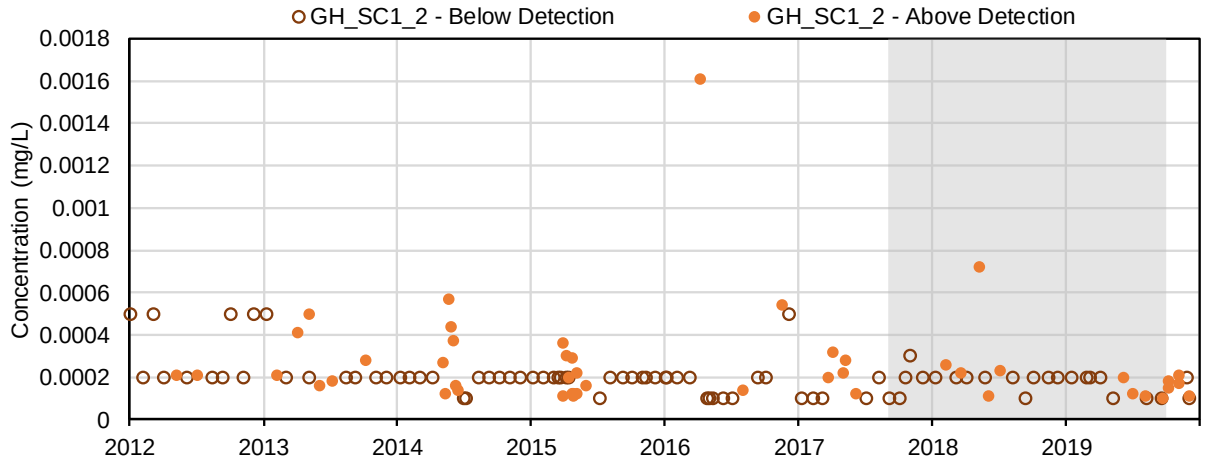
(57) Cadmium (mg/L); Total Metals



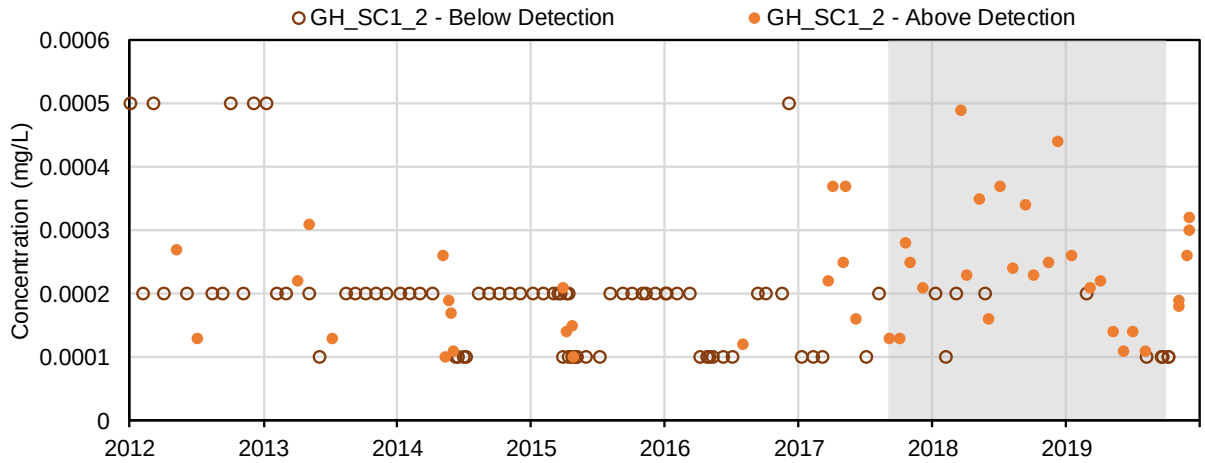
(58) Calcium (mg/L); Total Metals



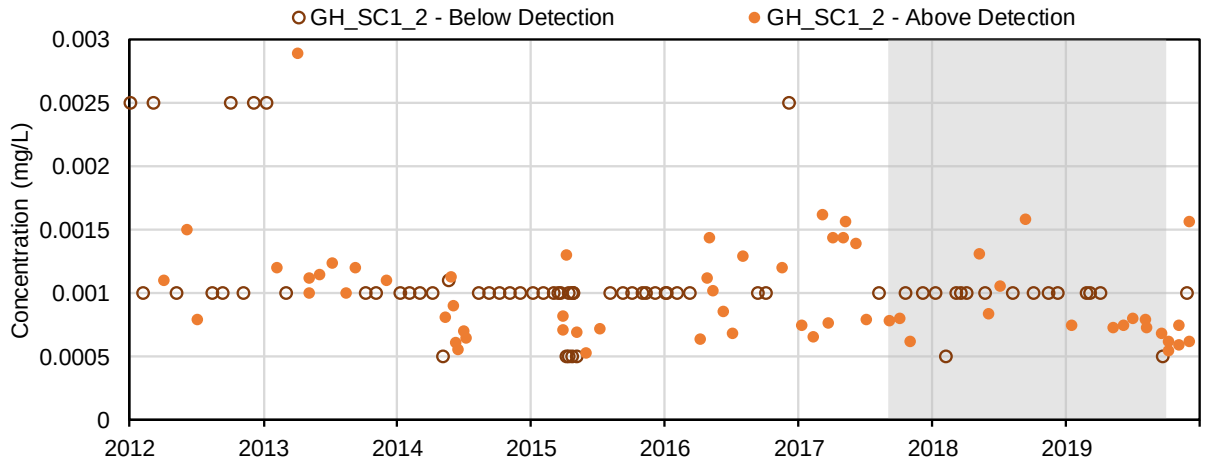
(59) Chromium (mg/L); Total Metals



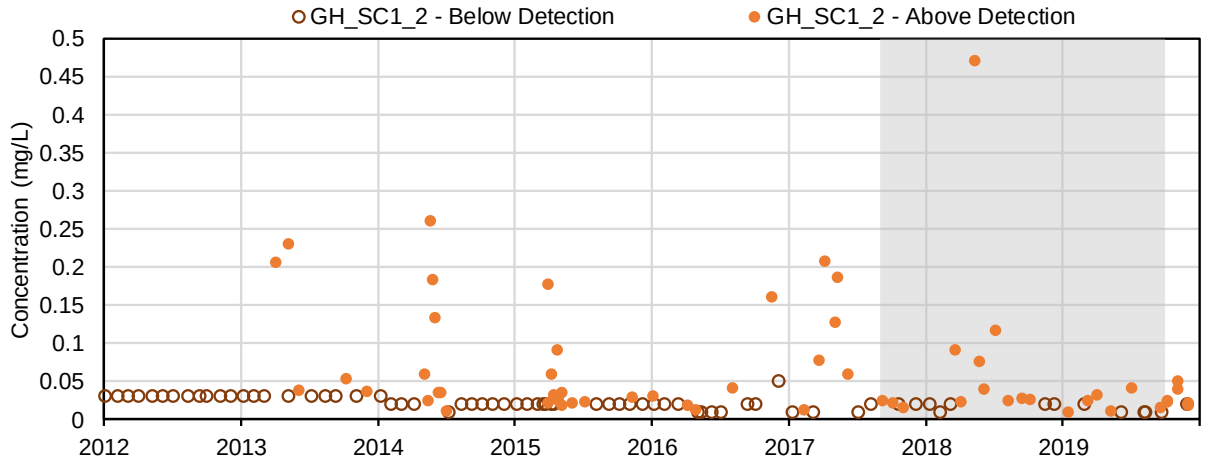
(60) Cobalt (mg/L); Total Metals



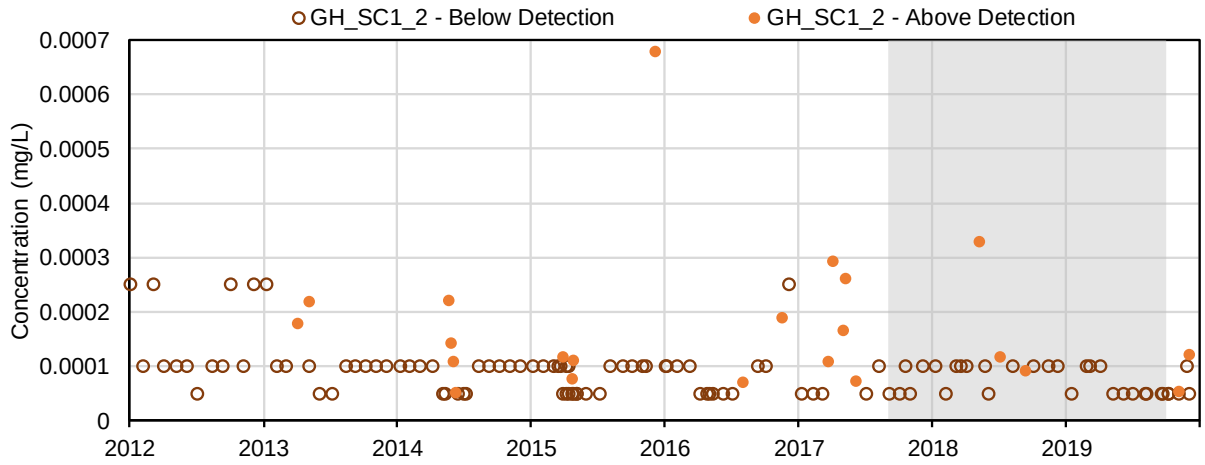
(61) Copper (mg/L); Total Metals



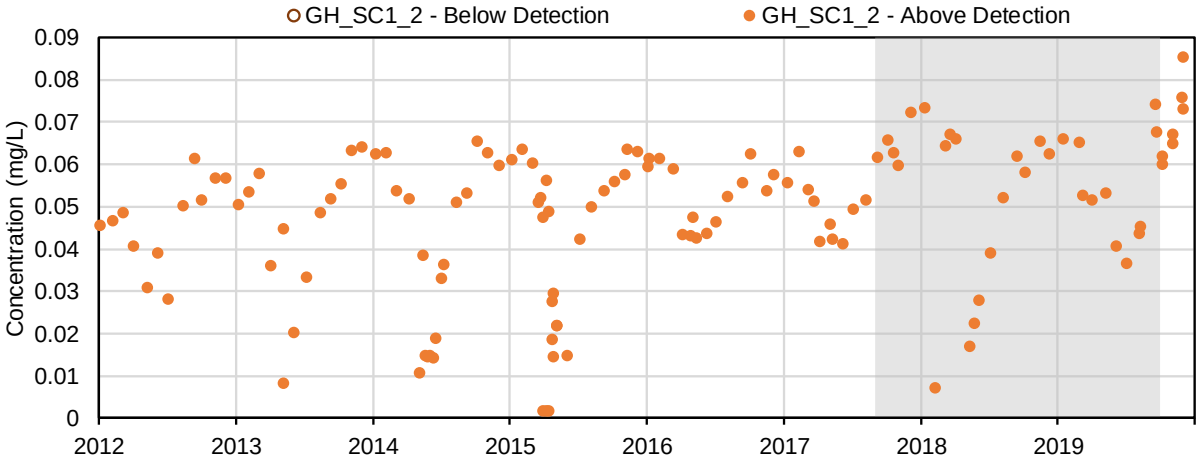
(62) Iron (mg/L); Total Metals



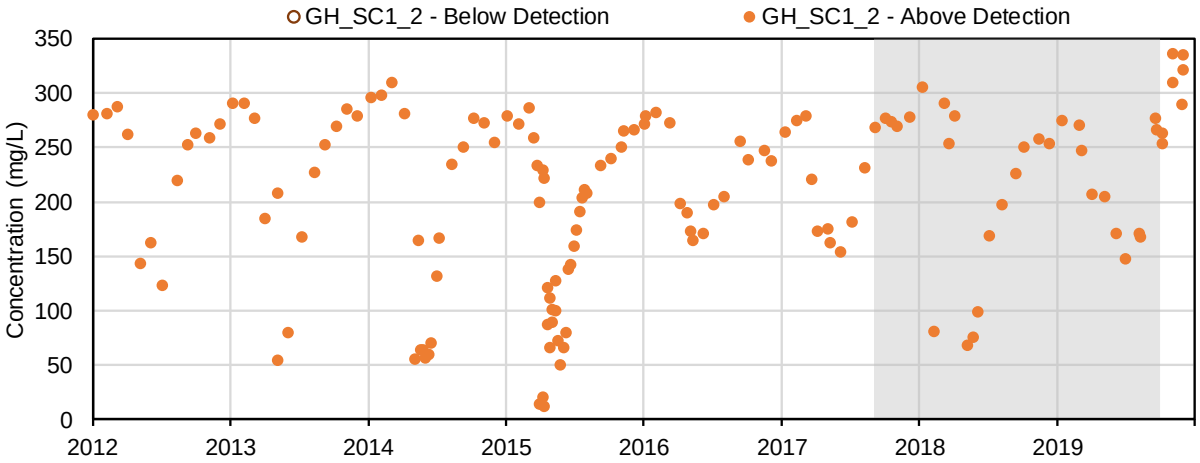
(63) Lead (mg/L); Total Metals



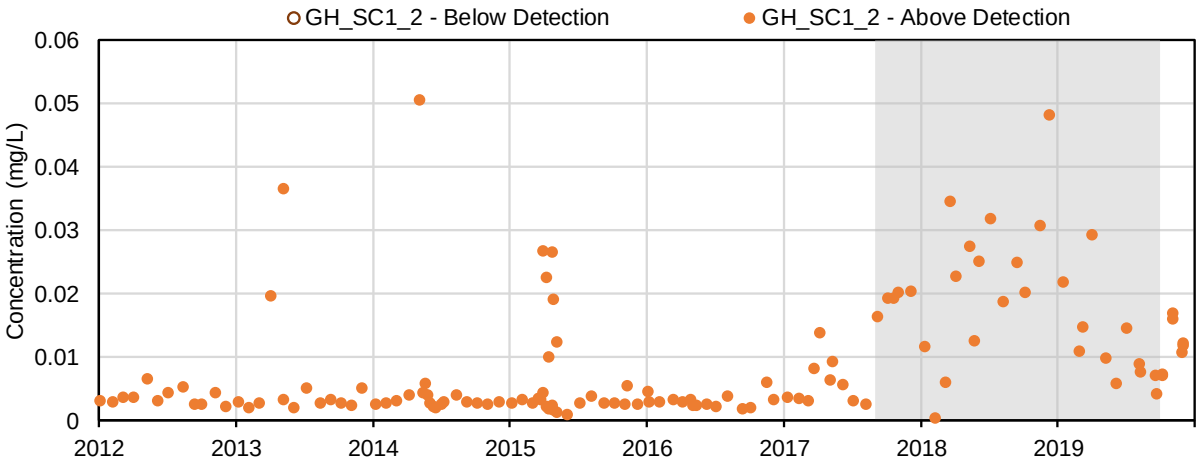
(64) Lithium (mg/L); Total Metals



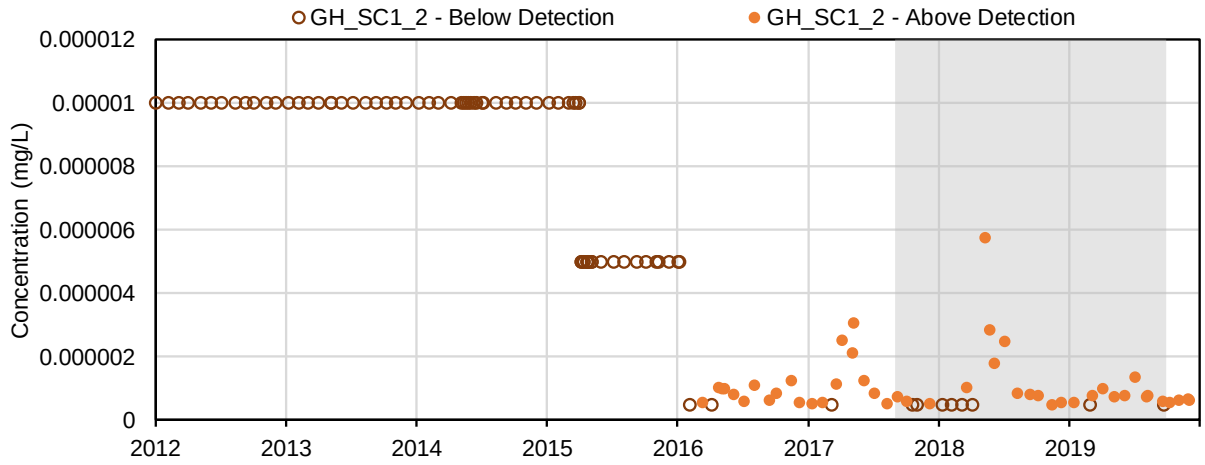
(65) Magnesium (mg/L); Total Metals



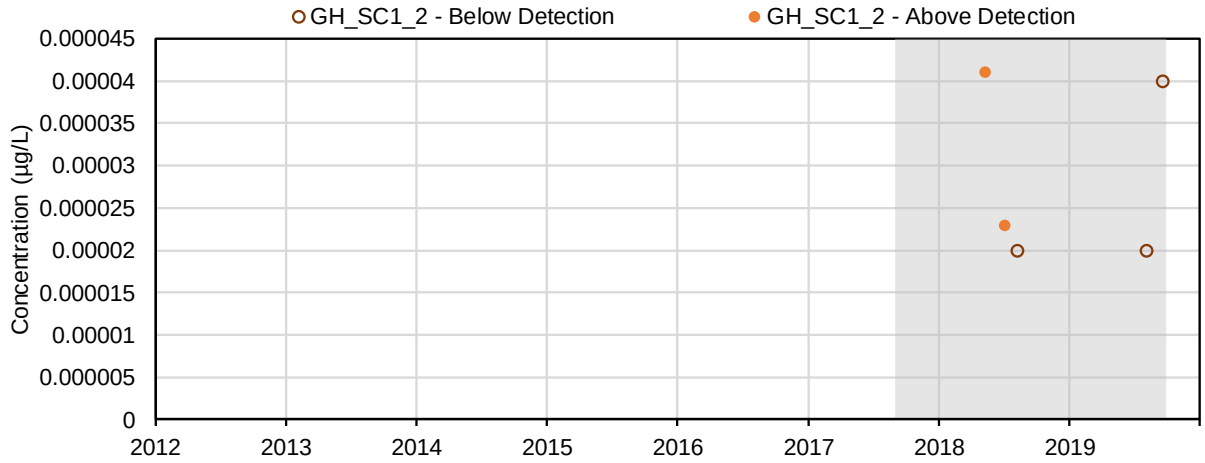
(66) Manganese (mg/L); Total Metals



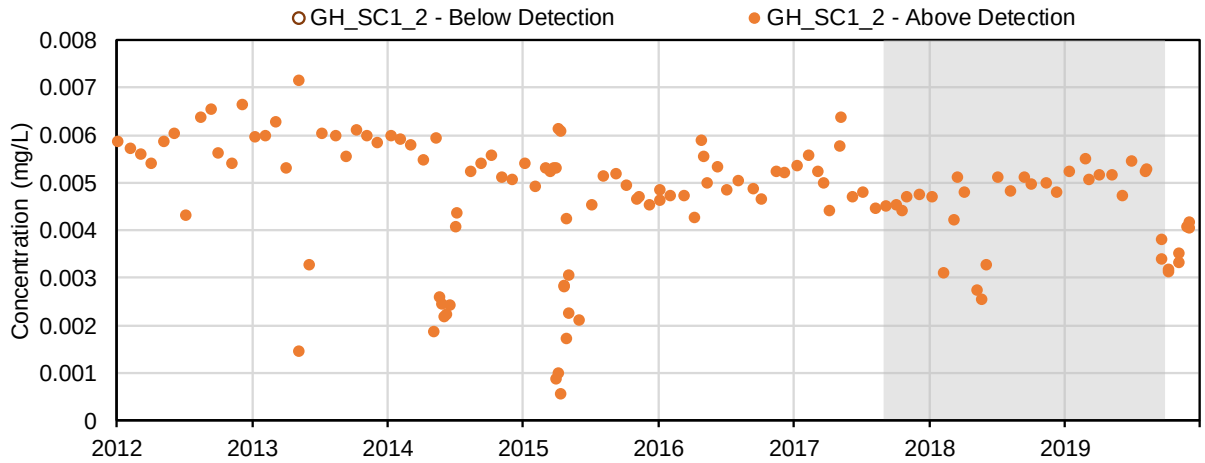
(67) Mercury (mg/L); Total Metals



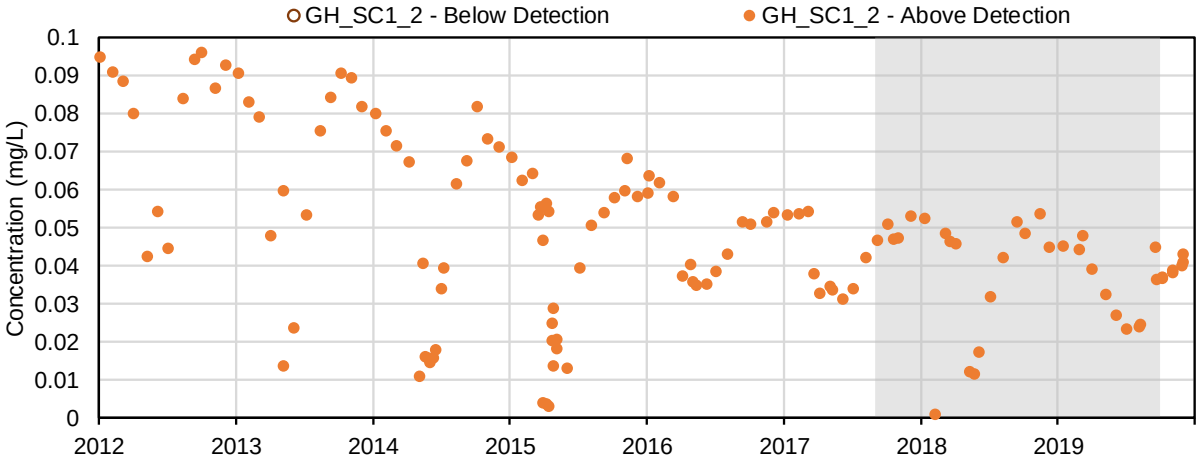
(68) Methyl mercury (µg/L); Total Metals



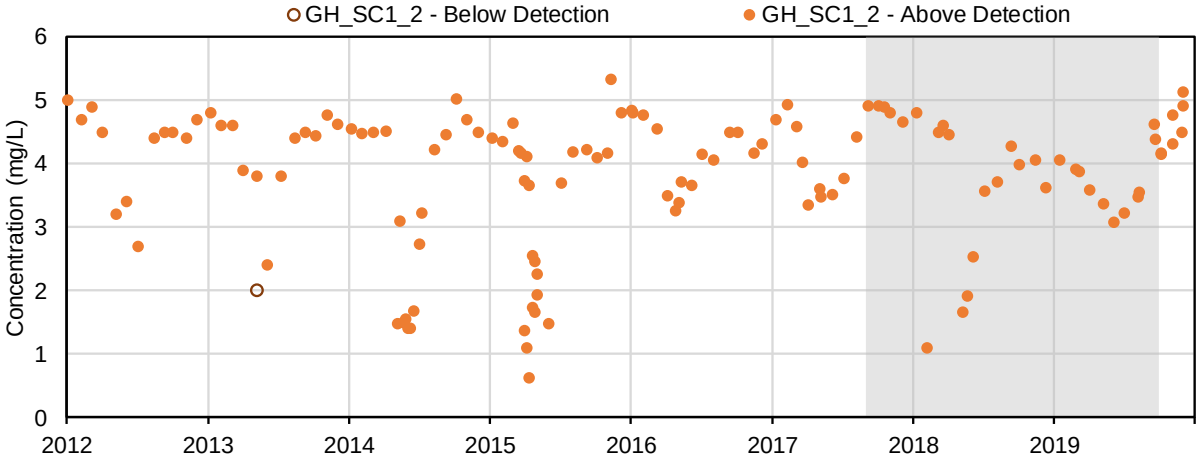
(69) Molybdenum (mg/L); Total Metals



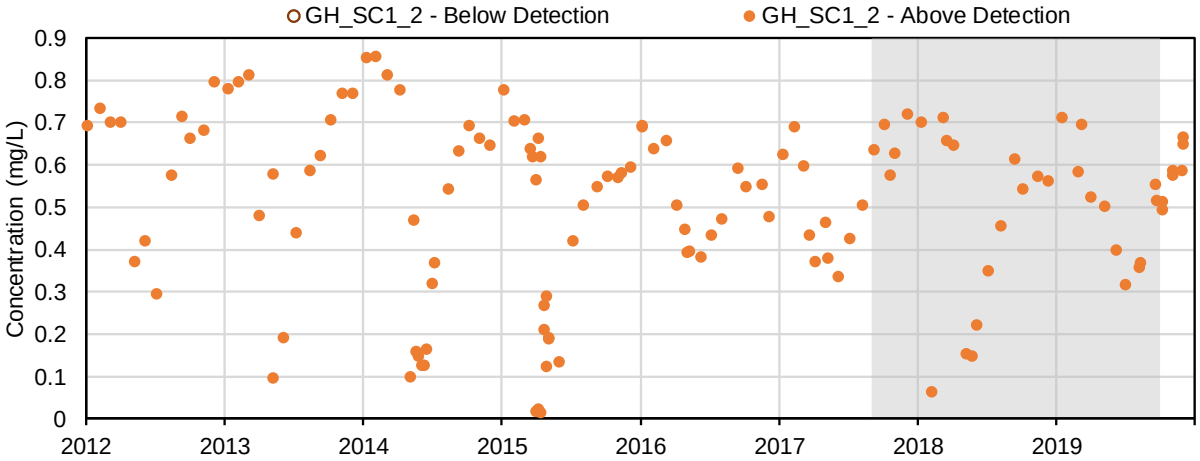
(70) Nickel (mg/L); Total Metals



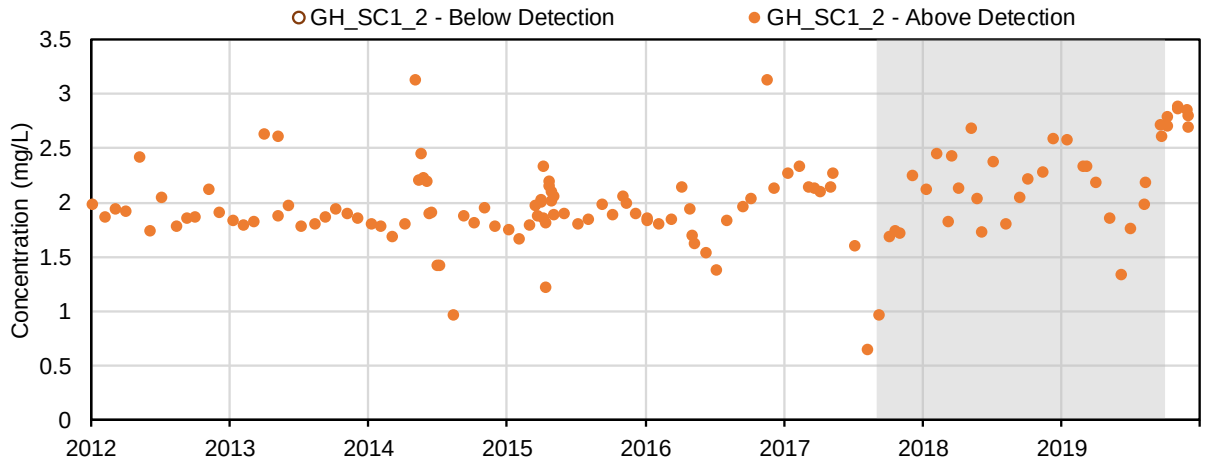
(71) Potassium (mg/L); Total Metals



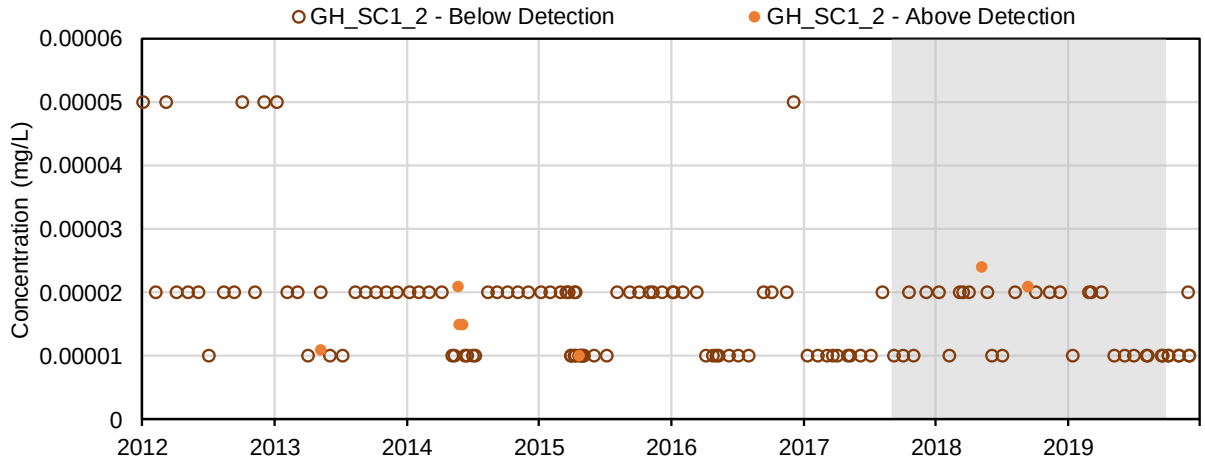
(72) Selenium (mg/L); Total Metals



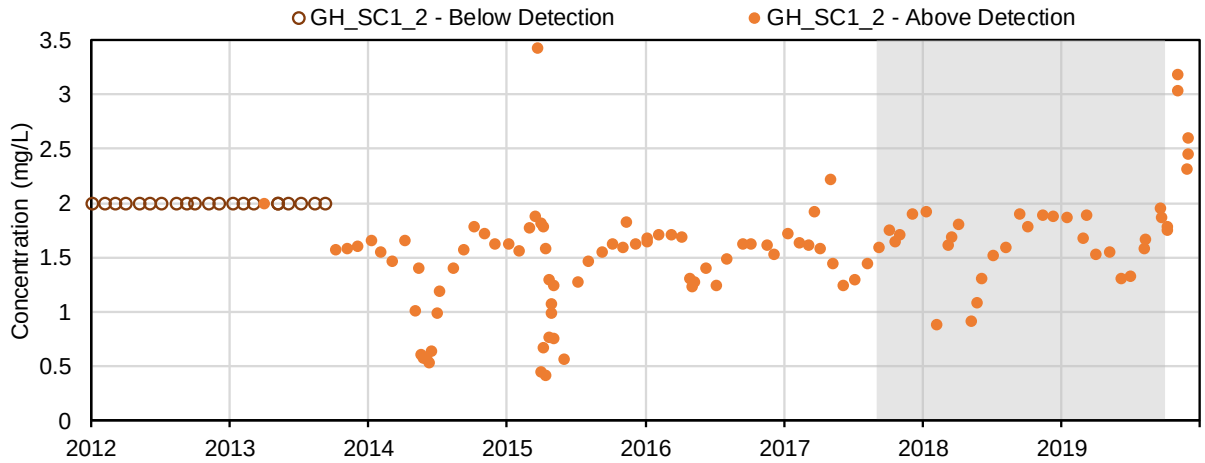
(73) Silicon (mg/L); Total Metals



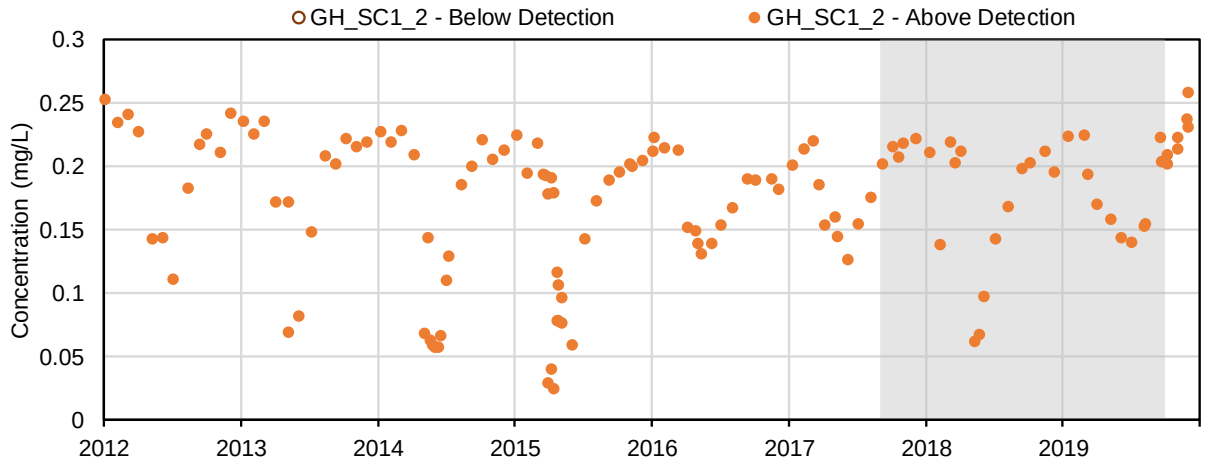
(74) Silver (mg/L); Total Metals



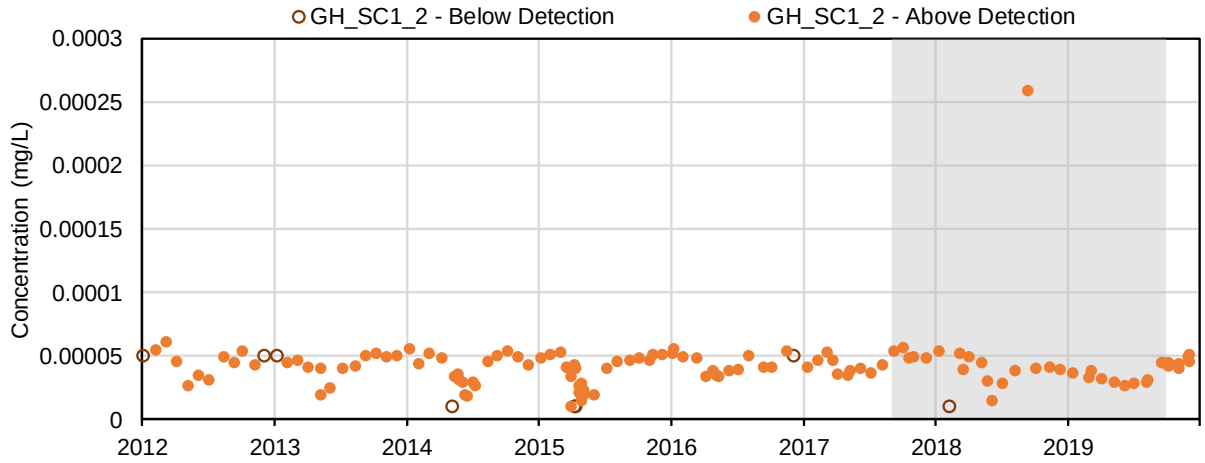
(75) Sodium (mg/L); Total Metals



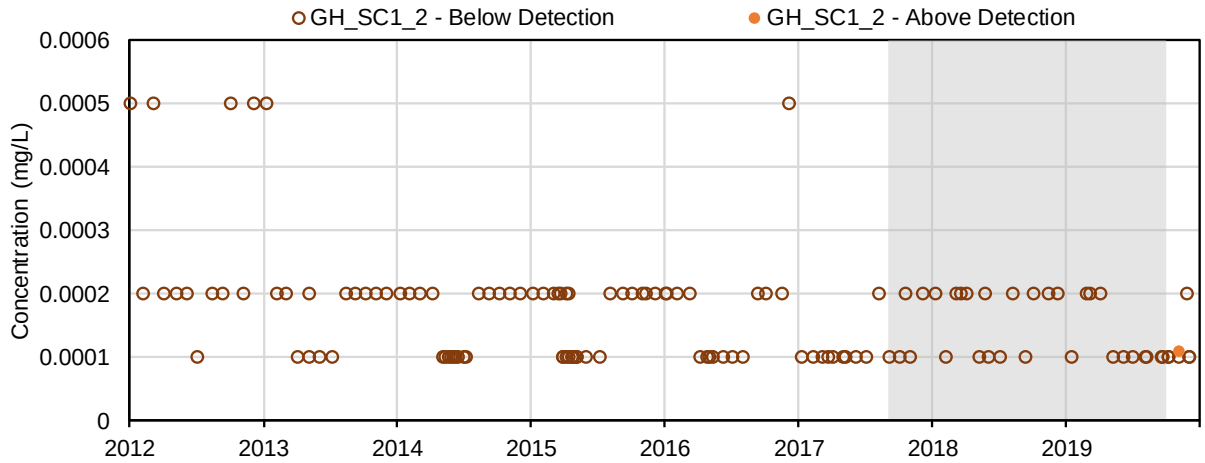
(76) Strontium (mg/L); Total Metals



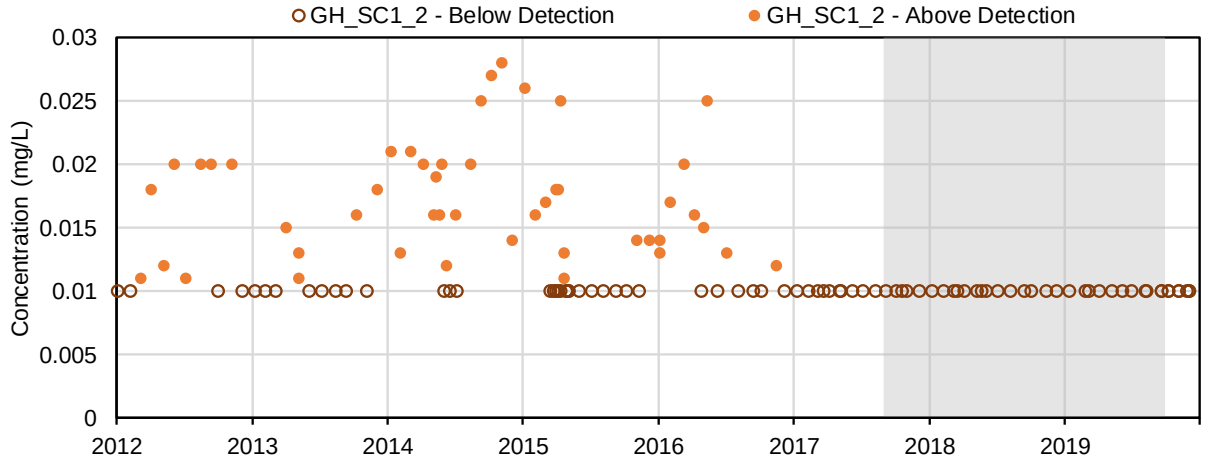
(77) Thallium (mg/L); Total Metals



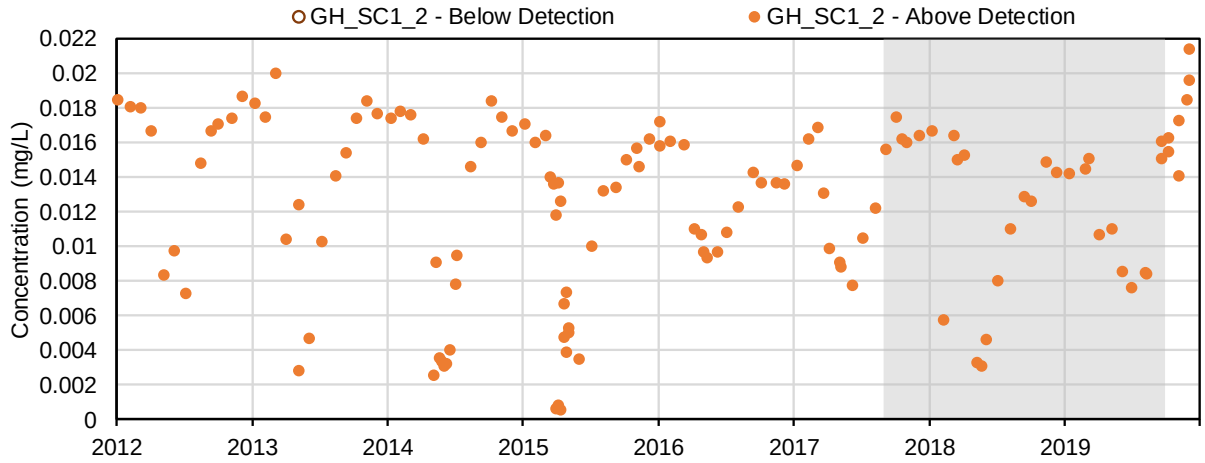
(78) Tin (mg/L); Total Metals



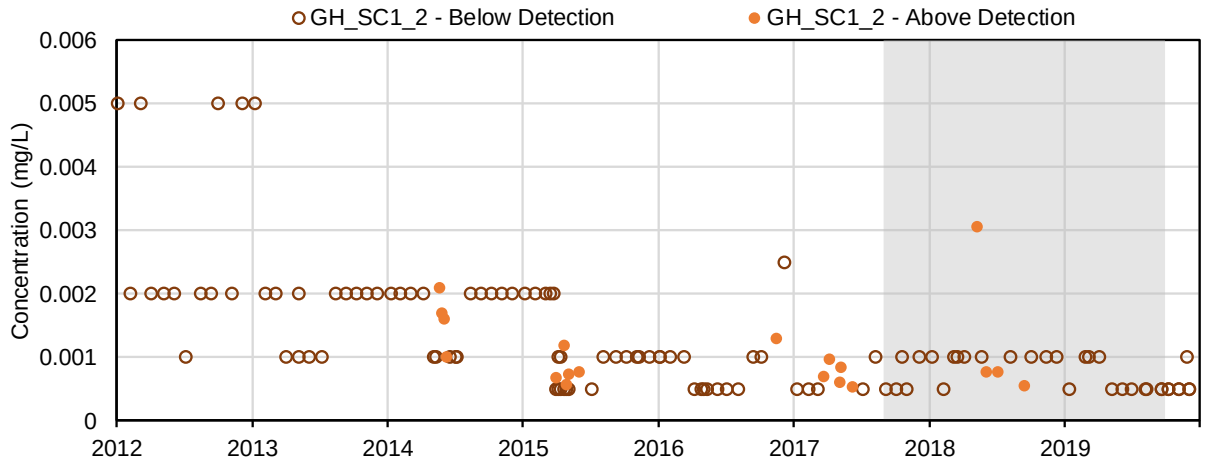
(79) Titanium (mg/L); Total Metals



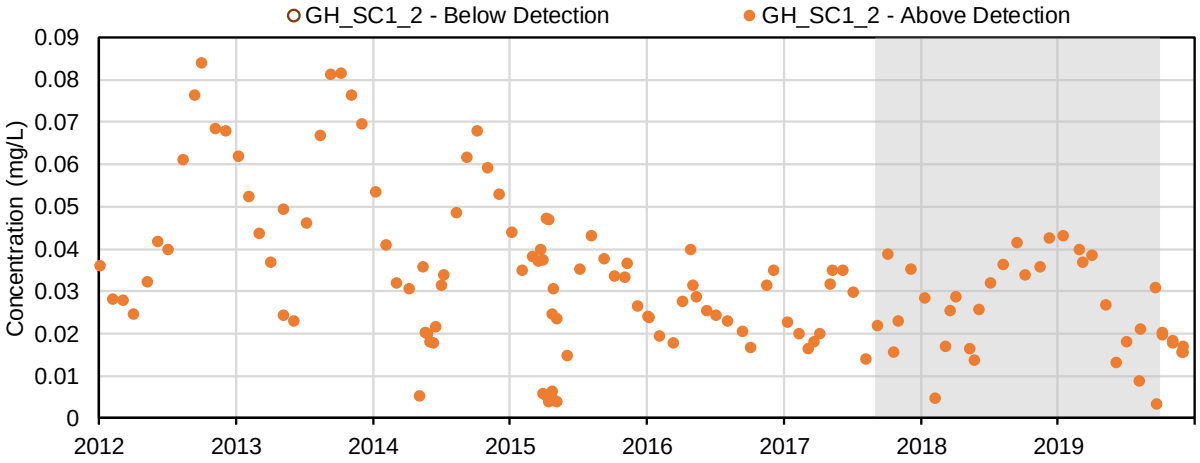
(80) Uranium (mg/L); Total Metals



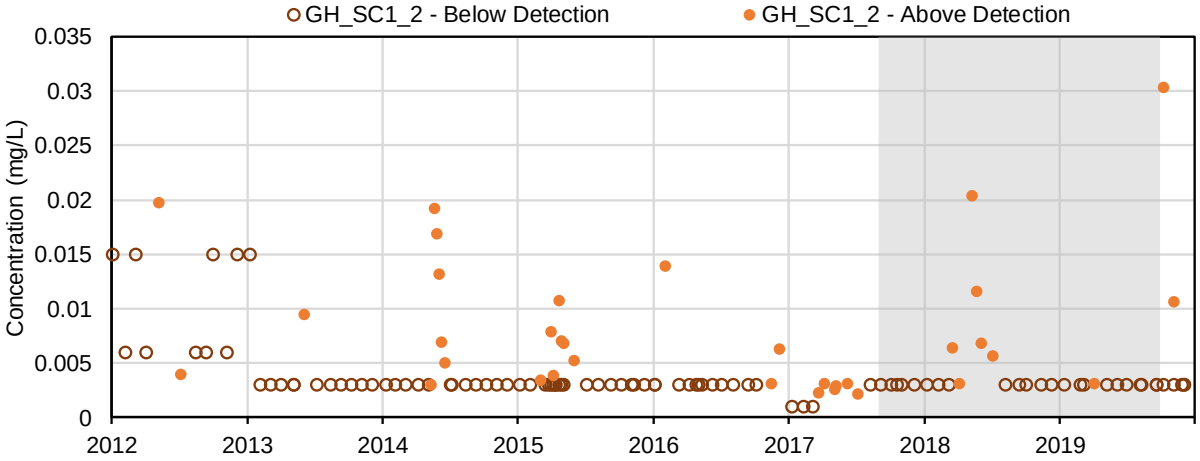
(81) Vanadium (mg/L); Total Metals



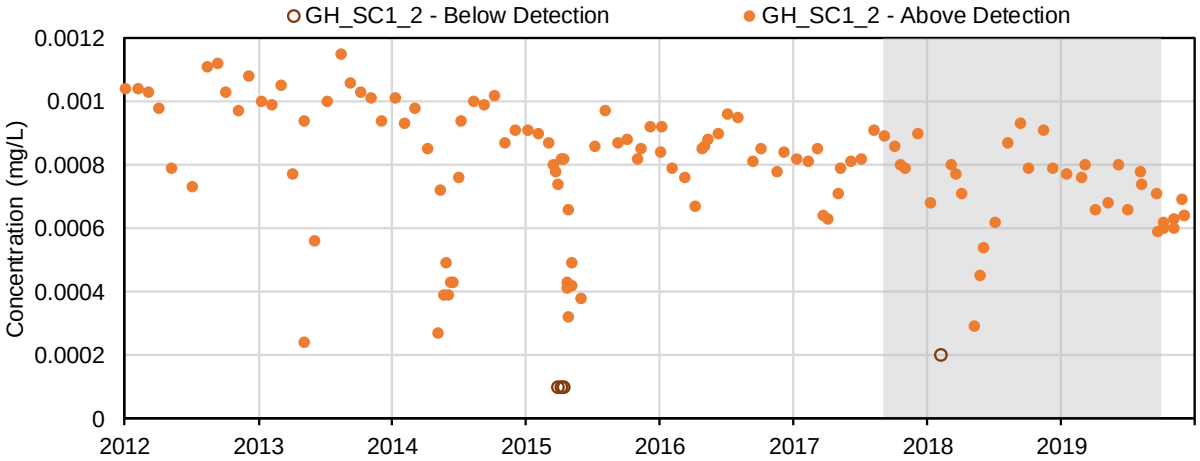
(82) Zinc (mg/L); Total Metals



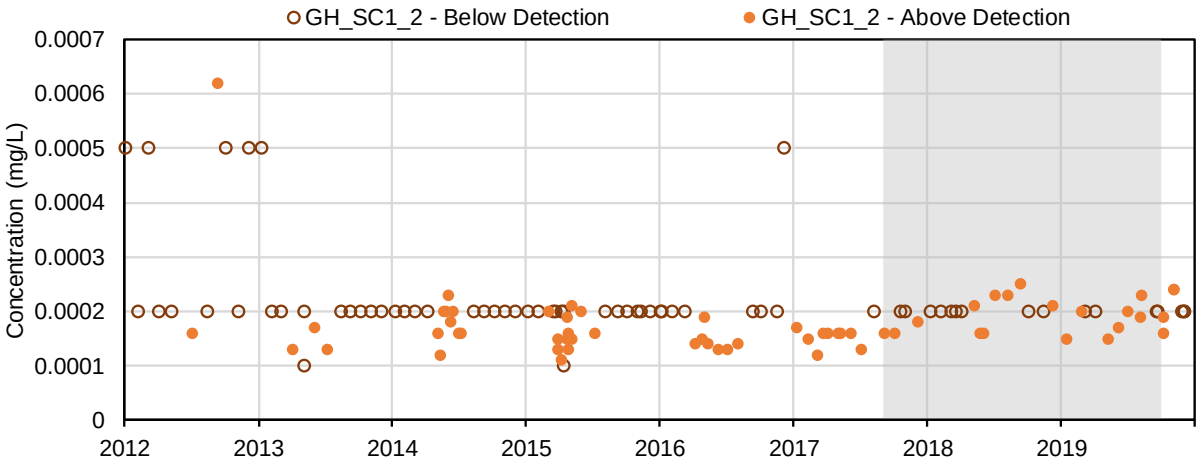
(83) Aluminum (mg/L); Dissolved Metals



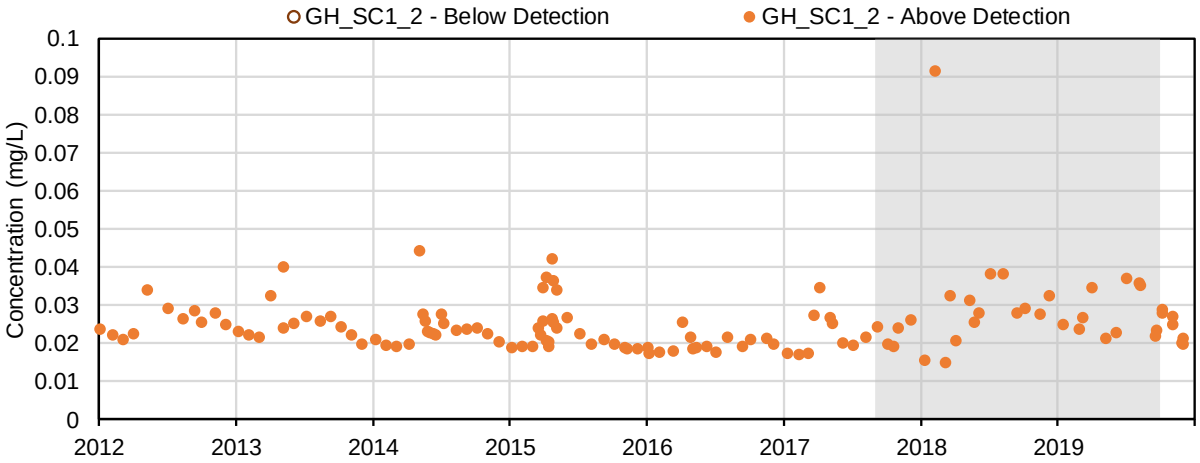
(84) Antimony (mg/L); Dissolved Metals



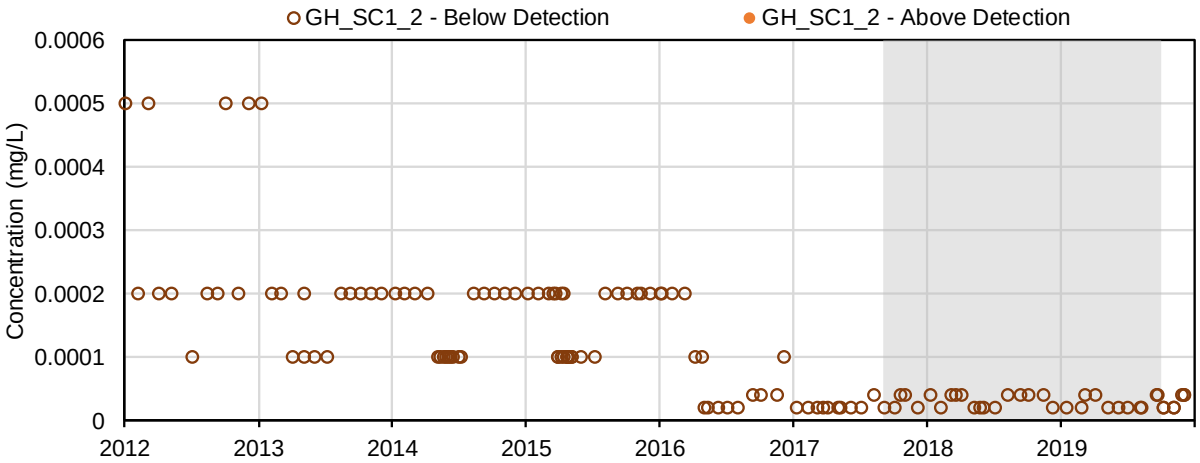
(85) Arsenic (mg/L); Dissolved Metals



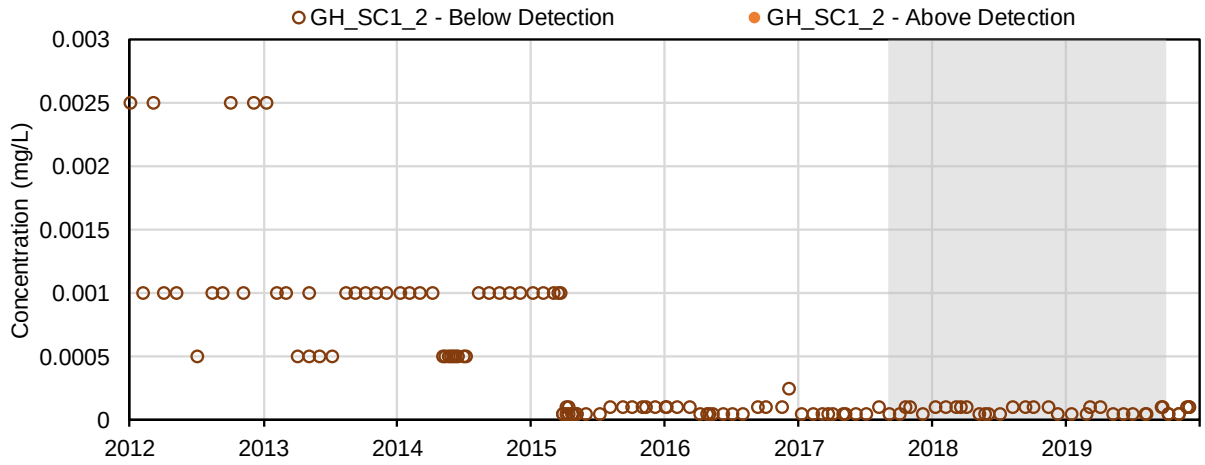
(86) Barium (mg/L); Dissolved Metals



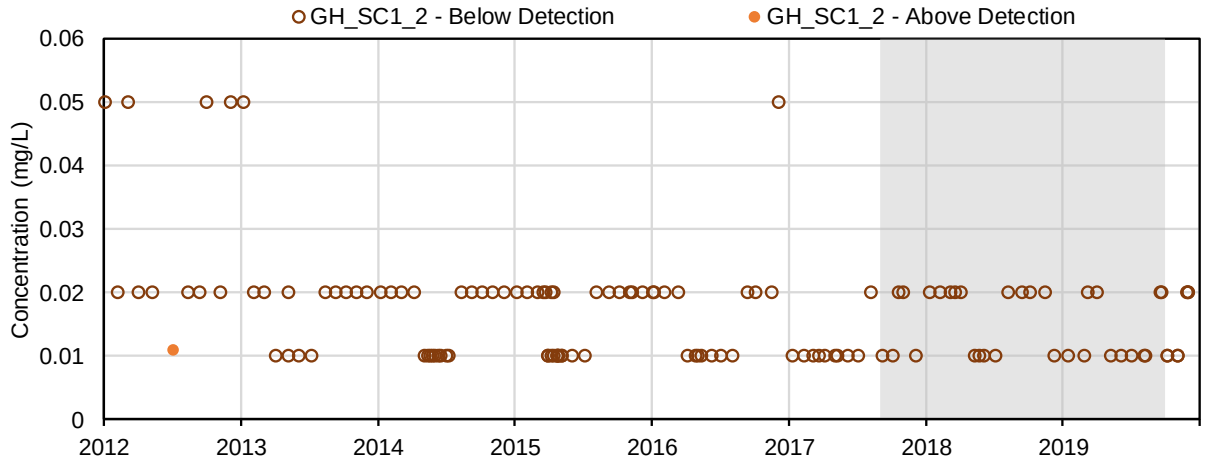
(87) Beryllium (mg/L); Dissolved Metals



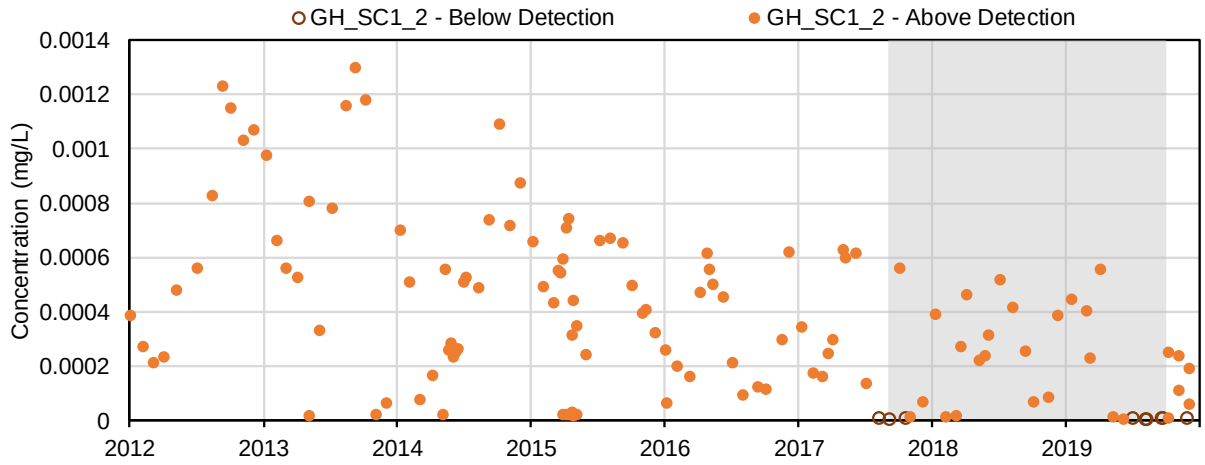
(88) Bismuth (mg/L); Dissolved Metals



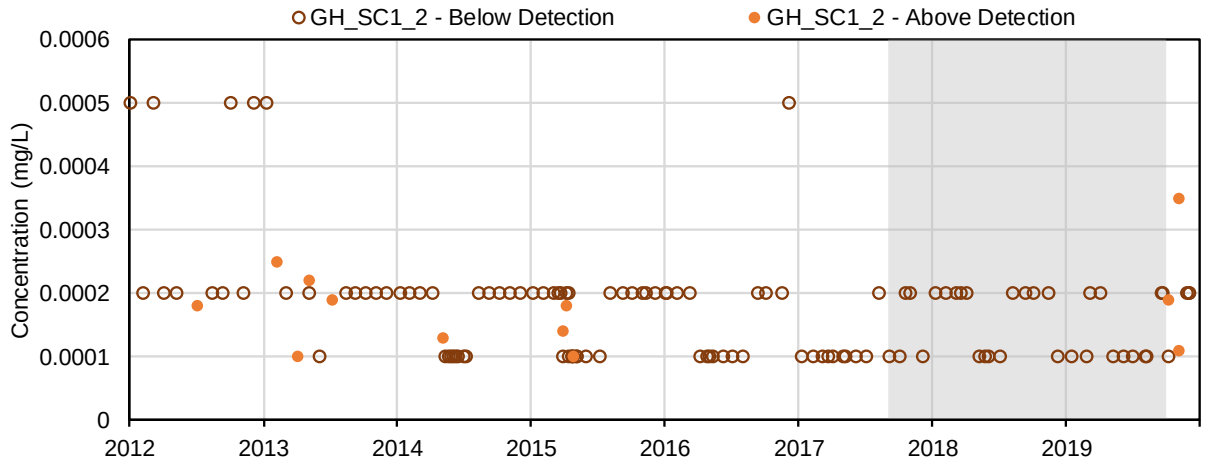
(89) Boron (mg/L); Dissolved Metals



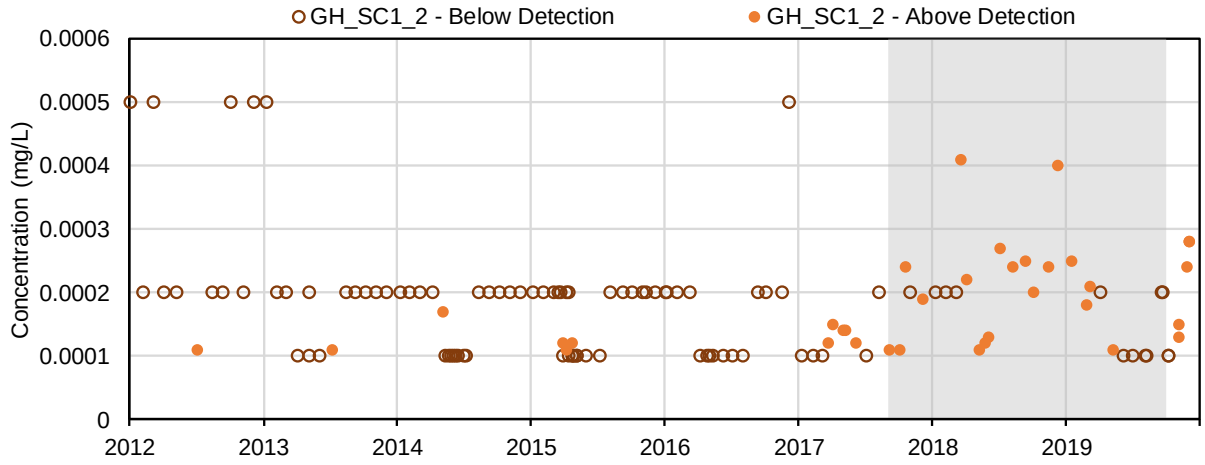
(90) Cadmium (mg/L); Dissolved Metals



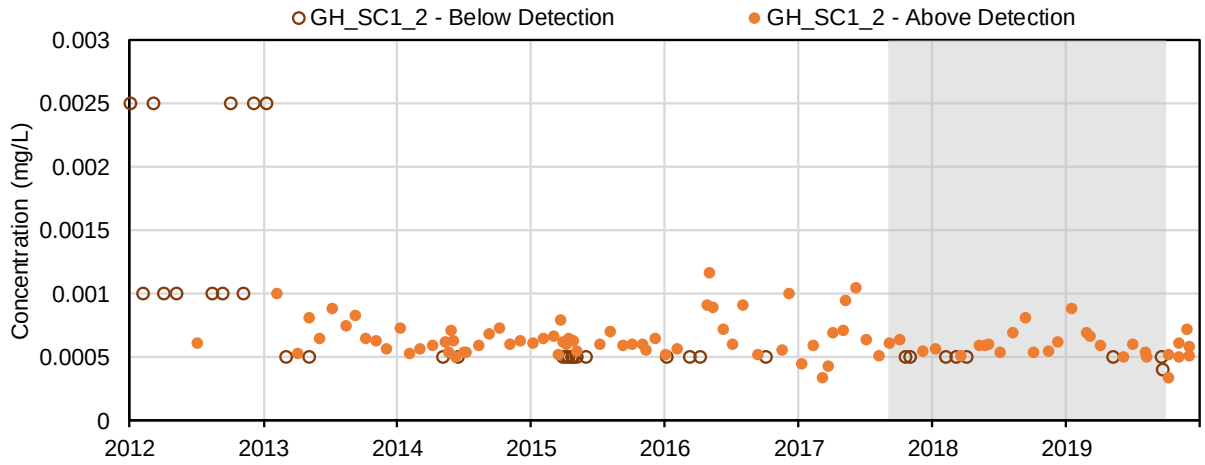
(91) Chromium (mg/L); Dissolved Metals



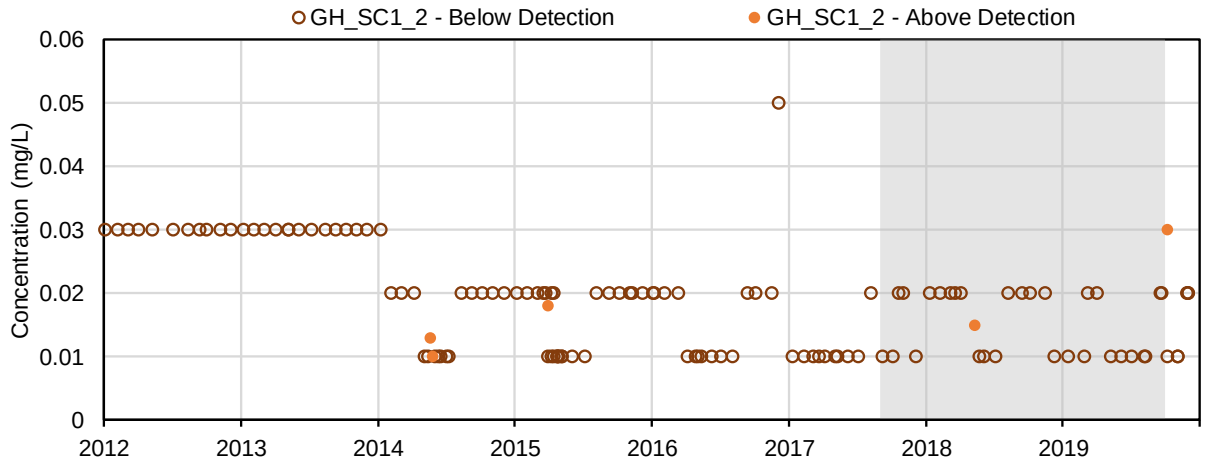
(92) Cobalt (mg/L); Dissolved Metals



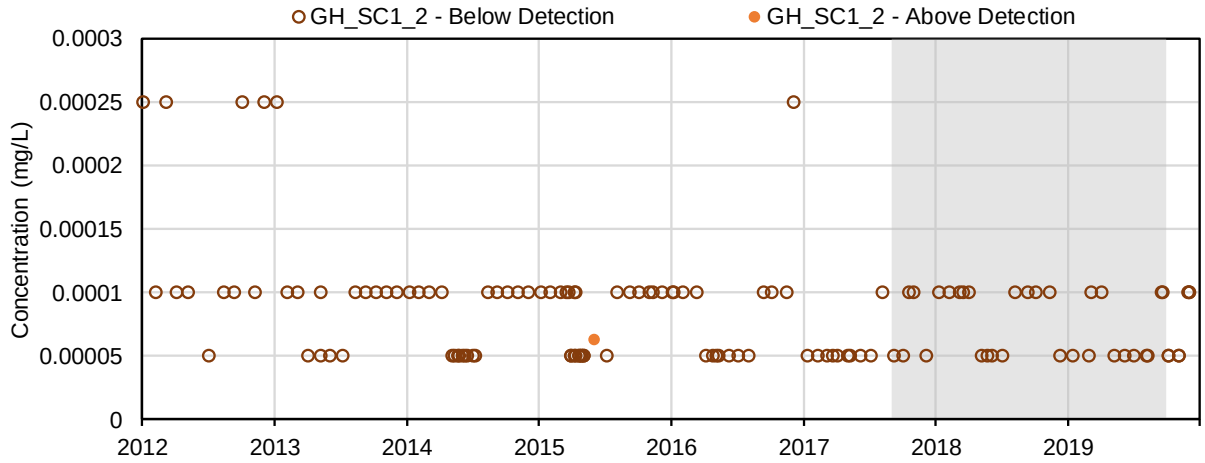
(93) Copper (mg/L); Dissolved Metals



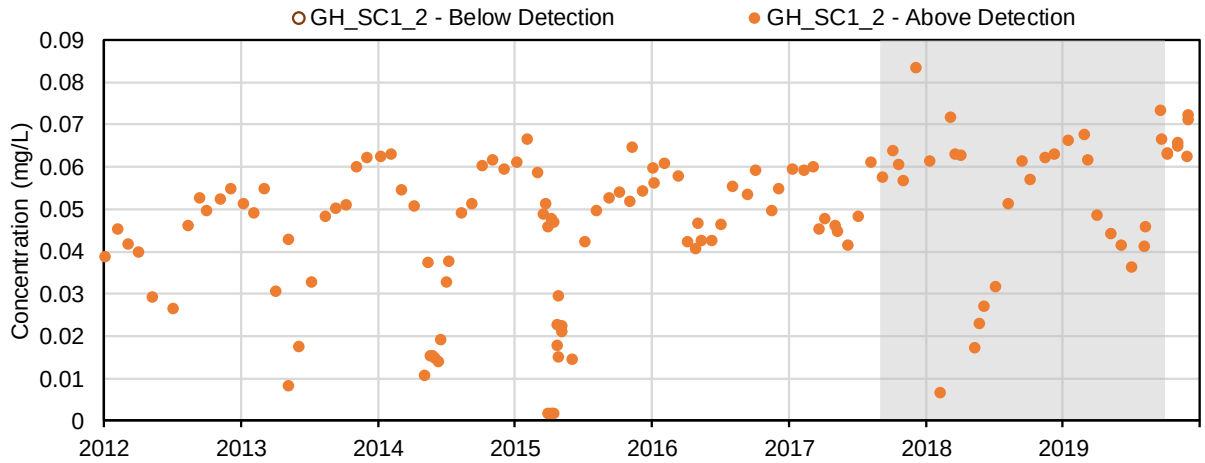
(94) Iron (mg/L); Dissolved Metals



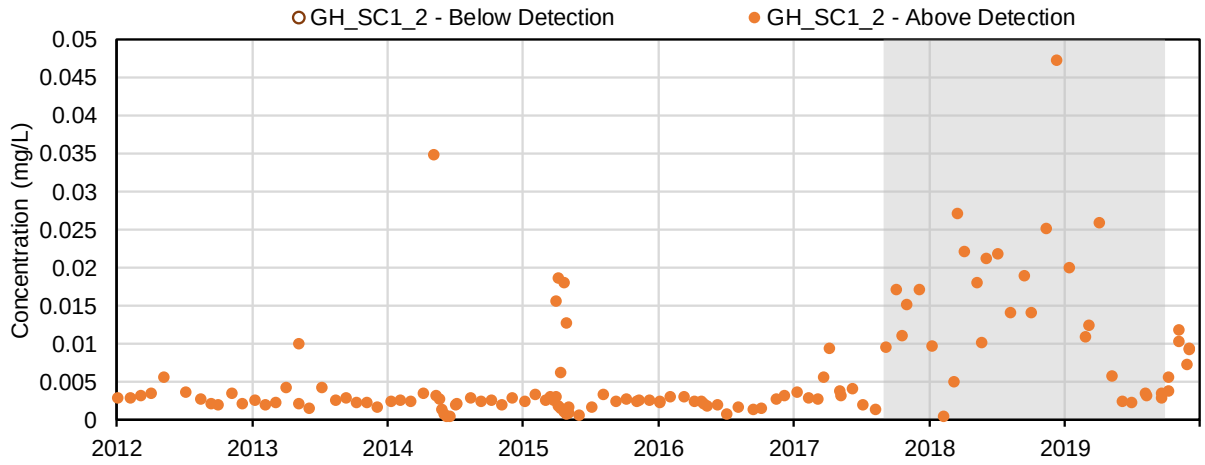
(95) Lead (mg/L); Dissolved Metals



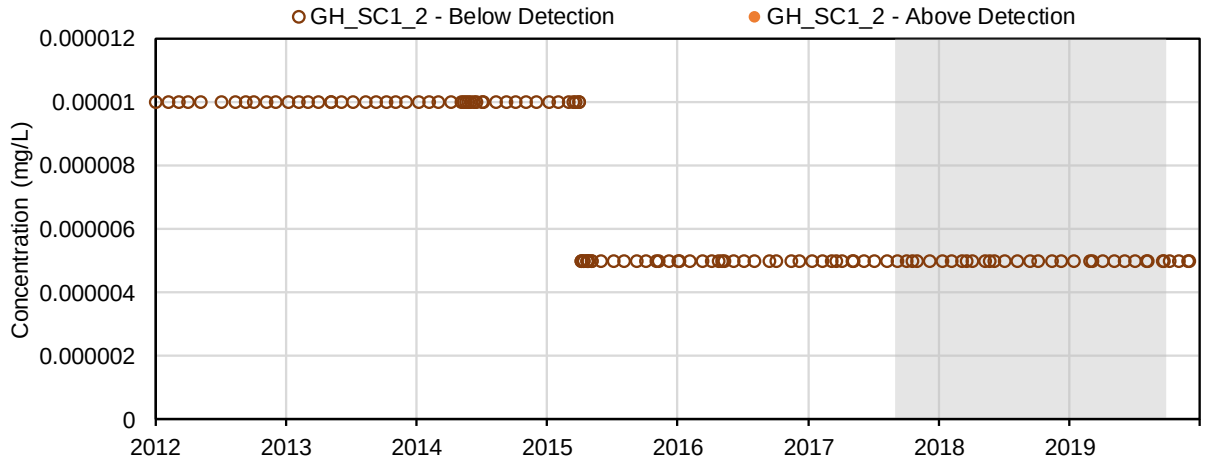
(96) Lithium (mg/L); Dissolved Metals



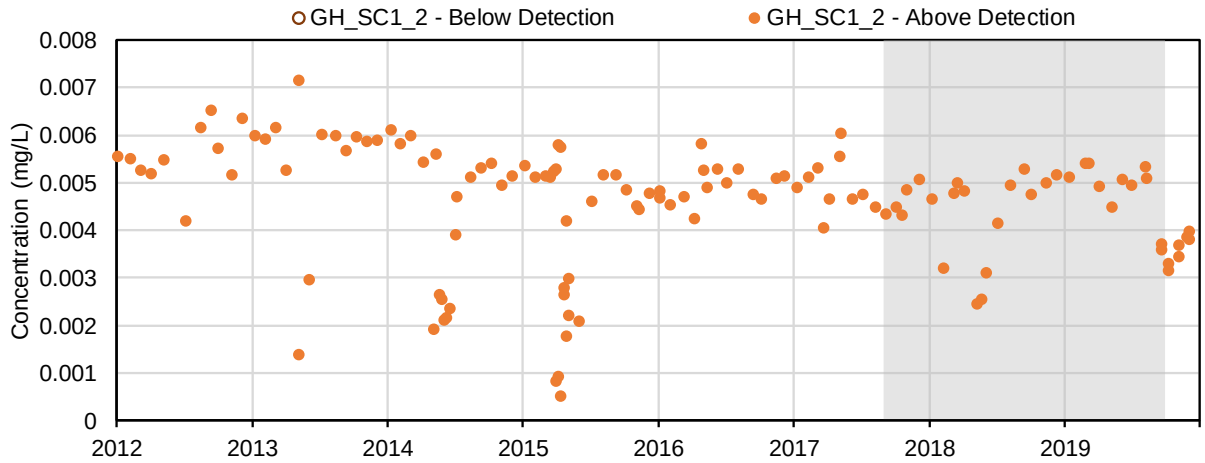
(97) Manganese (mg/L); Dissolved Metals



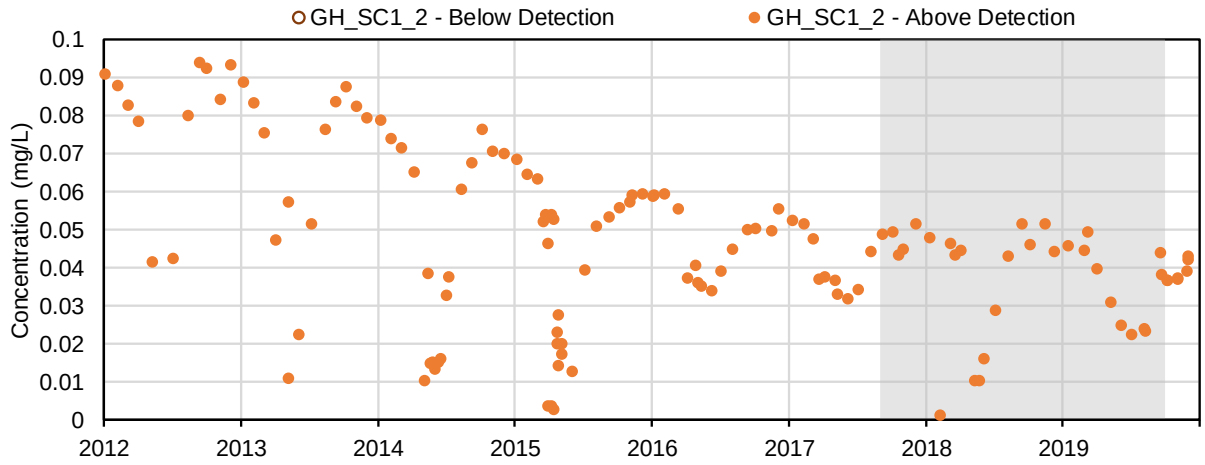
(98) Mercury (mg/L); Dissolved Metals



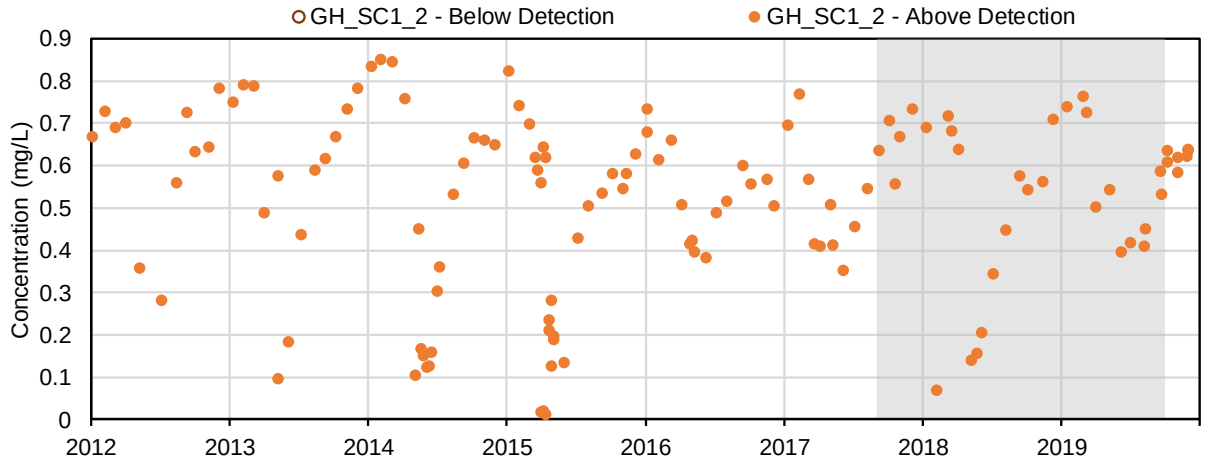
(99) Molybdenum (mg/L); Dissolved Metals



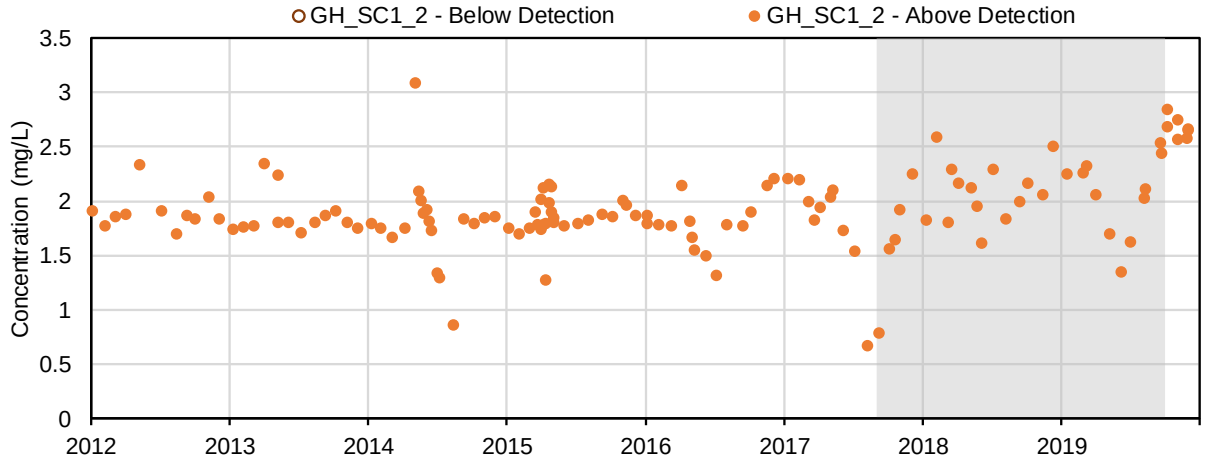
(100) Nickel (mg/L); Dissolved Metals



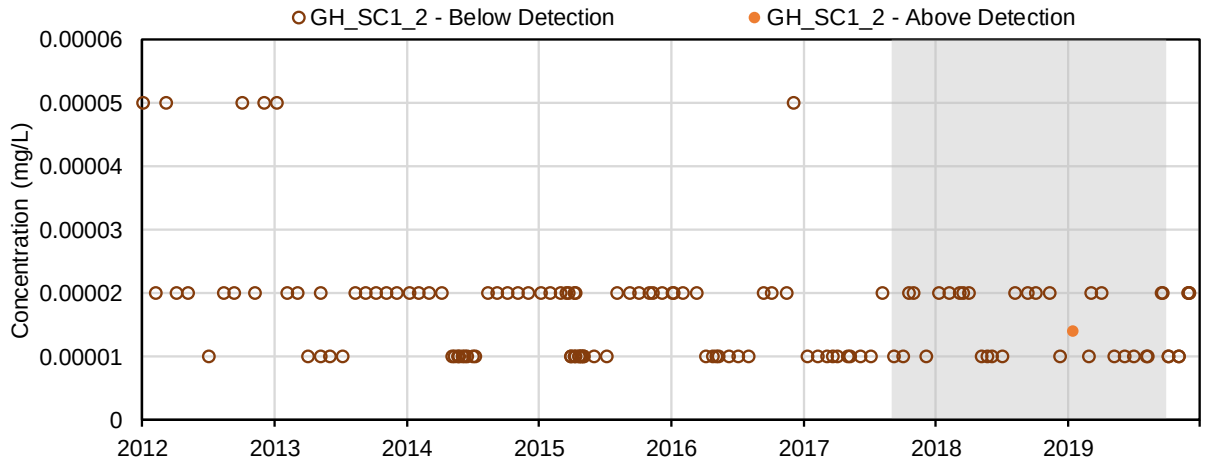
(101) Selenium (mg/L); Dissolved Metals



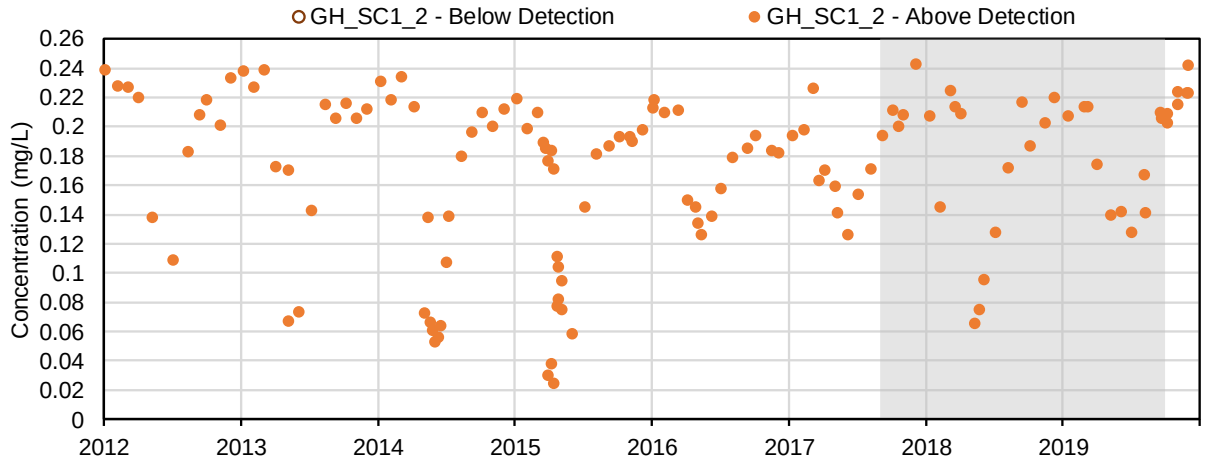
(102) Silicon (mg/L); Dissolved Metals



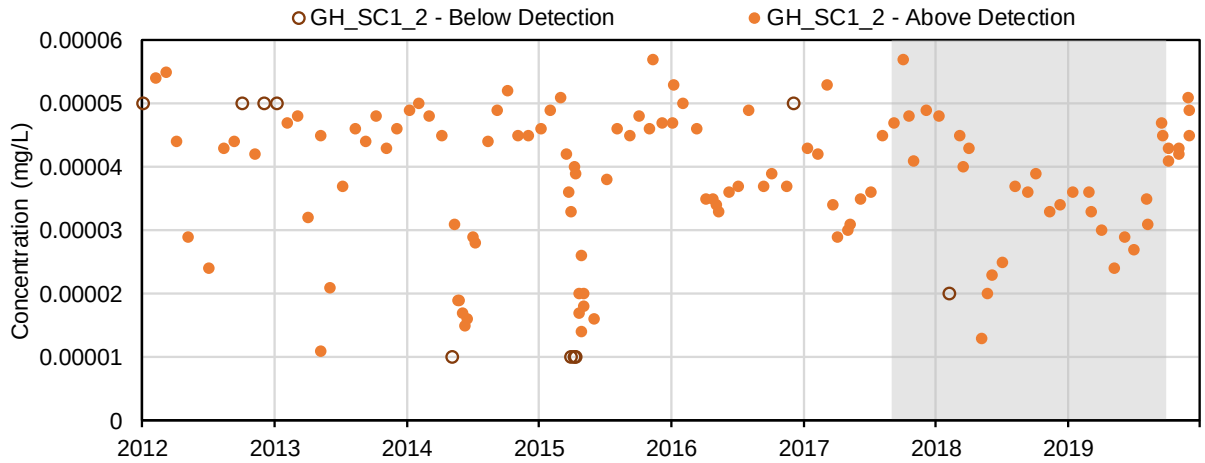
(103) Silver (mg/L); Dissolved Metals



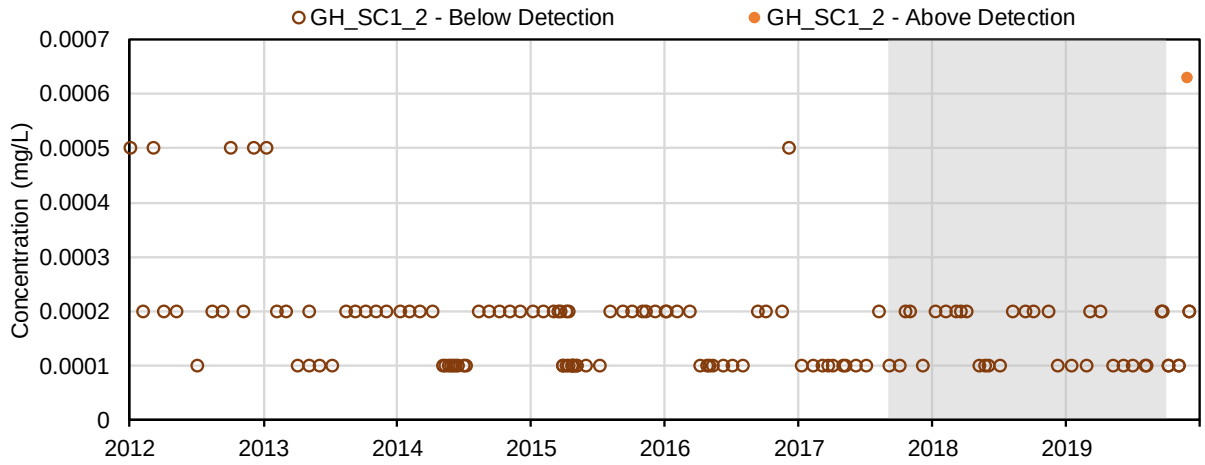
(104) Strontium (mg/L); Dissolved Metals



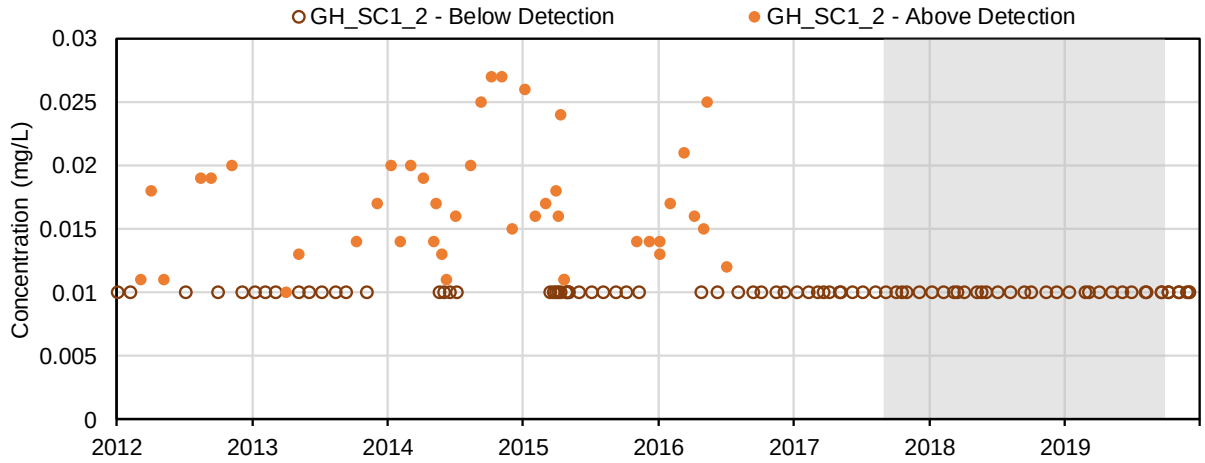
(105) Thallium (mg/L); Dissolved Metals



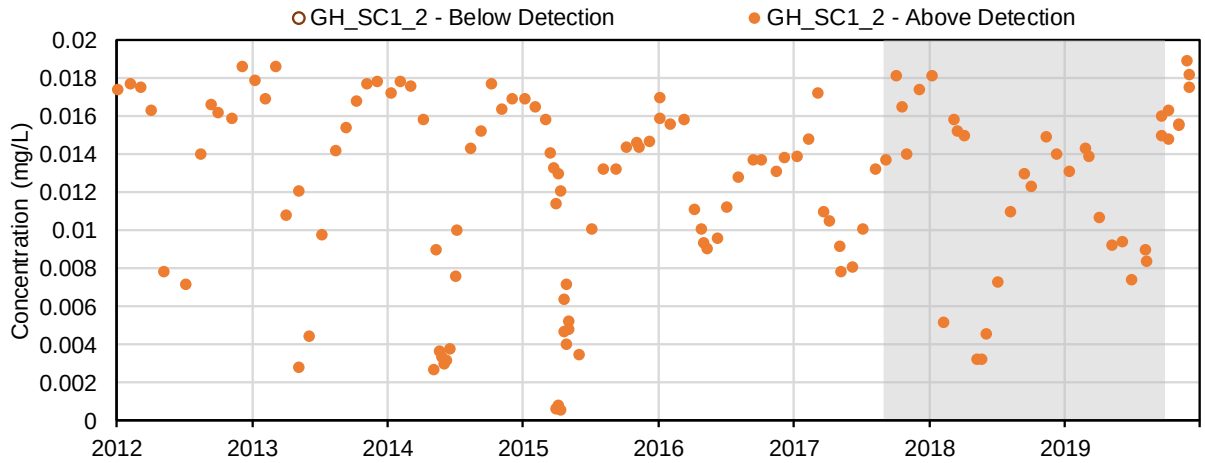
(106) Tin (mg/L); Dissolved Metals



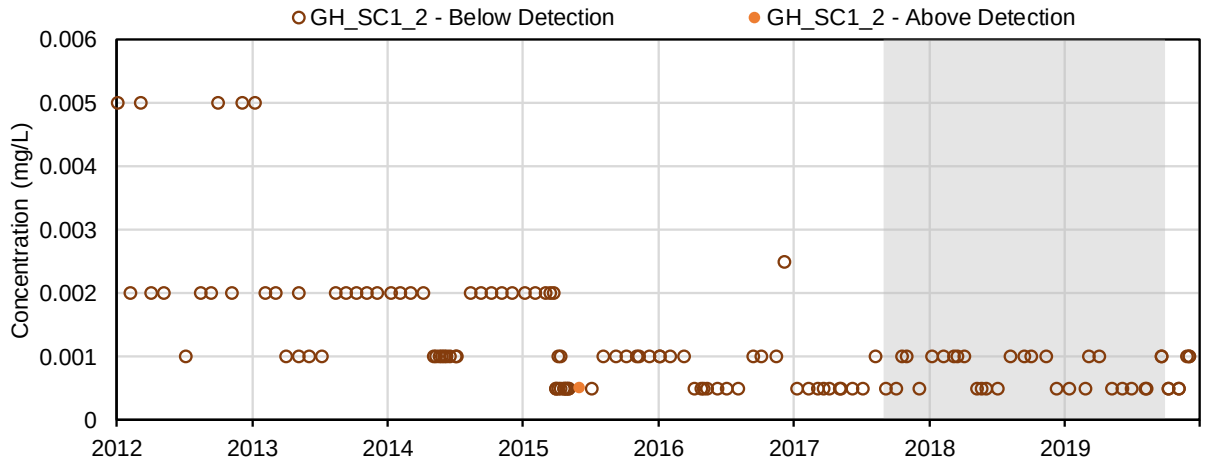
(107) Titanium (mg/L); Dissolved Metals



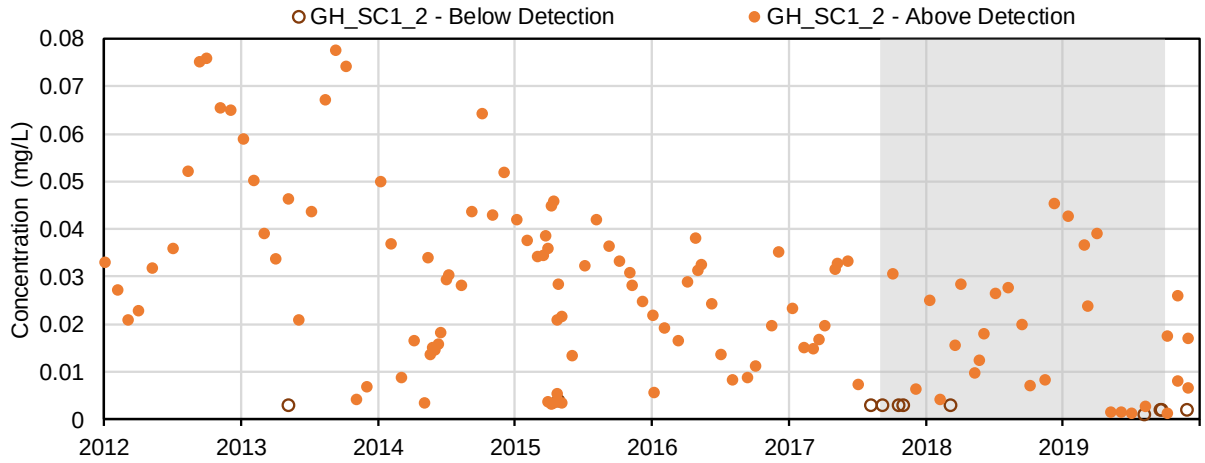
(108) Uranium (mg/L); Dissolved Metals



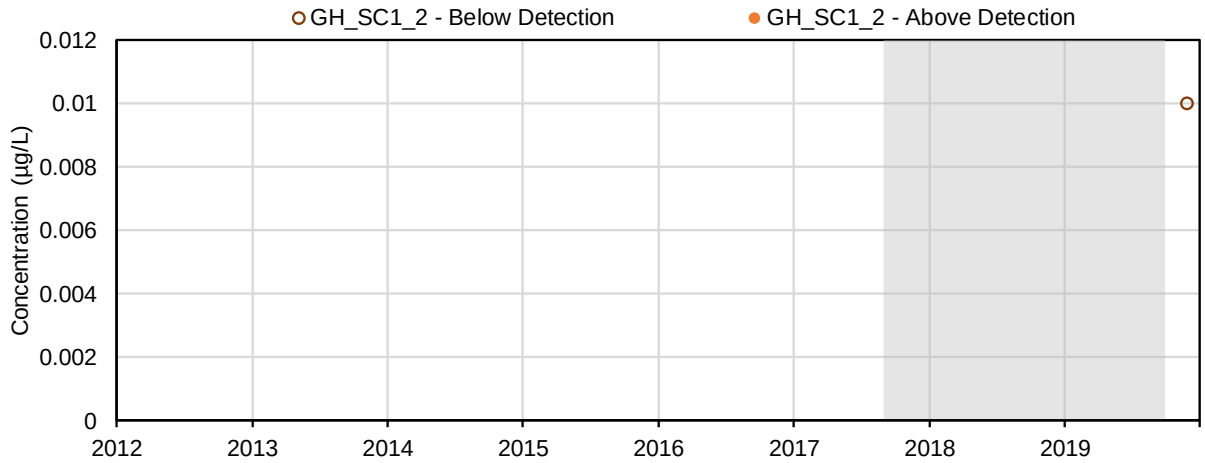
(109) Vanadium (mg/L); Dissolved Metals



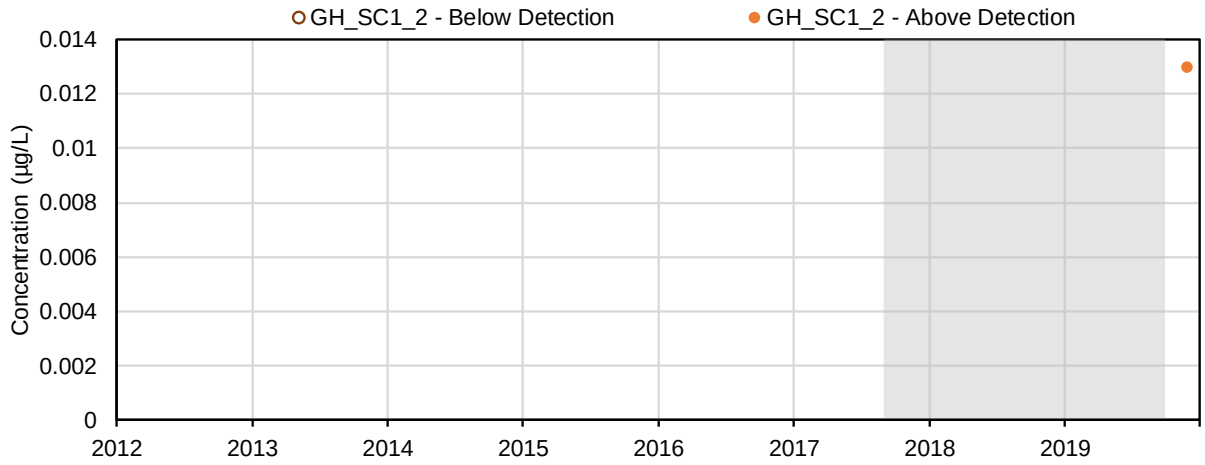
(110) Zinc (mg/L); Dissolved Metals



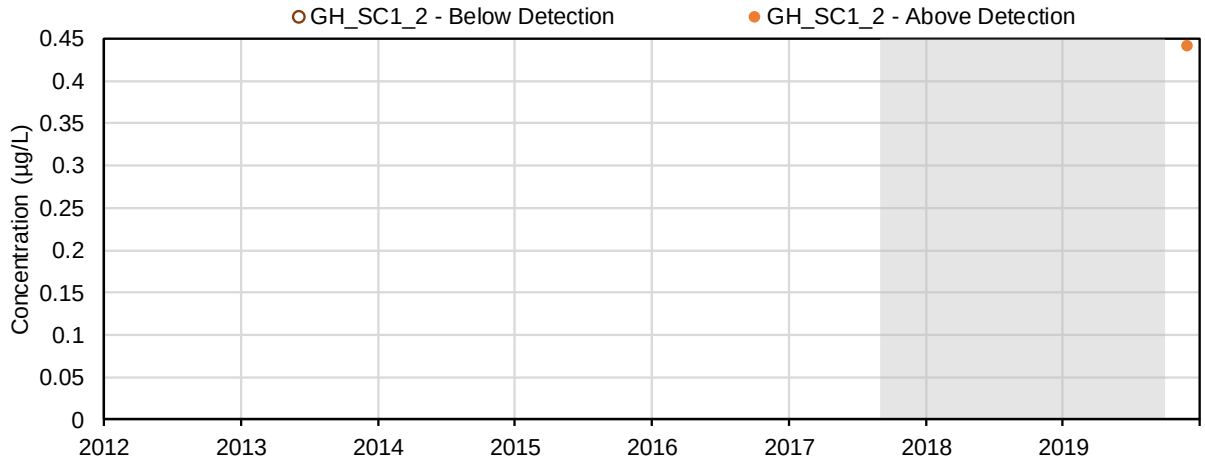
(111) Dissolved Dimethylseleneoxide (µg/L); Speciation of Selenium



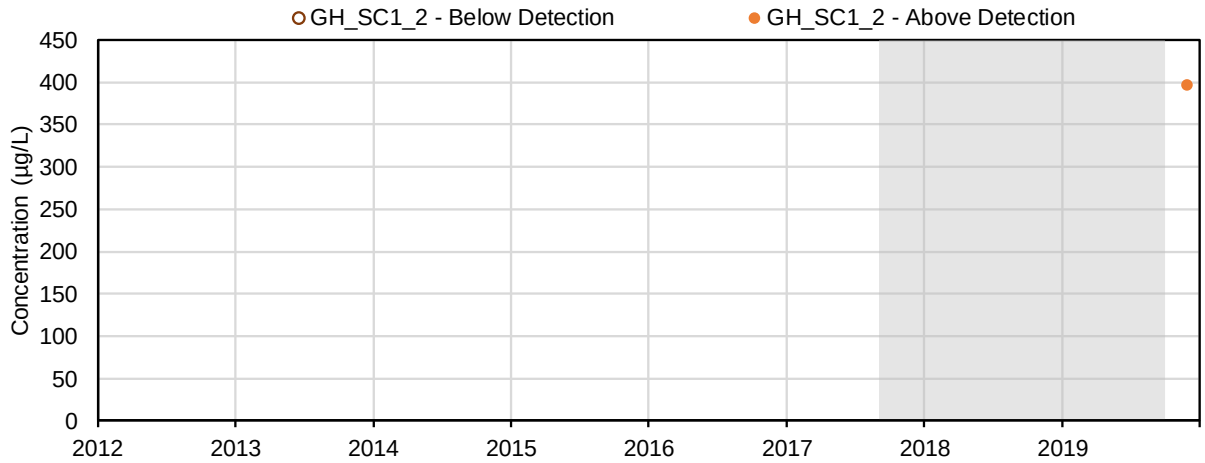
(112) Dissolved Methylseleninic Acid (µg/L); Speciation of Selenium



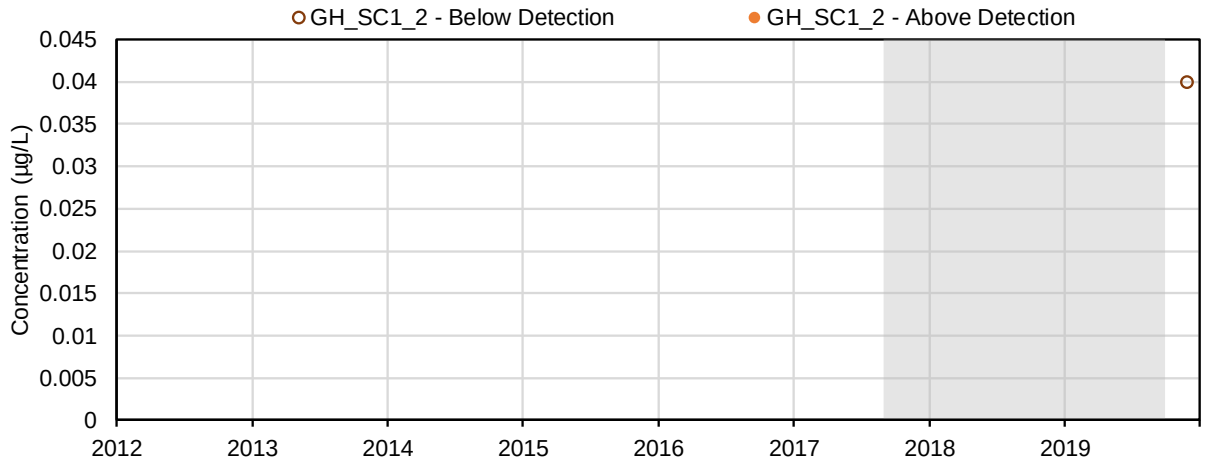
(113) Dissolved Selenite (µg/L); Speciation of Selenium



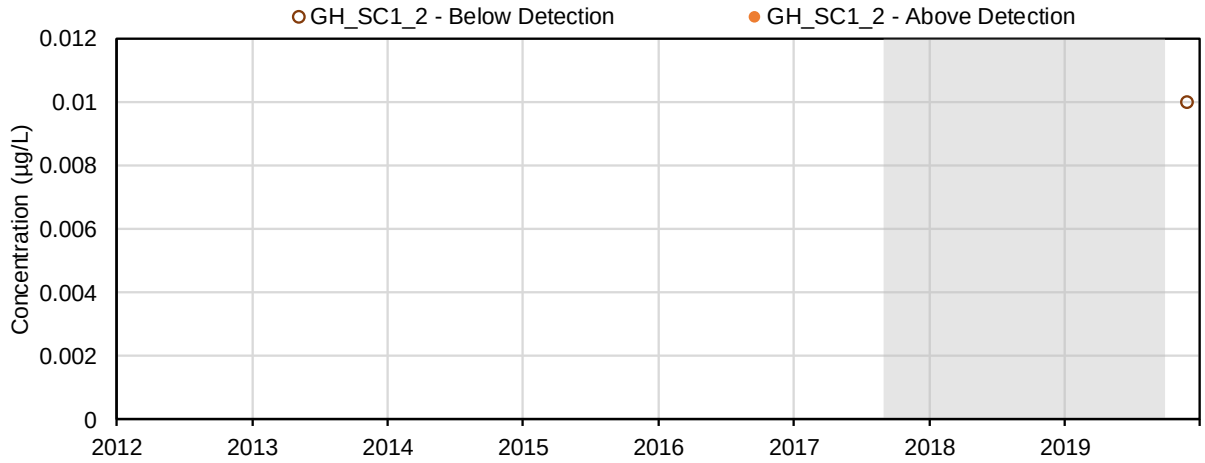
(114) Dissolved Selenate (µg/L); Speciation of Selenium



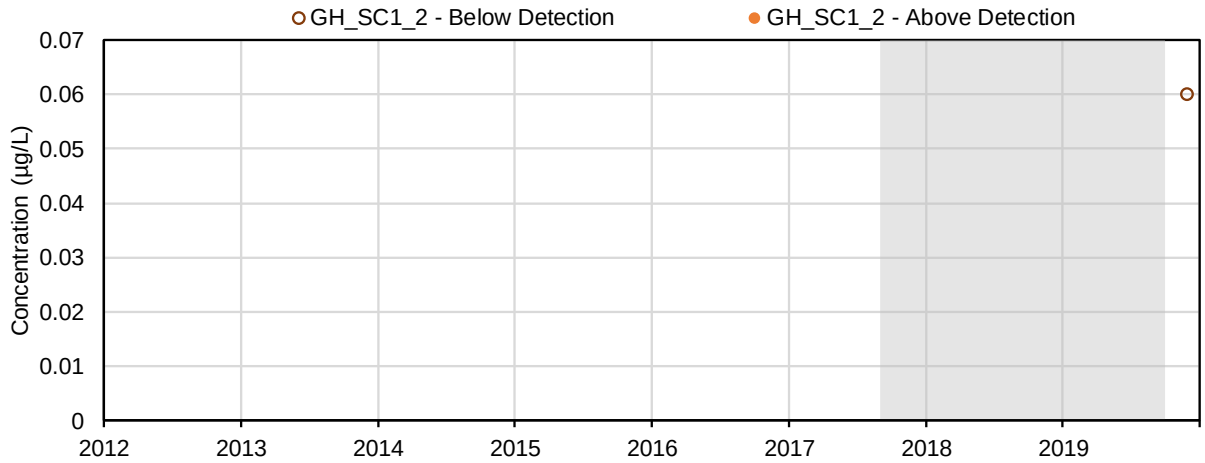
(115) Dissolved Selenocyanate (µg/L); Speciation of Selenium



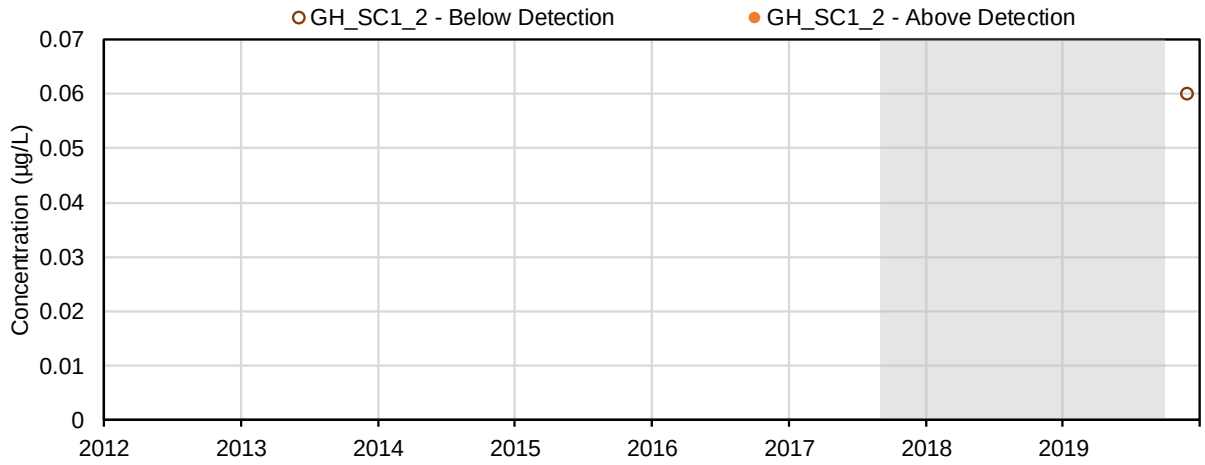
(116) Dissolved Selenomethionine (µg/L); Speciation of Selenium



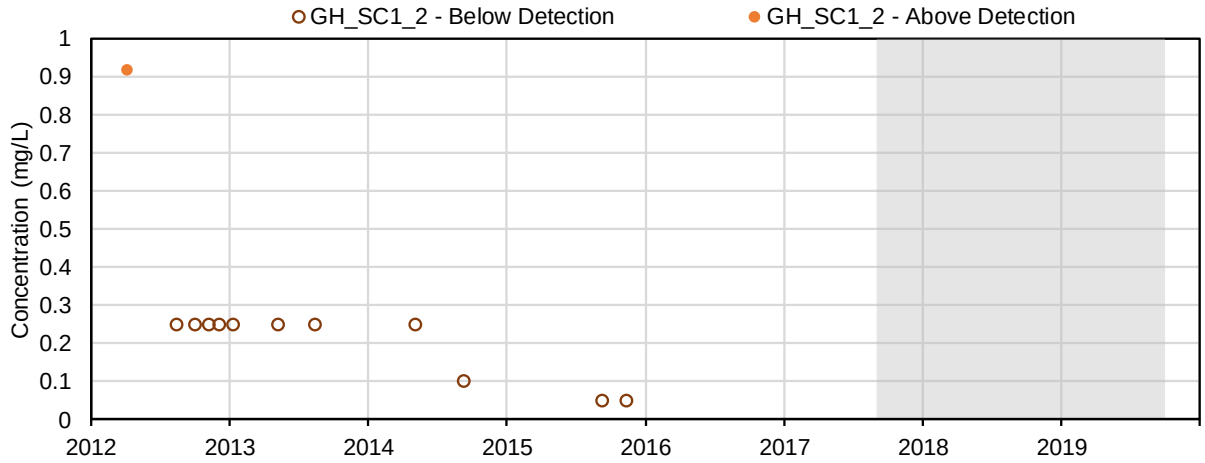
(117) Dissolved Selenosulphate (µg/L); Speciation of Selenium



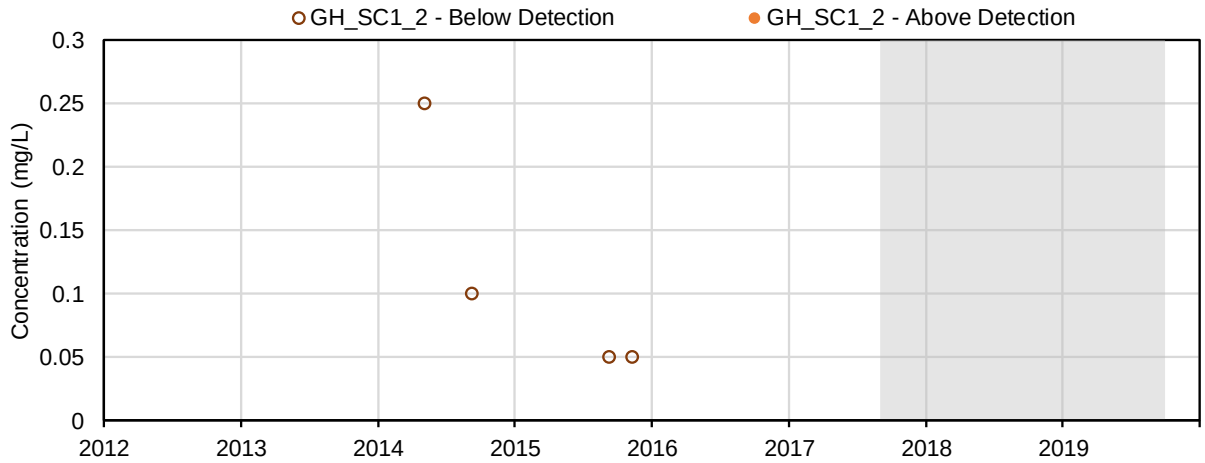
(118) Unknown Dissolved Selenium Species (µg/L); Speciation of Selenium



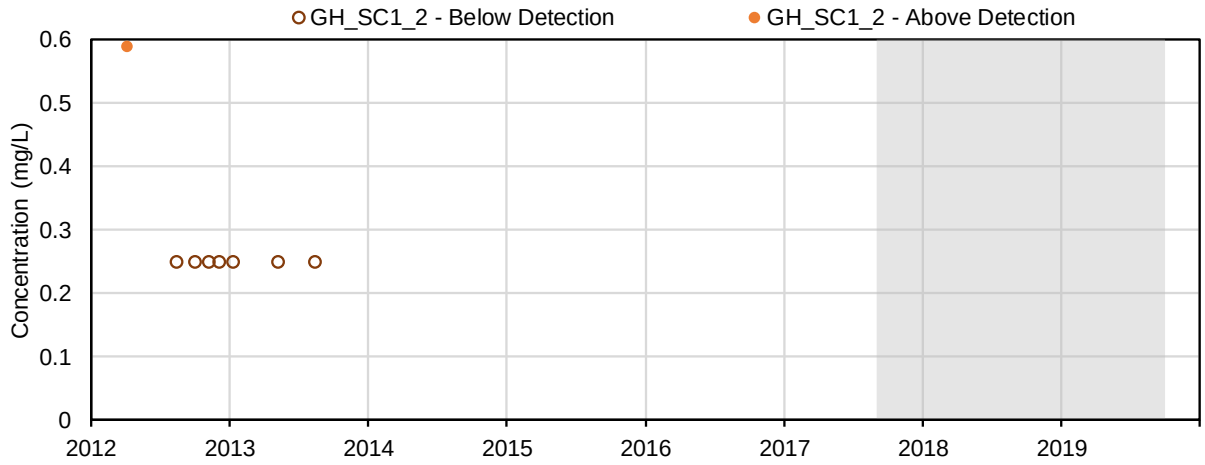
(119) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



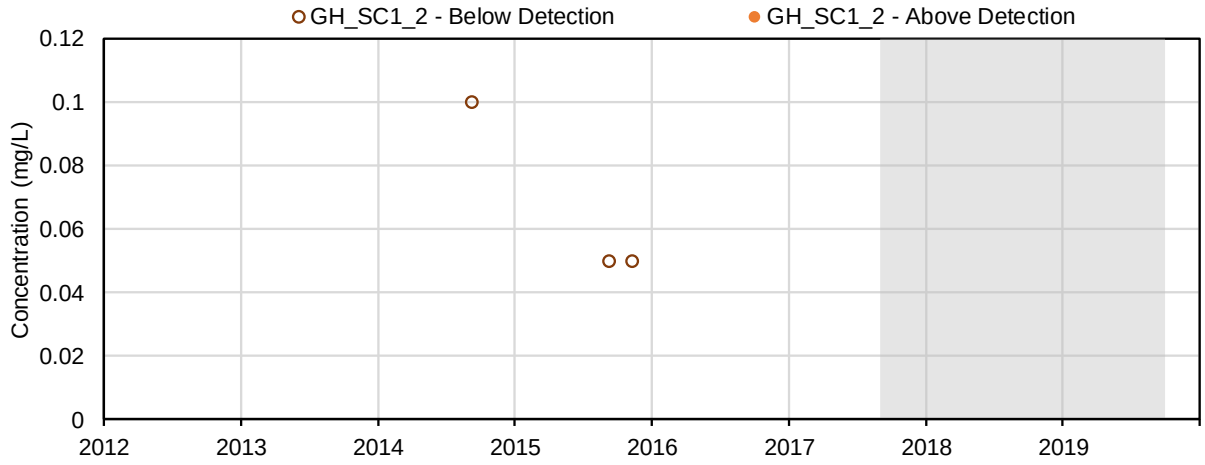
(120) Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



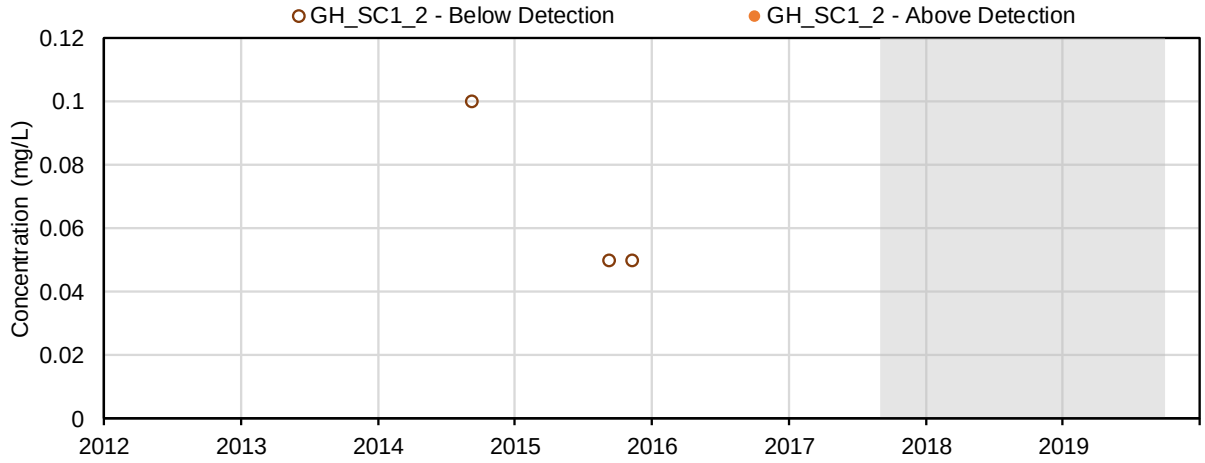
(121) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



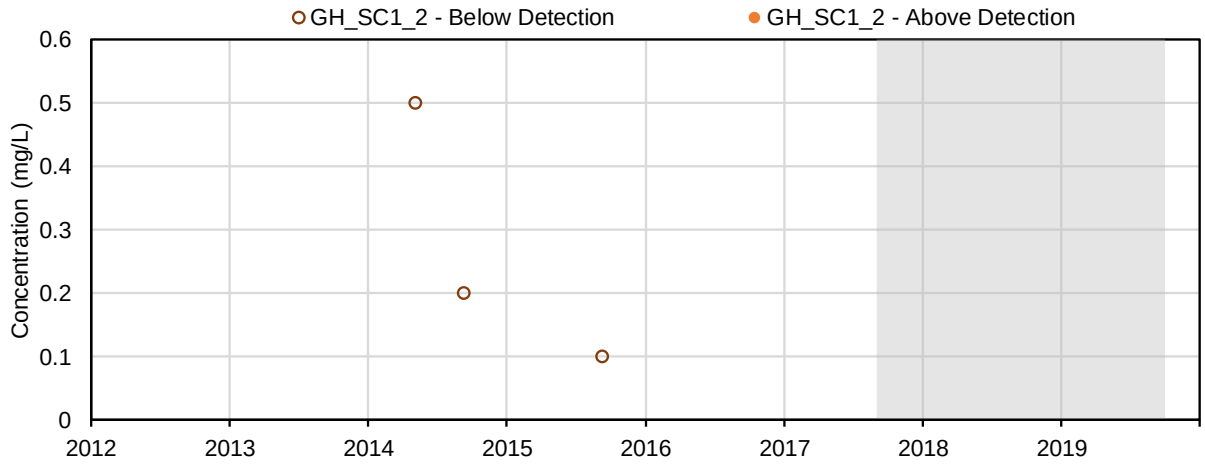
(122) Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L); Volatile Organics



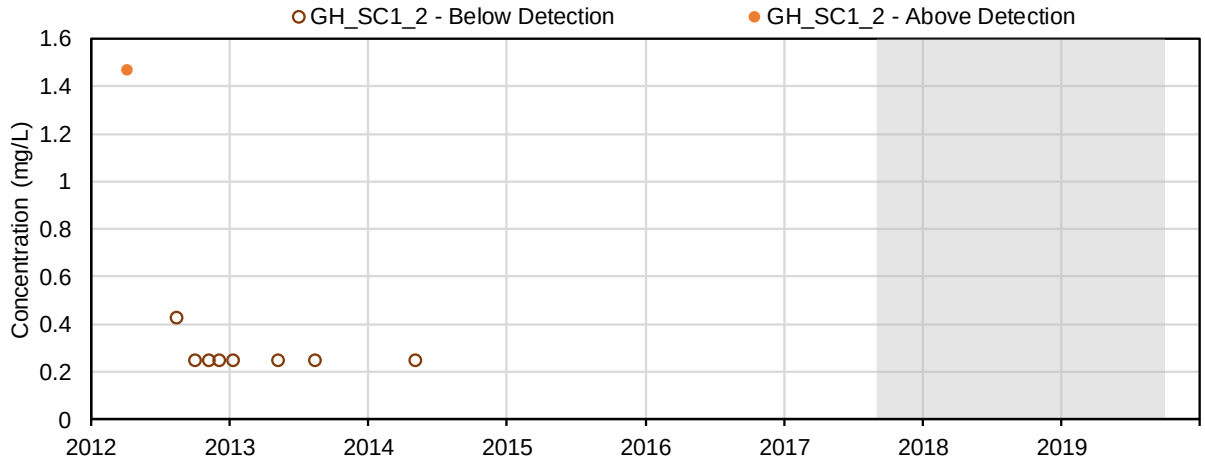
(123) Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L); Volatile Organics



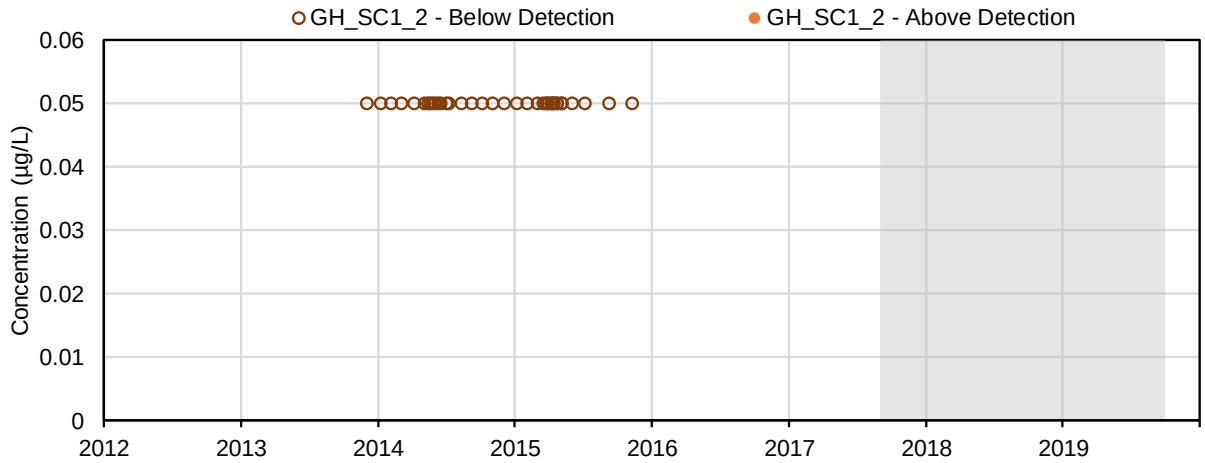
(124) Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L); Volatile Organics



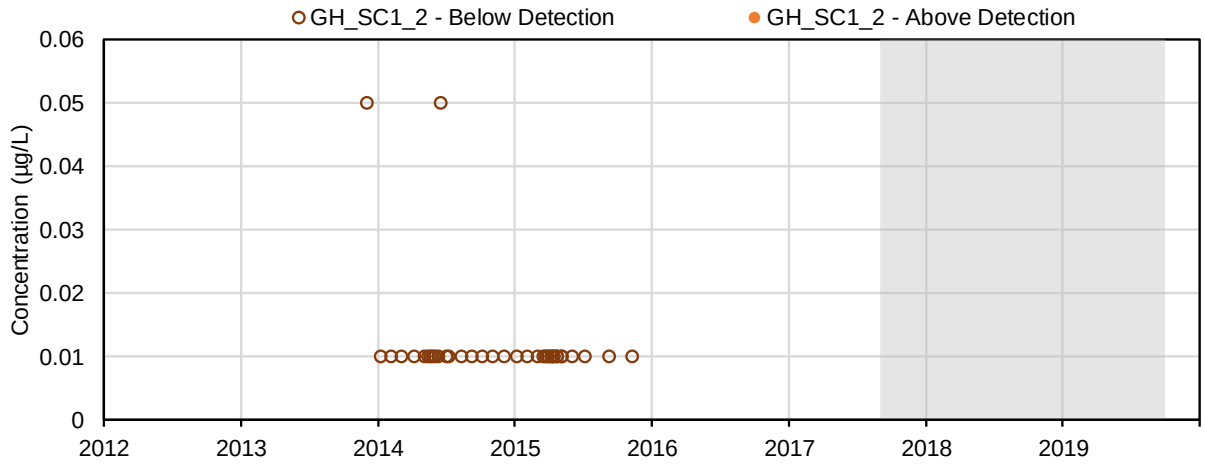
(125) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics



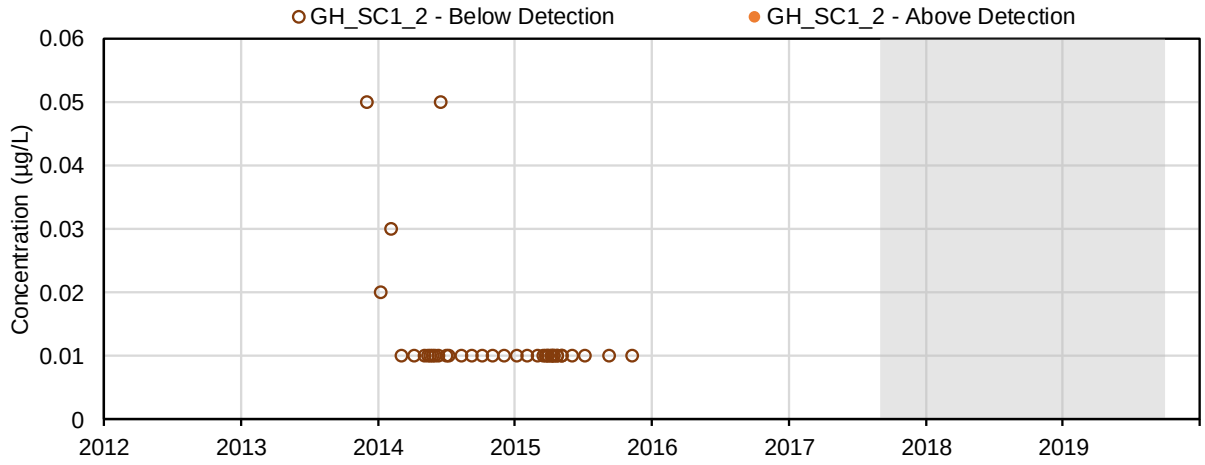
(126) Naphthalene (µg/L); Parent PAHs



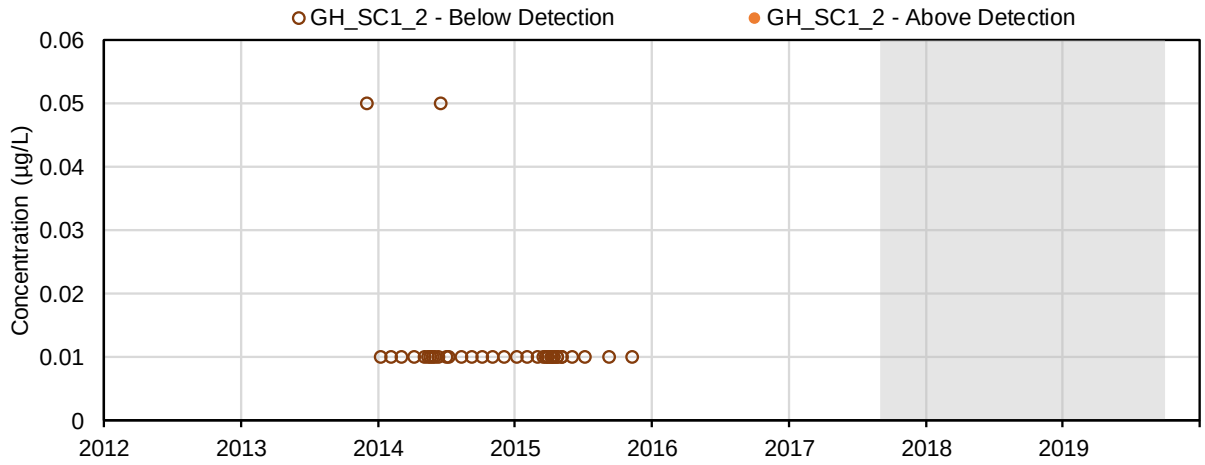
(128) Acenaphthylene (µg/L); Parent PAHs



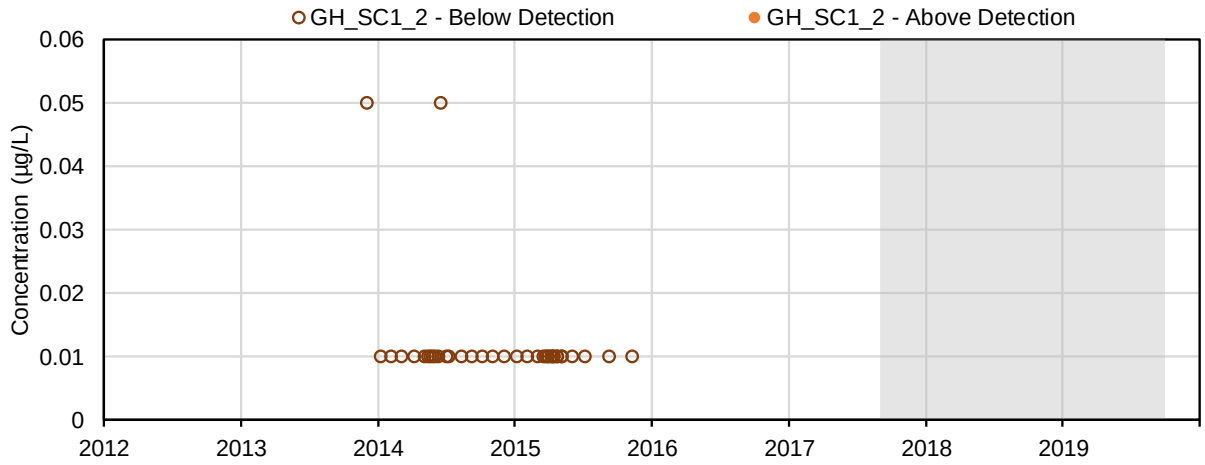
(129) Acenaphthene (µg/L); Parent PAHs



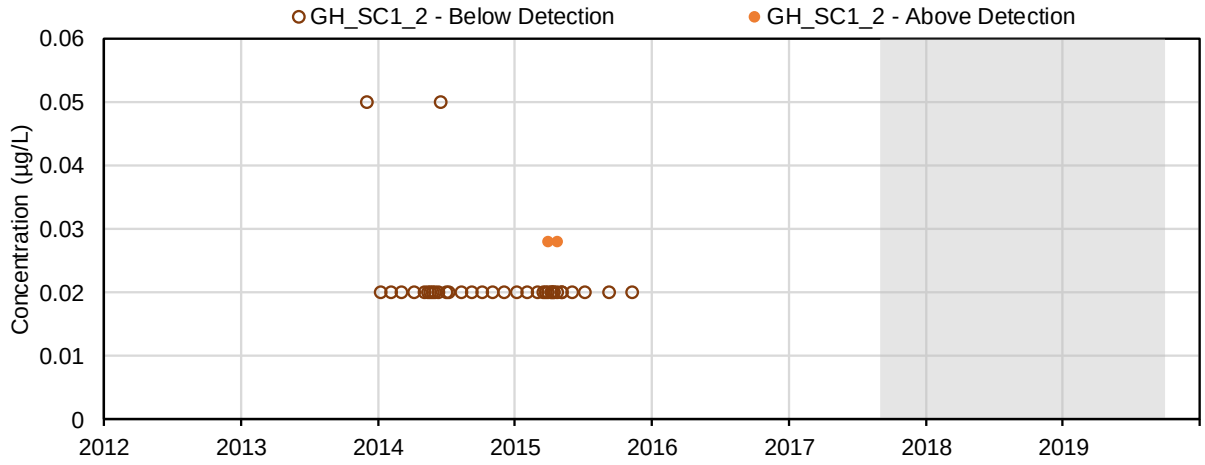
(131) Acridine (µg/L); Parent PAHs



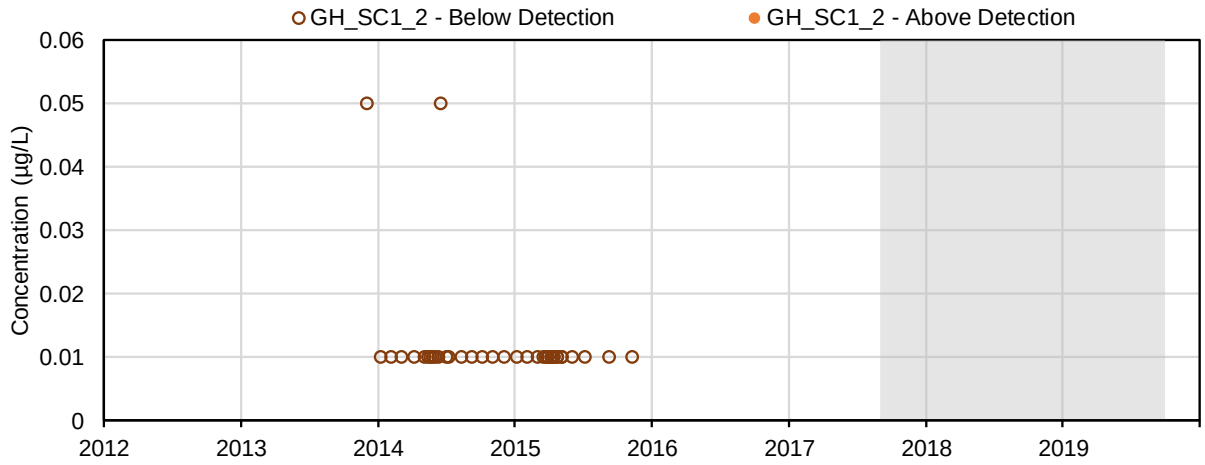
(133) Fluorene (µg/L); Parent PAHs



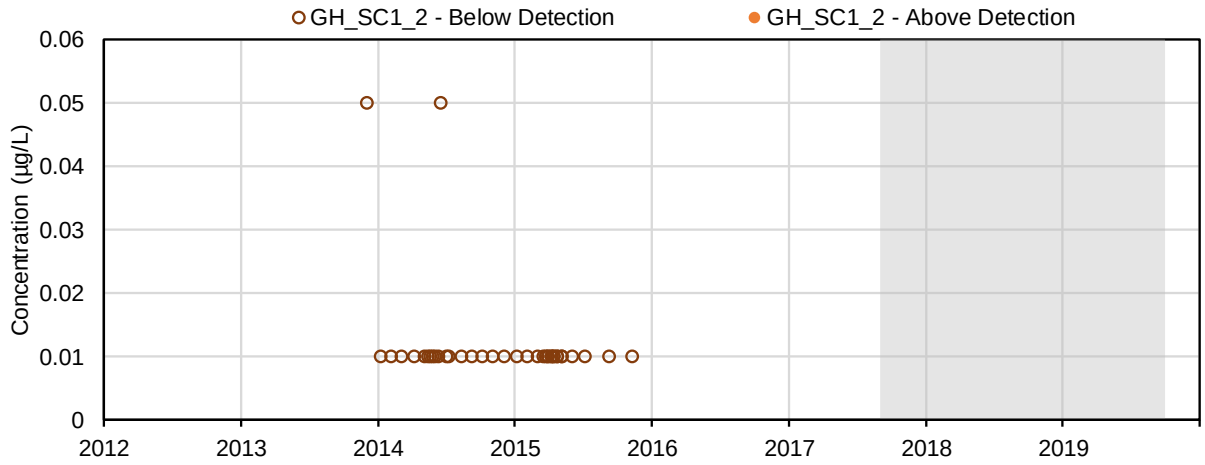
(134) Phenanthrene (µg/L); Parent PAHs



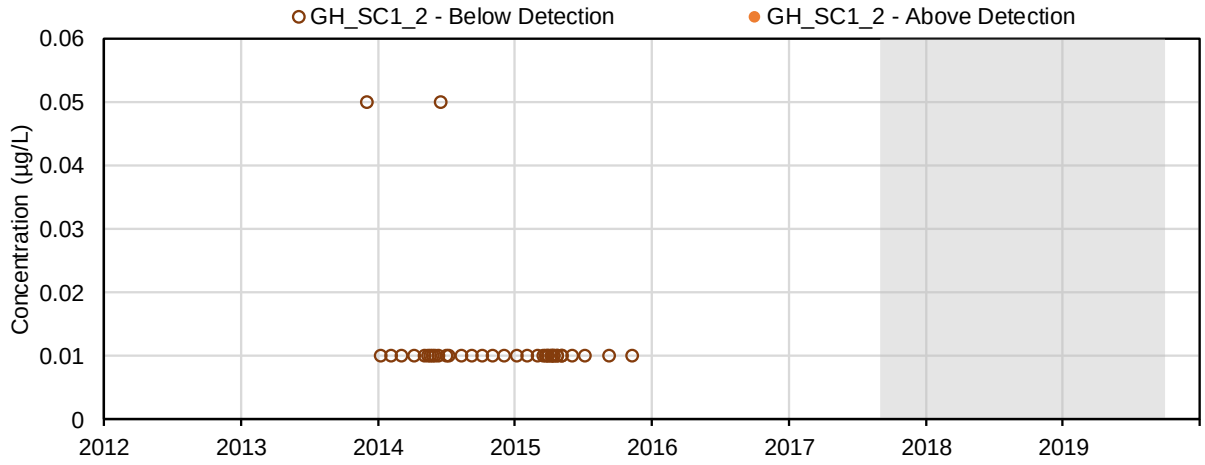
(136) Anthracene (µg/L); Parent PAHs



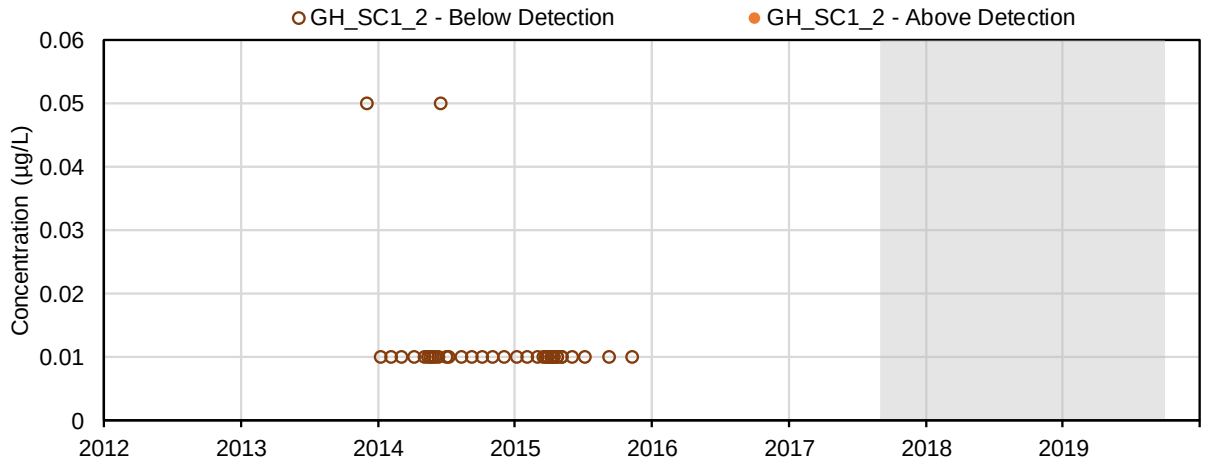
(137) Pyrene (µg/L); Parent PAHs



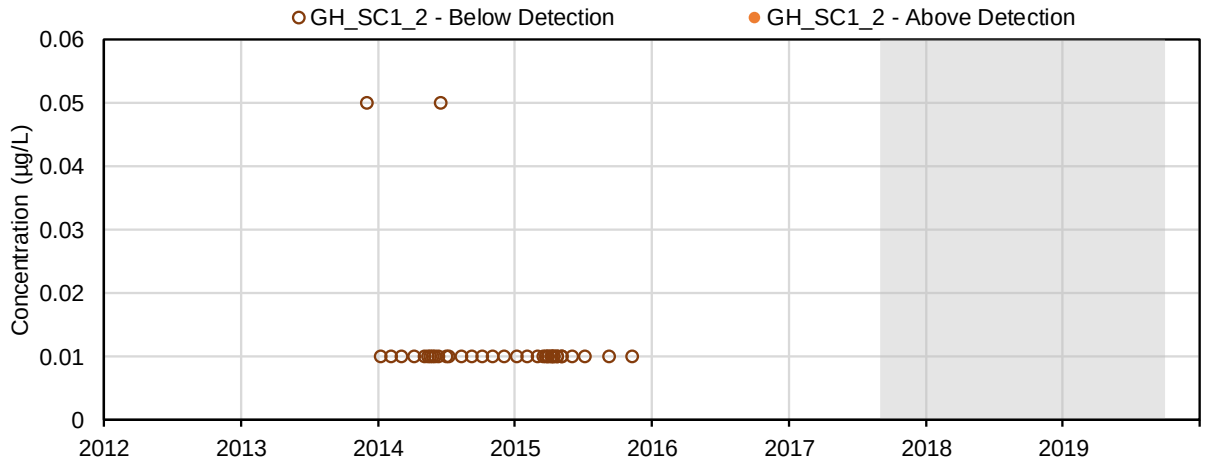
(138) Fluoranthene (µg/L); Parent PAHs



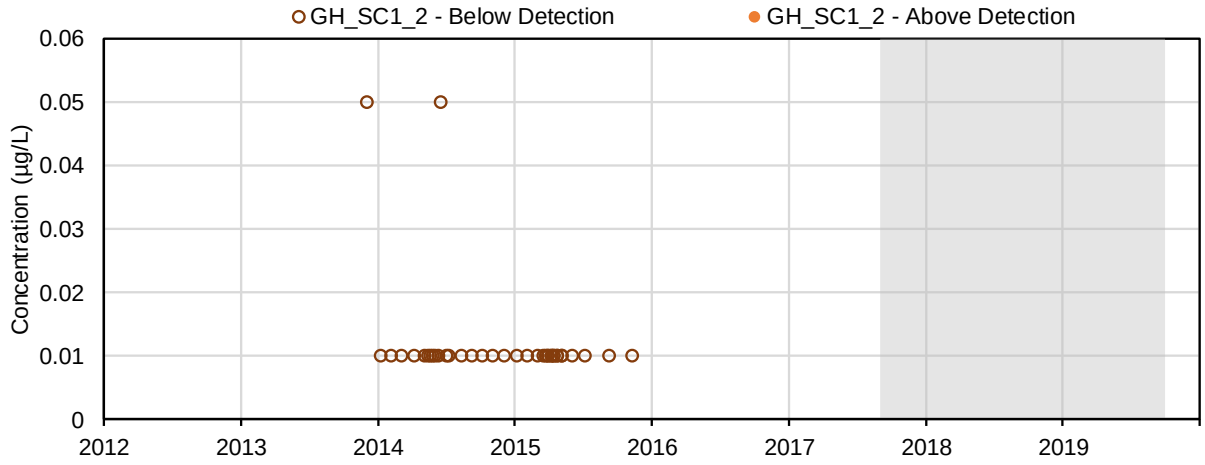
(139) Benzo(a)anthracene (µg/L); Parent PAHs



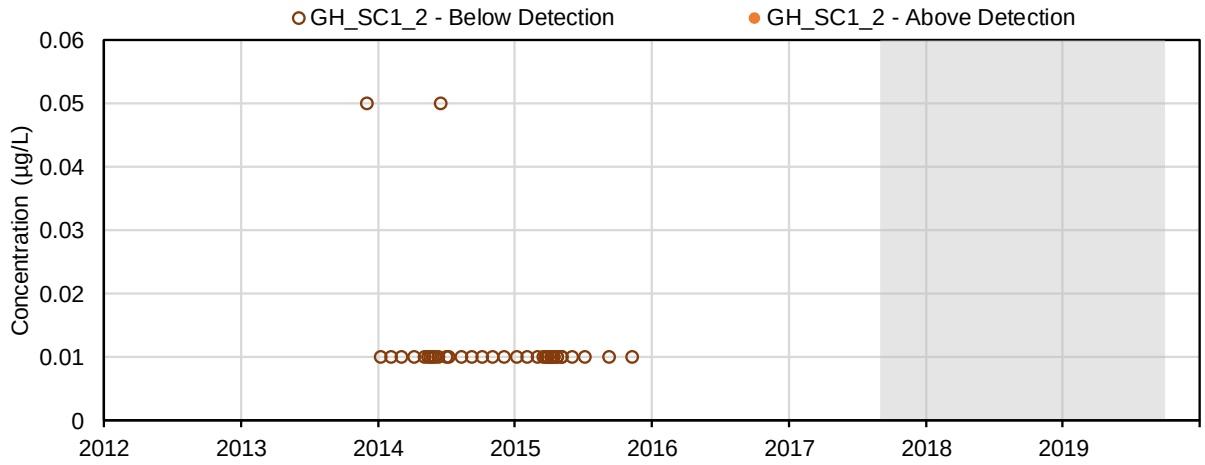
(140) Chrysene (µg/L); Parent PAHs



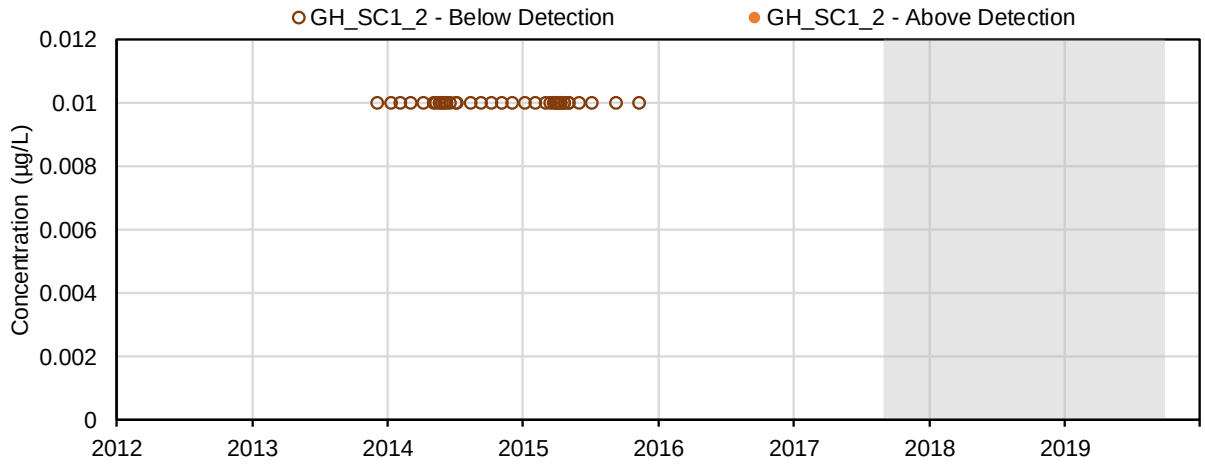
(142) Benzo(b)fluoranthene (µg/L); Parent PAHs



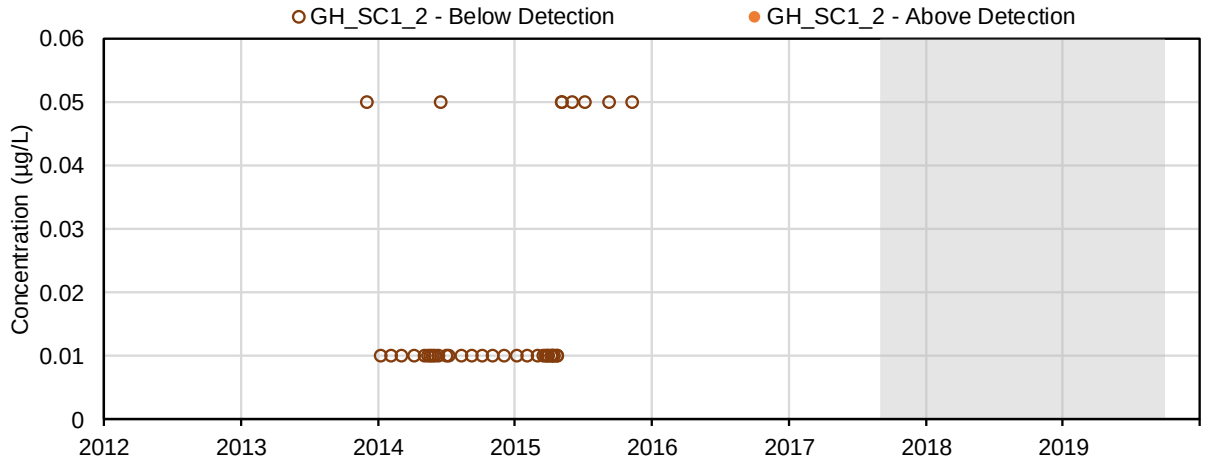
(143) Benzo(k)fluoranthene (µg/L); Parent PAHs



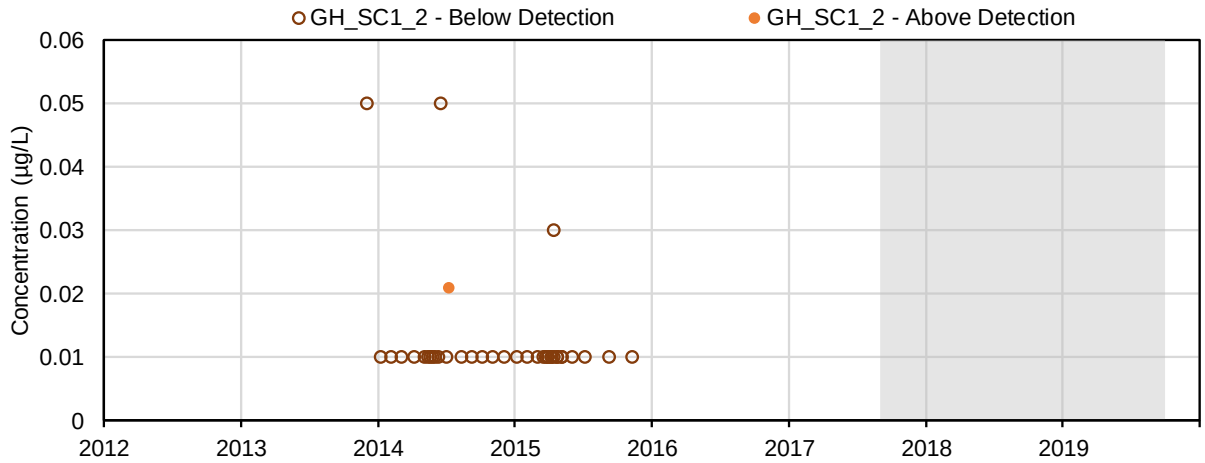
(144) Benzo(a)pyrene (µg/L); Parent PAHs



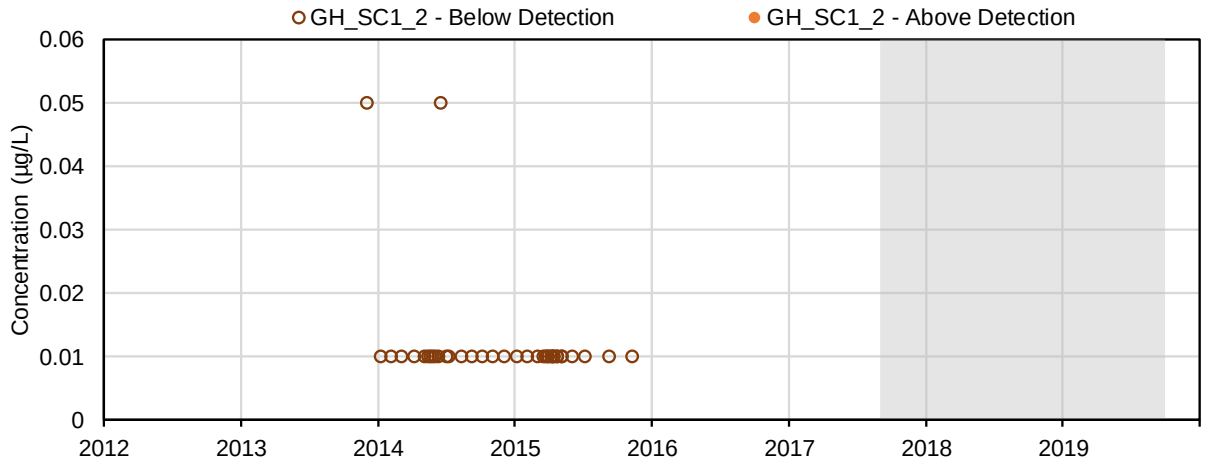
(145) Quinoline (µg/L); Parent PAHs



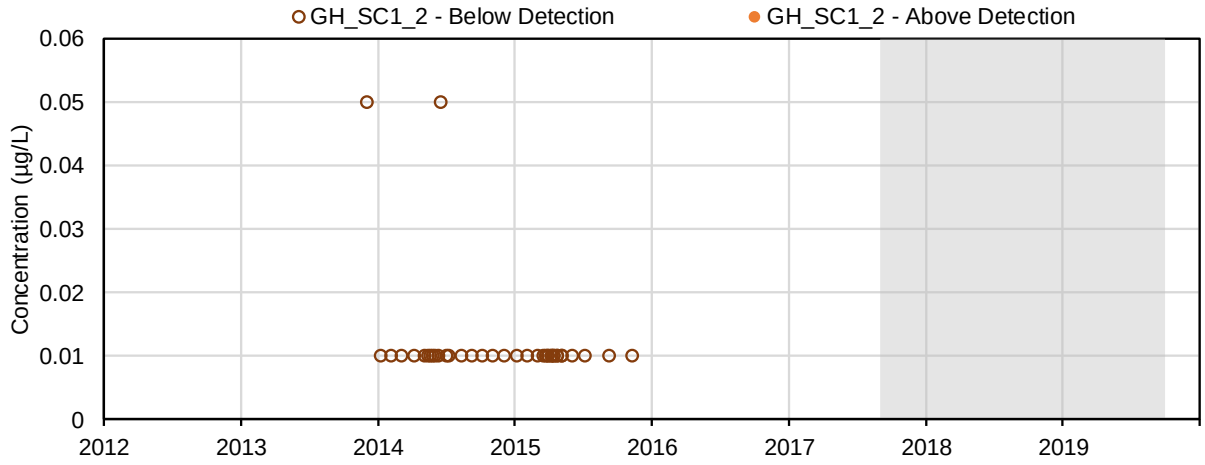
(146) Benzo(g,h,i)perylene (µg/L); Parent PAHs



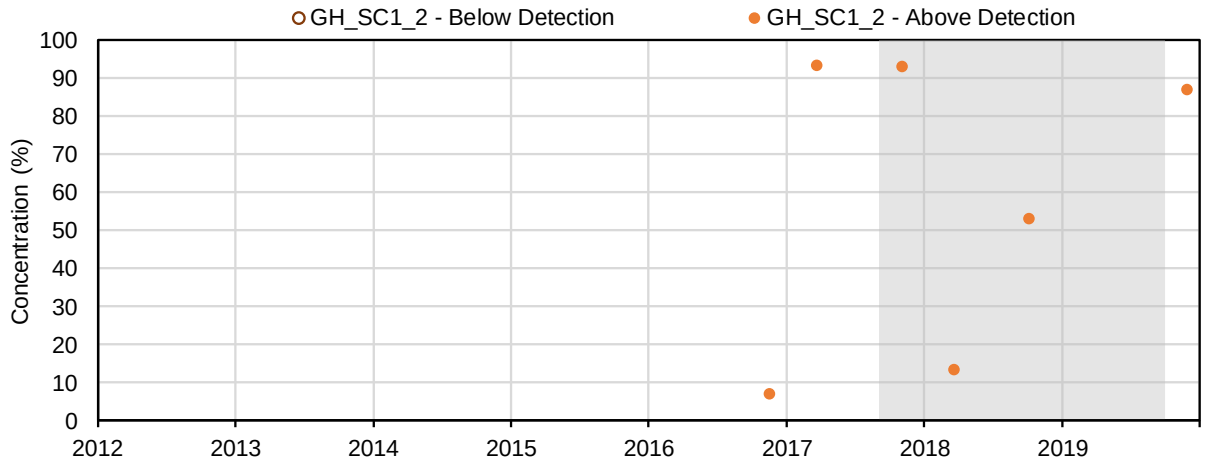
(147) Indeno(c,d-123)pyrene (µg/L); Parent PAHs



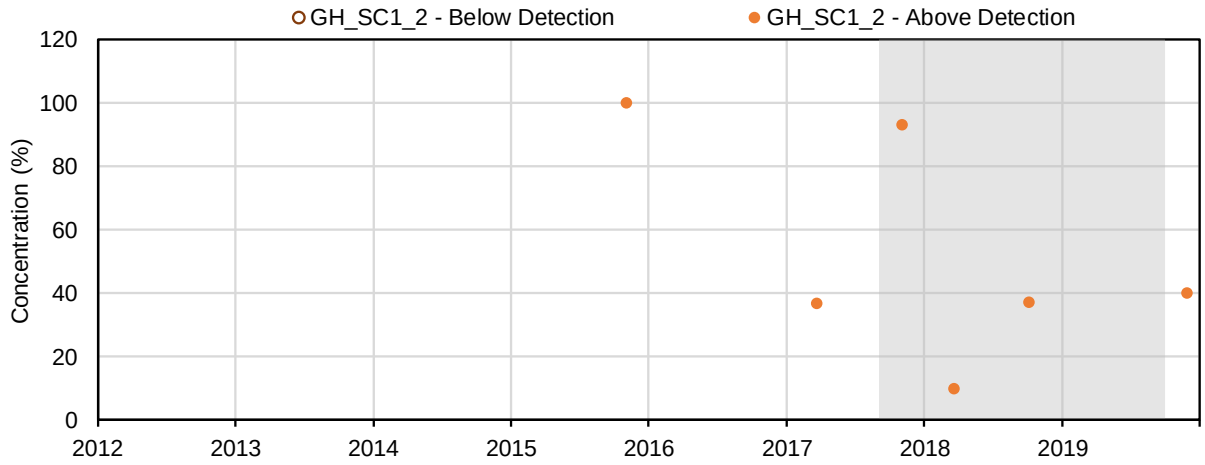
(148) Dibenzo(a,h)anthracene (µg/L); Parent PAHs



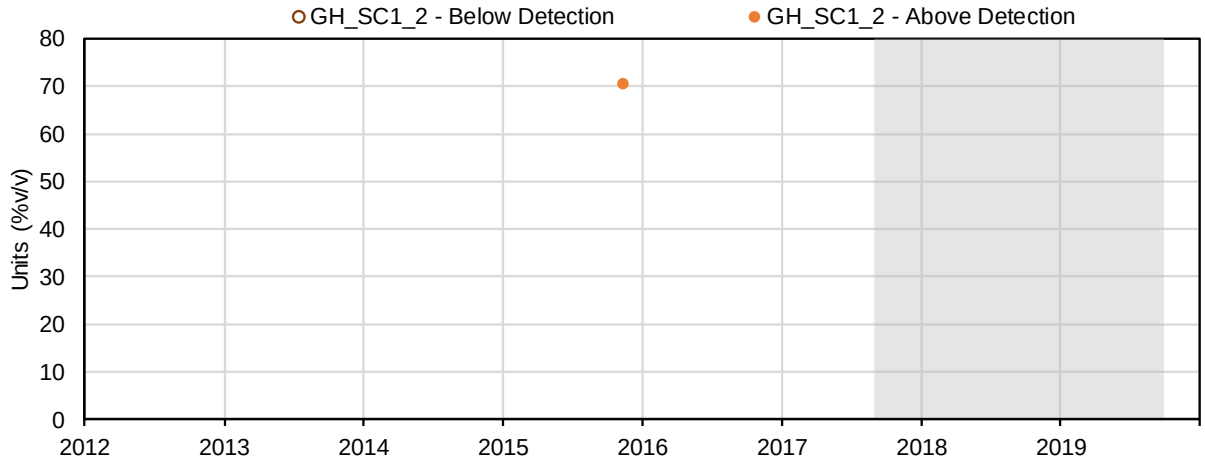
(149) Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility (%); Toxicity



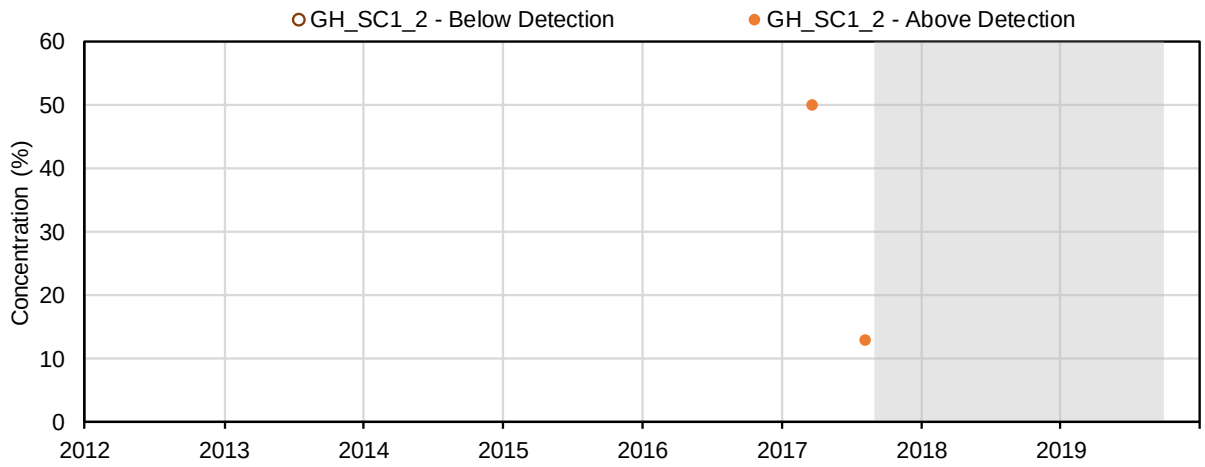
(150) Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%); Toxicity



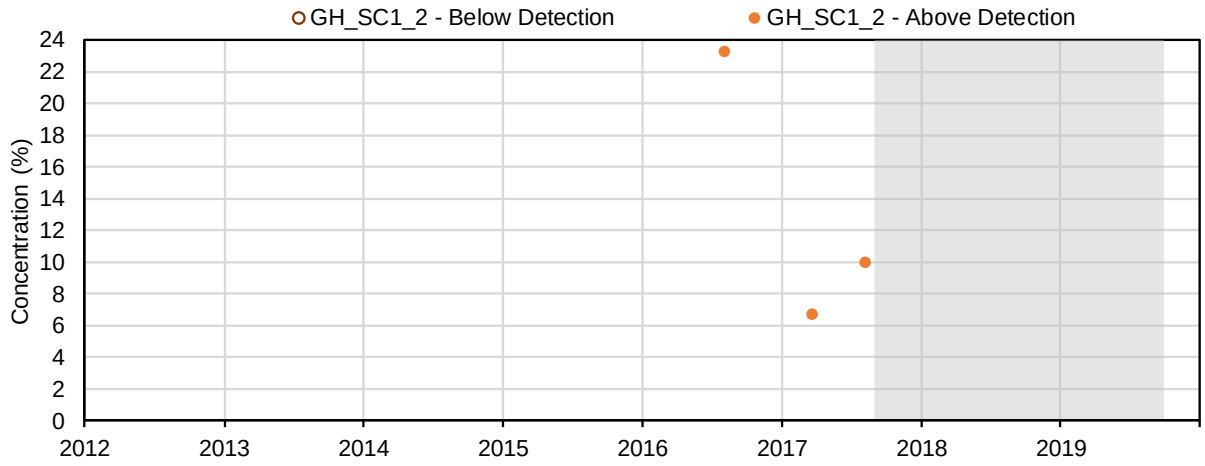
(151) Daphnia magna, 48-hour, LC50 toxicity, mortality or lethal dose (%v/v); Toxicity



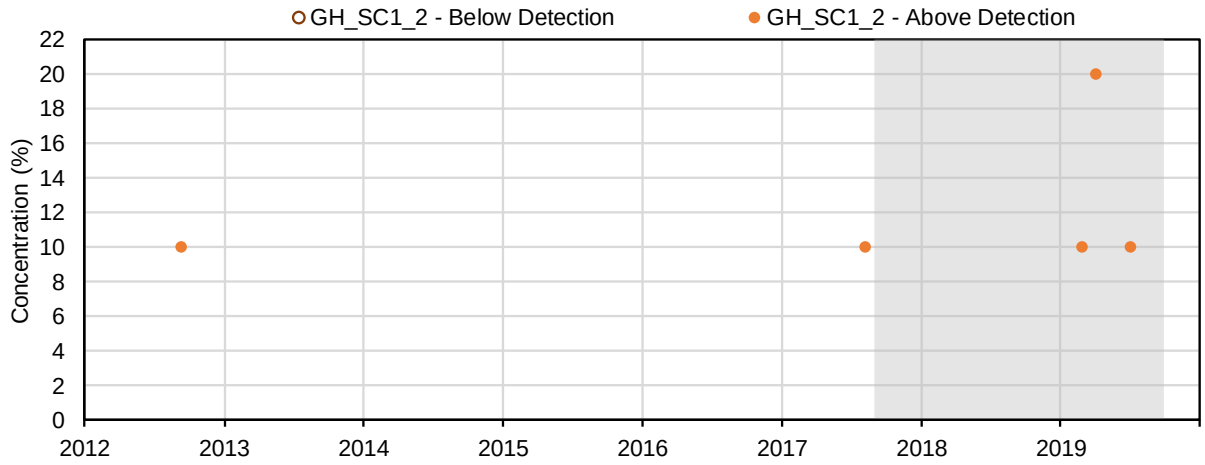
(152) Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility, 10 °C water (%); Toxicity



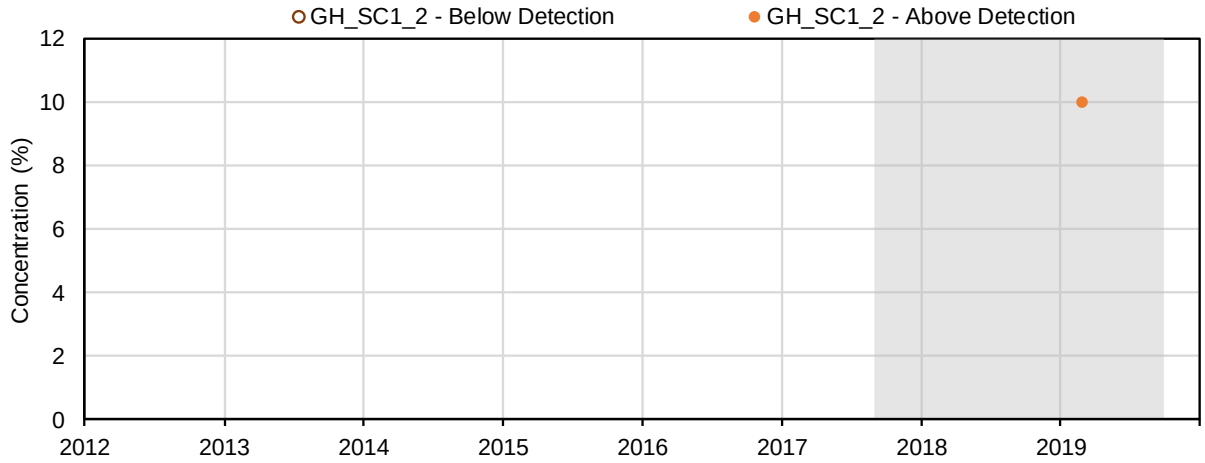
(153) Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality, 10 °C water (%); Toxicity



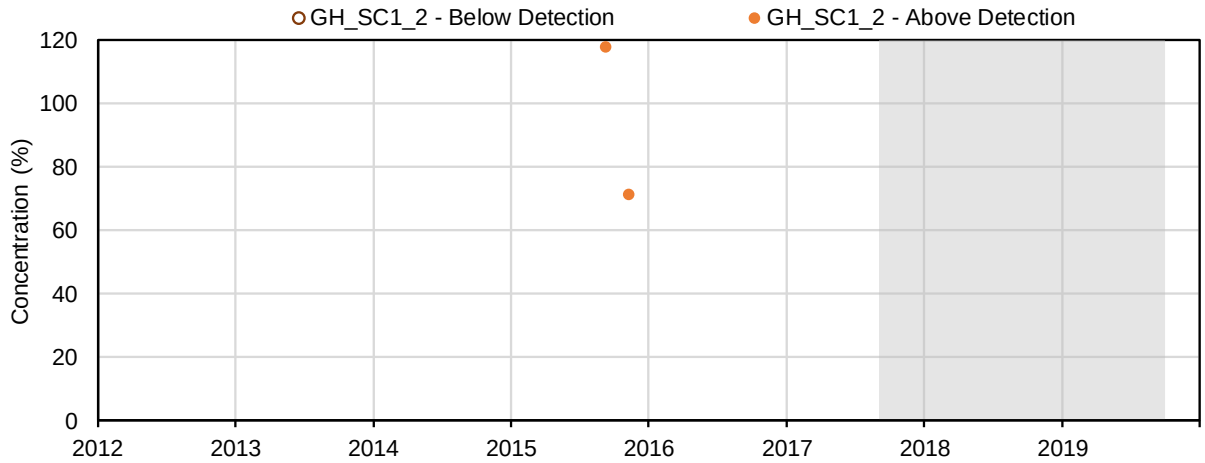
(154) Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality (%); Toxicity

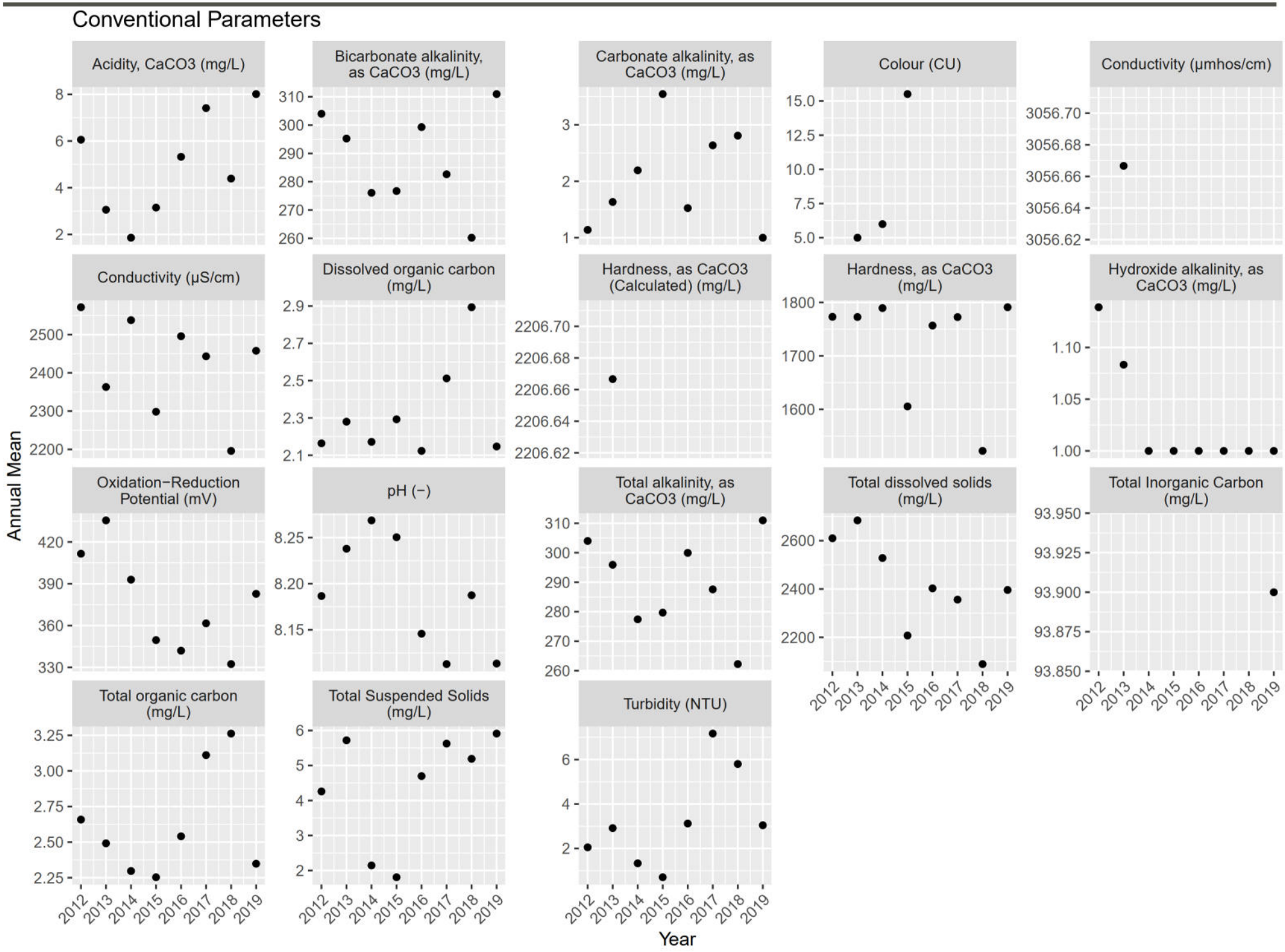


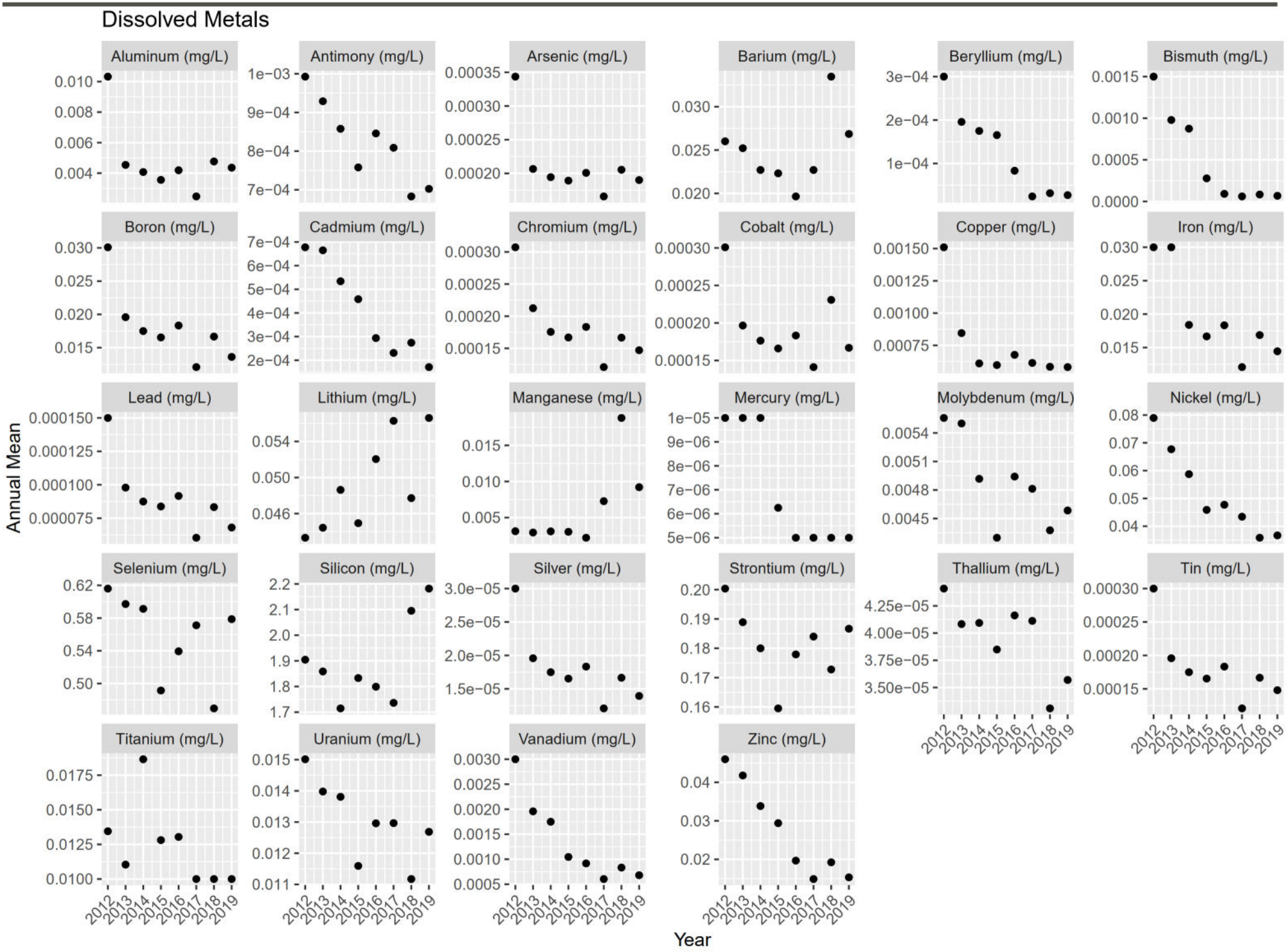
(155) Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed (%); Toxicity

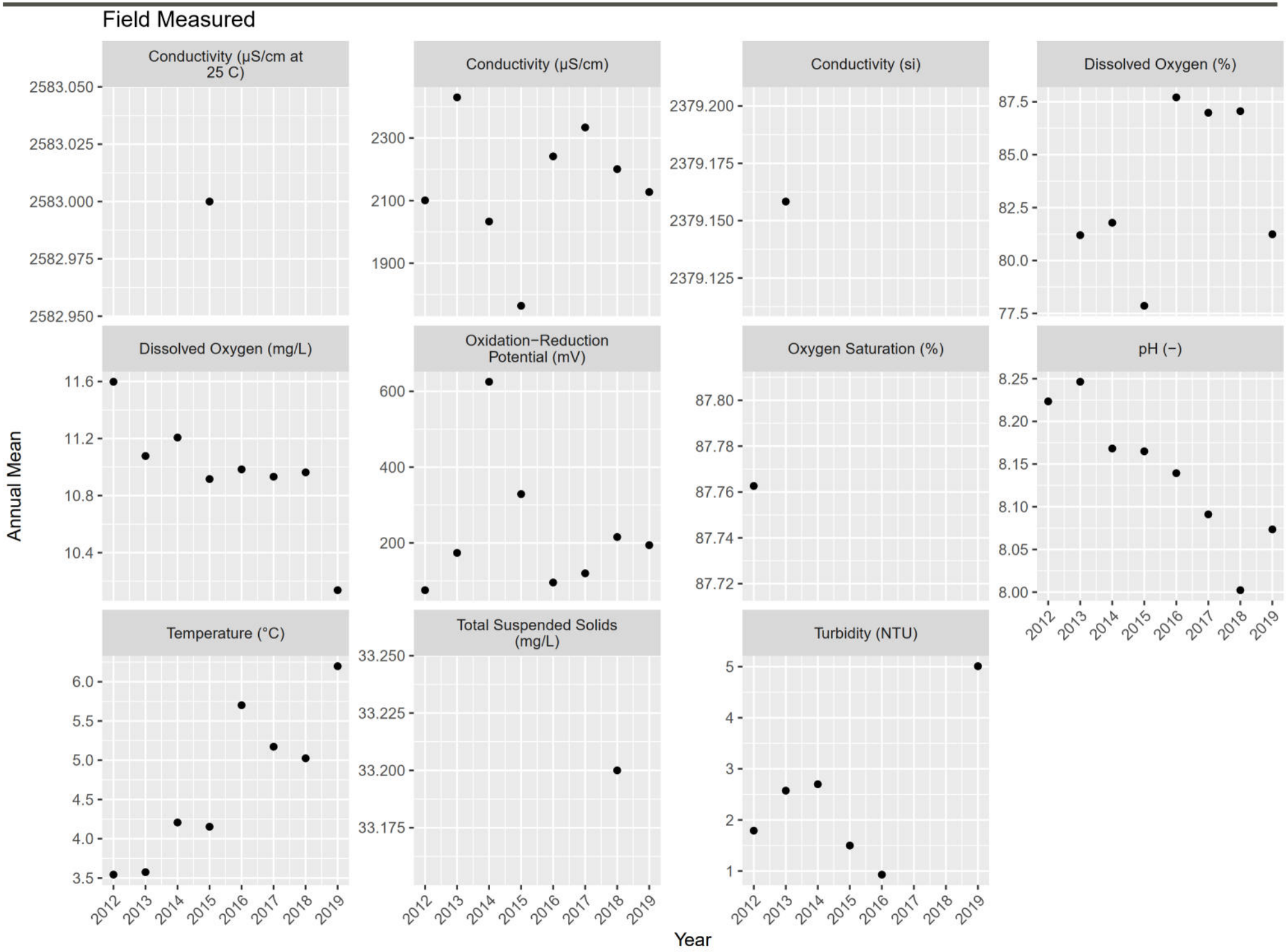


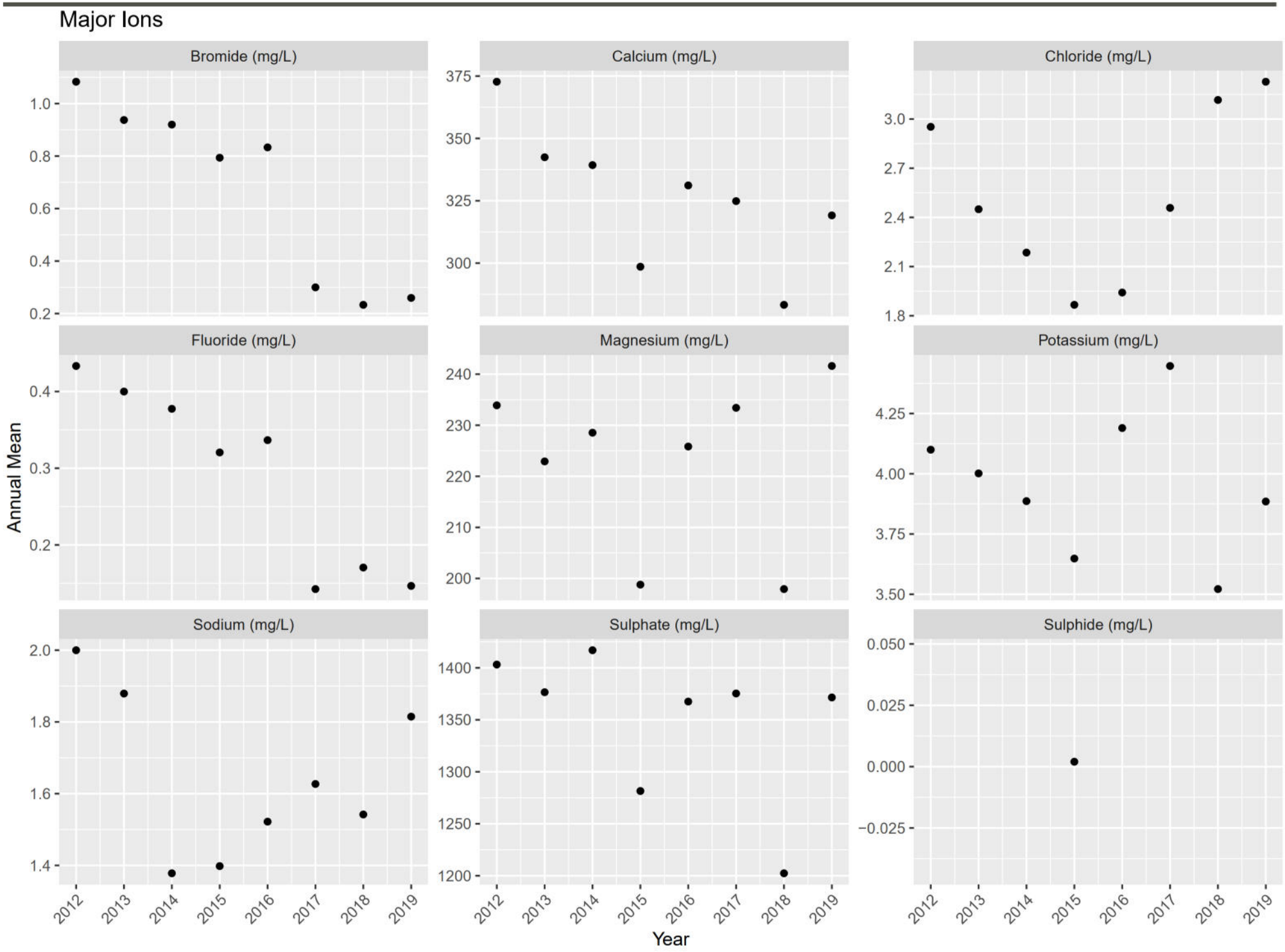
(156) 2-Bromobenzotrifluoride (%); Unknown

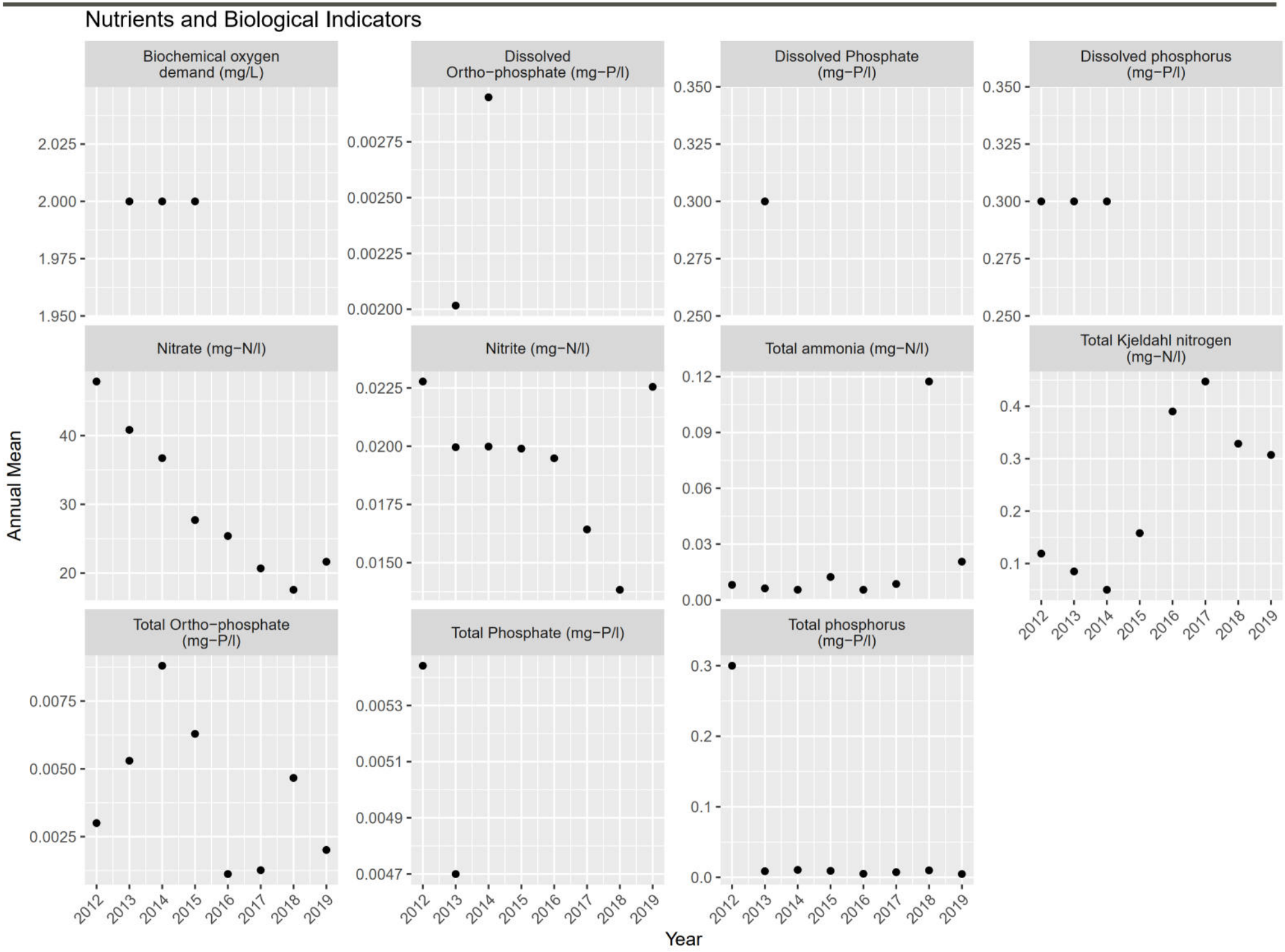


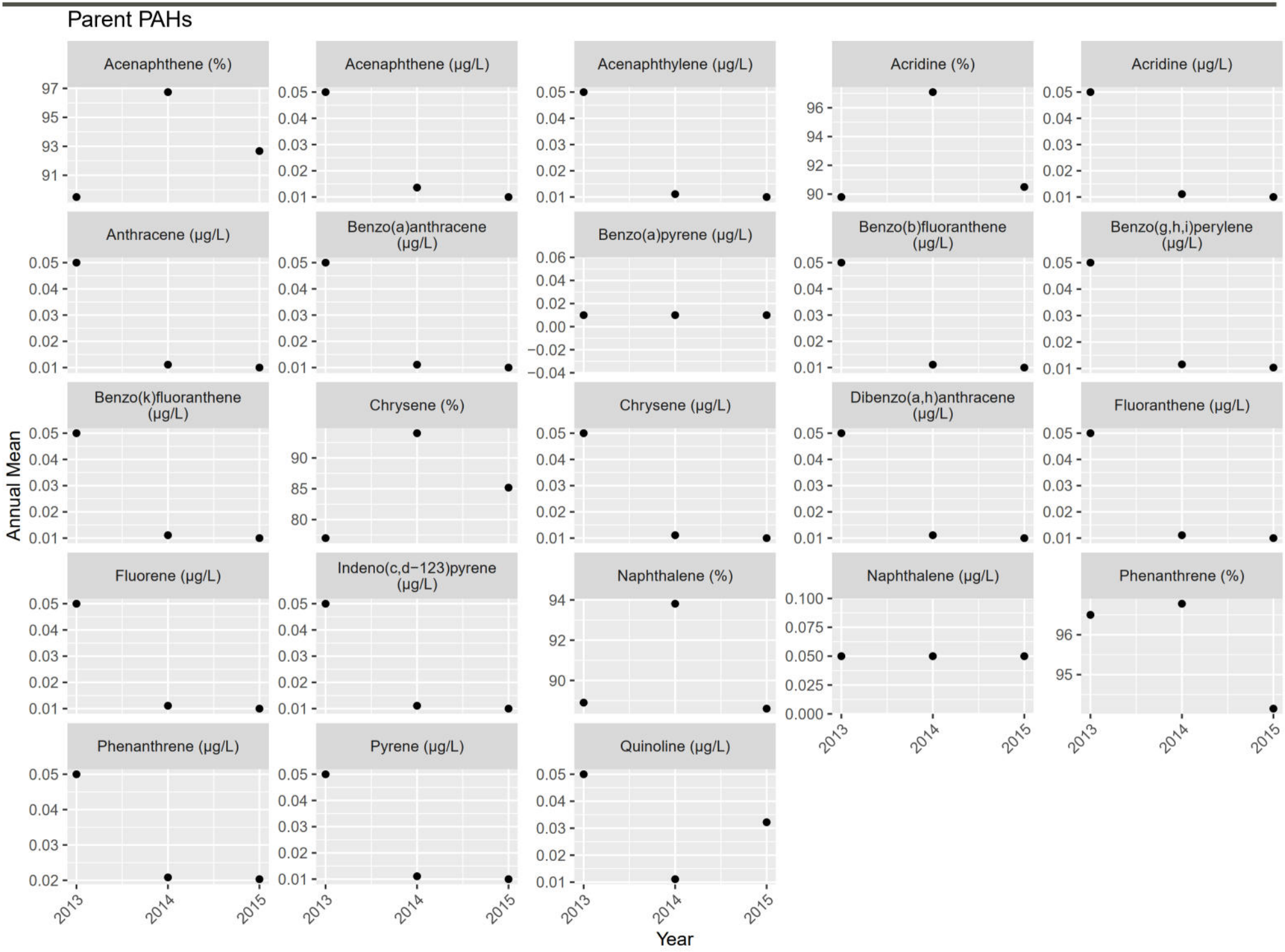

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Colour (CU)
Conductivity (µmhos/cm)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (Calculated) (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total Inorganic Carbon (mg/L)
Total organic carbon (mg/L)
Total Suspended Solids (mg/L)
Turbidity (NTU)
Annual Mean
Year

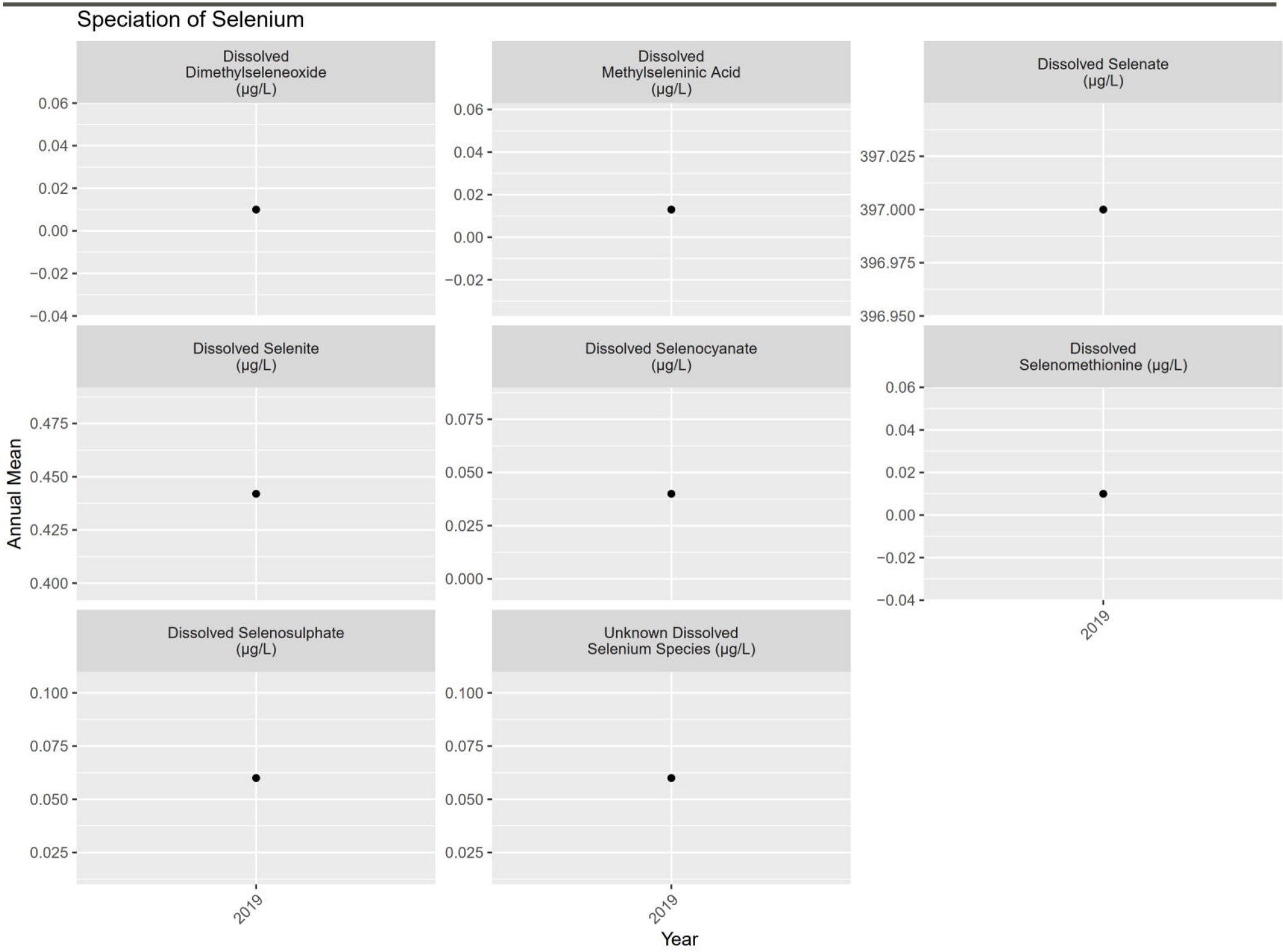

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

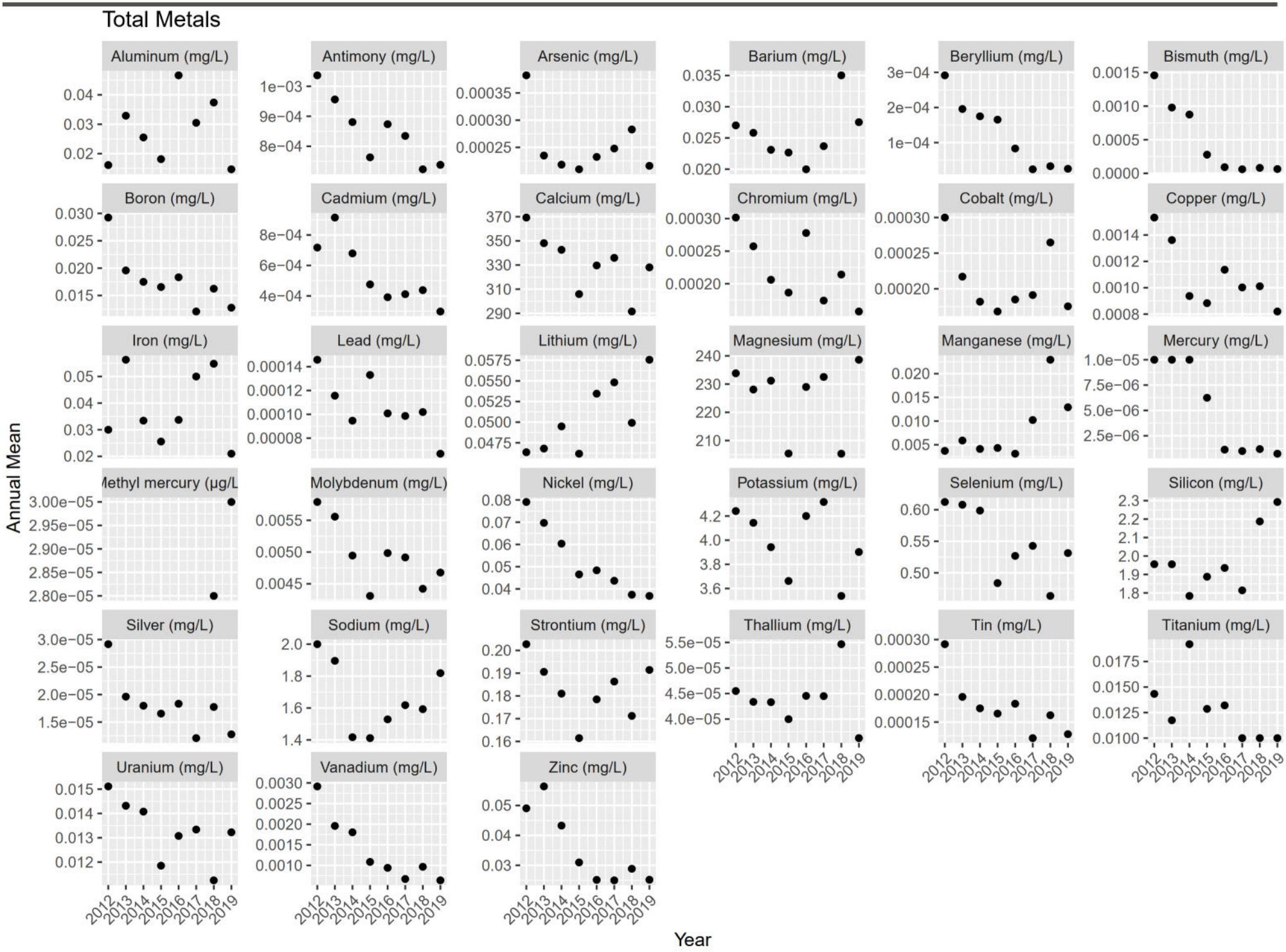

Field Measured
Conductivity (µS/cm at 25 C)
Conductivity (µS/cm)
Conductivity (si)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
Oxygen Saturation (%)
pH (−)
Temperature (°C)
Total Suspended Solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

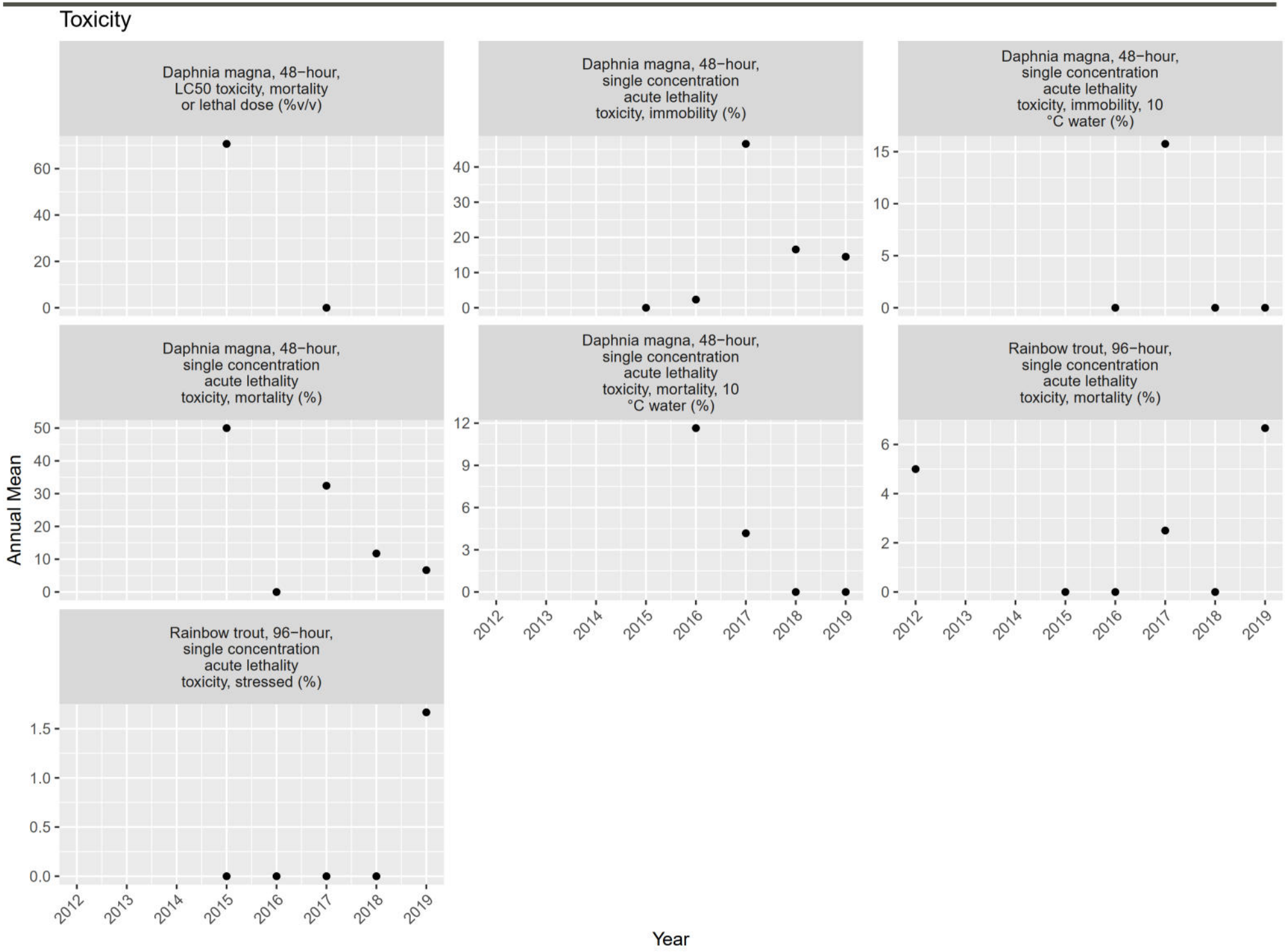

Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Sulphide (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

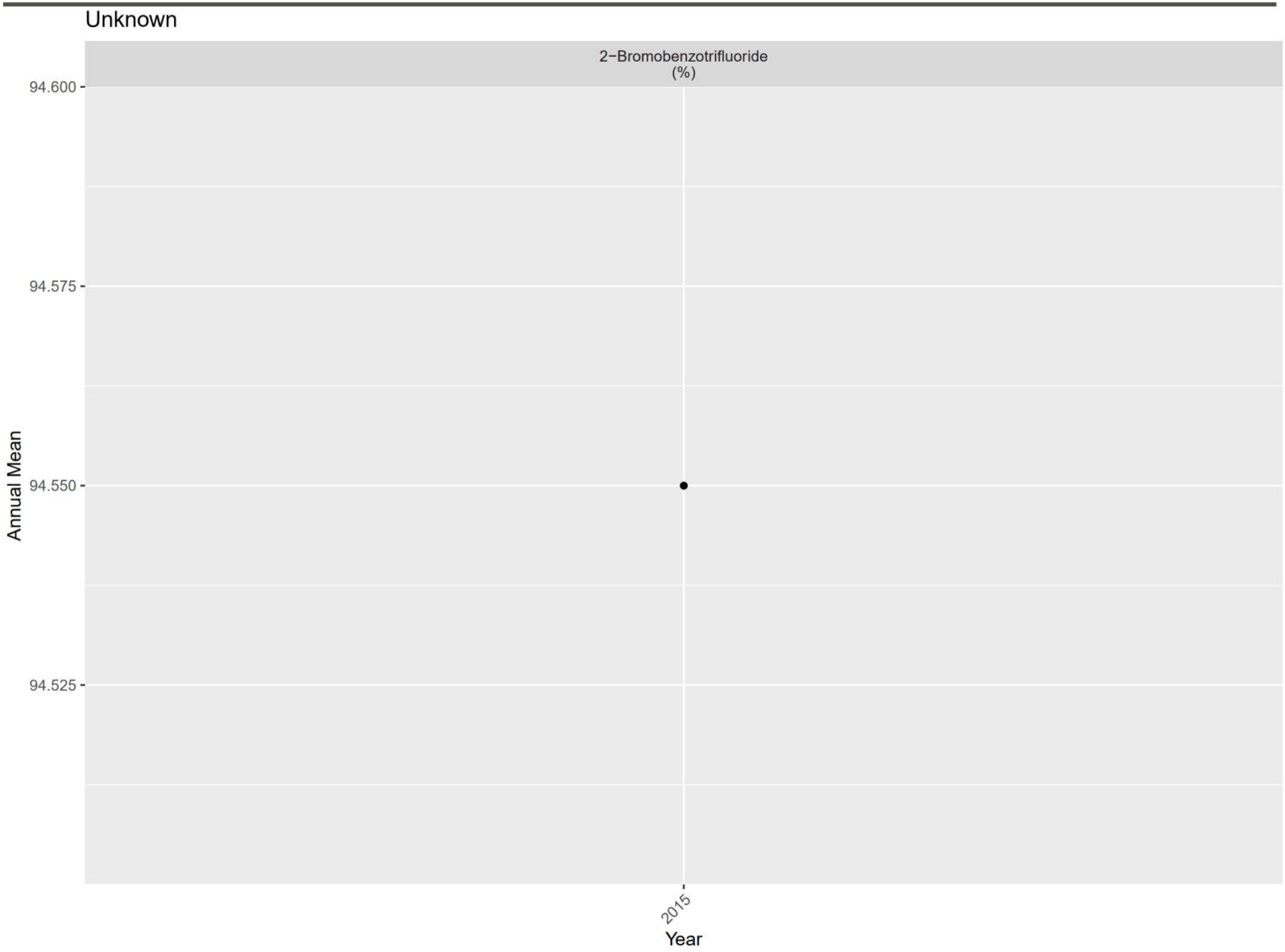

Nutrients and Biological Indicators
Biochemical oxygen demand (mg/L)
Dissolved Ortho−phosphate (mg−P/l)
Dissolved Phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

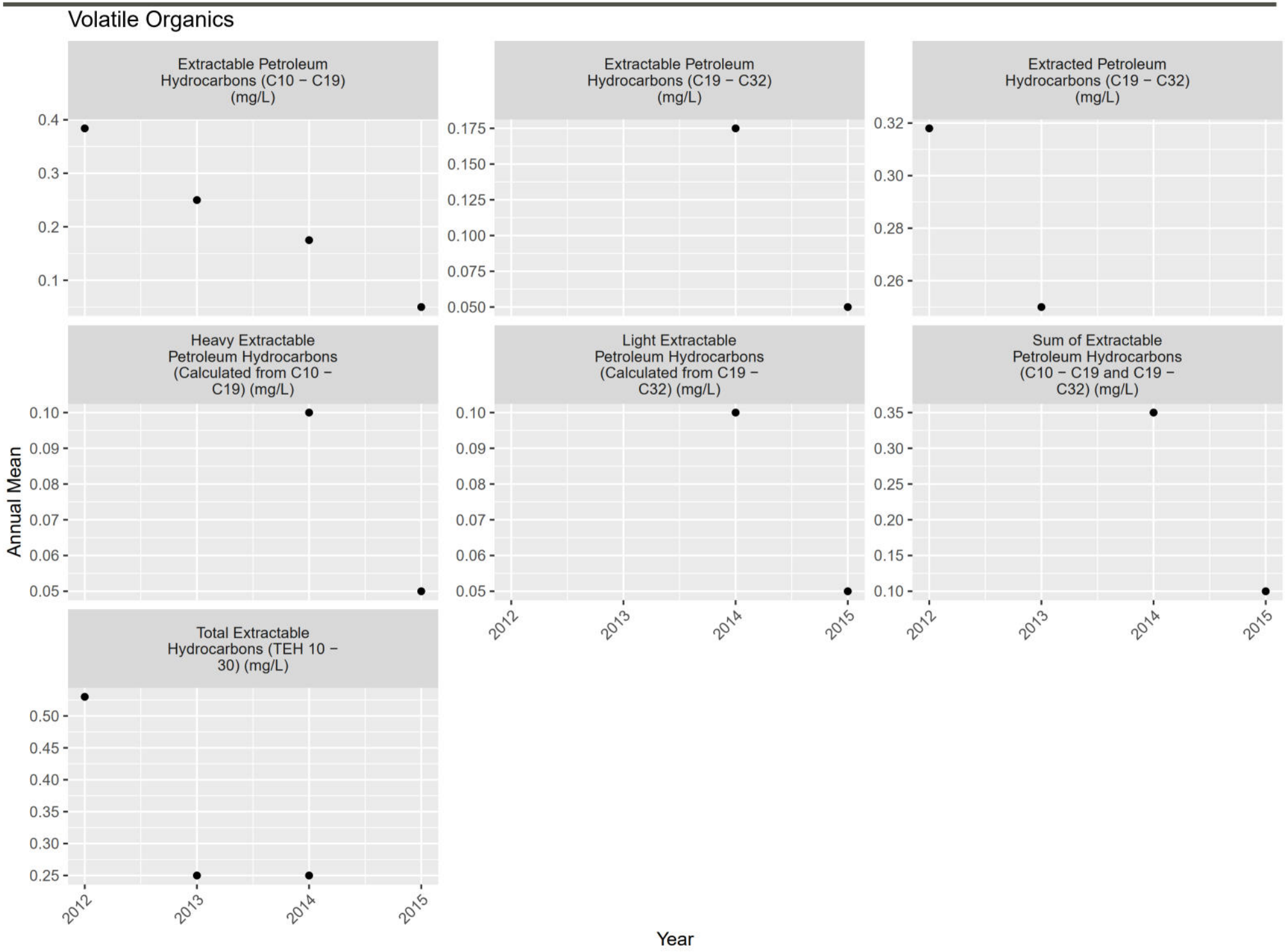

Parent PAHs
Acenaphthene (%)
Acenaphthene (µg/L)
Acenaphthylene (µg/L)
Acridine (%)
Acridine (µg/L)
Anthracene (µg/L)
Benzo(a)anthracene (µg/L)
Benzo(a)pyrene (µg/L)
Benzo(b)fluoranthene (µg/L)
Benzo(g,h,i)perylene (µg/L)
Benzo(k)fluoranthene (µg/L)
Chrysene (%)
Chrysene (µg/L)
Dibenzo(a,h)anthracene (µg/L)
Fluoranthene (µg/L)
Fluorene (µg/L)
Indeno(c,d−123)pyrene (µg/L)
Naphthalene (%)
Naphthalene (µg/L)
Phenanthrene (%)
Phenanthrene (µg/L)
Pyrene (µg/L)
Quinoline (µg/L)
Annual Mean
Year
2013
2014
2015


Speciation of Selenium
Dissolved Dimethylseleneoxide (µg/L)
Dissolved Methylseleninic Acid (µg/L)
Dissolved Selenate (µg/L)
Dissolved Selenite (µg/L)
Dissolved Selenocyanate (µg/L)
Dissolved Selenomethionine (µg/L)
Dissolved Selenosulphate (µg/L)
Unknown Dissolved Selenium Species (µg/L)
Annual Mean
Year
2019


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Methyl mercury (µg/L
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Toxicity
Daphnia magna, 48−hour, LC50 toxicity, mortality or lethal dose (%v/v)
Daphnia magna, 48−hour, single concentration acute lethality toxicity, immobility (%)
Daphnia magna, 48−hour, single concentration acute lethality toxicity, immobility, 10 °C water (%)
Daphnia magna, 48−hour, single concentration acute lethality toxicity, mortality (%)
Daphnia magna, 48−hour, single concentration acute lethality toxicity, mortality, 10 °C water (%)
Rainbow trout, 96−hour, single concentration acute lethality toxicity, mortality (%)
Rainbow trout, 96−hour, single concentration acute lethality toxicity, stressed (%)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

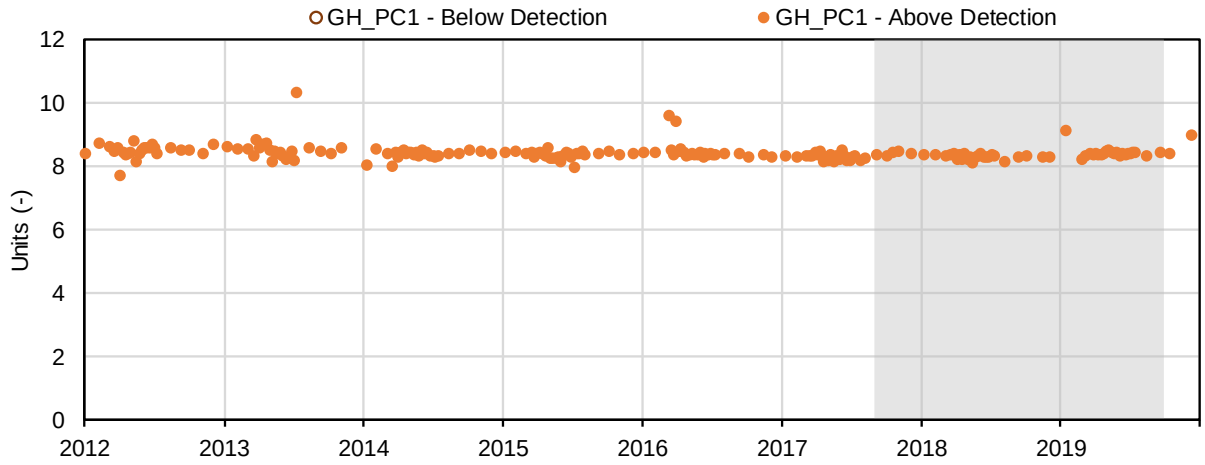

Unknown
2−Bromobenzotrifluoride
(%)
94.600
94.575
94.550
94.525
Annual Mean
2015
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extractable Petroleum Hydrocarbons (C19 − C32) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 − C19) (mg/L)
Light Extractable Petroleum Hydrocarbons (Calculated from C19 − C32) (mg/L)
Sum of Extractable Petroleum Hydrocarbons (C10 − C19 and C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
Year
2012
2013
2014
2015

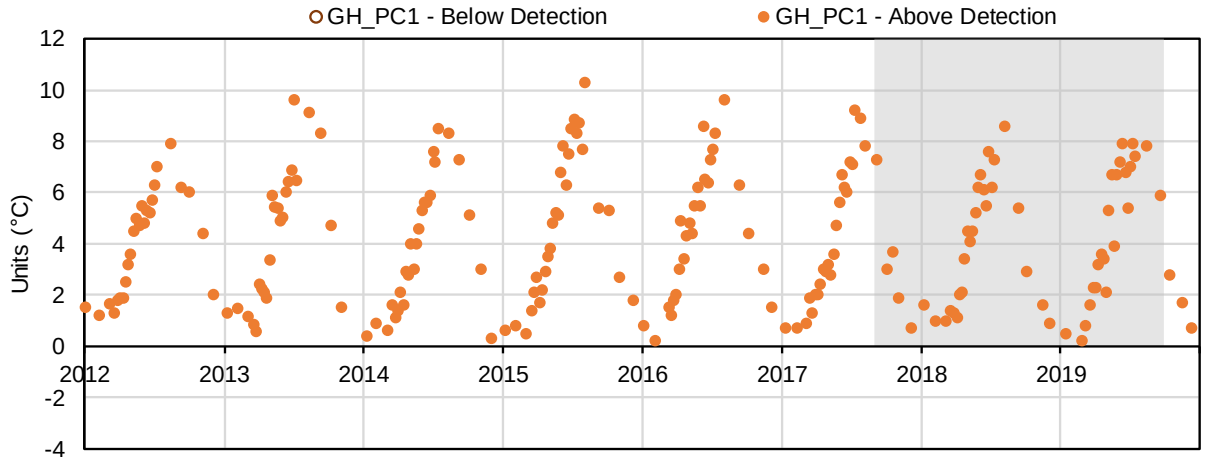
ATTACHMENT F24

GH_PC1 Plots

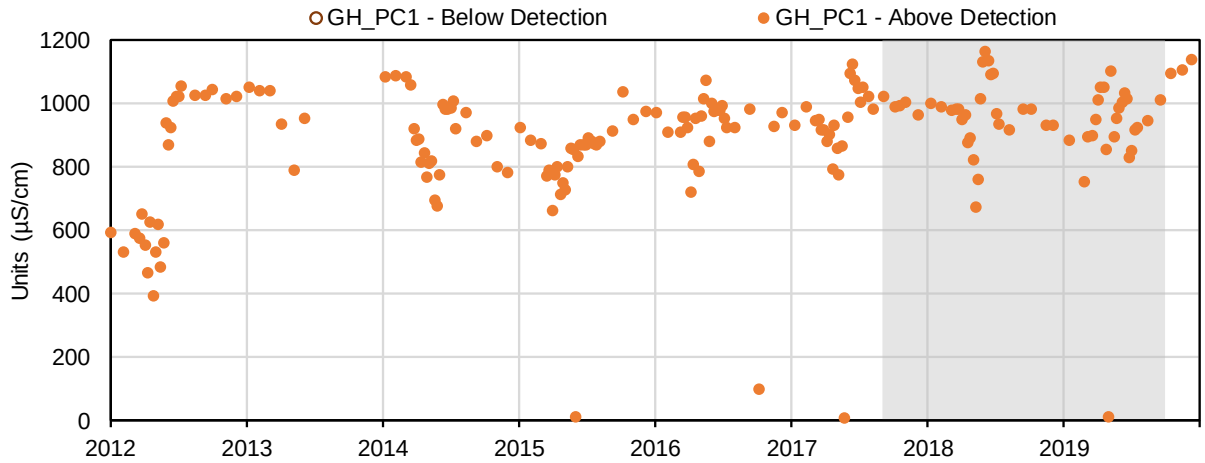
(1) pH (-); Field Measured



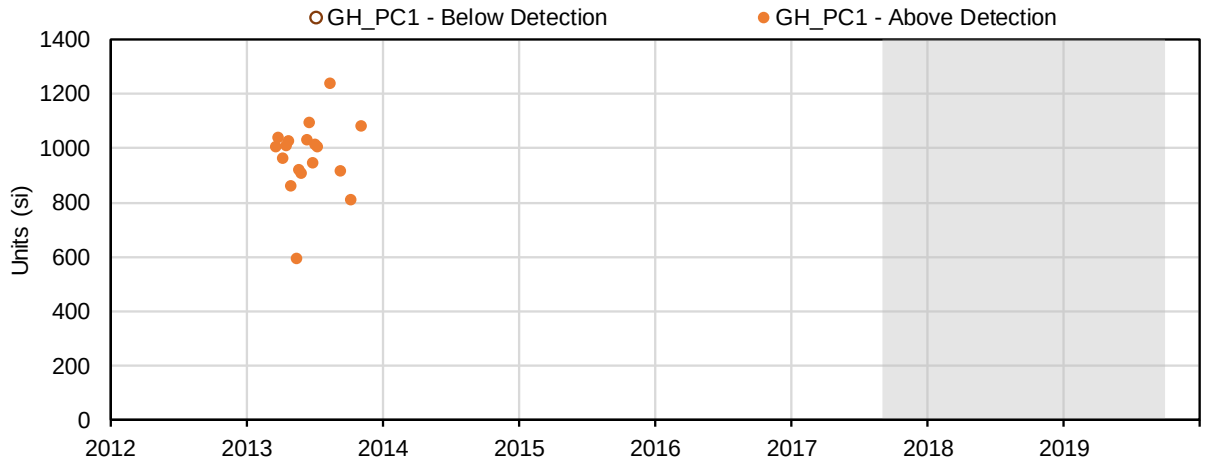
(2) Temperature (°C); Field Measured



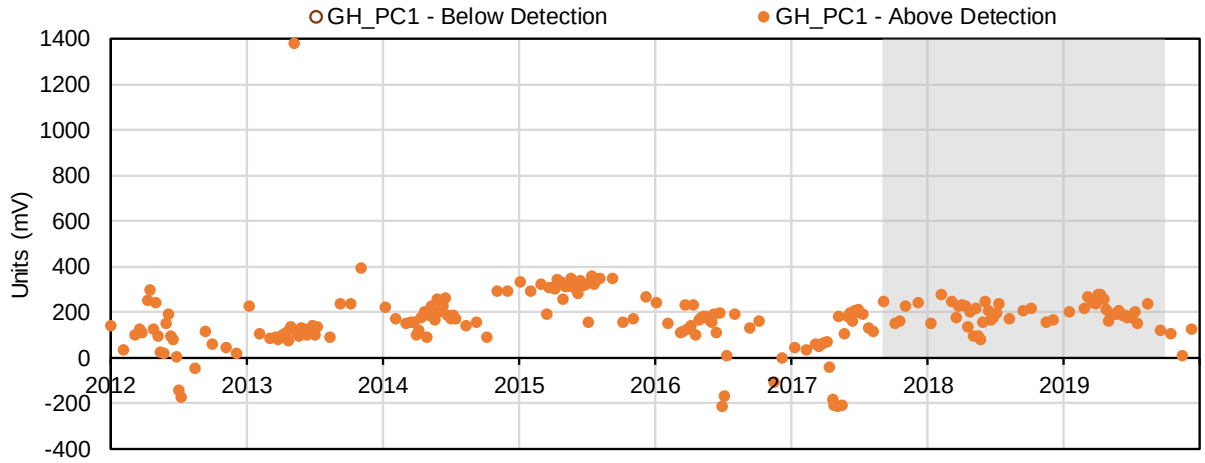
(3) Conductivity (µS/cm); Field Measured



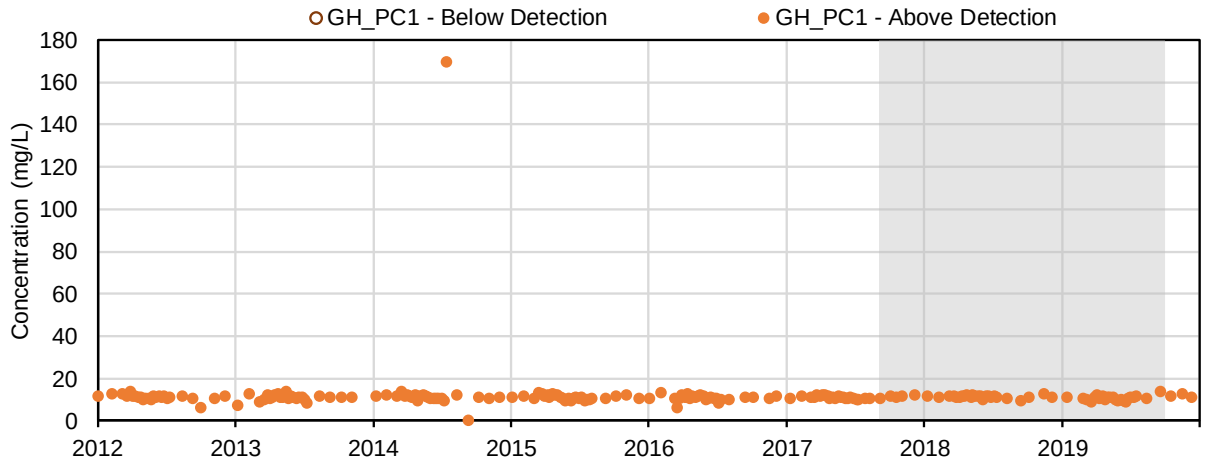
(4) Conductivity (si); Field Measured



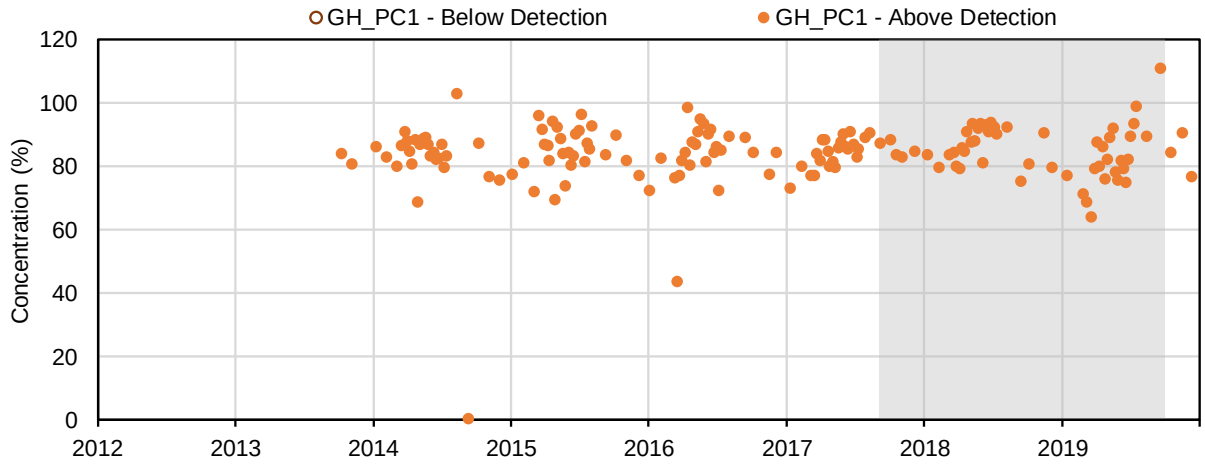
(5) Oxidation-Reduction Potential (mV); Field Measured



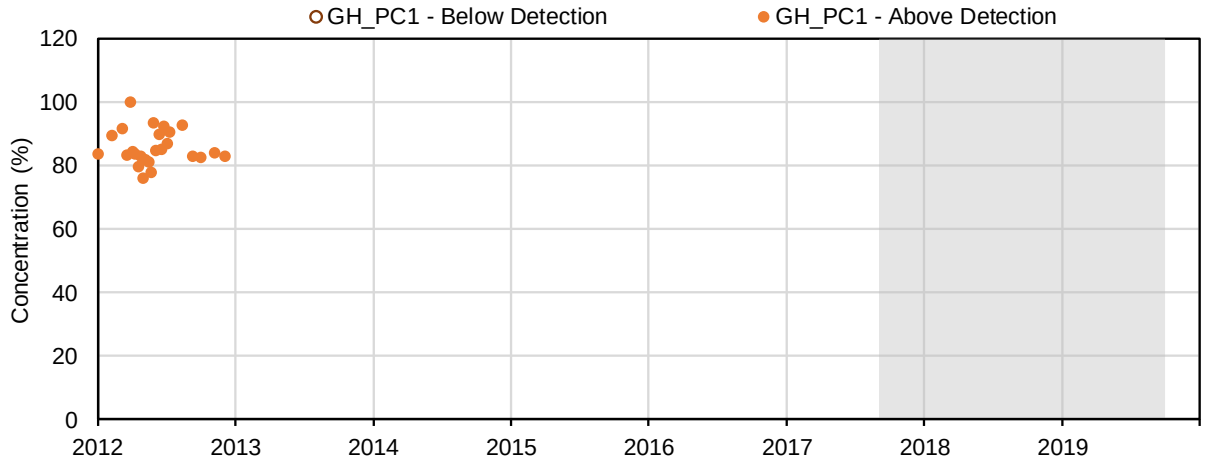
(6) Dissolved Oxygen (mg/L); Field Measured



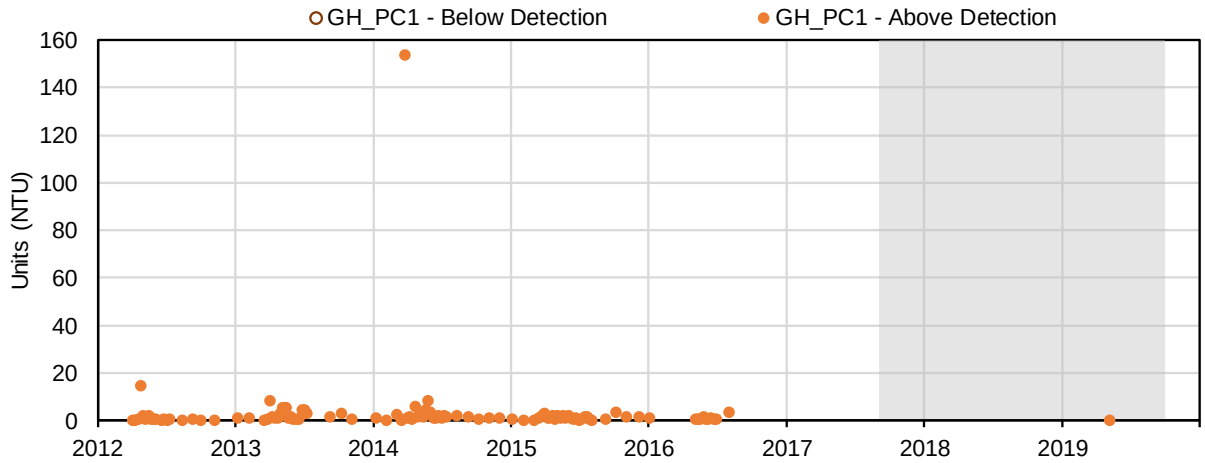
(7) Dissolved Oxygen (%); Field Measured



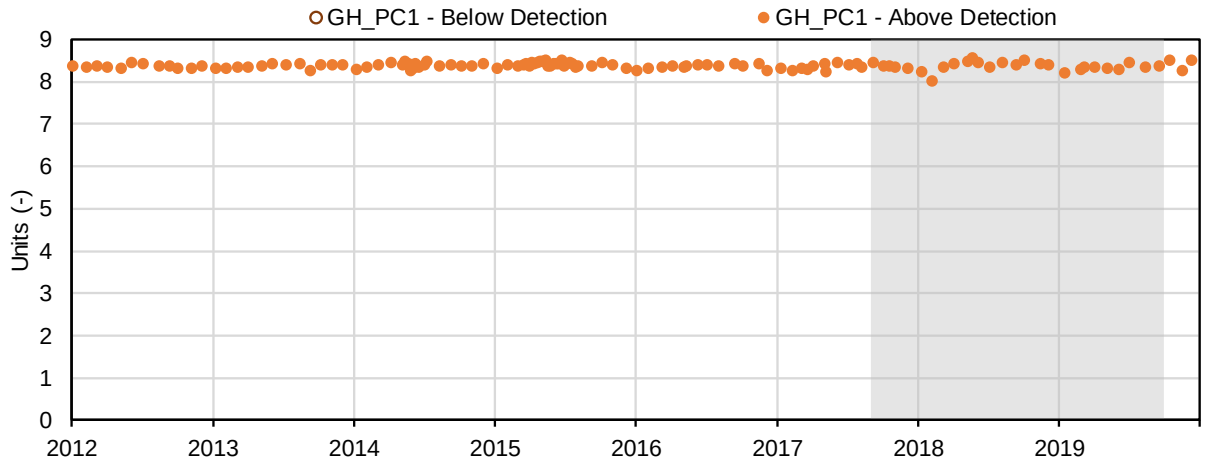
(8) Oxygen Saturation (%); Field Measured



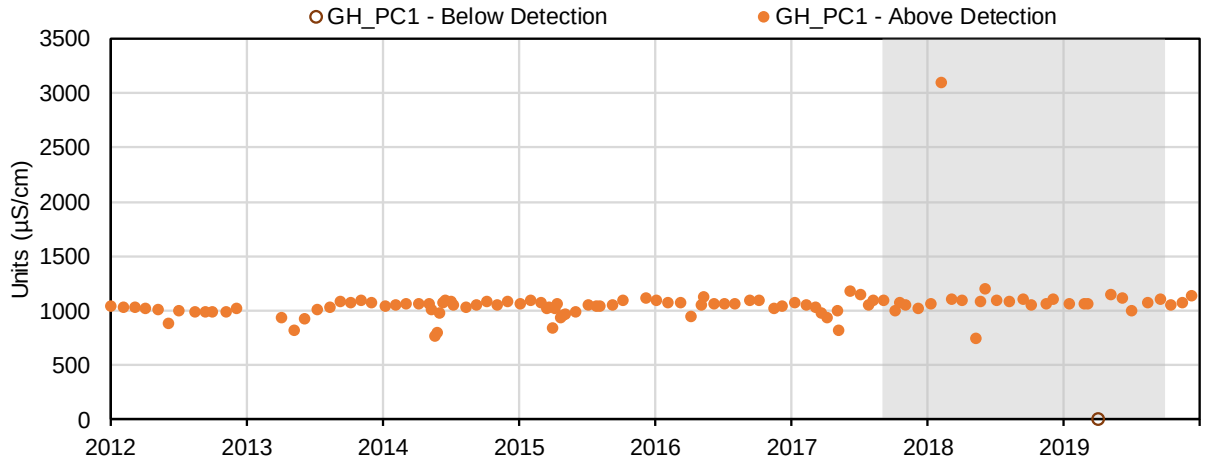
(9) Turbidity (NTU); Field Measured



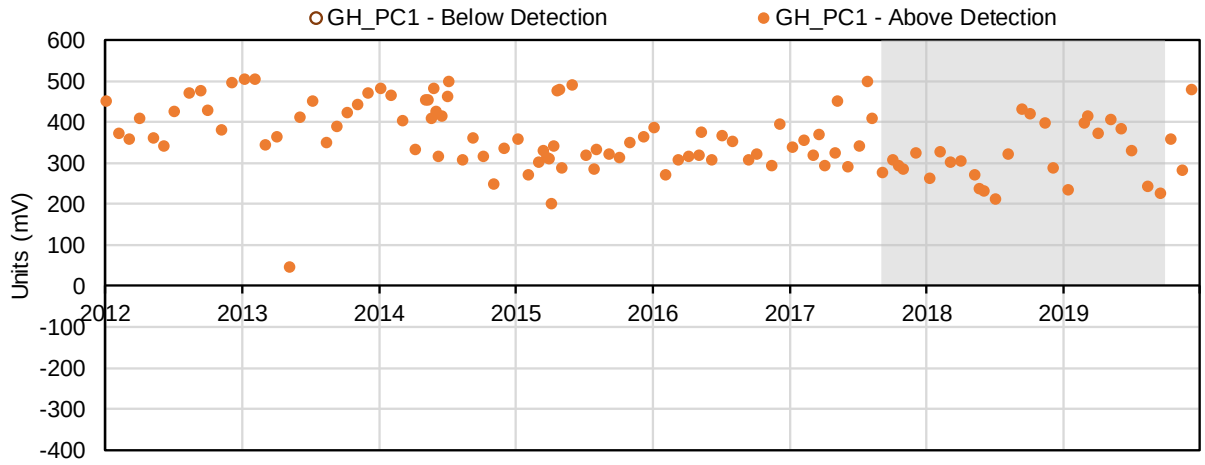
(10) pH (-); Conventional Parameters



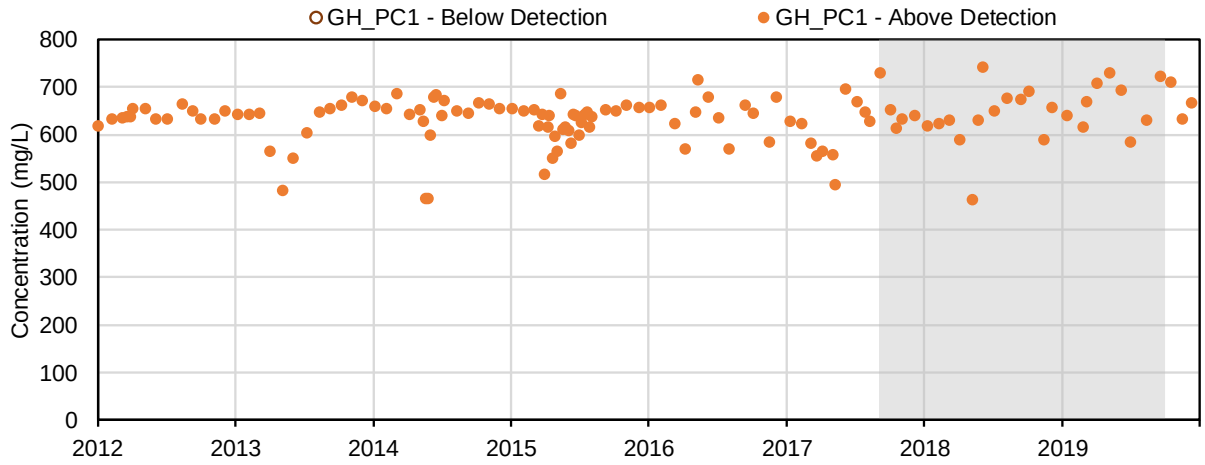
(11) Conductivity (µS/cm); Conventional Parameters



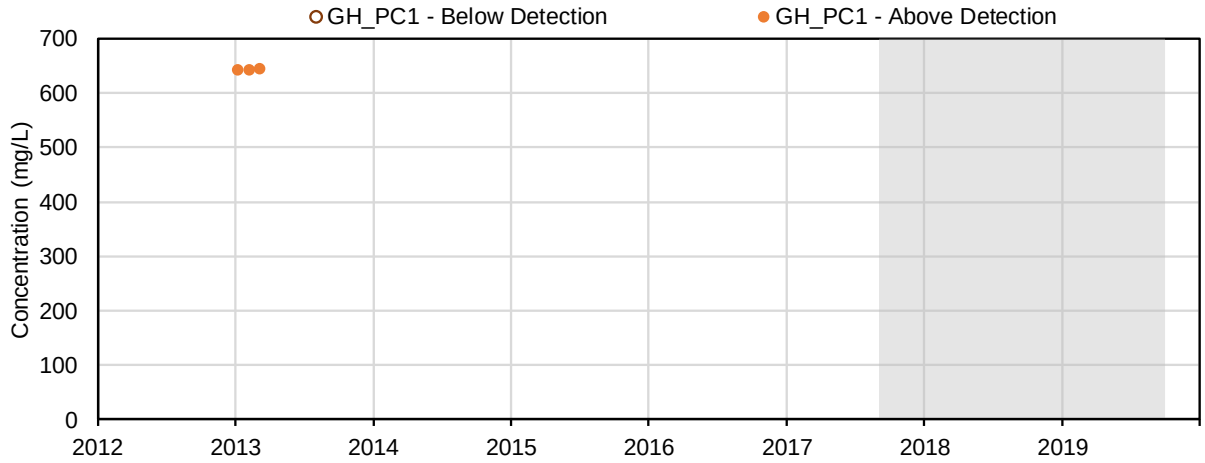
(12) Oxidation-Reduction Potential (mV); Conventional Parameters



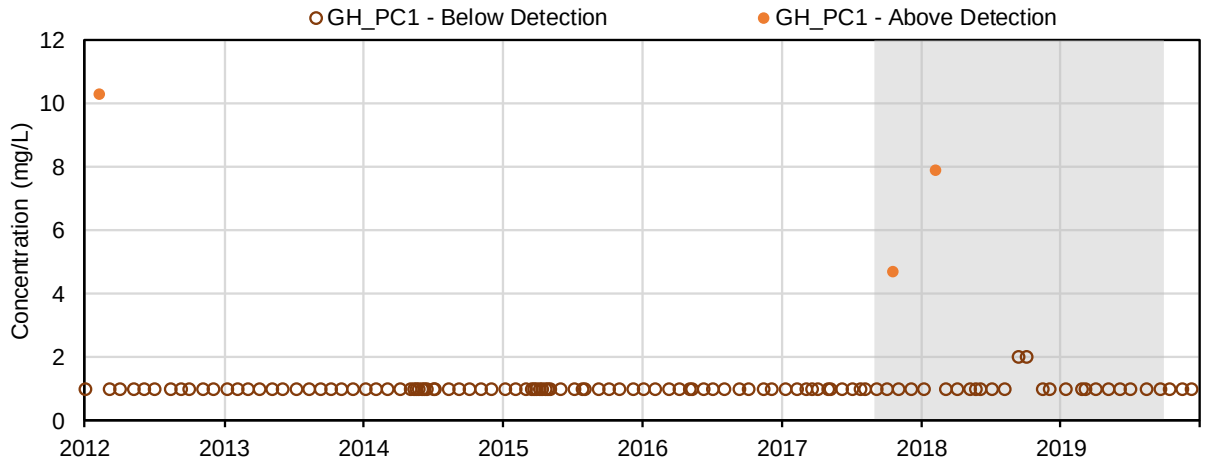
(13) Hardness, as CaCO3 (mg/L); Conventional Parameters



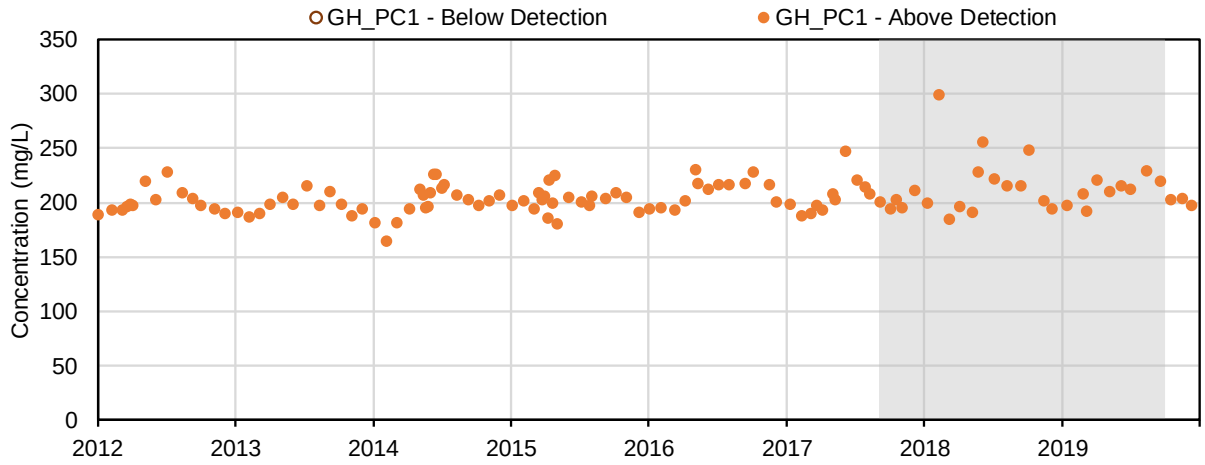
(14) Hardness, as CaCO3 (Calculated) (mg/L); Conventional Parameters



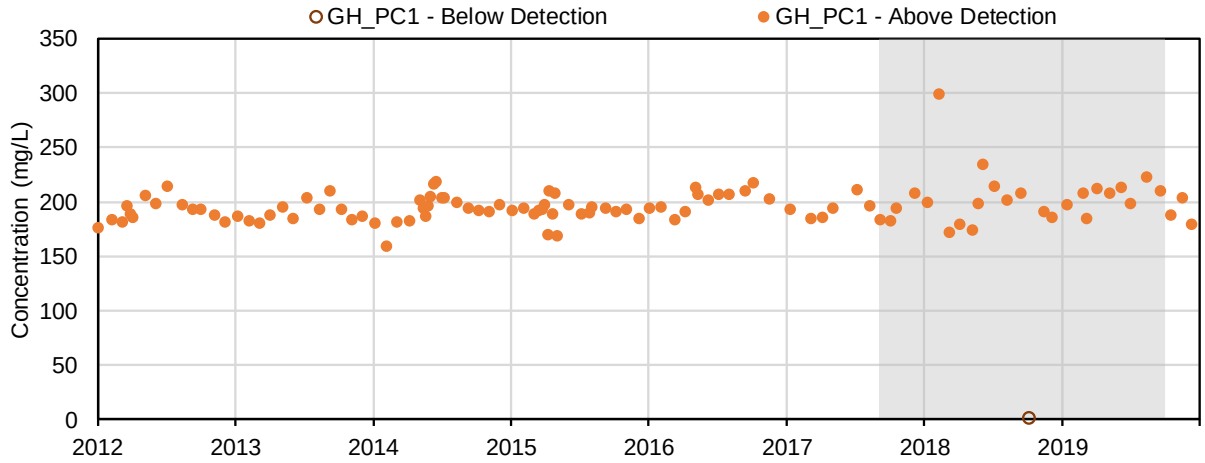
(15) Acidity, CaCO3 (mg/L); Conventional Parameters



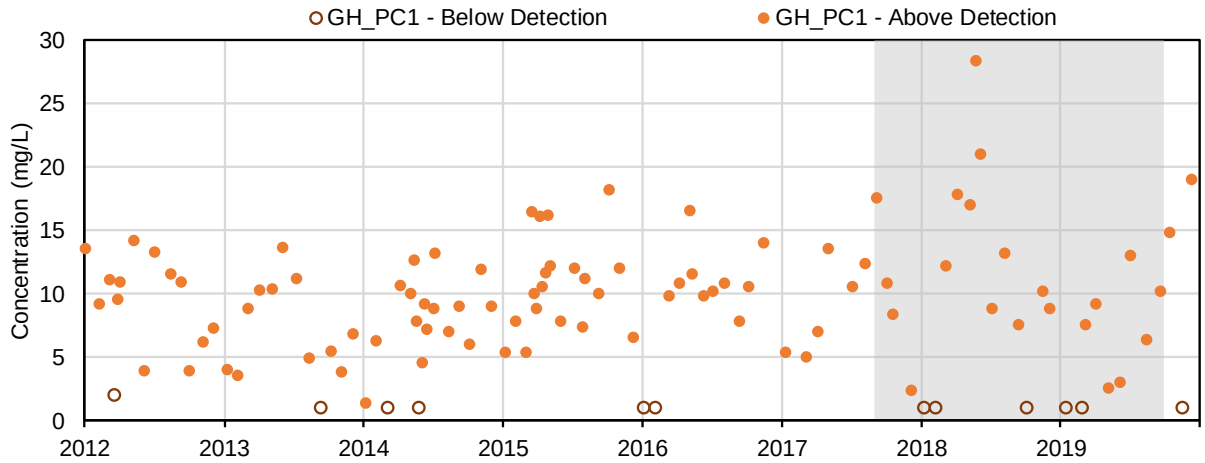
(16) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



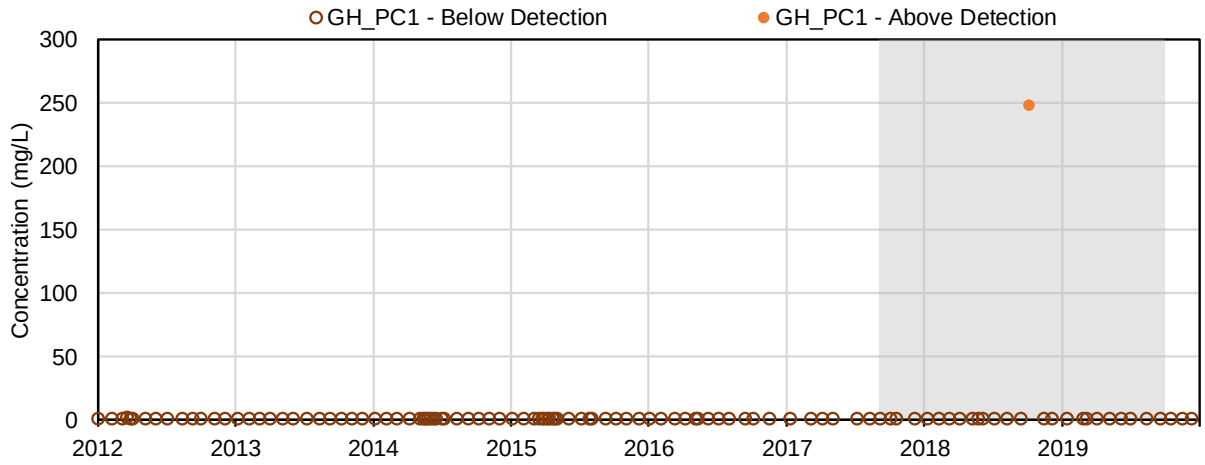
(17) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



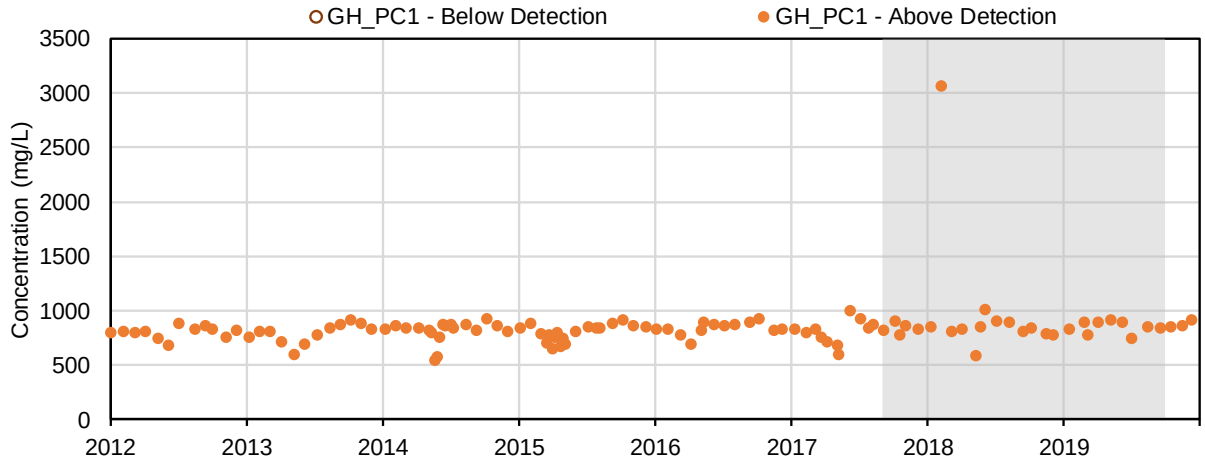
(18) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



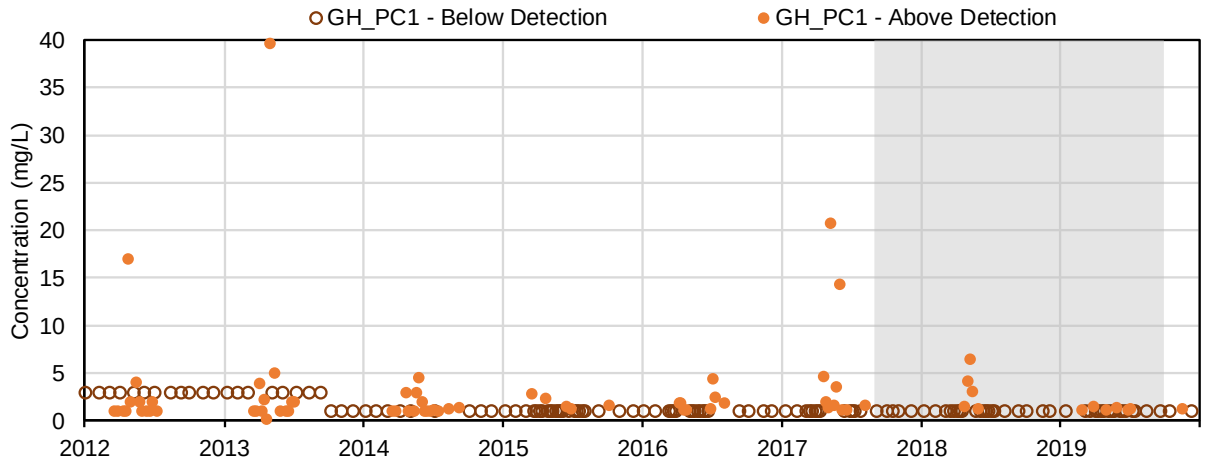
(19) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



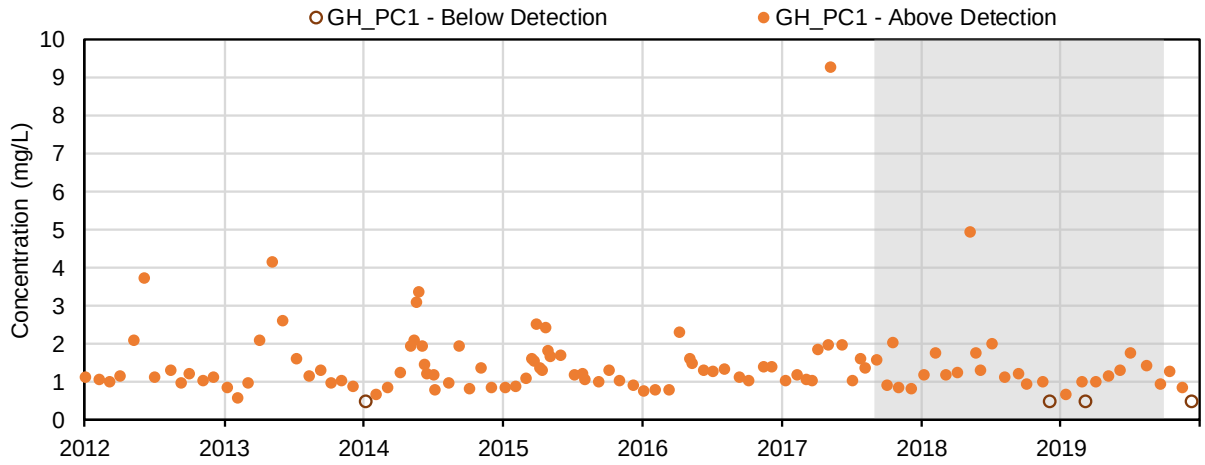
(20) Total dissolved solids (mg/L); Conventional Parameters



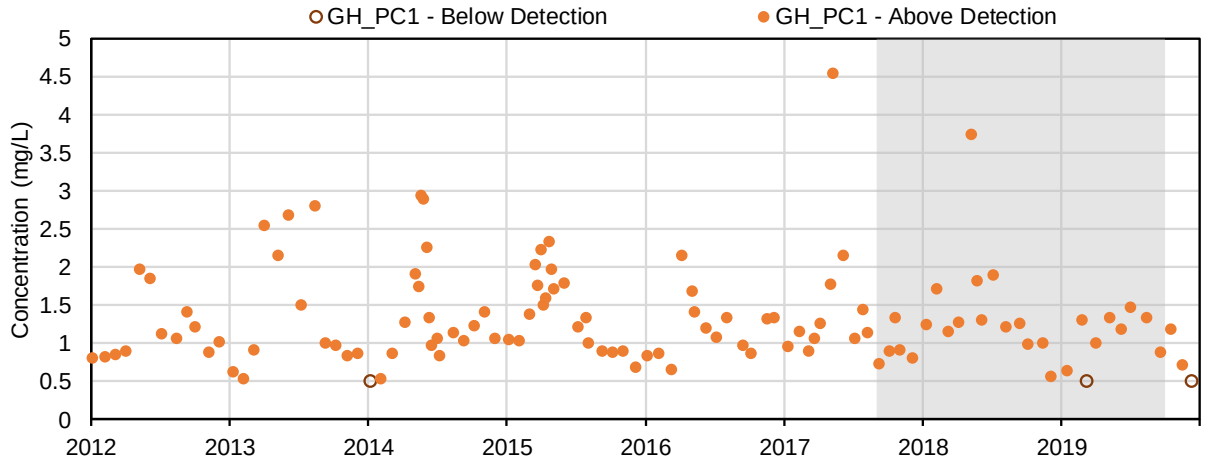
(21) Total suspended solids (mg/L); Conventional Parameters



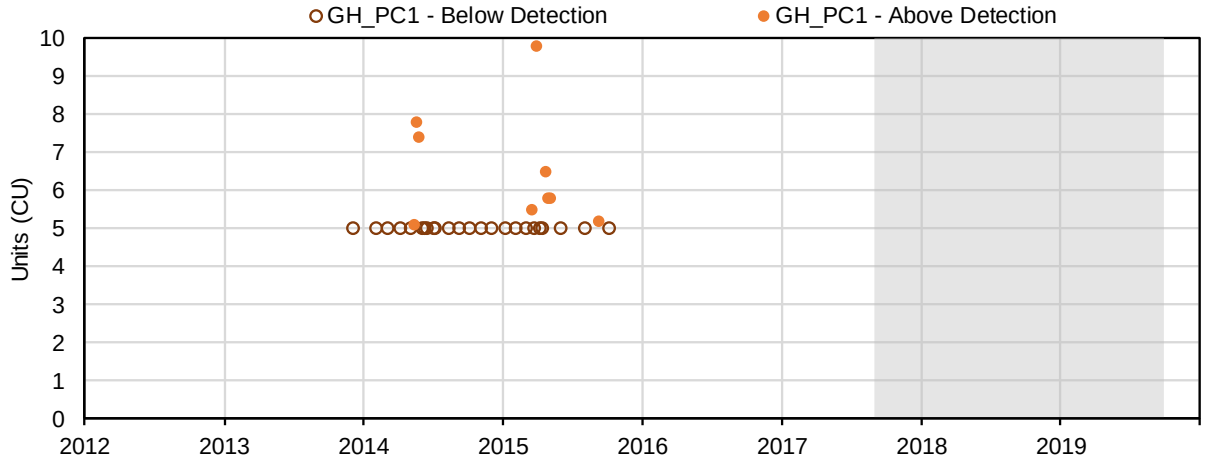
(22) Total organic carbon (mg/L); Conventional Parameters



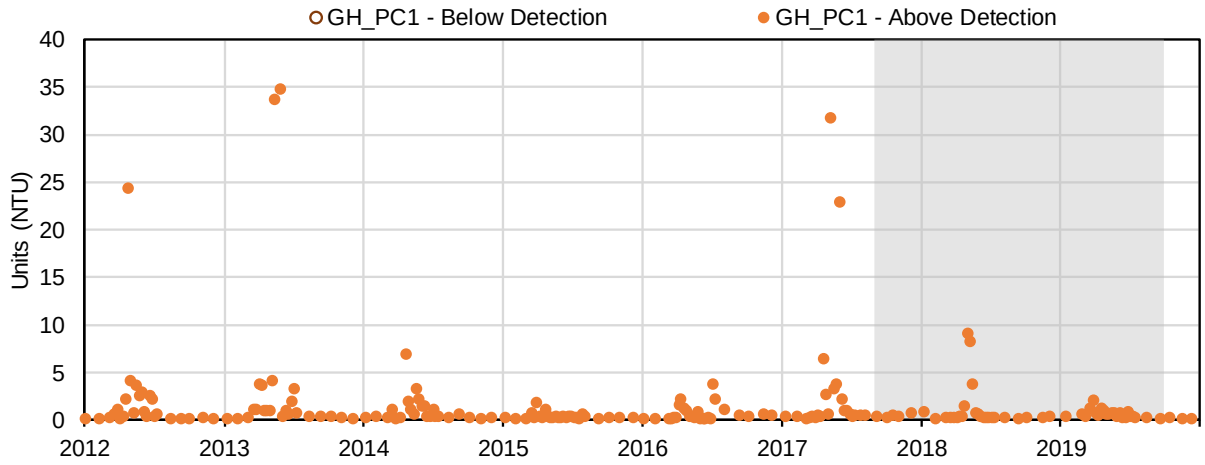
(23) Dissolved organic carbon (mg/L); Conventional Parameters



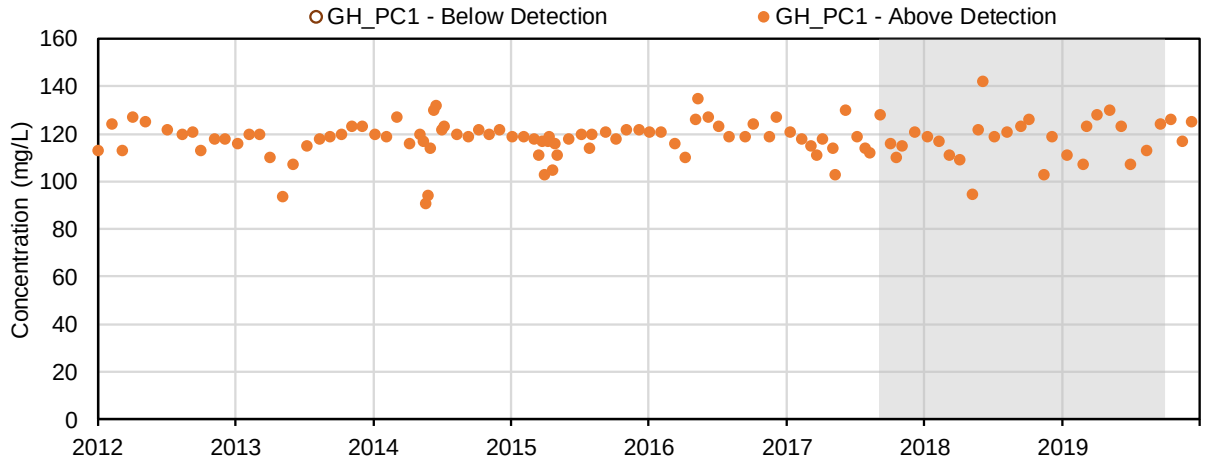
(24) Colour (CU); Conventional Parameters



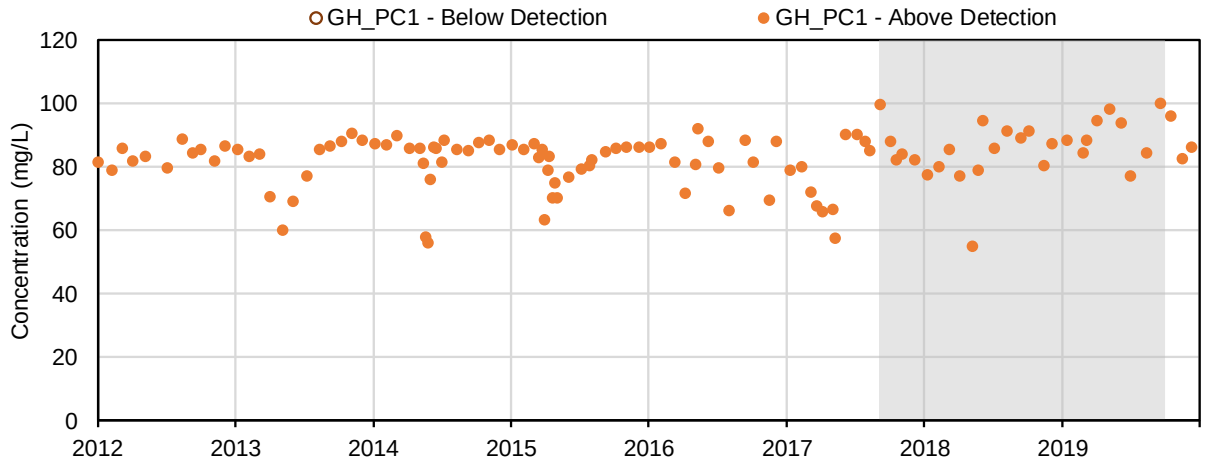
(25) Turbidity (NTU); Conventional Parameters



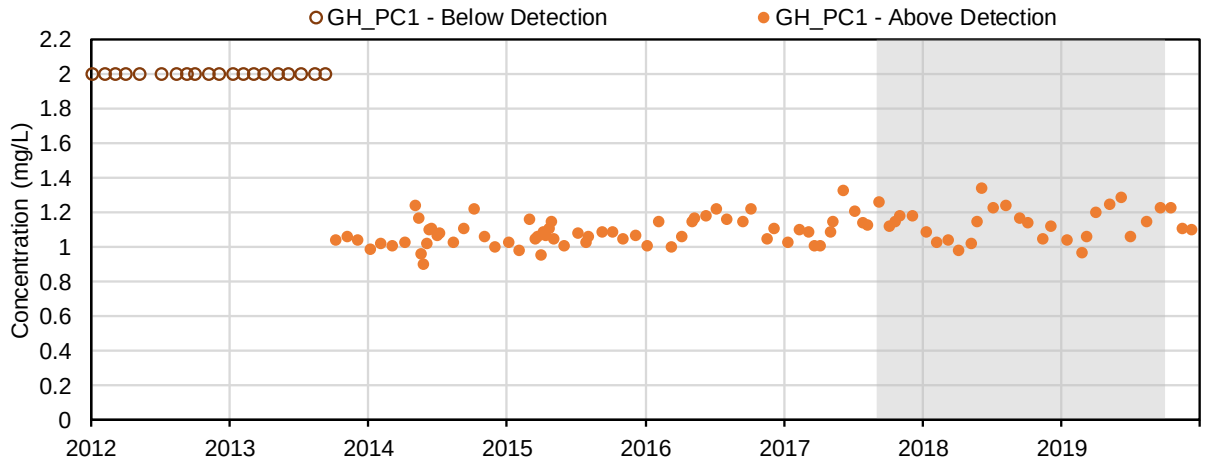
(26) Calcium (mg/L); Major Ions



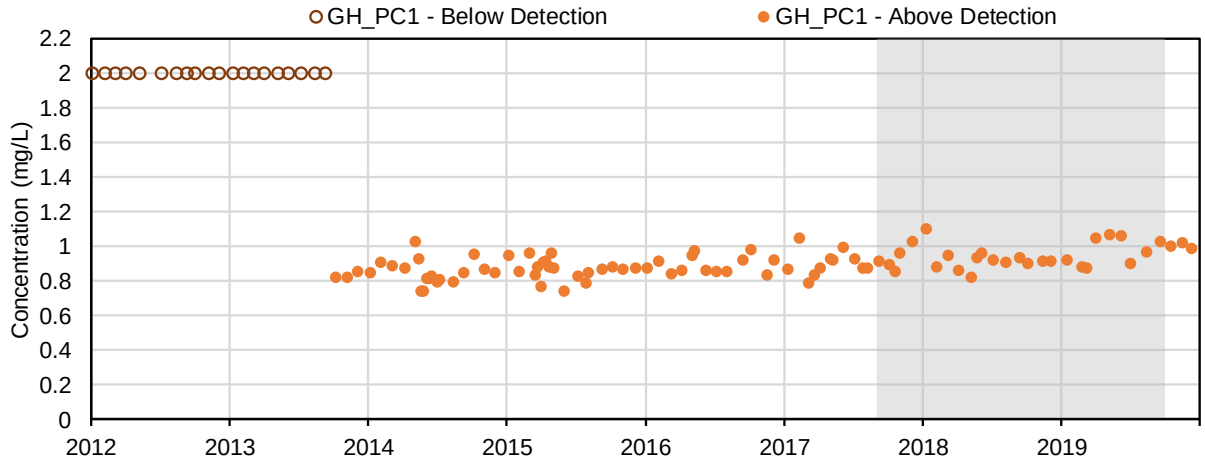
(27) Magnesium (mg/L); Major Ions



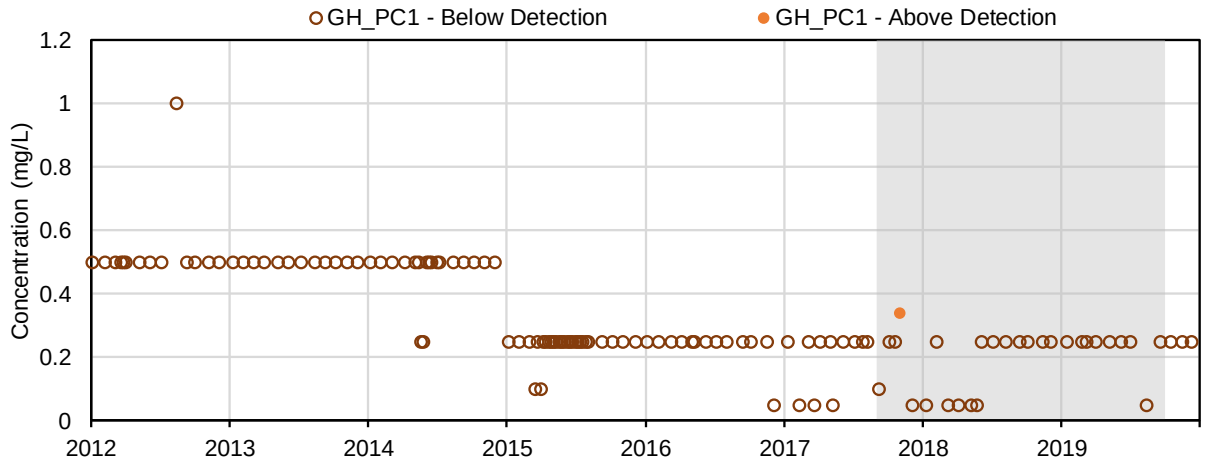
(28) Potassium (mg/L); Major Ions



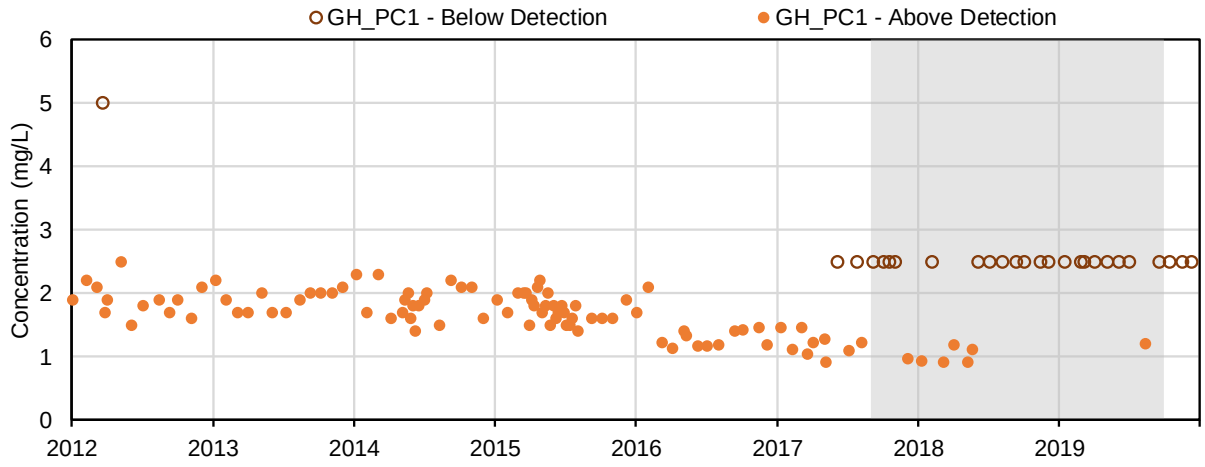
(29) Sodium (mg/L); Major Ions



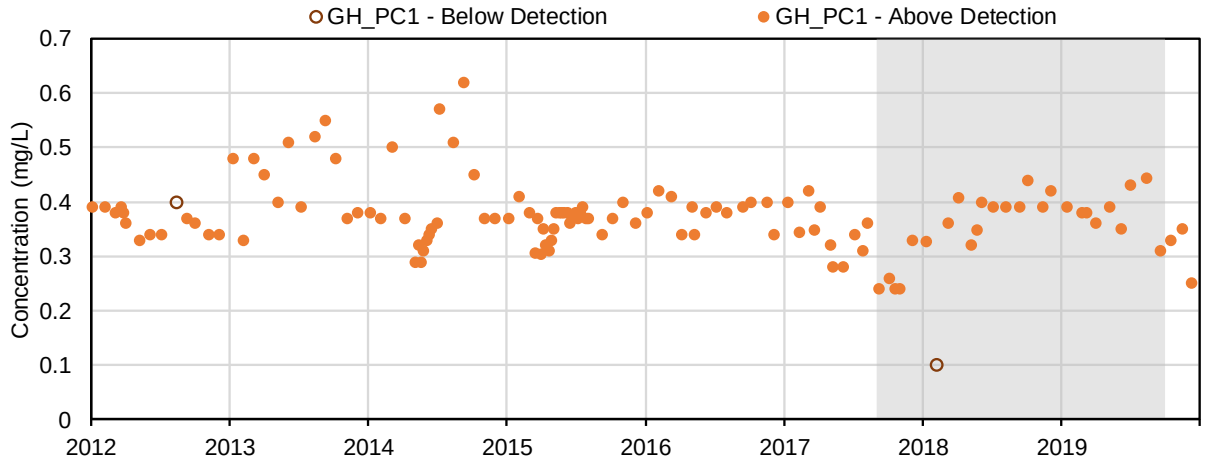
(30) Bromide (mg/L); Major Ions



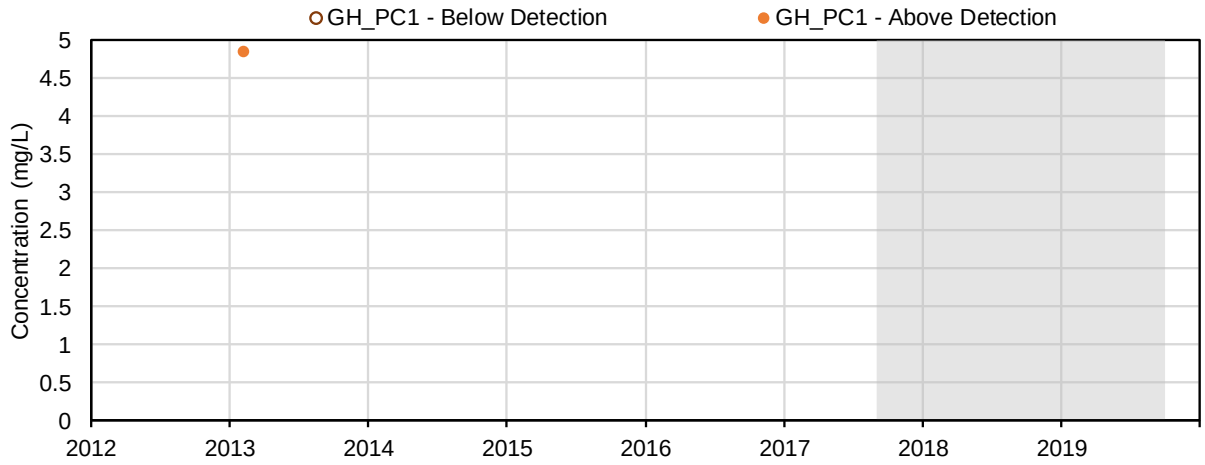
(31) Chloride (mg/L); Major Ions



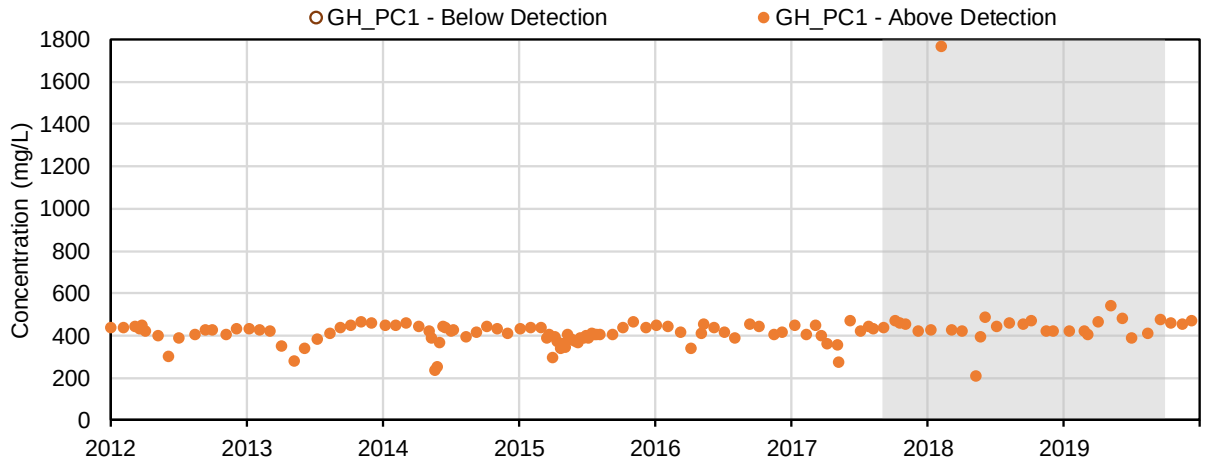
(32) Fluoride (mg/L); Major Ions



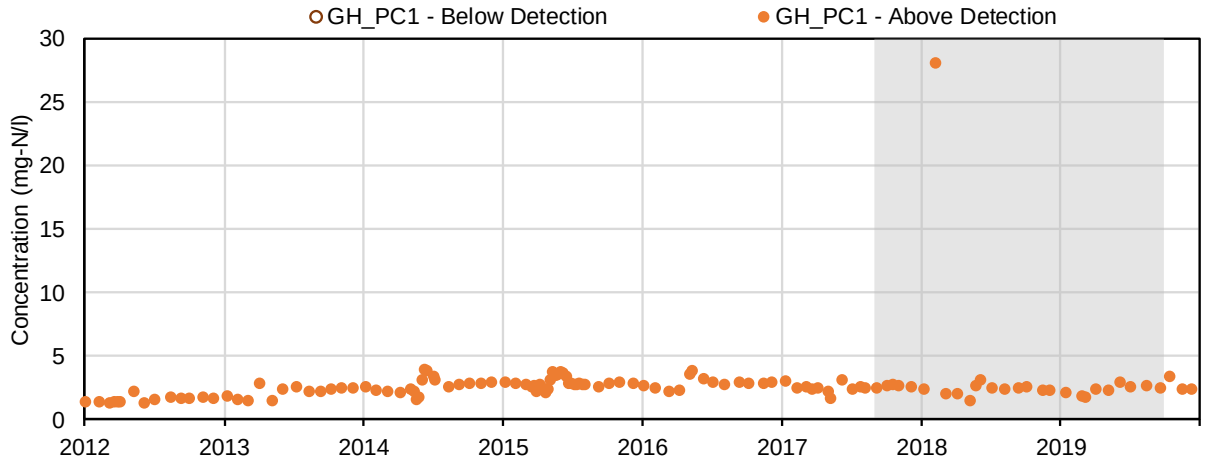
(33) Silica (mg/L); Major Ions



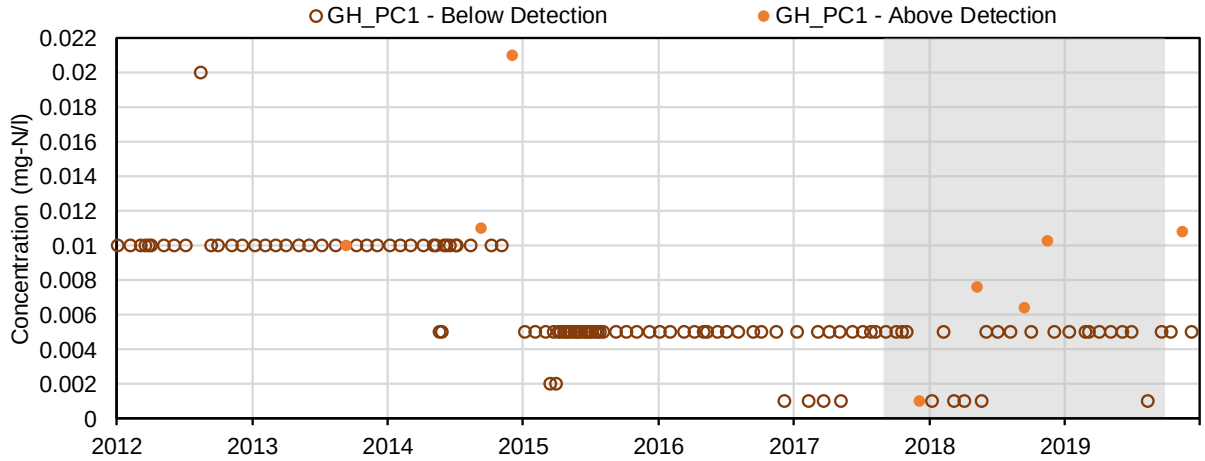
(34) Sulphate (mg/L); Major Ions



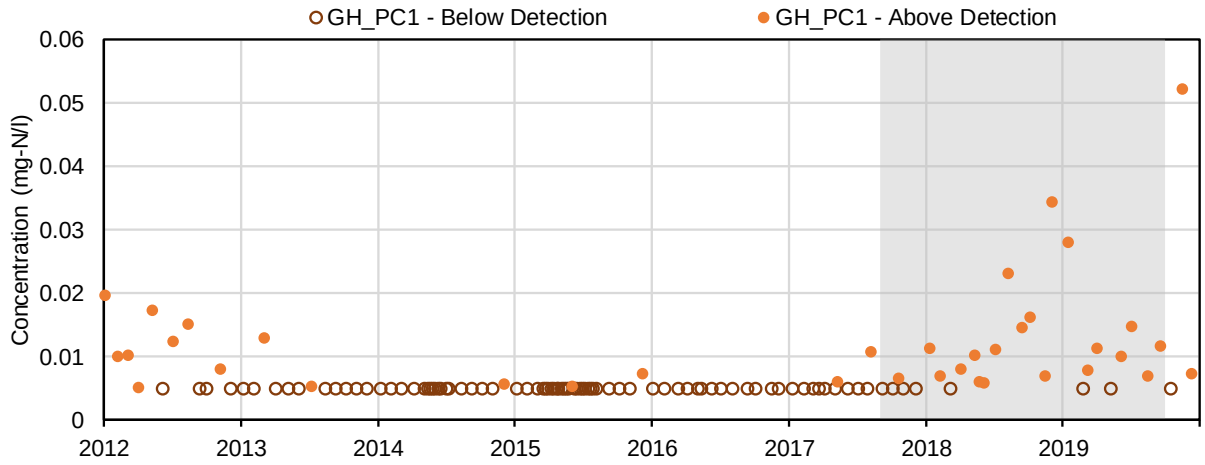
(35) Nitrate (mg-N/l); Nutrients and Biological Indicators



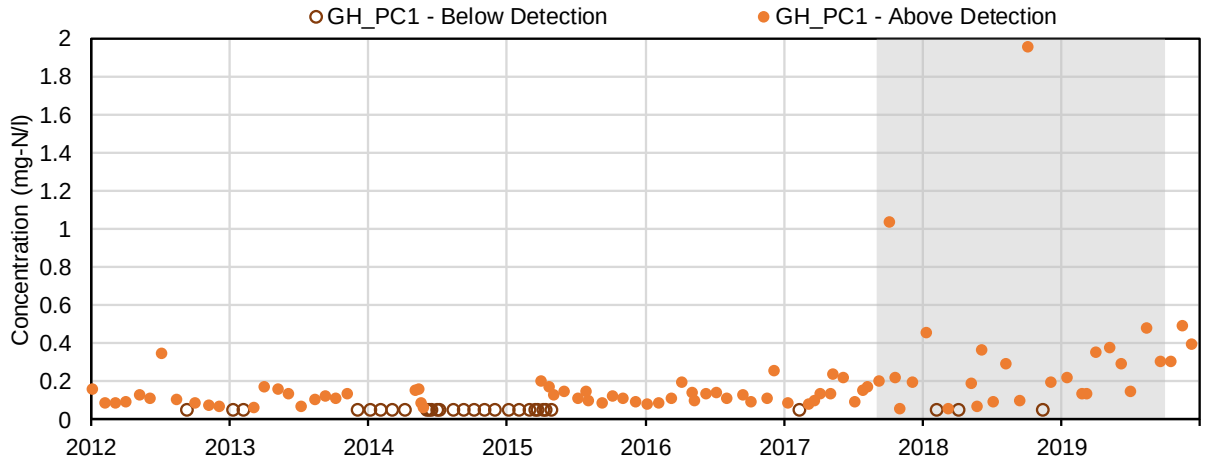
(36) Nitrite (mg-N/l); Nutrients and Biological Indicators



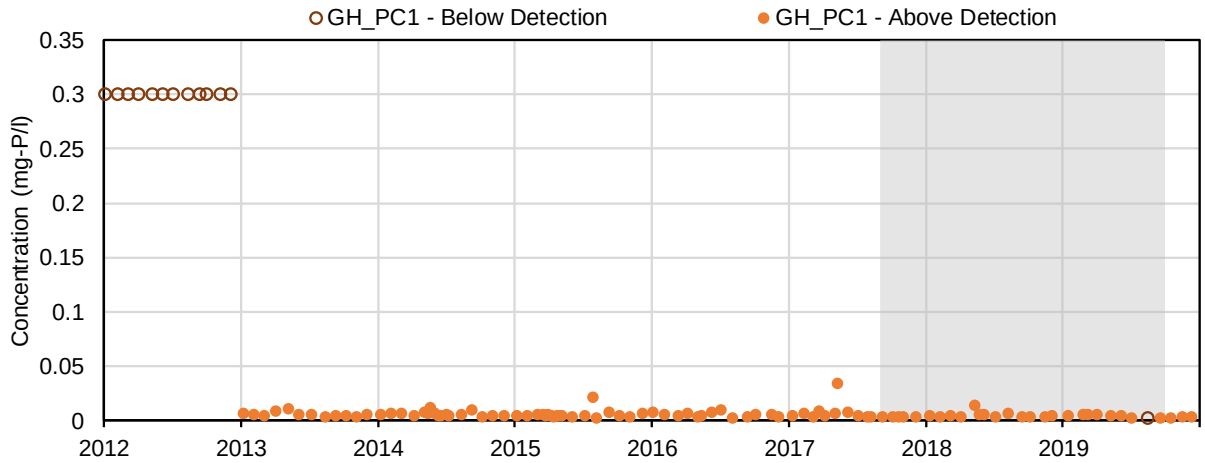
(37) Total ammonia (mg-N/l); Nutrients and Biological Indicators



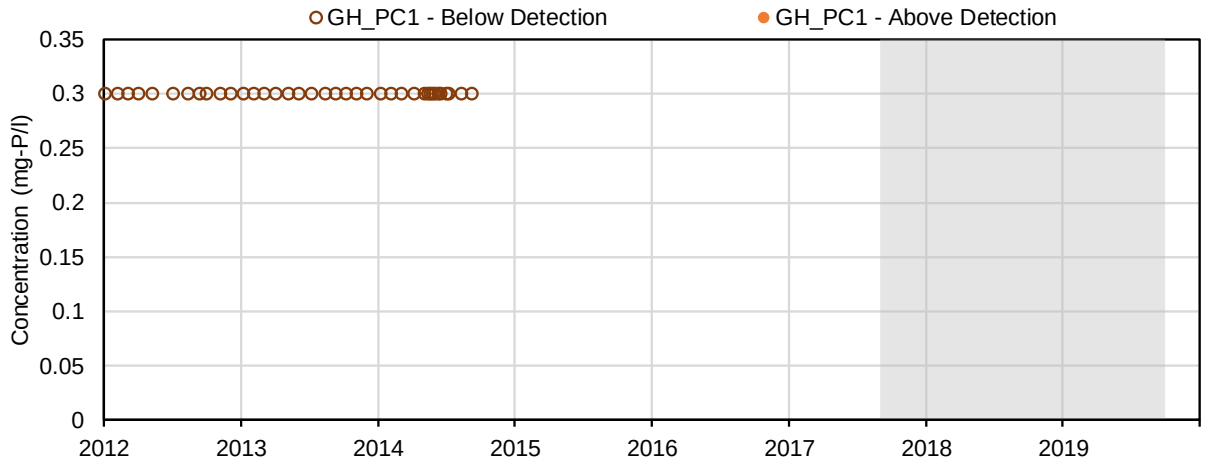
(38) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



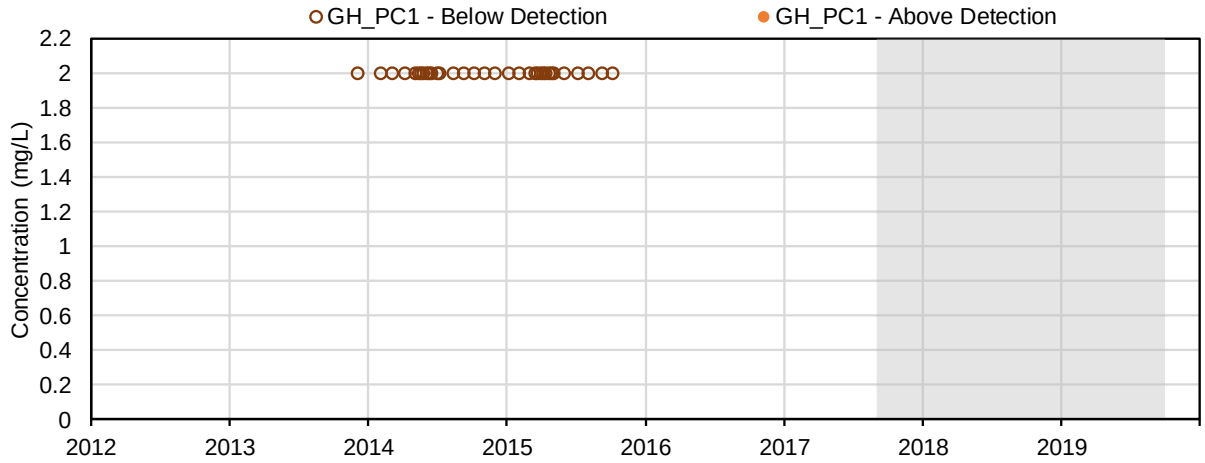
(39) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



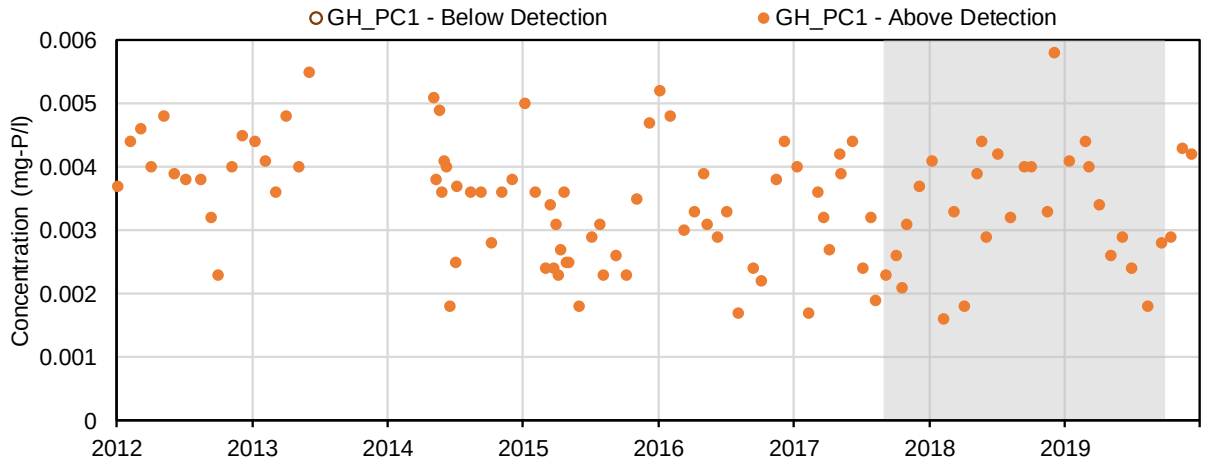
(40) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



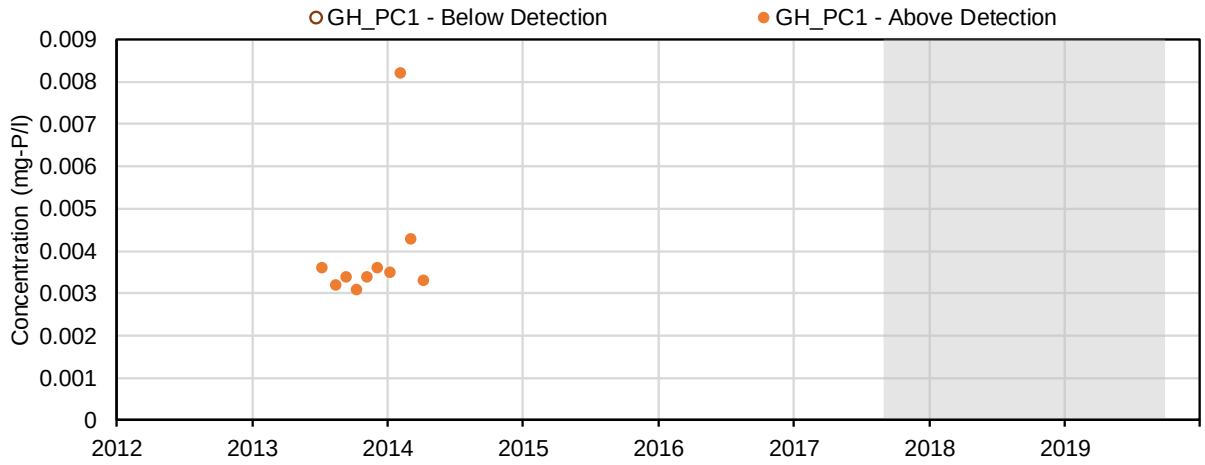
(41) Biochemical oxygen demand (mg/L); Nutrients and Biological Indicators



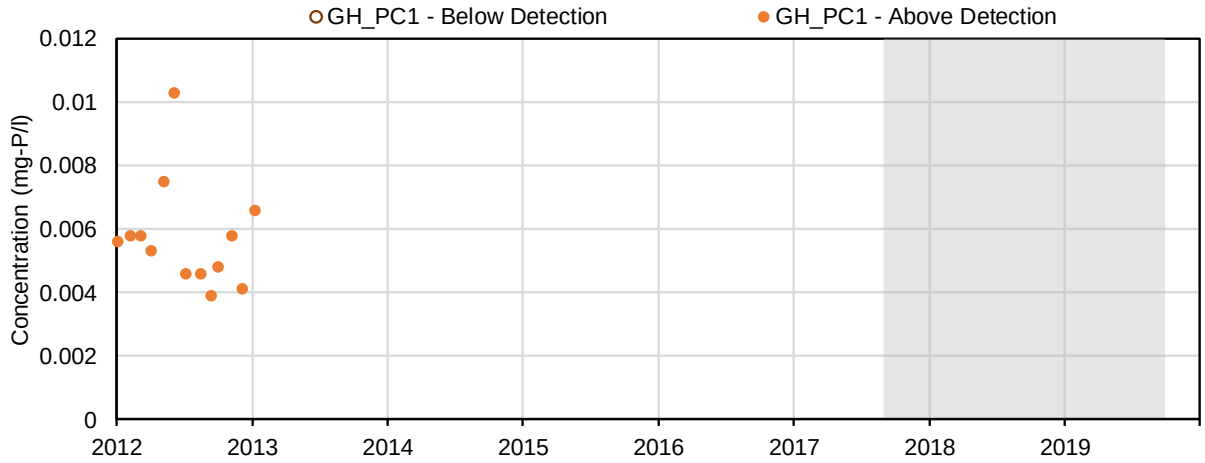
(42) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



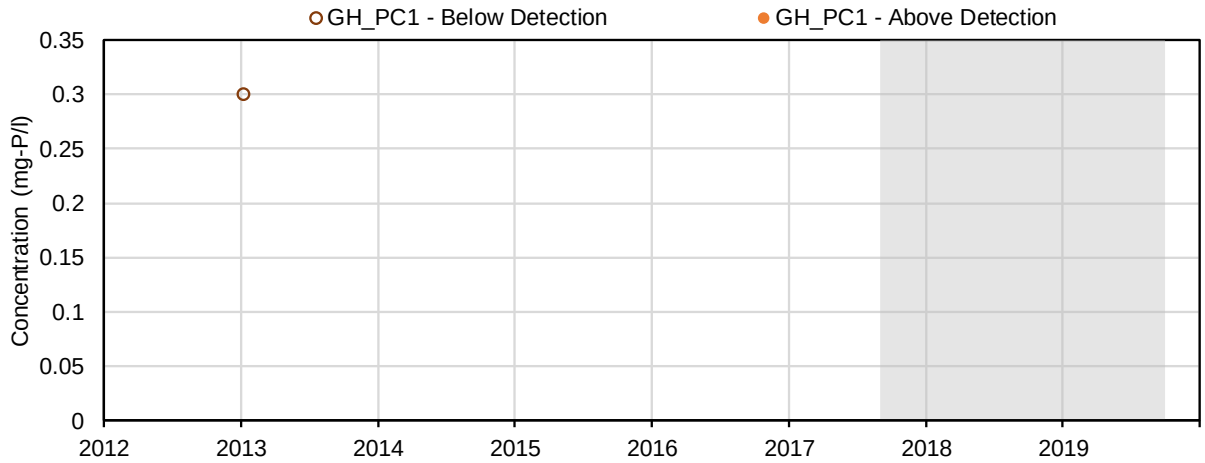
(43) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



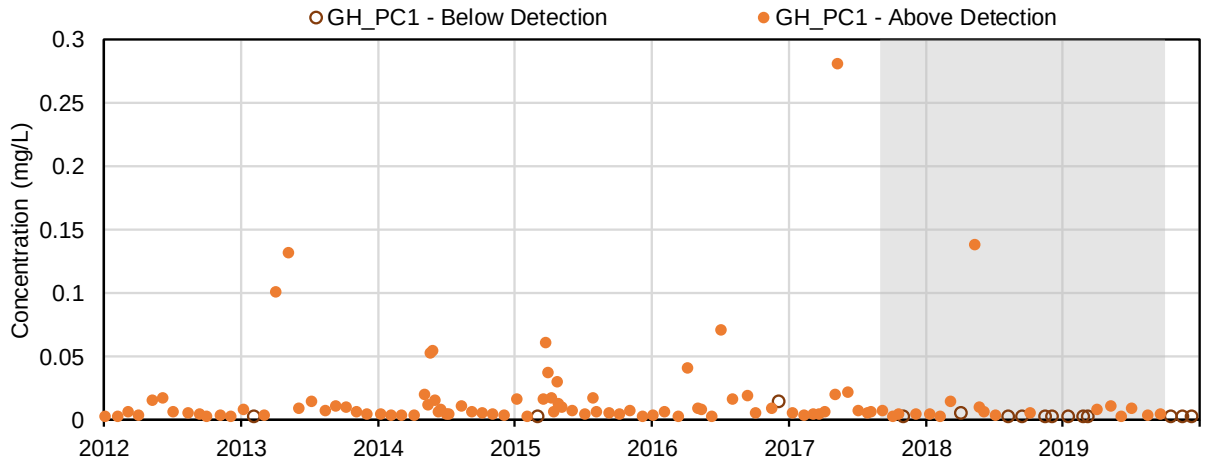
(44) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



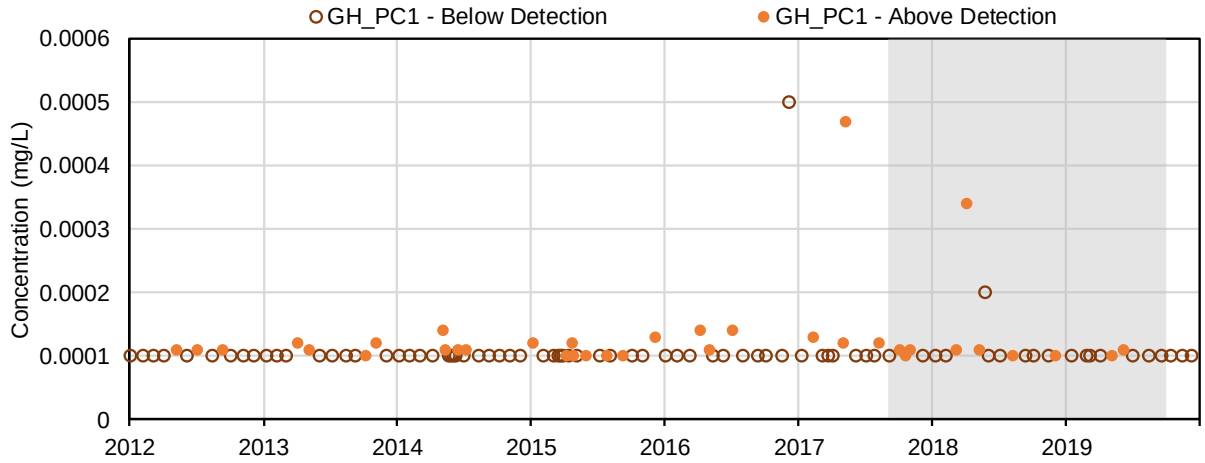
(45) Dissolved Phosphate (mg-P/l); Nutrients and Biological Indicators



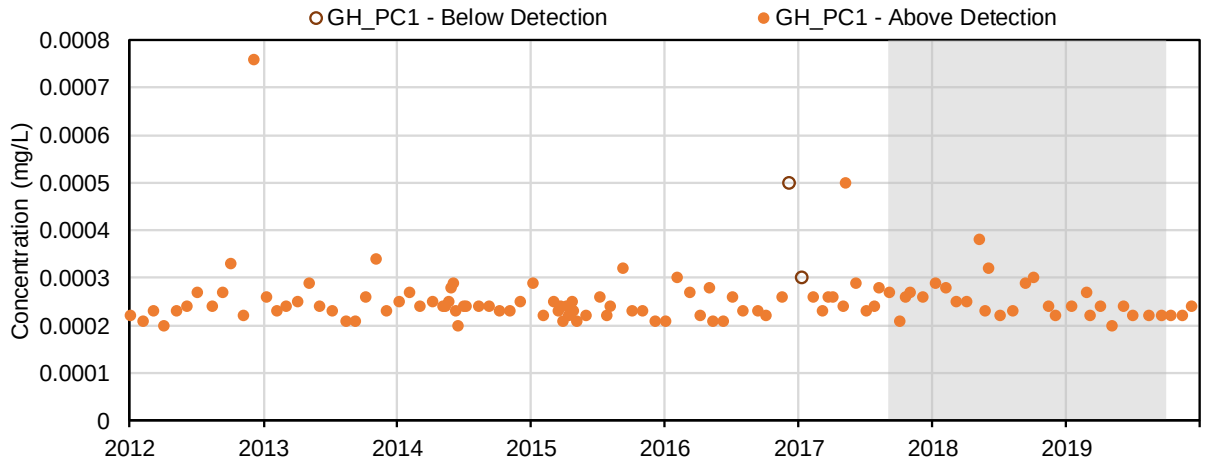
(46) Aluminum (mg/L); Total Metals



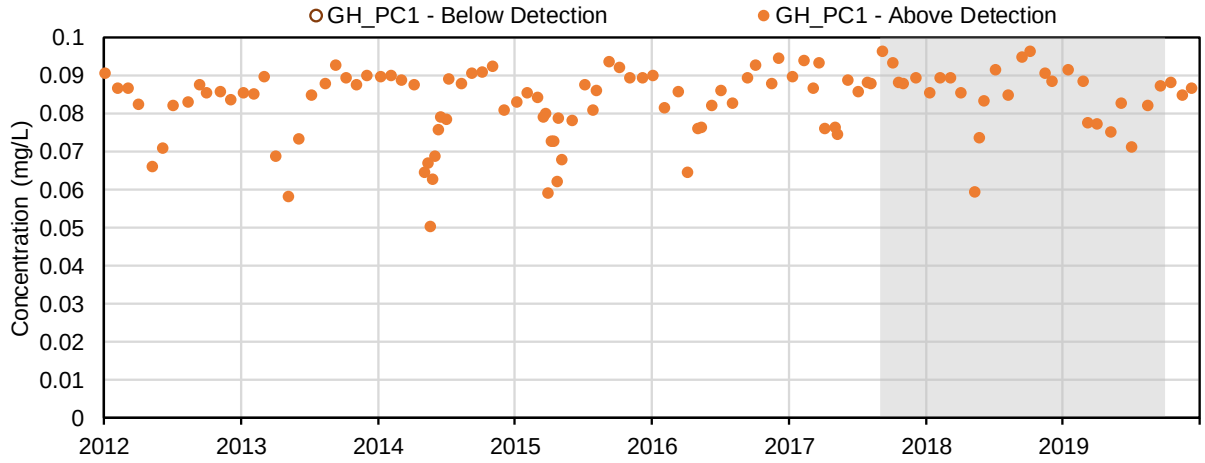
(47) Antimony (mg/L); Total Metals



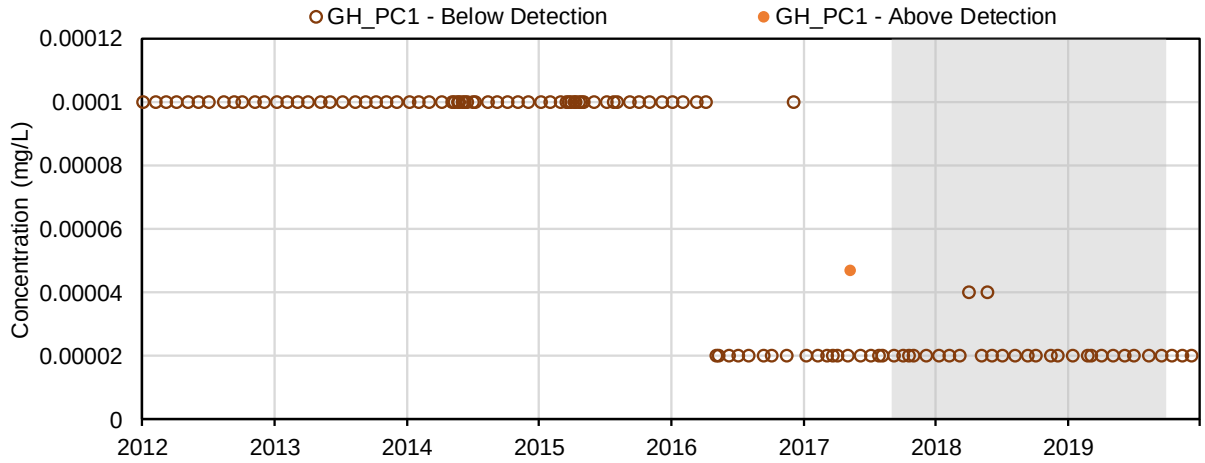
(48) Arsenic (mg/L); Total Metals



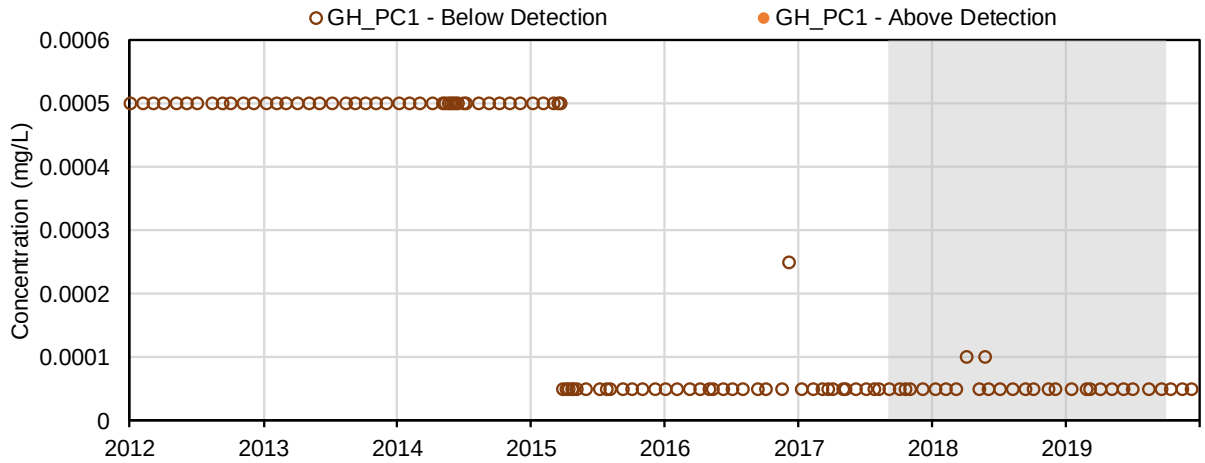
(49) Barium (mg/L); Total Metals



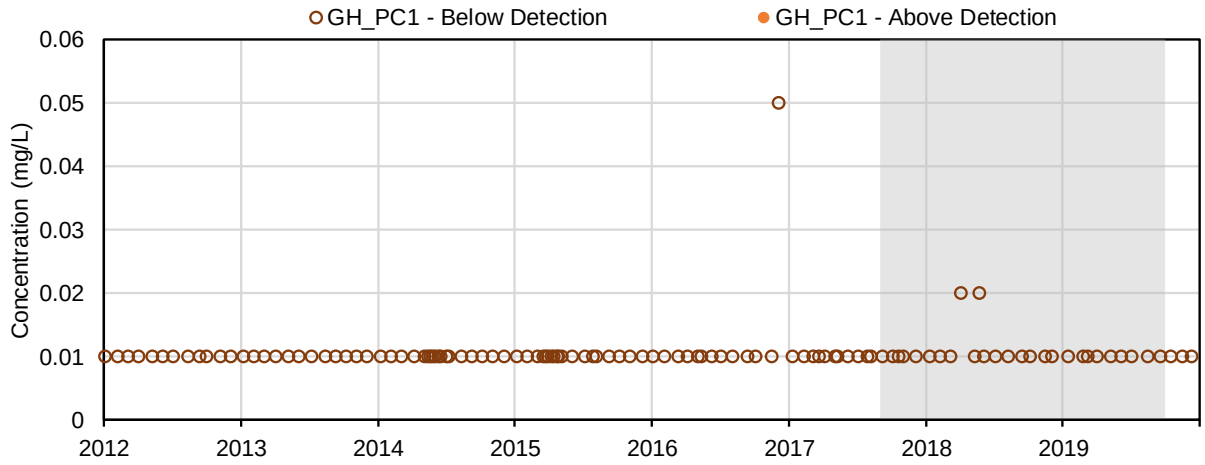
(50) Beryllium (mg/L); Total Metals



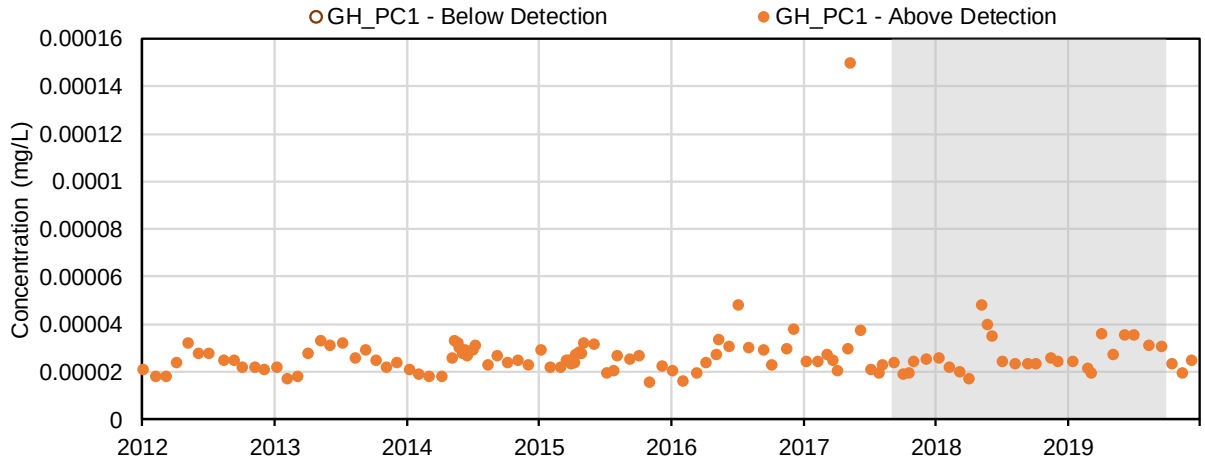
(51) Bismuth (mg/L); Total Metals



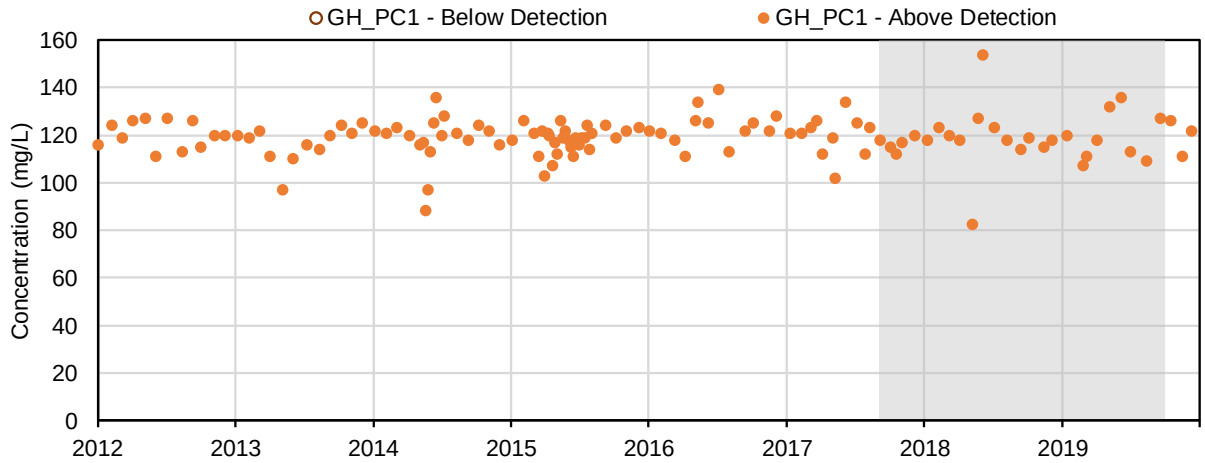
(52) Boron (mg/L); Total Metals



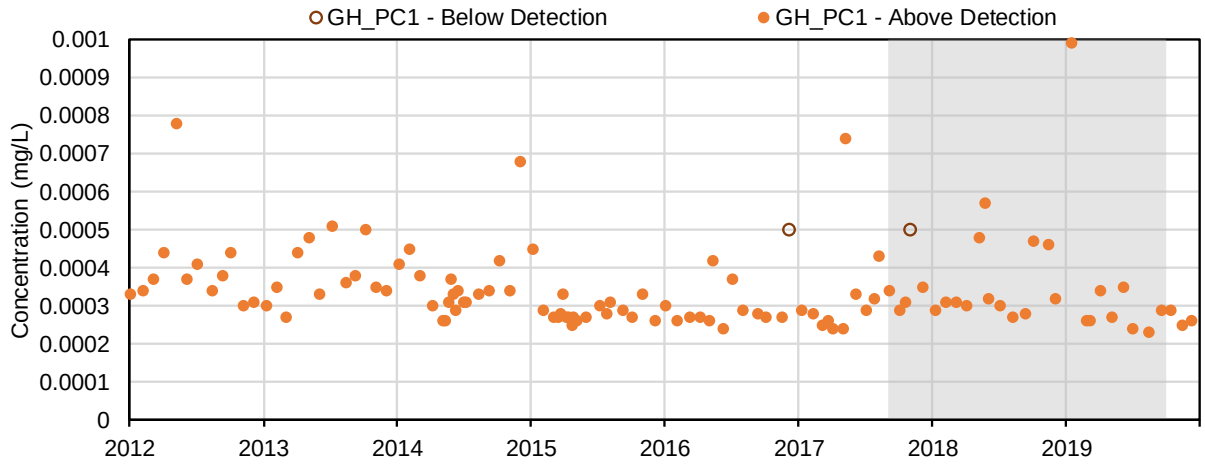
(53) Cadmium (mg/L); Total Metals



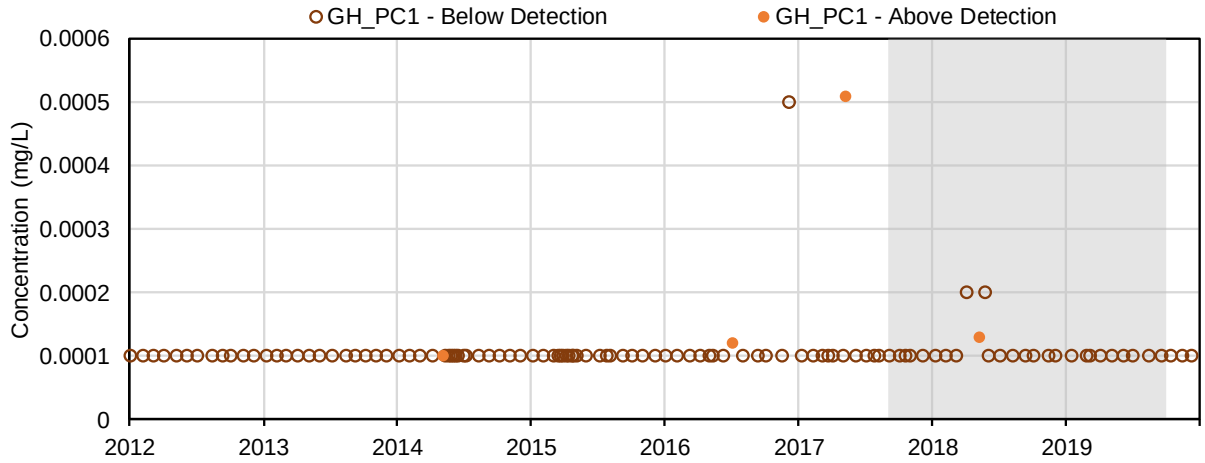
(54) Calcium (mg/L); Total Metals



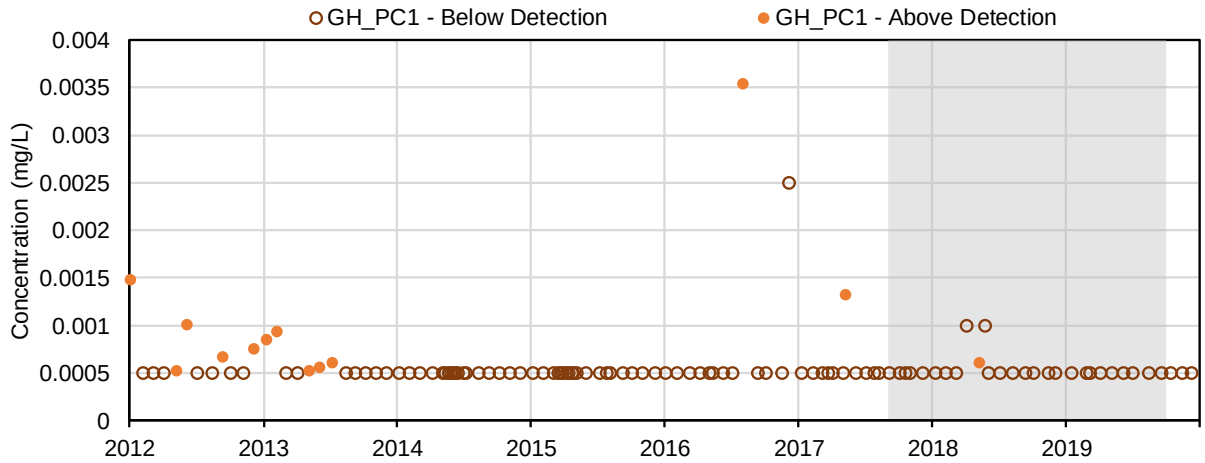
(55) Chromium (mg/L); Total Metals



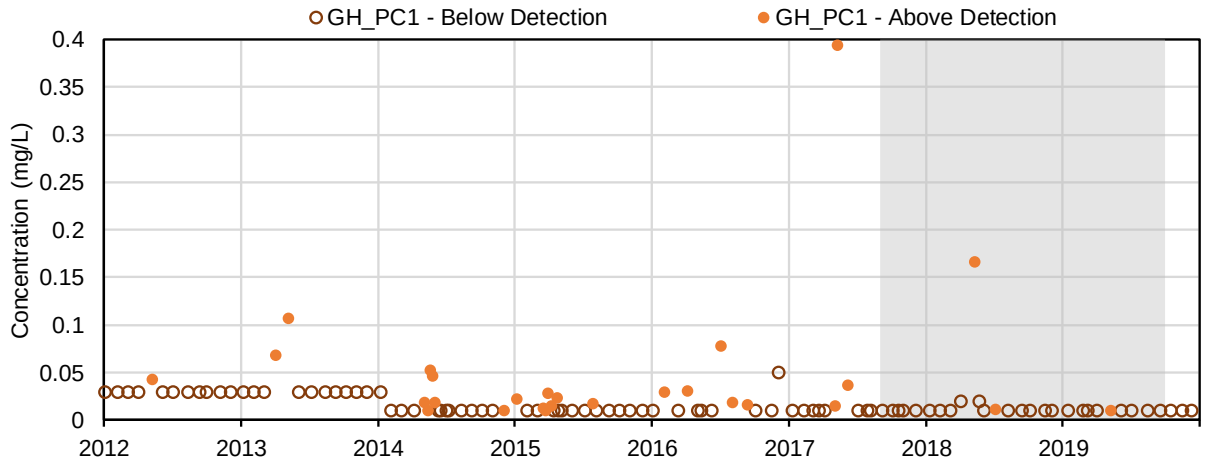
(56) Cobalt (mg/L); Total Metals



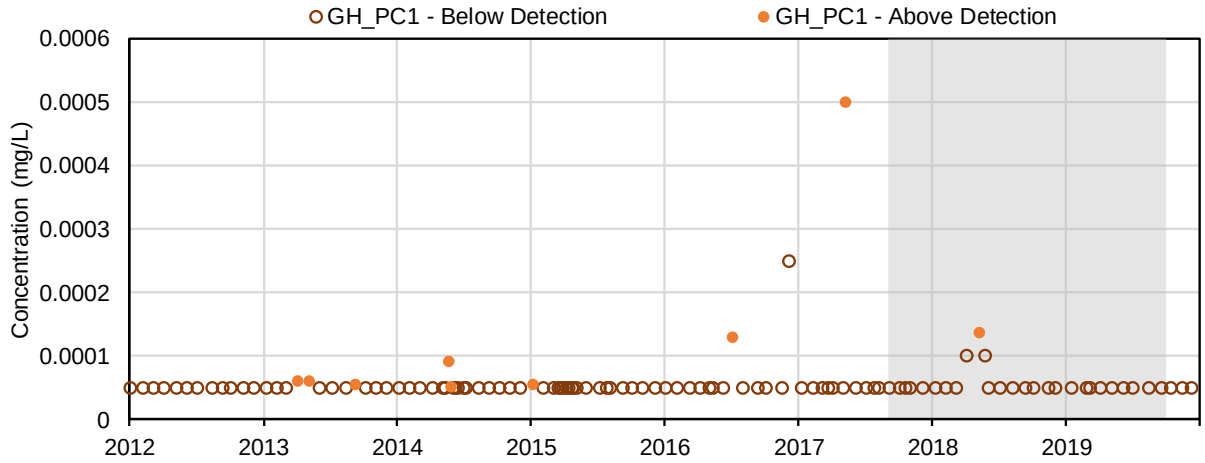
(57) Copper (mg/L); Total Metals



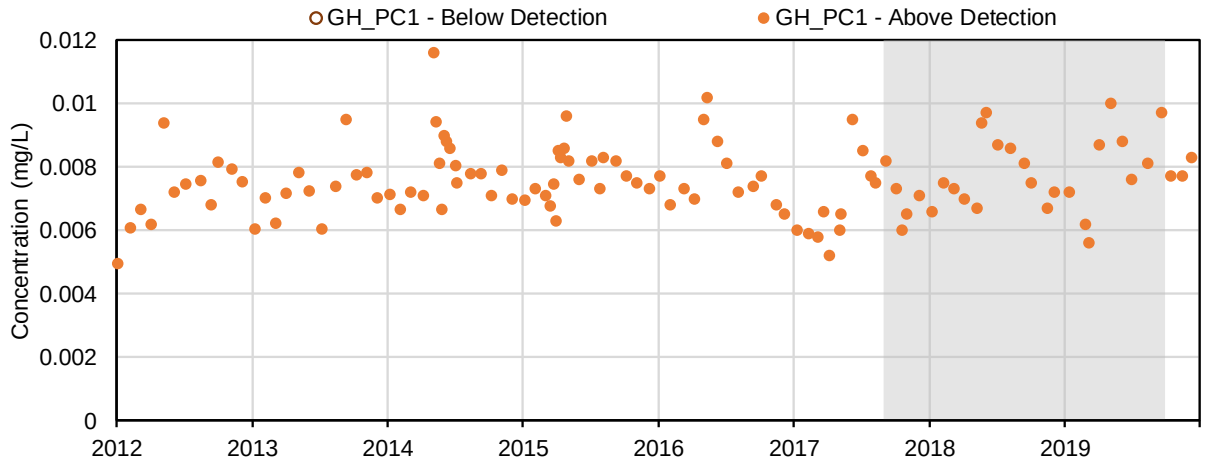
(58) Iron (mg/L); Total Metals



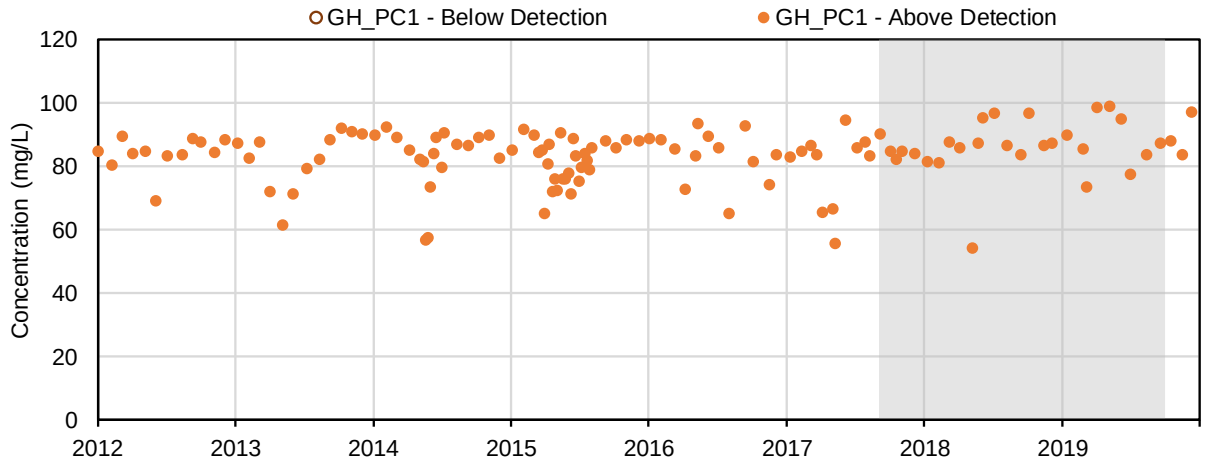
(59) Lead (mg/L); Total Metals



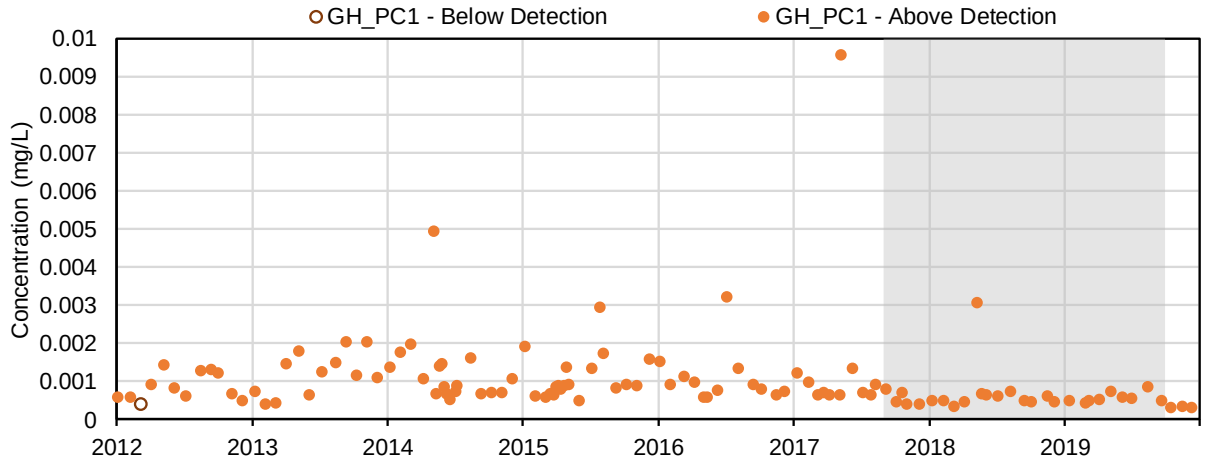
(60) Lithium (mg/L); Total Metals



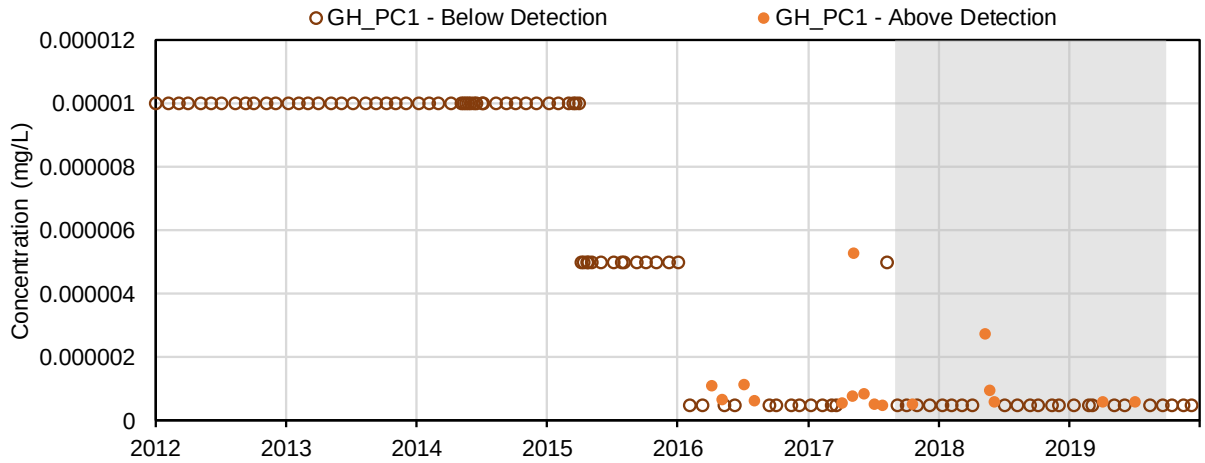
(61) Magnesium (mg/L); Total Metals



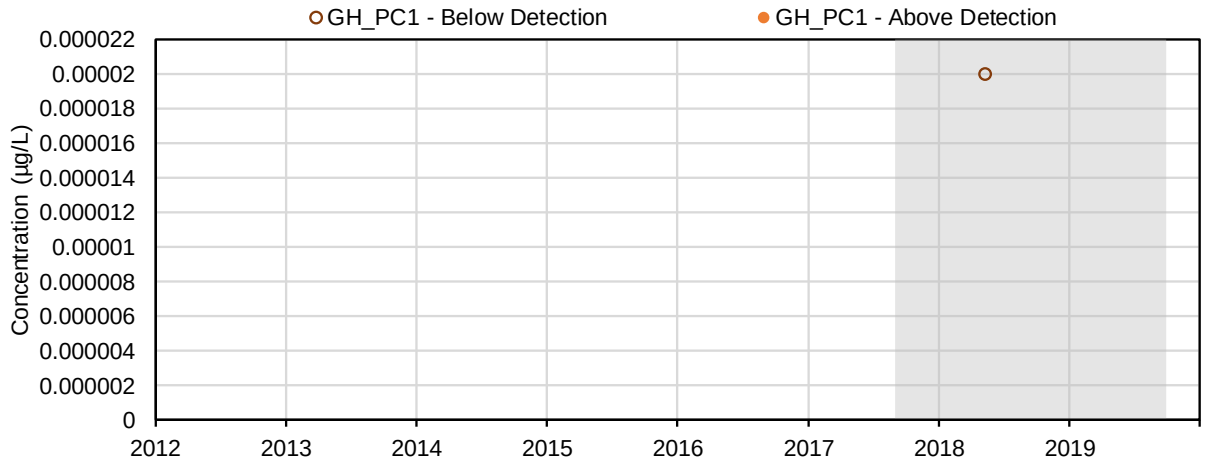
(62) Manganese (mg/L); Total Metals



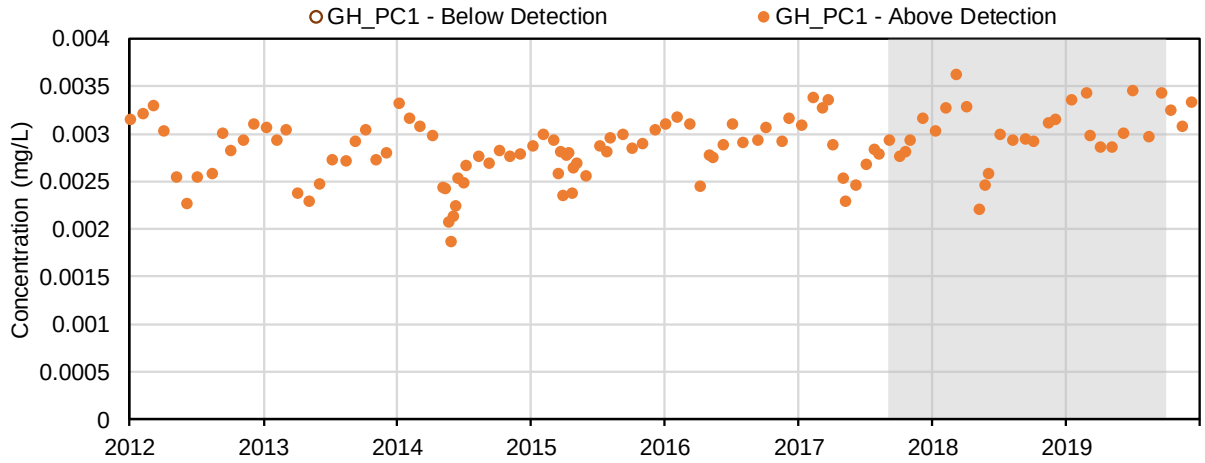
(63) Mercury (mg/L); Total Metals



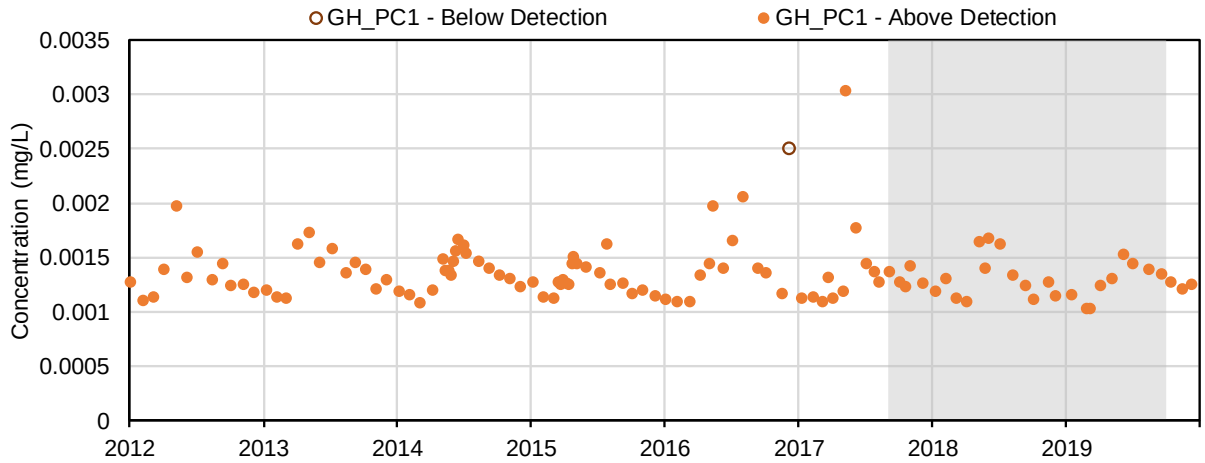
(64) Methyl mercury (µg/L); Total Metals



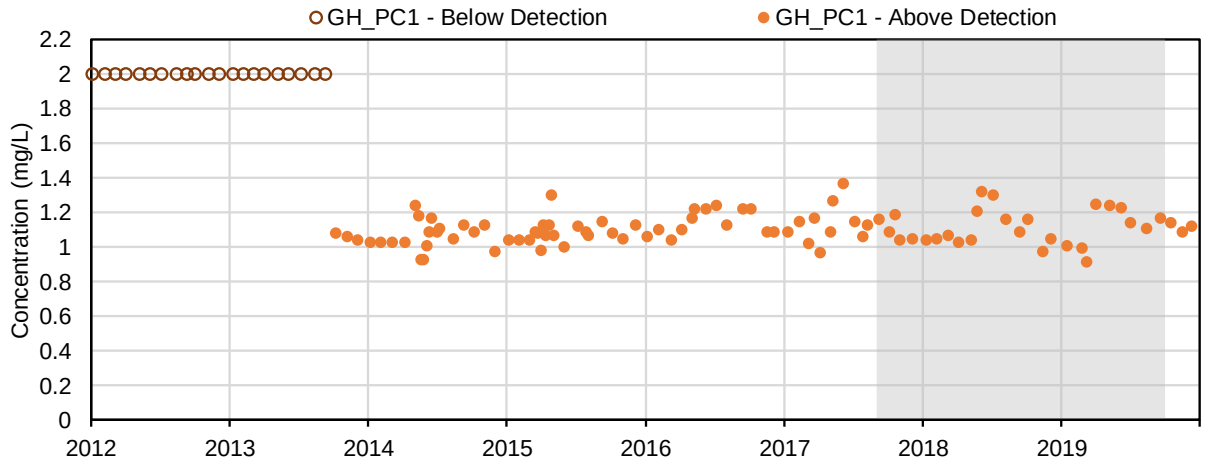
(65) Molybdenum (mg/L); Total Metals



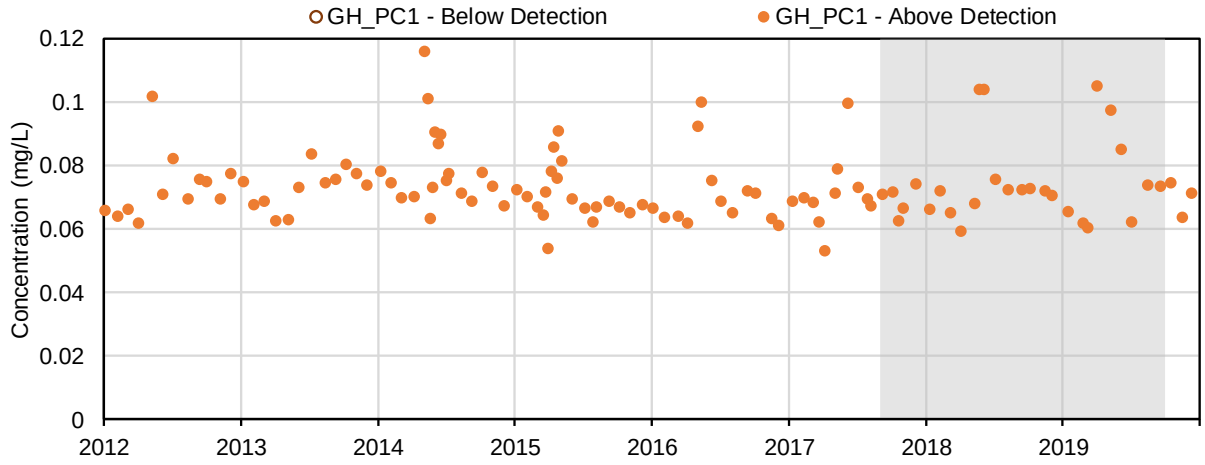
(66) Nickel (mg/L); Total Metals



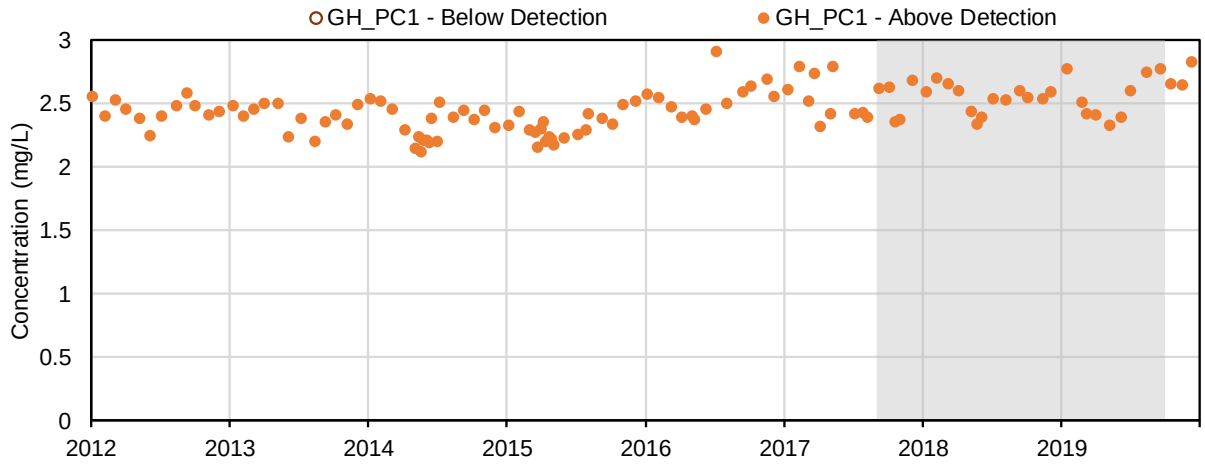
(67) Potassium (mg/L); Total Metals



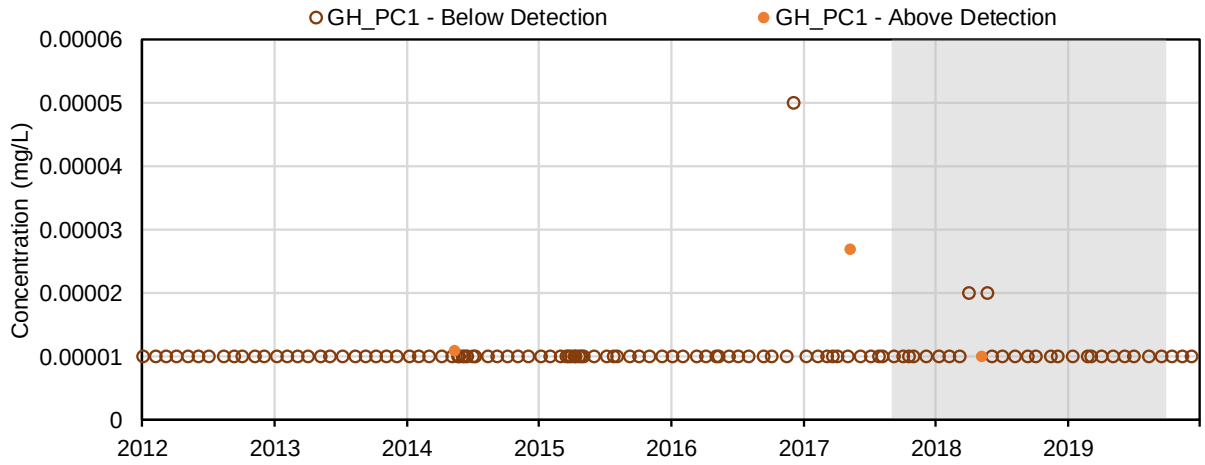
(68) Selenium (mg/L); Total Metals



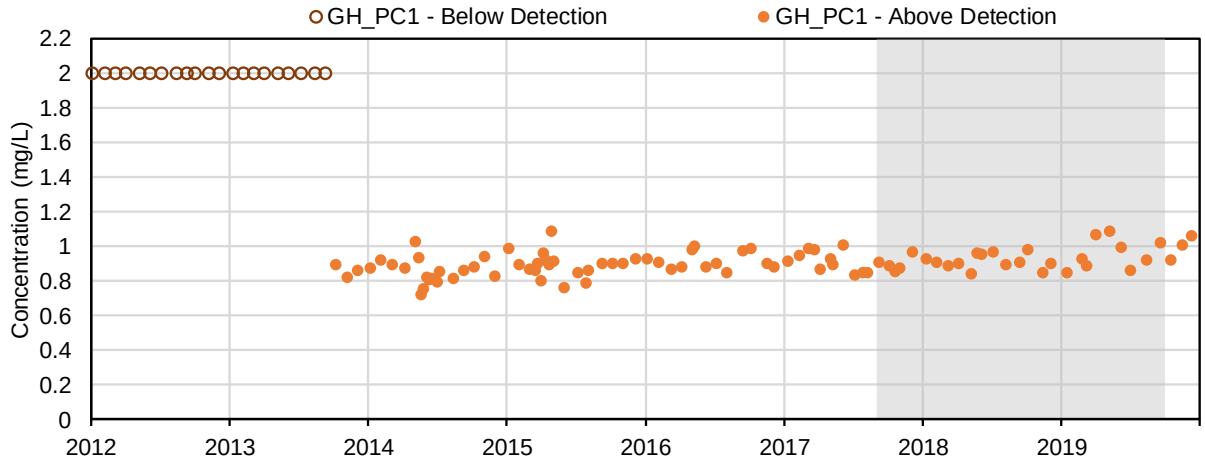
(69) Silicon (mg/L); Total Metals



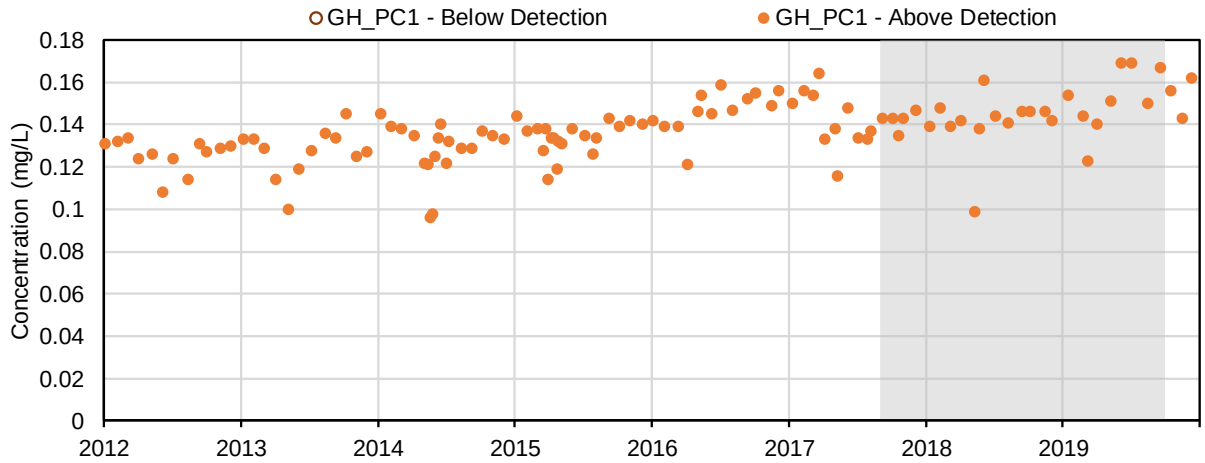
(70) Silver (mg/L); Total Metals



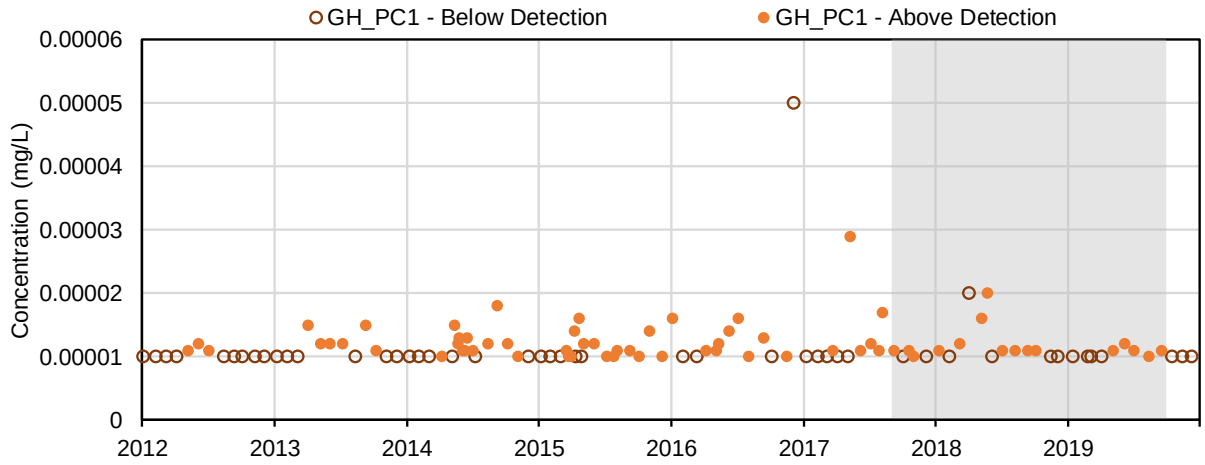
(71) Sodium (mg/L); Total Metals



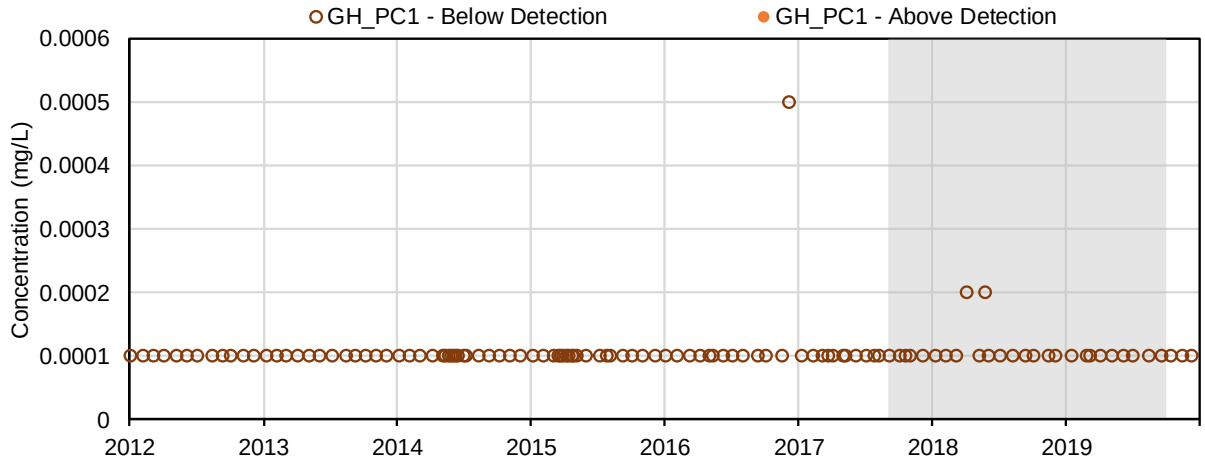
(72) Strontium (mg/L); Total Metals



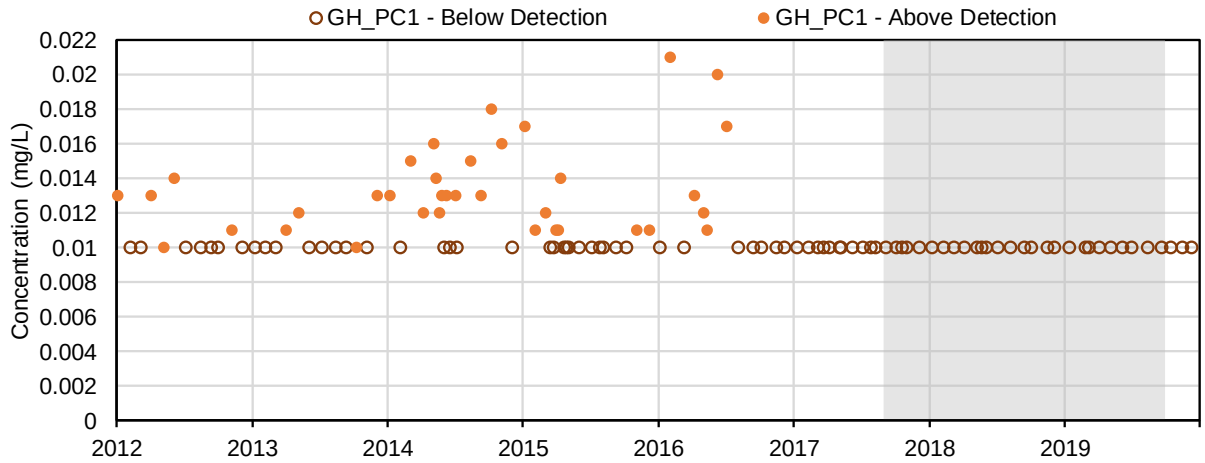
(73) Thallium (mg/L); Total Metals



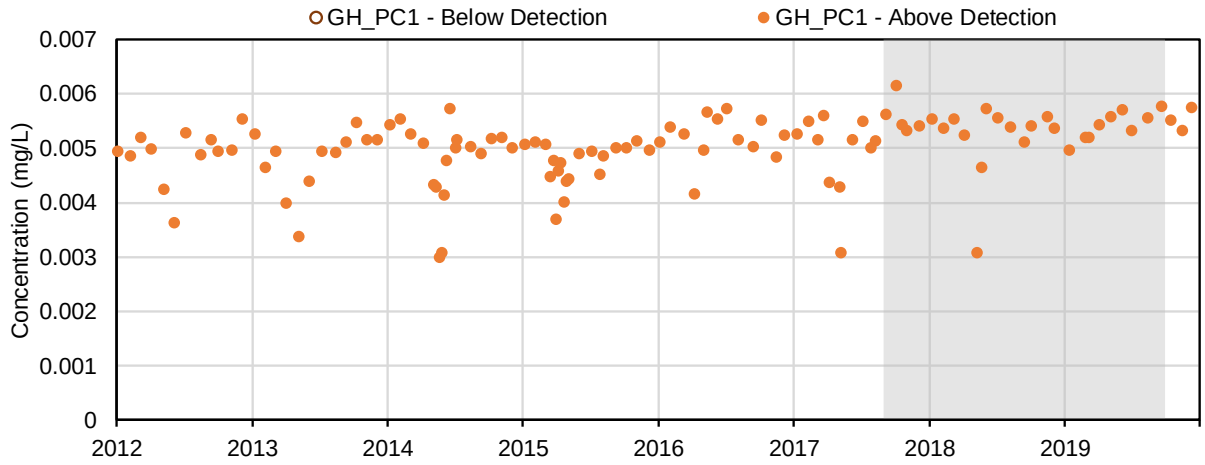
(74) Tin (mg/L); Total Metals



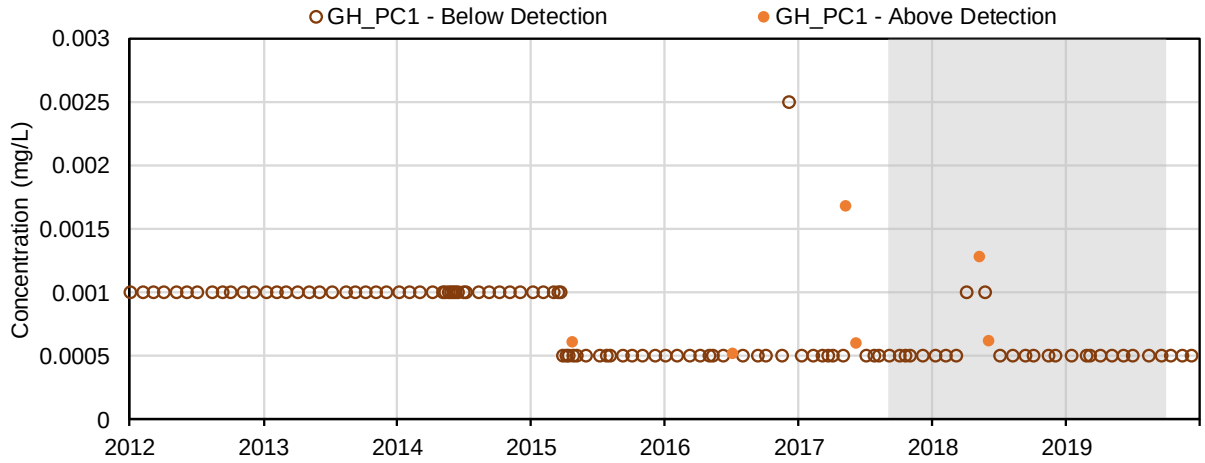
(75) Titanium (mg/L); Total Metals



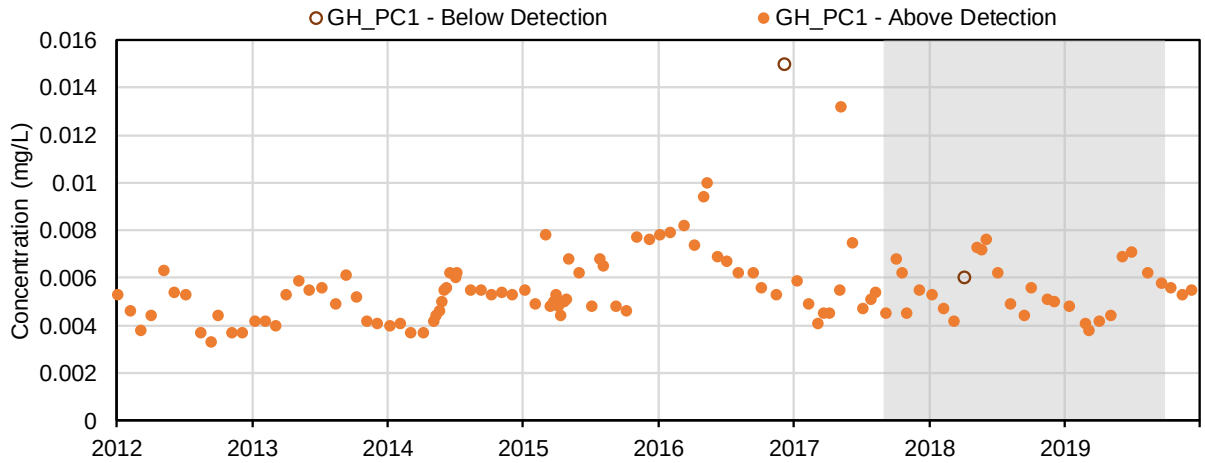
(76) Uranium (mg/L); Total Metals



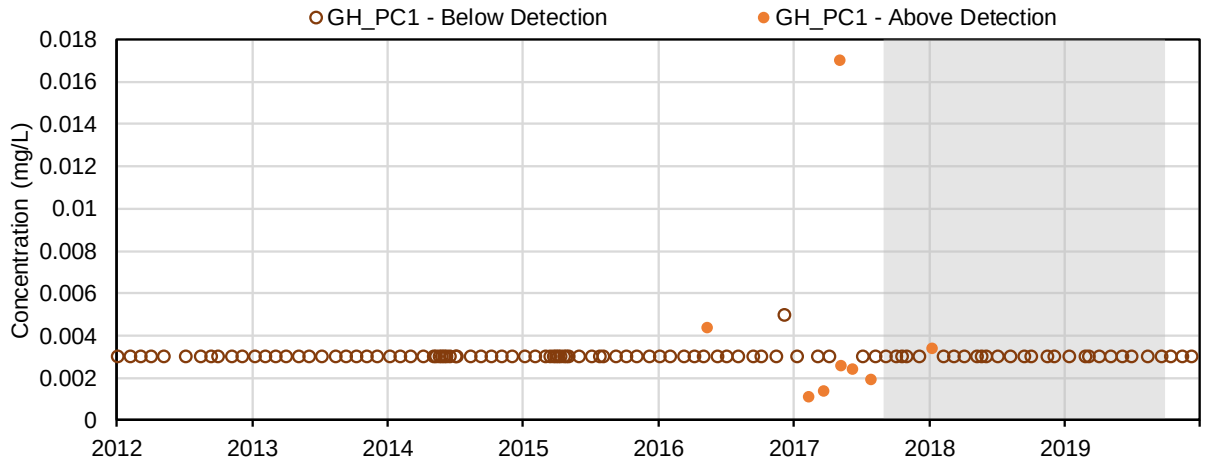
(77) Vanadium (mg/L); Total Metals



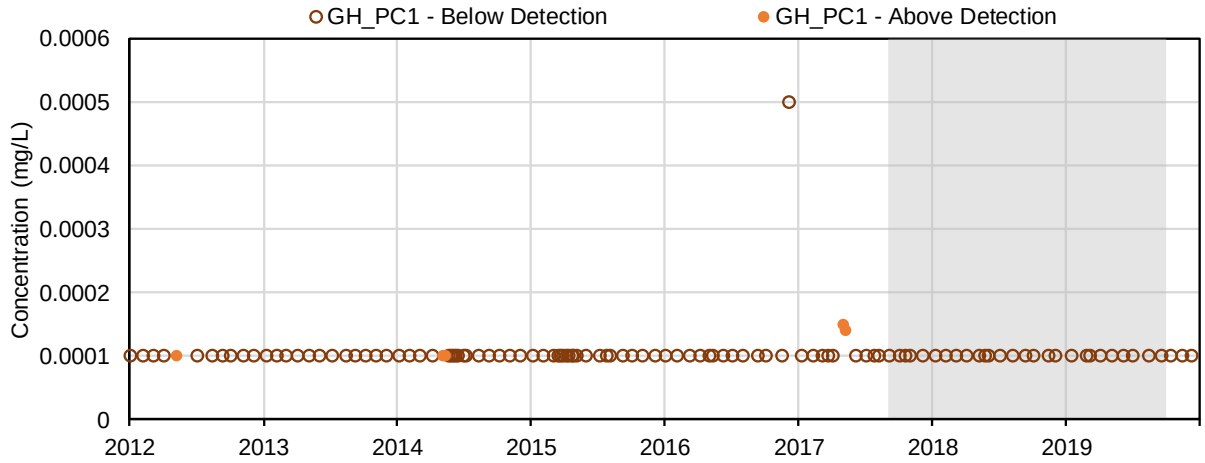
(78) Zinc (mg/L); Total Metals



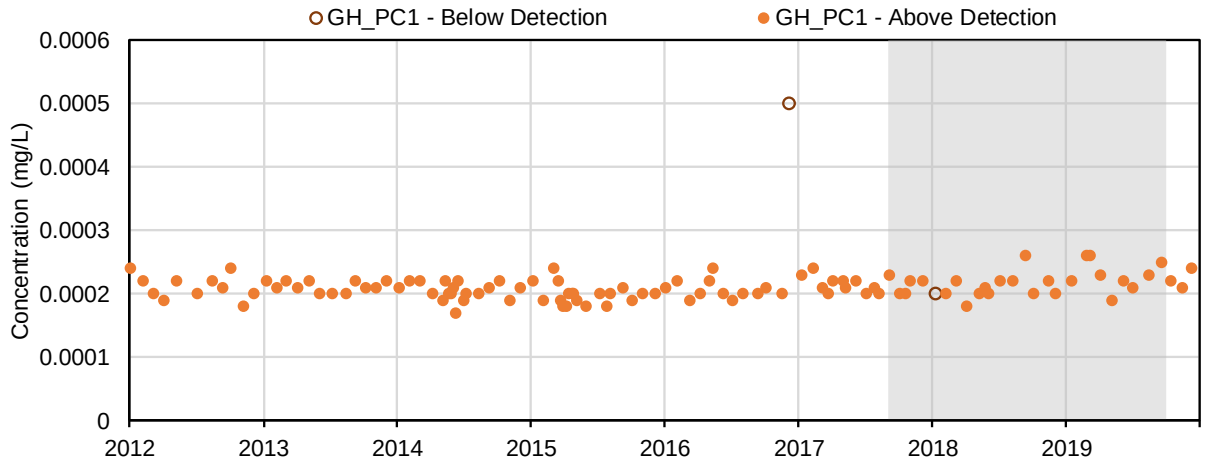
(79) Aluminum (mg/L); Dissolved Metals



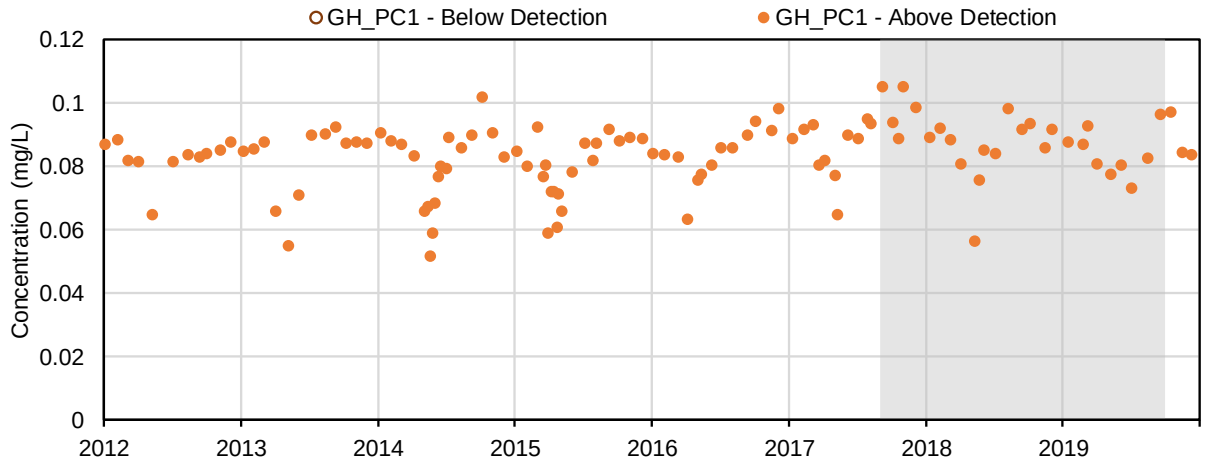
(80) Antimony (mg/L); Dissolved Metals



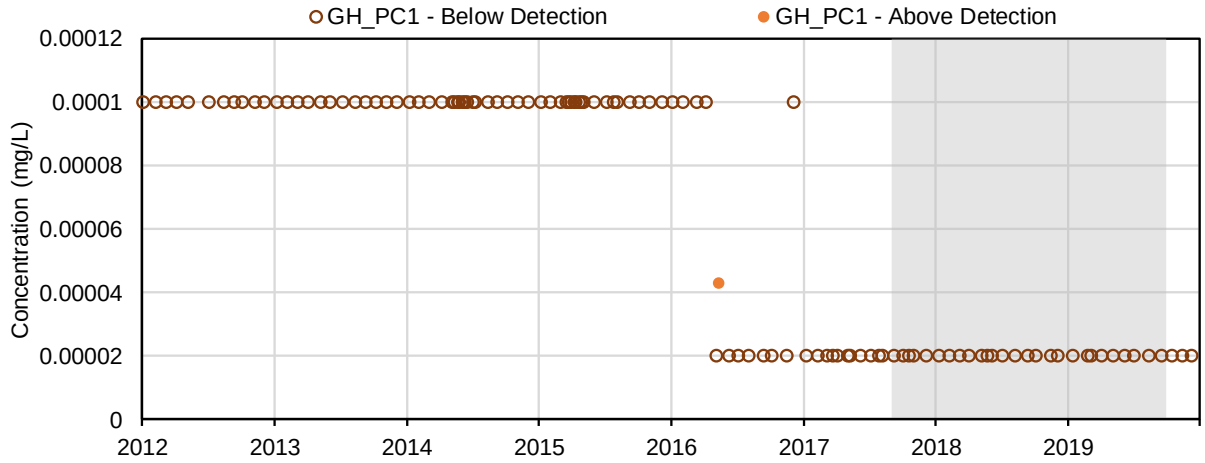
(81) Arsenic (mg/L); Dissolved Metals



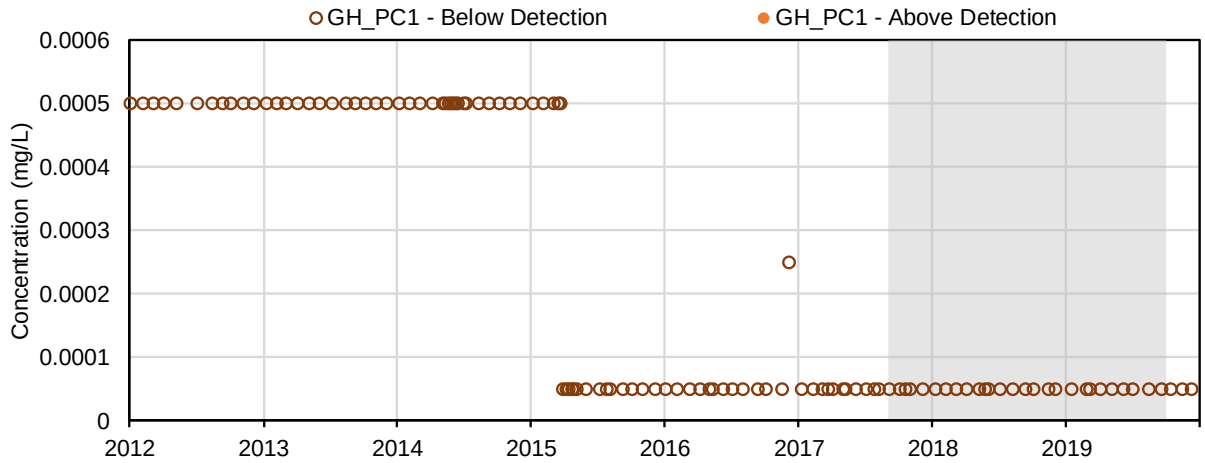
(82) Barium (mg/L); Dissolved Metals



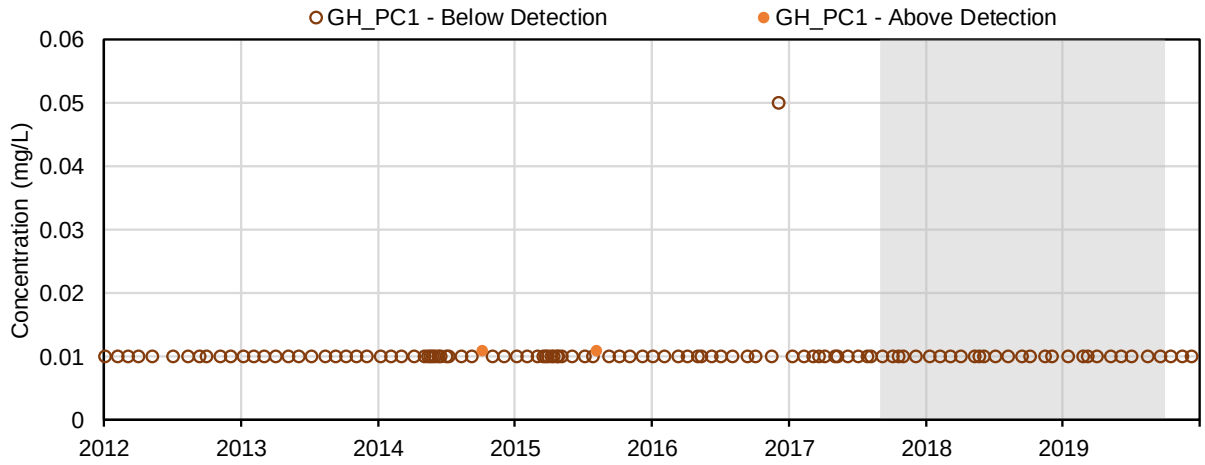
(83) Beryllium (mg/L); Dissolved Metals



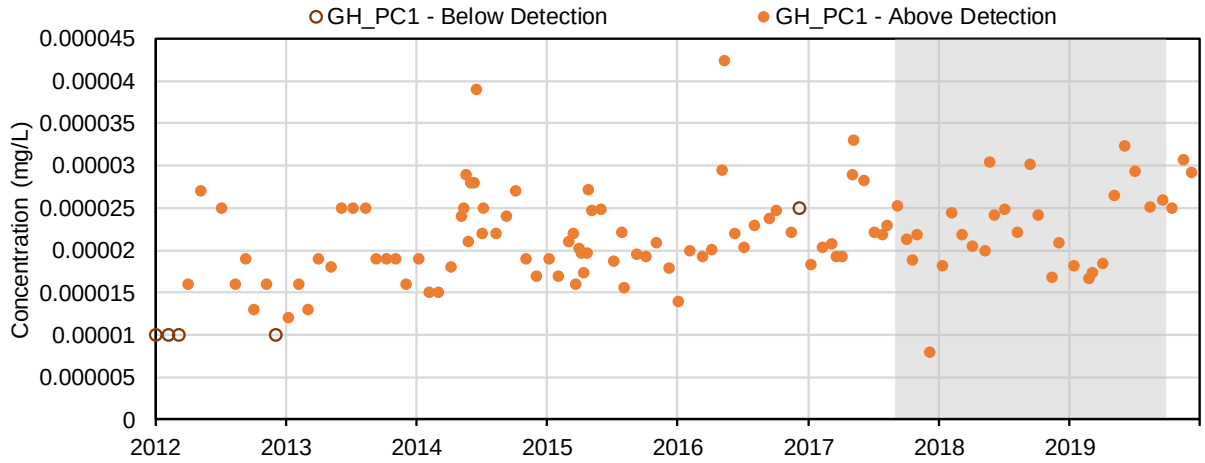
(84) Bismuth (mg/L); Dissolved Metals



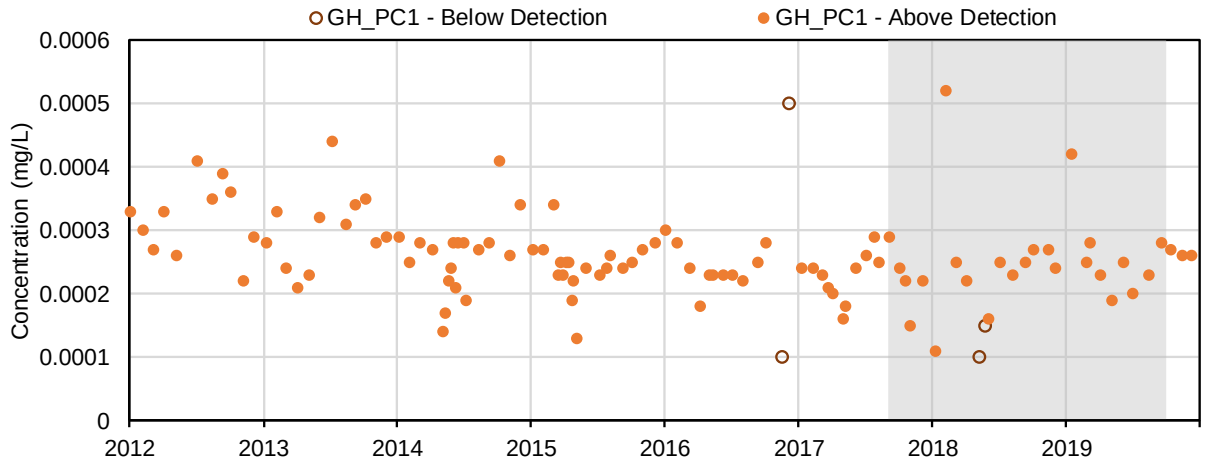
(85) Boron (mg/L); Dissolved Metals



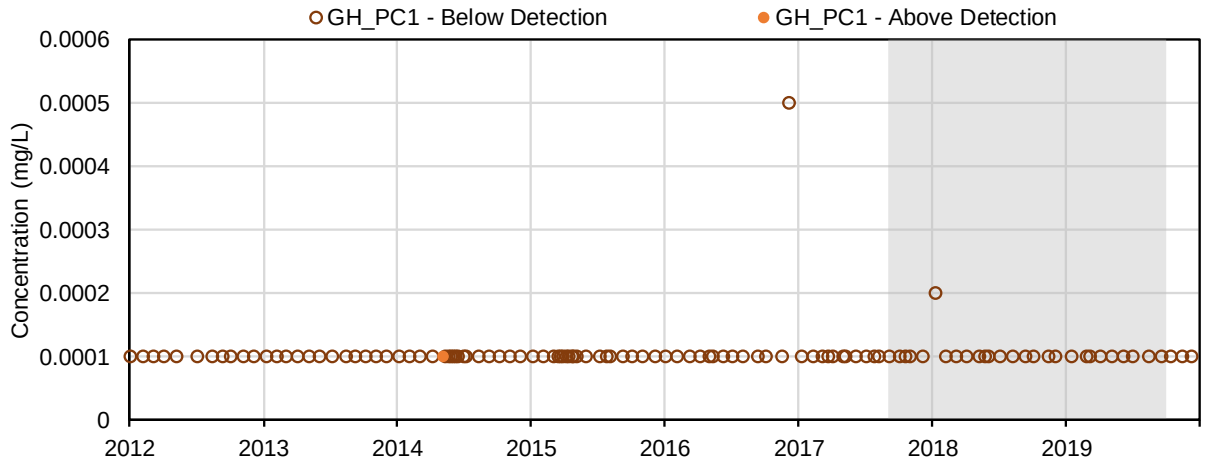
(86) Cadmium (mg/L); Dissolved Metals



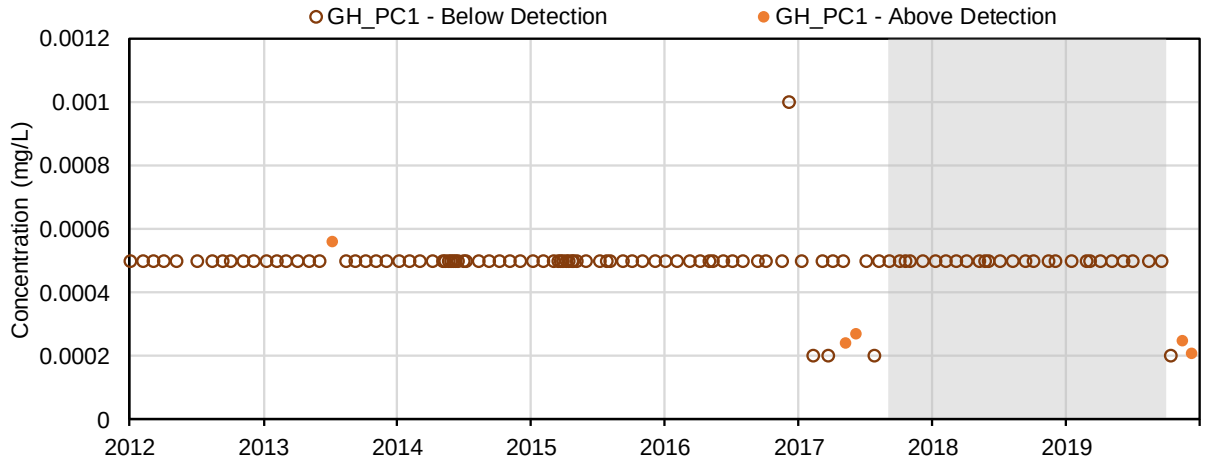
(87) Chromium (mg/L); Dissolved Metals



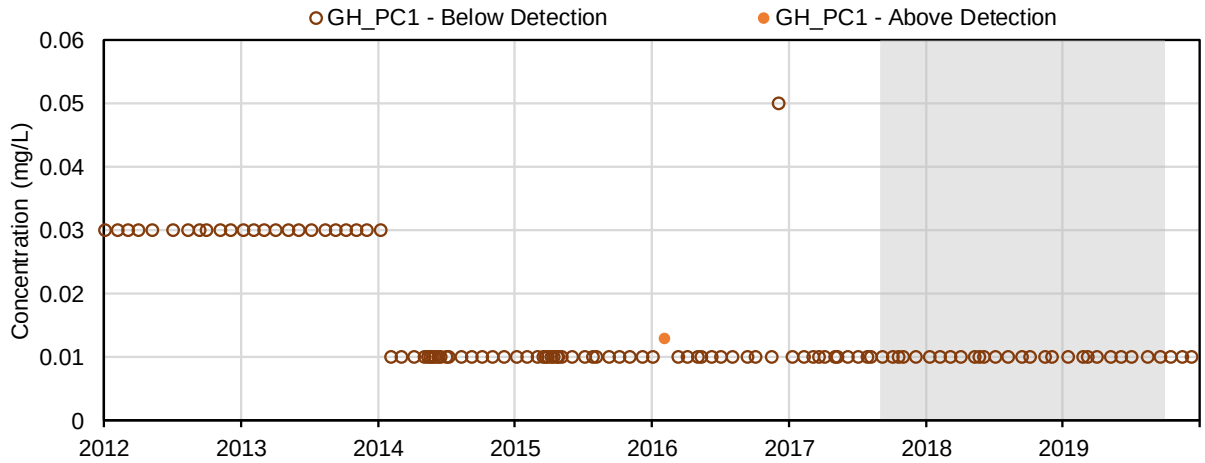
(88) Cobalt (mg/L); Dissolved Metals



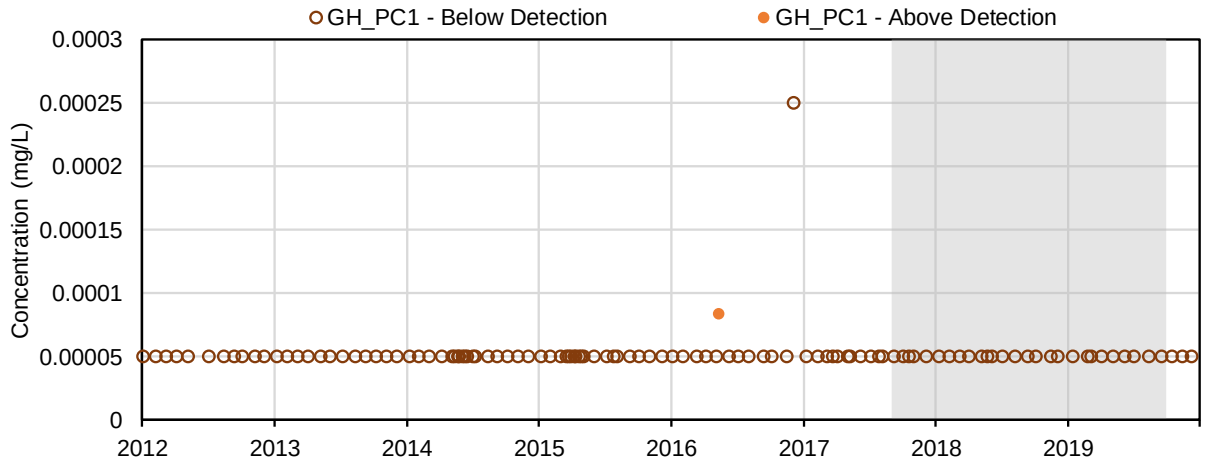
(89) Copper (mg/L); Dissolved Metals



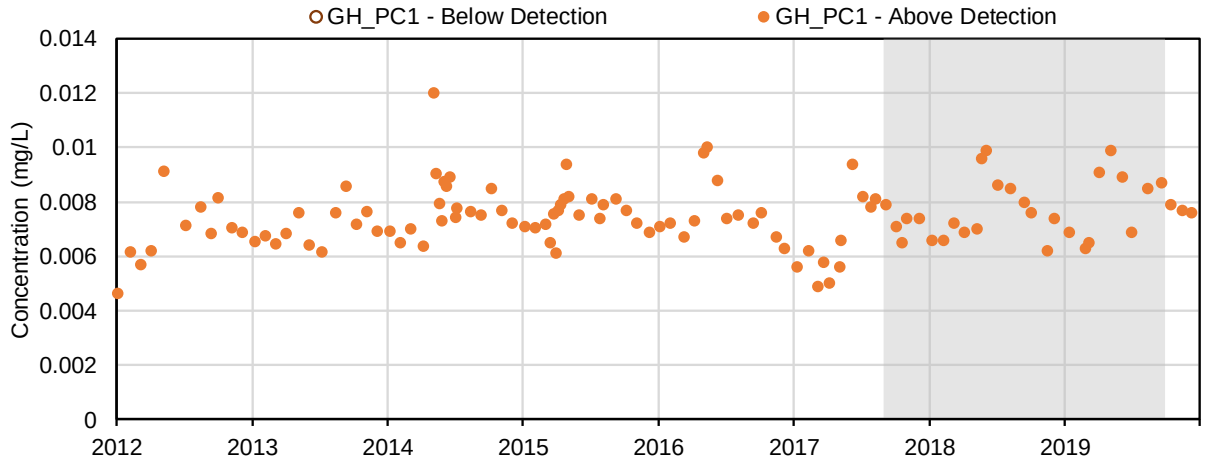
(90) Iron (mg/L); Dissolved Metals



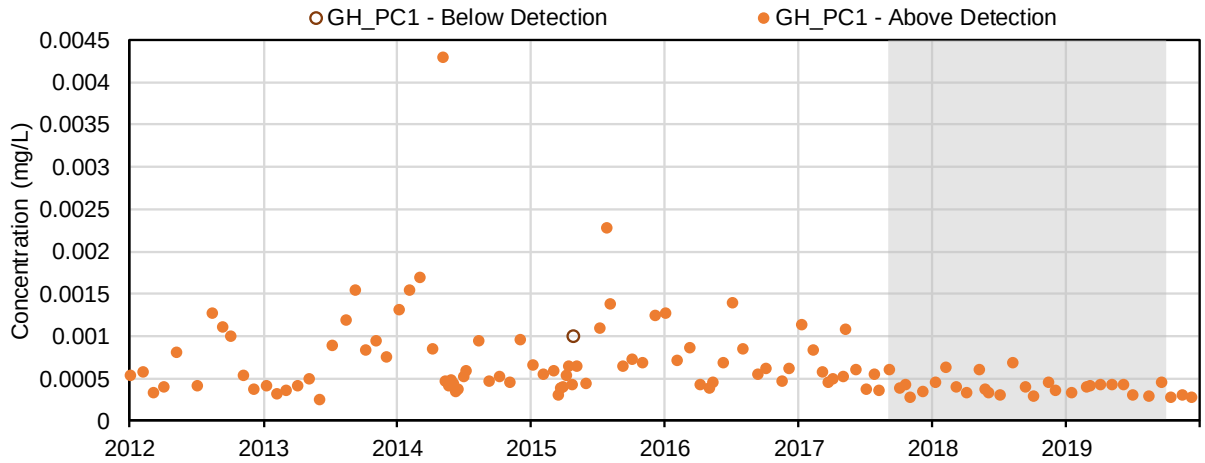
(91) Lead (mg/L); Dissolved Metals



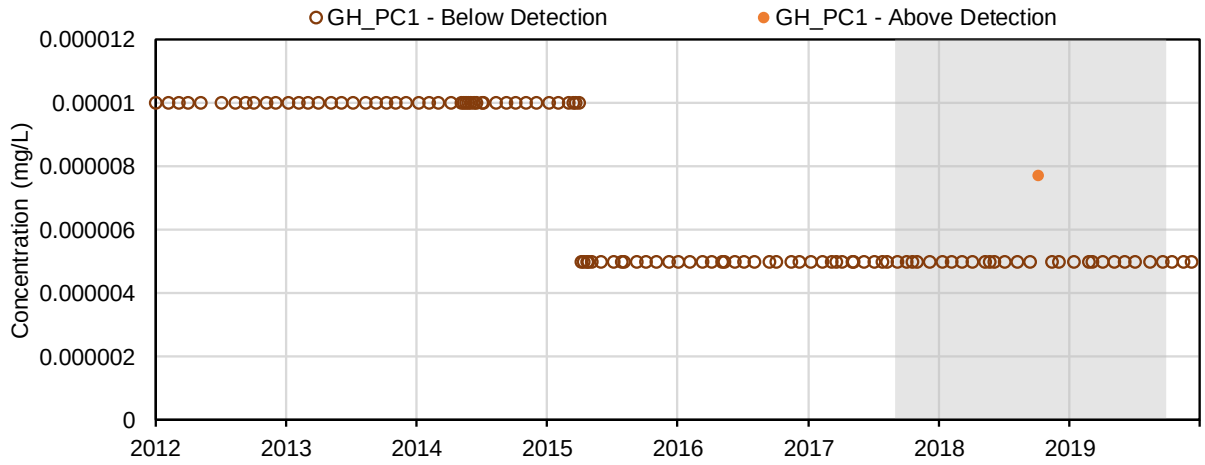
(92) Lithium (mg/L); Dissolved Metals



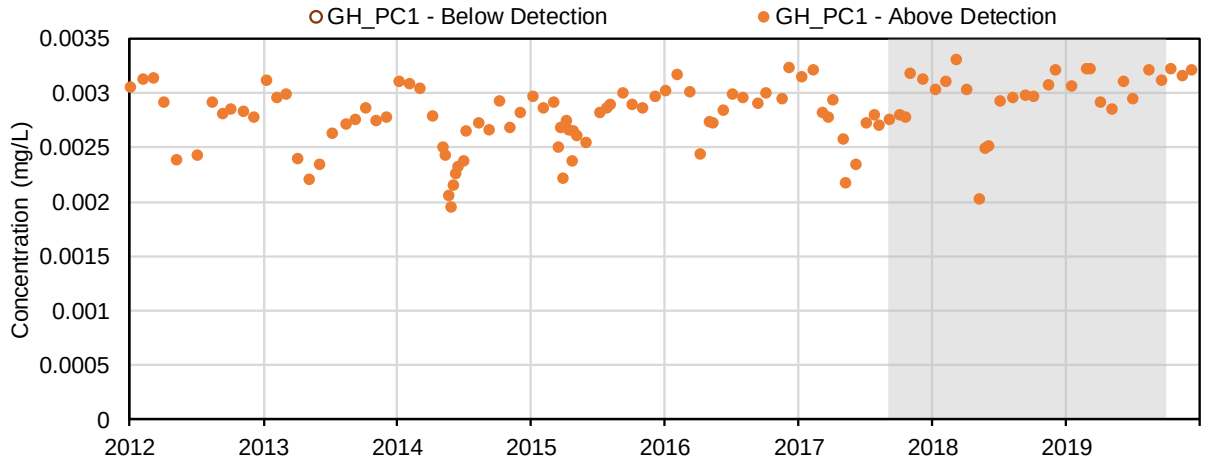
(93) Manganese (mg/L); Dissolved Metals



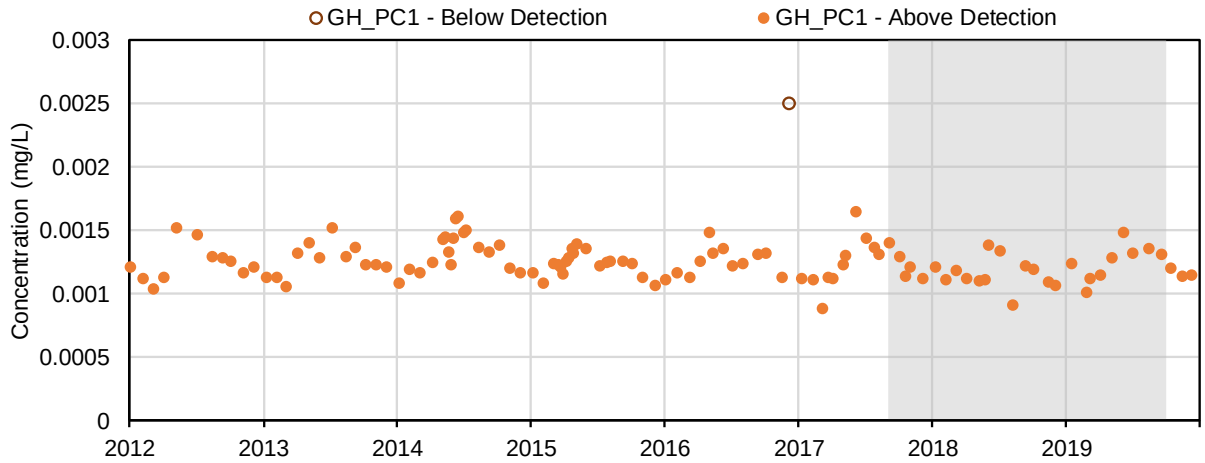
(94) Mercury (mg/L); Dissolved Metals



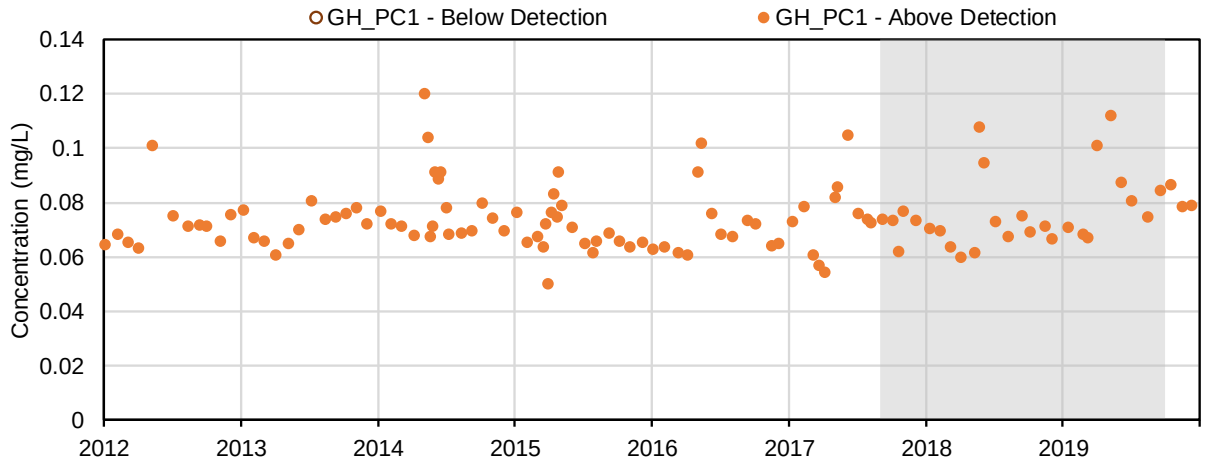
(95) Molybdenum (mg/L); Dissolved Metals



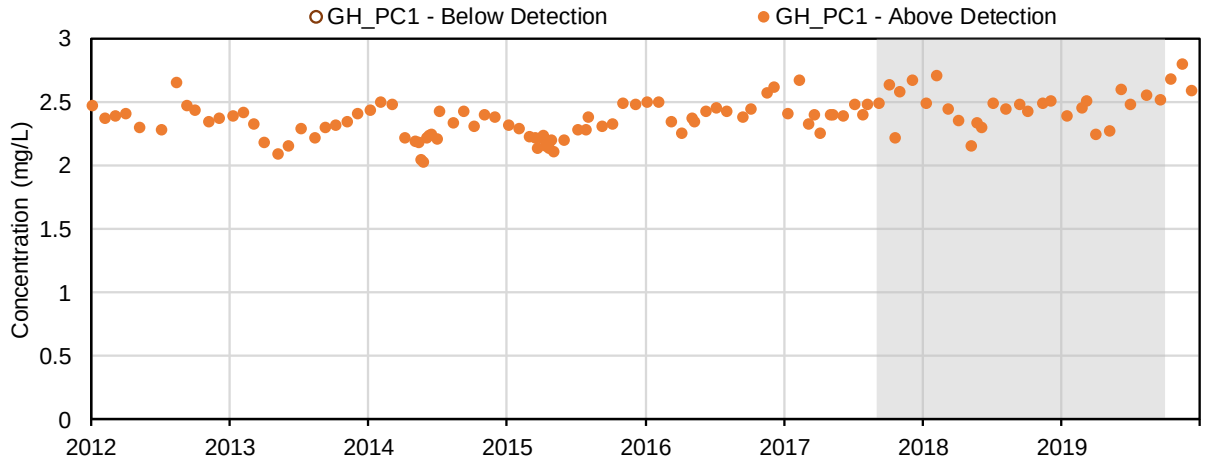
(96) Nickel (mg/L); Dissolved Metals



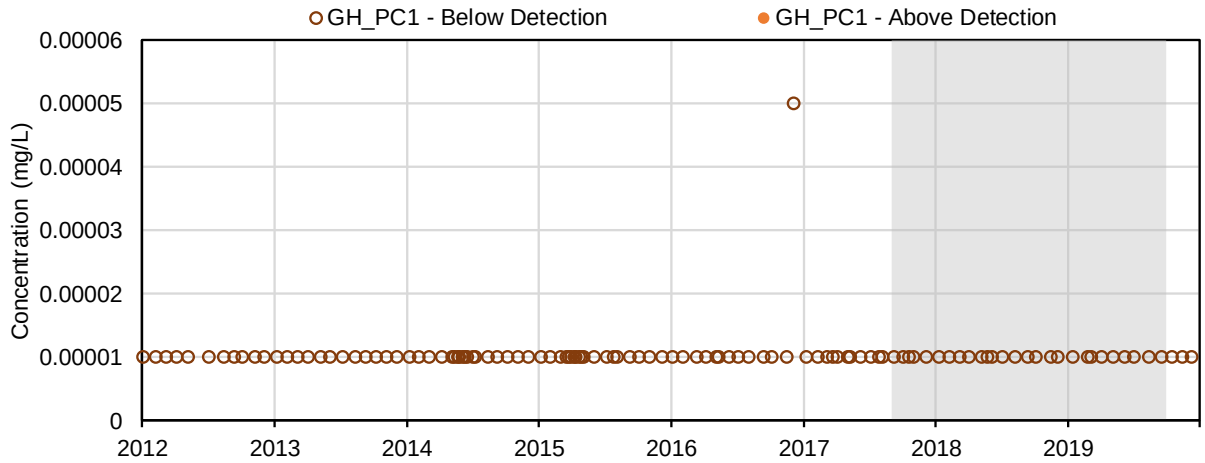
(97) Selenium (mg/L); Dissolved Metals



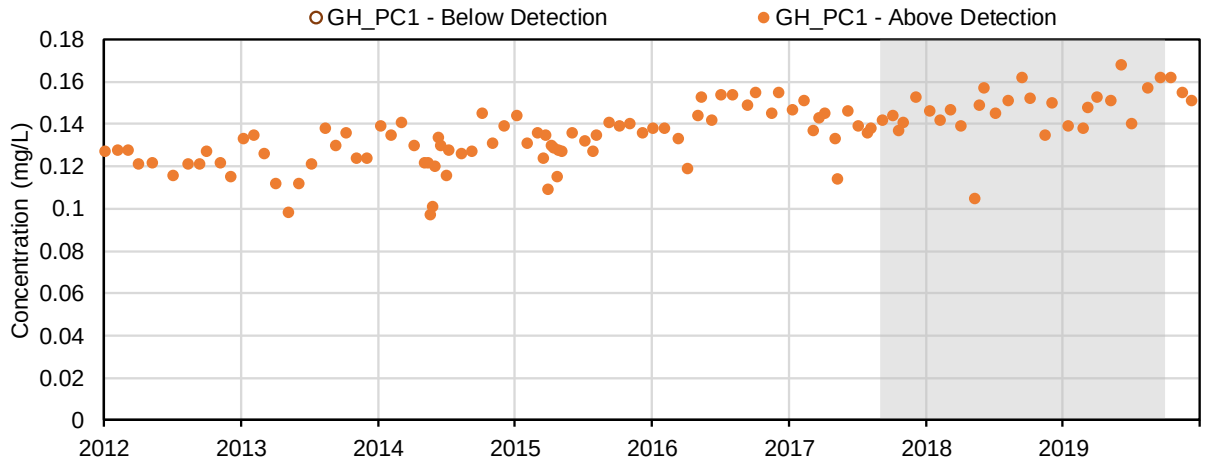
(98) Silicon (mg/L); Dissolved Metals



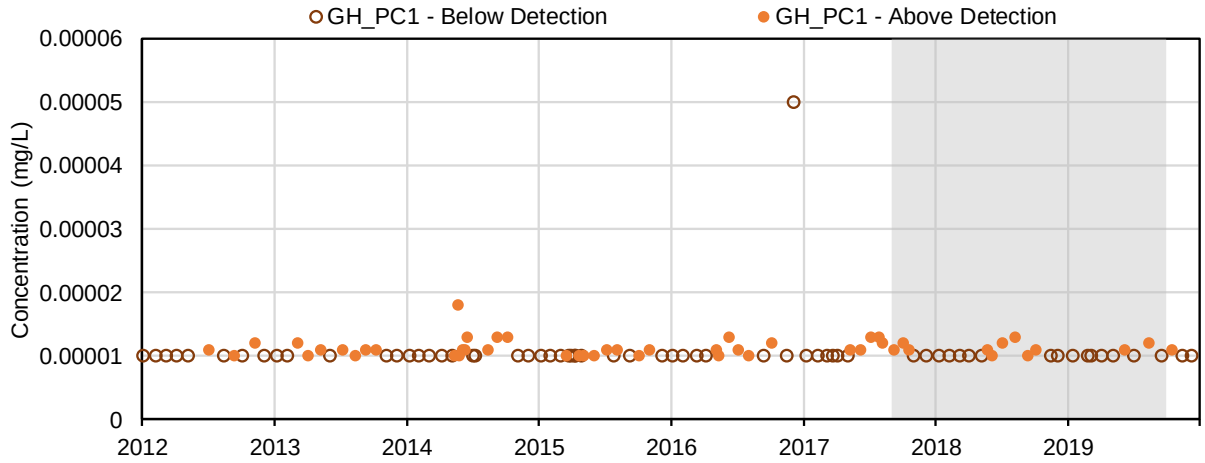
(99) Silver (mg/L); Dissolved Metals



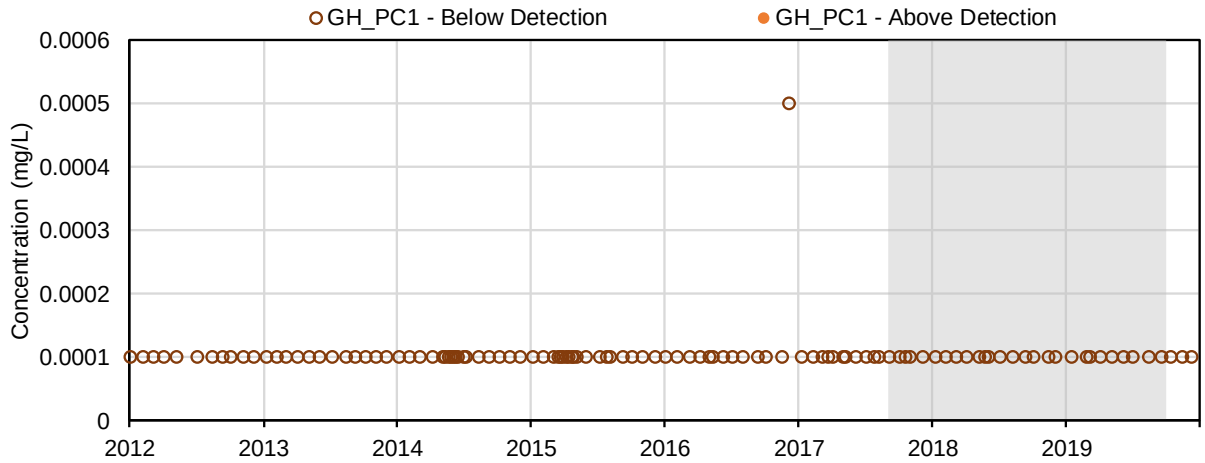
(100) Strontium (mg/L); Dissolved Metals



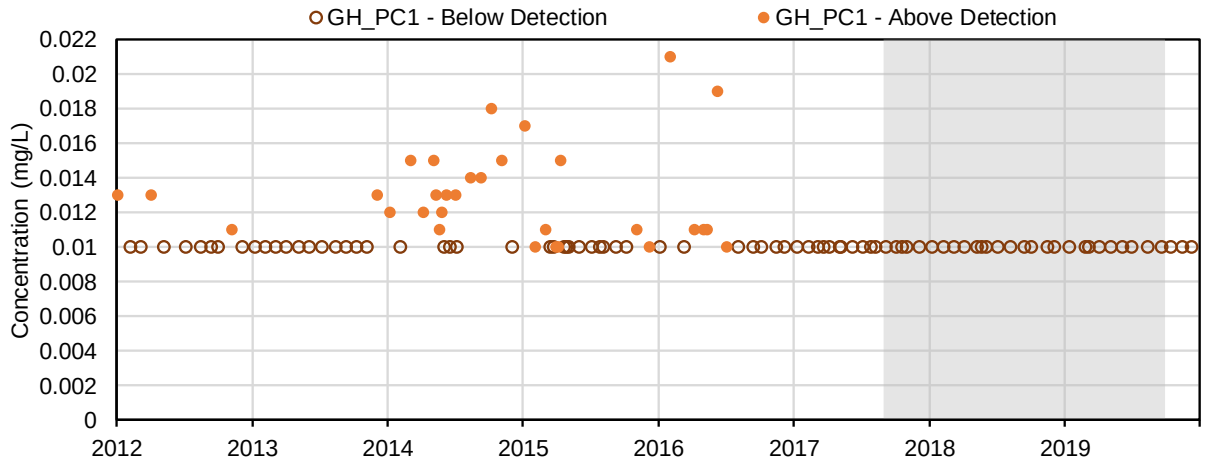
(101) Thallium (mg/L); Dissolved Metals



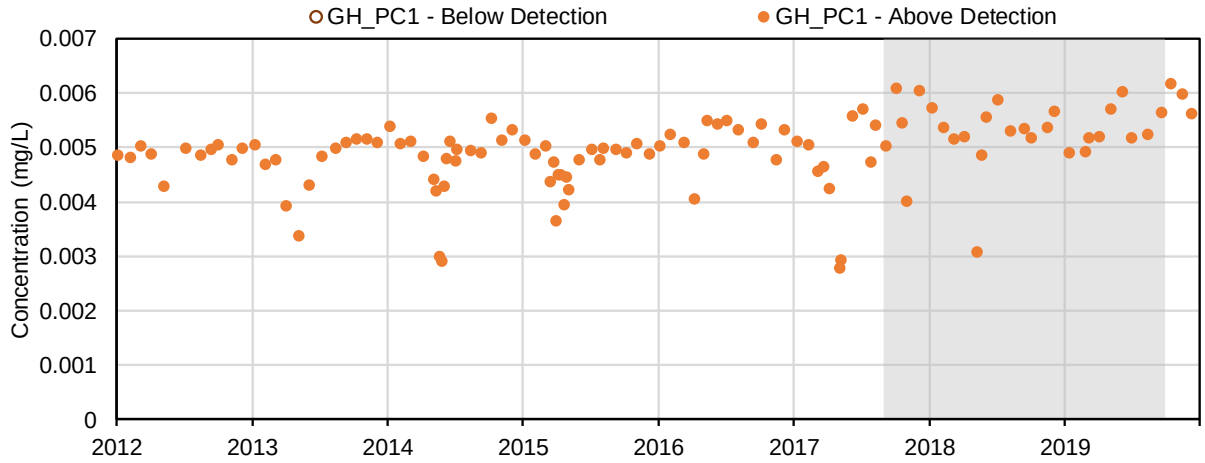
(102) Tin (mg/L); Dissolved Metals



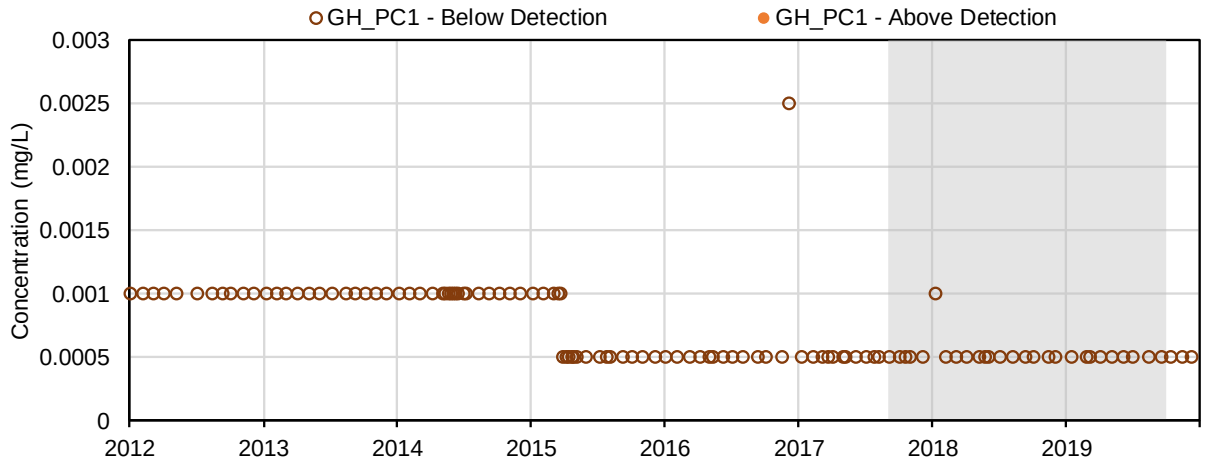
(103) Titanium (mg/L); Dissolved Metals



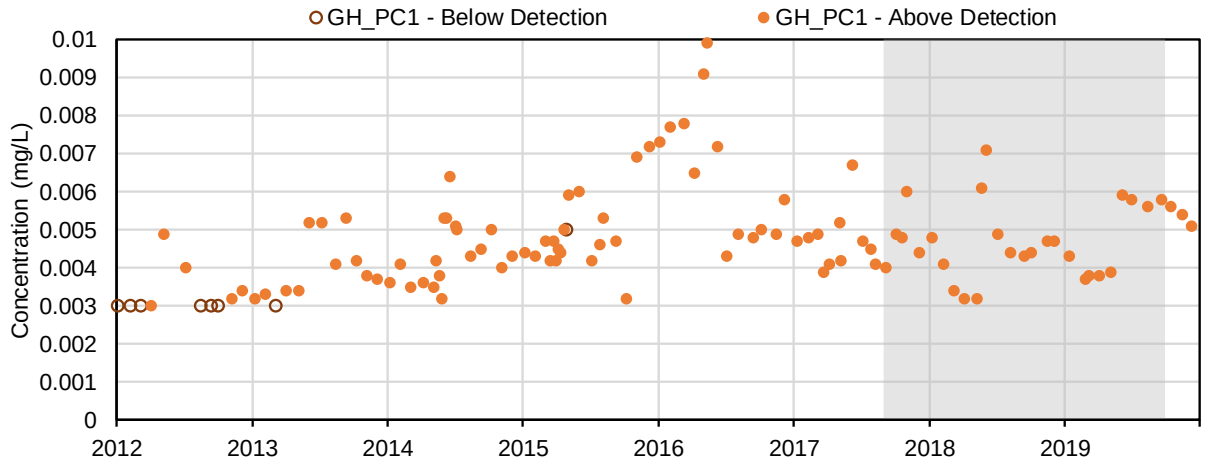
(104) Uranium (mg/L); Dissolved Metals



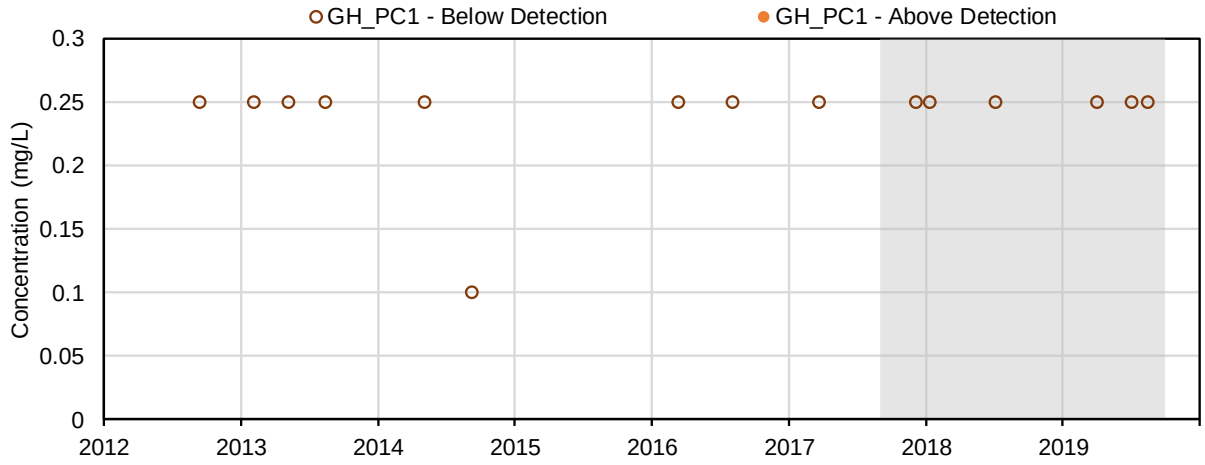
(105) Vanadium (mg/L); Dissolved Metals



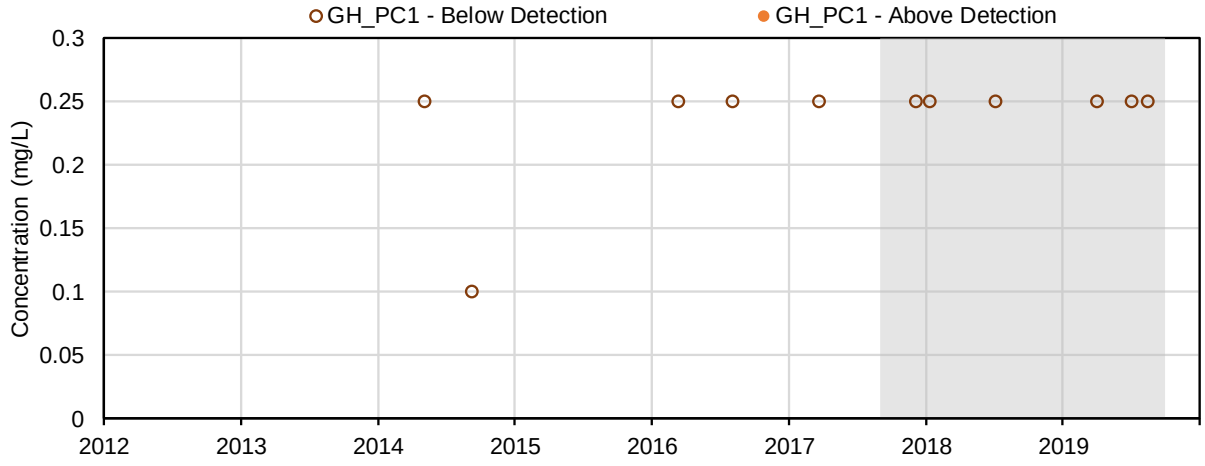
(106) Zinc (mg/L); Dissolved Metals



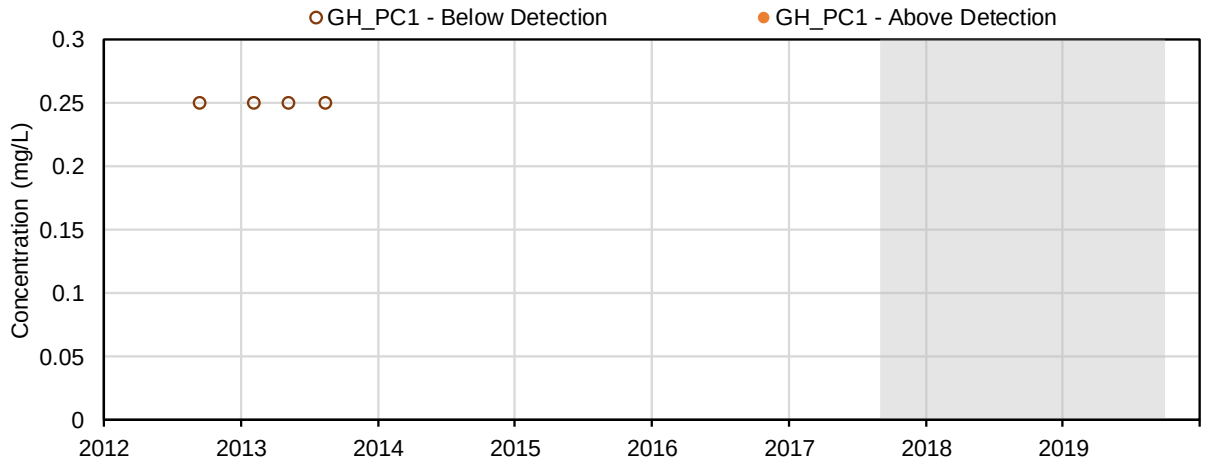
(107) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



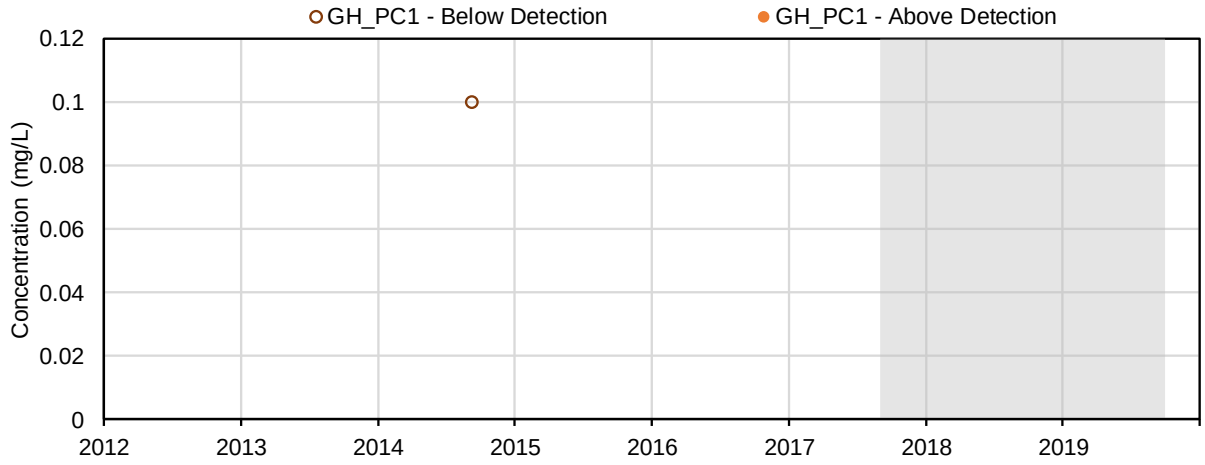
(108) Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



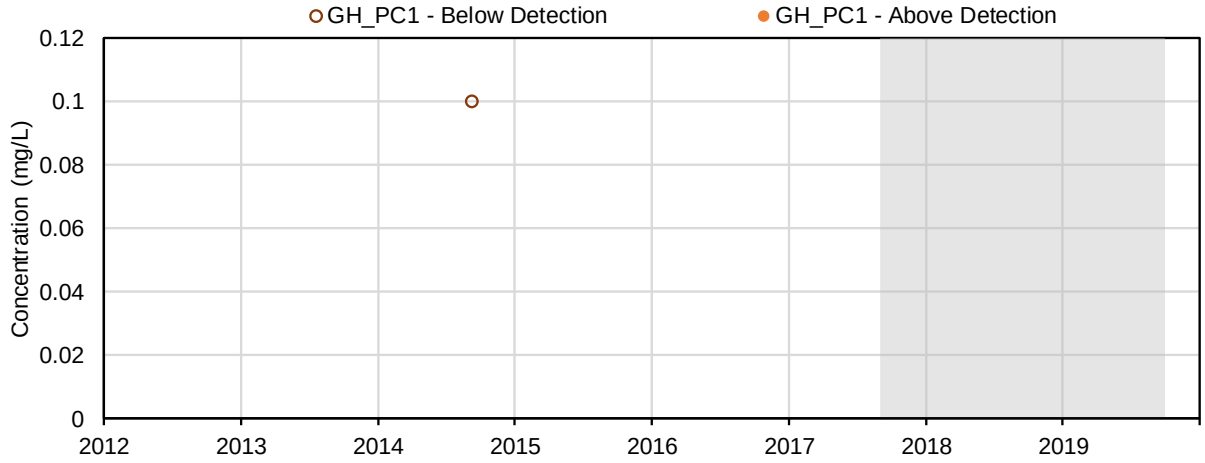
(109) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



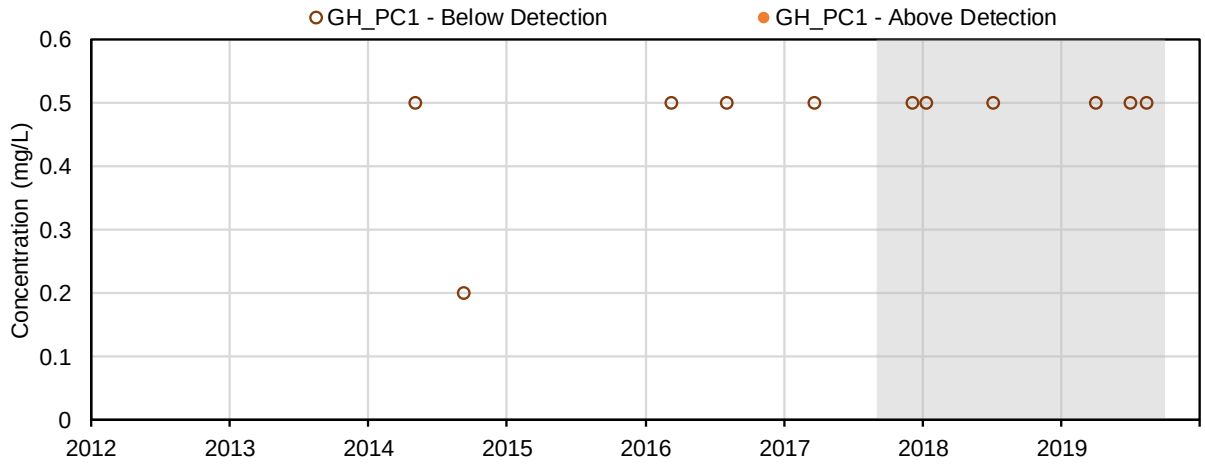
(110) Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L); Volatile Organics



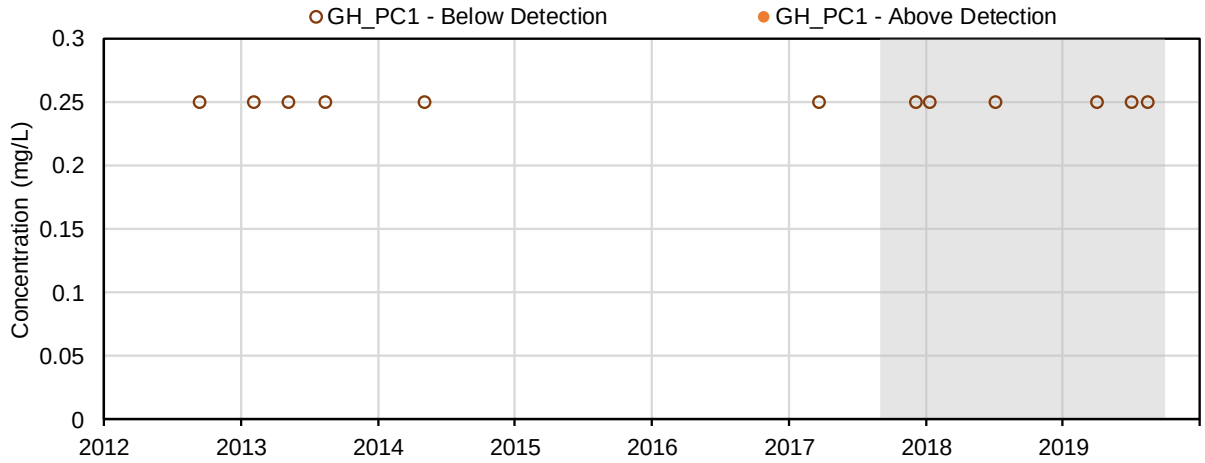
(111) Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L); Volatile Organics



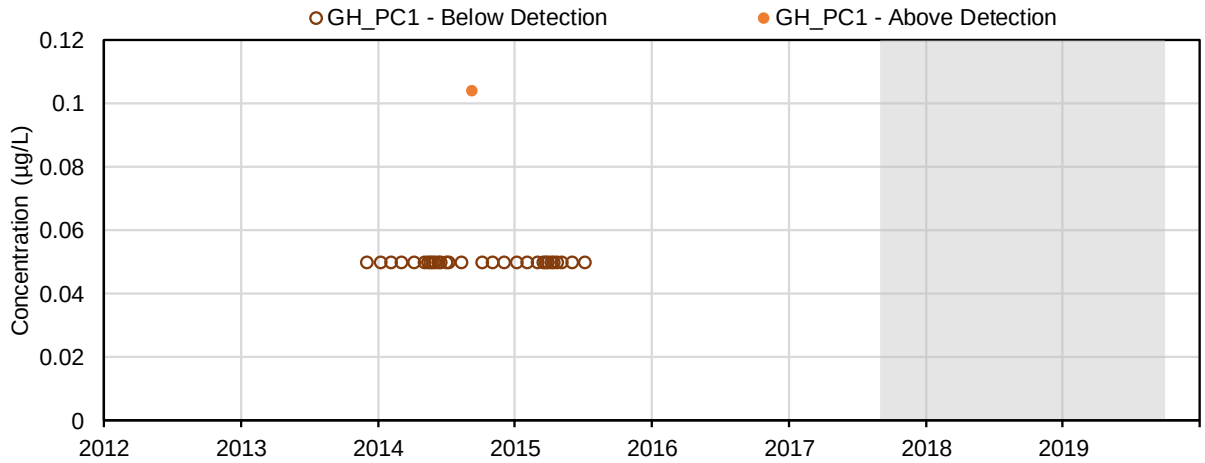
(112) Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L); Volatile Organics



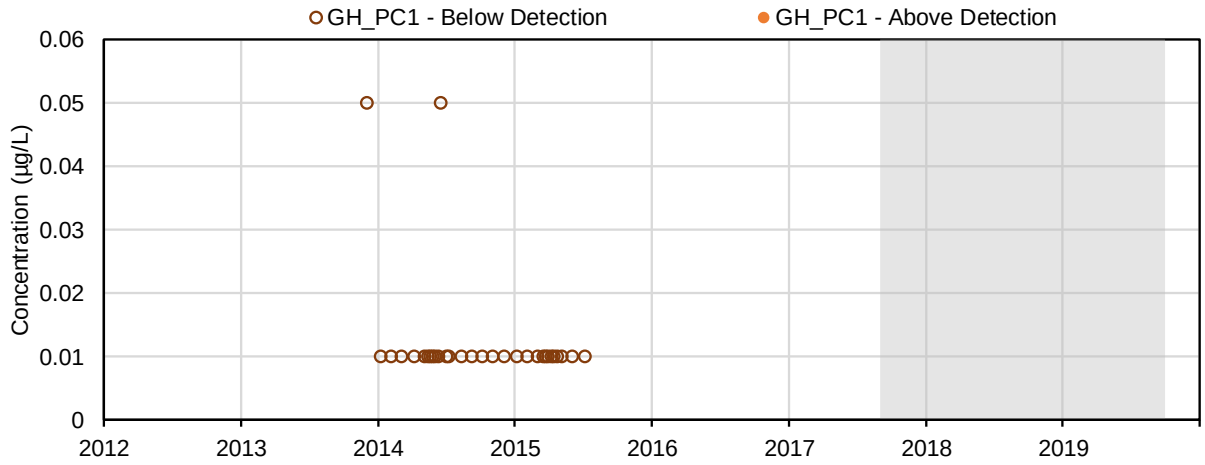
(113) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics



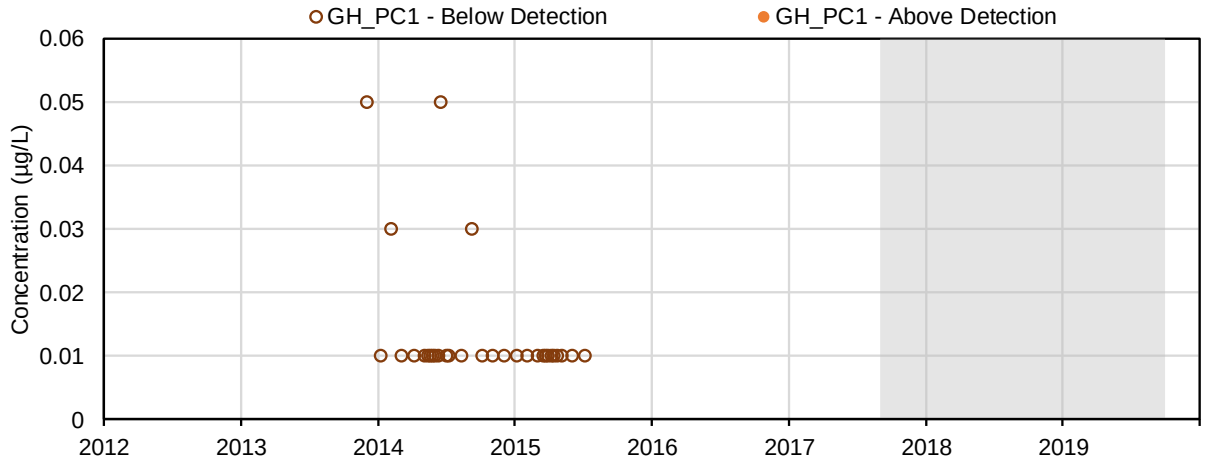
(114) Naphthalene (µg/L); Parent PAHs



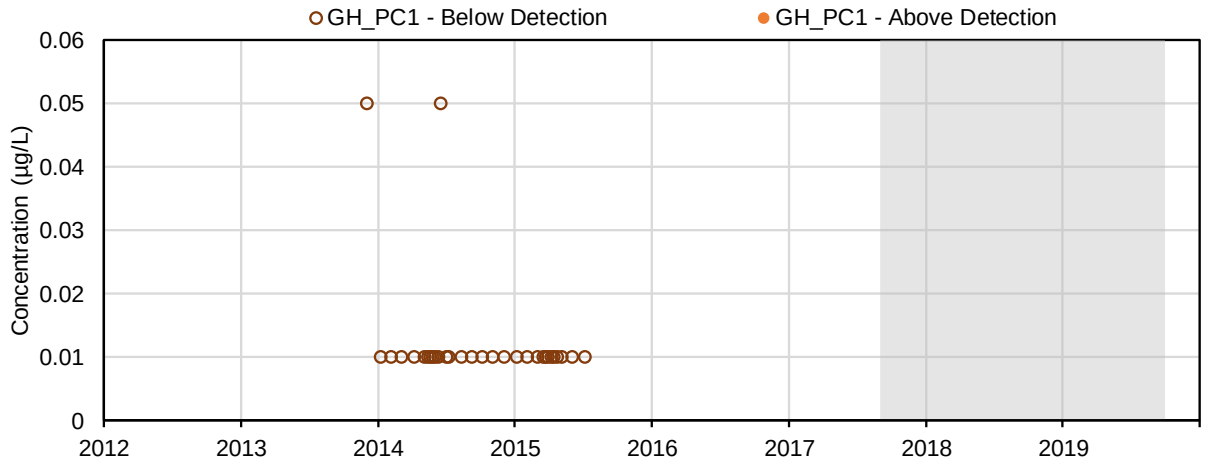
(115) Acenaphthylene (µg/L); Parent PAHs



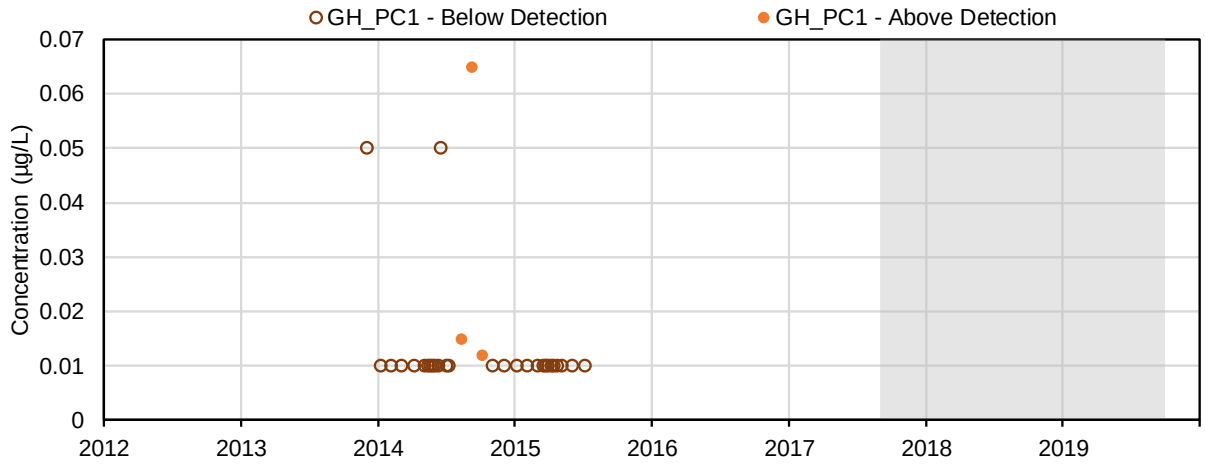
(116) Acenaphthene (µg/L); Parent PAHs



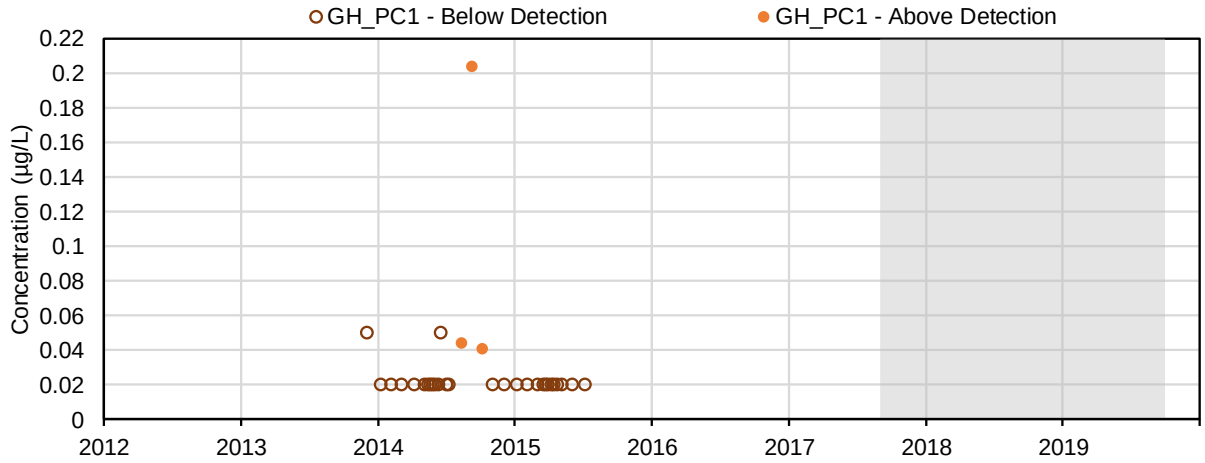
(117) Acridine (µg/L); Parent PAHs



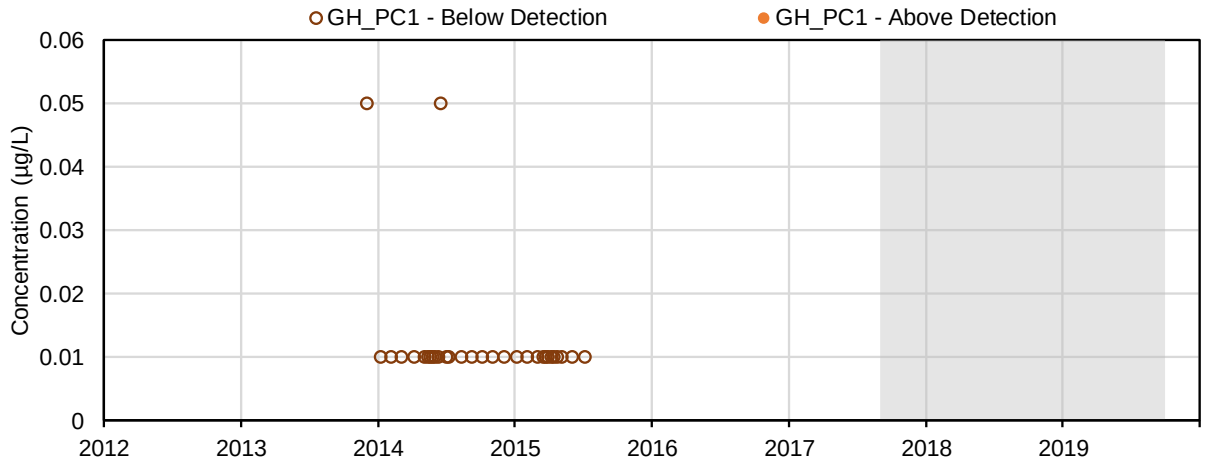
(118) Fluorene (µg/L); Parent PAHs



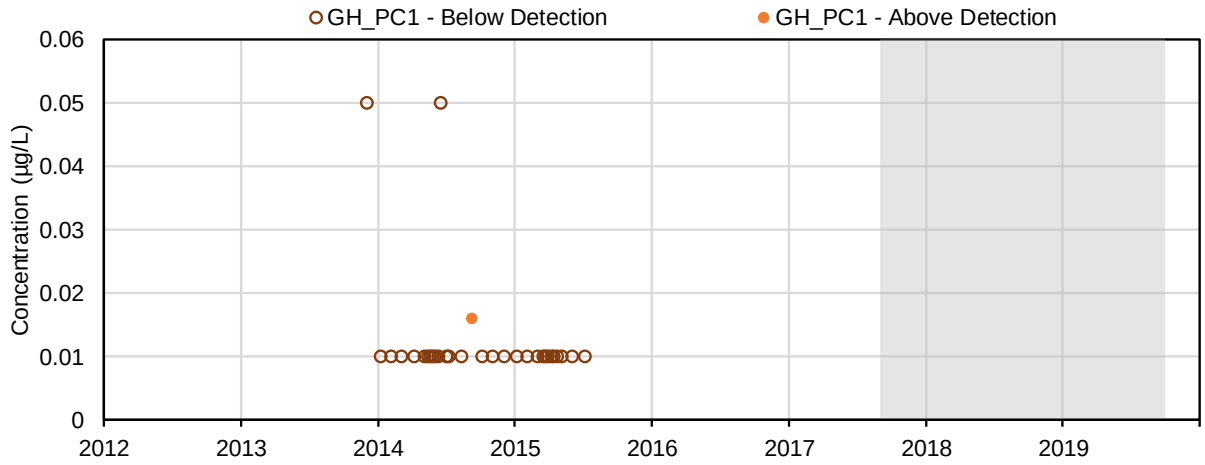
(119) Phenanthrene (µg/L); Parent PAHs



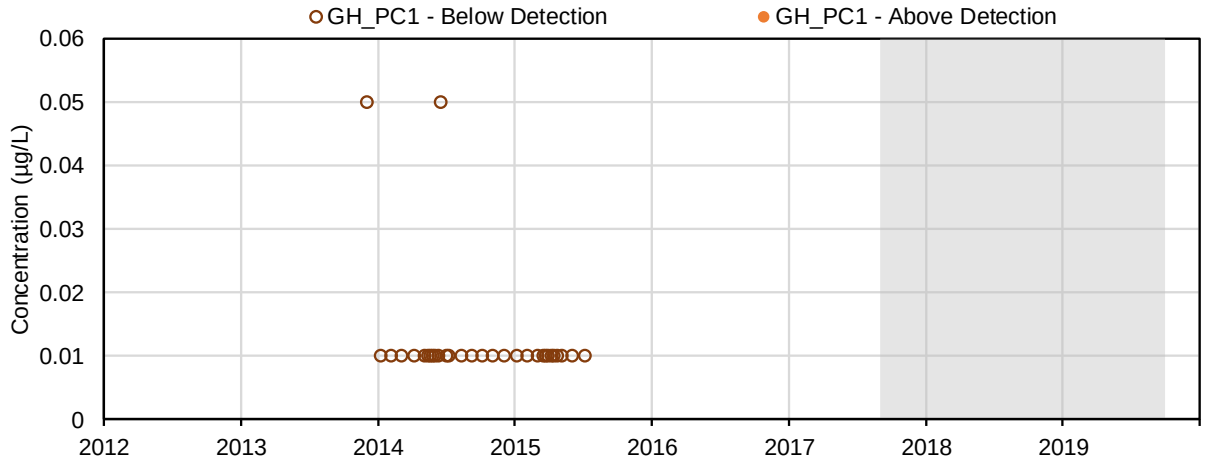
(120) Anthracene (µg/L); Parent PAHs



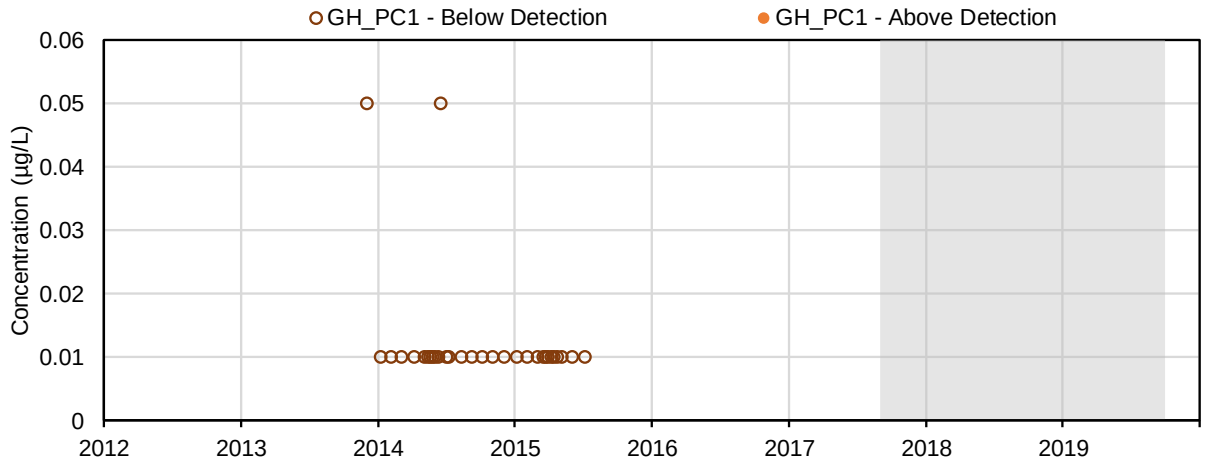
(121) Pyrene (µg/L); Parent PAHs



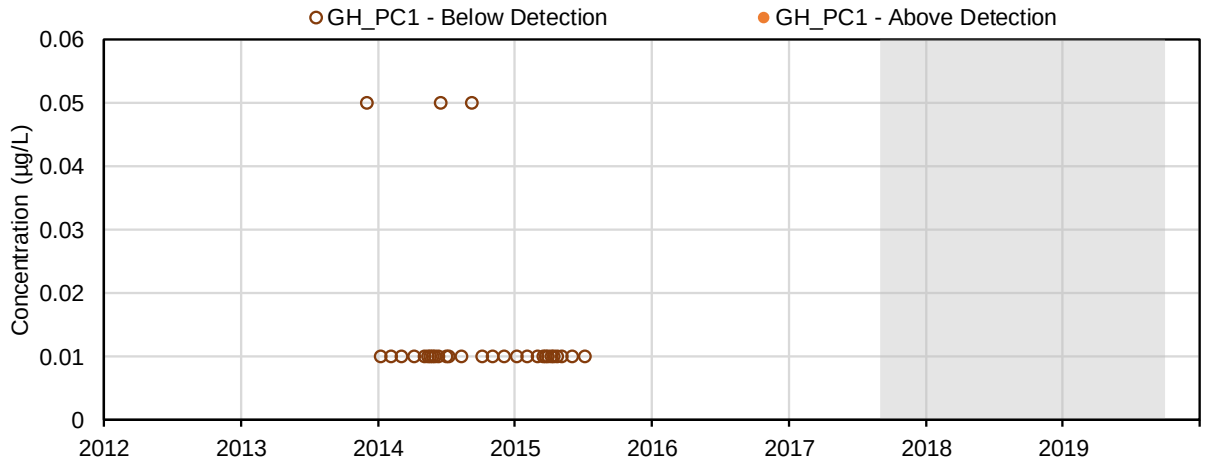
(122) Fluoranthene (µg/L); Parent PAHs



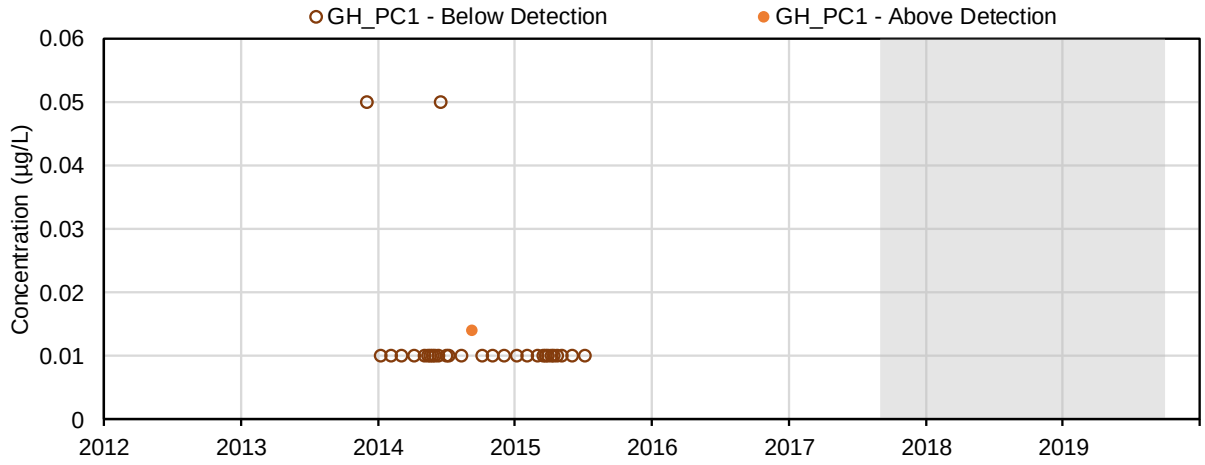
(123) Benzo(a)anthracene (µg/L); Parent PAHs



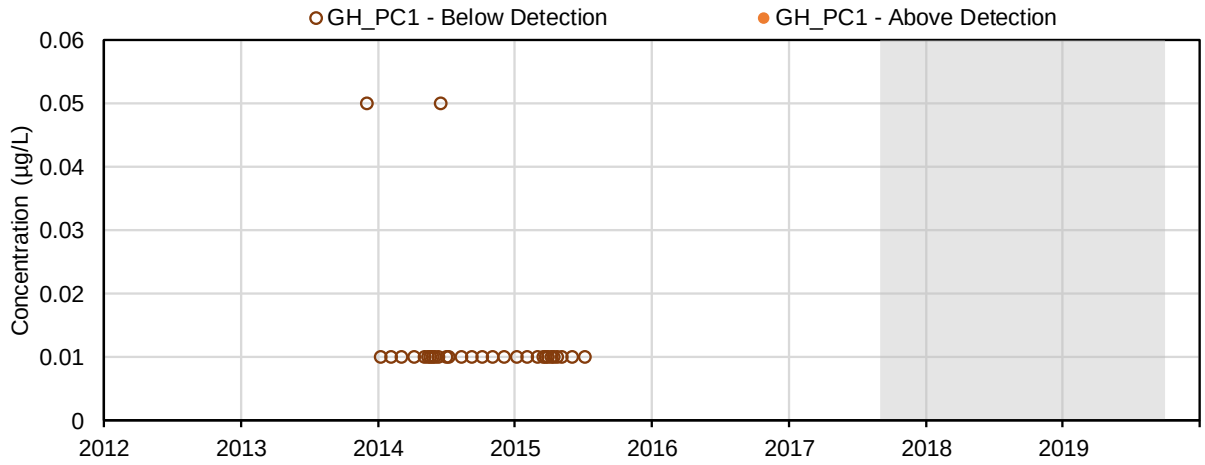
(124) Chrysene (µg/L); Parent PAHs



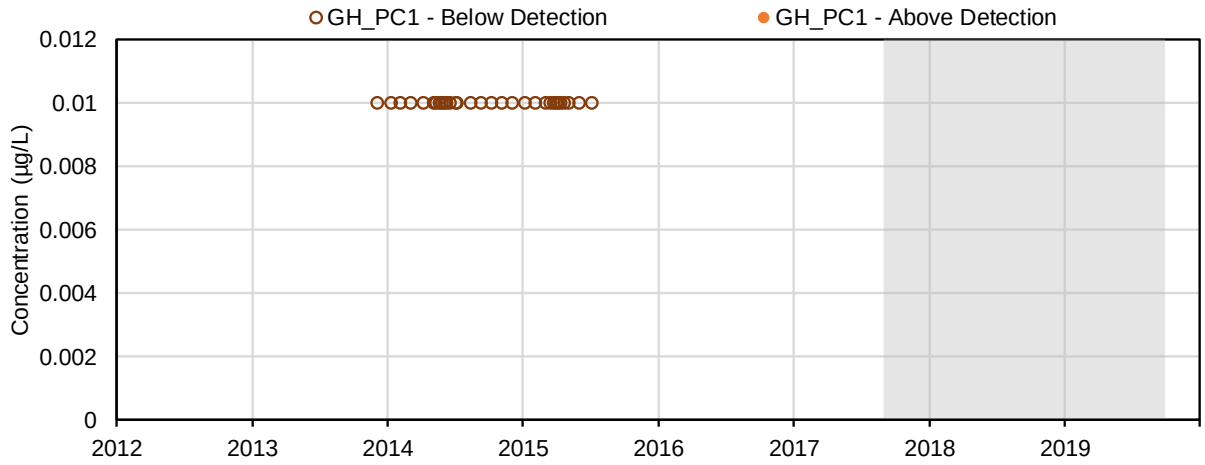
(125) Benzo(b)fluoranthene (µg/L); Parent PAHs



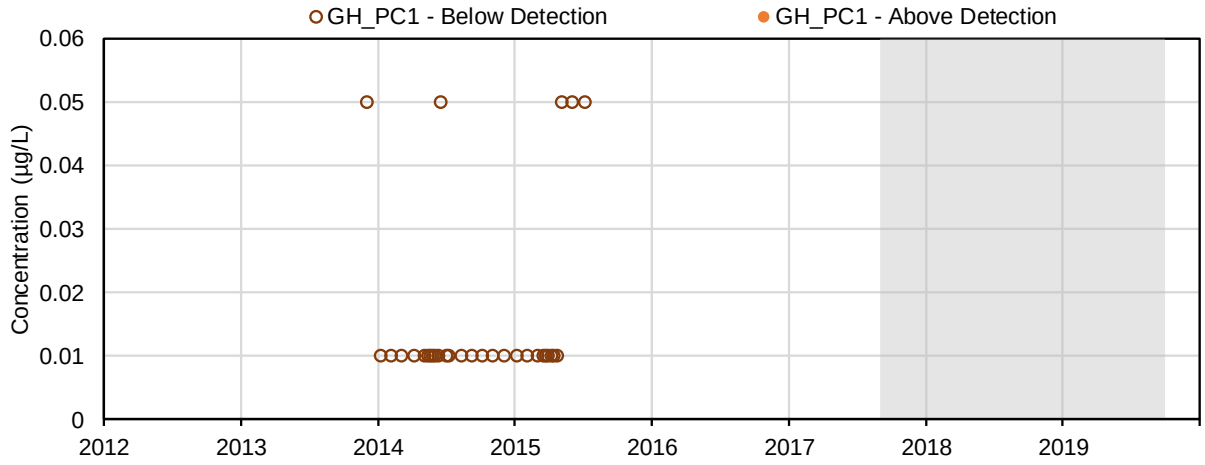
(126) Benzo(k)fluoranthene (µg/L); Parent PAHs



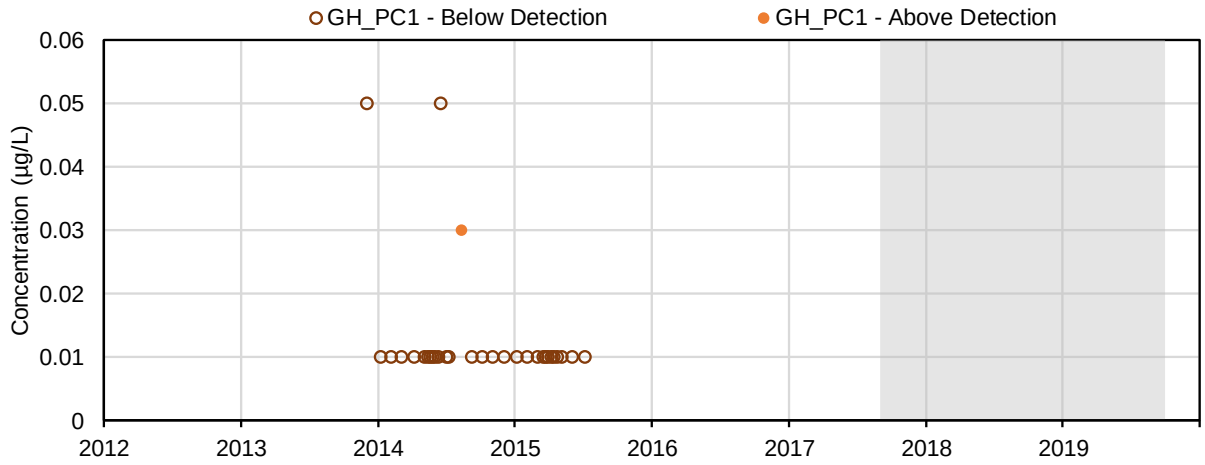
(127) Benzo(a)pyrene (µg/L); Parent PAHs



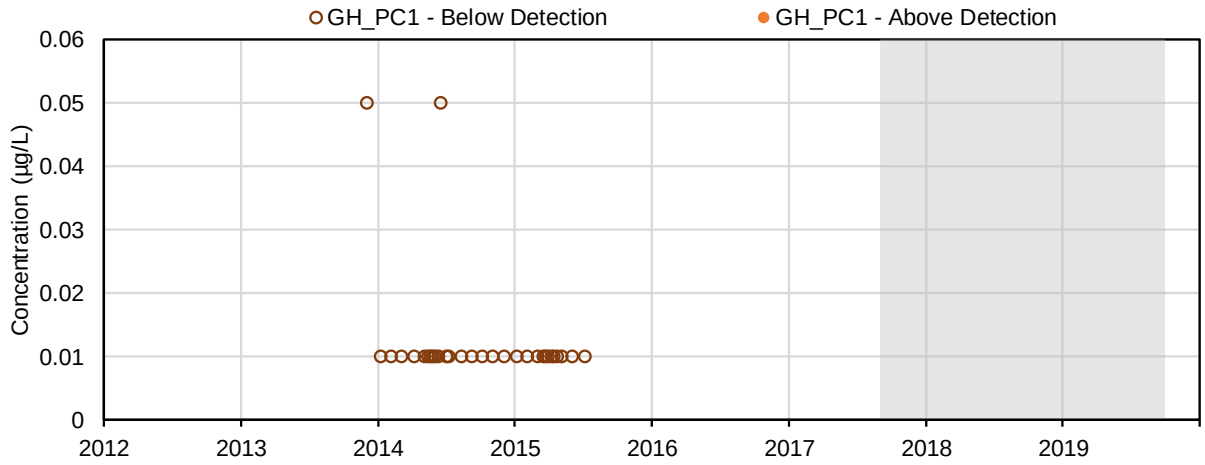
(128) Quinoline (µg/L); Parent PAHs



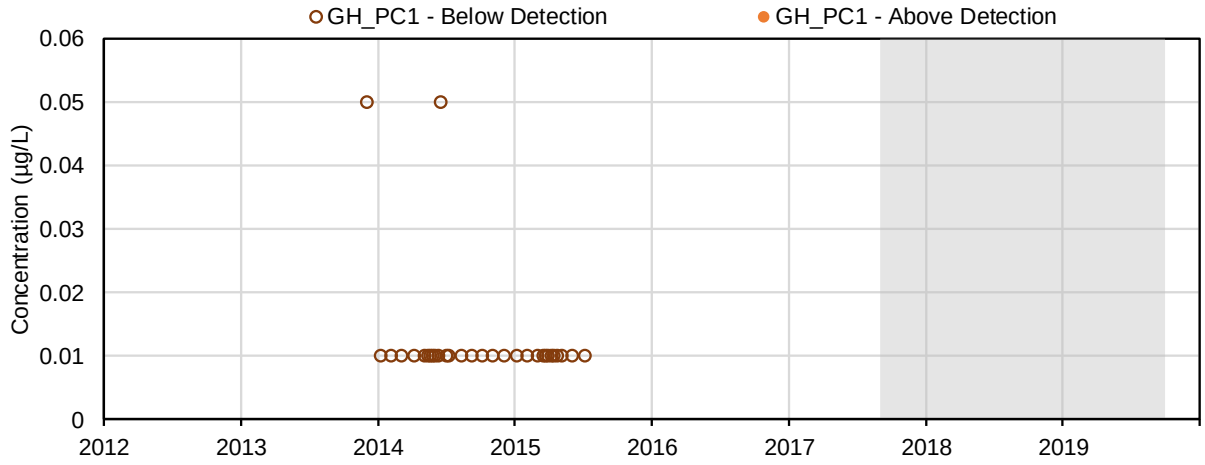
(129) Benzo(g,h,i)perylene (µg/L); Parent PAHs



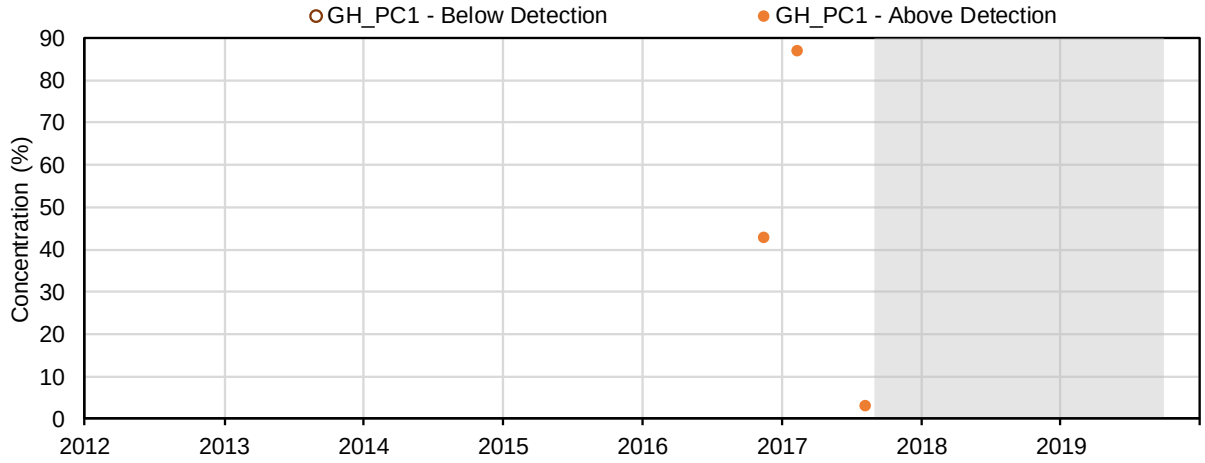
(130) Indeno(c,d-123)pyrene (µg/L); Parent PAHs



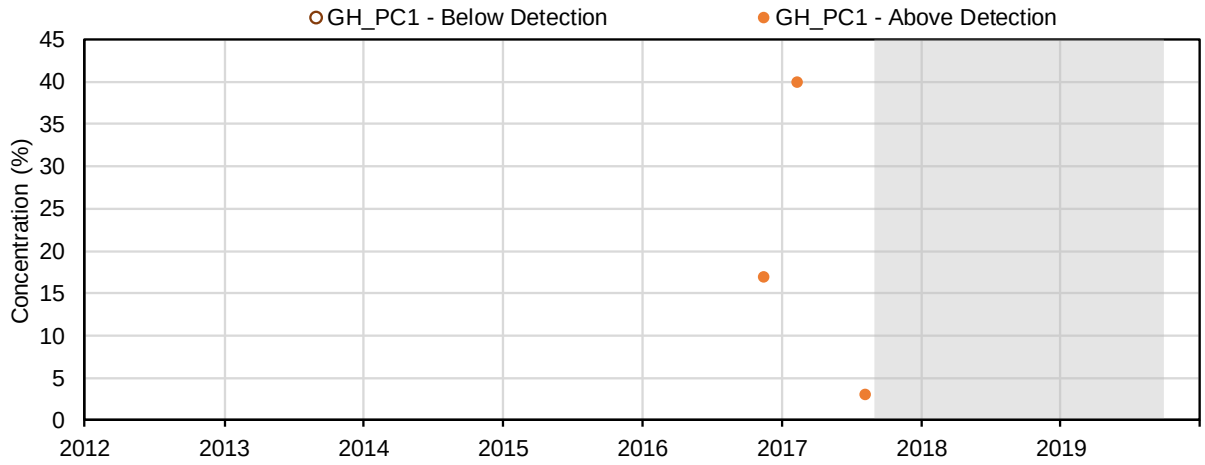
(131) Dibenzo(a,h)anthracene (µg/L); Parent PAHs



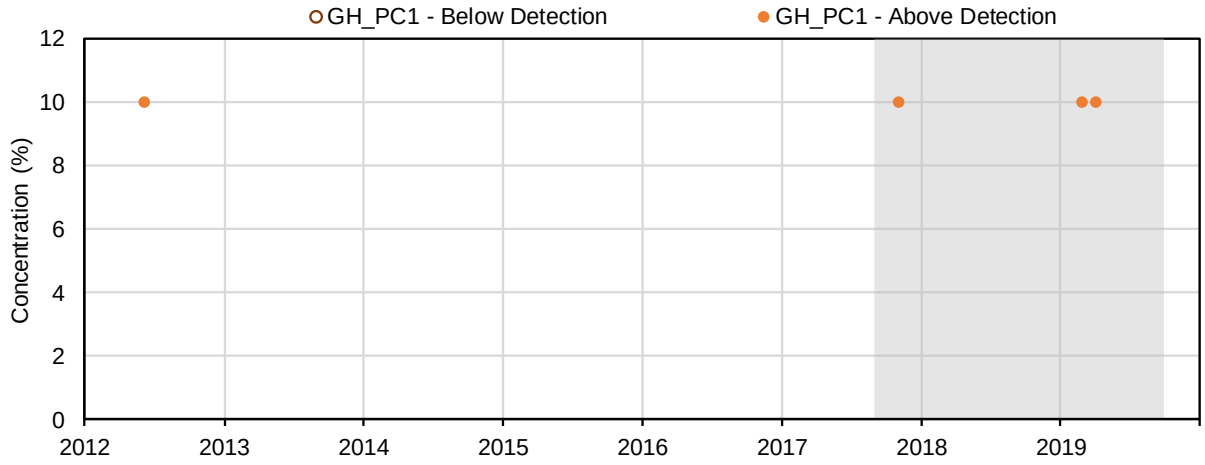
(132) Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility (%); Toxicity



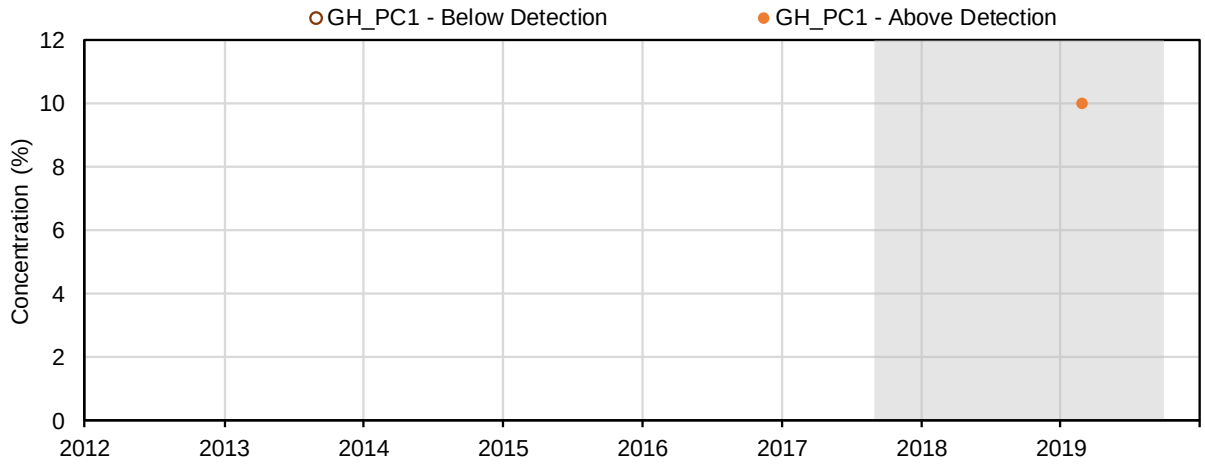
(133) Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%); Toxicity



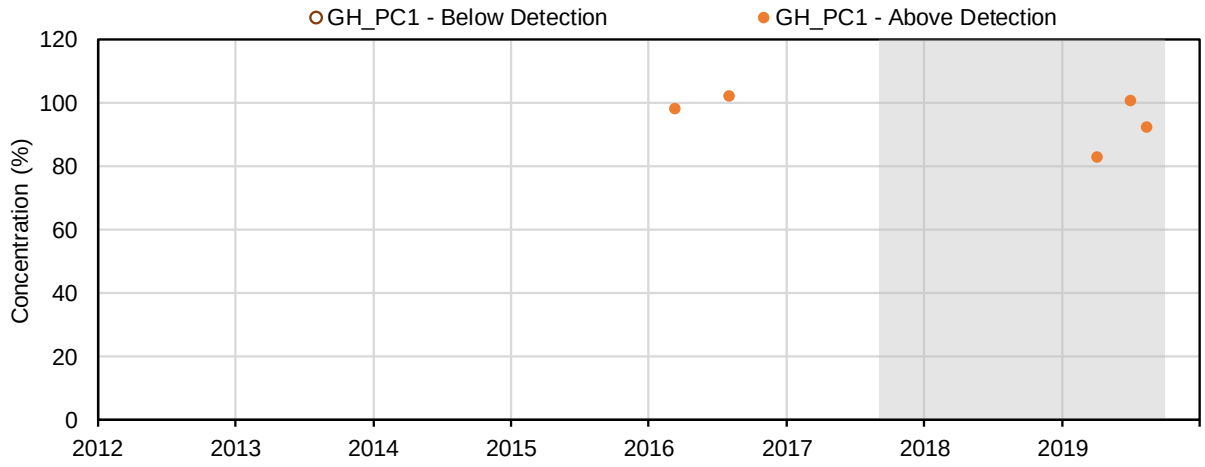
(134) Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality (%); Toxicity

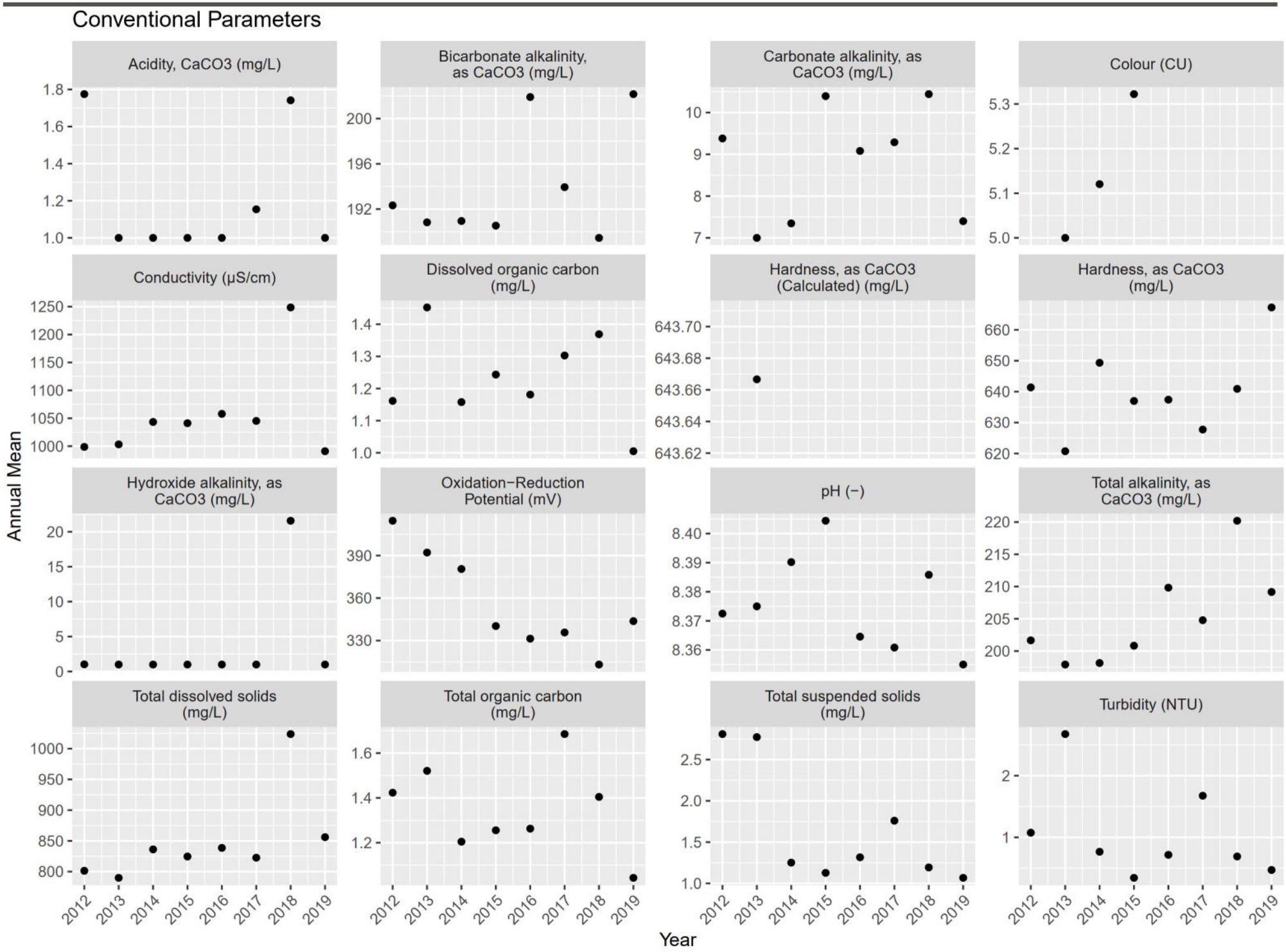


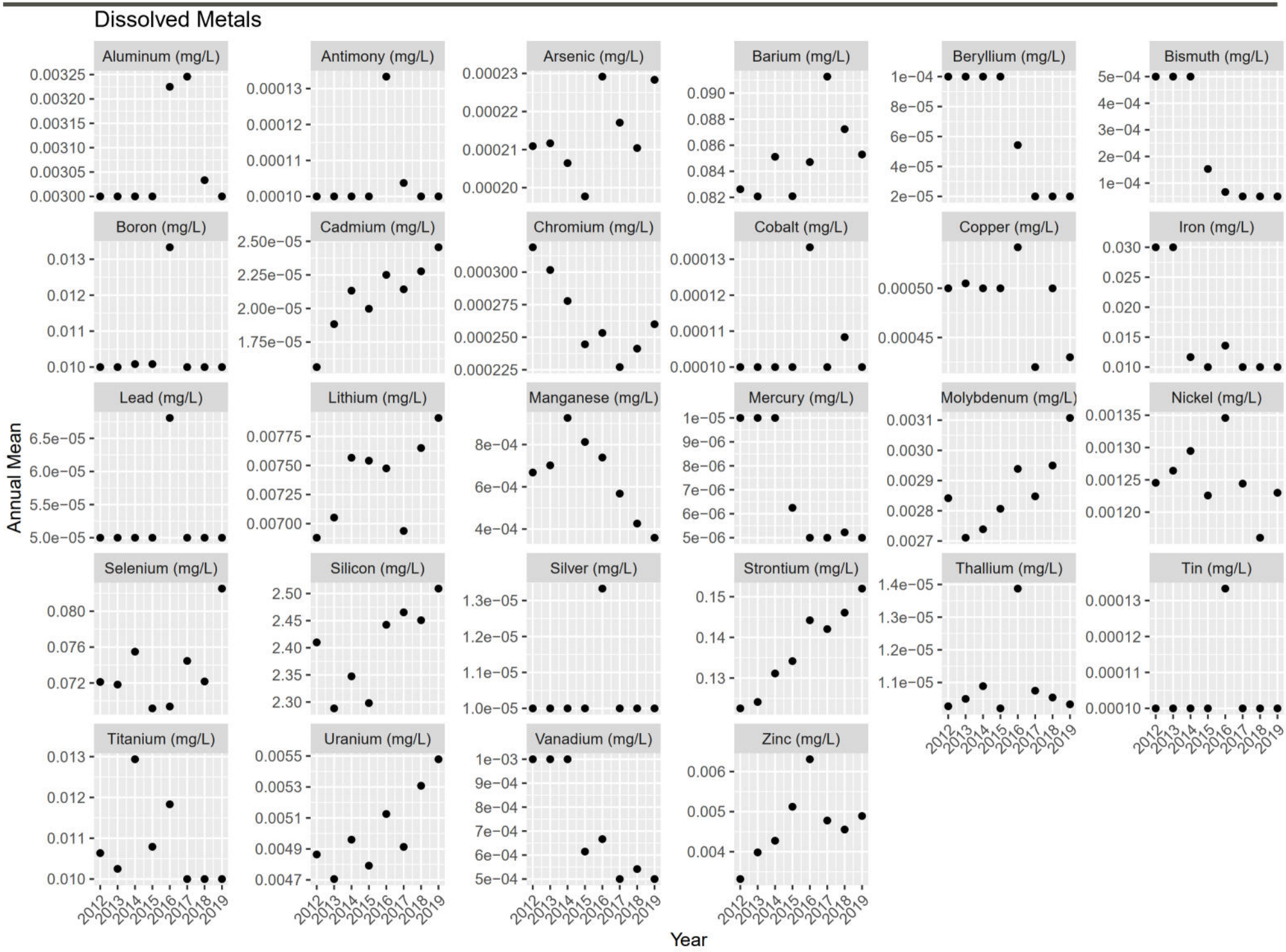
(135) Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed (%); Toxicity

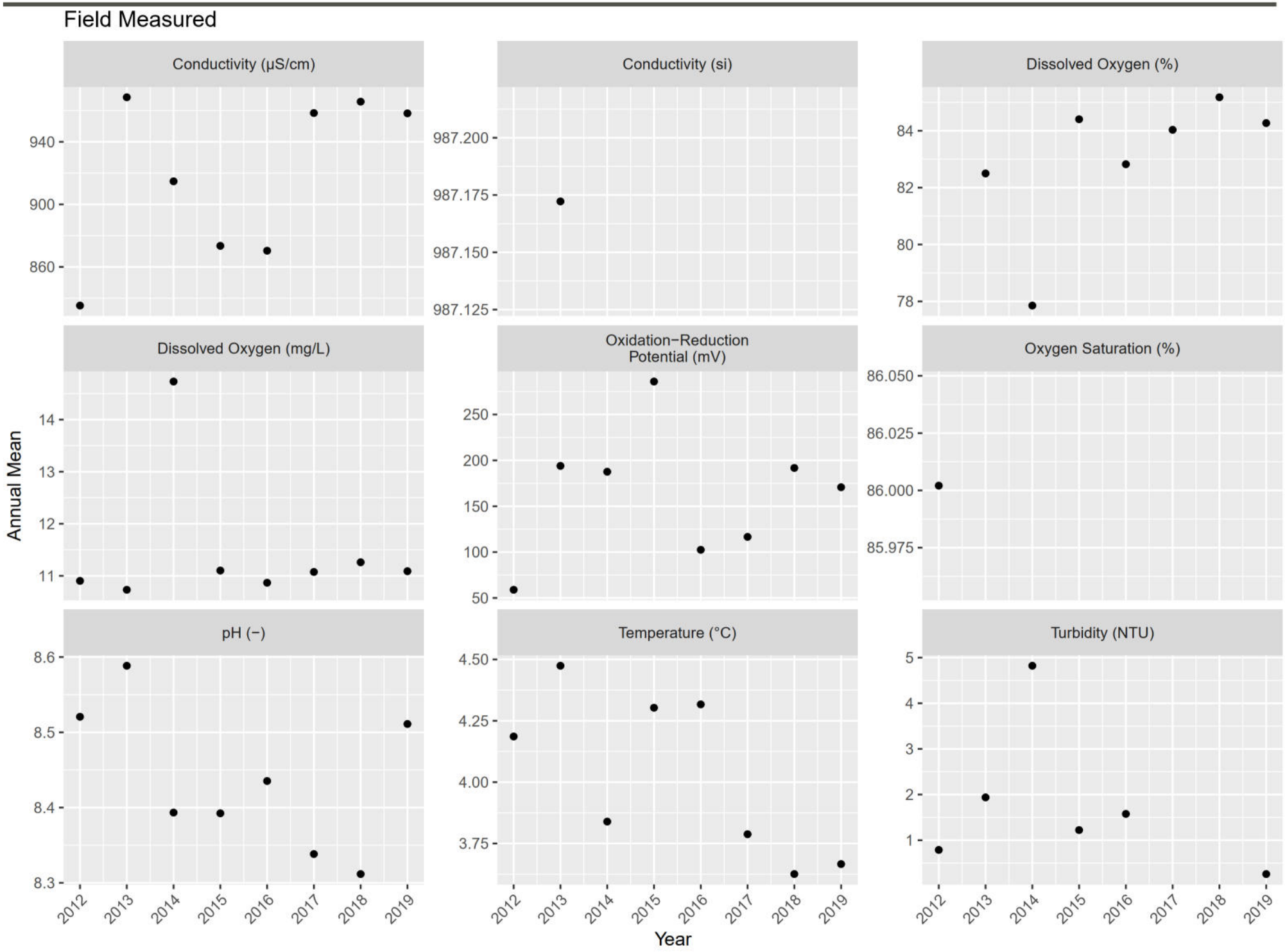


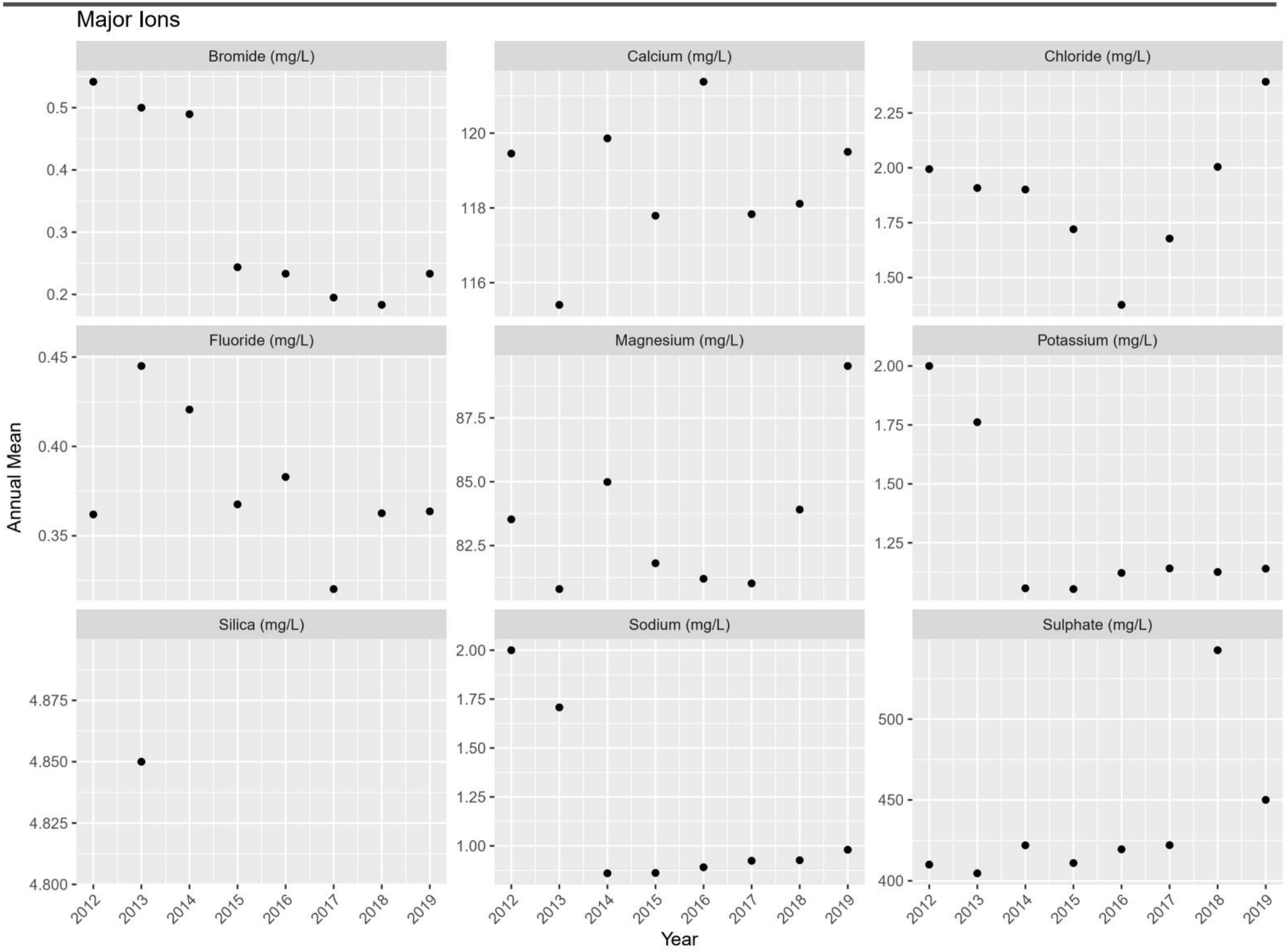
(136) 2-Bromobenzotrifluoride (%); Unknown

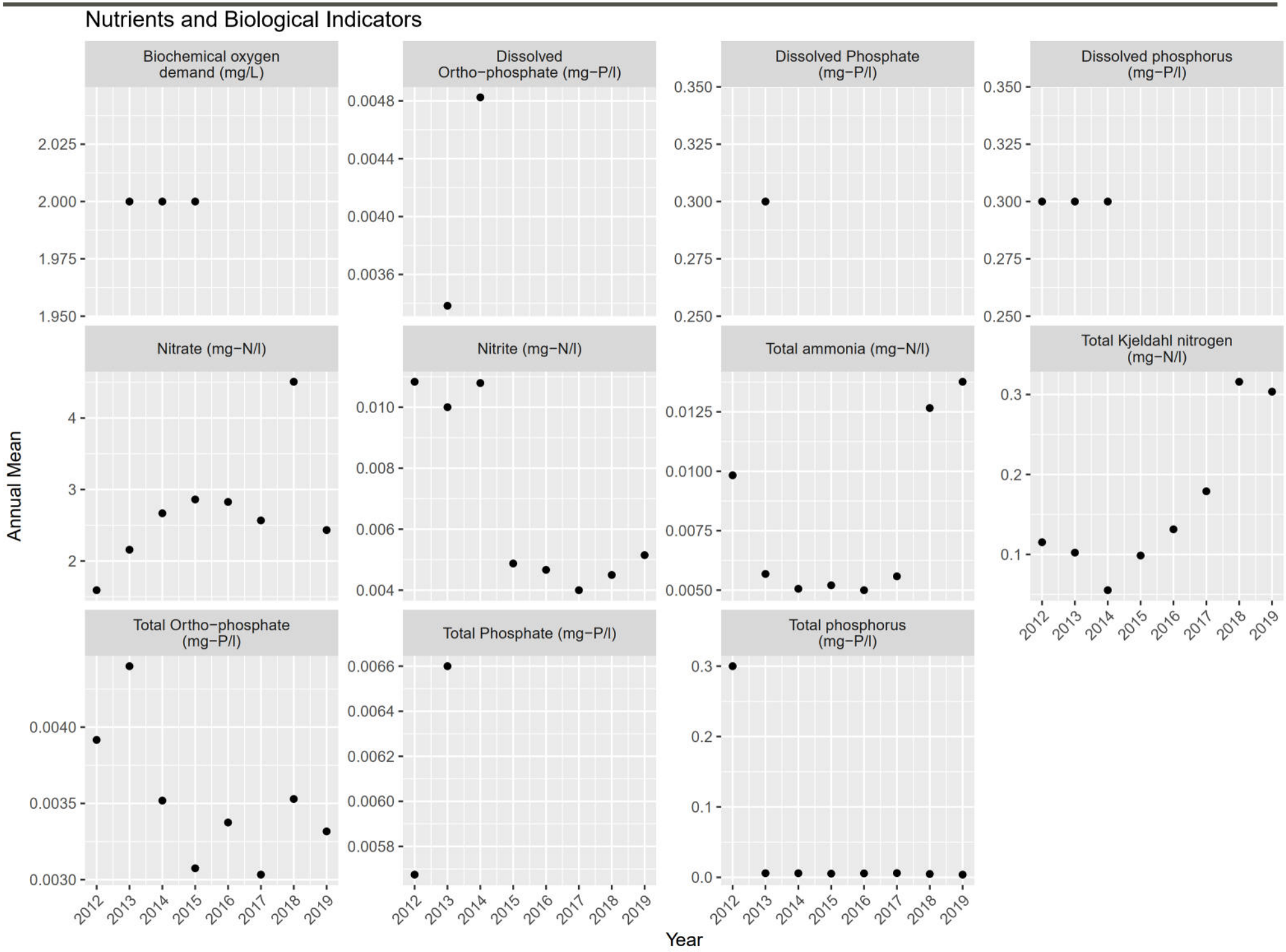


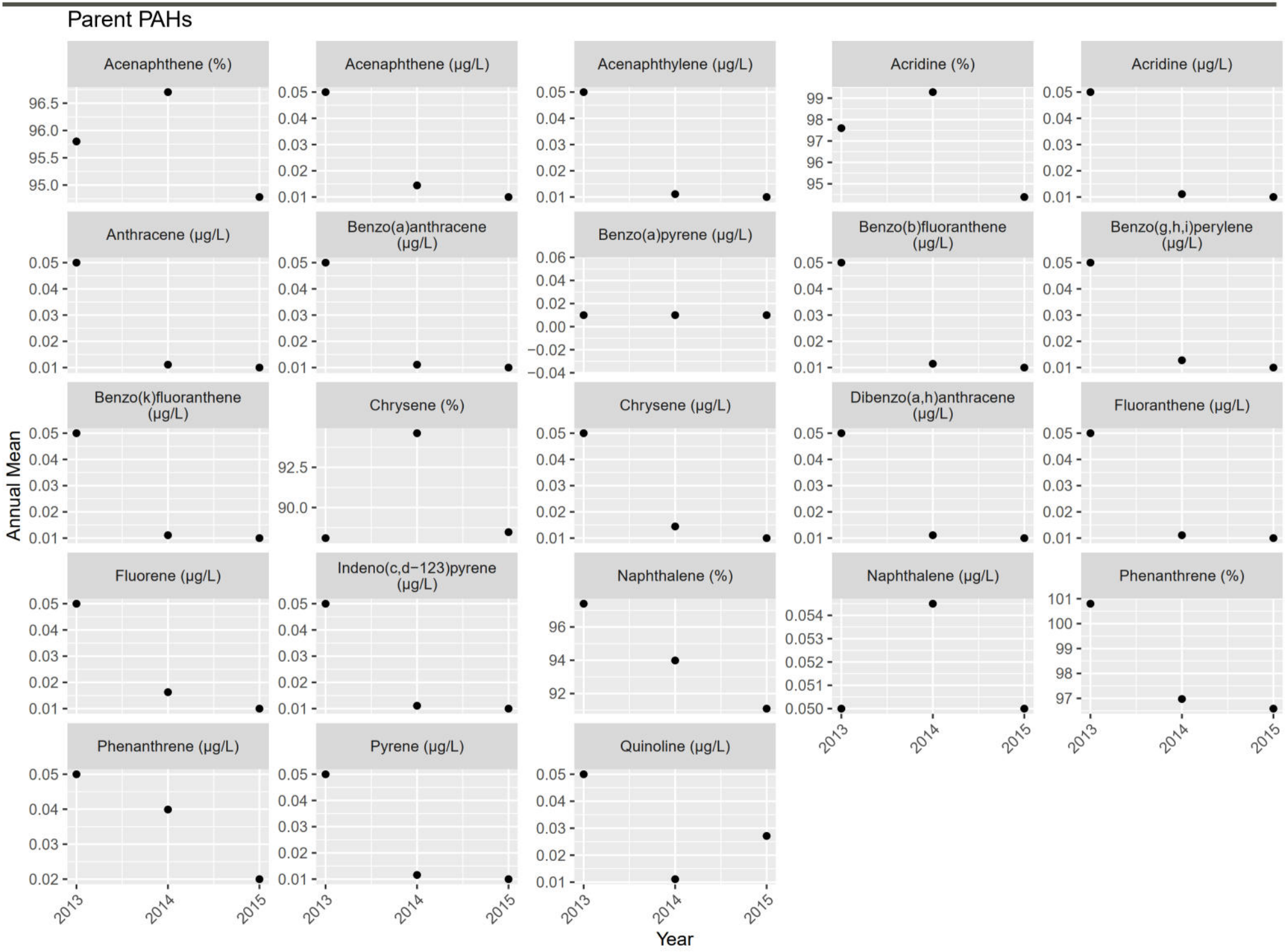

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Colour (CU)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (Calculated) (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

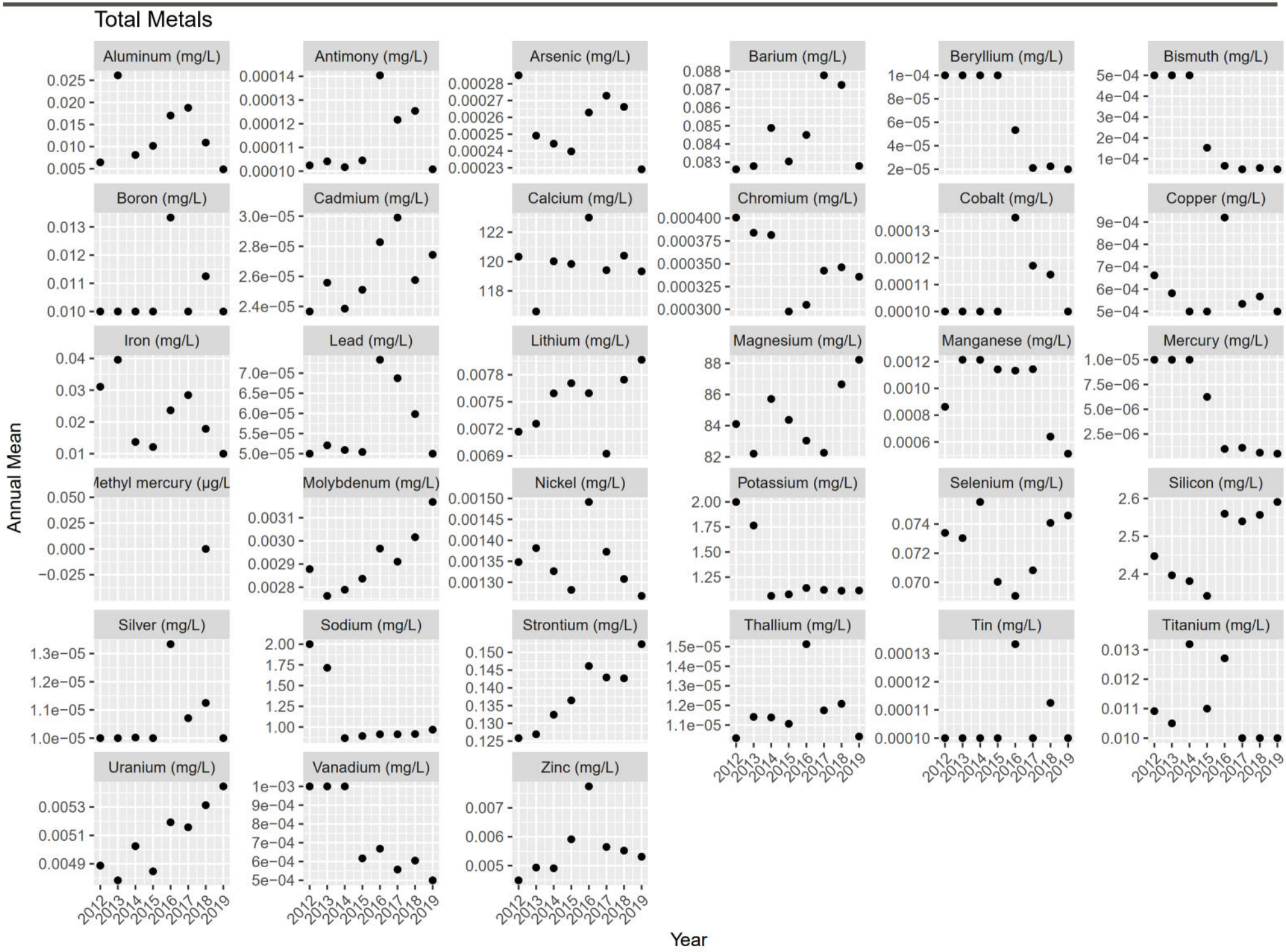

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

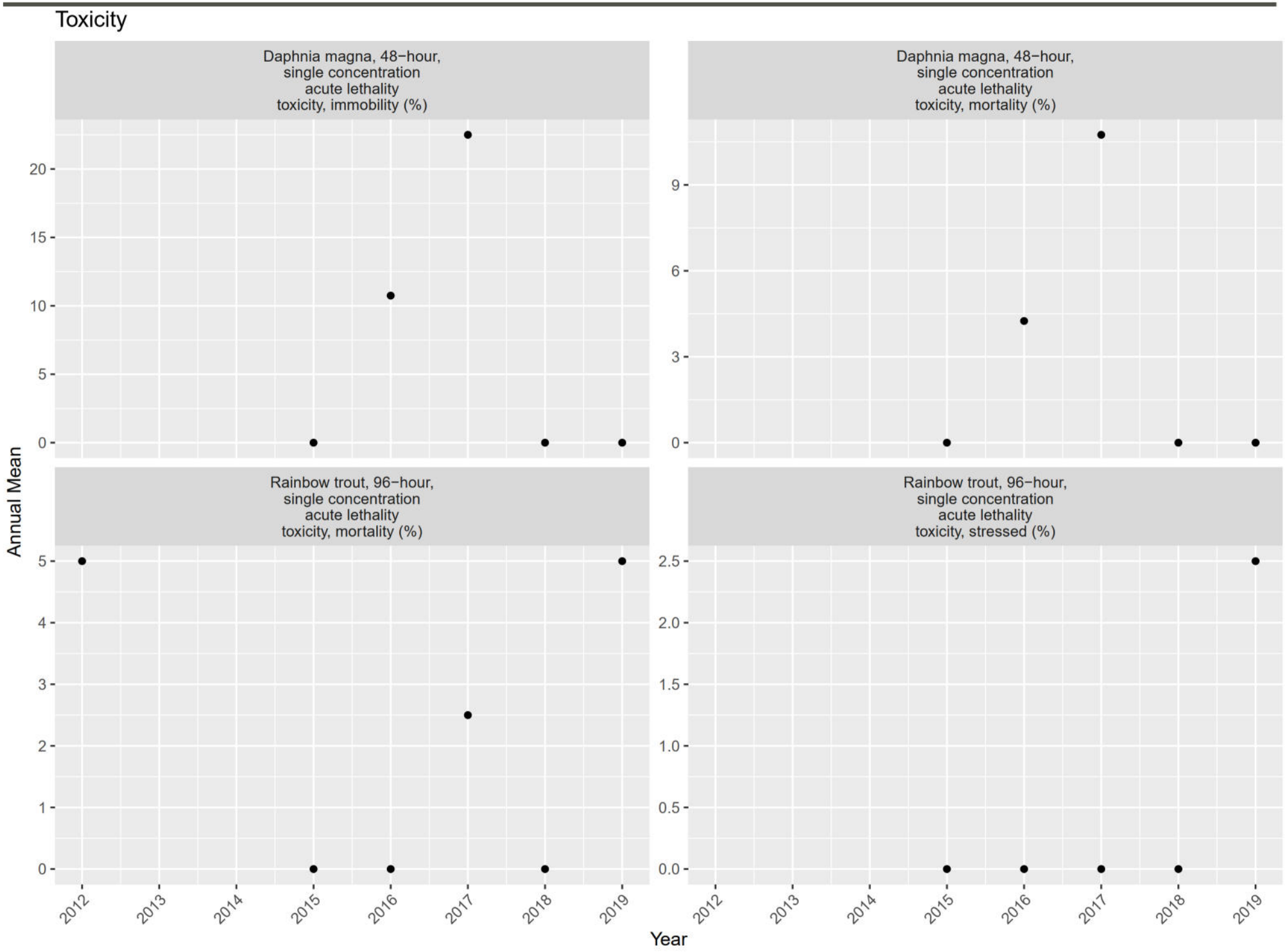

Field Measured
Conductivity (µS/cm)
940
900
860
Conductivity (si)
987.200
987.175
987.150
987.125
Dissolved Oxygen (%)
84
82
80
78
Dissolved Oxygen (mg/L)
14
13
12
11
Oxidation−Reduction Potential (mV)
250
200
150
100
50
Oxygen Saturation (%)
86.050
86.025
86.000
85.975
pH (−)
8.6
8.5
8.4
8.3
Temperature (°C)
4.50
4.25
4.00
3.75
Turbidity (NTU)
5
4
3
2
1
2012
2013
2014
2015
2016
2017
2018
2019
Annual Mean
Year

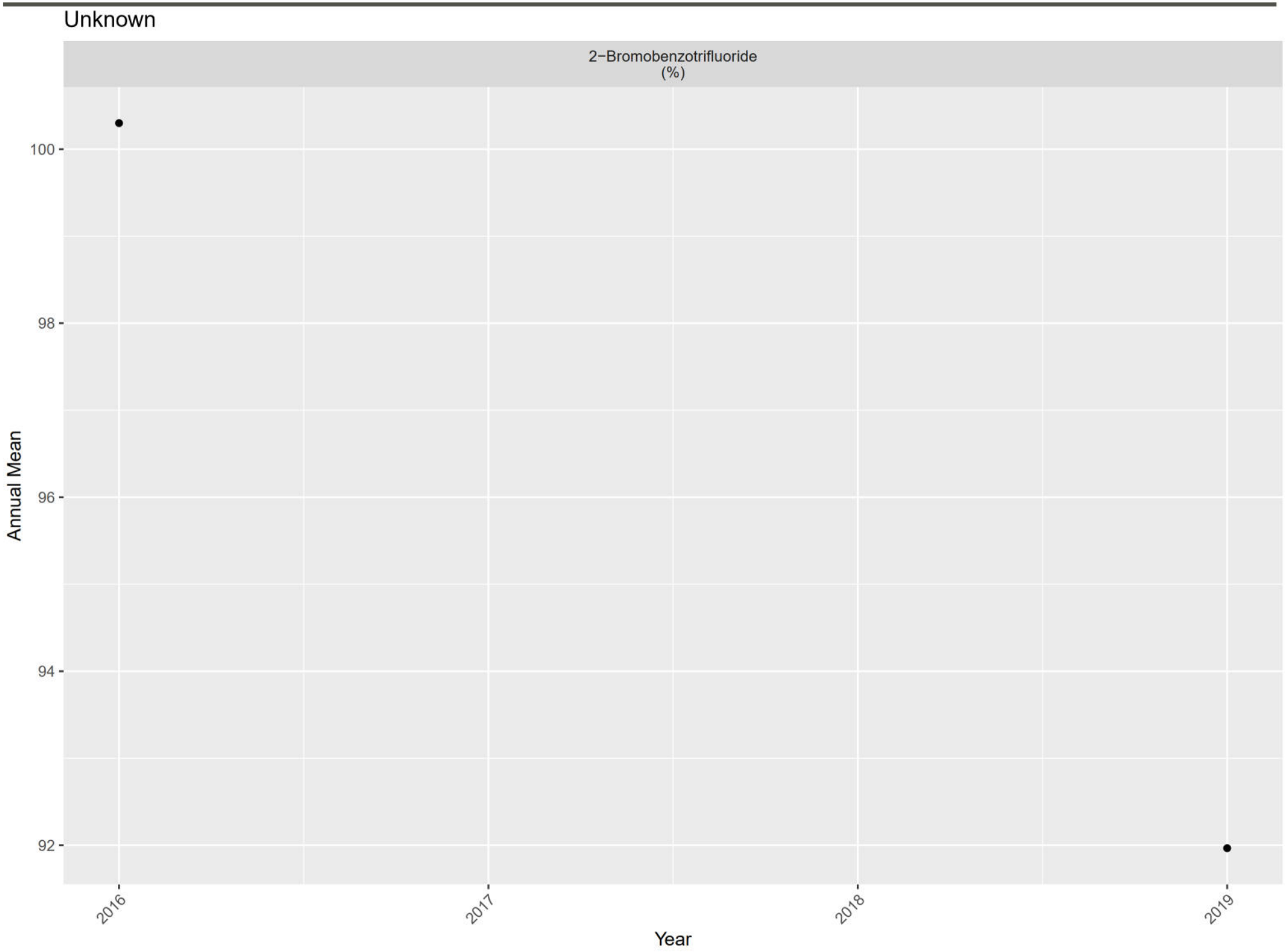

Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Silica (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

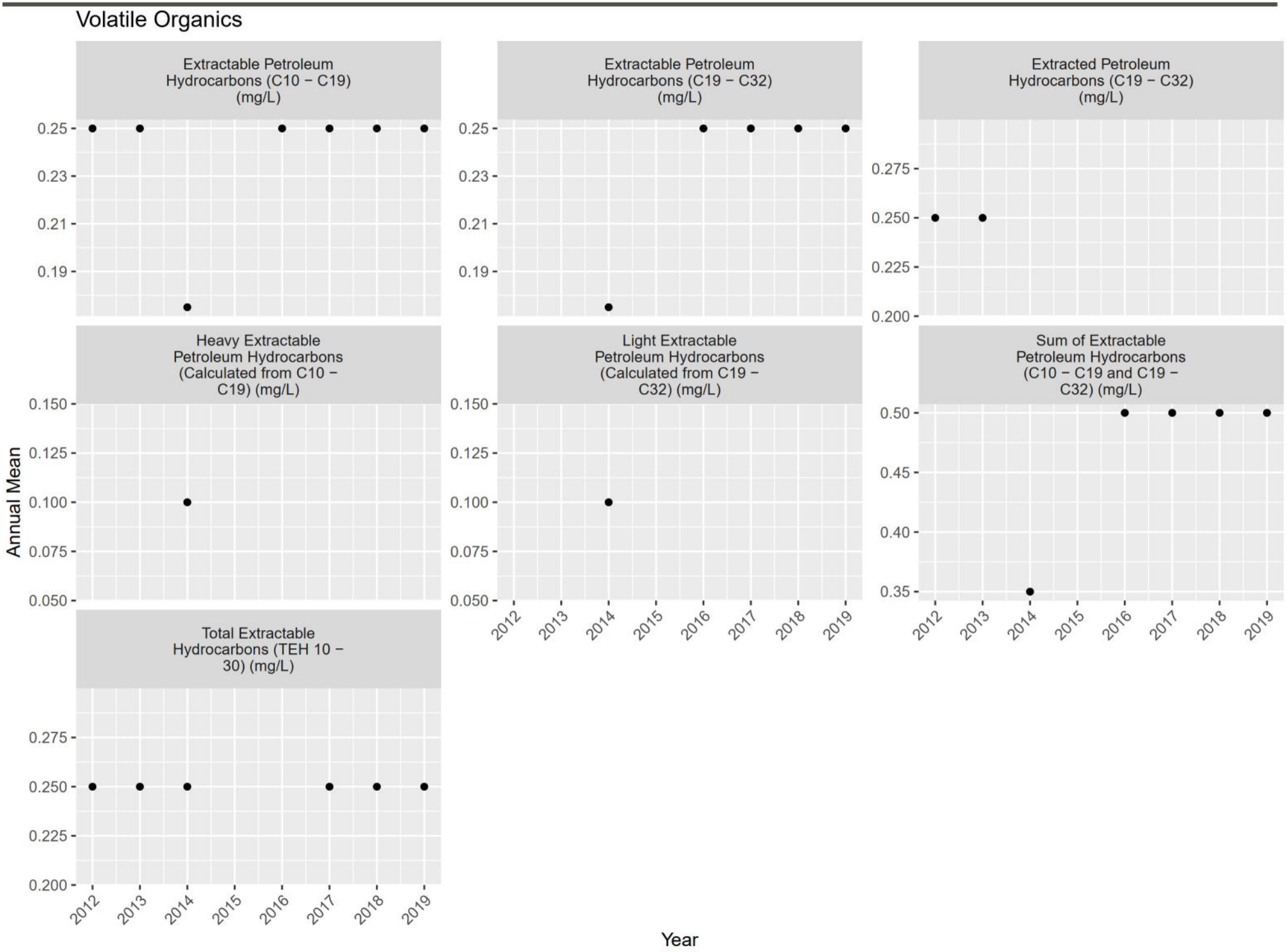

Nutrients and Biological Indicators
Biochemical oxygen demand (mg/L)
Dissolved Ortho−phosphate (mg−P/l)
Dissolved Phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Parent PAHs
Acenaphthene (%)
Acenaphthene (µg/L)
Acenaphthylene (µg/L)
Acridine (%)
Acridine (µg/L)
Anthracene (µg/L)
Benzo(a)anthracene (µg/L)
Benzo(a)pyrene (µg/L)
Benzo(b)fluoranthene (µg/L)
Benzo(g,h,i)perylene (µg/L)
Benzo(k)fluoranthene (µg/L)
Chrysene (%)
Chrysene (µg/L)
Dibenzo(a,h)anthracene (µg/L)
Fluoranthene (µg/L)
Fluorene (µg/L)
Indeno(c,d−123)pyrene (µg/L)
Naphthalene (%)
Naphthalene (µg/L)
Phenanthrene (%)
Phenanthrene (µg/L)
Pyrene (µg/L)
Quinoline (µg/L)
Annual Mean
Year
2013
2014
2015


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Methyl mercury (µg/L
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Toxicity
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, immobility (%)
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, stressed (%)
Annual Mean
Year
0
5
10
15
20
3
6
9
1
2
4
0.5
1.0
1.5
2.0
2.5
0.0
2012
2013
2014
2015
2016
2017
2018
2019

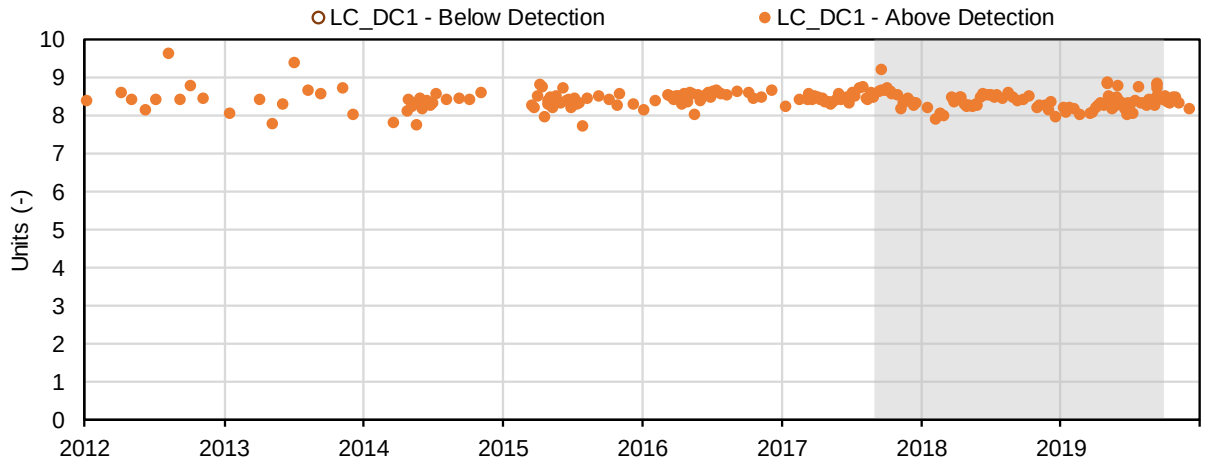

Unknown
2−Bromobenzotrifluoride
(%)
100
98
96
94
92
Annual Mean
2016
2017
2018
2019
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extractable Petroleum Hydrocarbons (C19 − C32) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 − C19) (mg/L)
Light Extractable Petroleum Hydrocarbons (Calculated from C19 − C32) (mg/L)
Sum of Extractable Petroleum Hydrocarbons (C10 − C19 and C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
Year
0.25
0.23
0.21
0.19
0.275
0.250
0.225
0.200
0.150
0.125
0.100
0.075
0.050
0.50
0.45
0.40
0.35
2012
2013
2014
2015
2016
2017
2018
2019

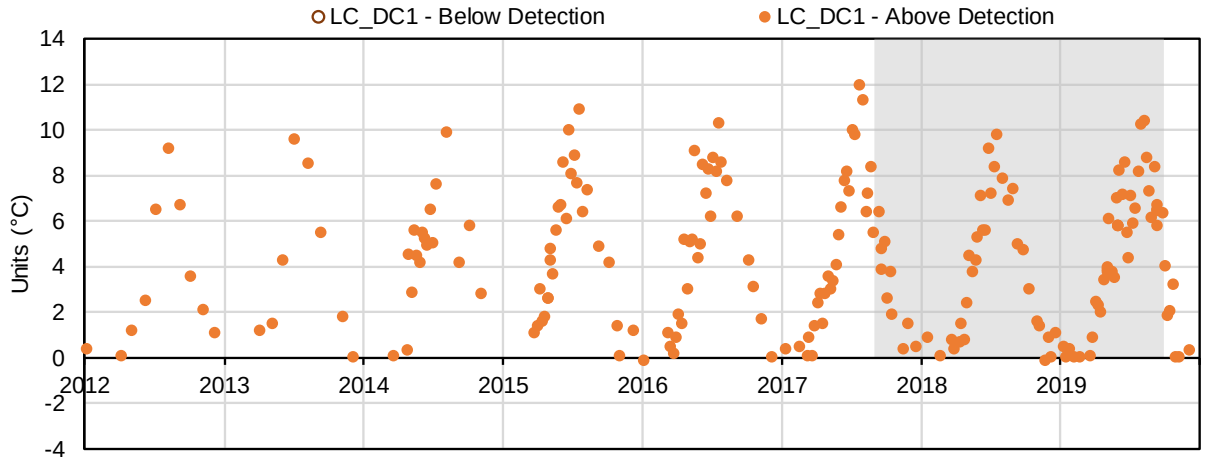
ATTACHMENT F25

LC_DC1 Plots

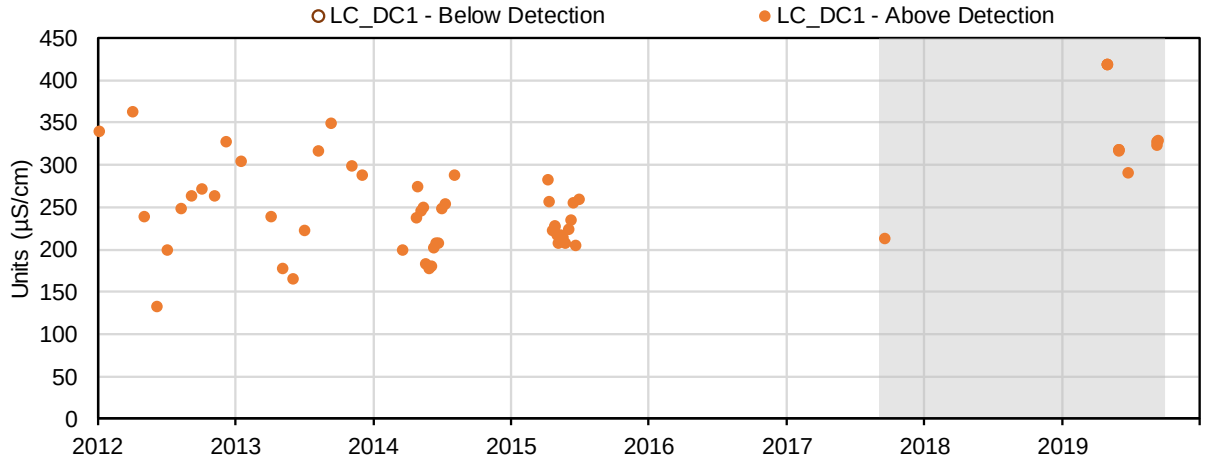
(1) pH (-); Field Measured



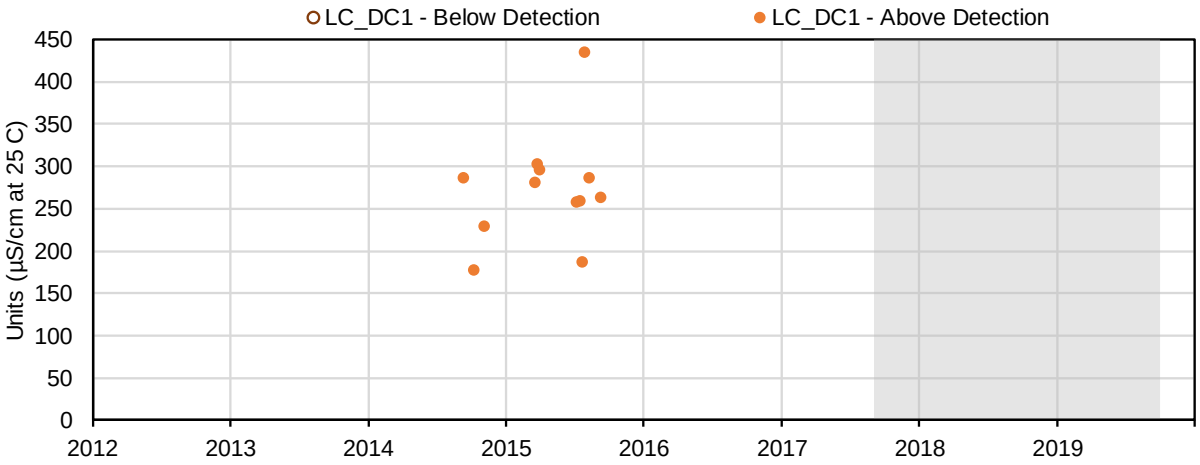
(2) Temperature (°C); Field Measured



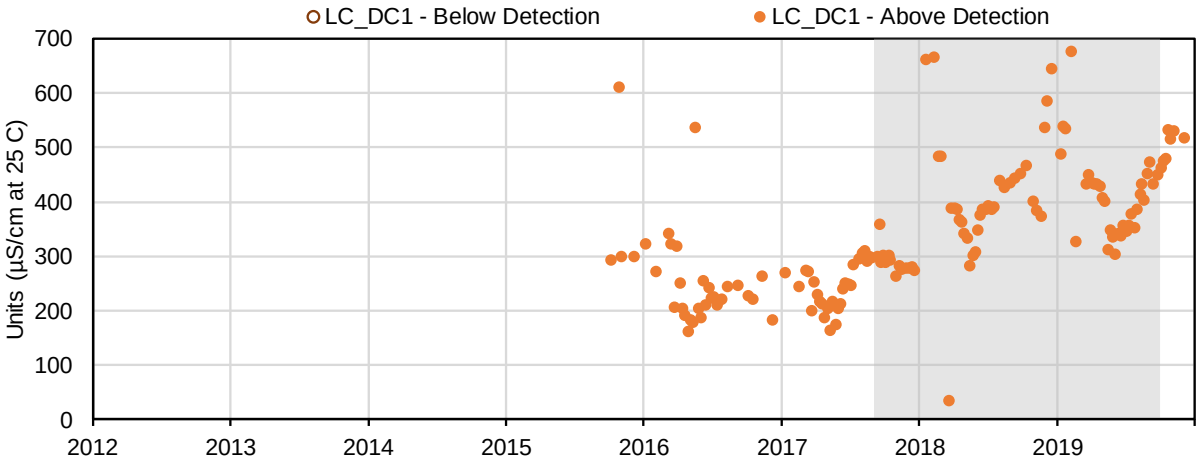
(3) Conductivity (µS/cm); Field Measured



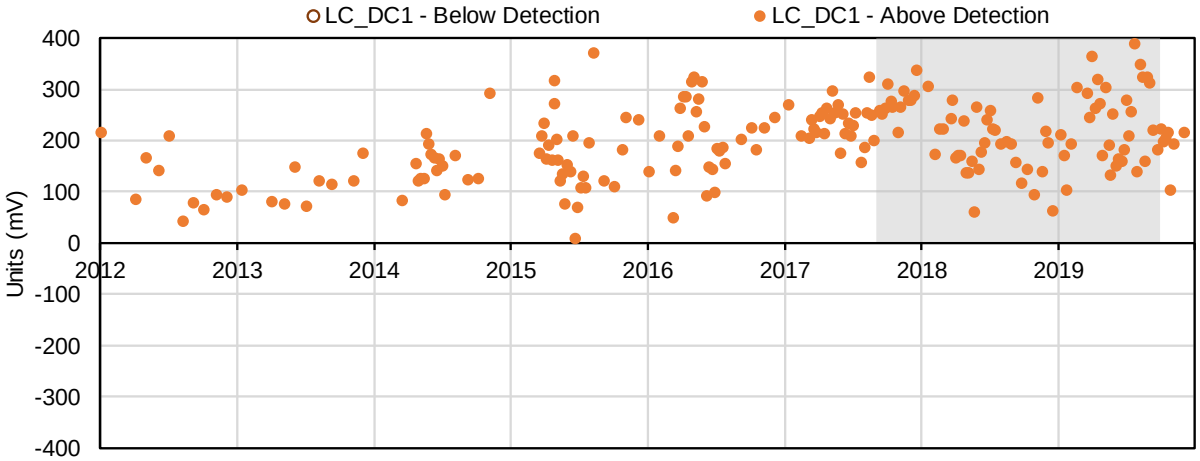
(4) Conductivity (µS/cm at 25 C); Field Measured



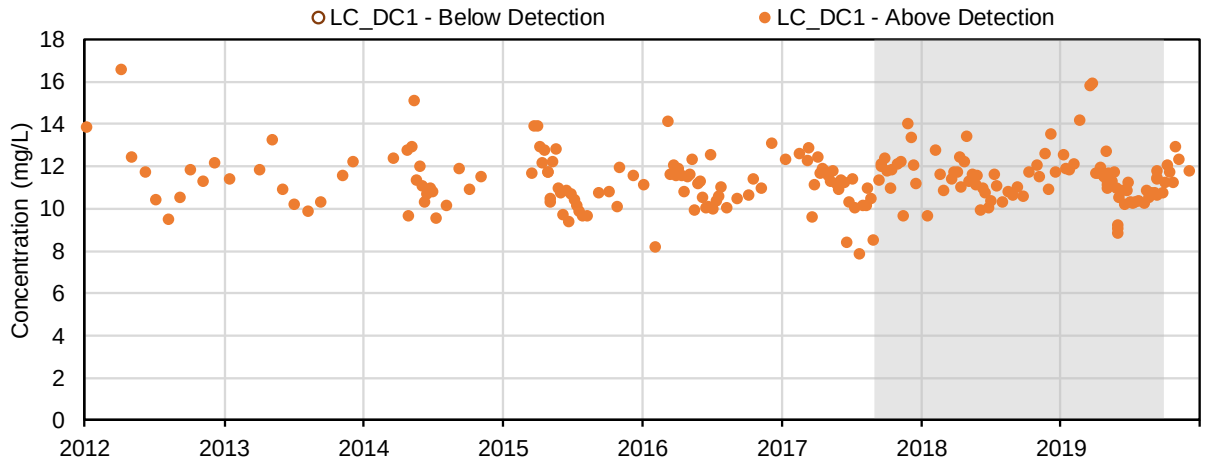
(5) Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C); Field Measured



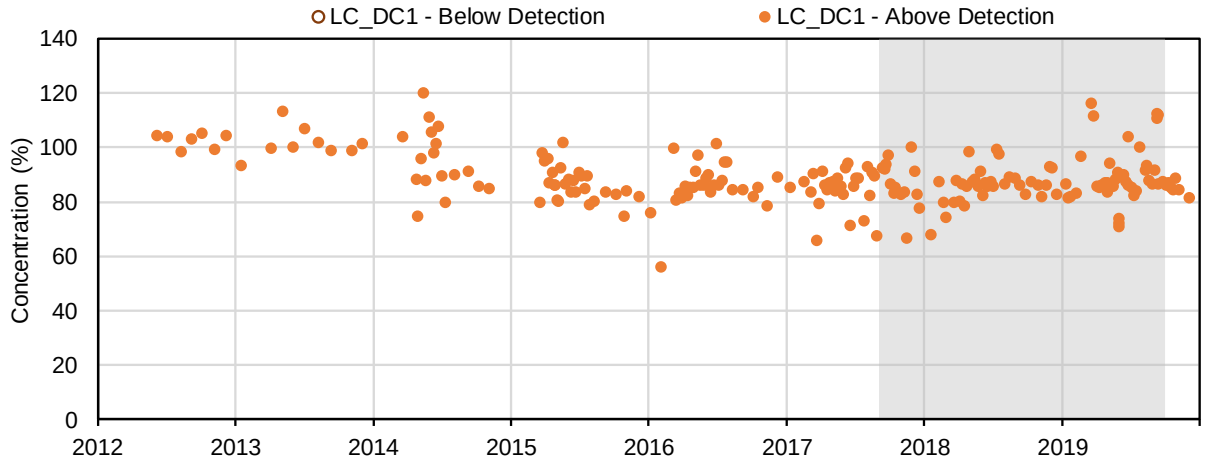
(6) Oxidation-Reduction Potential (mV); Field Measured



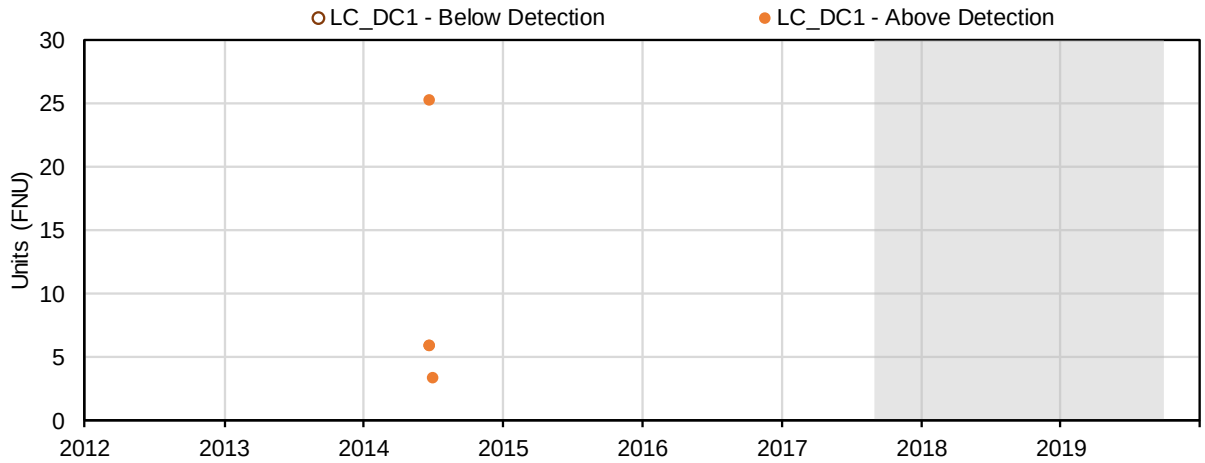
(7) Dissolved Oxygen (mg/L); Field Measured



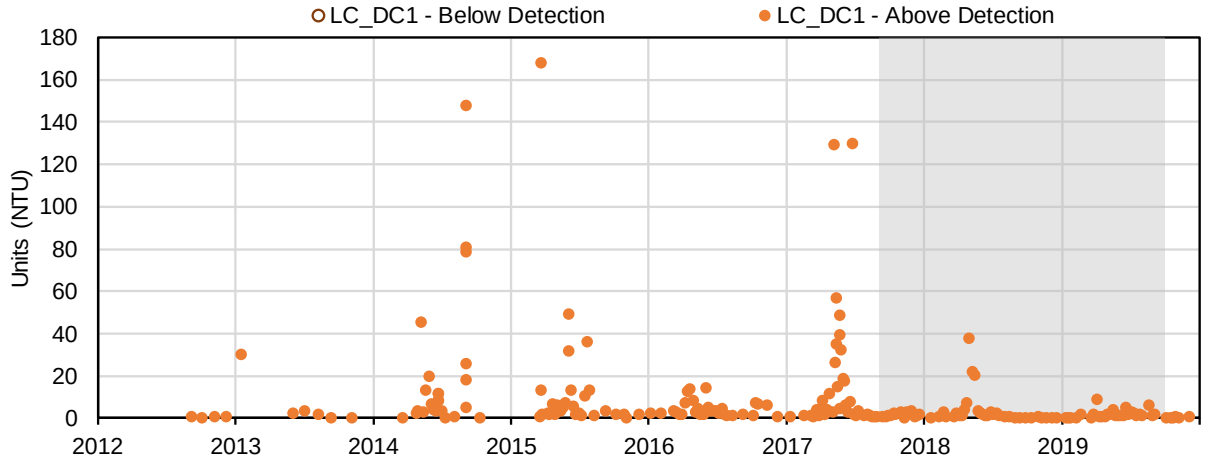
(8) Dissolved Oxygen (%); Field Measured



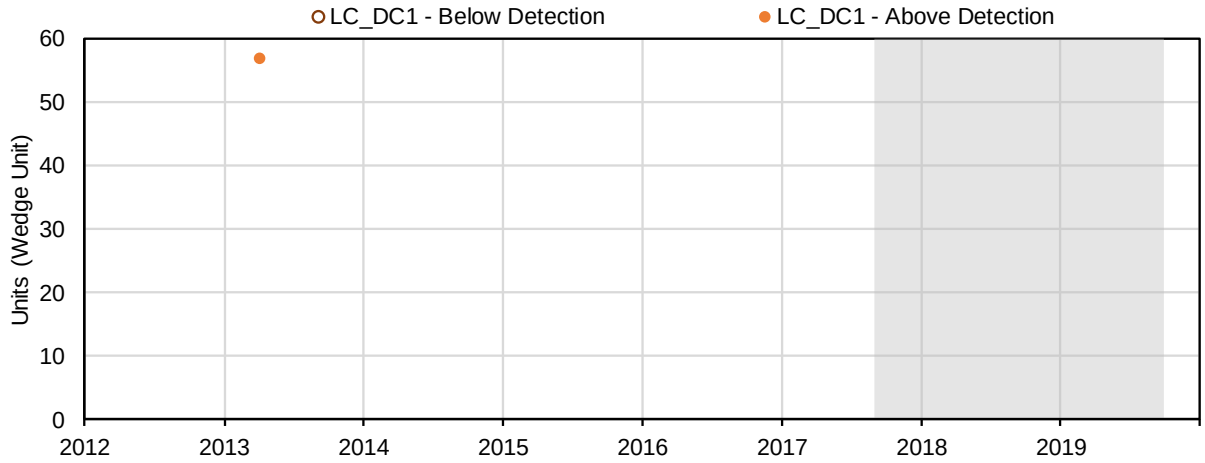
(9) Turbidity (FNU); Field Measured



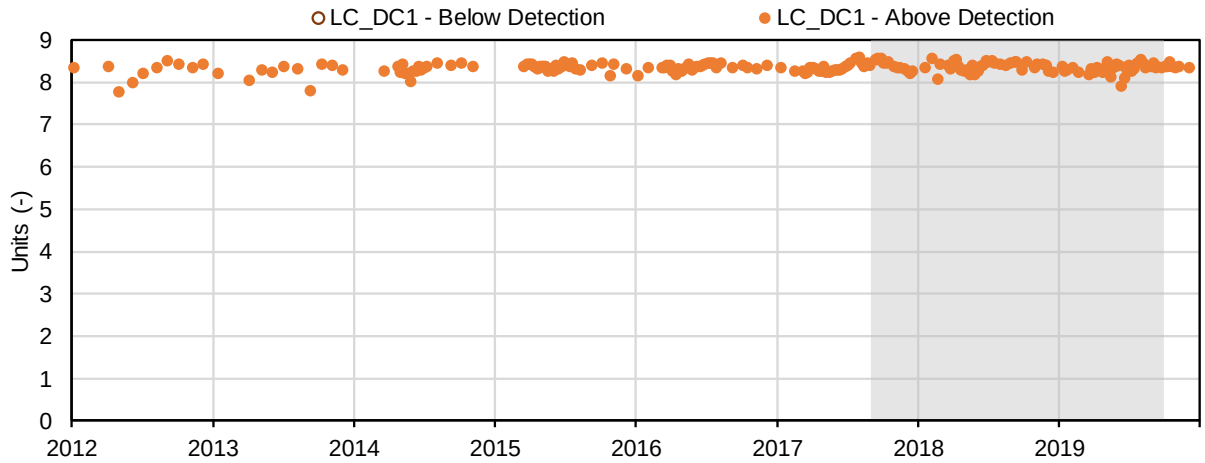
(10) Turbidity (NTU); Field Measured



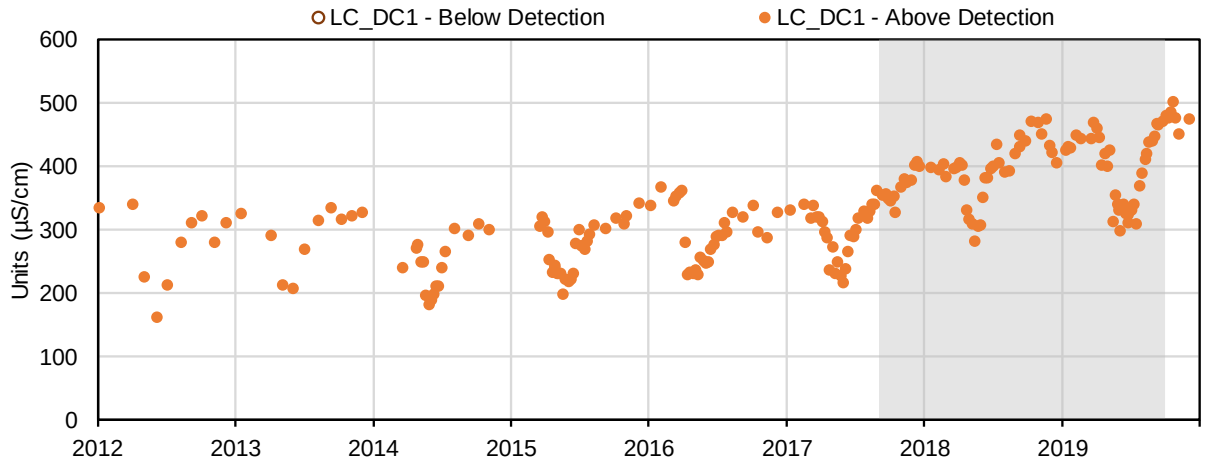
(11) Turbidity (Wedge Unit); Field Measured



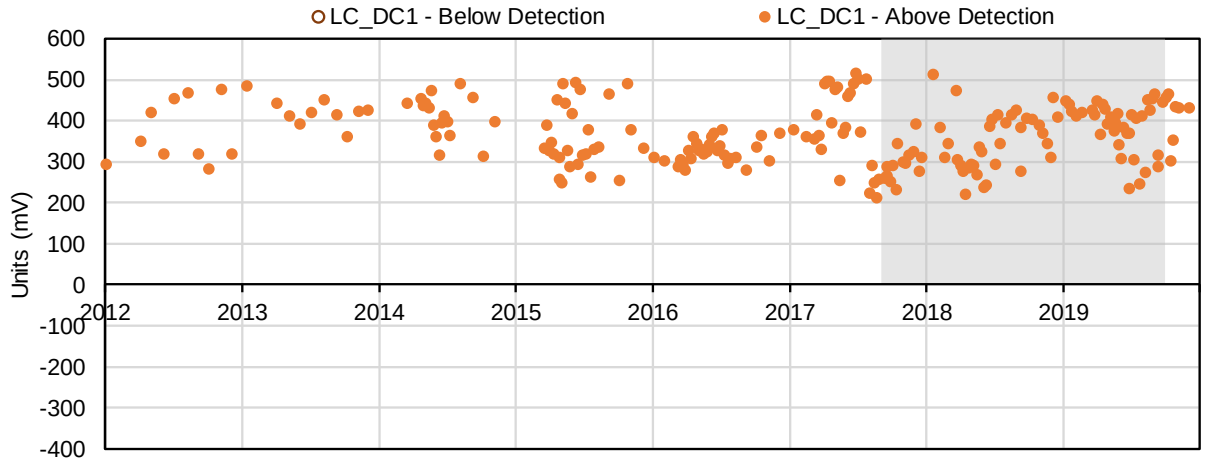
(12) pH (-); Conventional Parameters



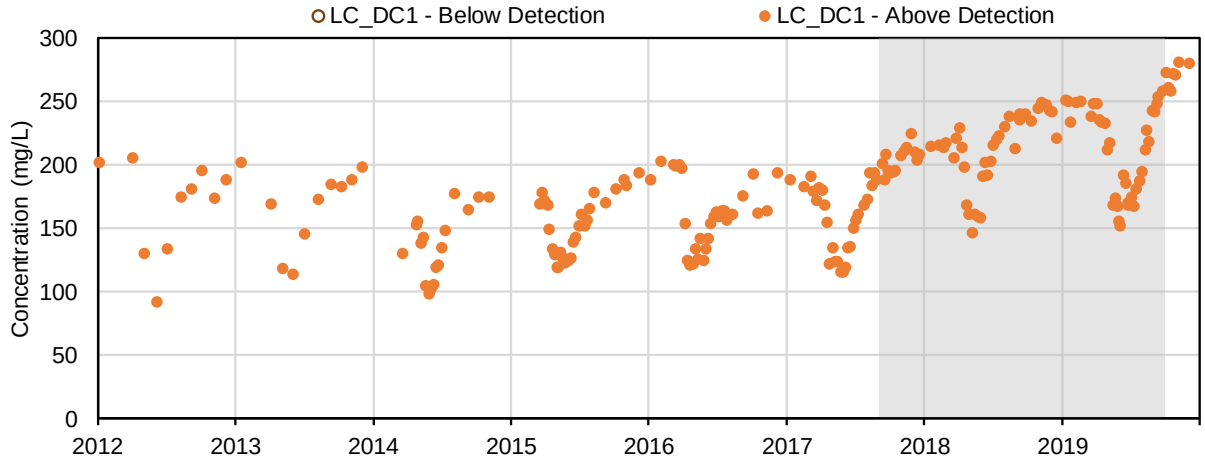
(13) Conductivity (µS/cm); Conventional Parameters



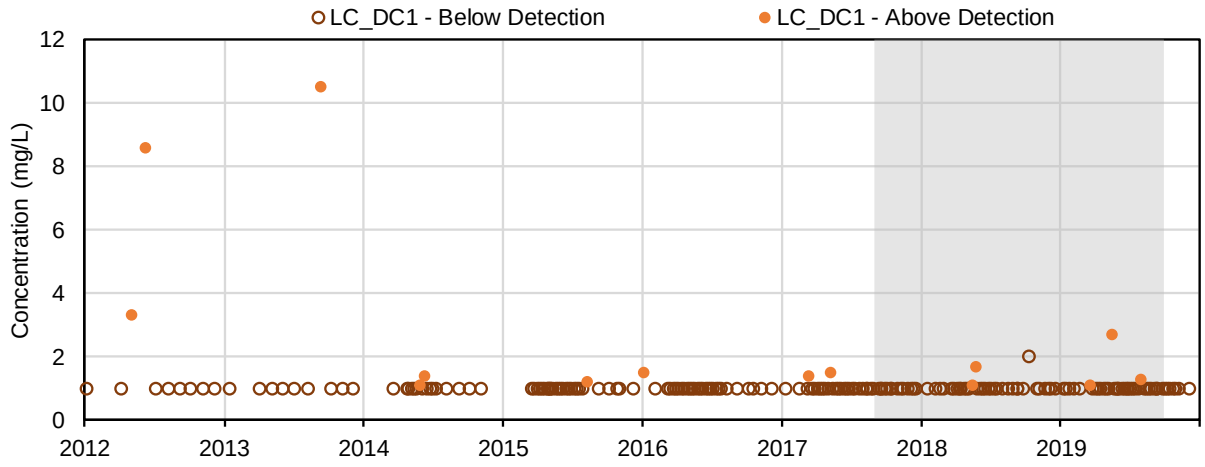
(14) Oxidation-Reduction Potential (mV); Conventional Parameters



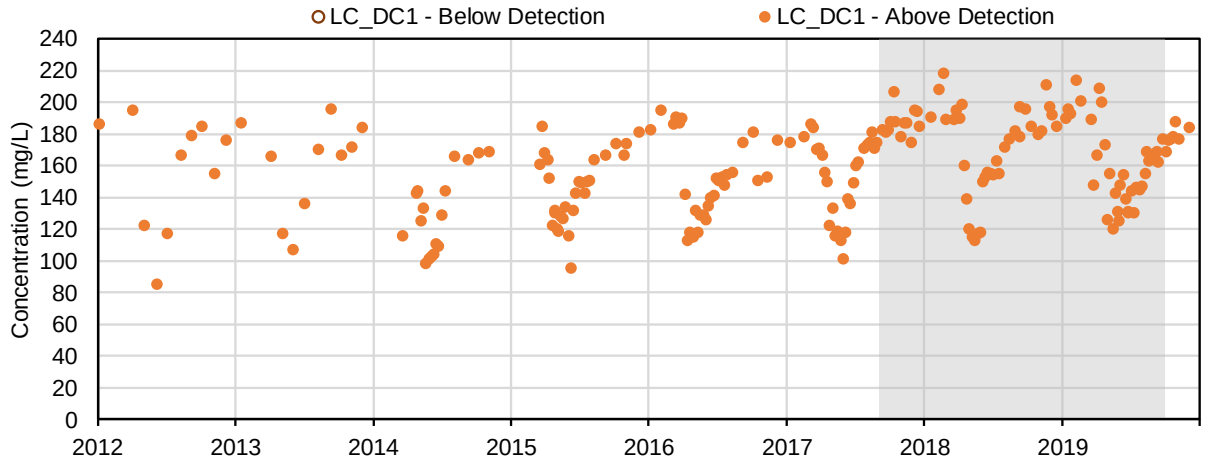
(15) Hardness, as CaCO3 (mg/L); Conventional Parameters



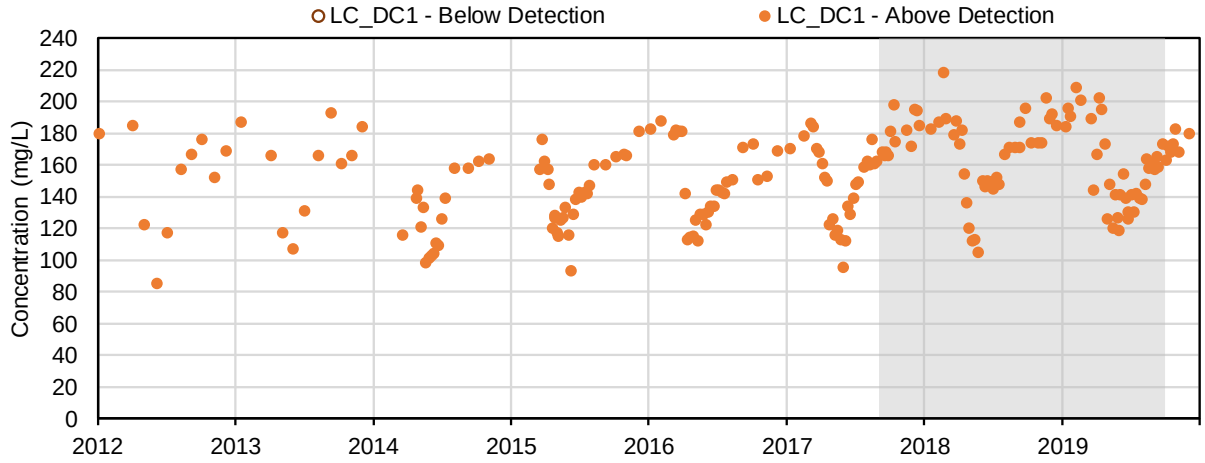
(16) Acidity, CaCO3 (mg/L); Conventional Parameters



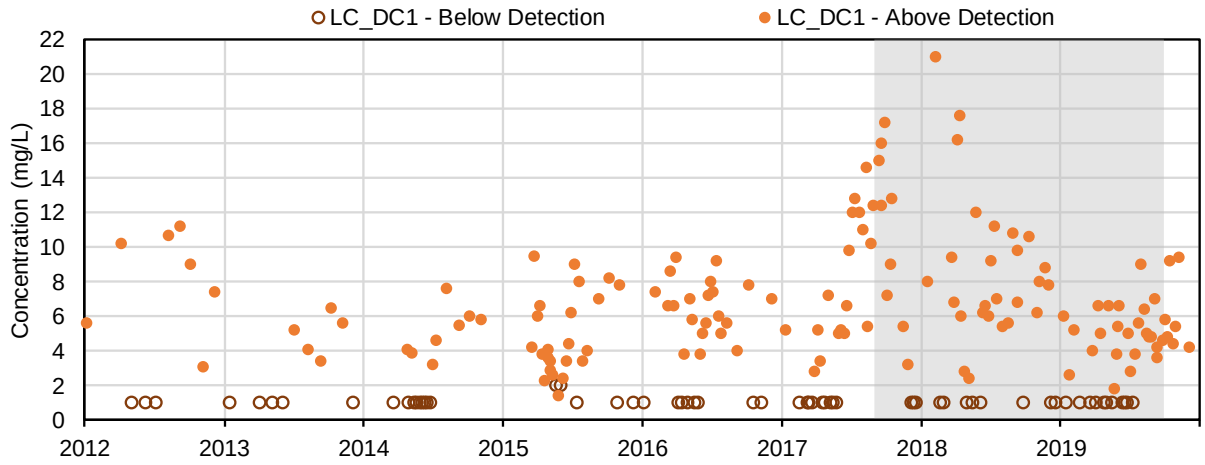
(17) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



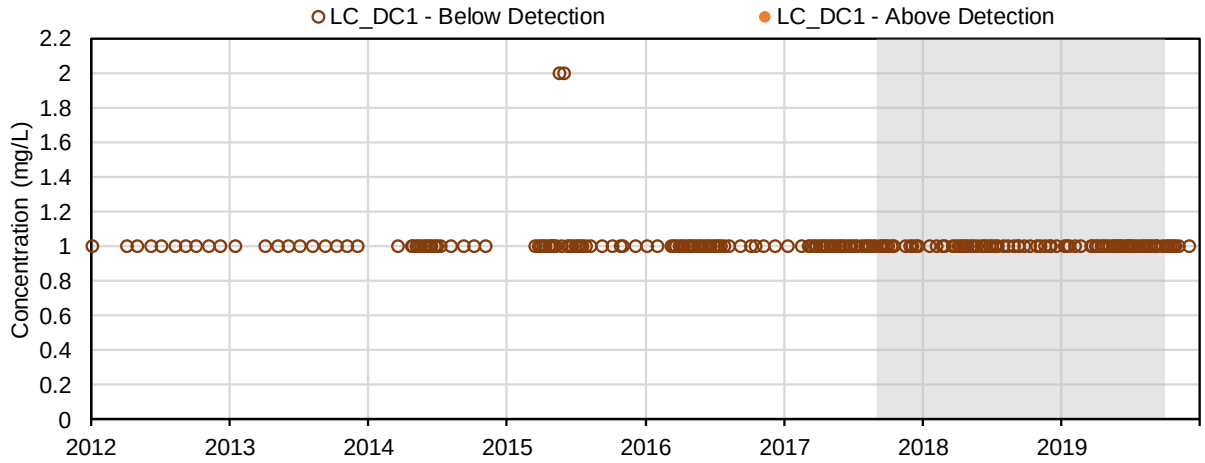
(18) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



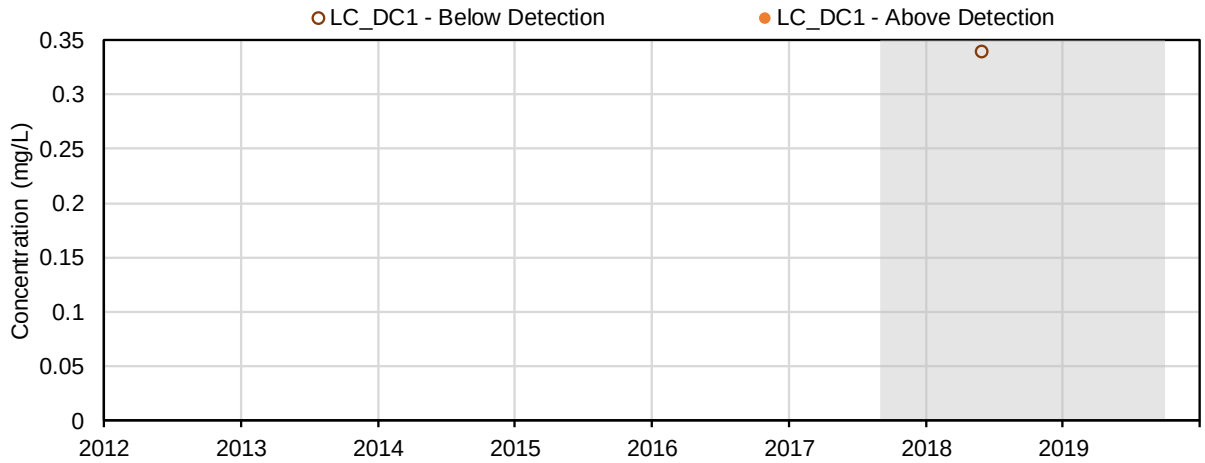
(19) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



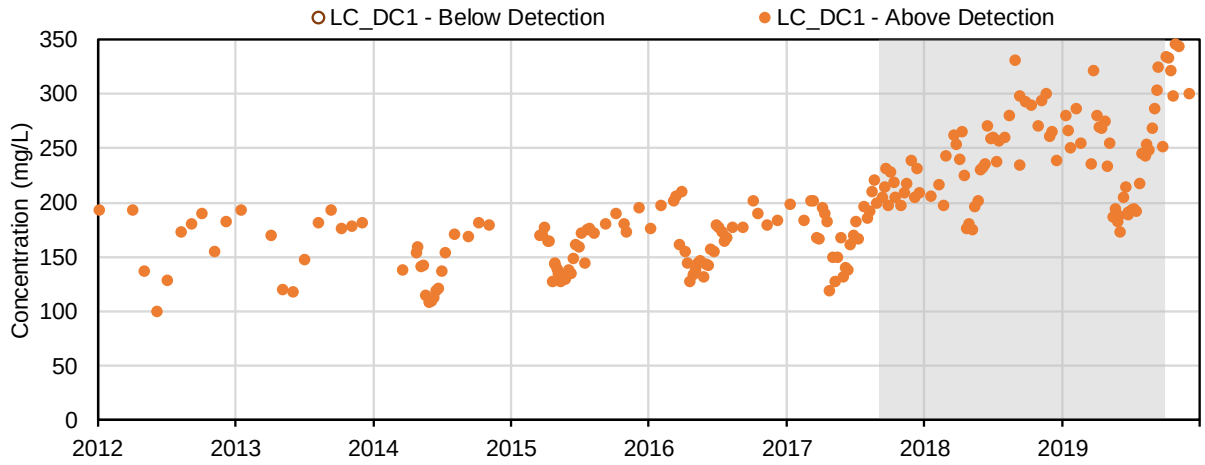
(20) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



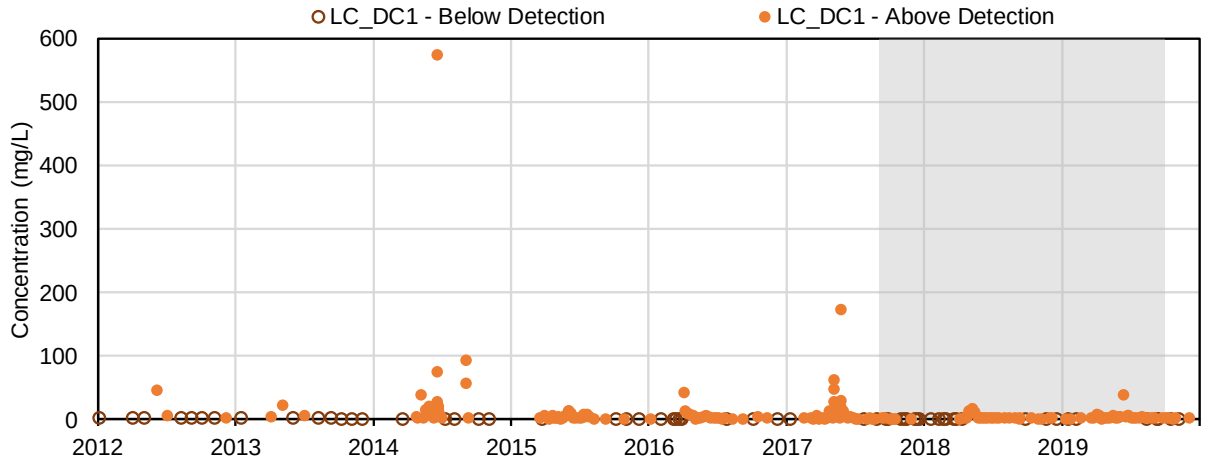
(21) Hydroxide (mg/L); Conventional Parameters



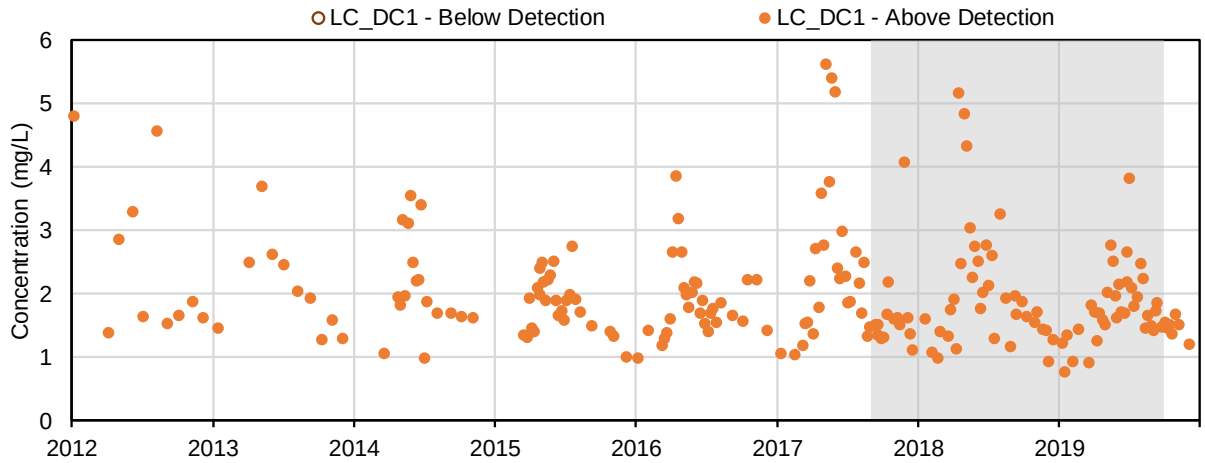
(22) Total dissolved solids (mg/L); Conventional Parameters



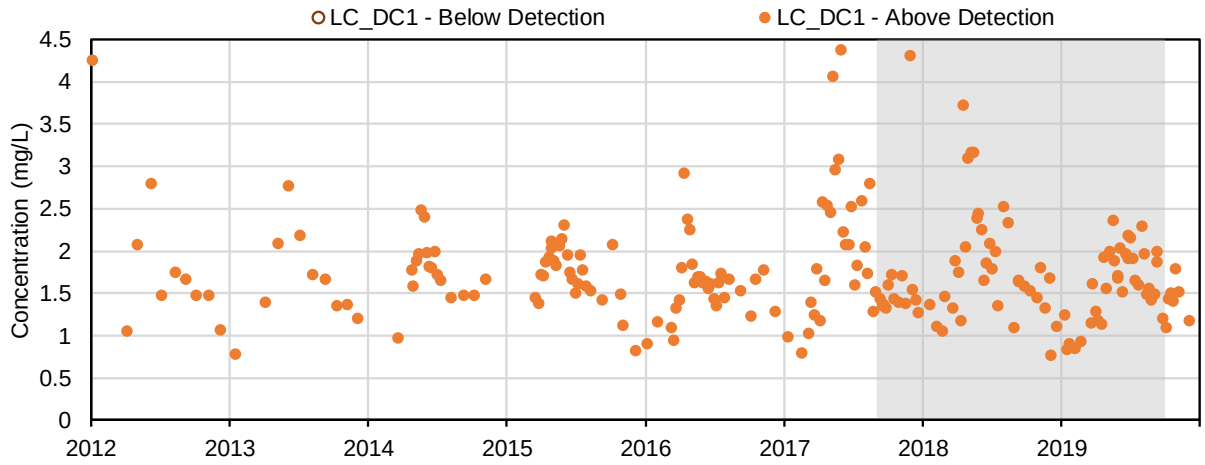
(23) Total suspended solids (mg/L); Conventional Parameters



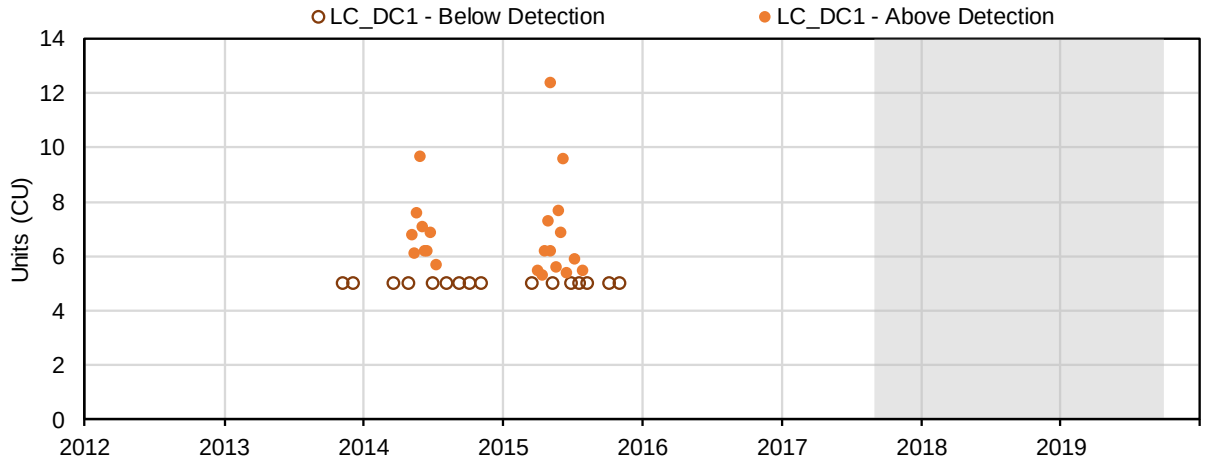
(24) Total organic carbon (mg/L); Conventional Parameters



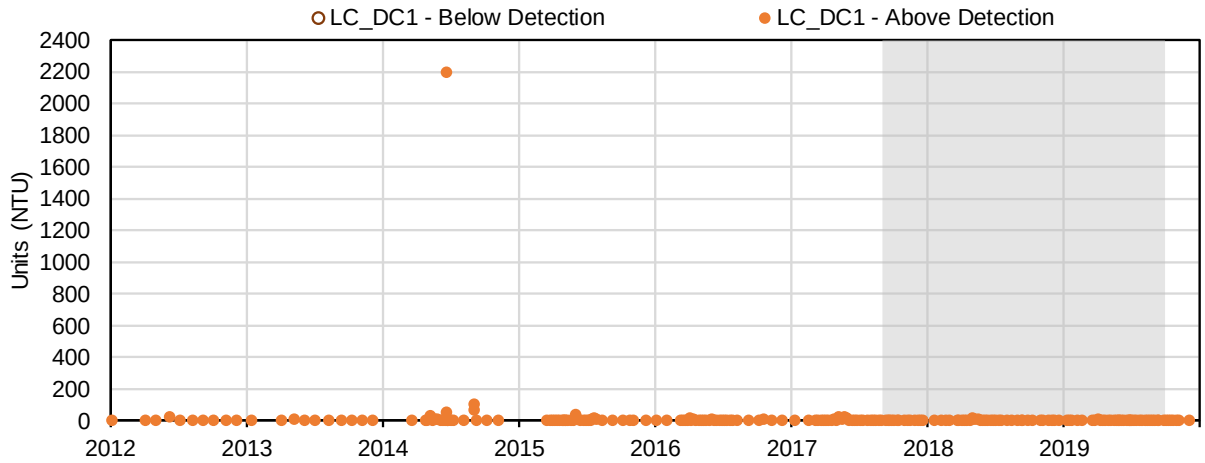
(25) Dissolved organic carbon (mg/L); Conventional Parameters



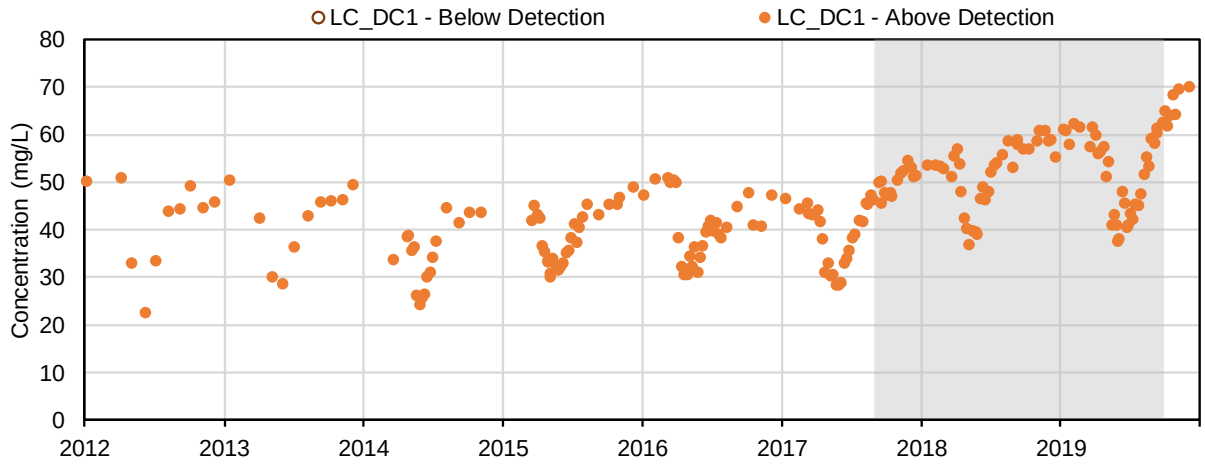
(26) Colour (CU); Conventional Parameters



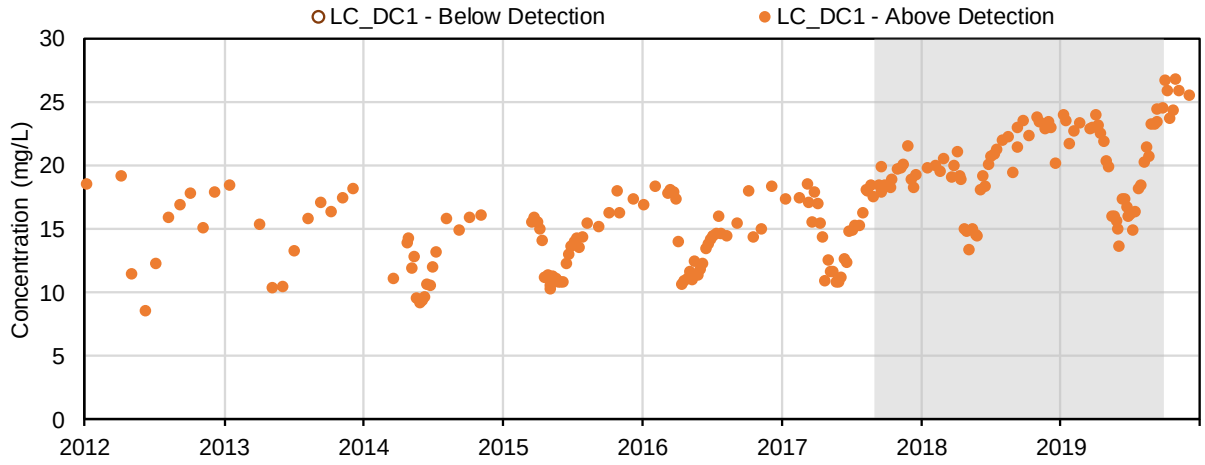
(27) Turbidity (NTU); Conventional Parameters



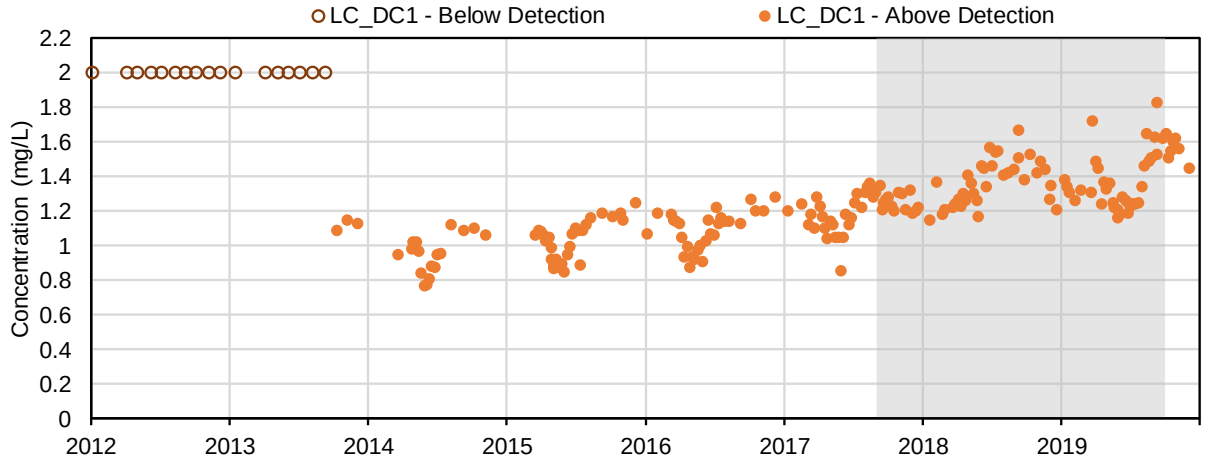
(28) Calcium (mg/L); Major Ions



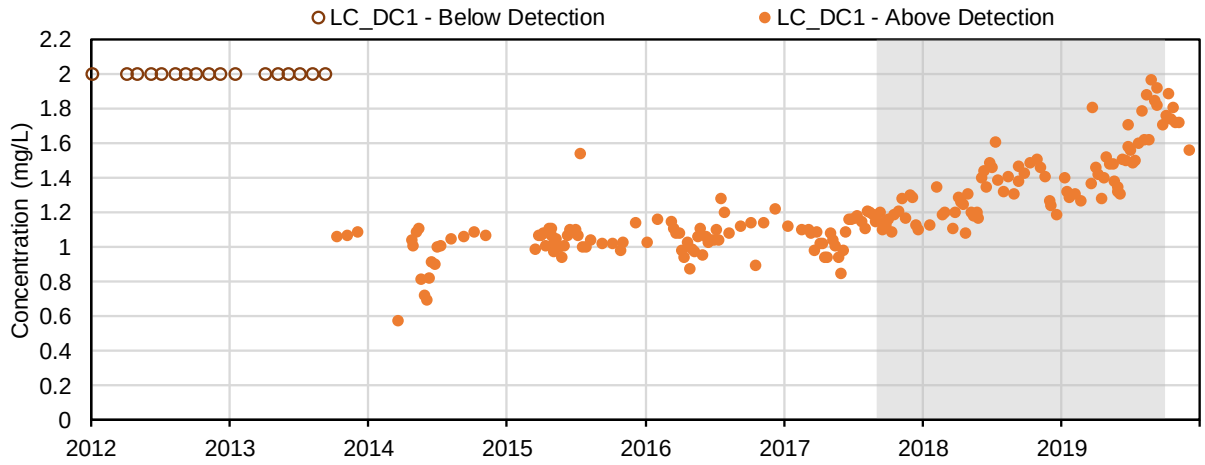
(29) Magnesium (mg/L); Major Ions



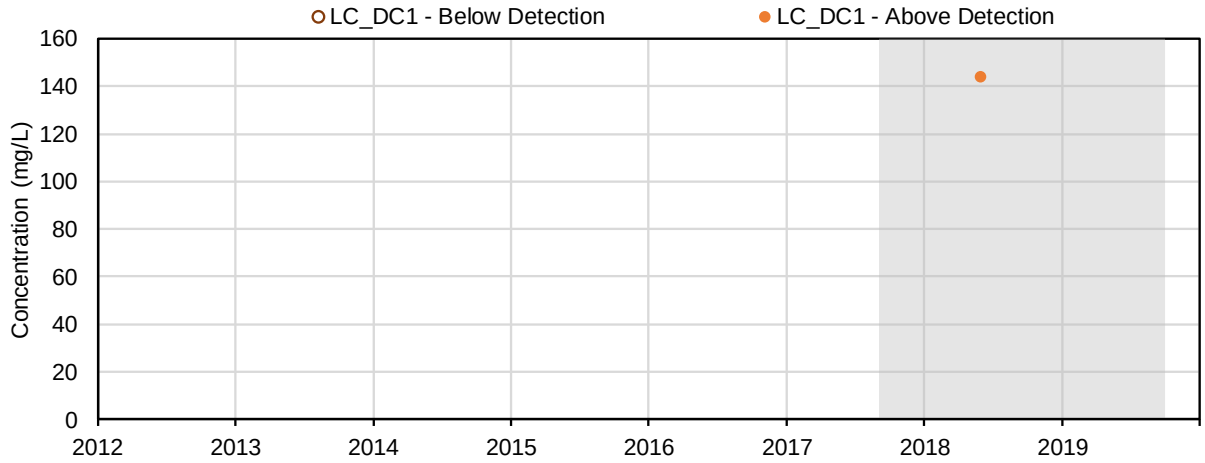
(30) Potassium (mg/L); Major Ions



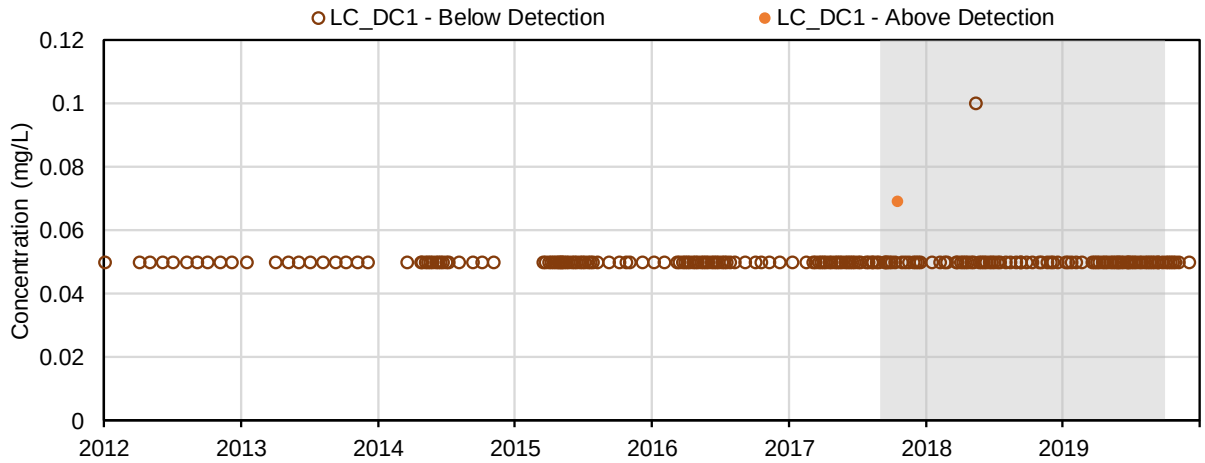
(31) Sodium (mg/L); Major Ions



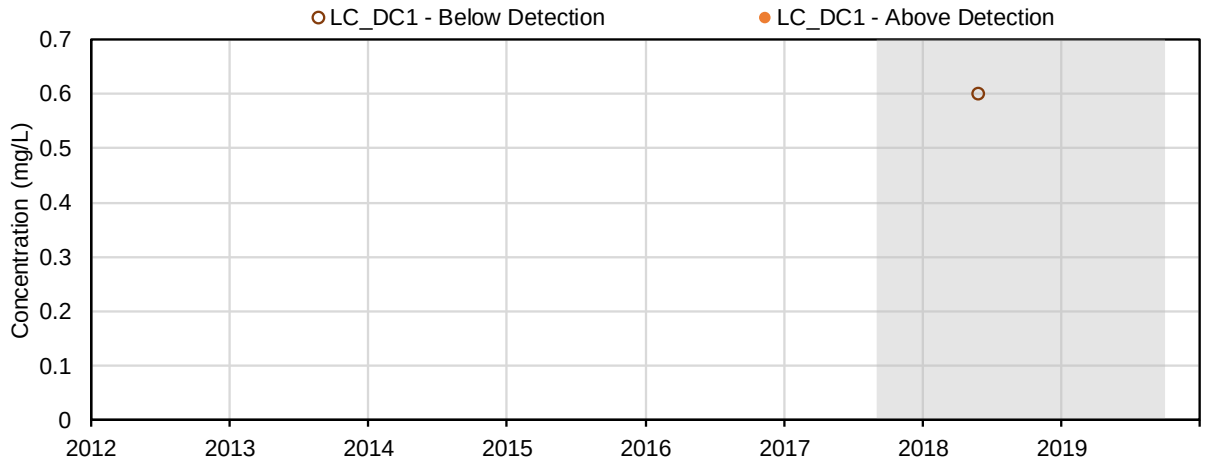
(32) Bicarbonate (mg/L); Major Ions



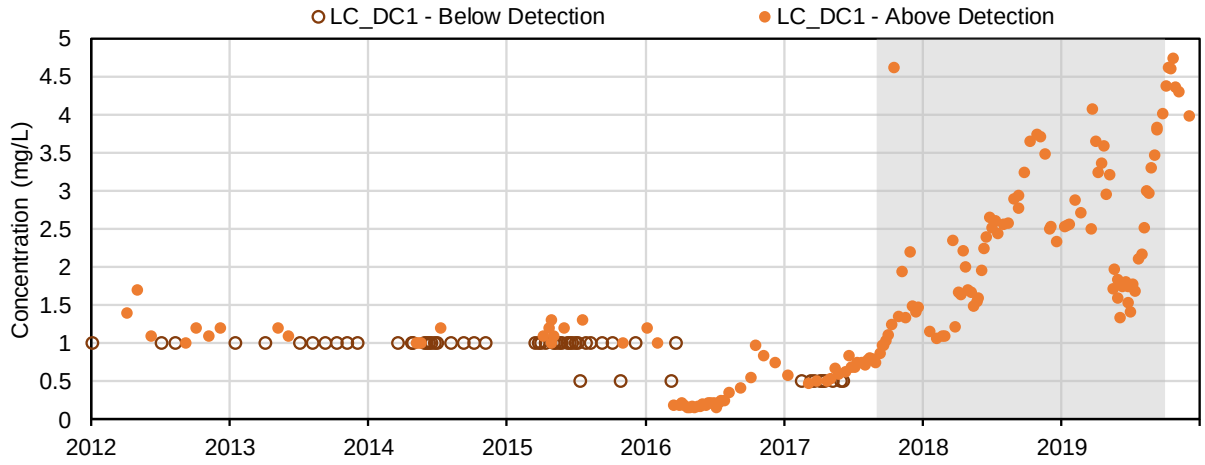
(33) Bromide (mg/L); Major Ions



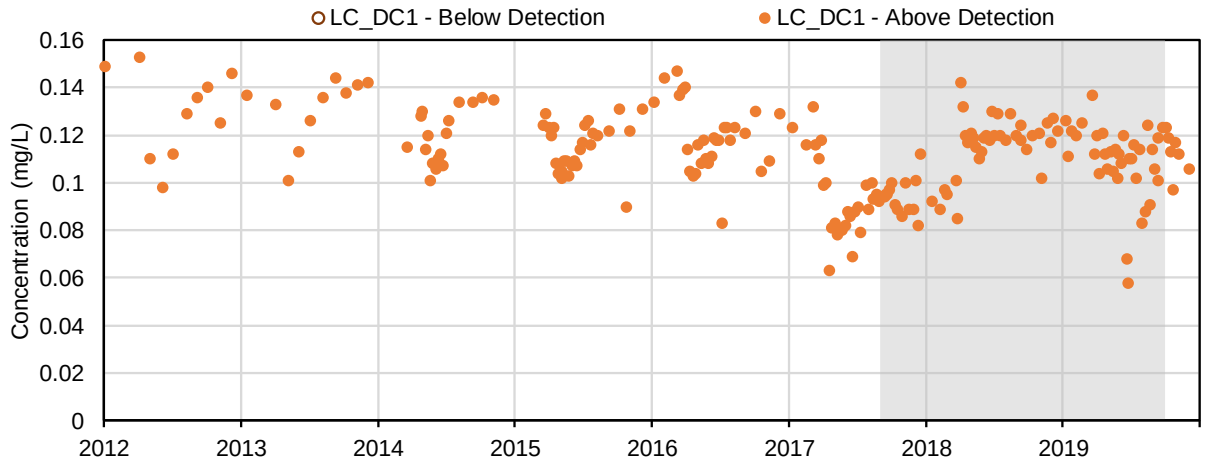
(34) Carbonate (mg/L); Major Ions



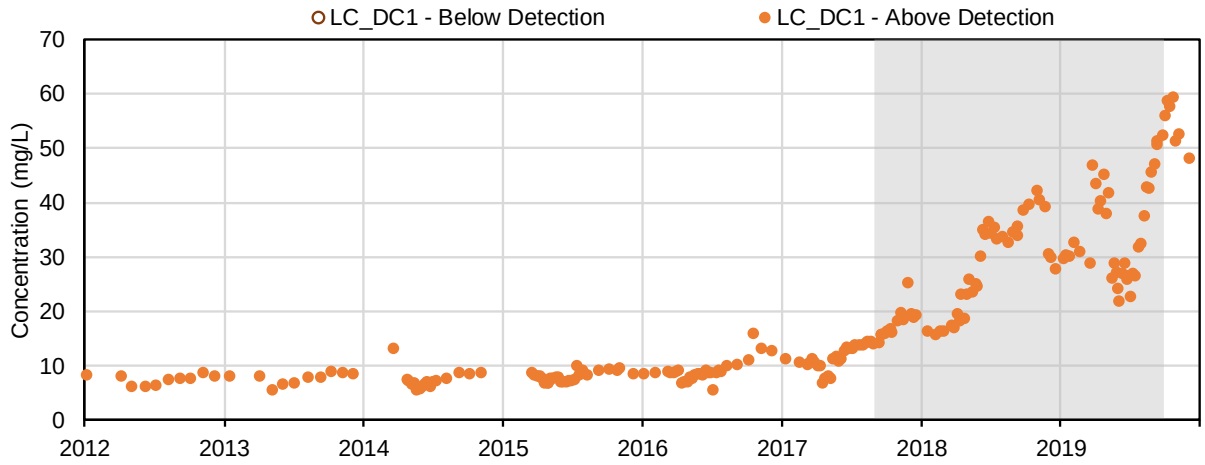
(35) Chloride (mg/L); Major Ions



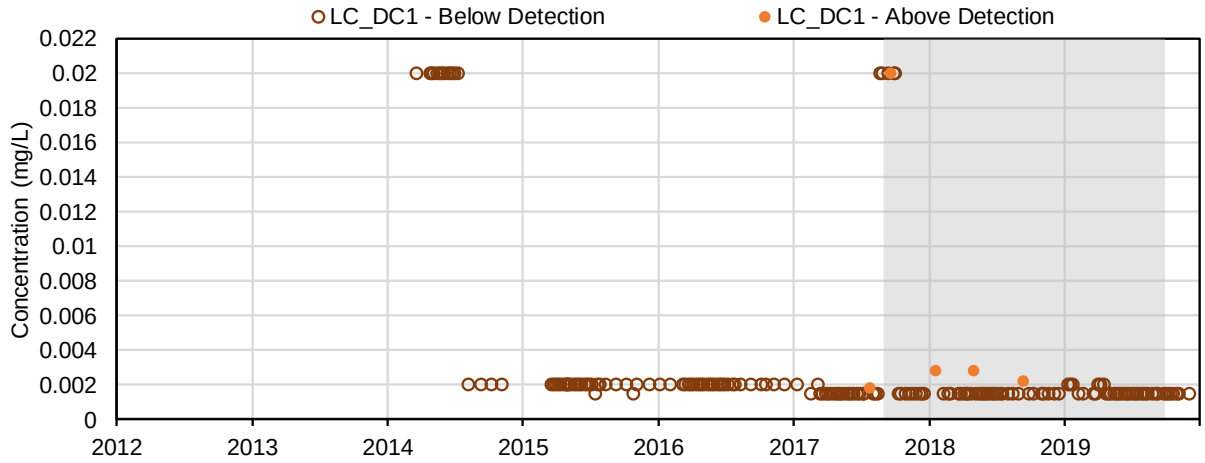
(36) Fluoride (mg/L); Major Ions



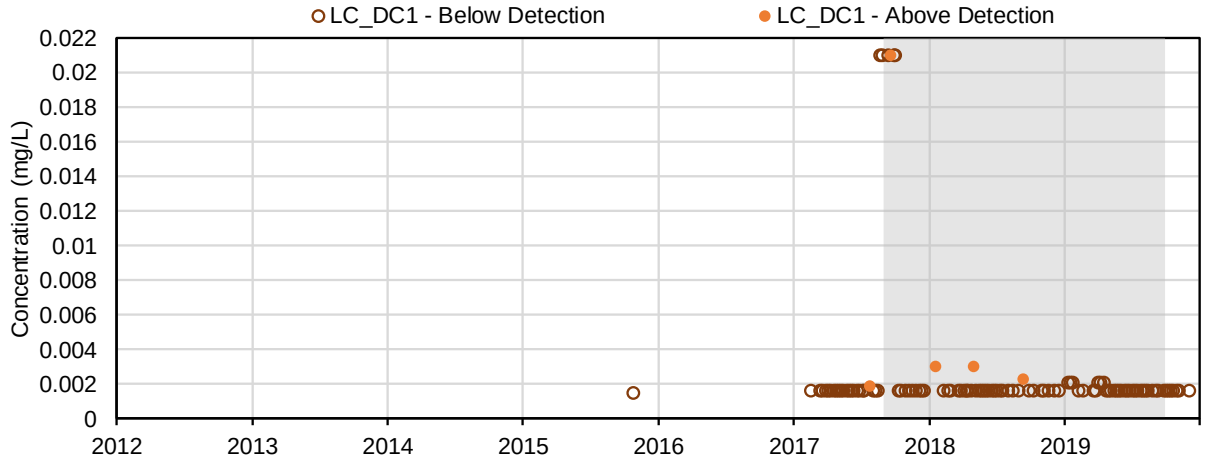
(37) Sulphate (mg/L); Major Ions



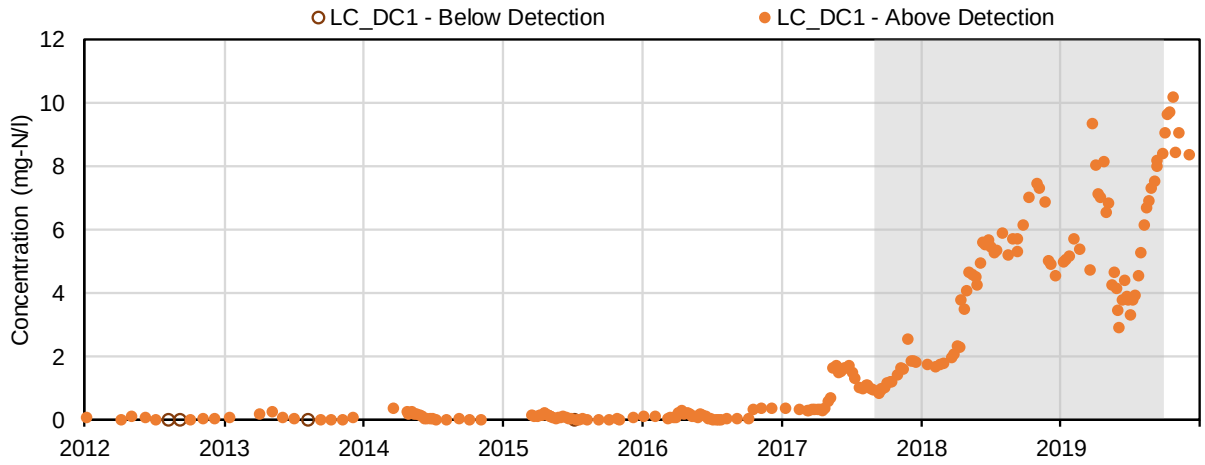
(38) Sulphide (mg/L); Major Ions



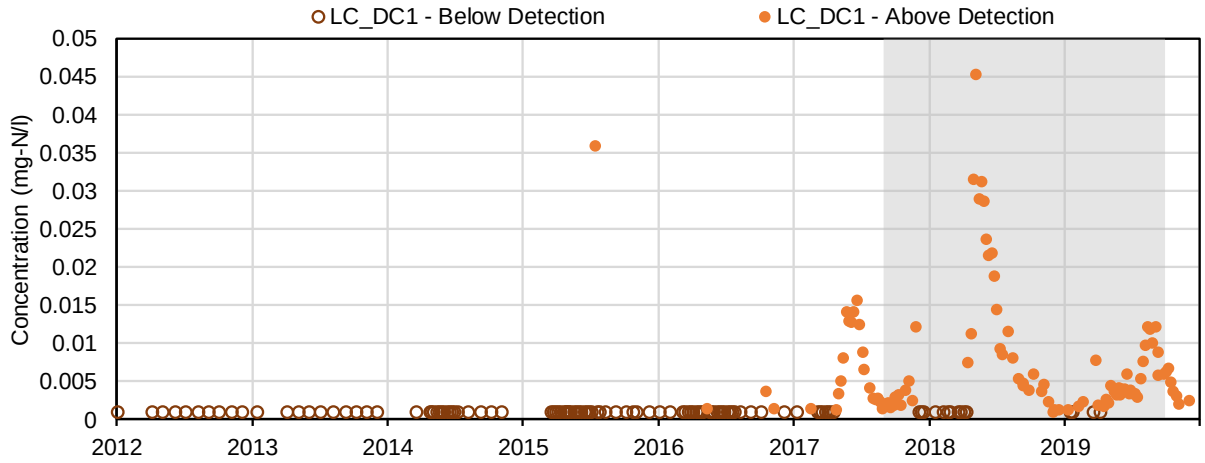
(39) Hydrogen Sulphide (mg/L); Major Ions



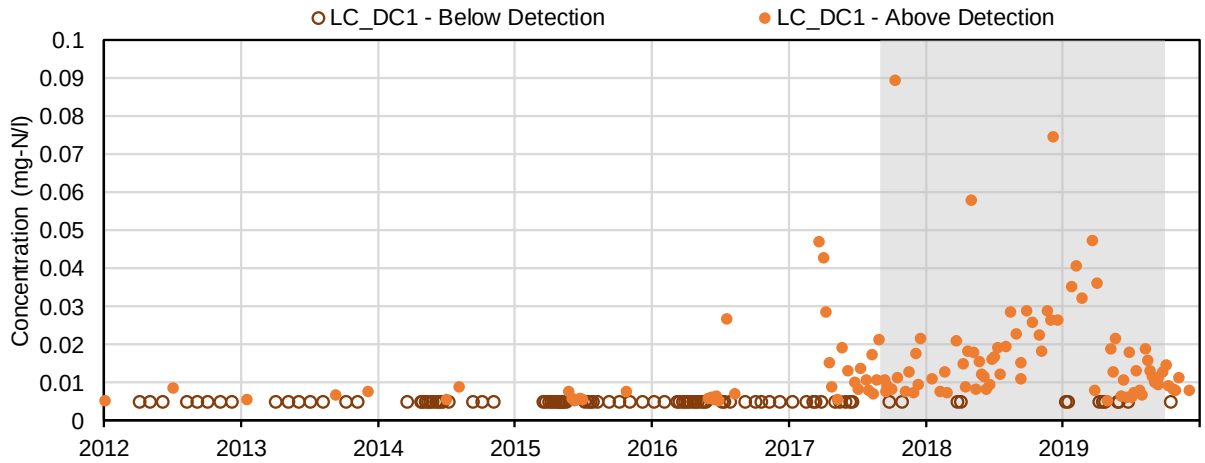
(40) Nitrate (mg-N/l); Nutrients and Biological Indicators



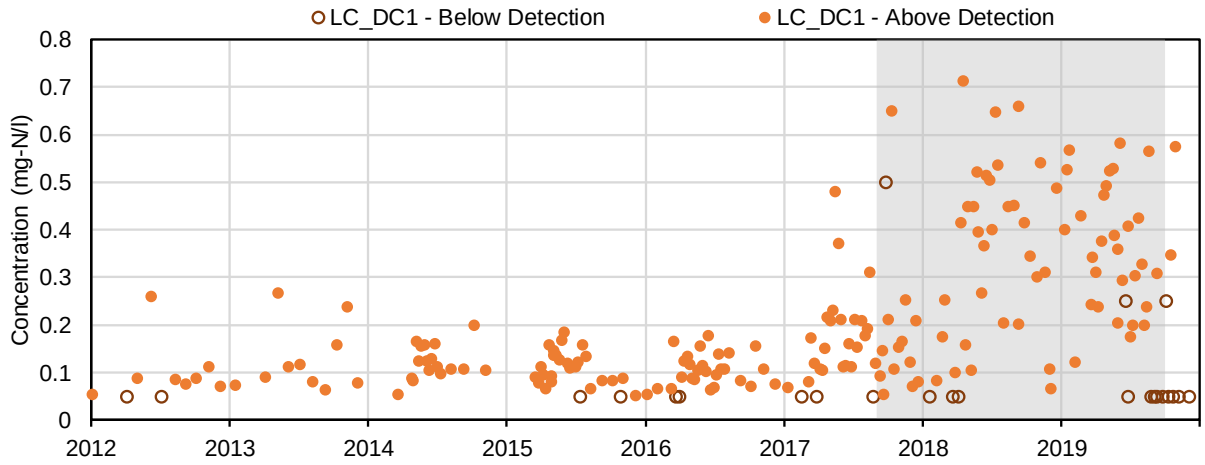
(41) Nitrite (mg-N/l); Nutrients and Biological Indicators



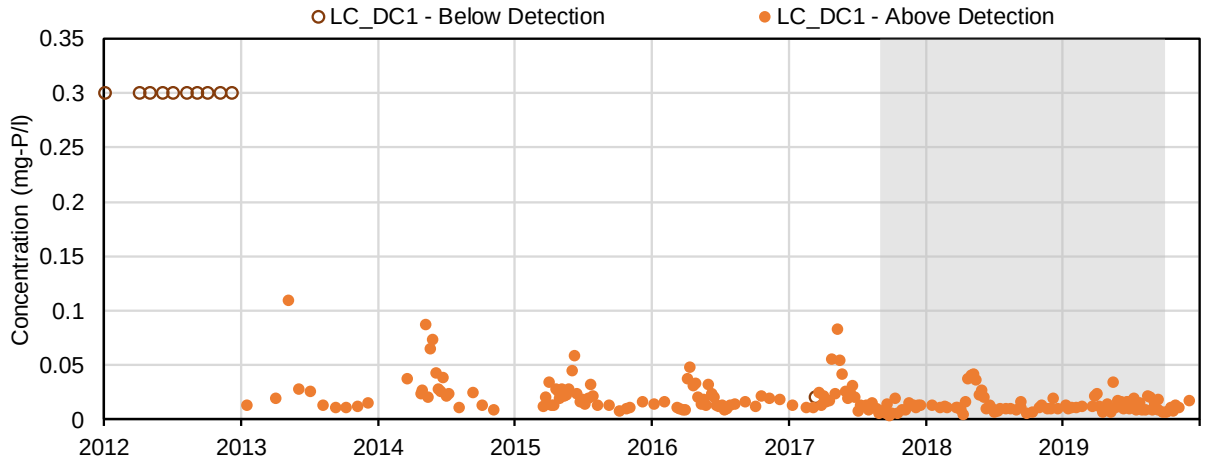
(42) Total ammonia (mg-N/l); Nutrients and Biological Indicators



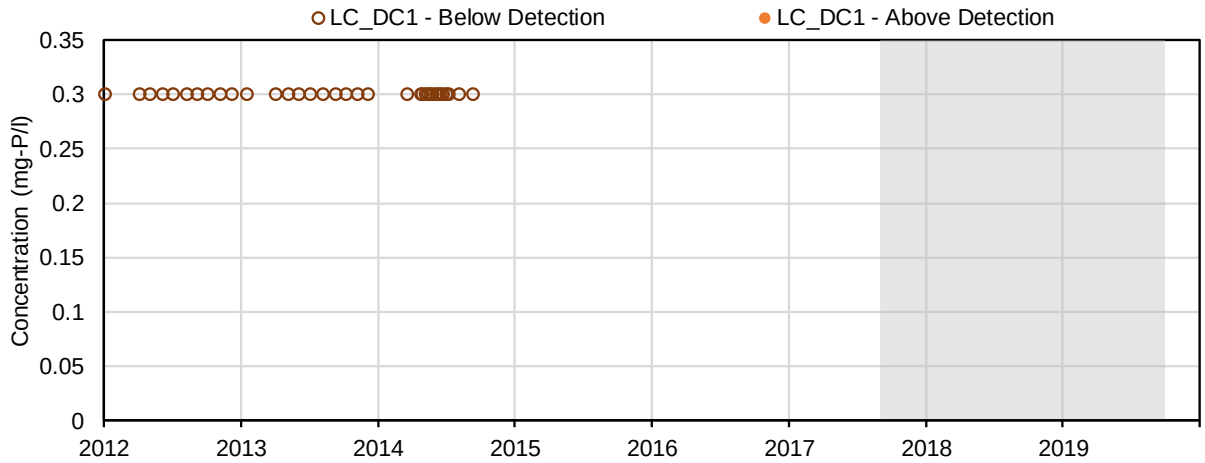
(43) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



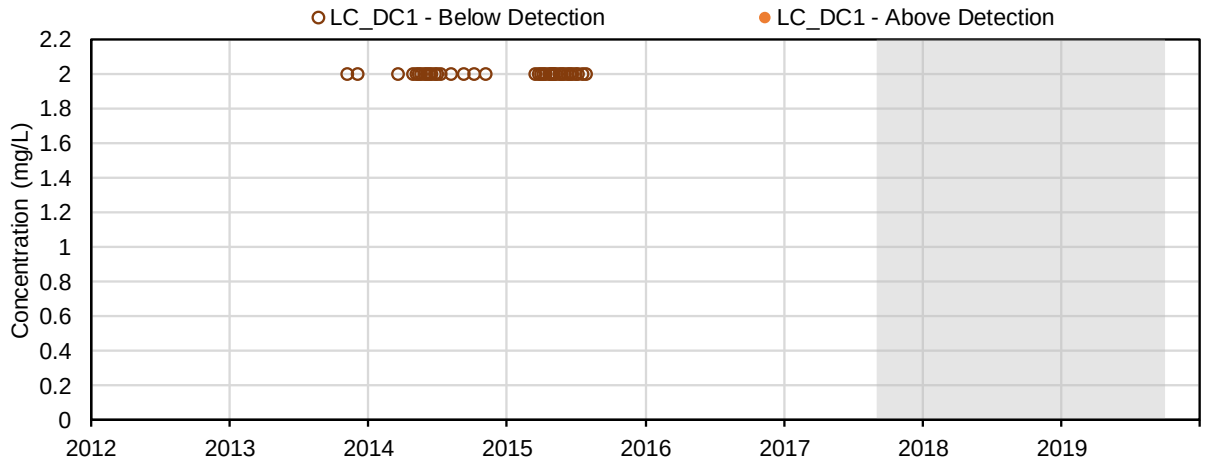
(44) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



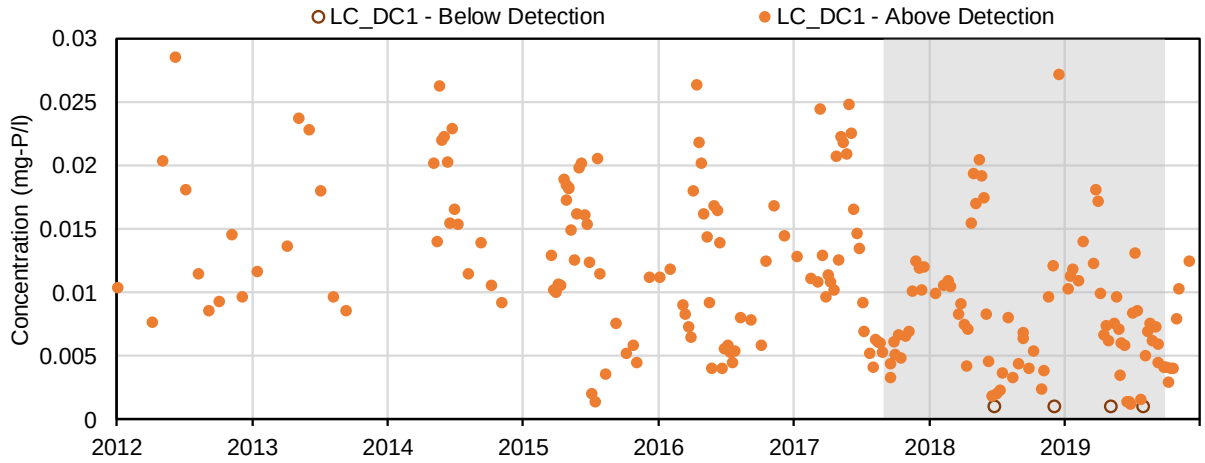
(45) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



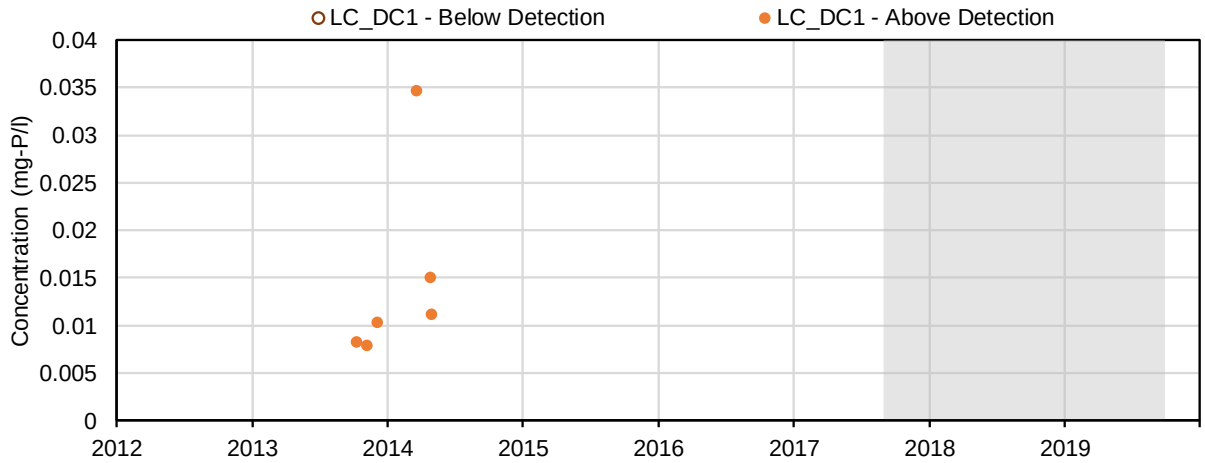
(46) Biochemical oxygen demand (mg/L); Nutrients and Biological Indicators



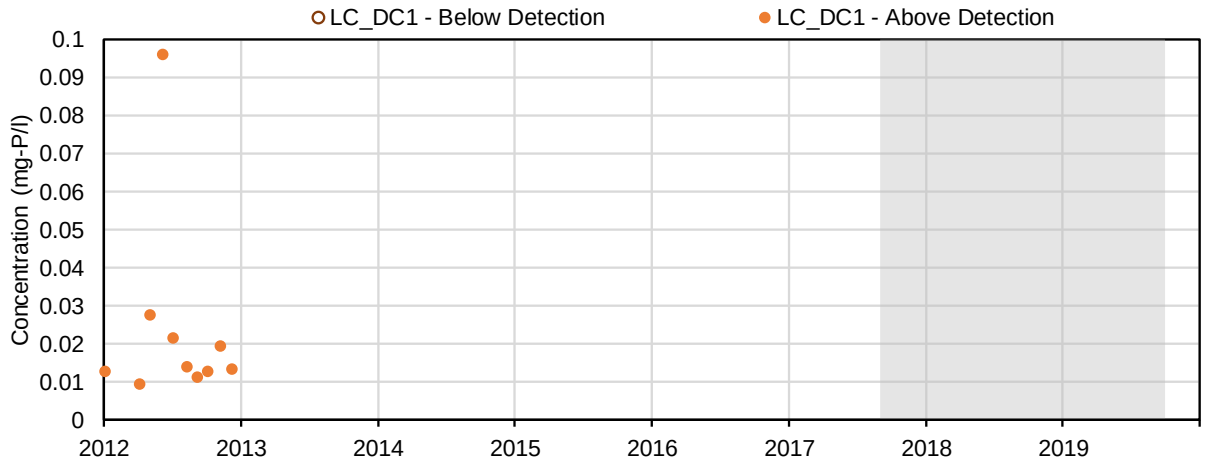
(47) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



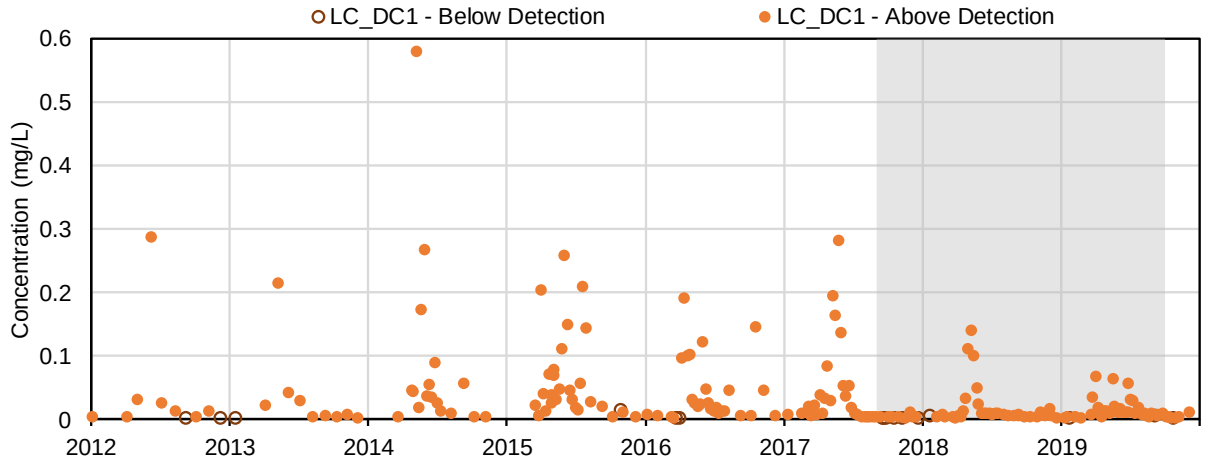
(48) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



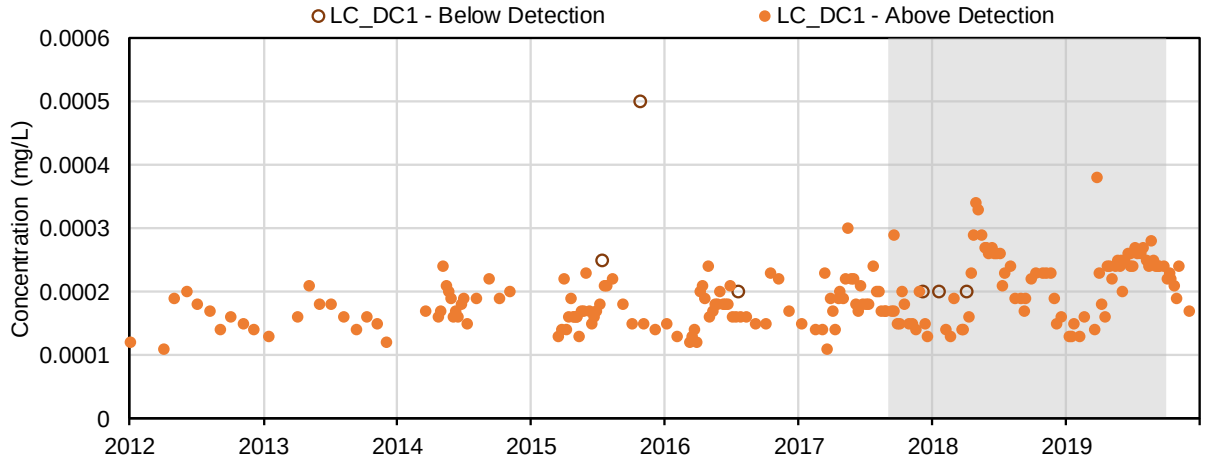
(49) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



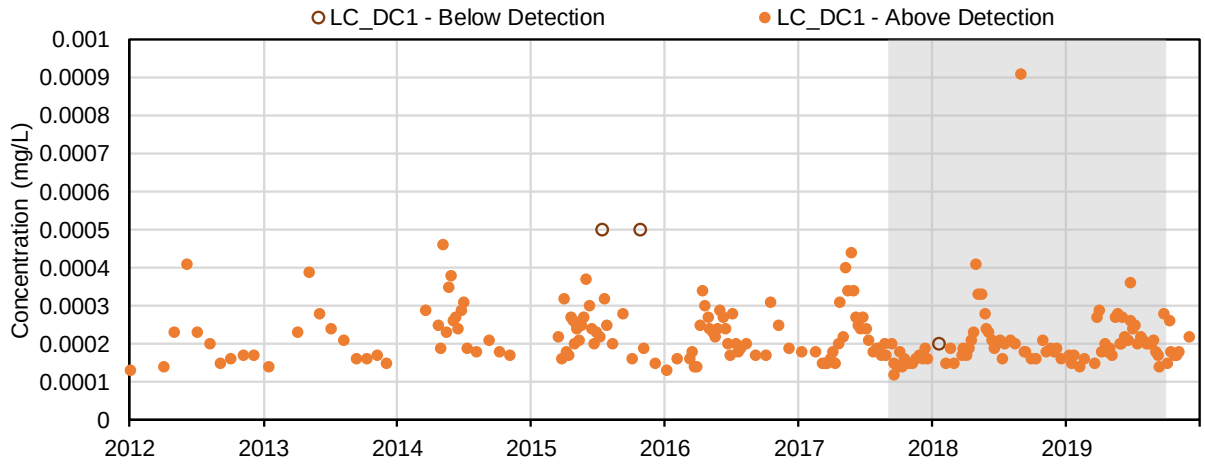
(50) Aluminum (mg/L); Total Metals



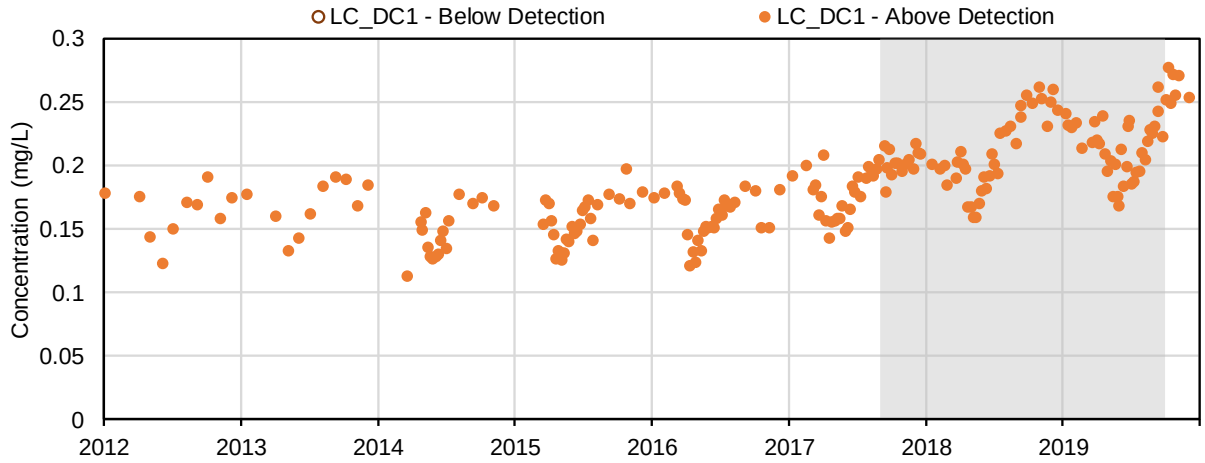
(51) Antimony (mg/L); Total Metals



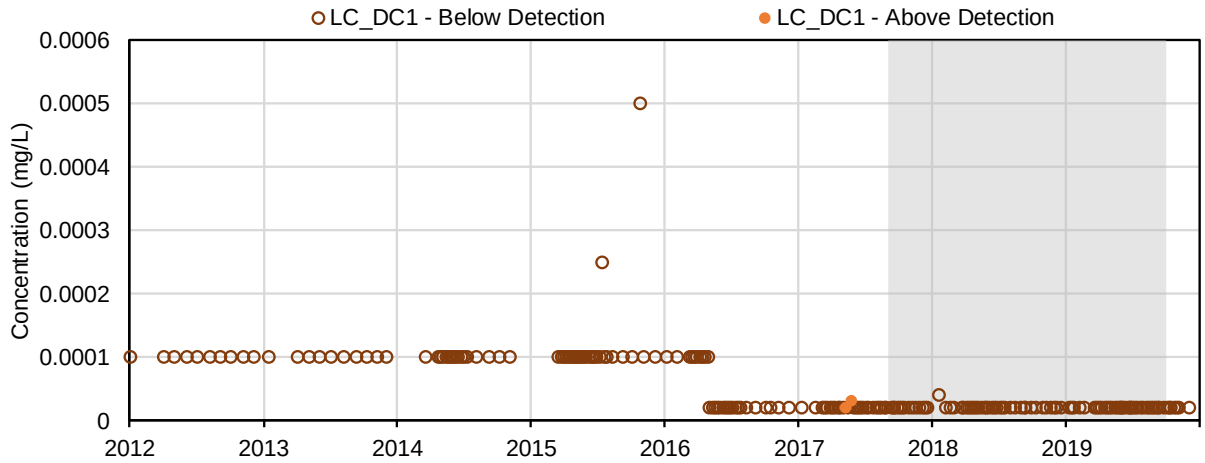
(52) Arsenic (mg/L); Total Metals



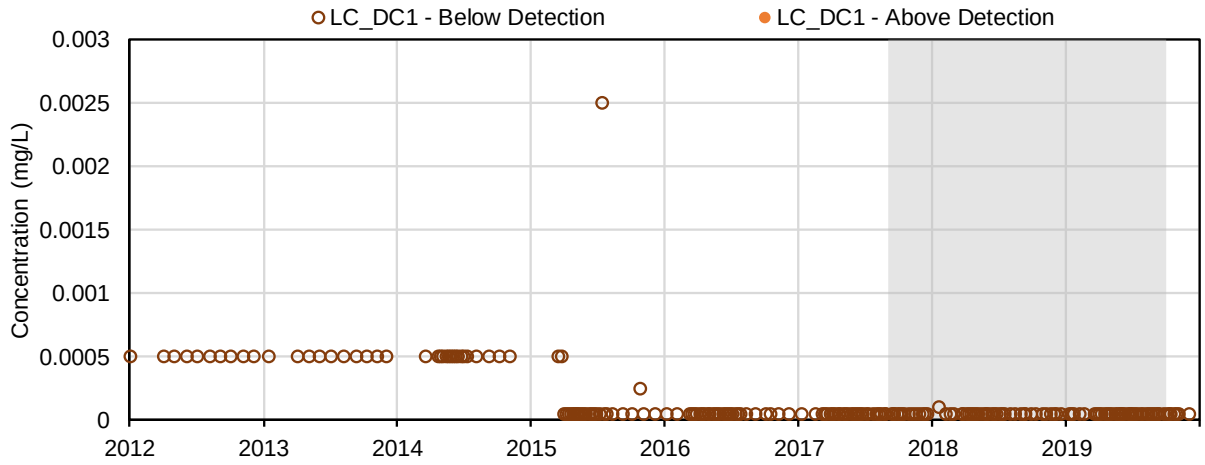
(53) Barium (mg/L); Total Metals



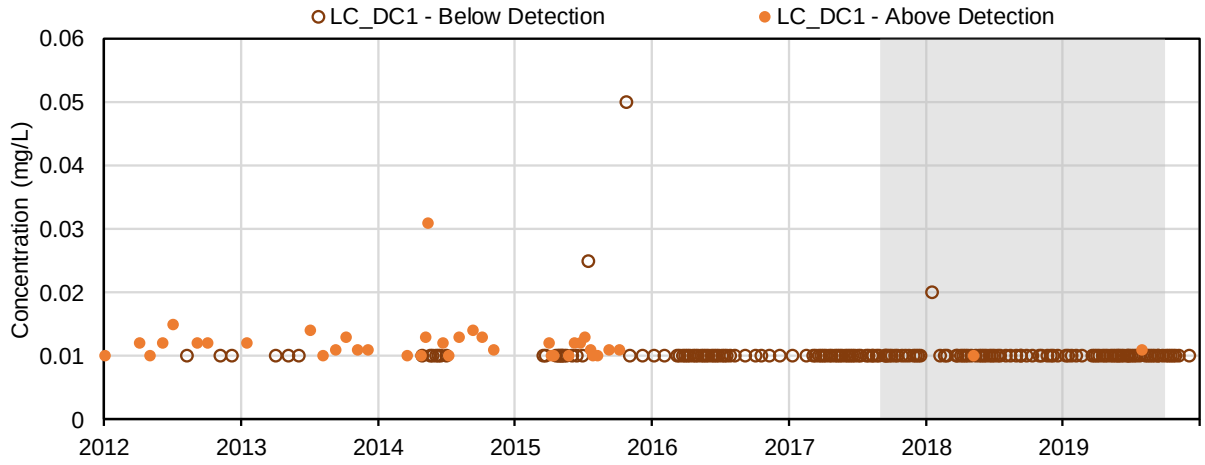
(54) Beryllium (mg/L); Total Metals



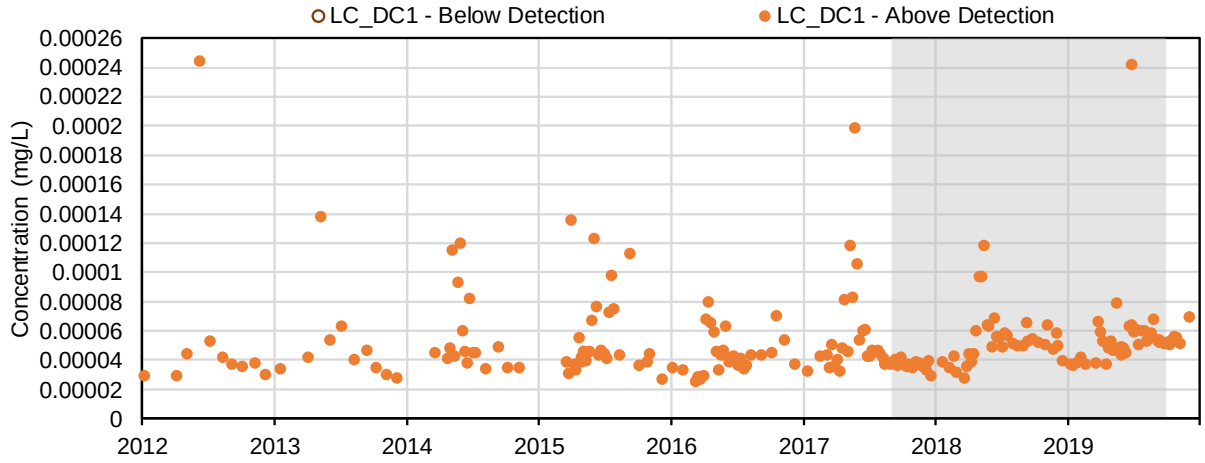
(55) Bismuth (mg/L); Total Metals



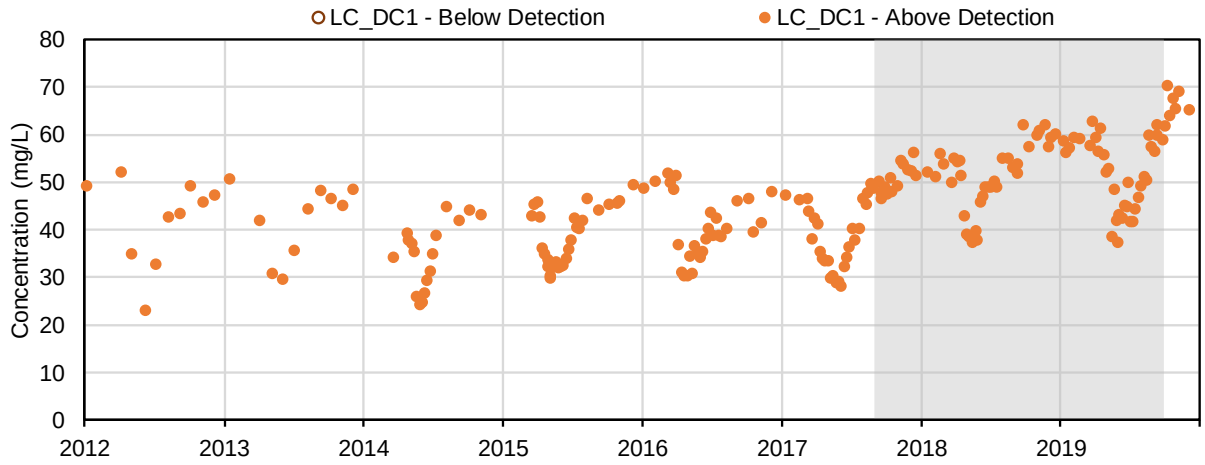
(56) Boron (mg/L); Total Metals



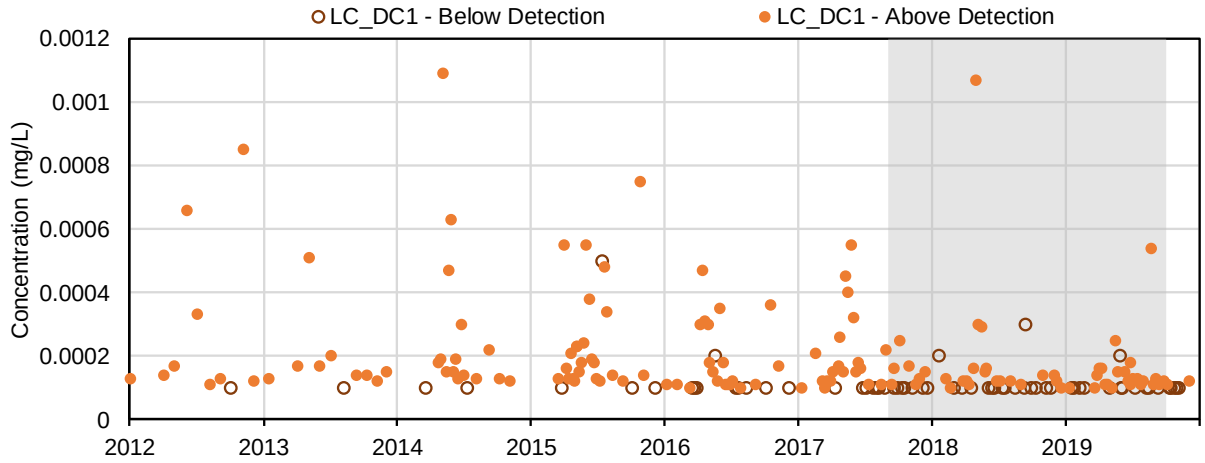
(57) Cadmium (mg/L); Total Metals



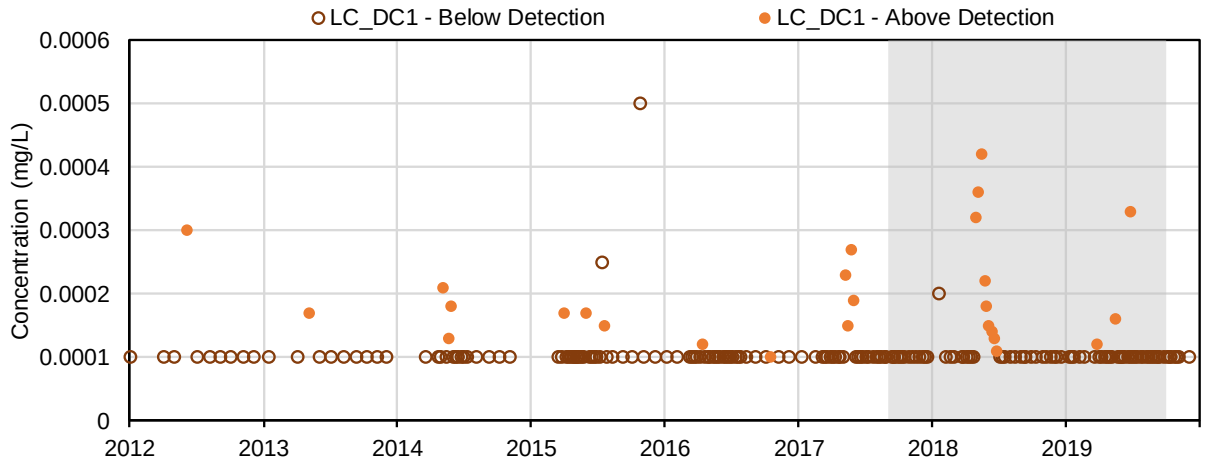
(58) Calcium (mg/L); Total Metals



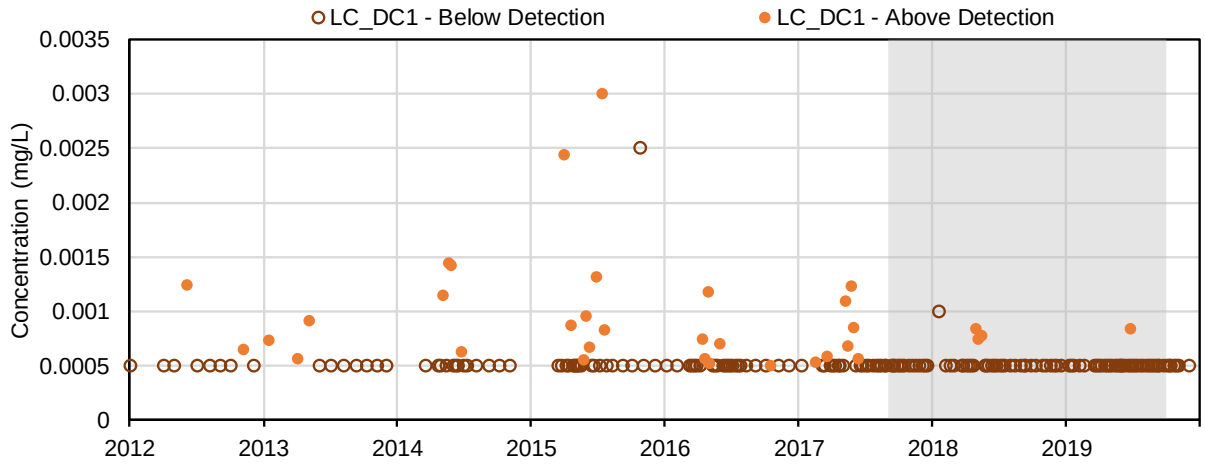
(59) Chromium (mg/L); Total Metals



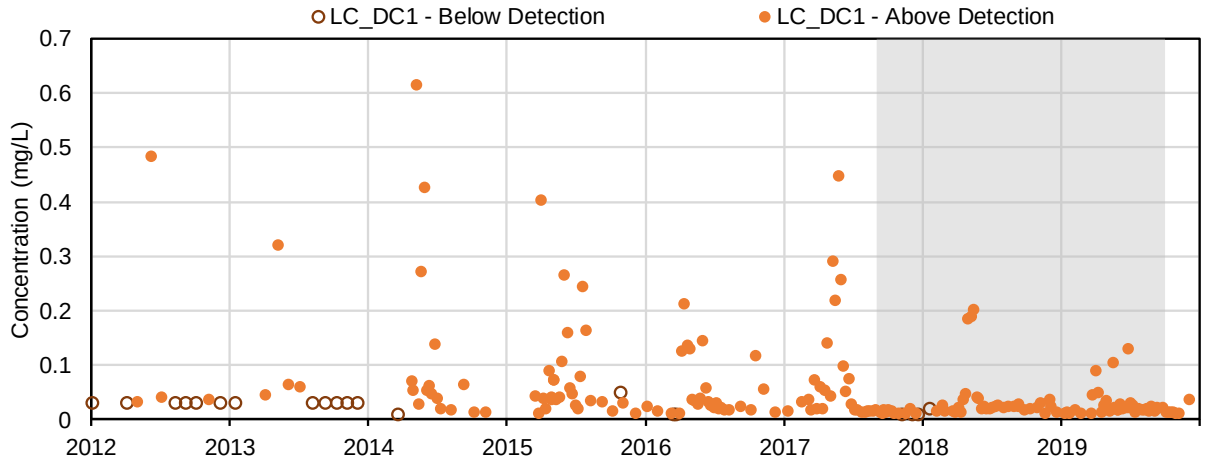
(60) Cobalt (mg/L); Total Metals



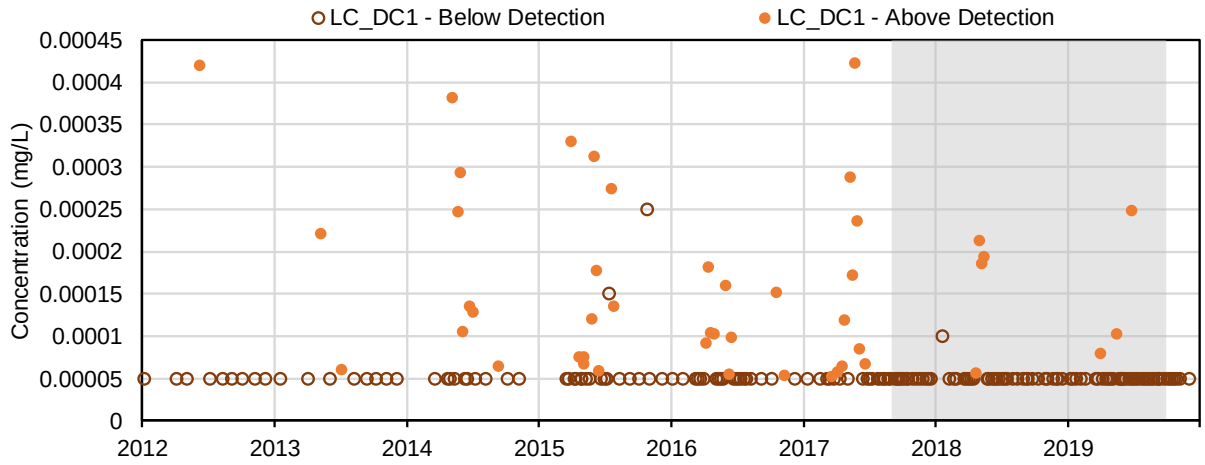
(61) Copper (mg/L); Total Metals



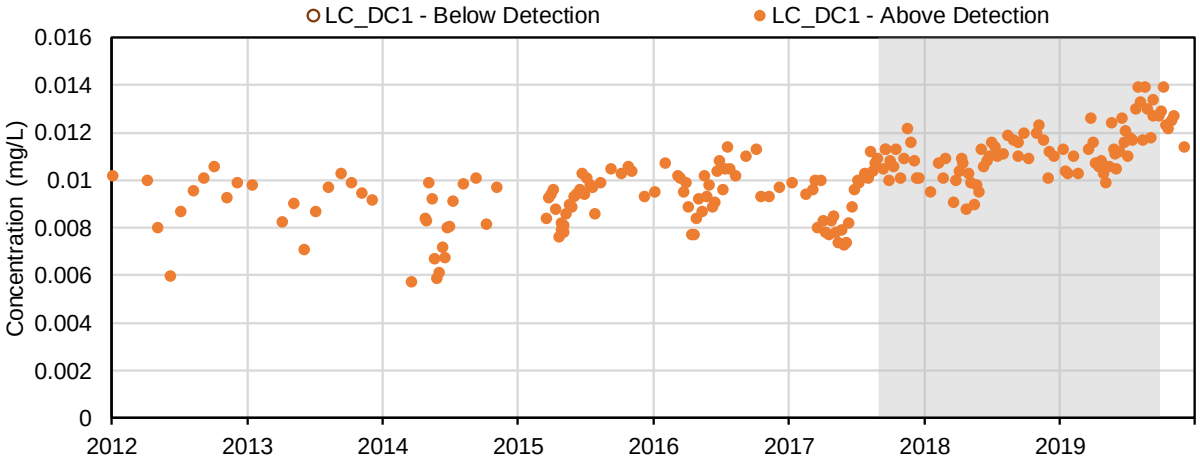
(62) Iron (mg/L); Total Metals



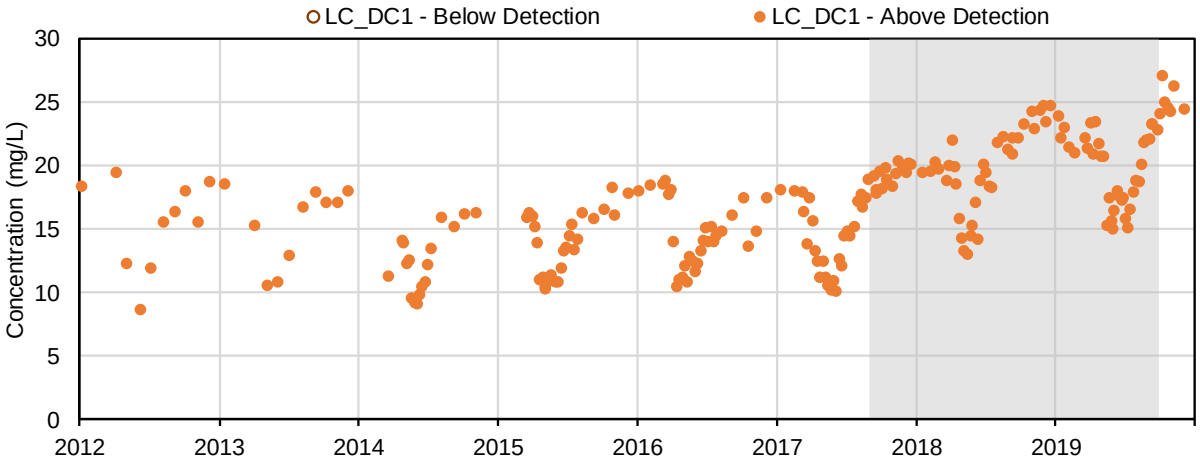
(63) Lead (mg/L); Total Metals



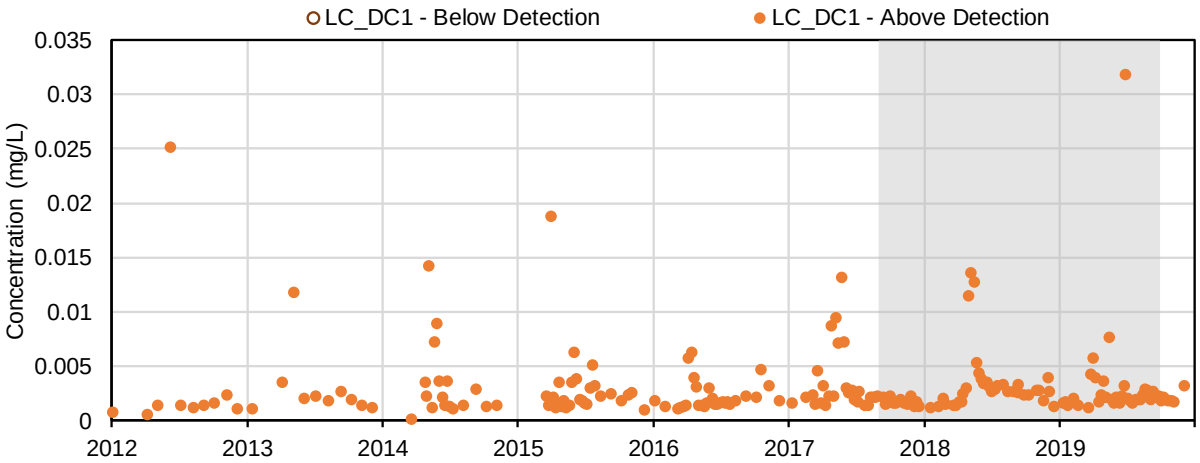
(64) Lithium (mg/L); Total Metals



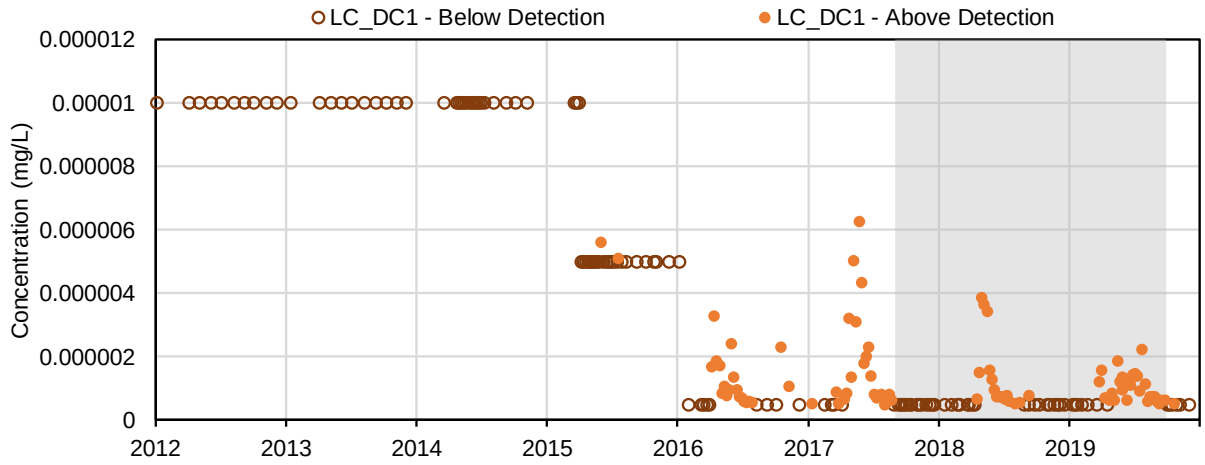
(65) Magnesium (mg/L); Total Metals



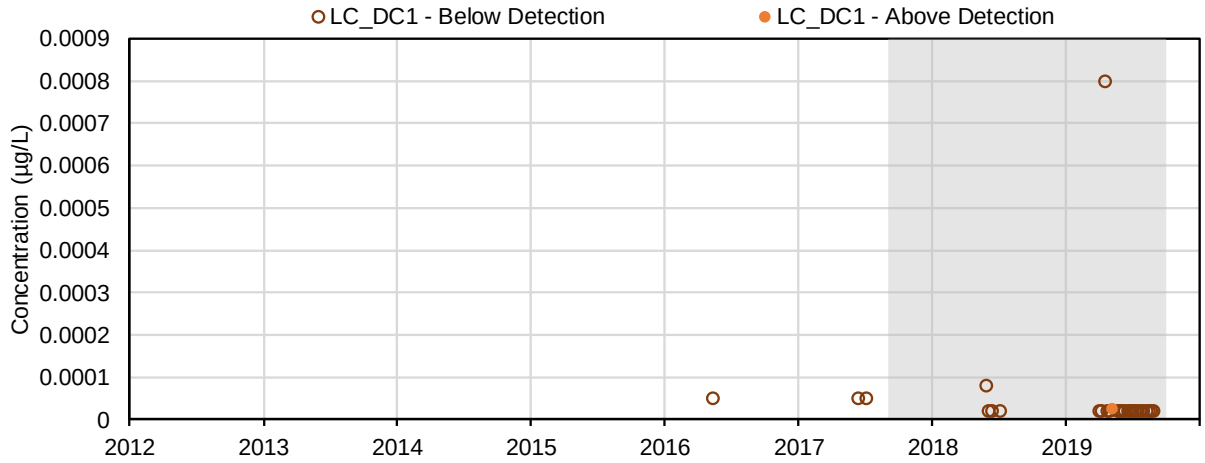
(66) Manganese (mg/L); Total Metals



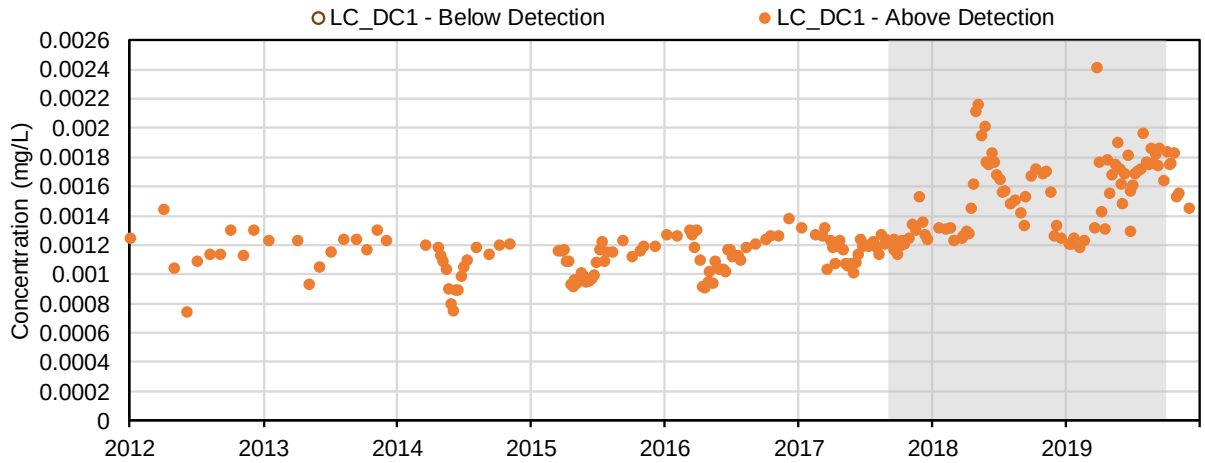
(67) Mercury (mg/L); Total Metals



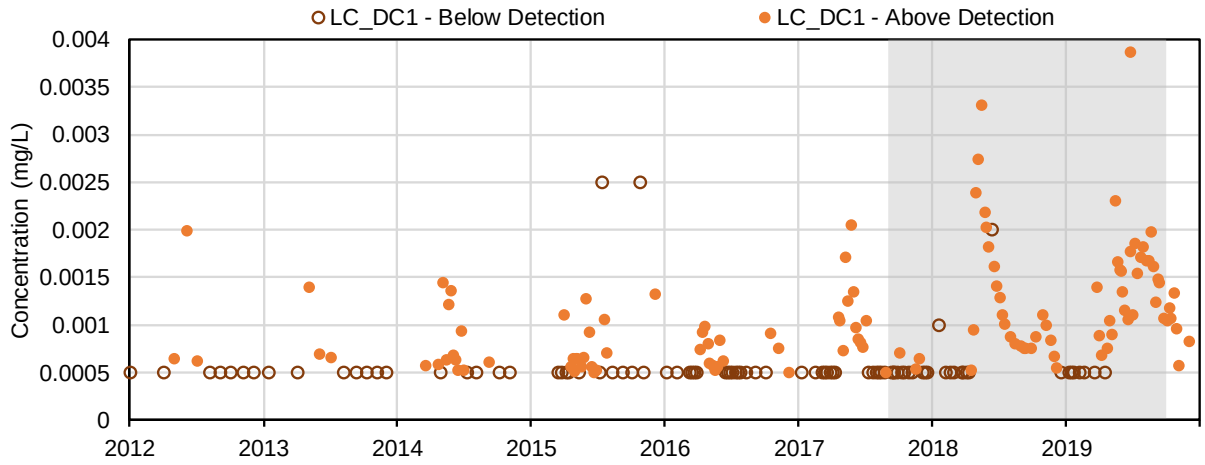
(68) Methyl mercury (µg/L); Total Metals



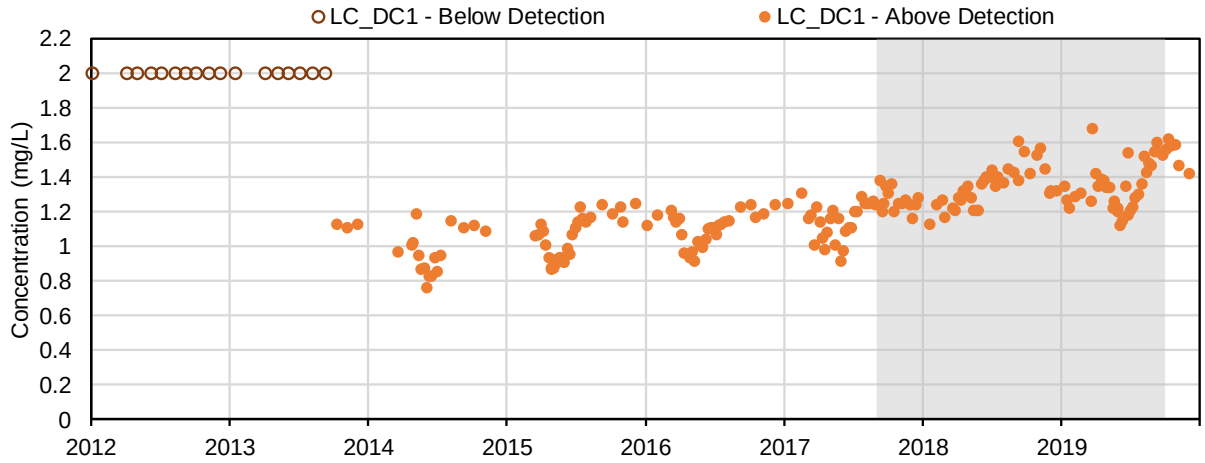
(69) Molybdenum (mg/L); Total Metals



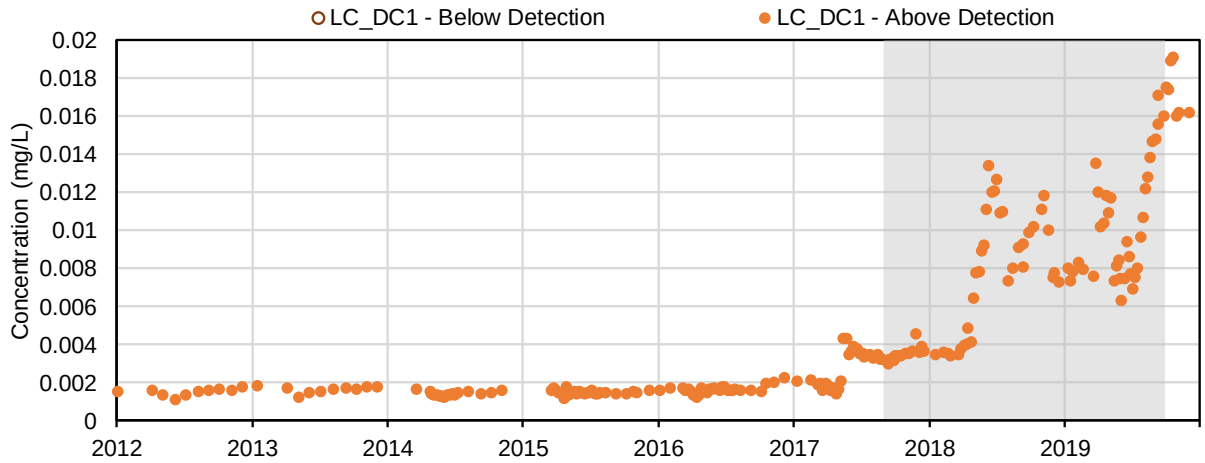
(70) Nickel (mg/L); Total Metals



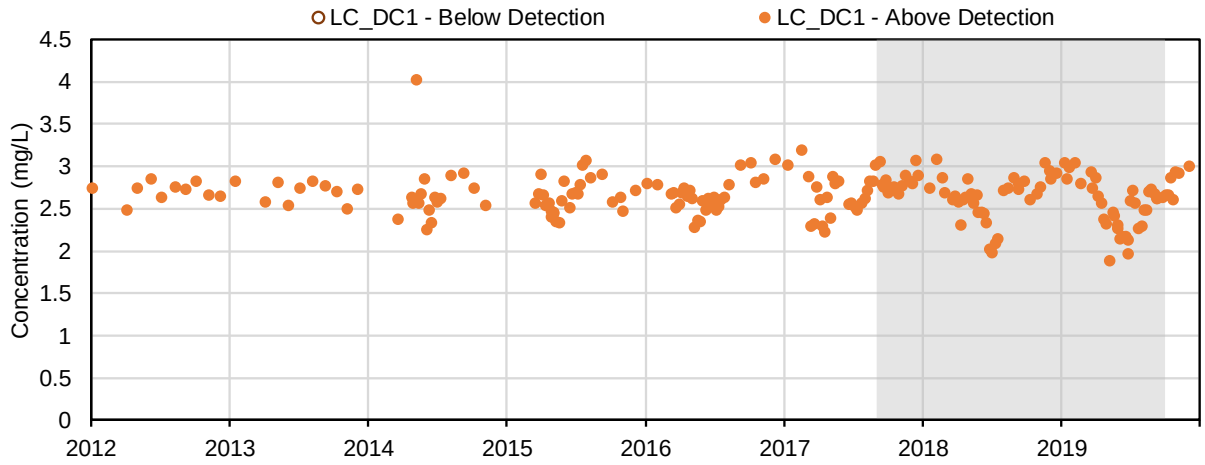
(71) Potassium (mg/L); Total Metals



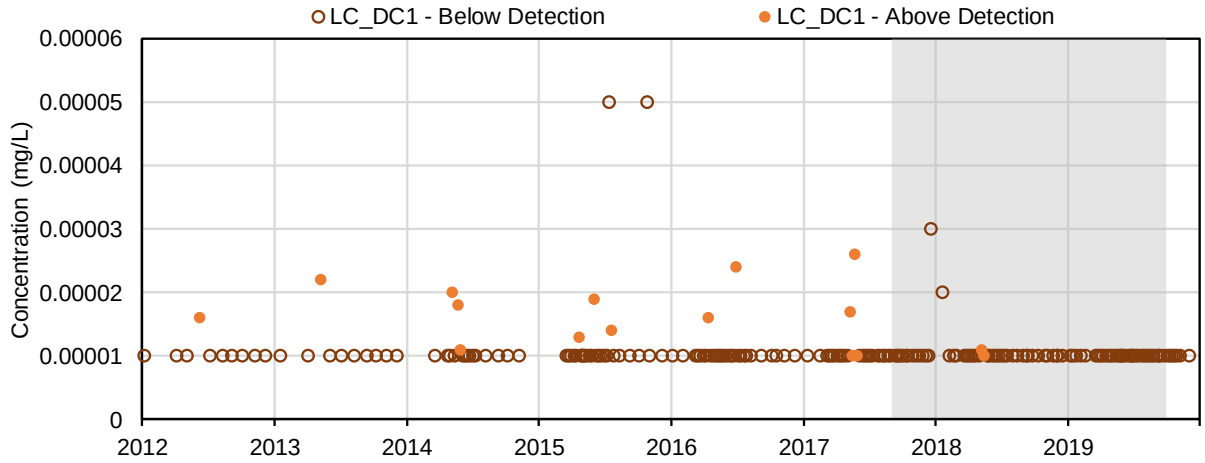
(72) Selenium (mg/L); Total Metals



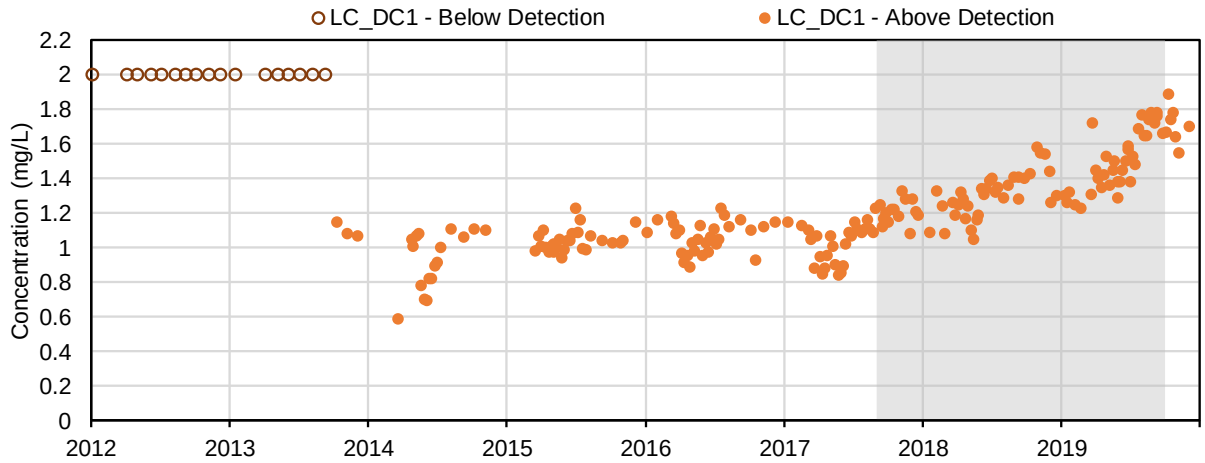
(73) Silicon (mg/L); Total Metals



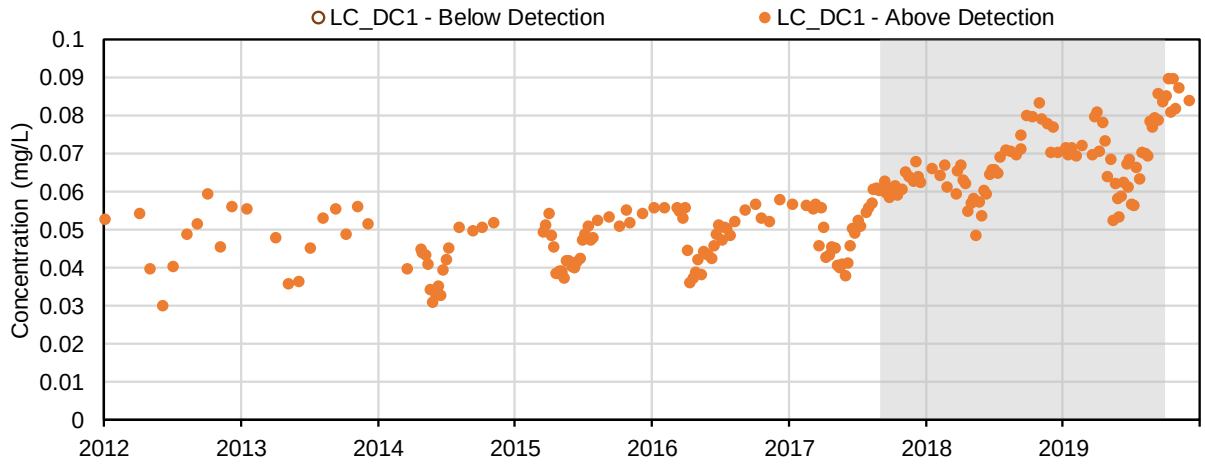
(74) Silver (mg/L); Total Metals



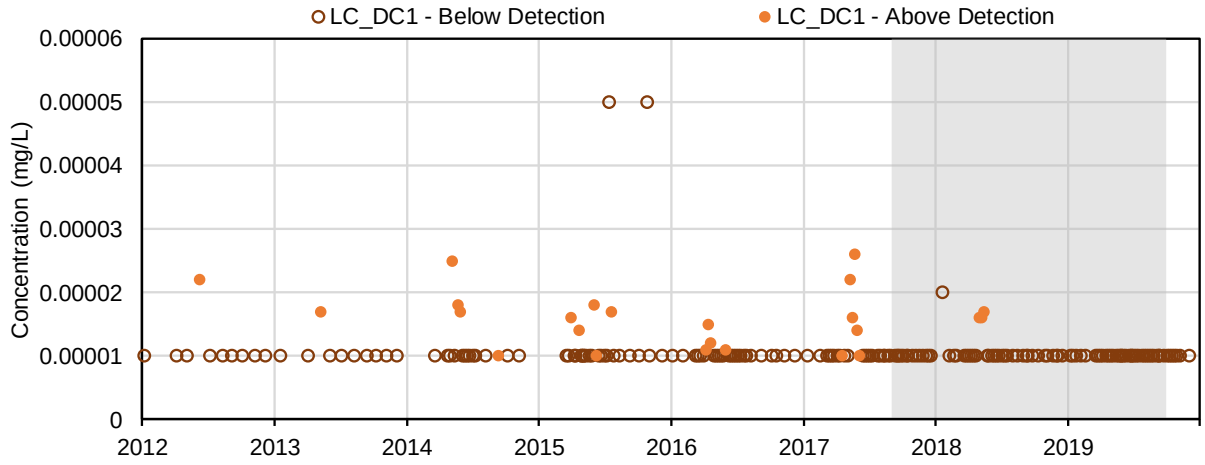
(75) Sodium (mg/L); Total Metals



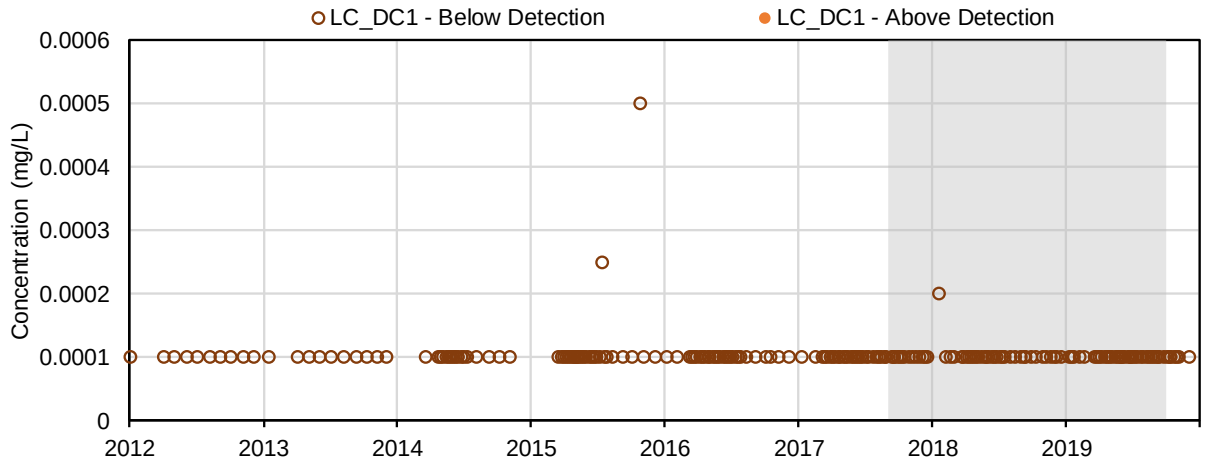
(76) Strontium (mg/L); Total Metals



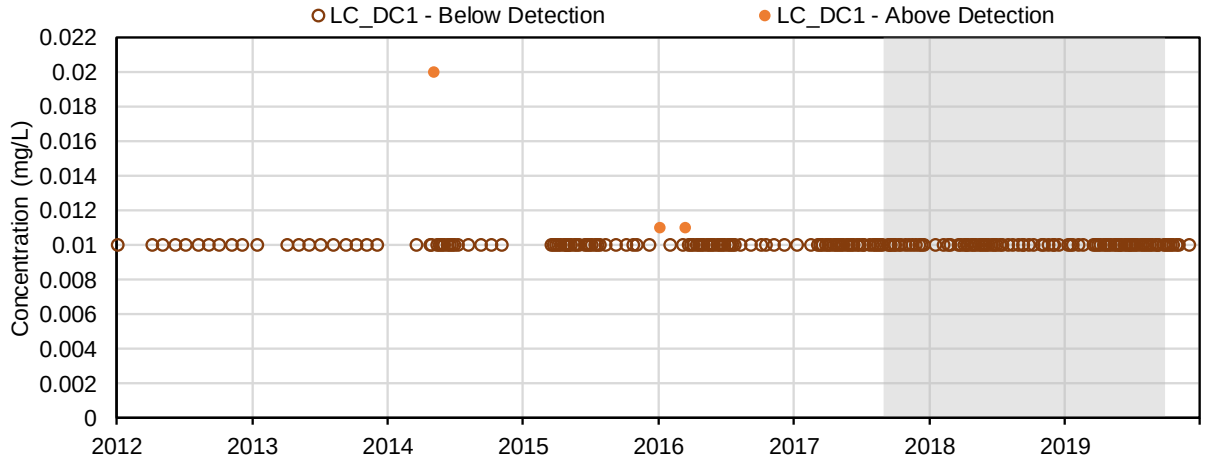
(77) Thallium (mg/L); Total Metals



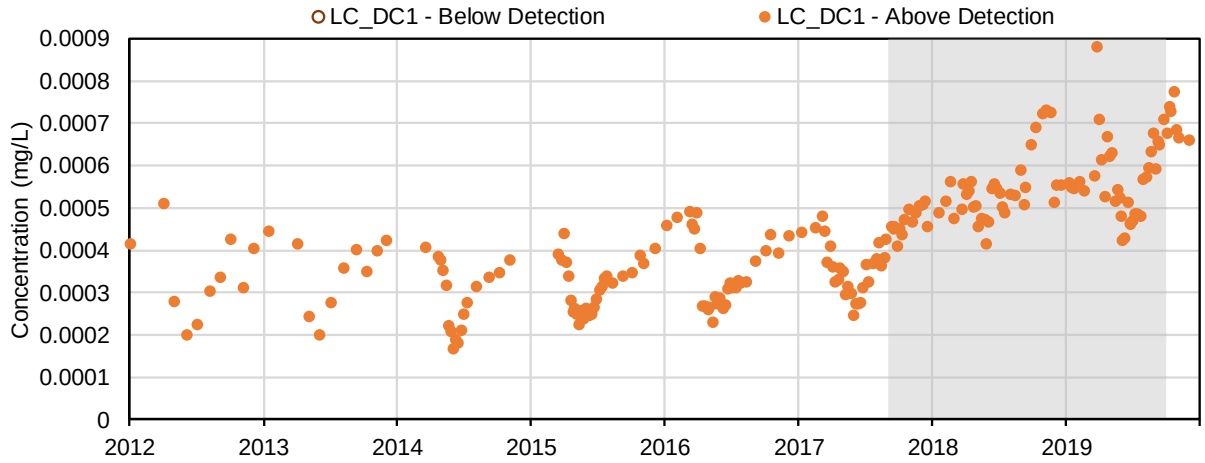
(78) Tin (mg/L); Total Metals



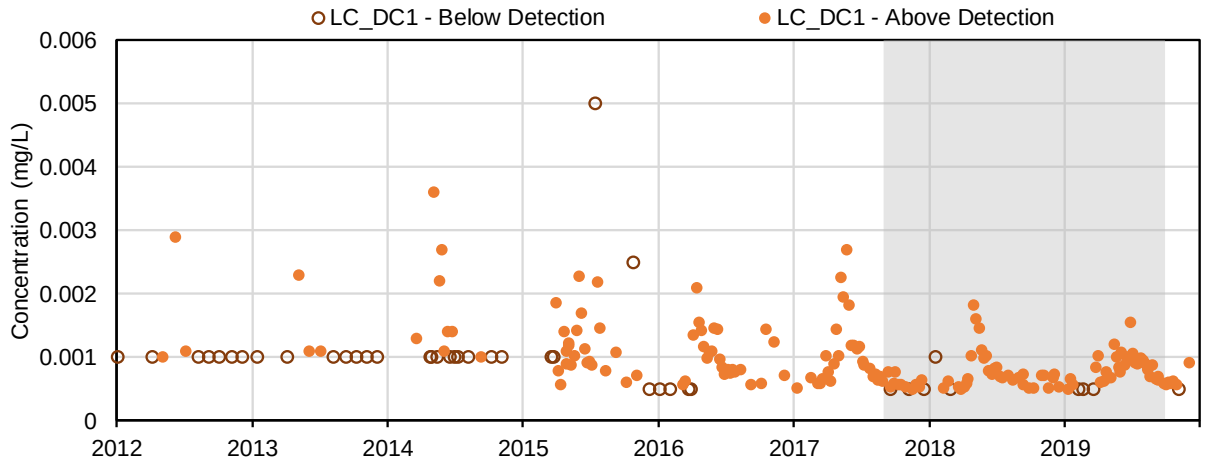
(79) Titanium (mg/L); Total Metals



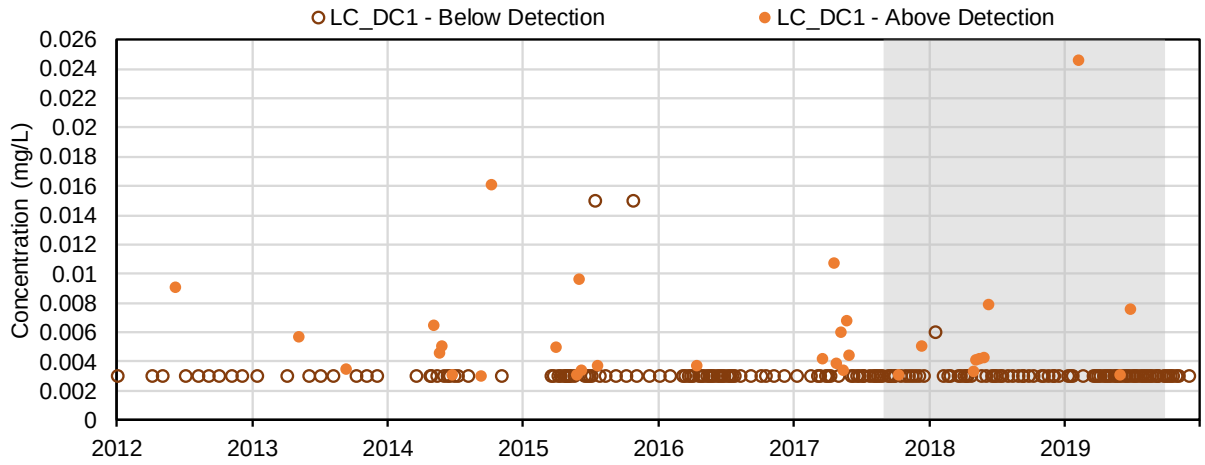
(80) Uranium (mg/L); Total Metals



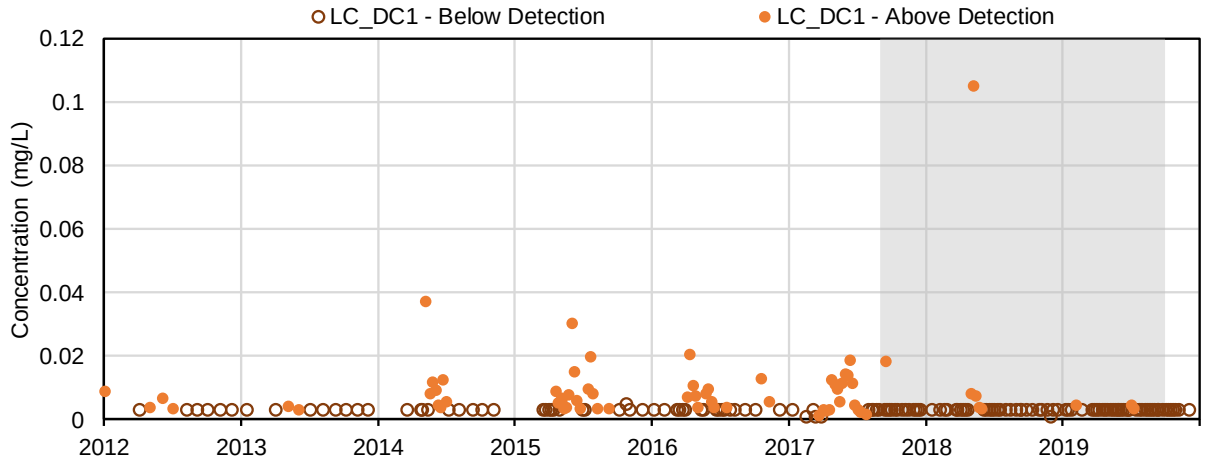
(81) Vanadium (mg/L); Total Metals



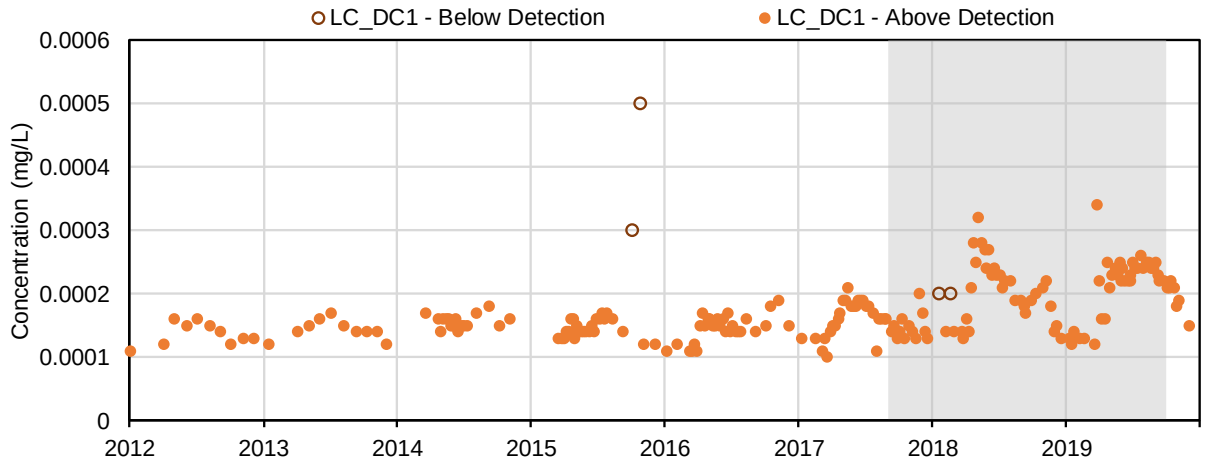
(82) Zinc (mg/L); Total Metals



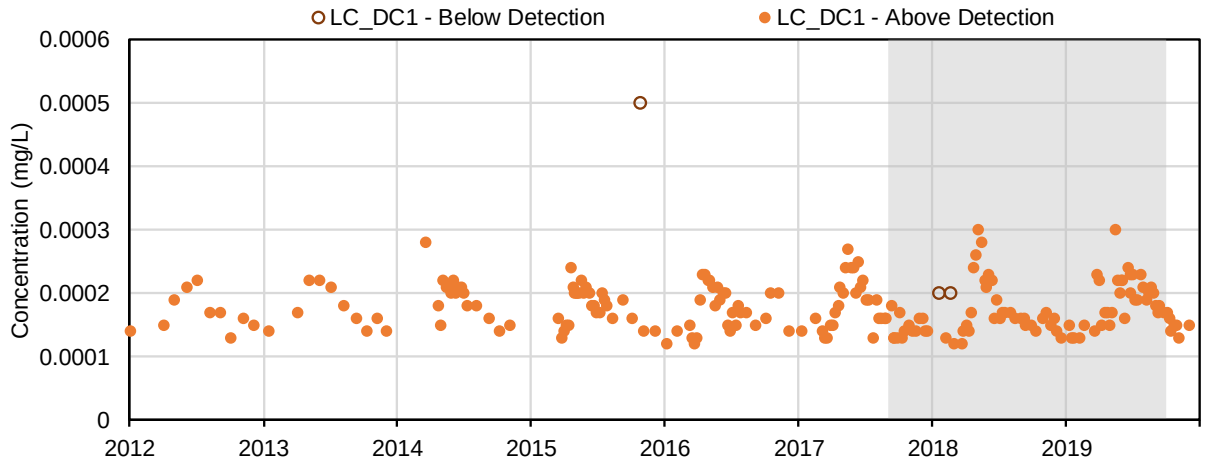
(83) Aluminum (mg/L); Dissolved Metals



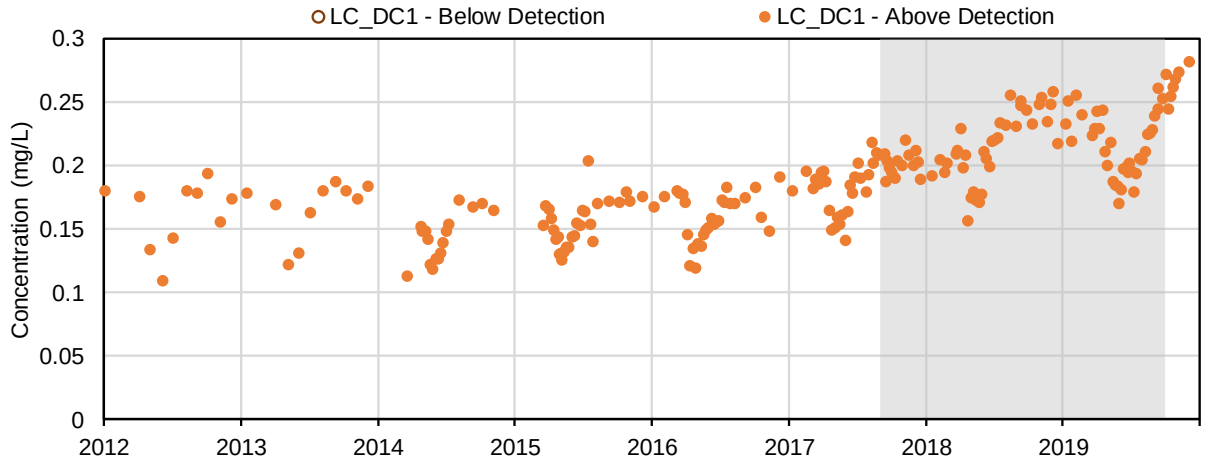
(84) Antimony (mg/L); Dissolved Metals



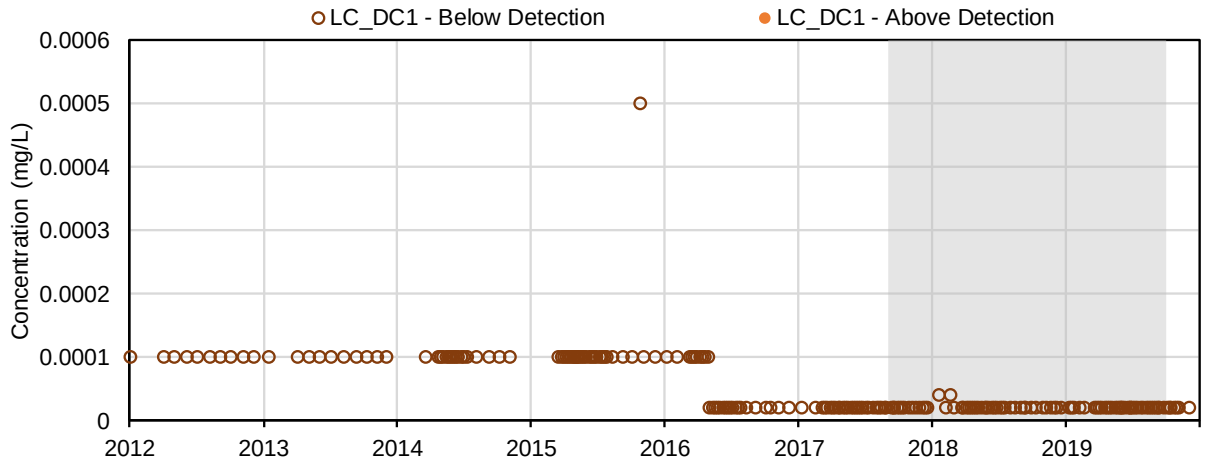
(85) Arsenic (mg/L); Dissolved Metals



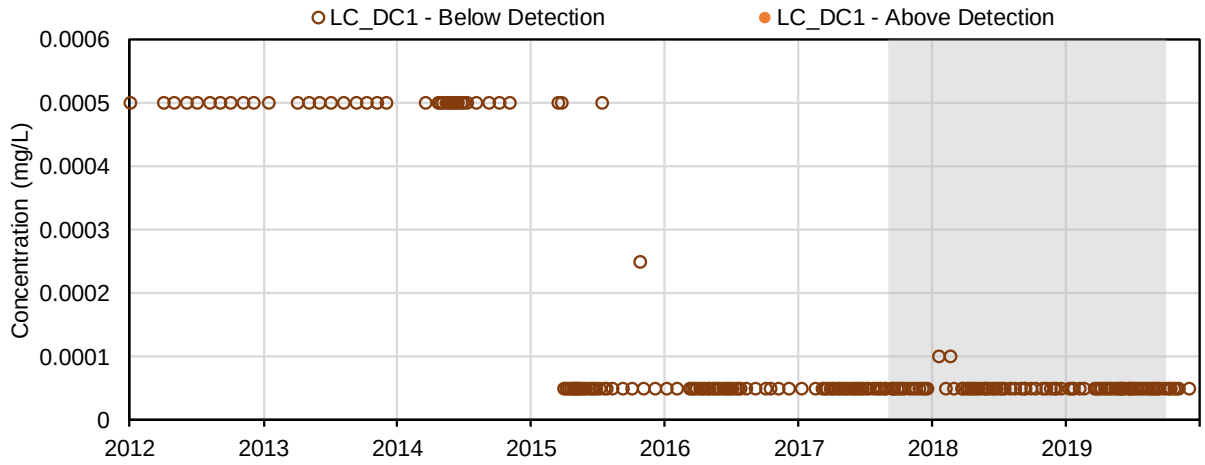
(86) Barium (mg/L); Dissolved Metals



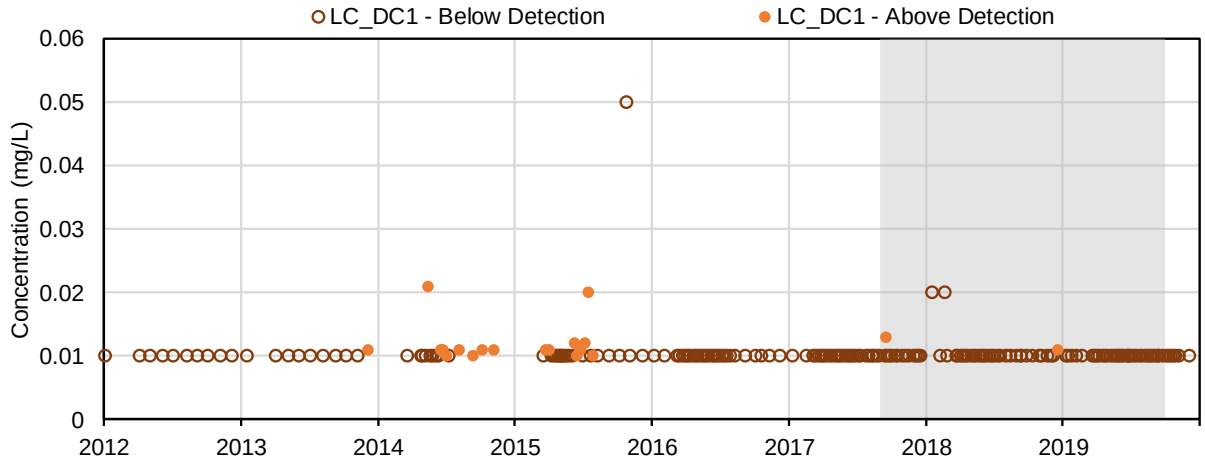
(87) Beryllium (mg/L); Dissolved Metals



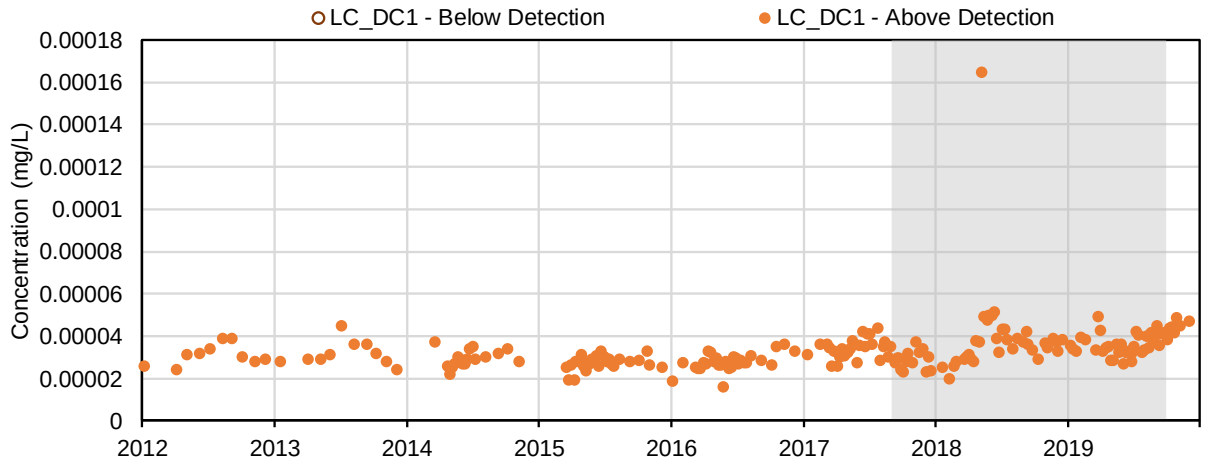
(88) Bismuth (mg/L); Dissolved Metals



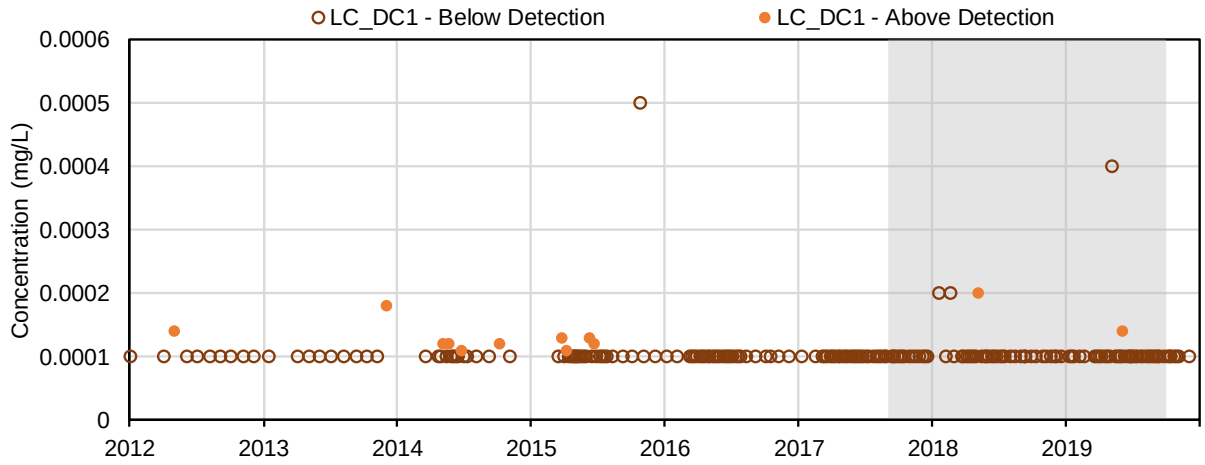
(89) Boron (mg/L); Dissolved Metals



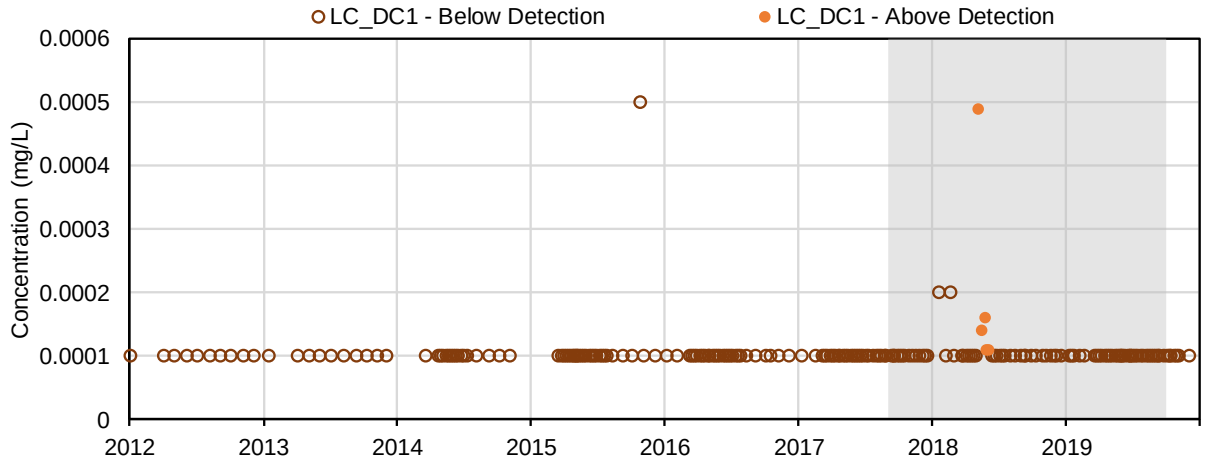
(90) Cadmium (mg/L); Dissolved Metals



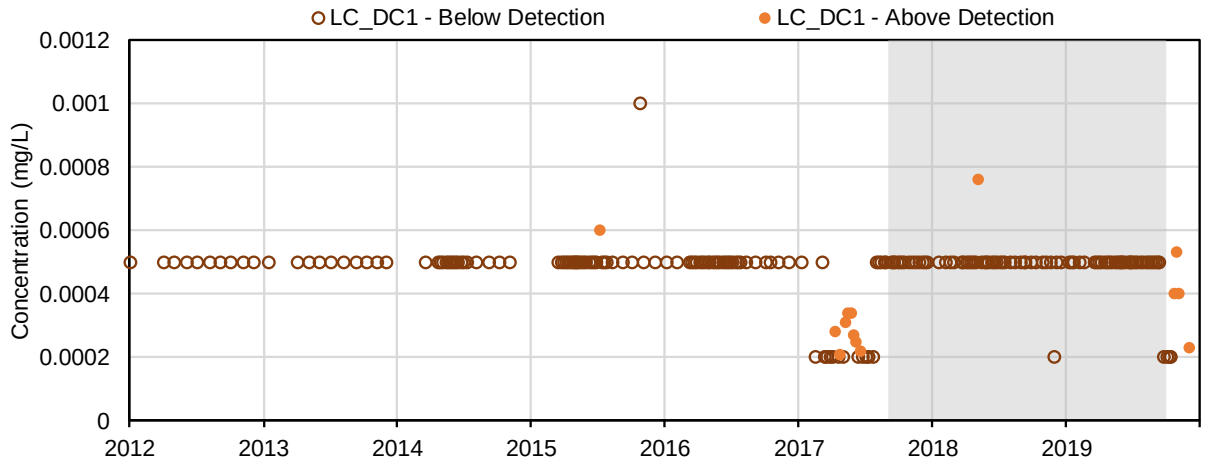
(91) Chromium (mg/L); Dissolved Metals



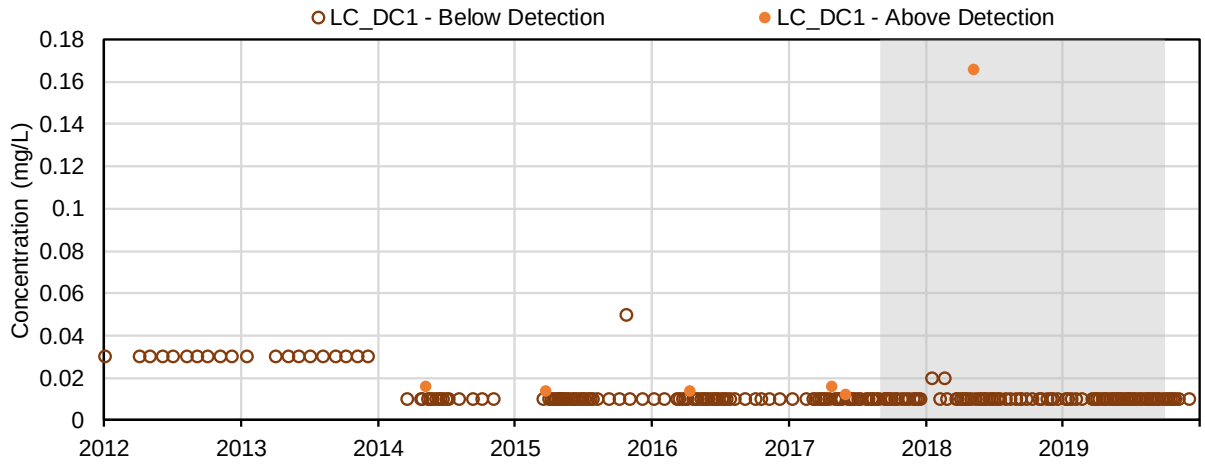
(92) Cobalt (mg/L); Dissolved Metals



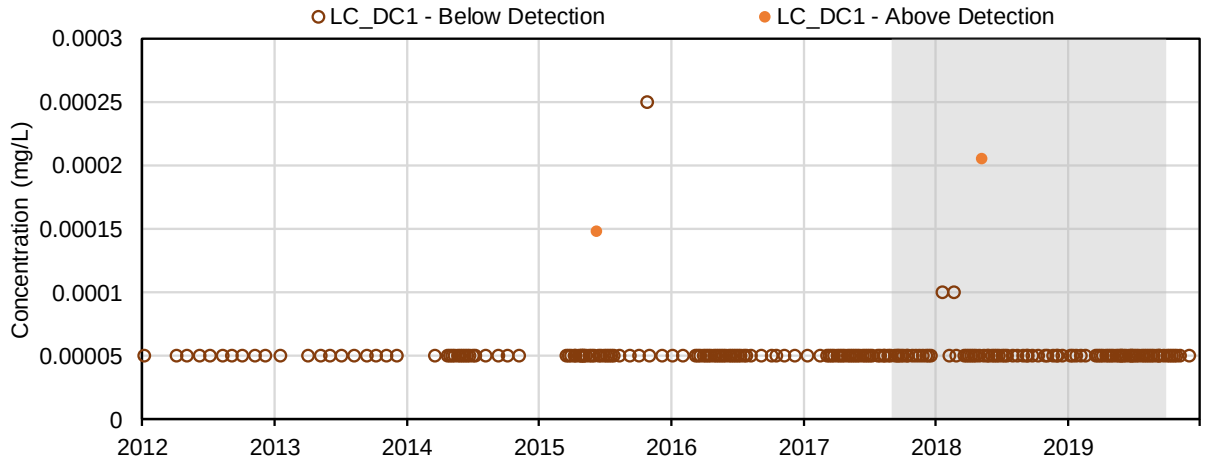
(93) Copper (mg/L); Dissolved Metals



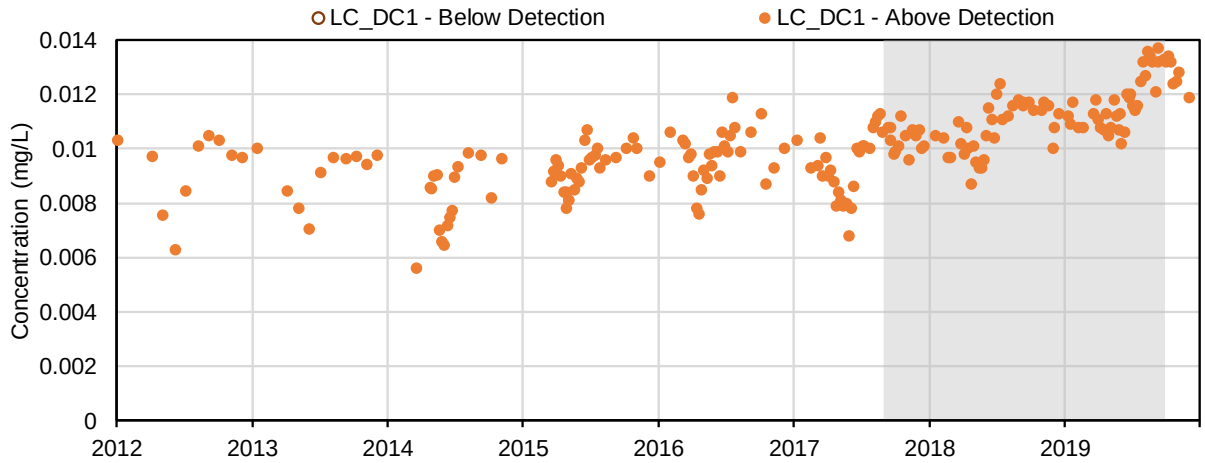
(94) Iron (mg/L); Dissolved Metals



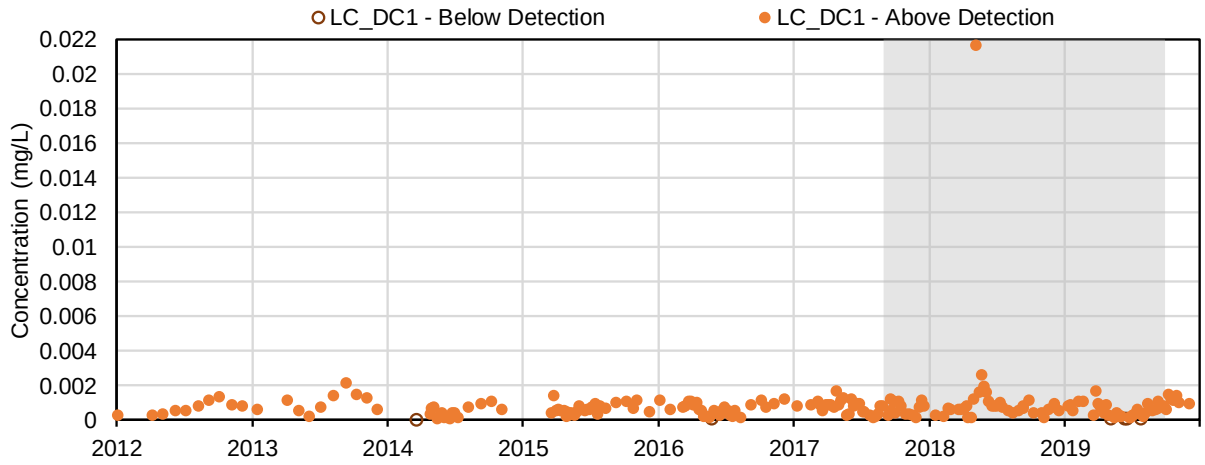
(95) Lead (mg/L); Dissolved Metals



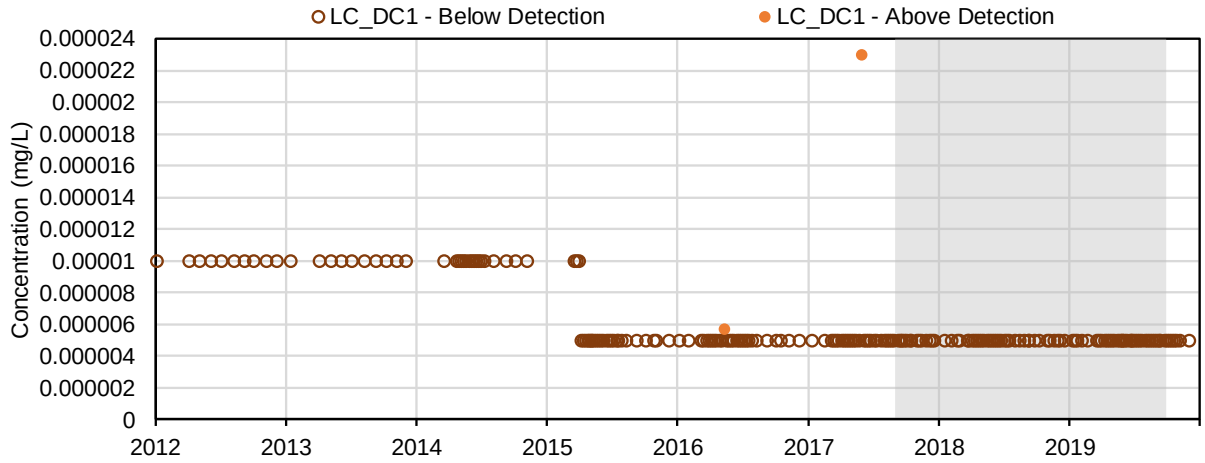
(96) Lithium (mg/L); Dissolved Metals



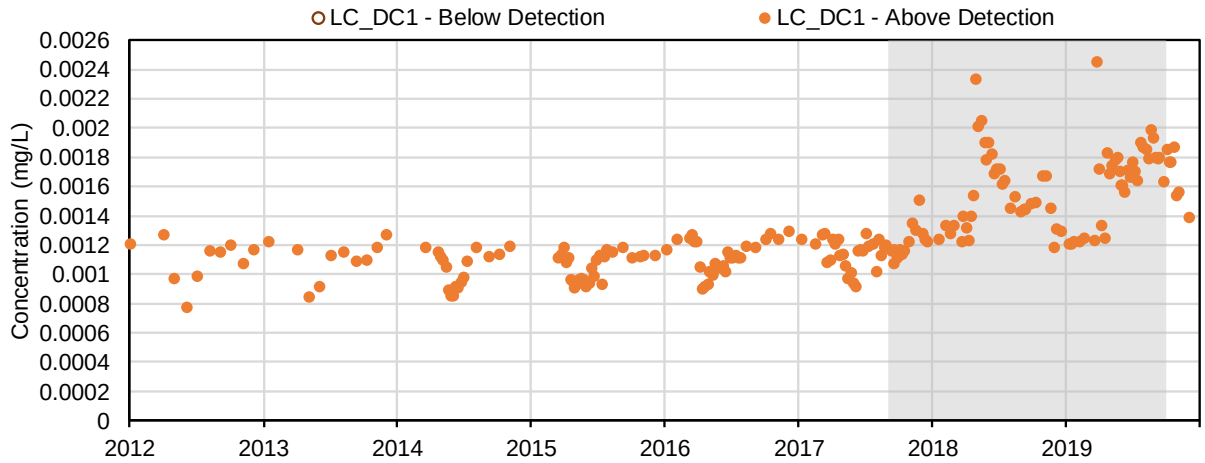
(97) Manganese (mg/L); Dissolved Metals



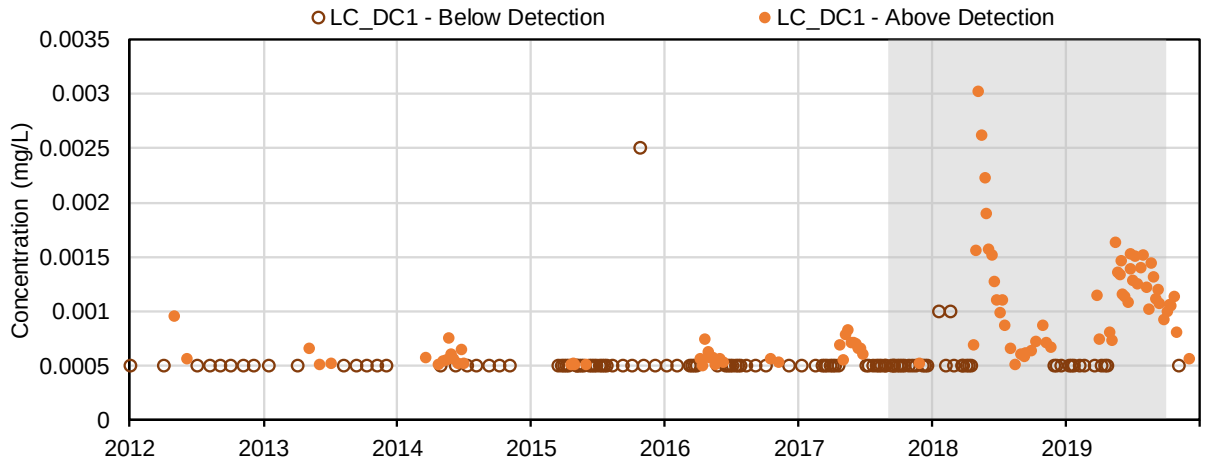
(98) Mercury (mg/L); Dissolved Metals



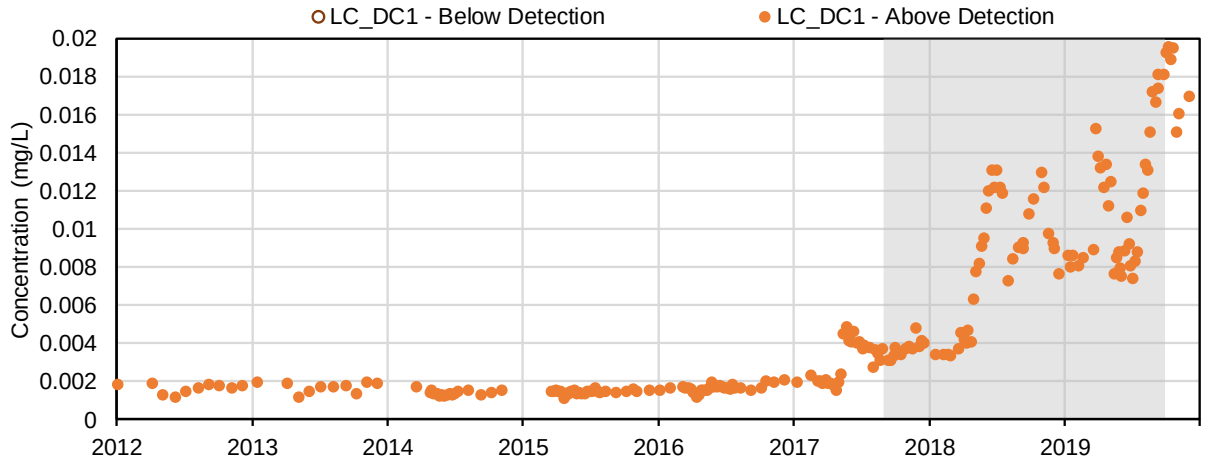
(99) Molybdenum (mg/L); Dissolved Metals



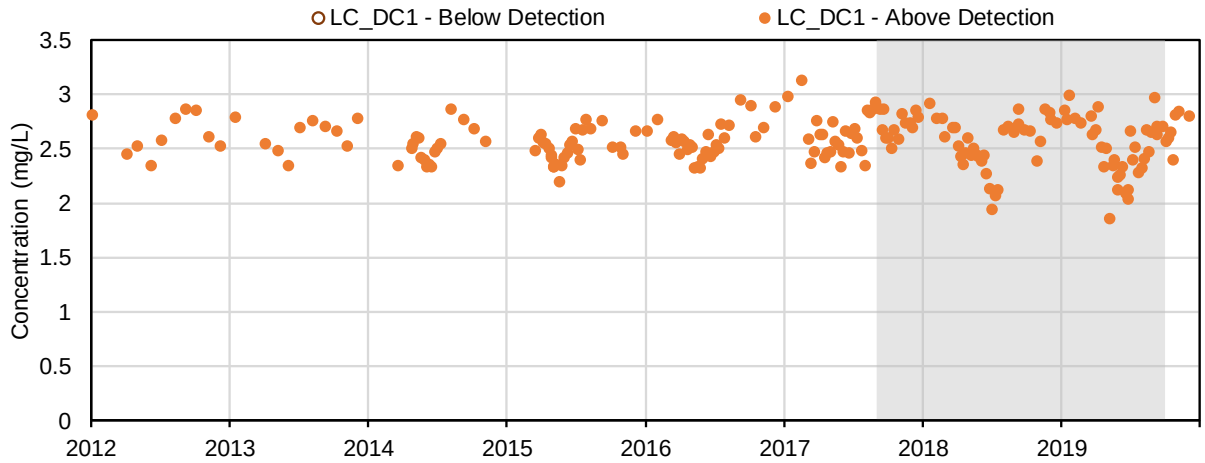
(100) Nickel (mg/L); Dissolved Metals



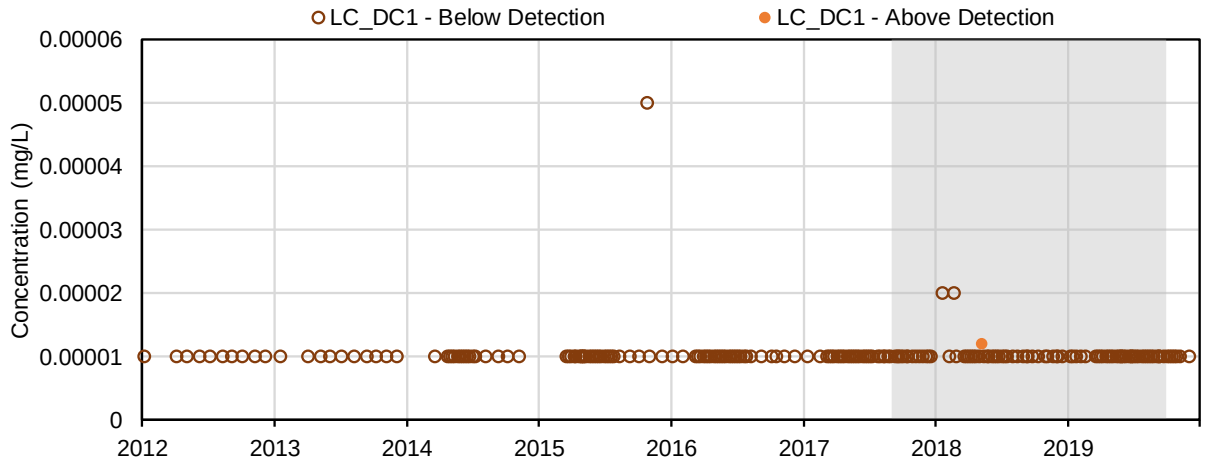
(101) Selenium (mg/L); Dissolved Metals



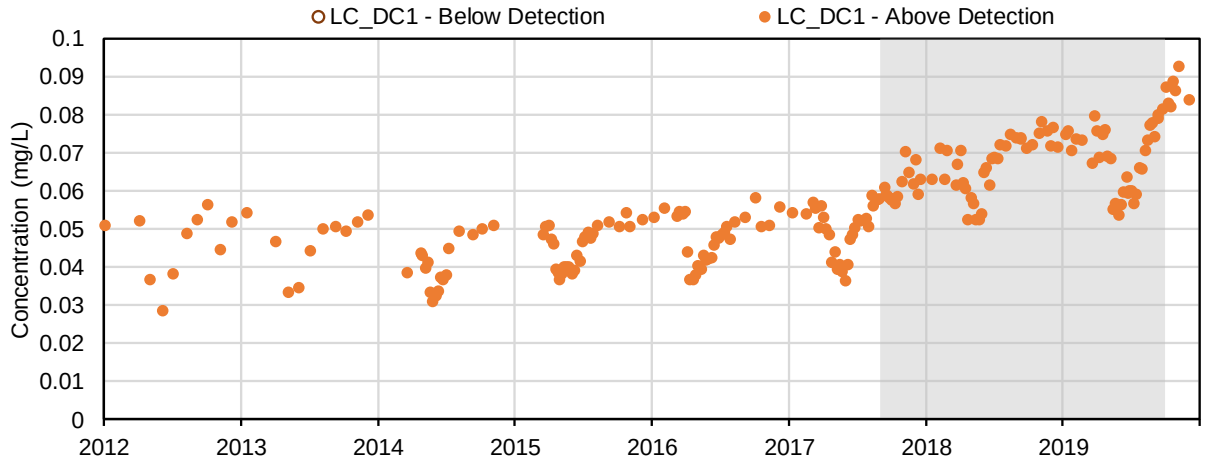
(102) Silicon (mg/L); Dissolved Metals



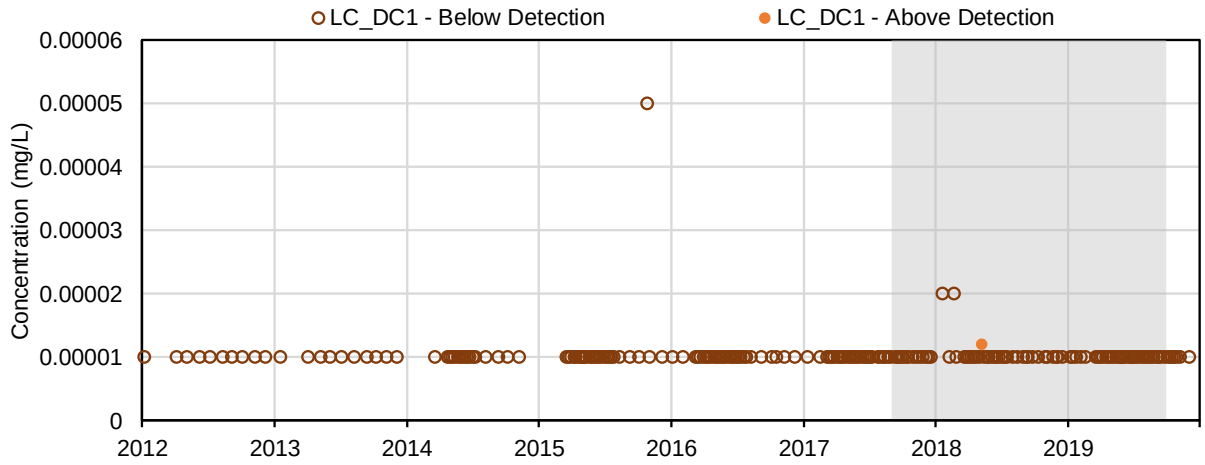
(103) Silver (mg/L); Dissolved Metals



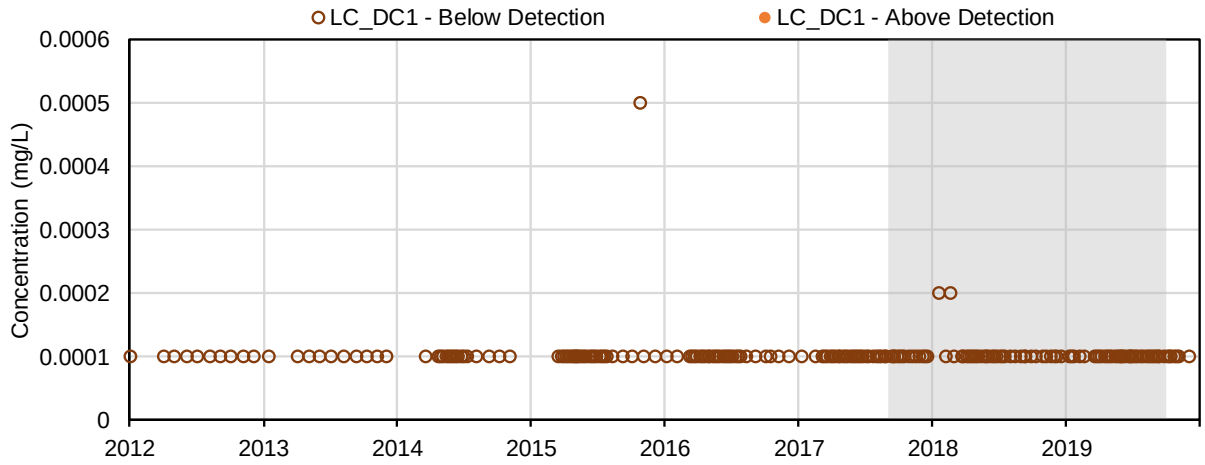
(104) Strontium (mg/L); Dissolved Metals



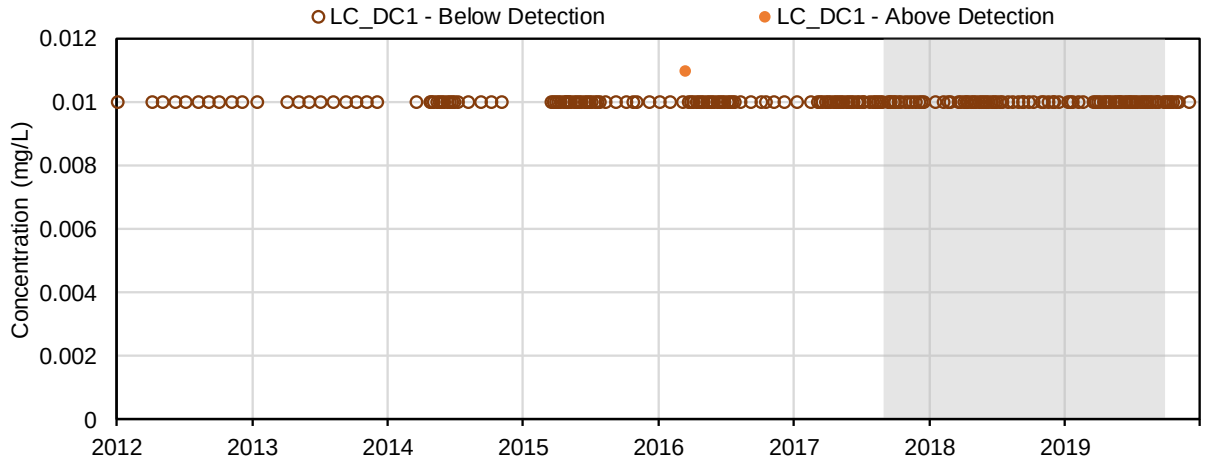
(105) Thallium (mg/L); Dissolved Metals



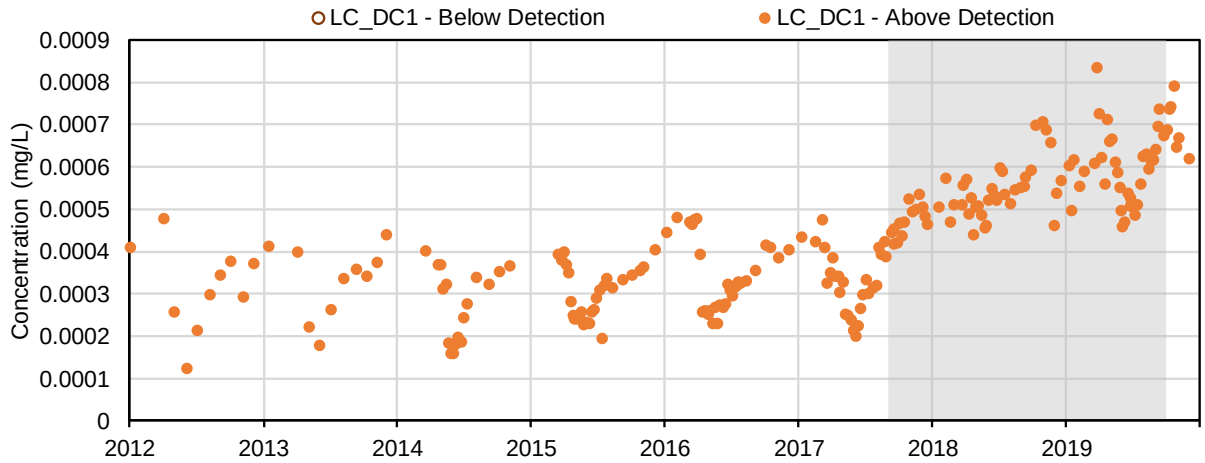
(106) Tin (mg/L); Dissolved Metals



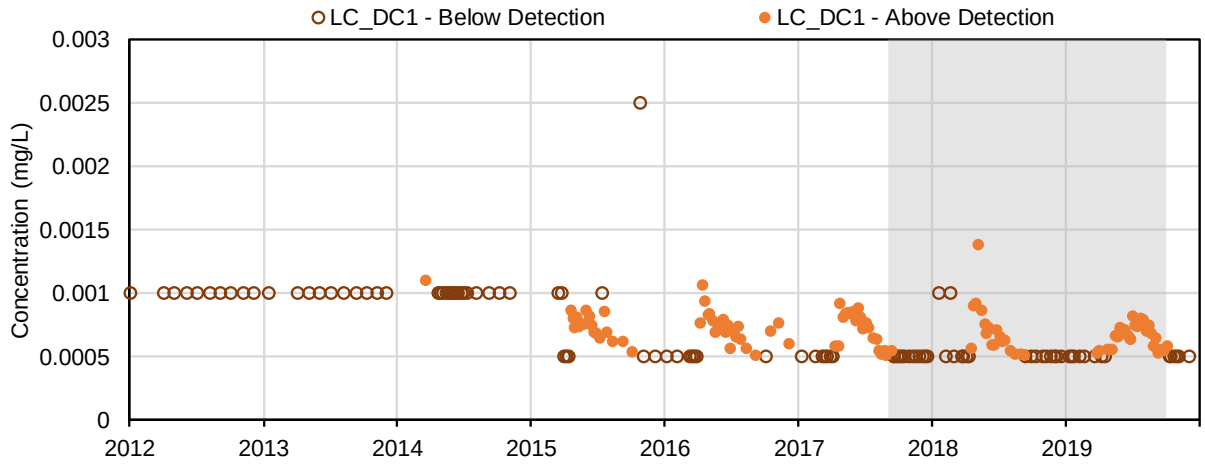
(107) Titanium (mg/L); Dissolved Metals



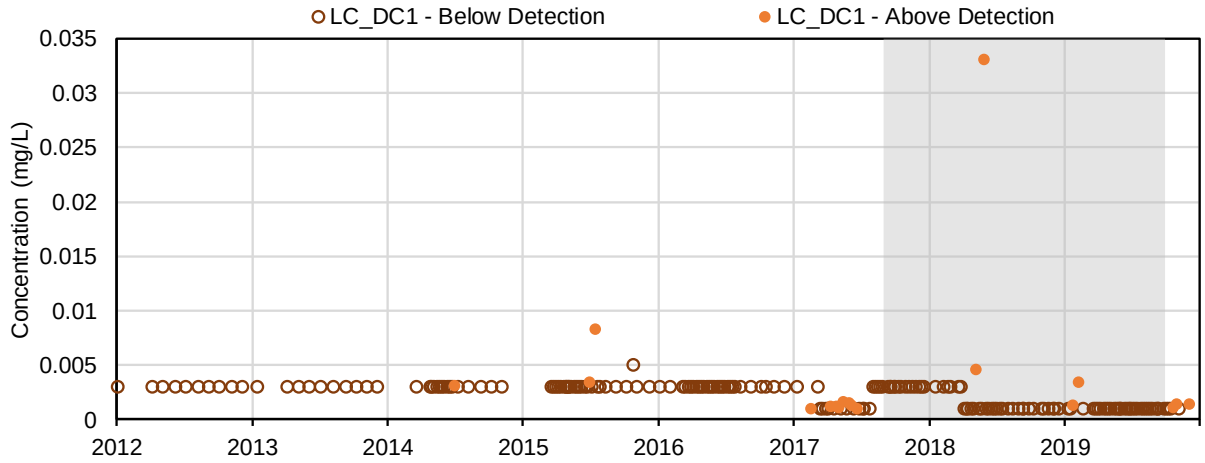
(108) Uranium (mg/L); Dissolved Metals



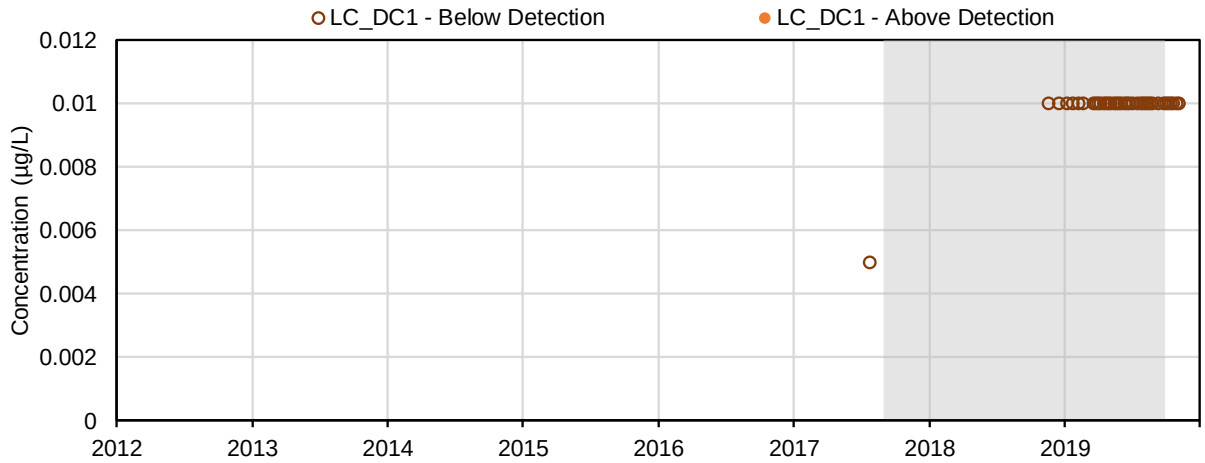
(109) Vanadium (mg/L); Dissolved Metals



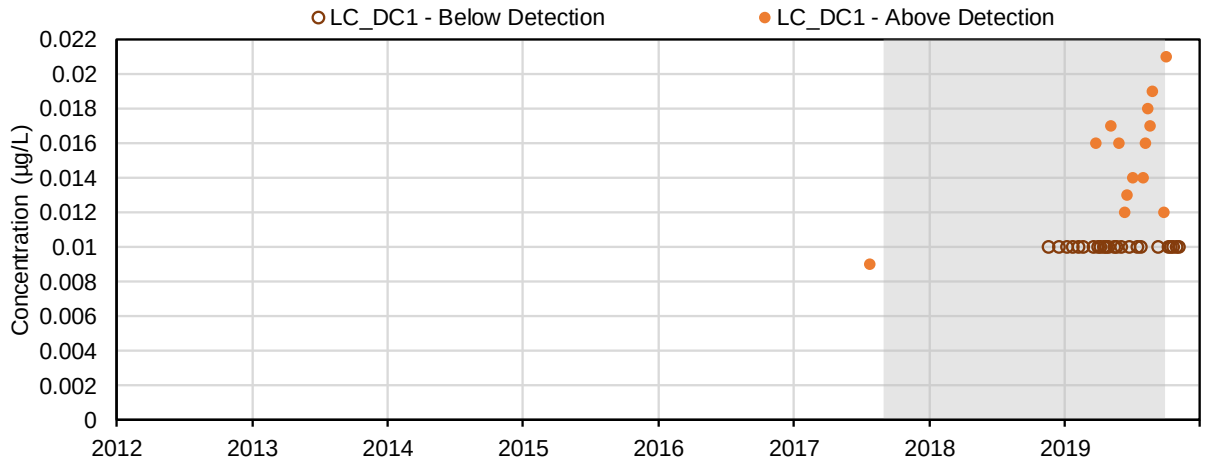
(110) Zinc (mg/L); Dissolved Metals



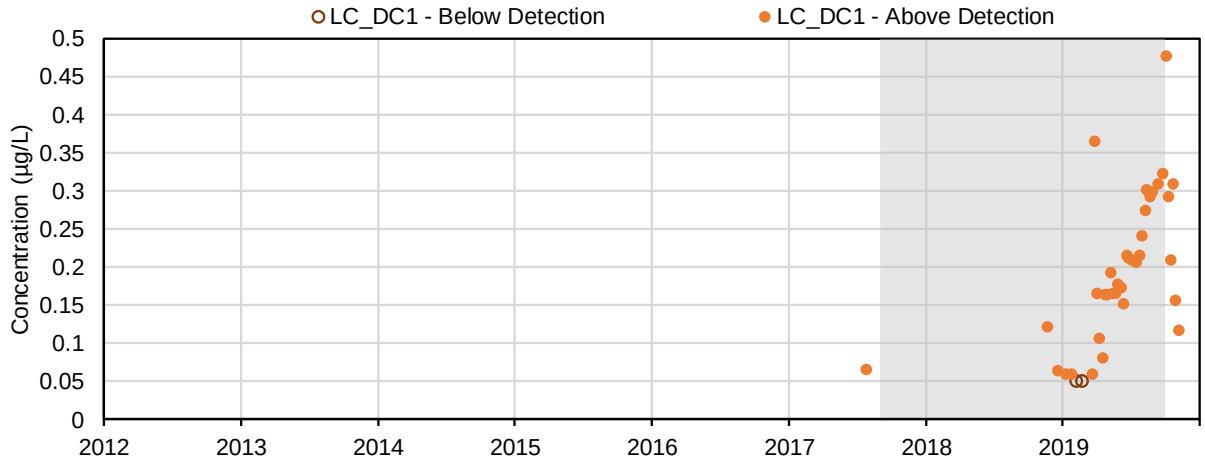
(111) Dissolved Dimethylseleneoxide (µg/L); Speciation of Selenium



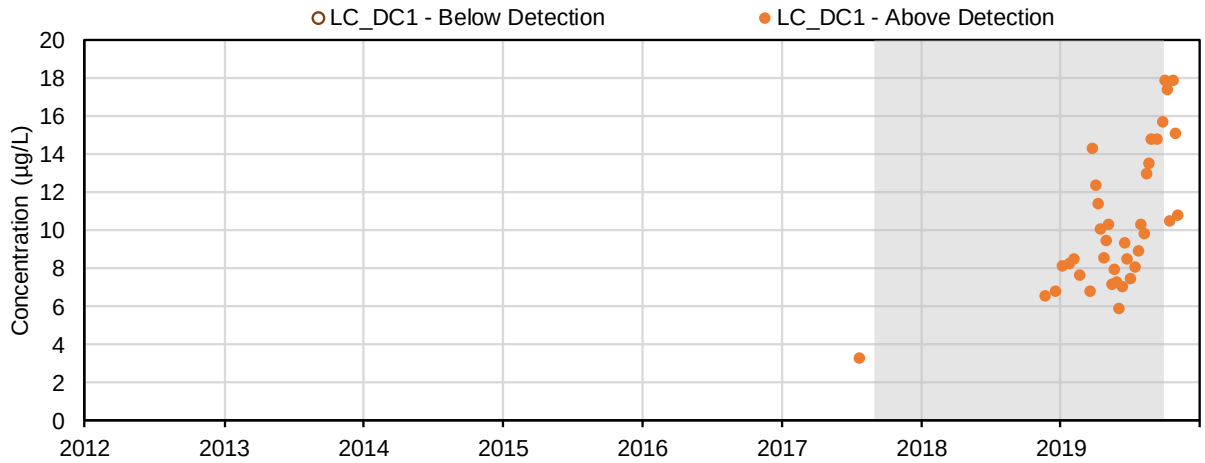
(112) Dissolved Methylseleninic Acid (µg/L); Speciation of Selenium



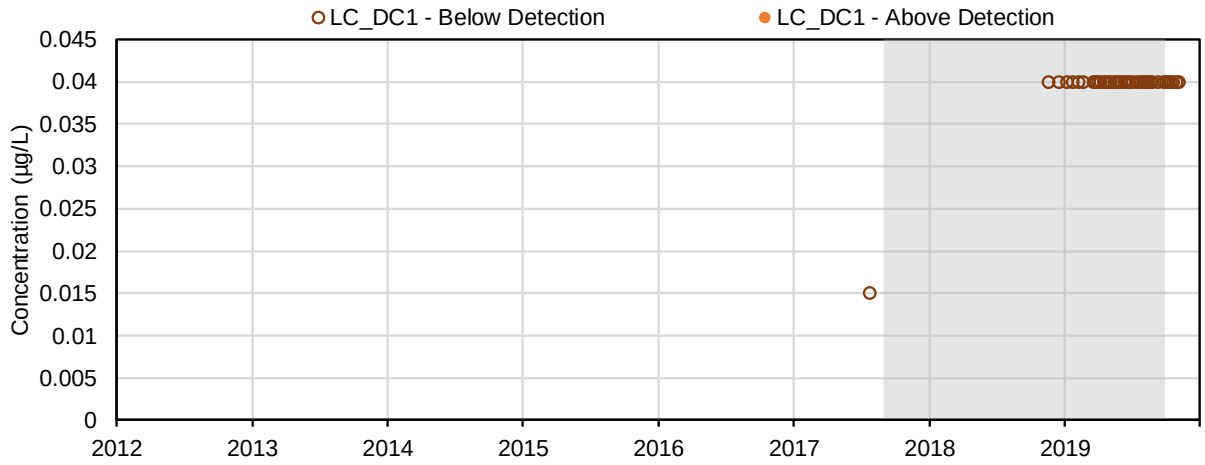
(113) Dissolved Selenite (µg/L); Speciation of Selenium



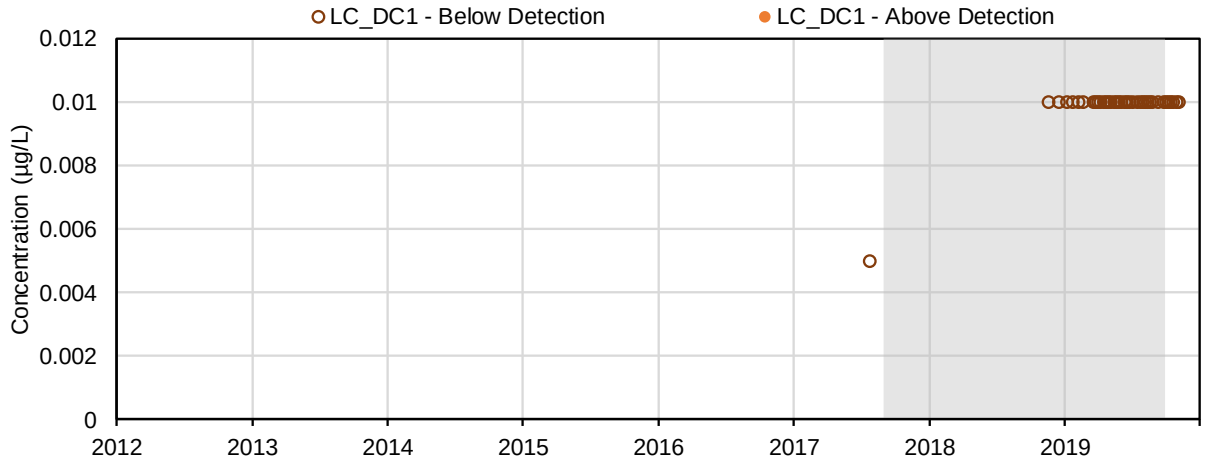
(114) Dissolved Selenate (µg/L); Speciation of Selenium



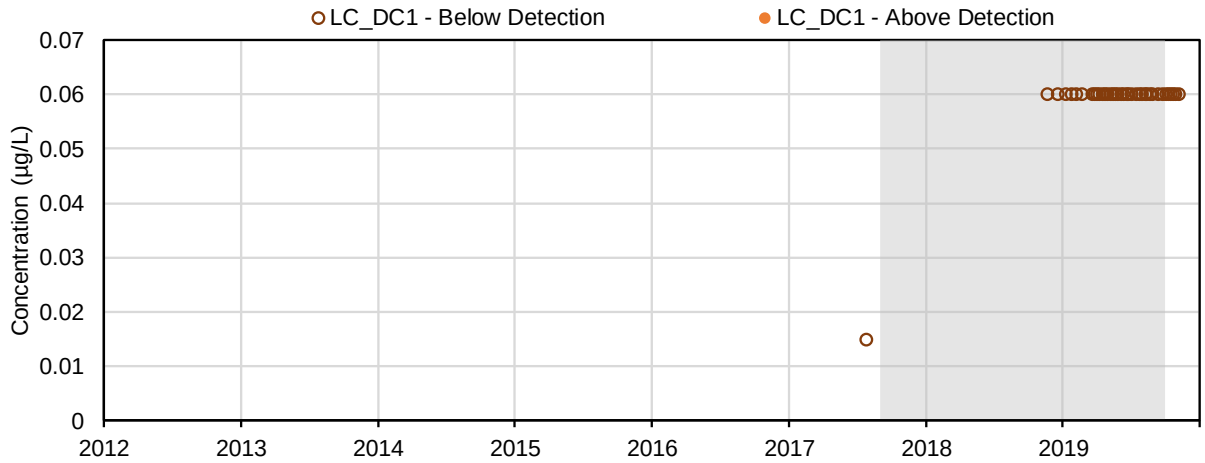
(115) Dissolved Selenocyanate (µg/L); Speciation of Selenium



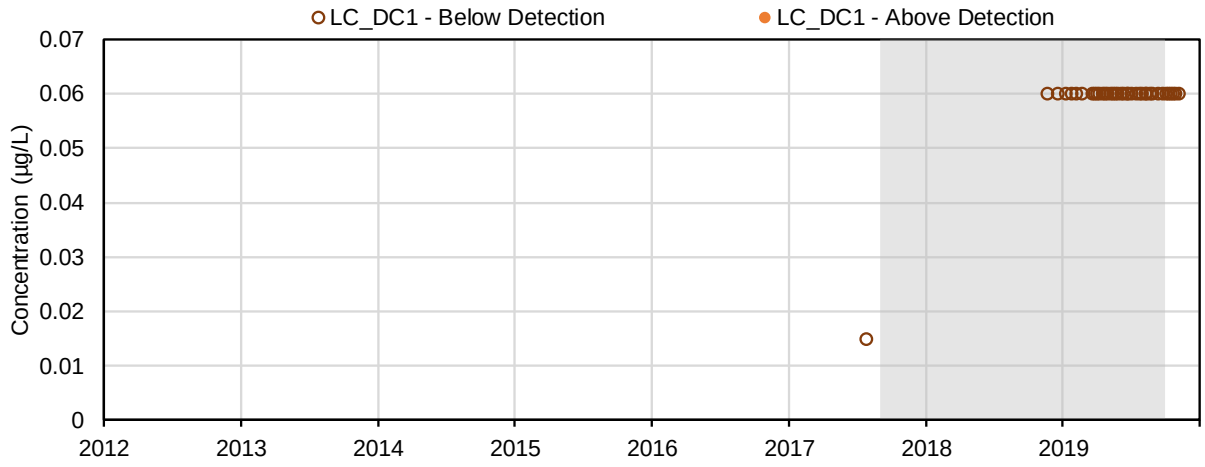
(116) Dissolved Selenomethionine (µg/L); Speciation of Selenium

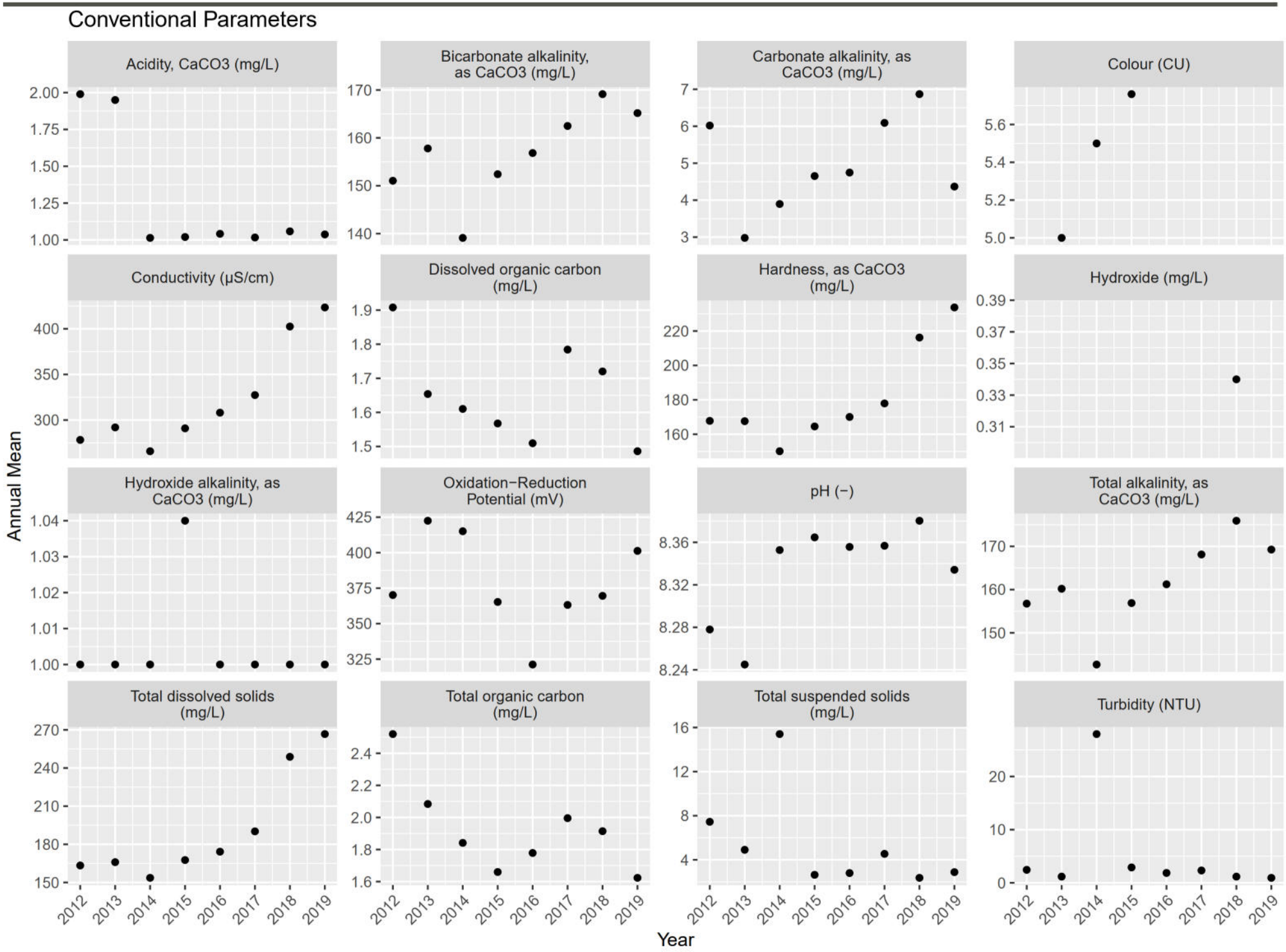


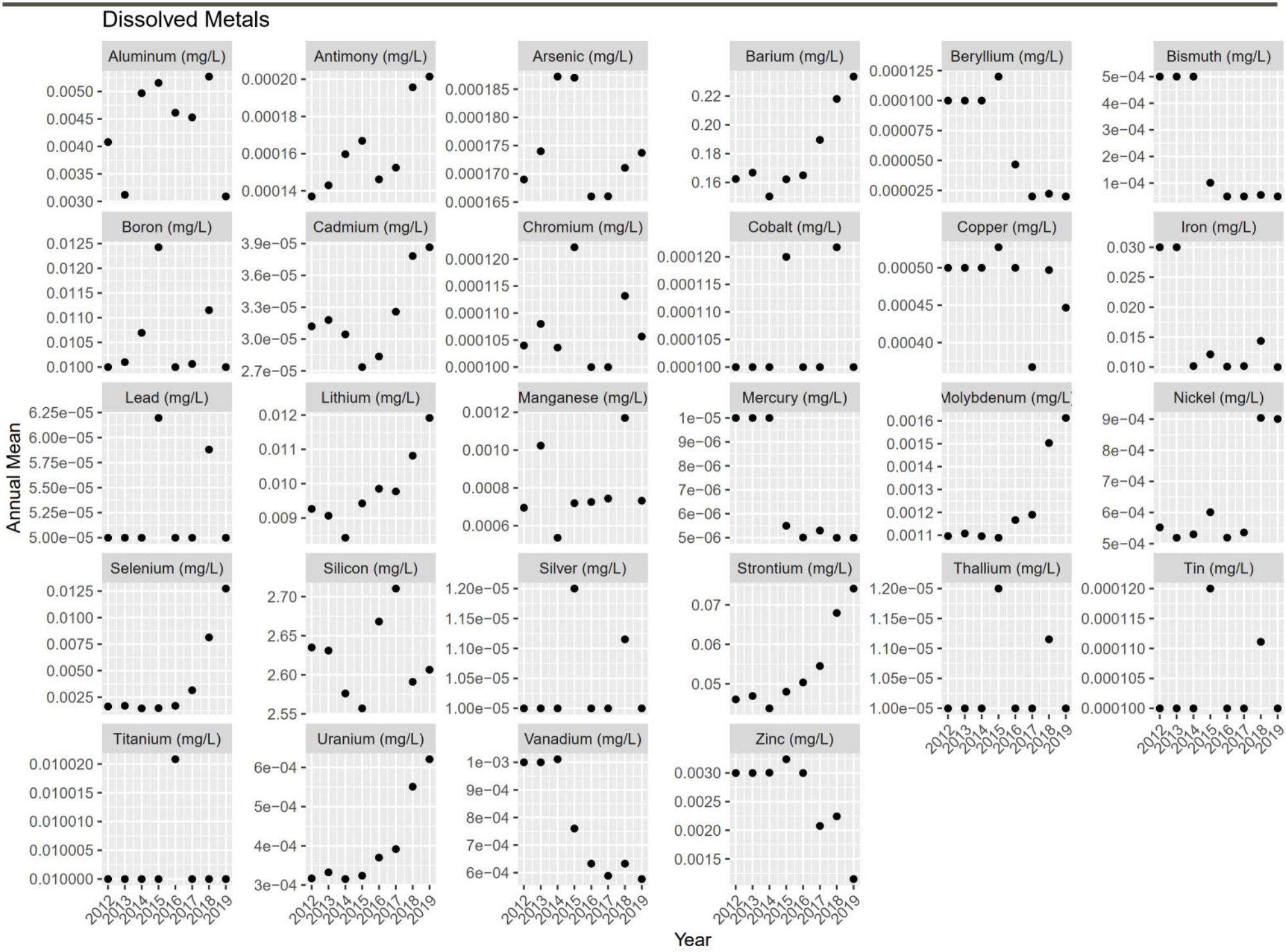
(117) Dissolved Selenosulphate (µg/L); Speciation of Selenium

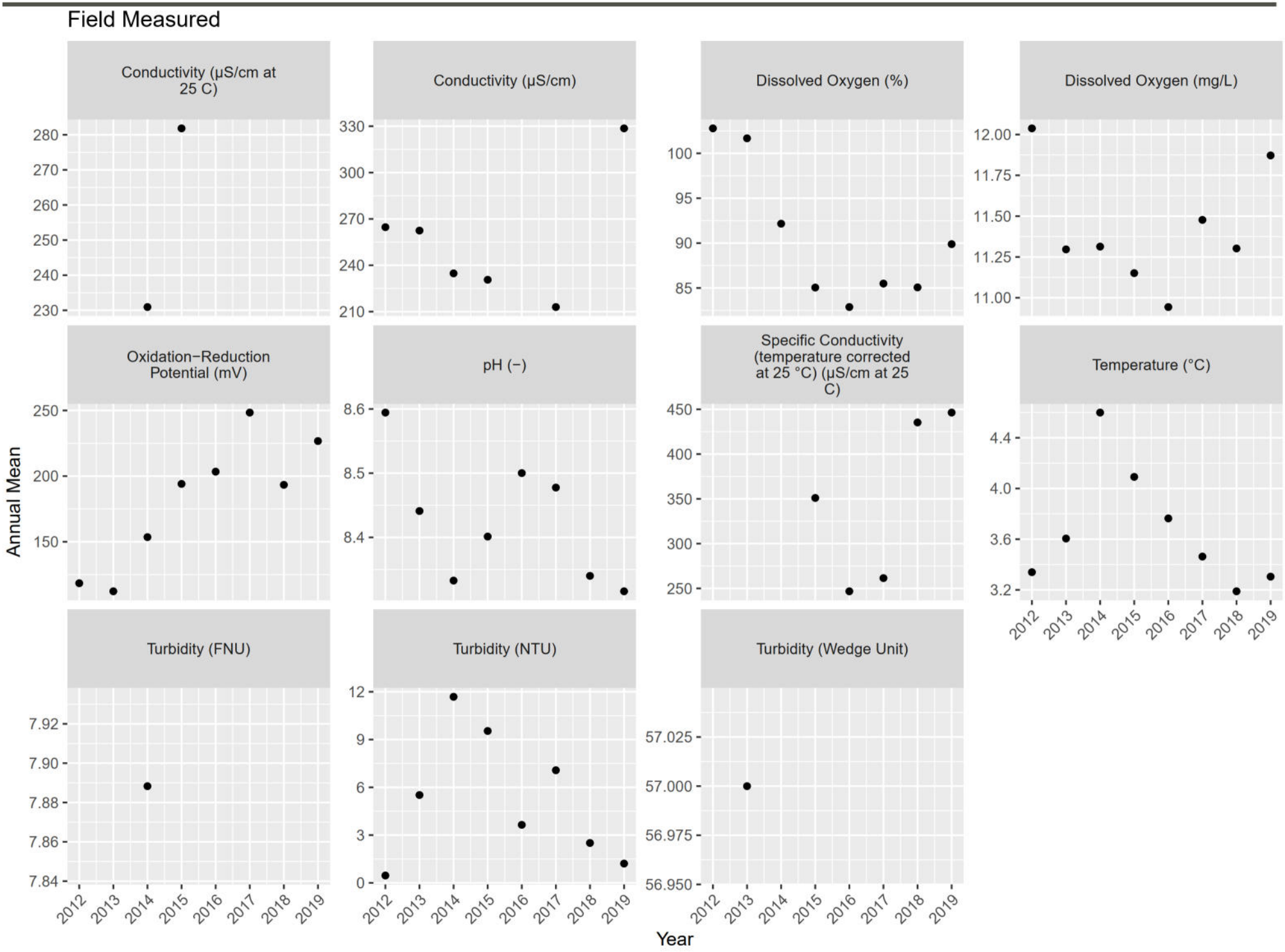


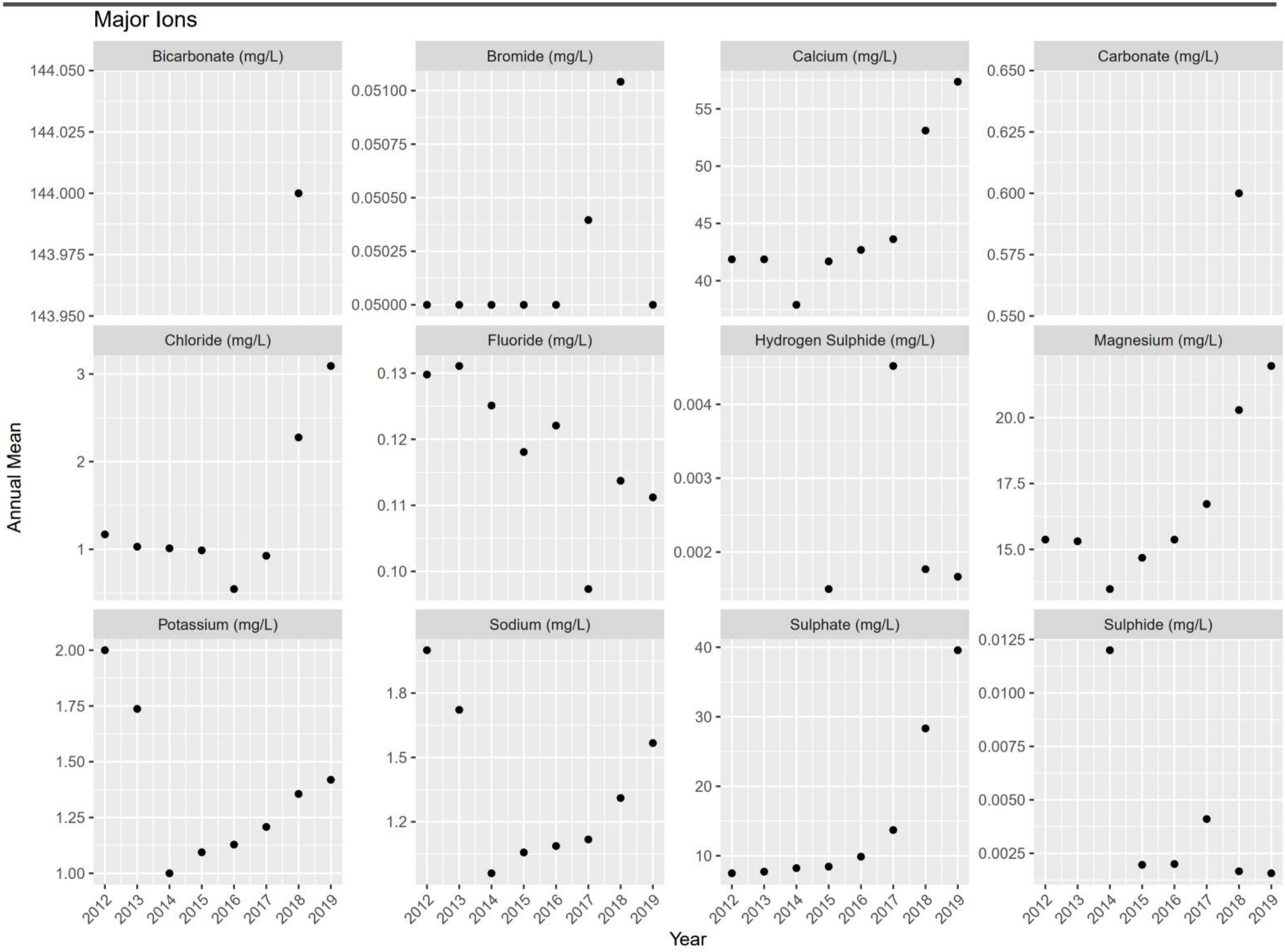
(118) Unknown Dissolved Selenium Species (µg/L); Speciation of Selenium

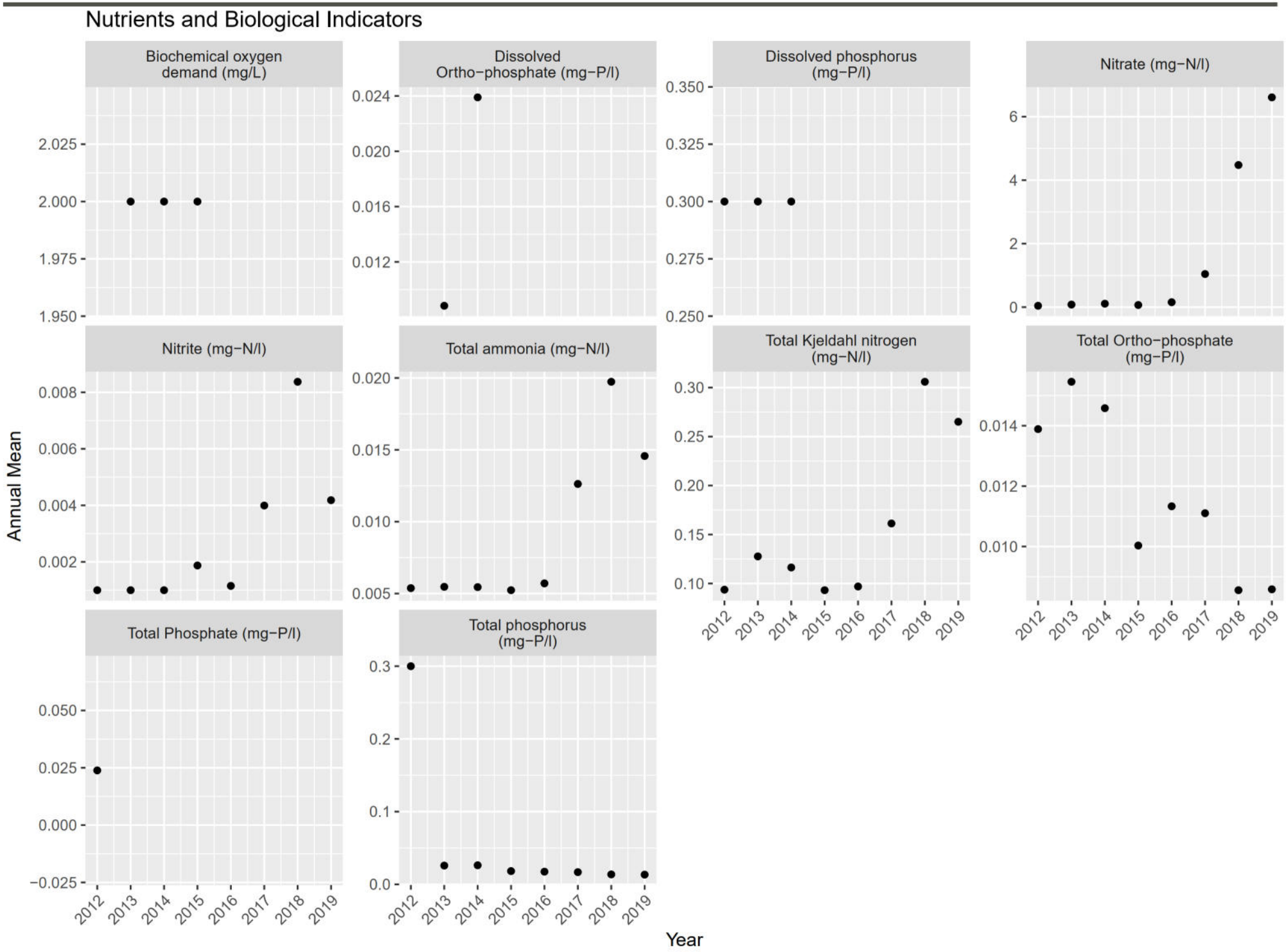


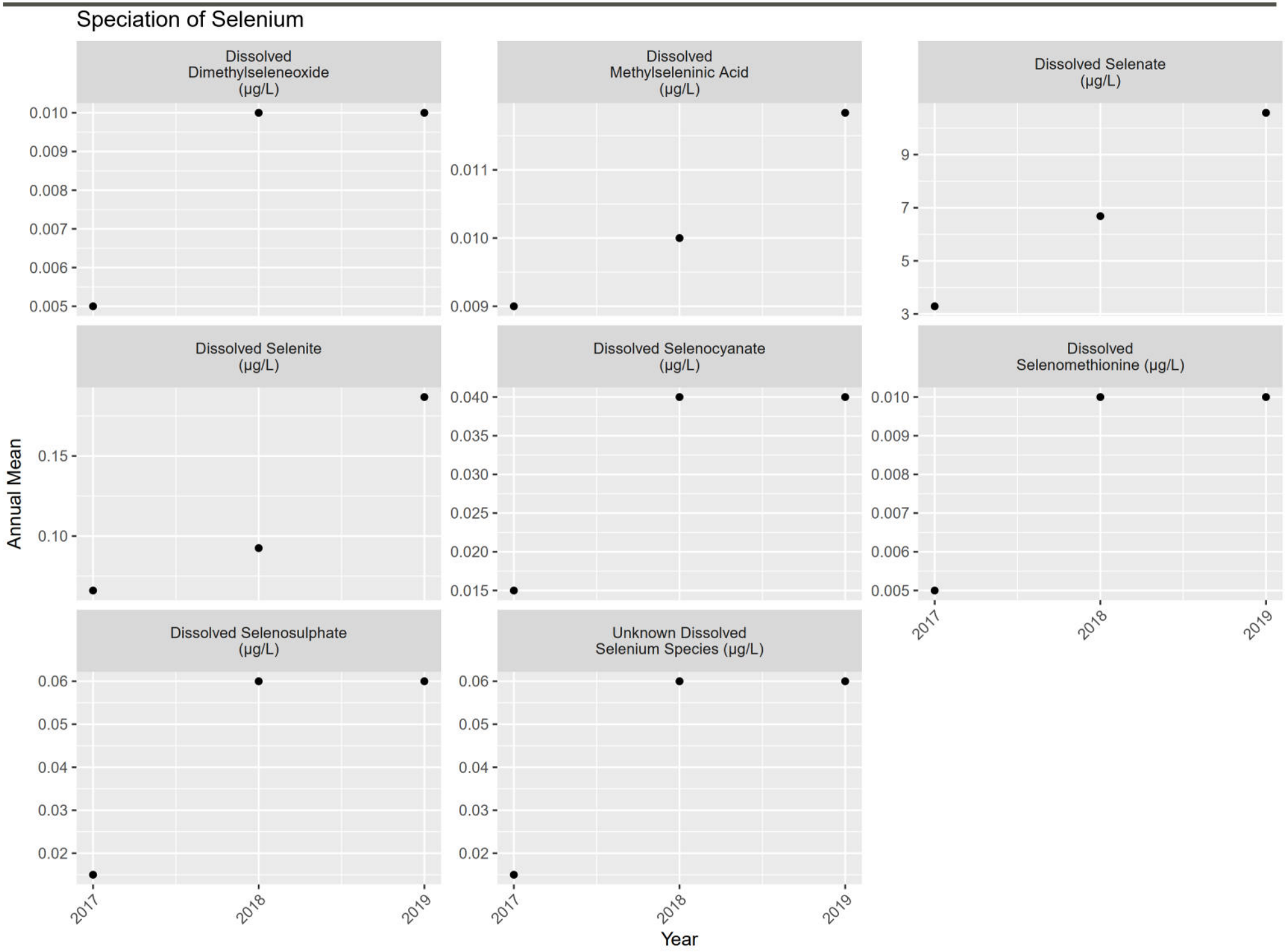

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Colour (CU)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

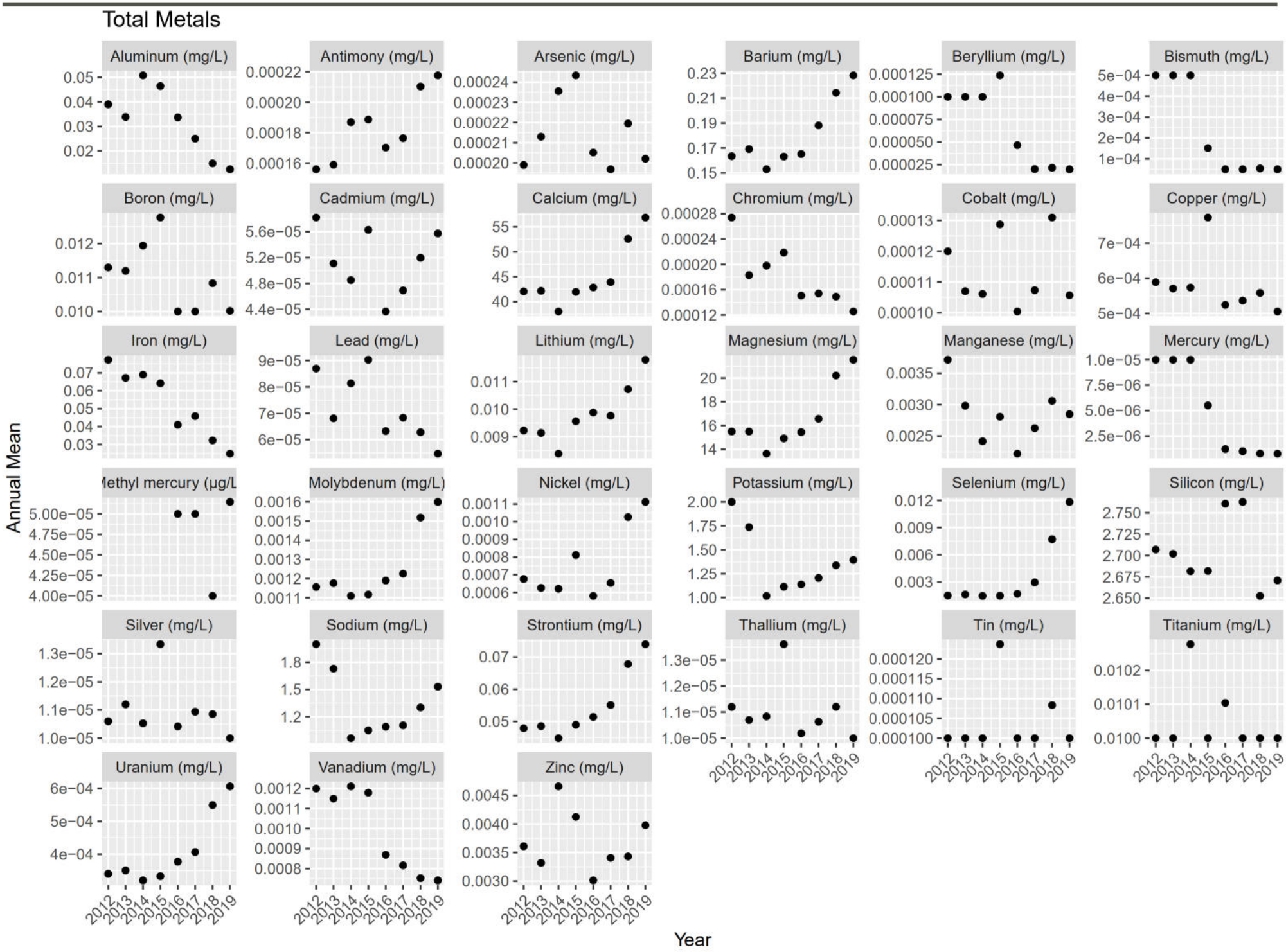

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

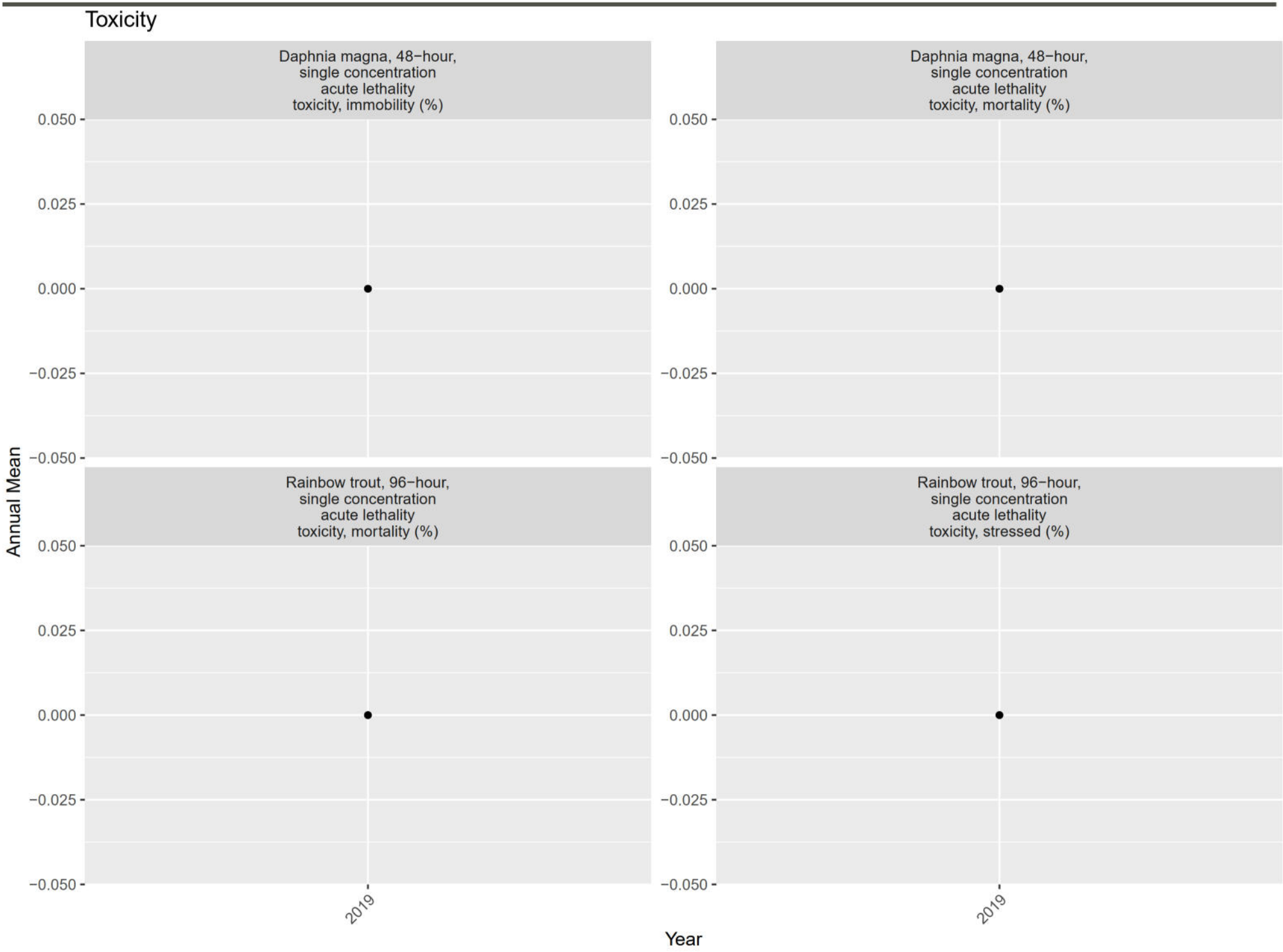

Field Measured
Conductivity (µS/cm at 25 C)
Conductivity (µS/cm)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)
Temperature (°C)
Turbidity (FNU)
Turbidity (NTU)
Turbidity (Wedge Unit)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Major Ions
Bicarbonate (mg/L)
Bromide (mg/L)
Calcium (mg/L)
Carbonate (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Hydrogen Sulphide (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Sulphide (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Nutrients and Biological Indicators
Biochemical oxygen demand (mg/L)
Dissolved Ortho−phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year


Speciation of Selenium
Dissolved Dimethylseleneoxide (µg/L)
Dissolved Methylseleninic Acid (µg/L)
Dissolved Selenate (µg/L)
Dissolved Selenite (µg/L)
Dissolved Selenocyanate (µg/L)
Dissolved Selenomethionine (µg/L)
Dissolved Selenosulphate (µg/L)
Unknown Dissolved Selenium Species (µg/L)
Annual Mean
Year
2017
2018
2019

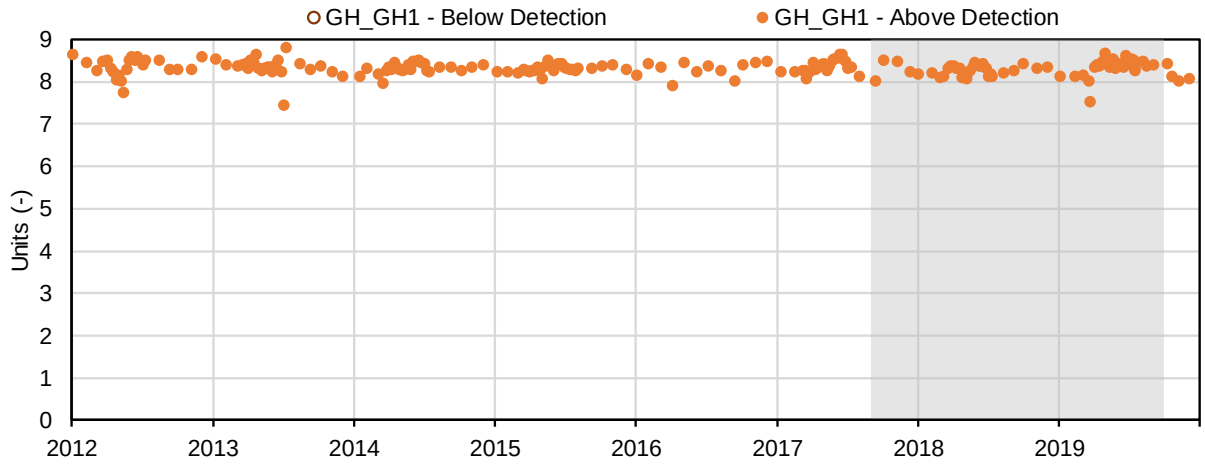

Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Methyl mercury (µg/L
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Toxicity
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, immobility (%)
Daphnia magna, 48−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, mortality (%)
Rainbow trout, 96−hour,
single concentration
acute lethality
toxicity, stressed (%)
Annual Mean
0.050
0.025
0.000
−0.025
−0.050
2019
Year

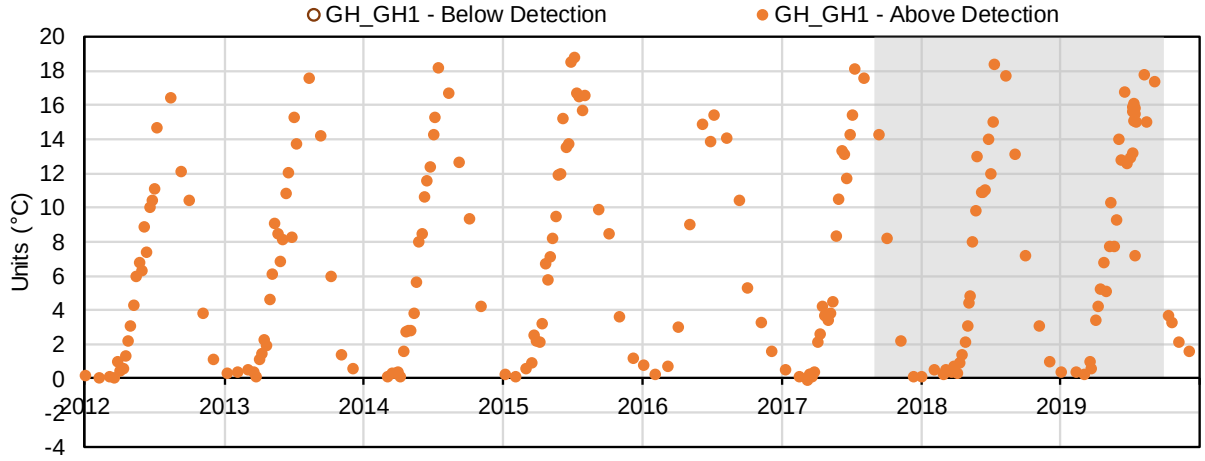
ATTACHMENT F26

GH_GH1 Plots

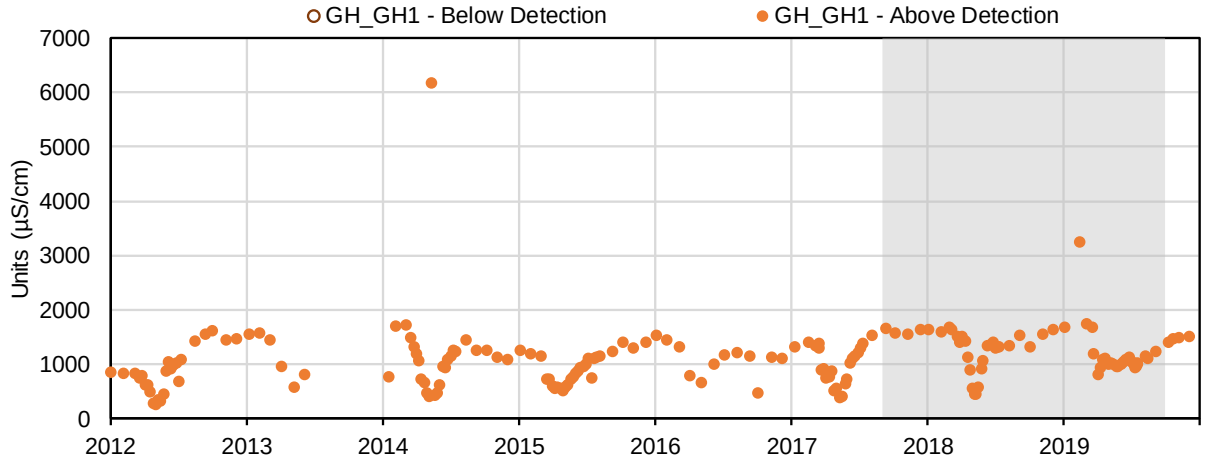
(1) pH (-); Field Measured



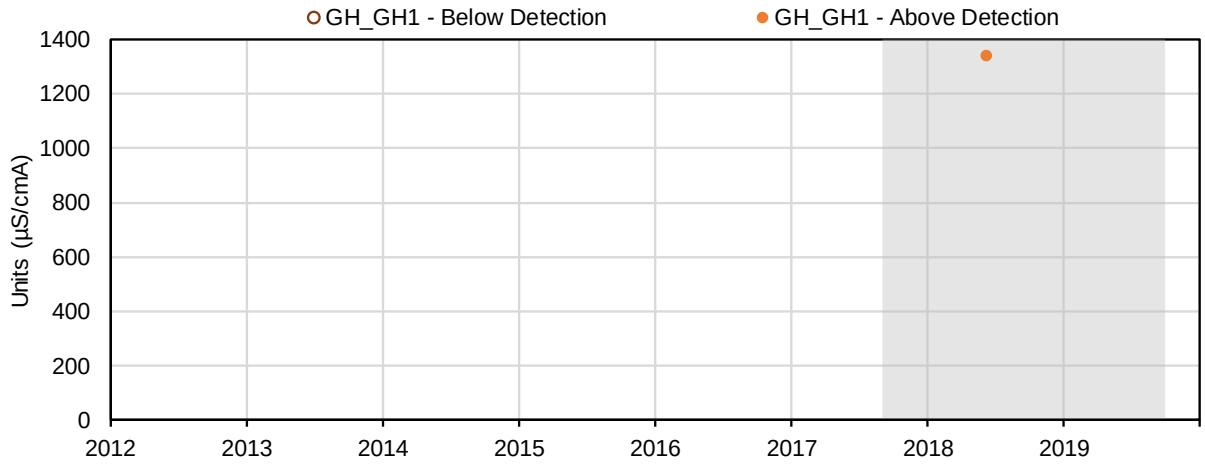
(2) Temperature (°C); Field Measured



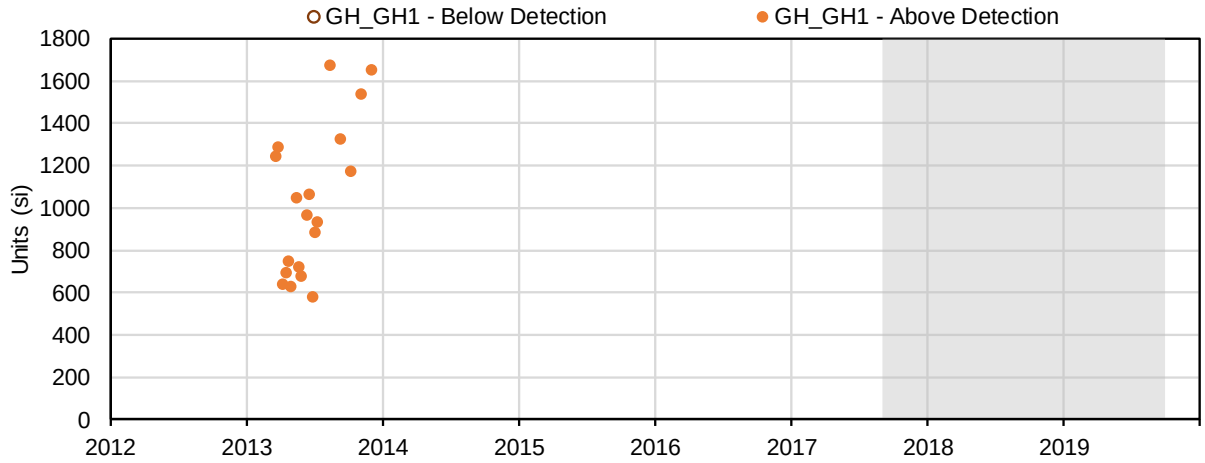
(3) Conductivity (µS/cm); Field Measured



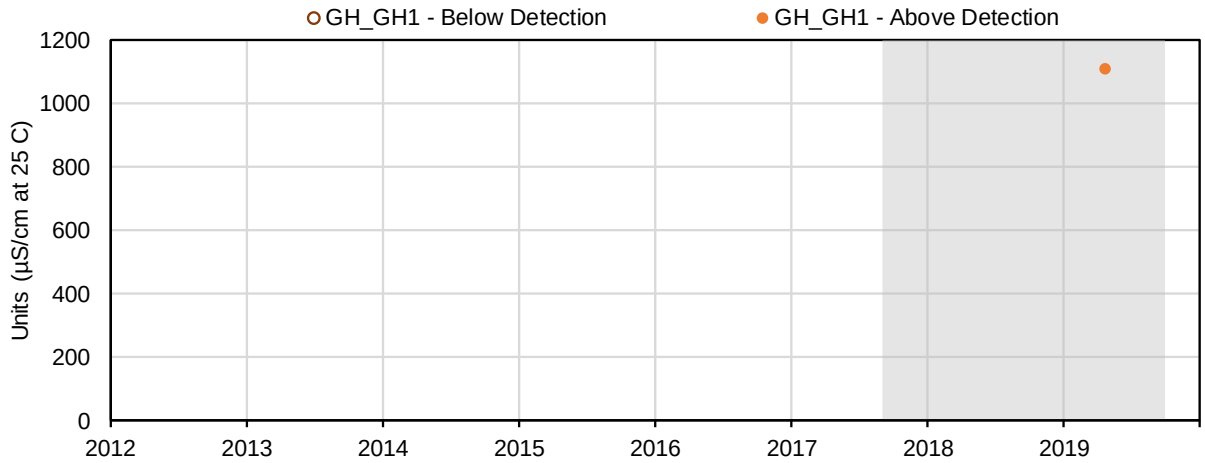
(4) Conductivity (µS/cmA); Field Measured



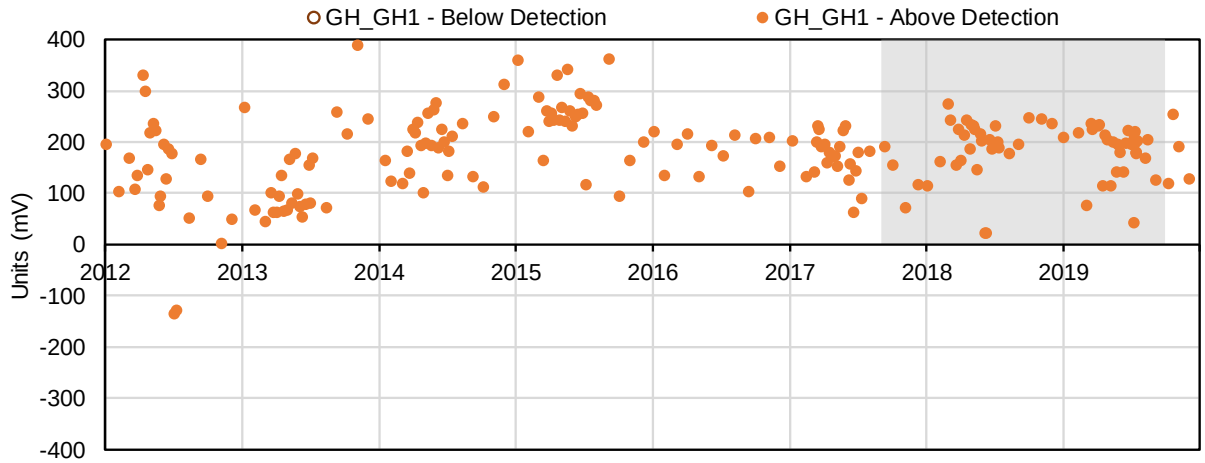
(5) Conductivity (si); Field Measured



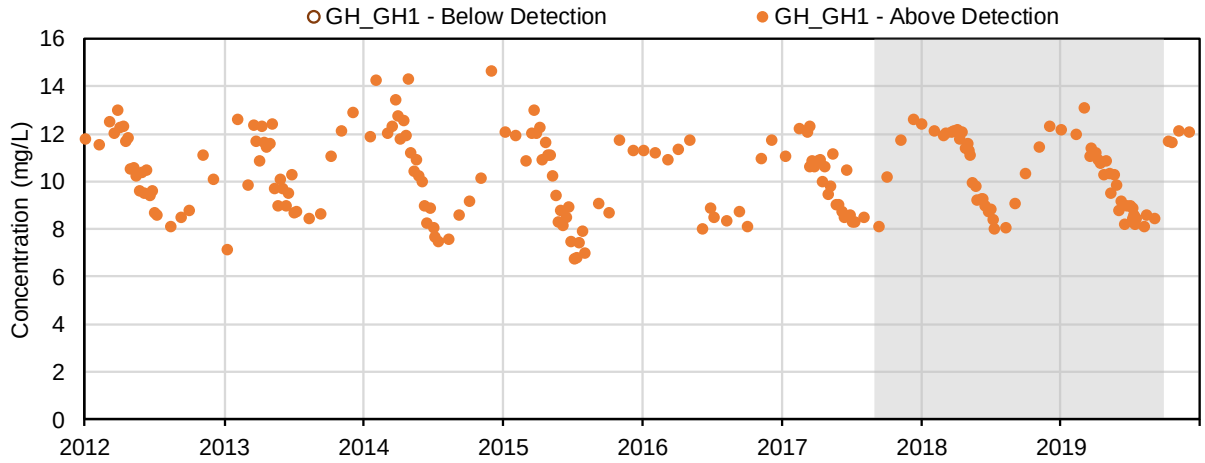
(6) Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C); Field Measured



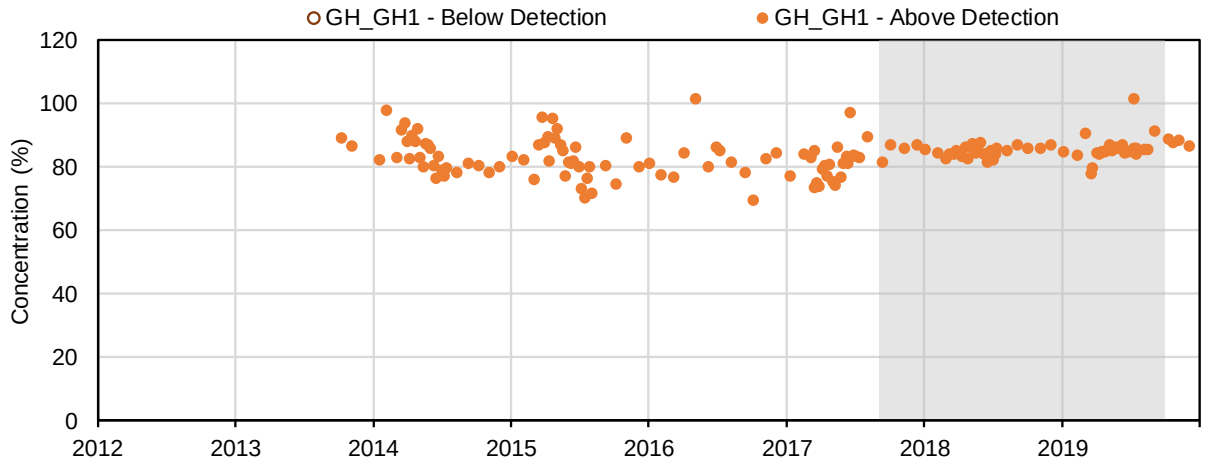
(7) Oxidation-Reduction Potential (mV); Field Measured



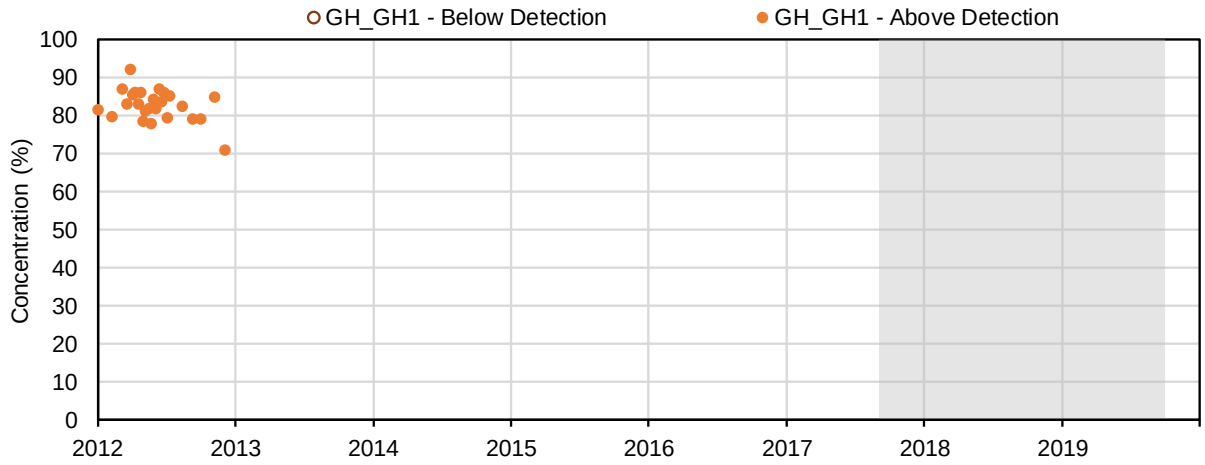
(8) Dissolved Oxygen (mg/L); Field Measured



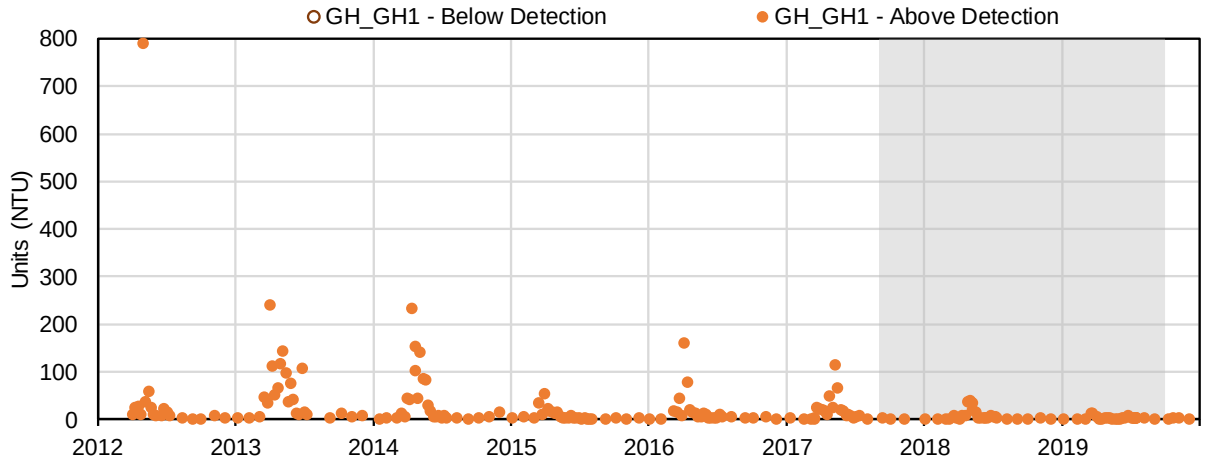
(9) Dissolved Oxygen (%); Field Measured



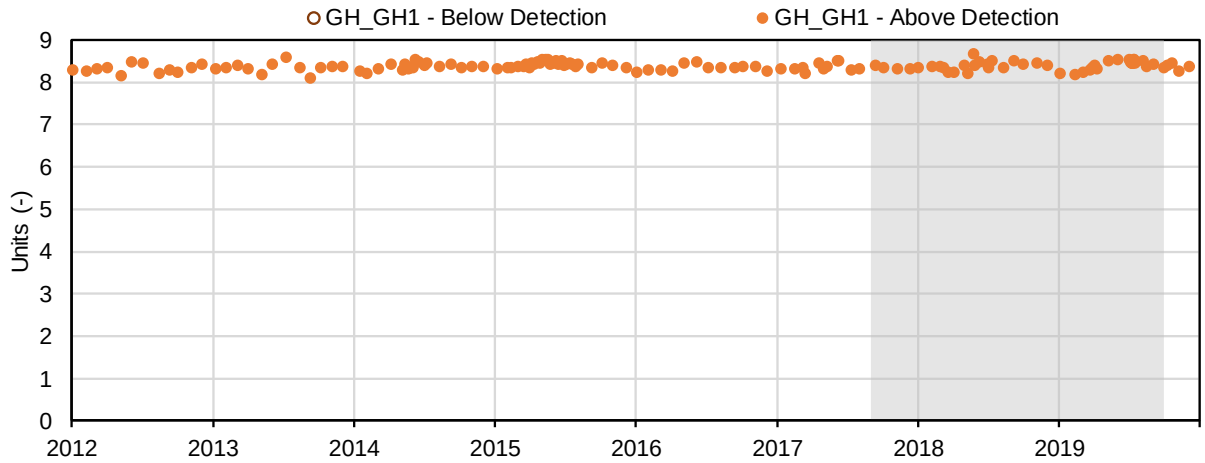
(10) Oxygen Saturation (%); Field Measured



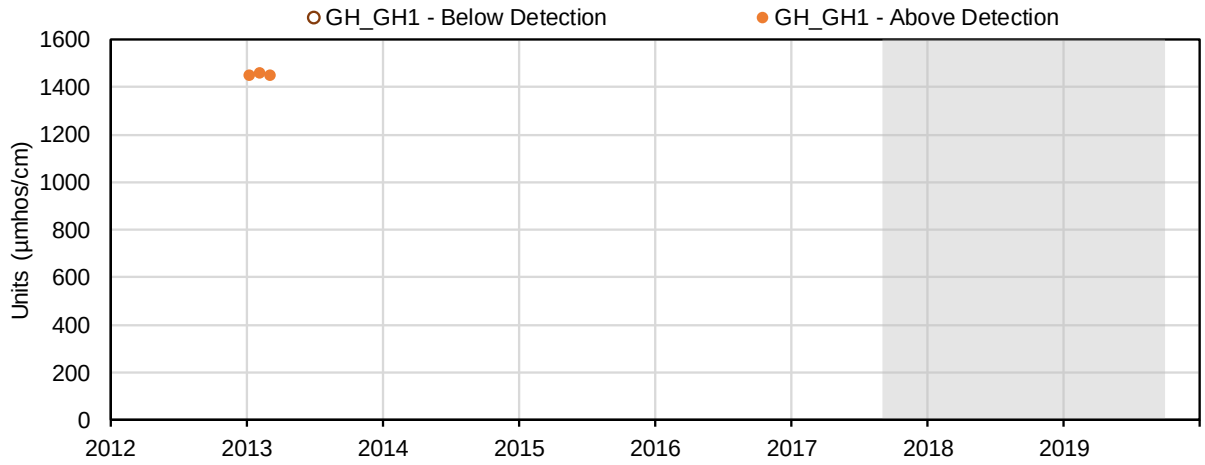
(11) Turbidity (NTU); Field Measured



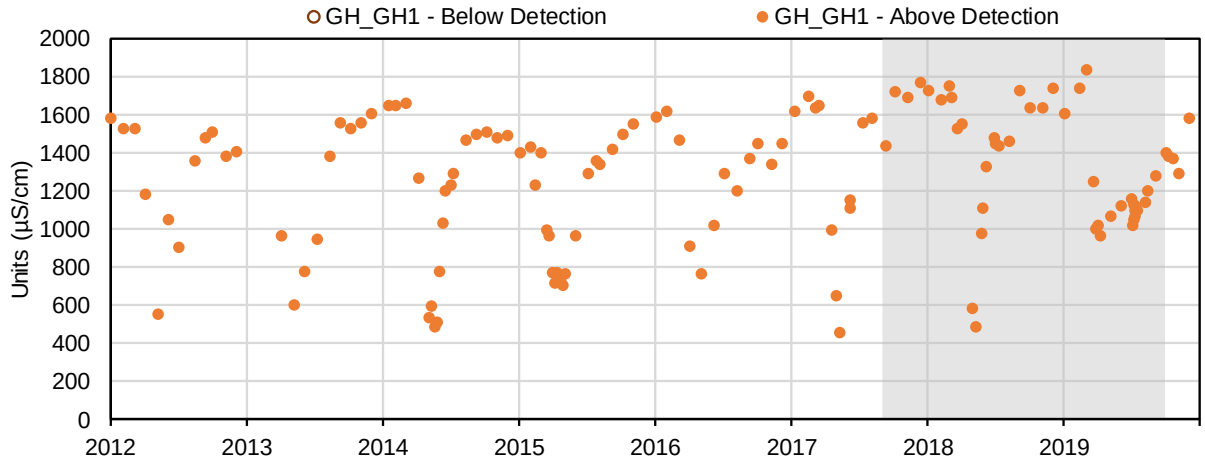
(12) pH (-); Conventional Parameters



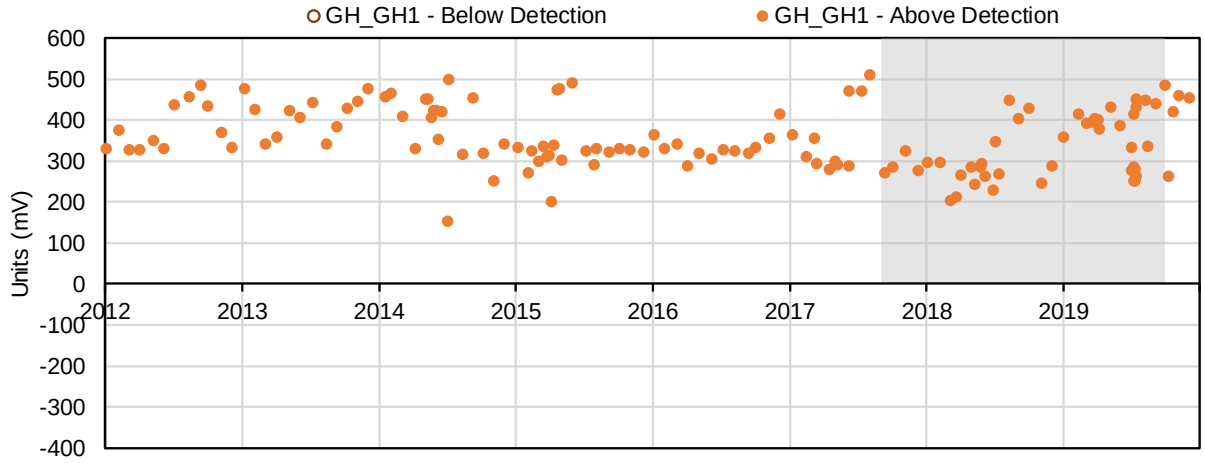
(13) Conductivity (µmhos/cm); Conventional Parameters



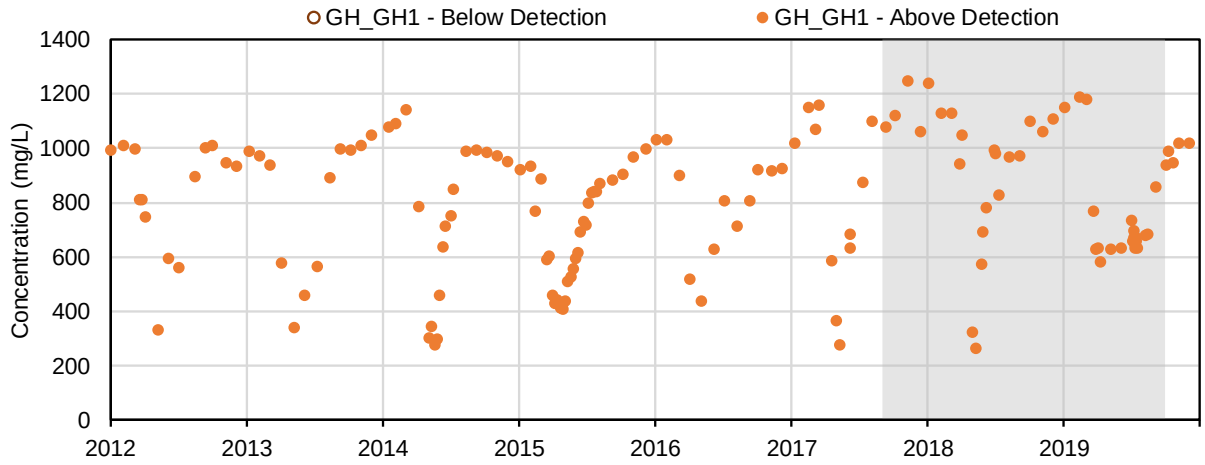
(14) Conductivity (µS/cm); Conventional Parameters



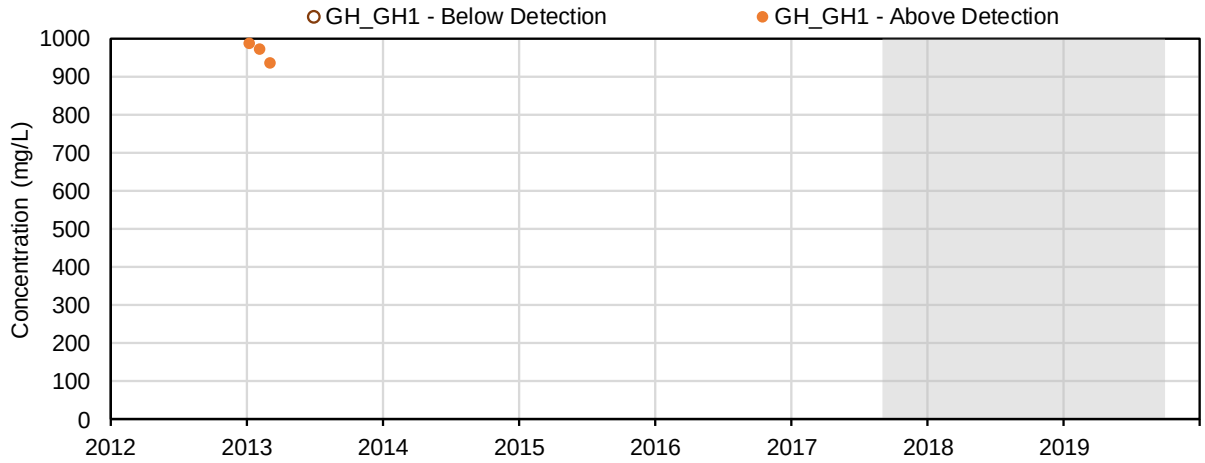
(15) Oxidation-Reduction Potential (mV); Conventional Parameters



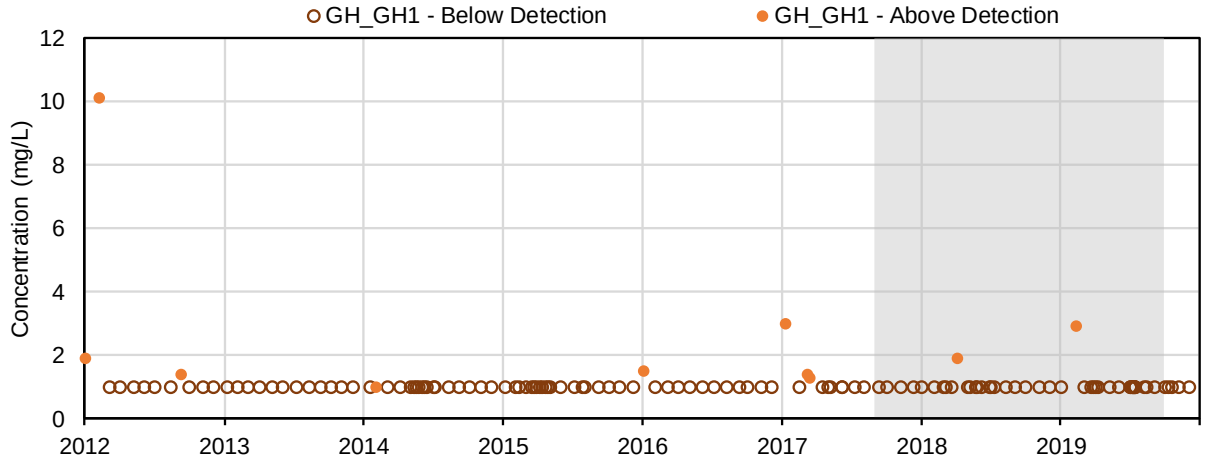
(16) Hardness, as CaCO3 (mg/L); Conventional Parameters



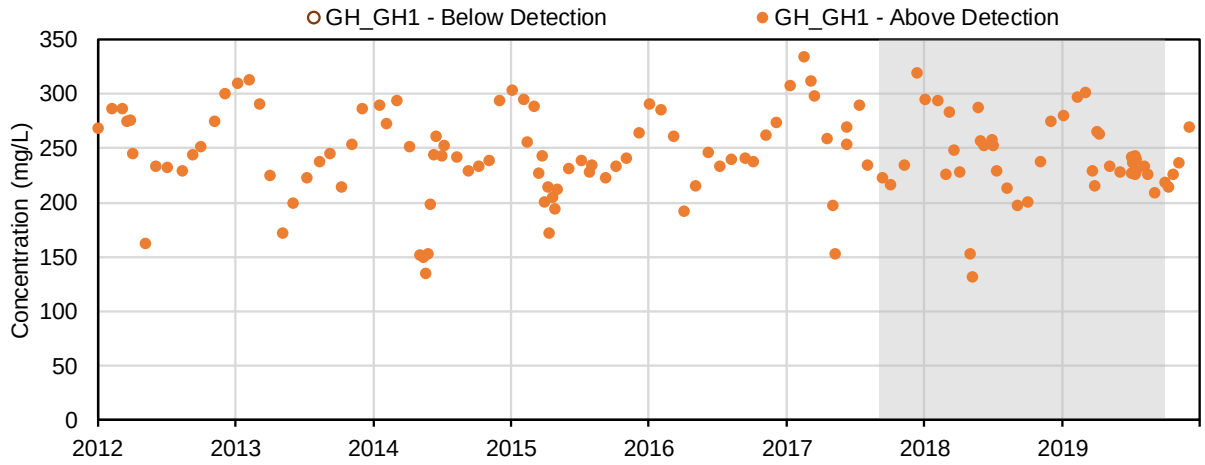
(17) Hardness, as CaCO3 (Calculated) (mg/L); Conventional Parameters



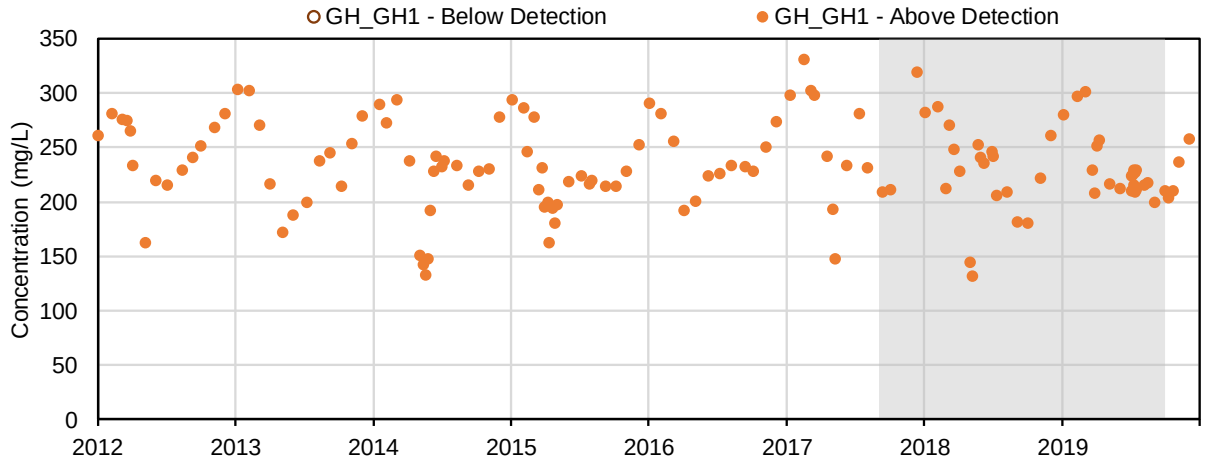
(18) Acidity, CaCO3 (mg/L); Conventional Parameters



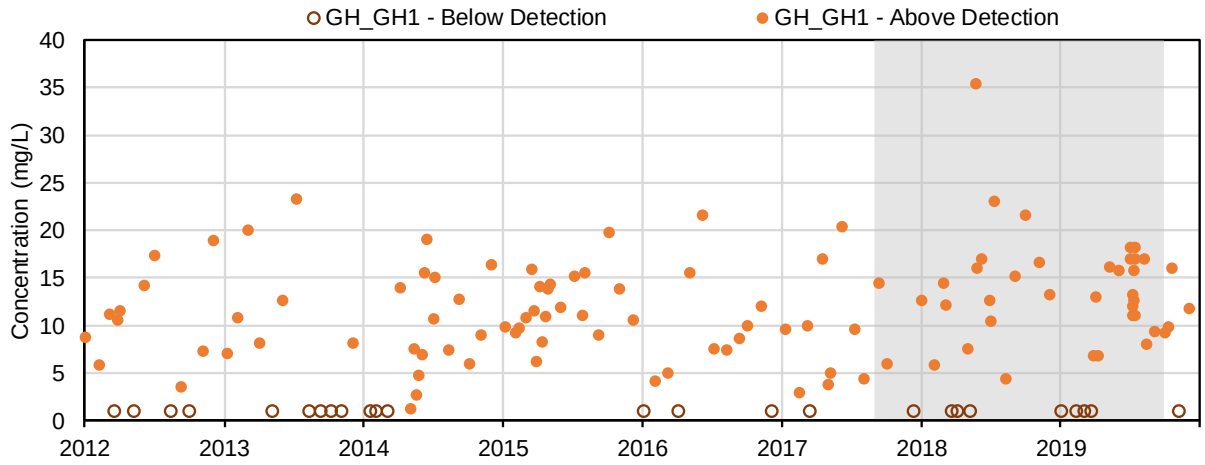
(19) Total alkalinity, as CaCO3 (mg/L); Conventional Parameters



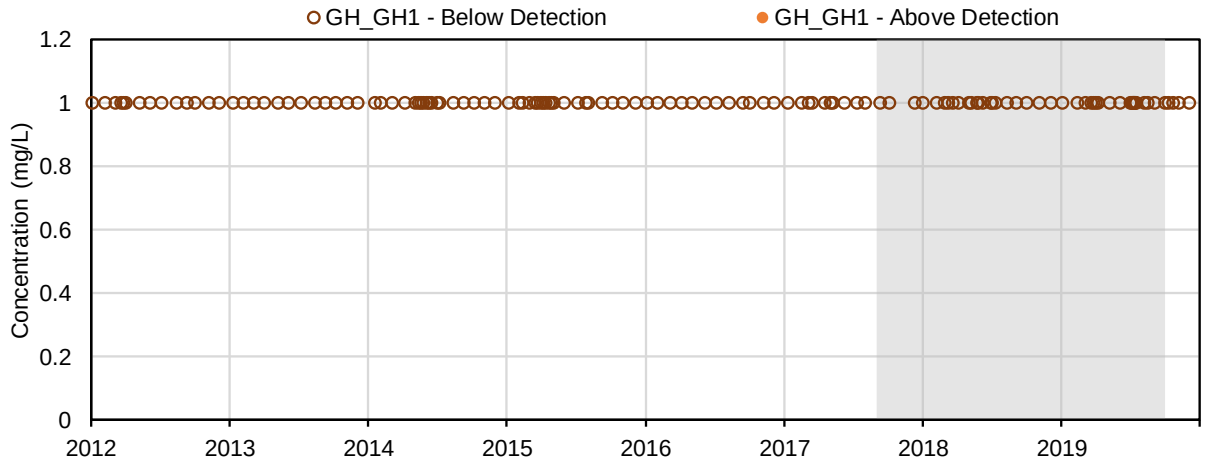
(20) Bicarbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



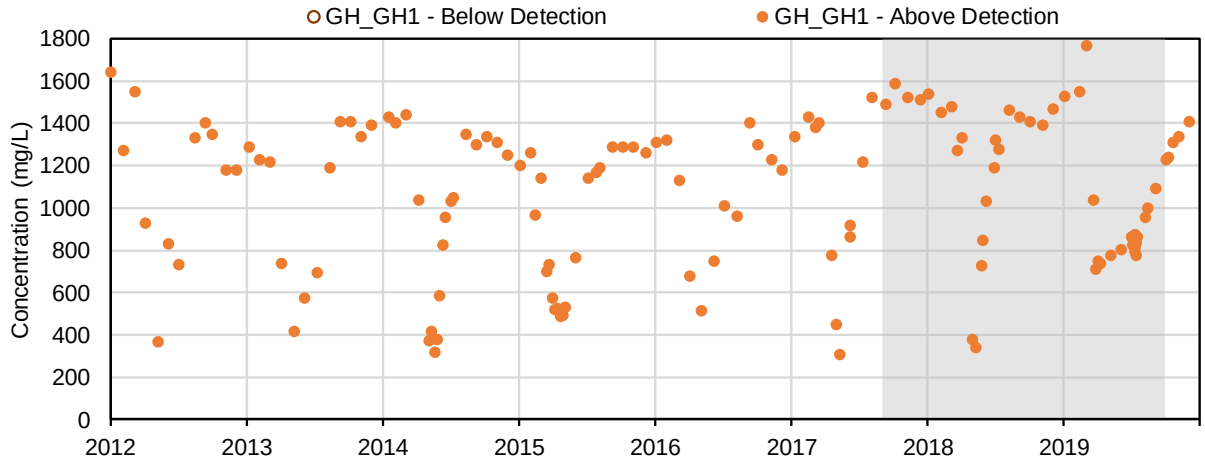
(21) Carbonate alkalinity, as CaCO3 (mg/L); Conventional Parameters



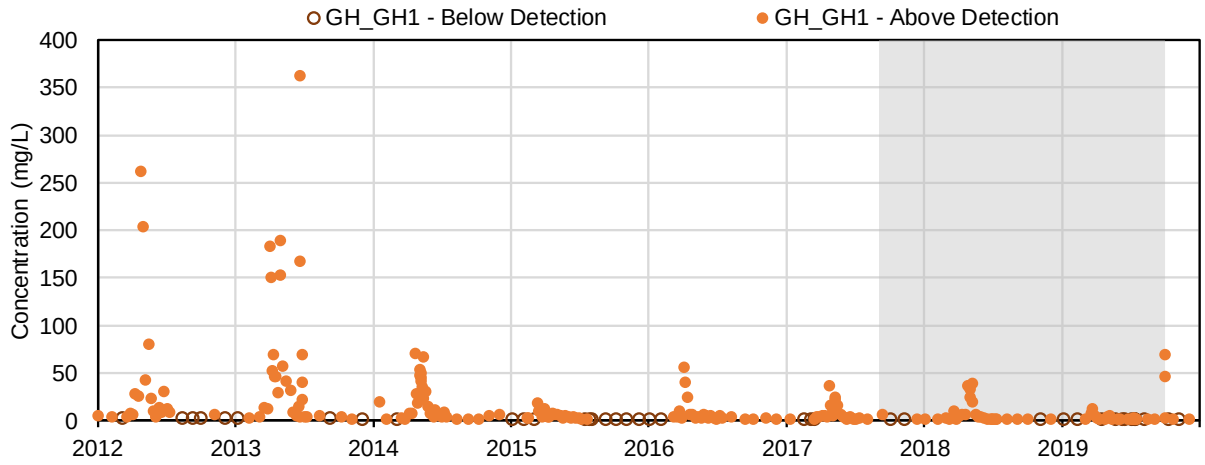
(22) Hydroxide alkalinity, as CaCO3 (mg/L); Conventional Parameters



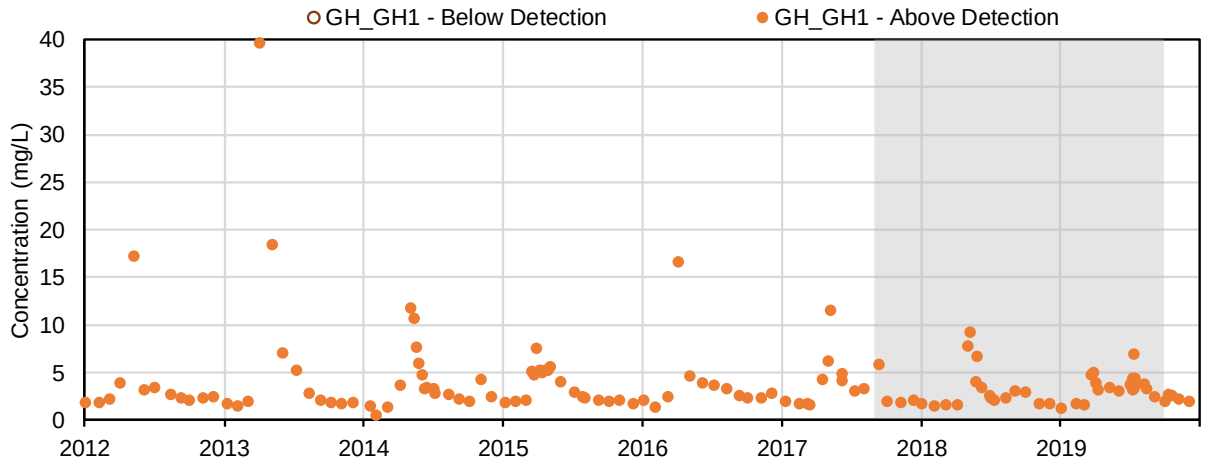
(23) Total dissolved solids (mg/L); Conventional Parameters



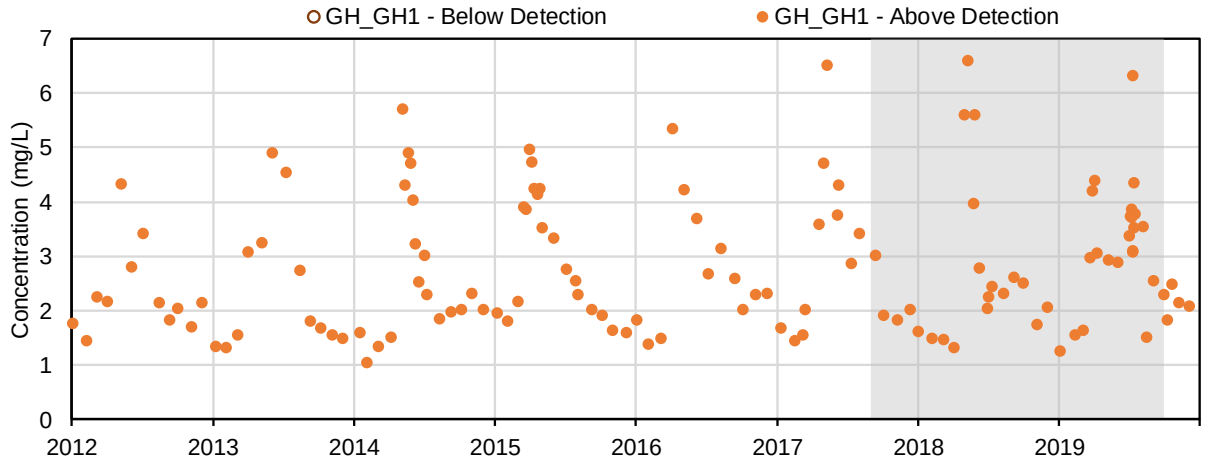
(24) Total suspended solids (mg/L); Conventional Parameters



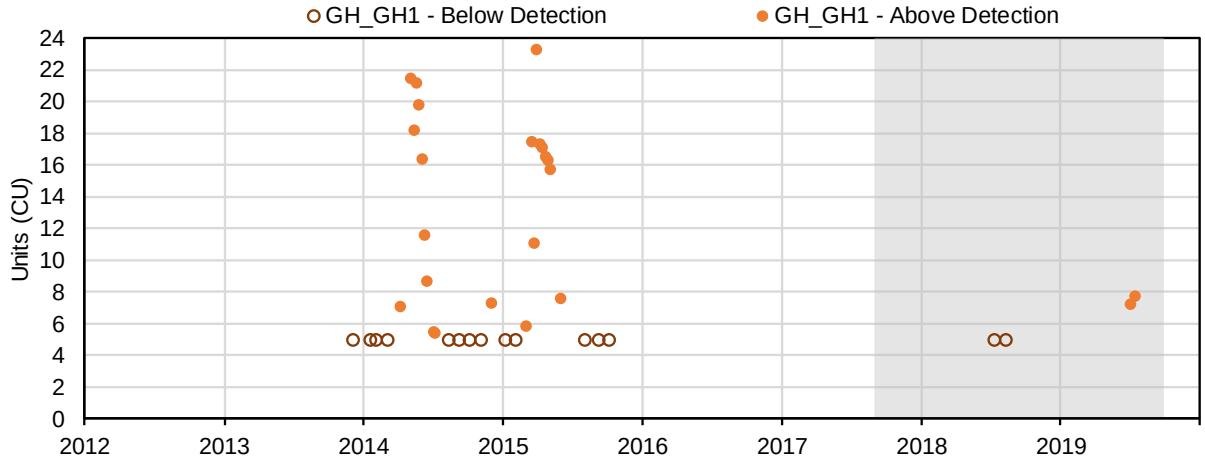
(25) Total organic carbon (mg/L); Conventional Parameters



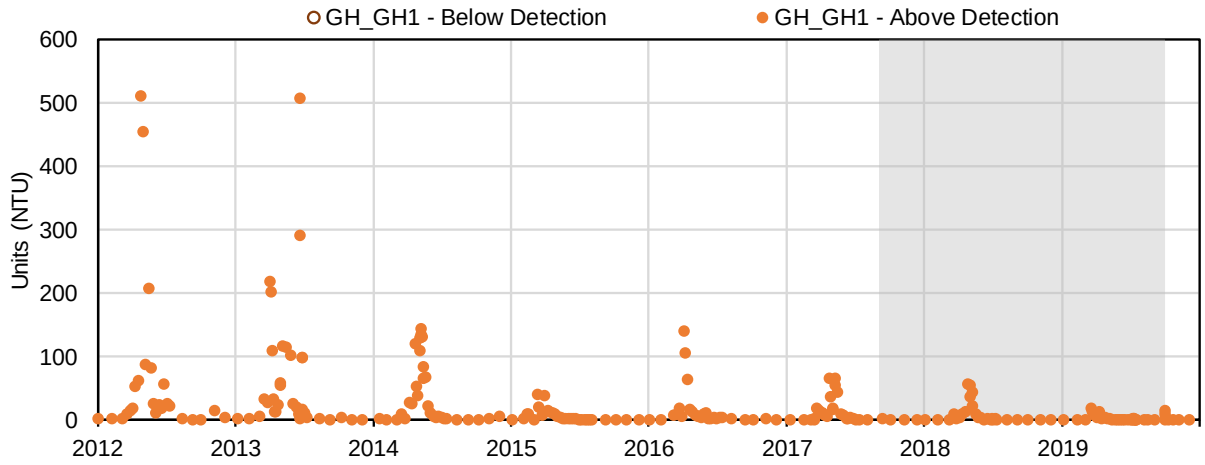
(26) Dissolved organic carbon (mg/L); Conventional Parameters



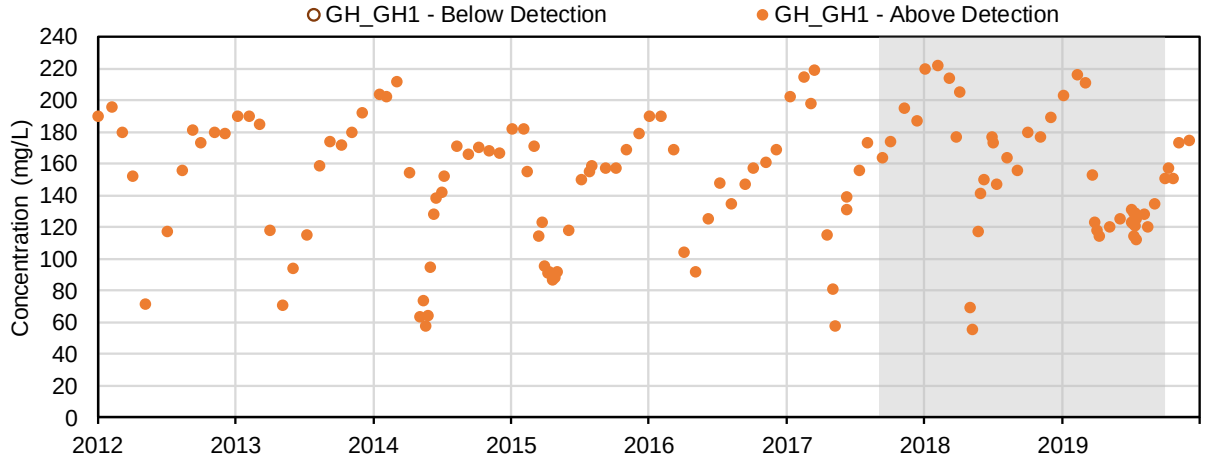
(27) Colour (CU); Conventional Parameters



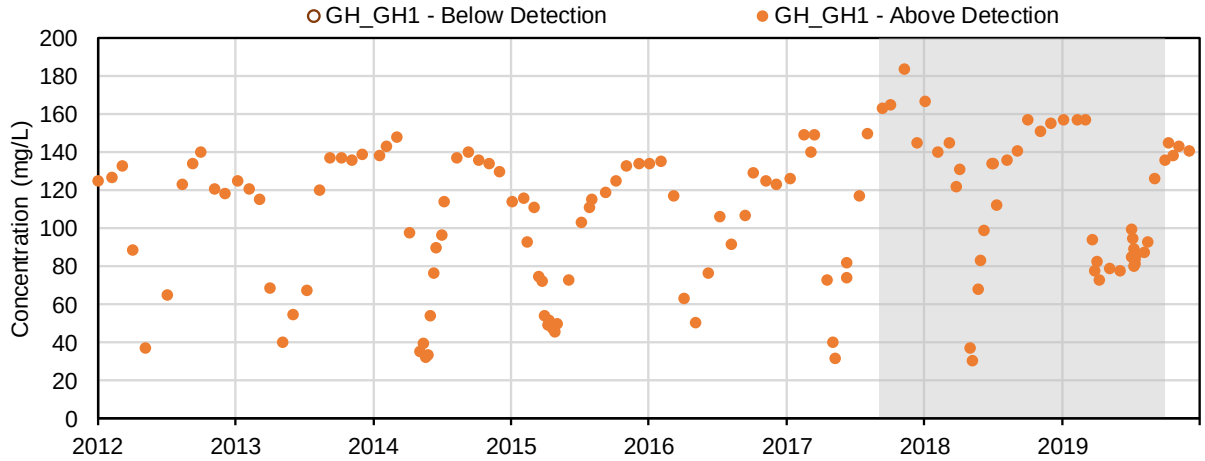
(28) Turbidity (NTU); Conventional Parameters



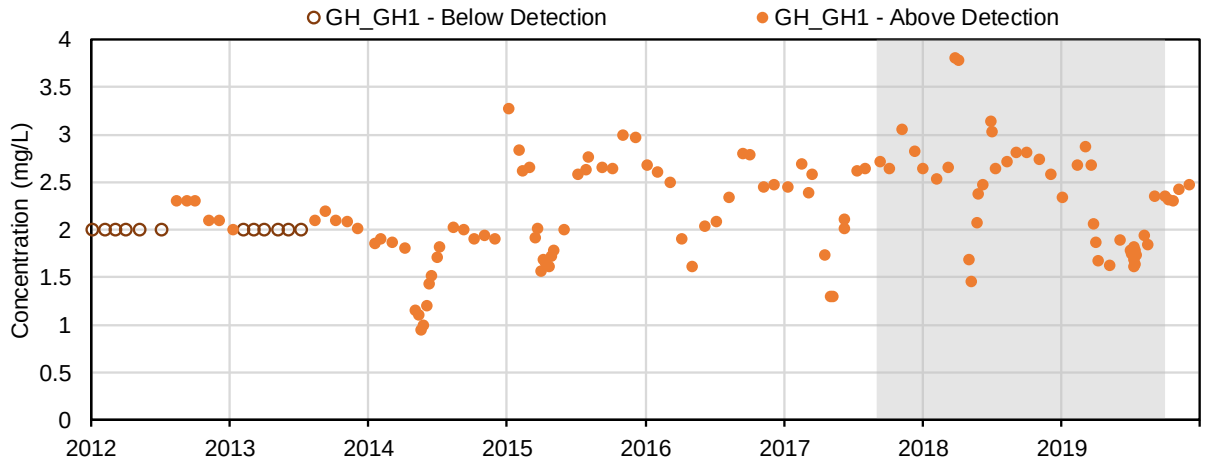
(29) Calcium (mg/L); Major Ions



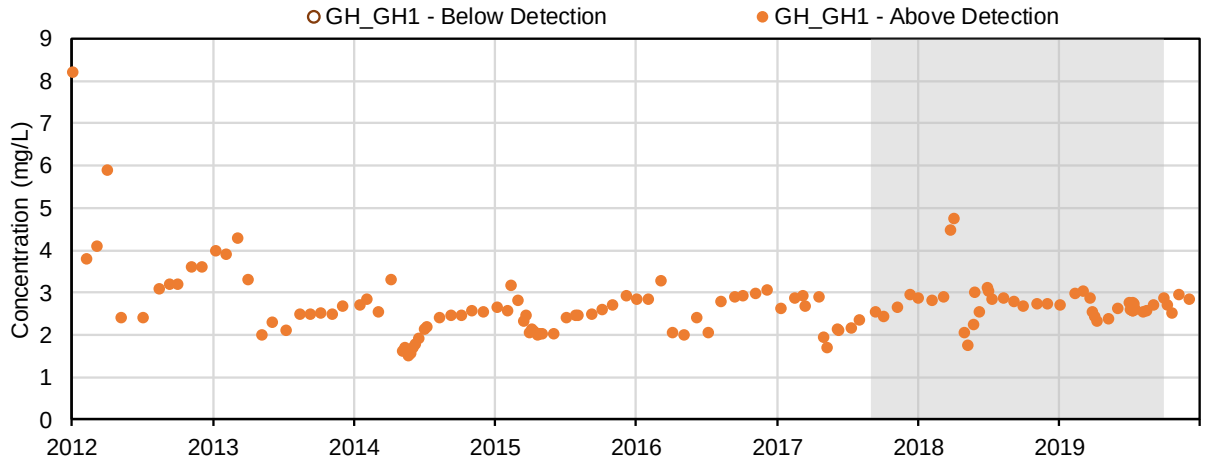
(30) Magnesium (mg/L); Major Ions



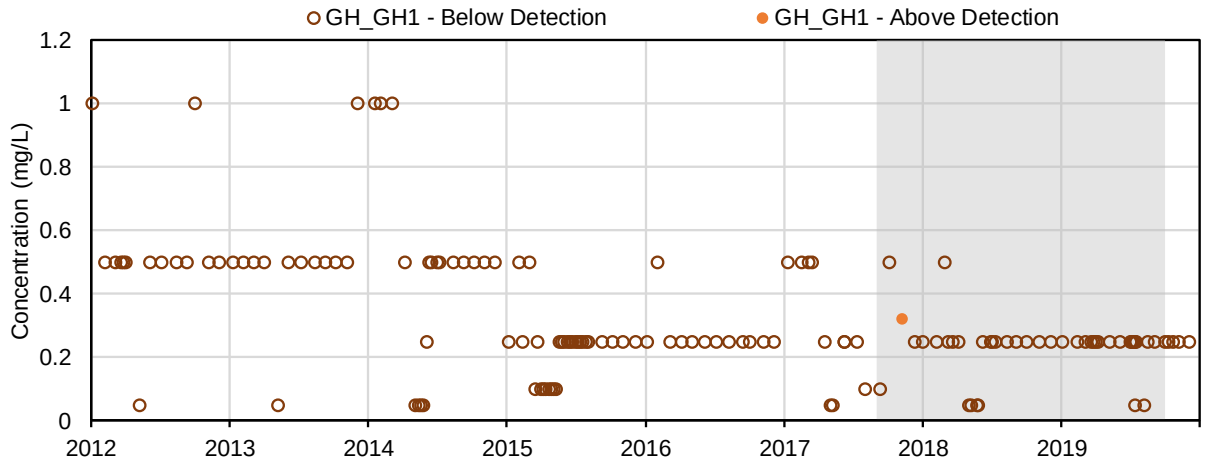
(31) Potassium (mg/L); Major Ions



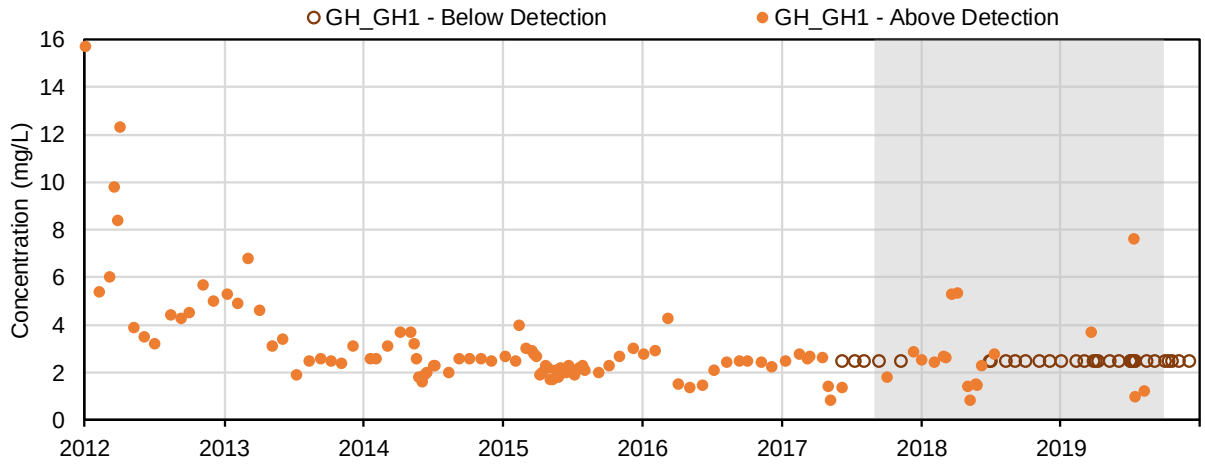
(32) Sodium (mg/L); Major Ions



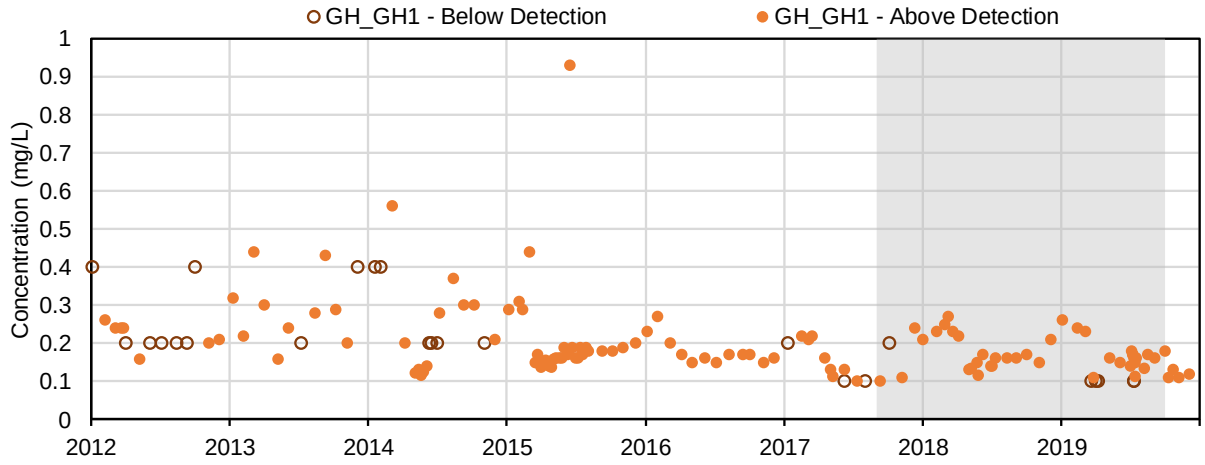
(33) Bromide (mg/L); Major Ions



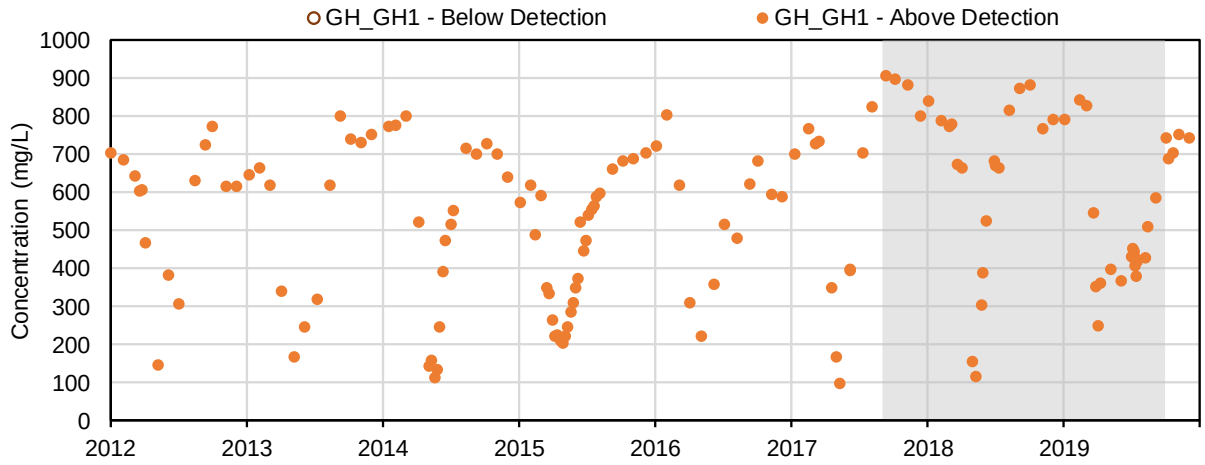
(34) Chloride (mg/L); Major Ions



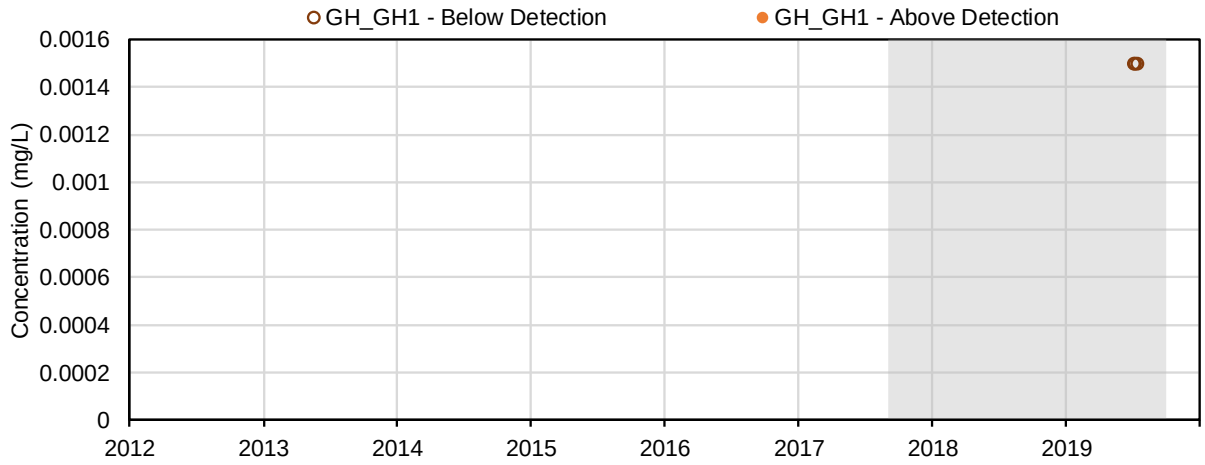
(35) Fluoride (mg/L); Major Ions



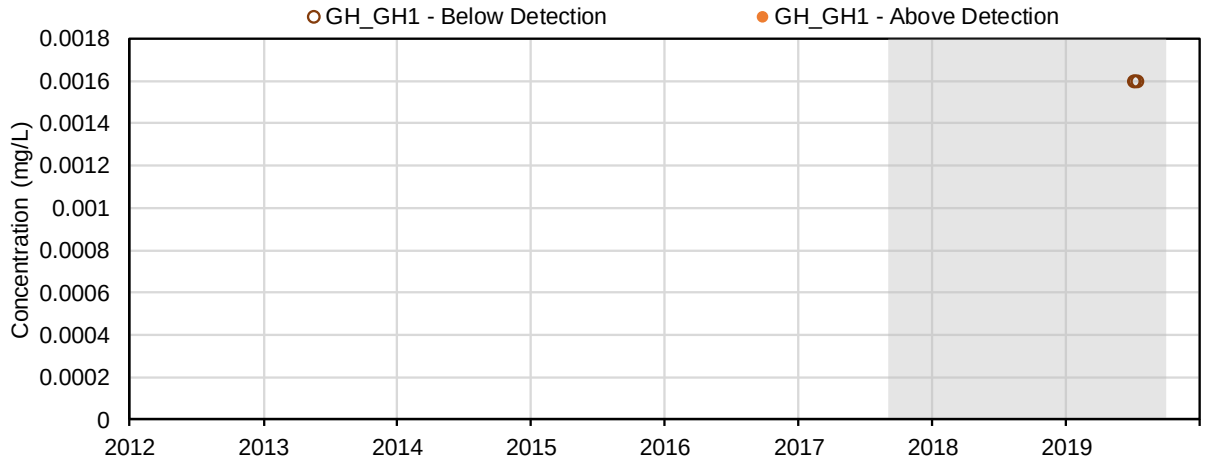
(36) Sulphate (mg/L); Major Ions



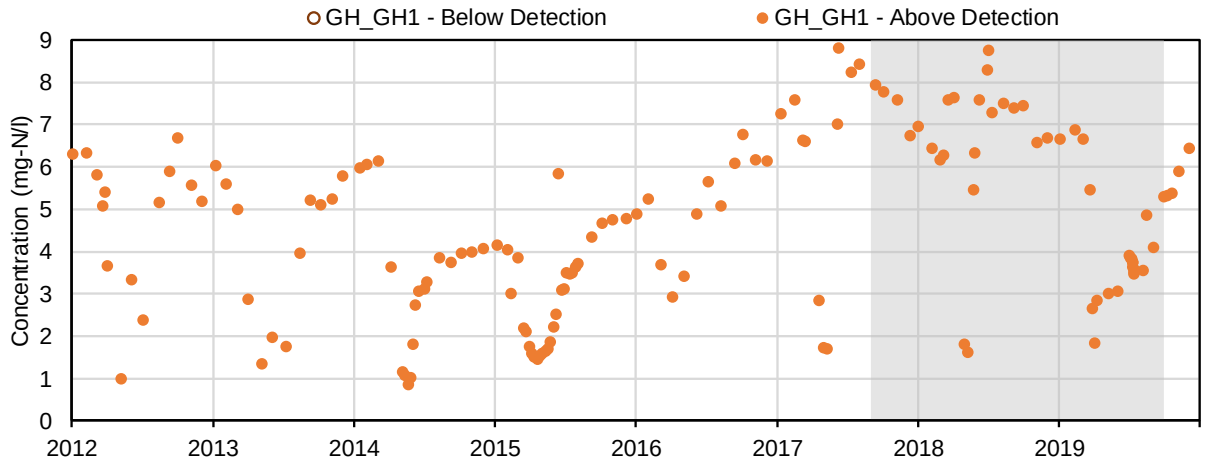
(37) Sulphide (mg/L); Major Ions



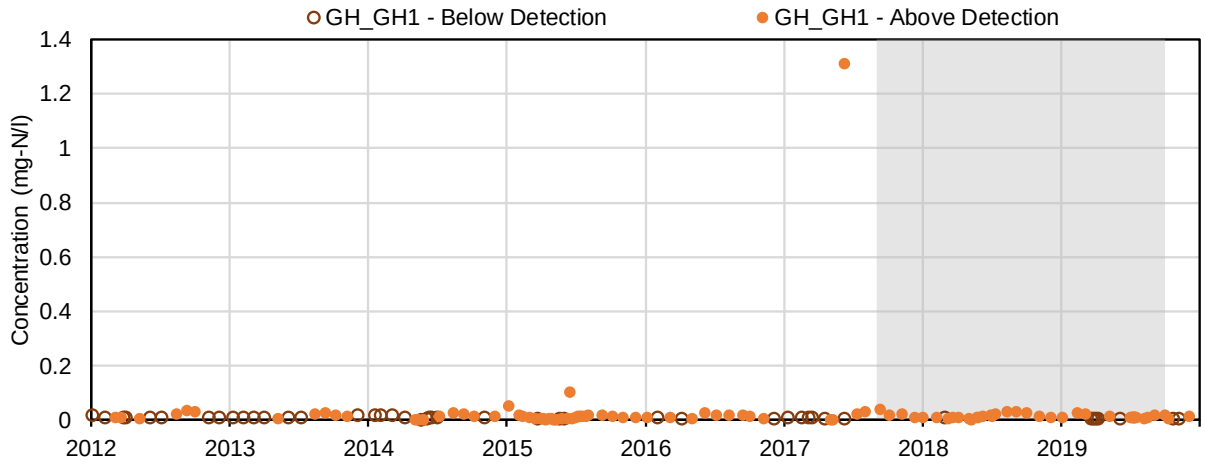
(38) Hydrogen Sulphide (mg/L); Major Ions



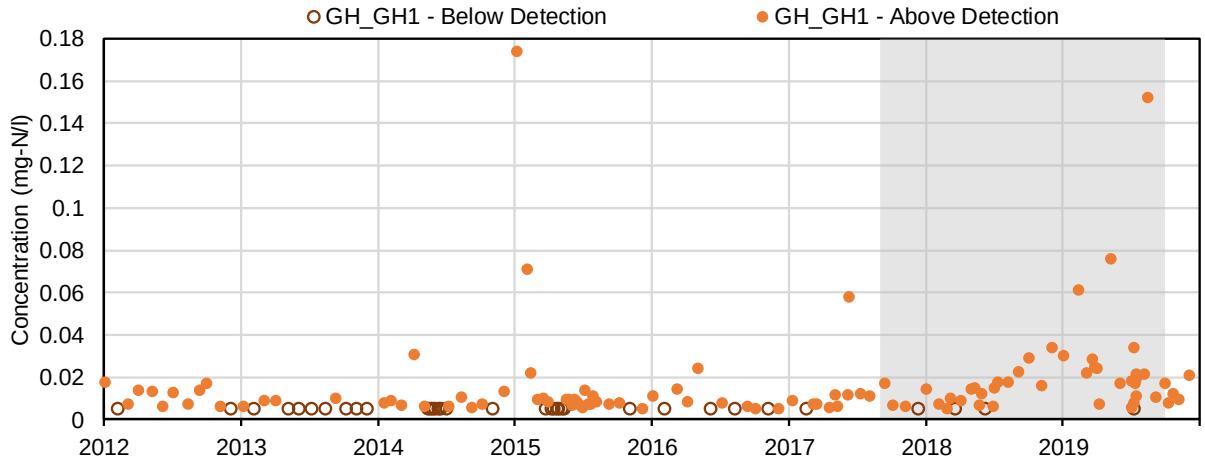
(39) Nitrate (mg-N/l); Nutrients and Biological Indicators



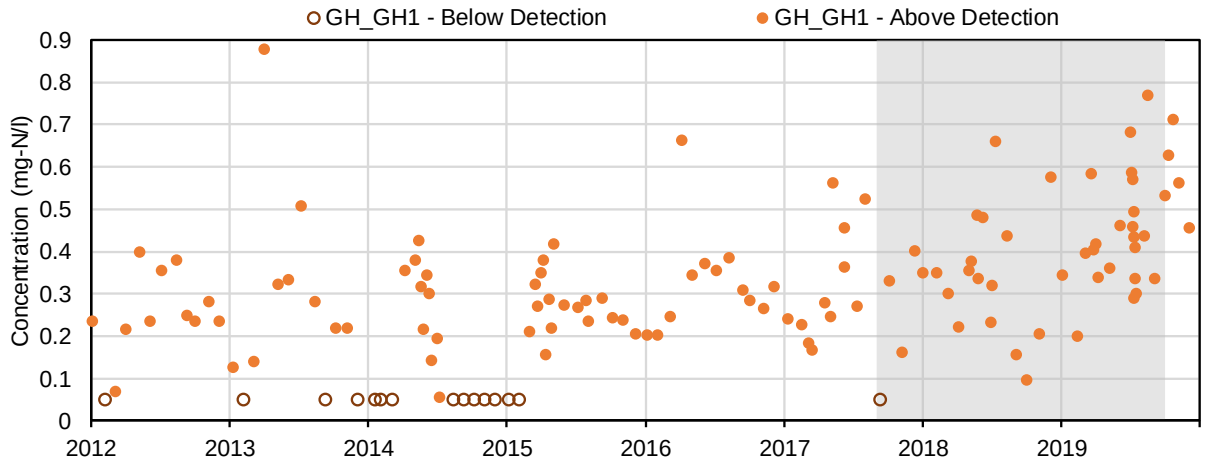
(40) Nitrite (mg-N/l); Nutrients and Biological Indicators



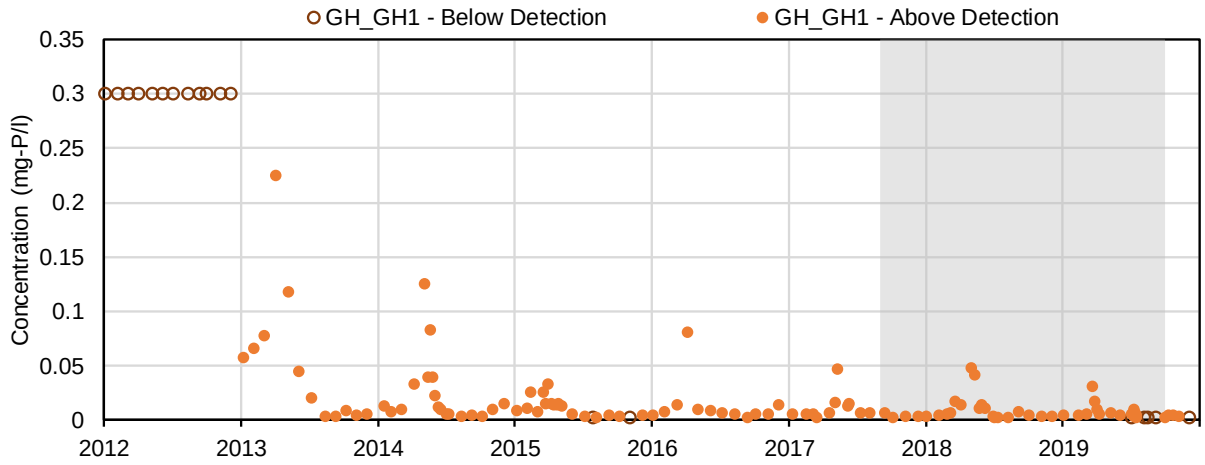
(41) Total ammonia (mg-N/l); Nutrients and Biological Indicators



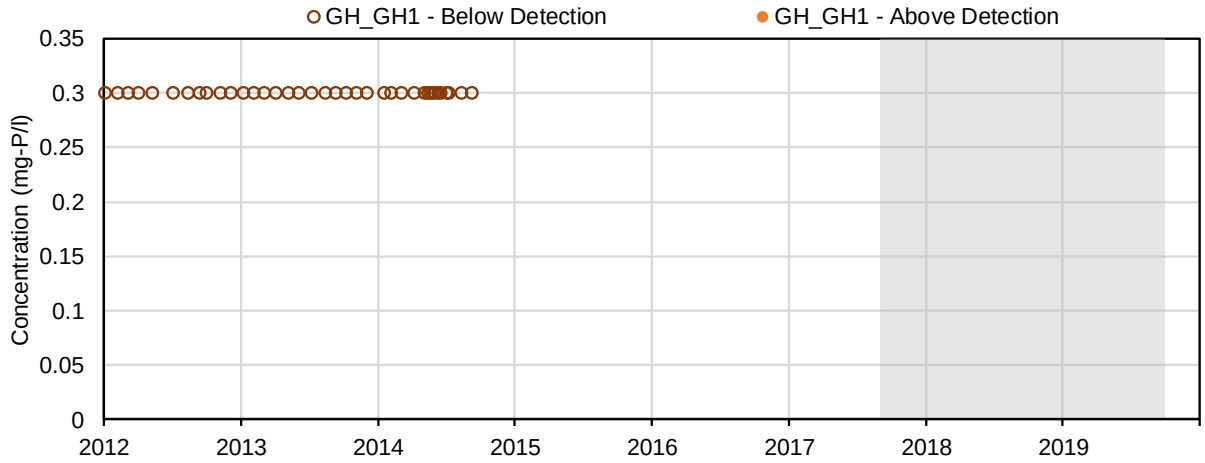
(42) Total Kjeldahl nitrogen (mg-N/l); Nutrients and Biological Indicators



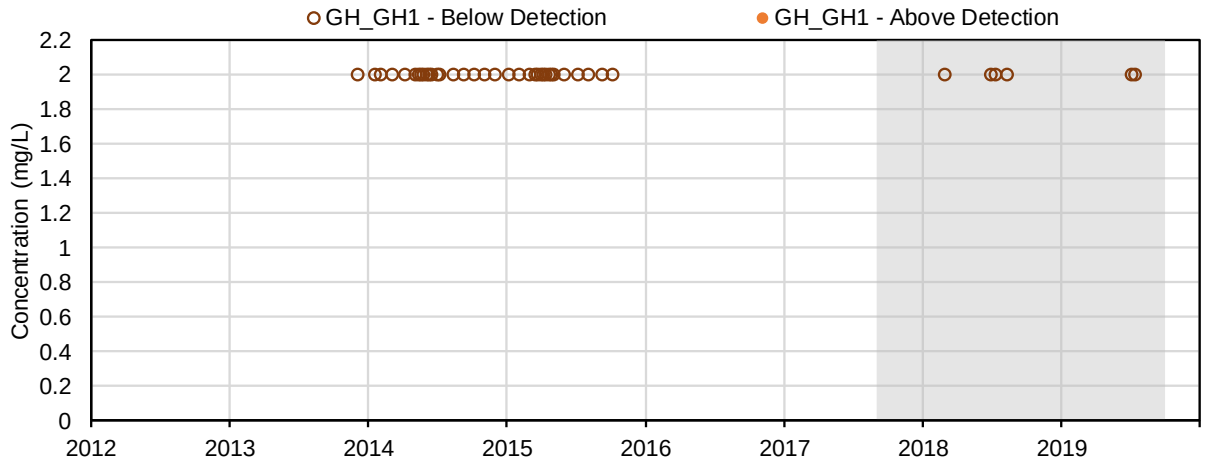
(43) Total phosphorus (mg-P/l); Nutrients and Biological Indicators



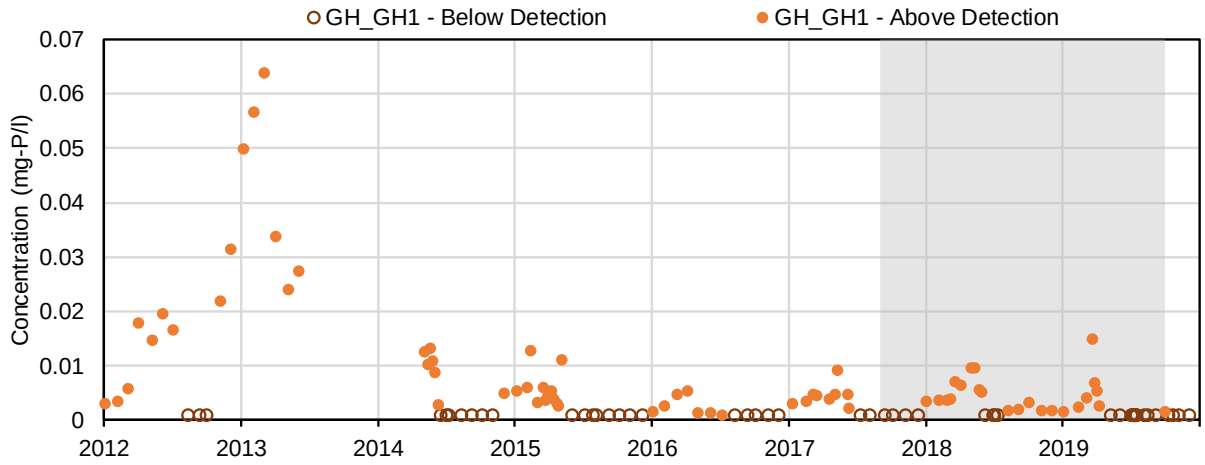
(44) Dissolved phosphorus (mg-P/l); Nutrients and Biological Indicators



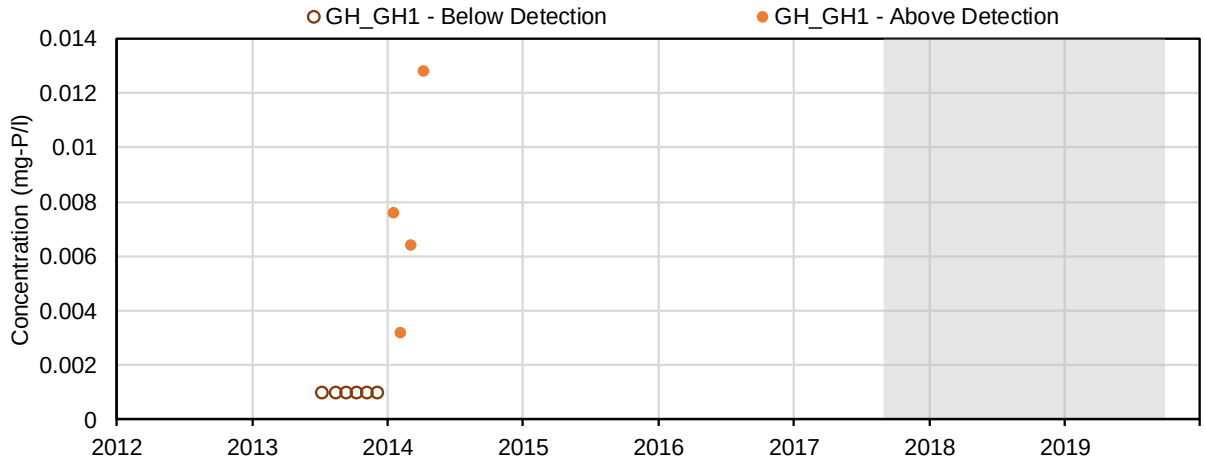
(45) Biochemical oxygen demand (mg/L); Nutrients and Biological Indicators



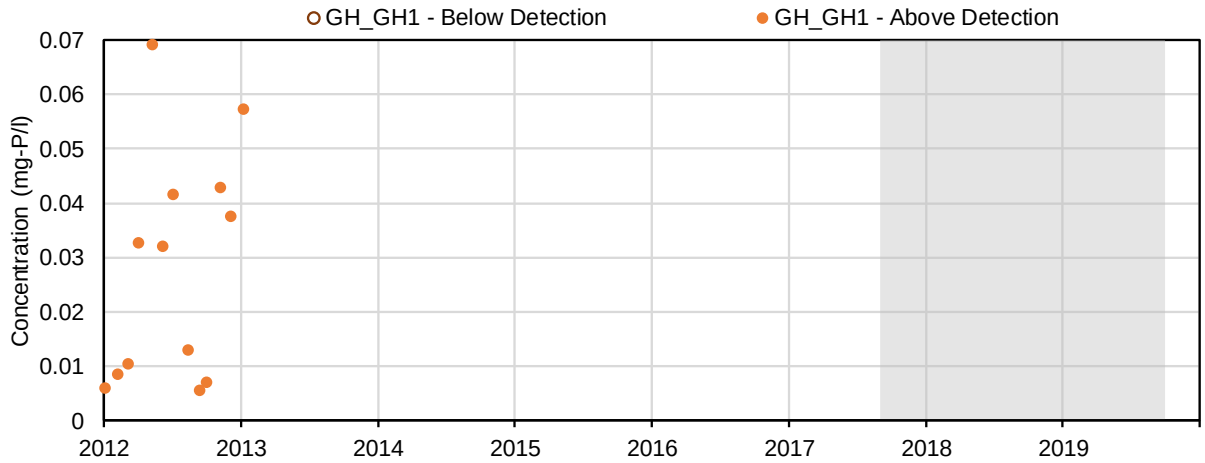
(46) Total Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



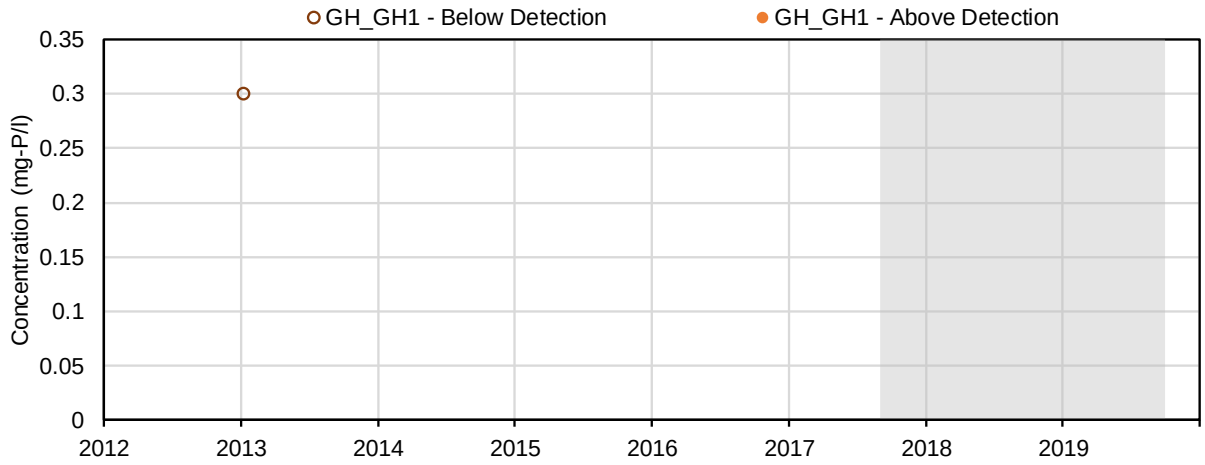
(47) Dissolved Ortho-phosphate (mg-P/l); Nutrients and Biological Indicators



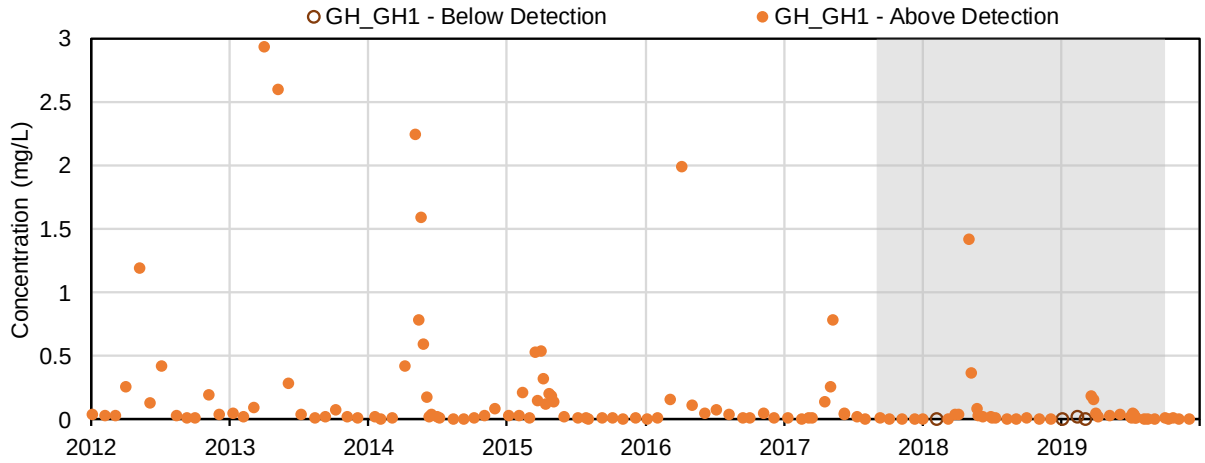
(48) Total Phosphate (mg-P/l); Nutrients and Biological Indicators



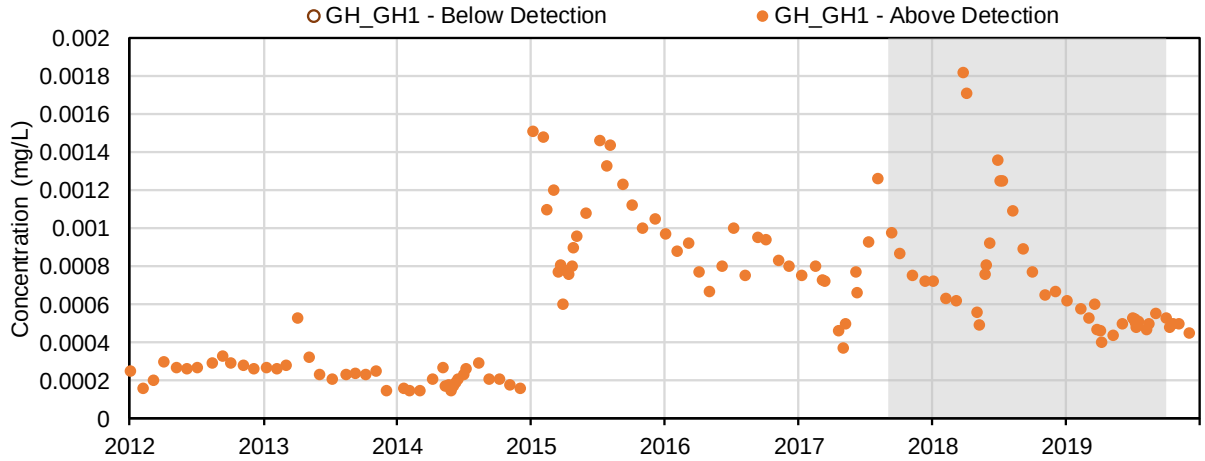
(49) Dissolved Phosphate (mg-P/l); Nutrients and Biological Indicators



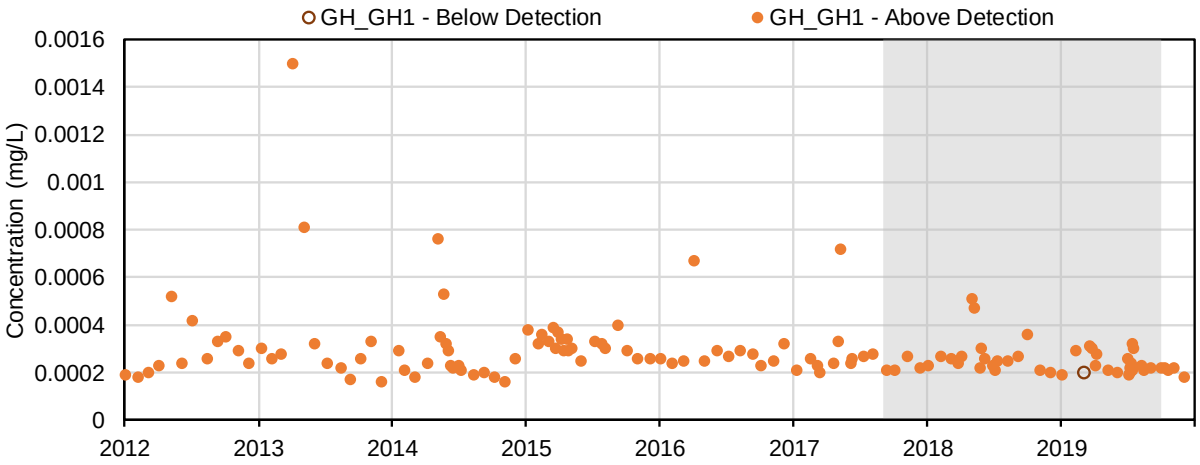
(50) Aluminum (mg/L); Total Metals



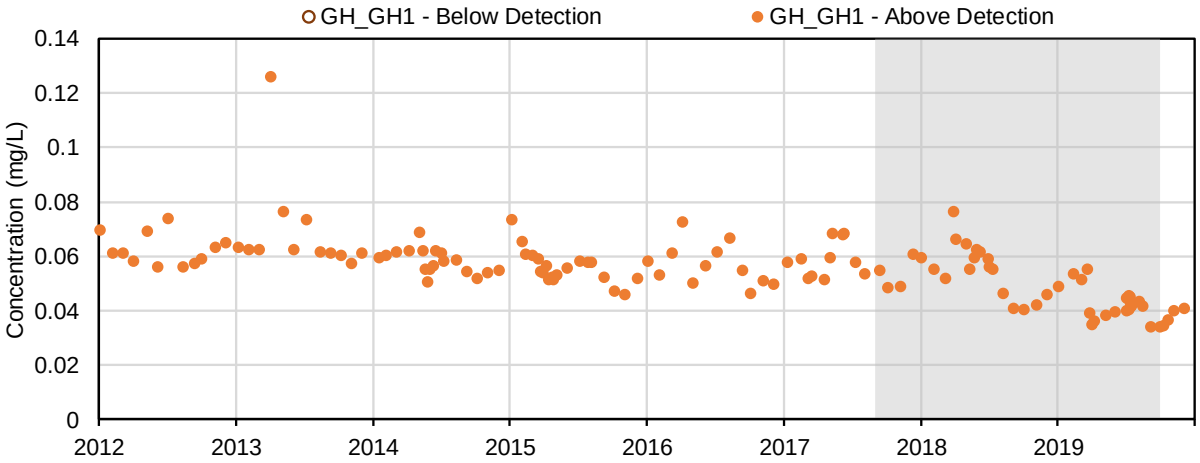
(51) Antimony (mg/L); Total Metals



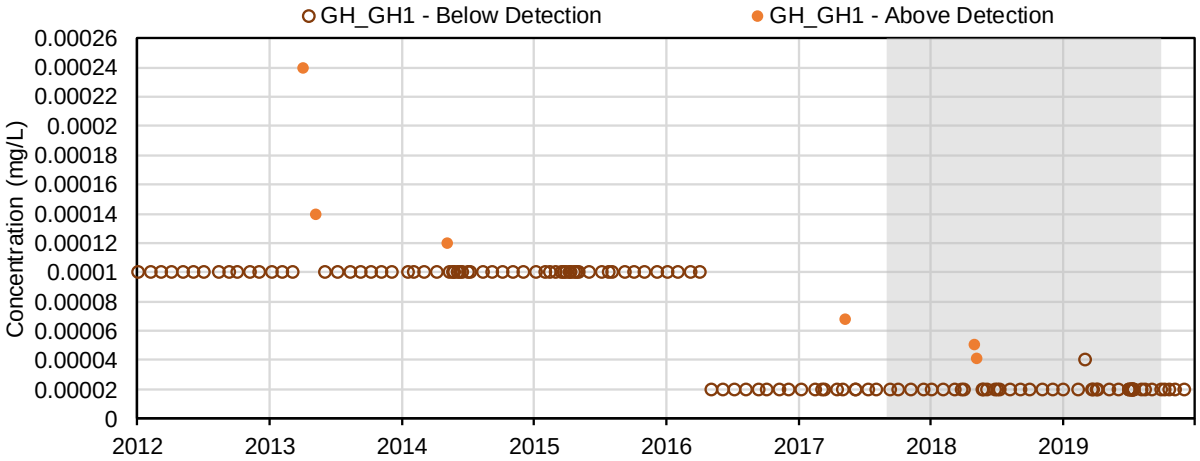
(52) Arsenic (mg/L); Total Metals



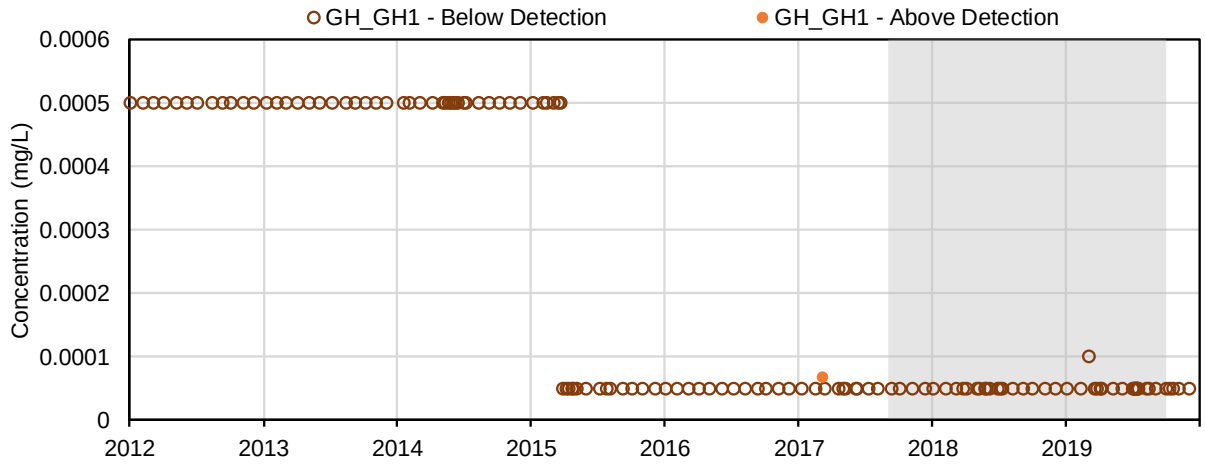
(53) Barium (mg/L); Total Metals



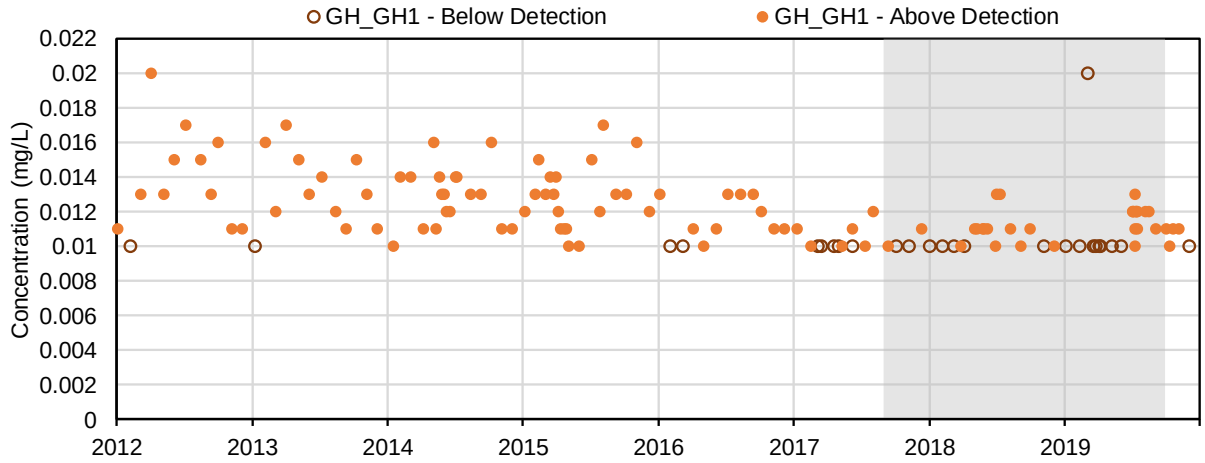
(54) Beryllium (mg/L); Total Metals



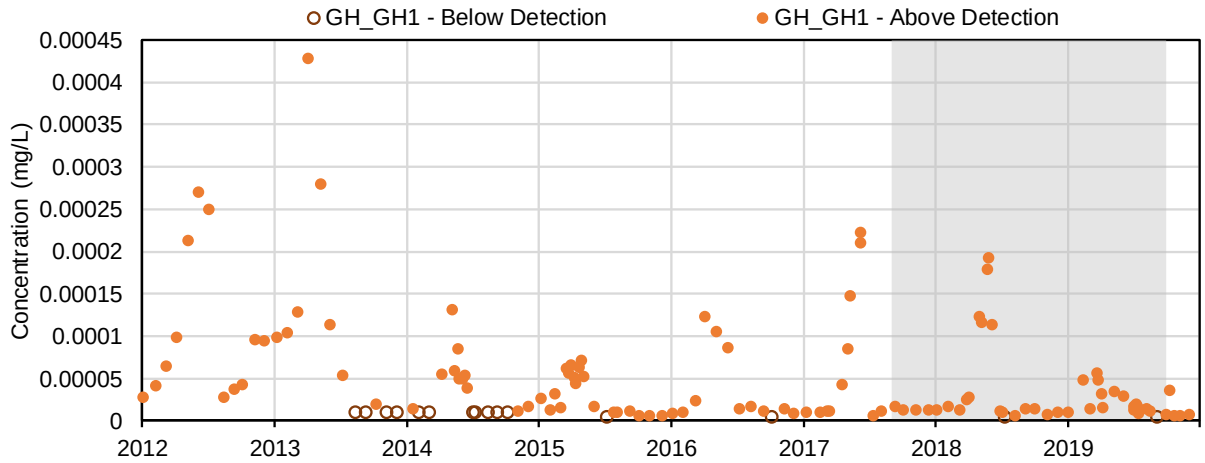
(55) Bismuth (mg/L); Total Metals



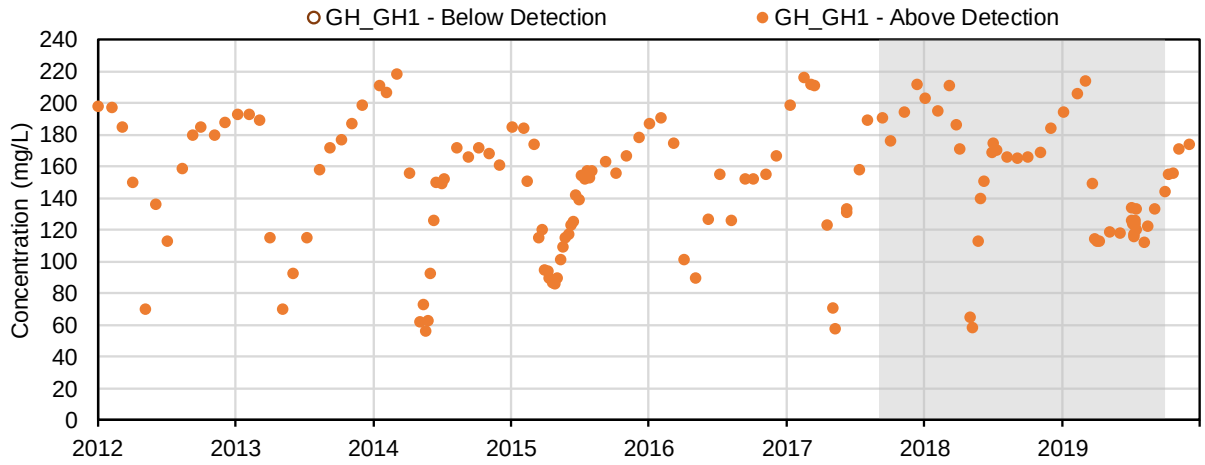
(56) Boron (mg/L); Total Metals



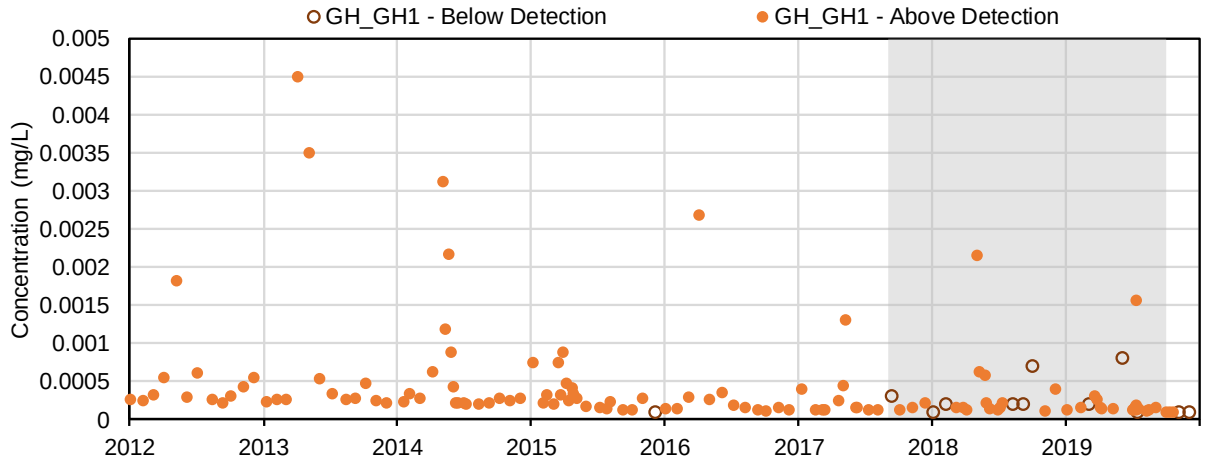
(57) Cadmium (mg/L); Total Metals



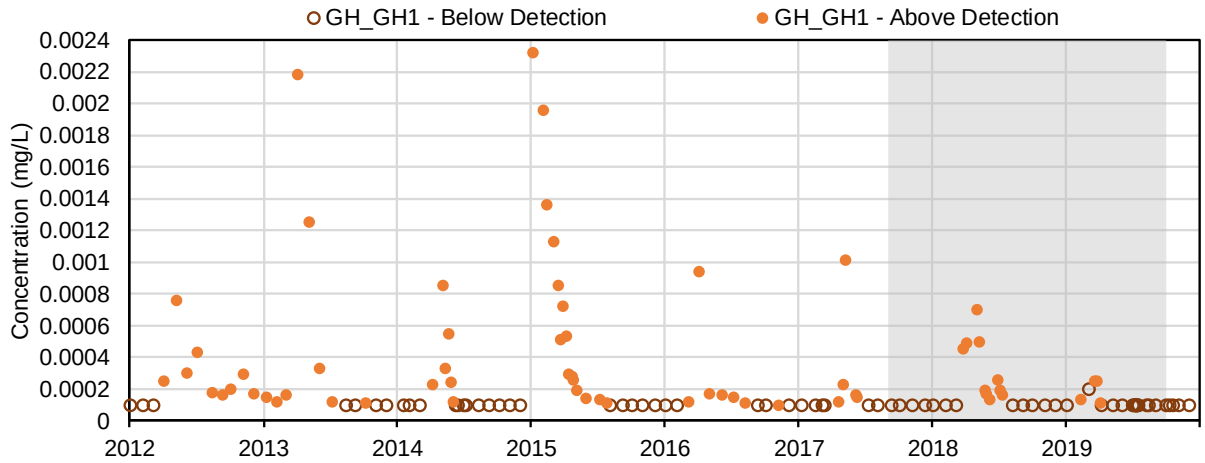
(58) Calcium (mg/L); Total Metals



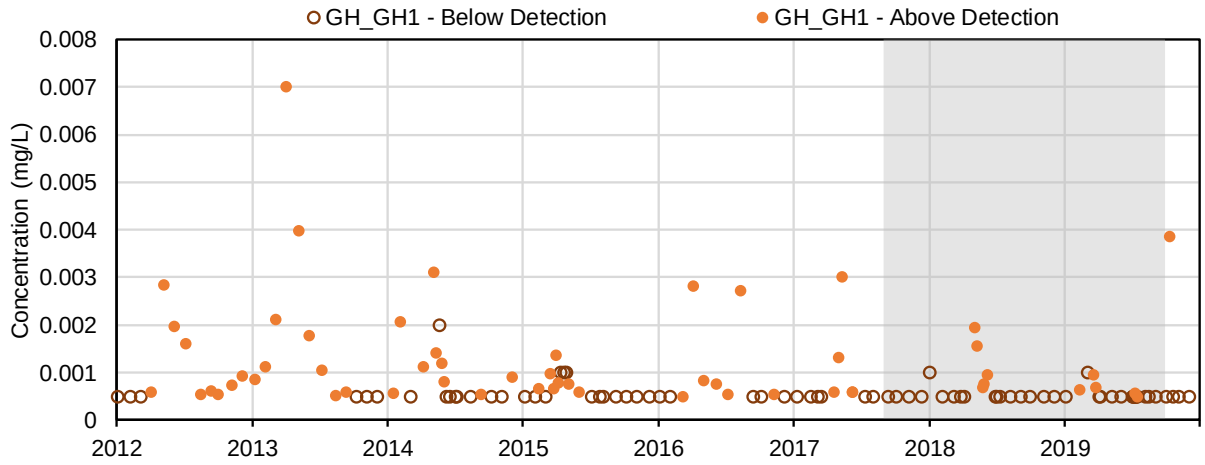
(59) Chromium (mg/L); Total Metals



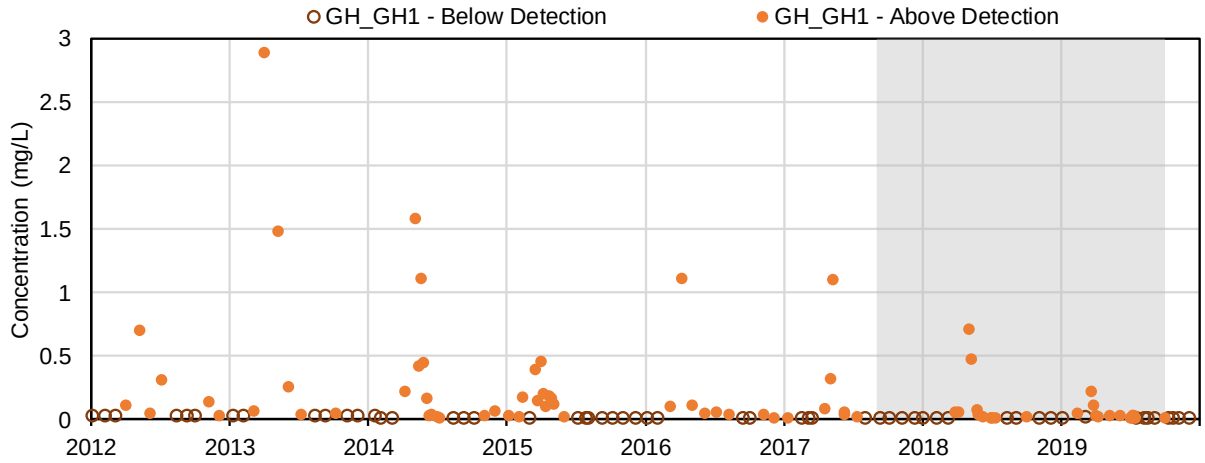
(60) Cobalt (mg/L); Total Metals



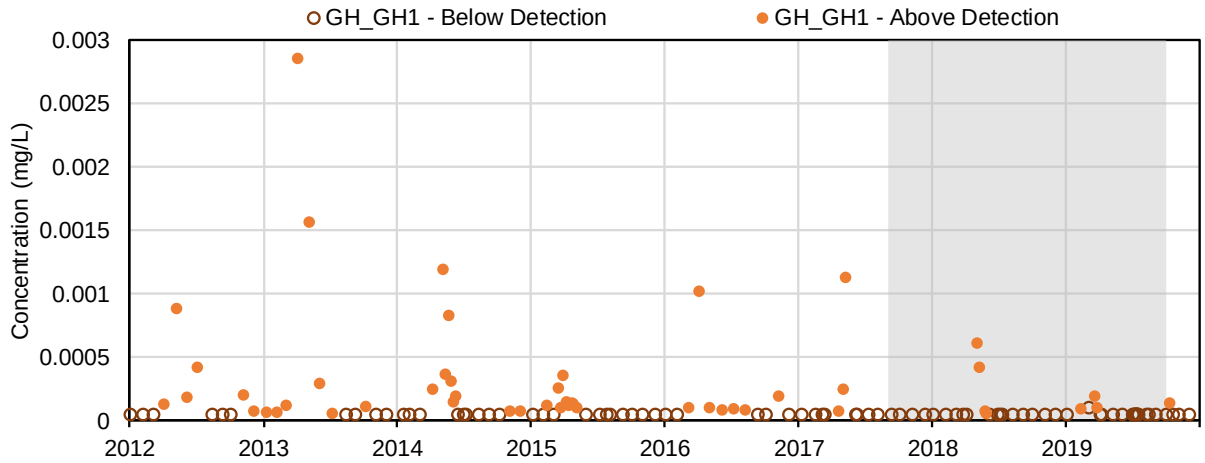
(61) Copper (mg/L); Total Metals



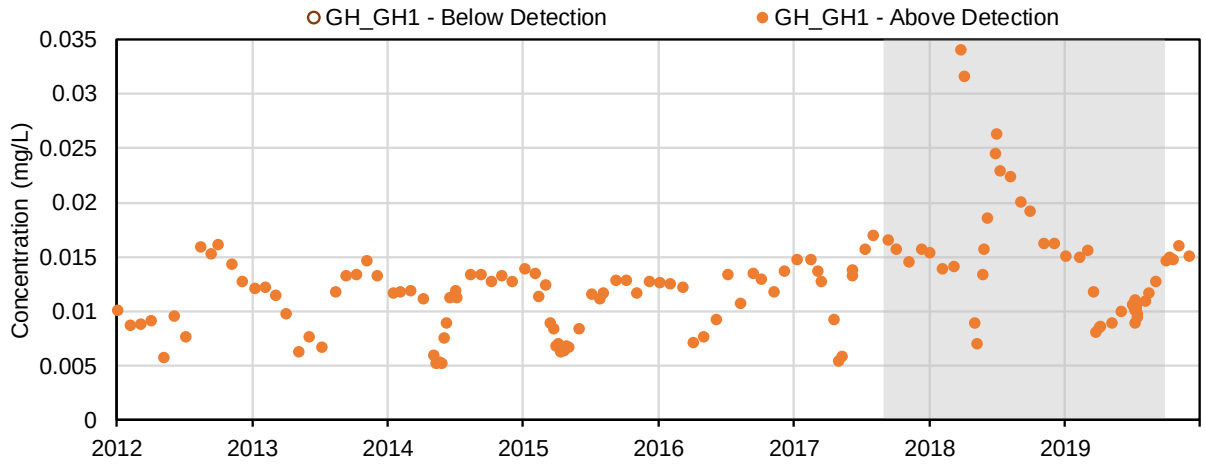
(62) Iron (mg/L); Total Metals



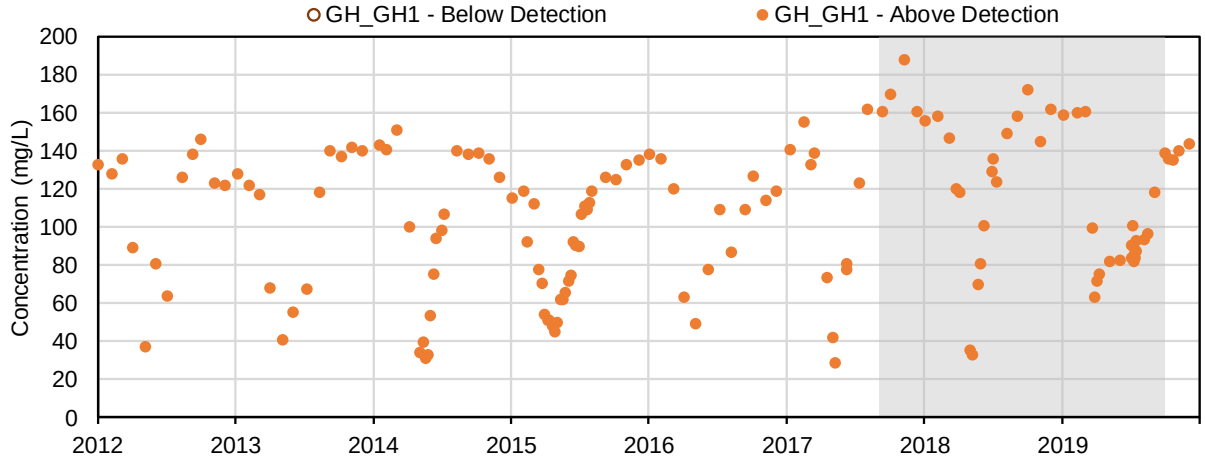
(63) Lead (mg/L); Total Metals



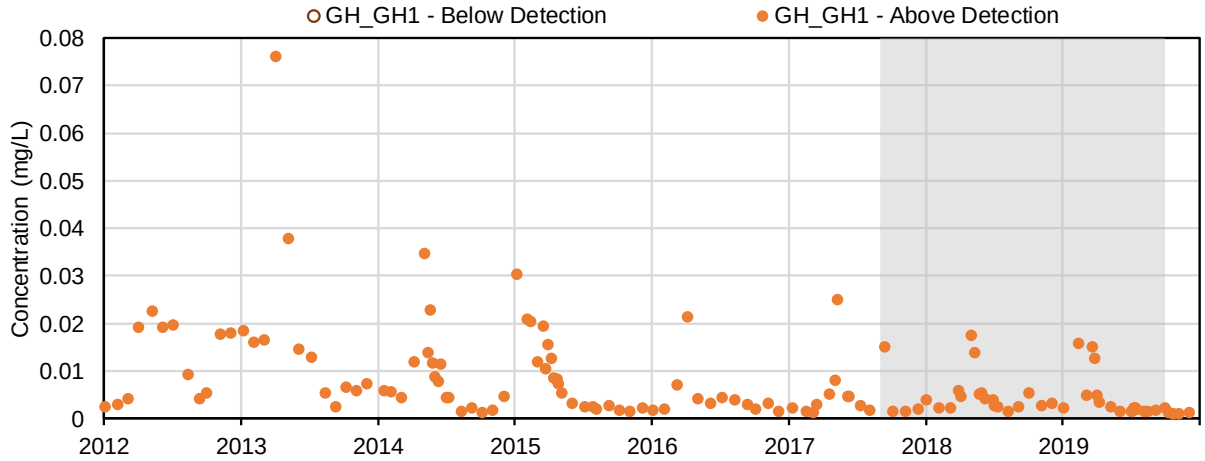
(64) Lithium (mg/L); Total Metals



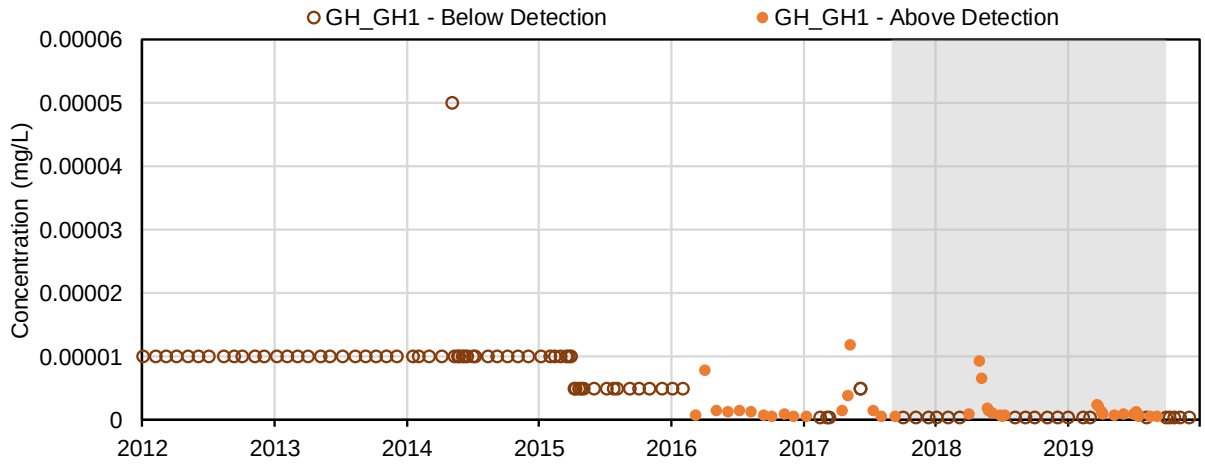
(65) Magnesium (mg/L); Total Metals



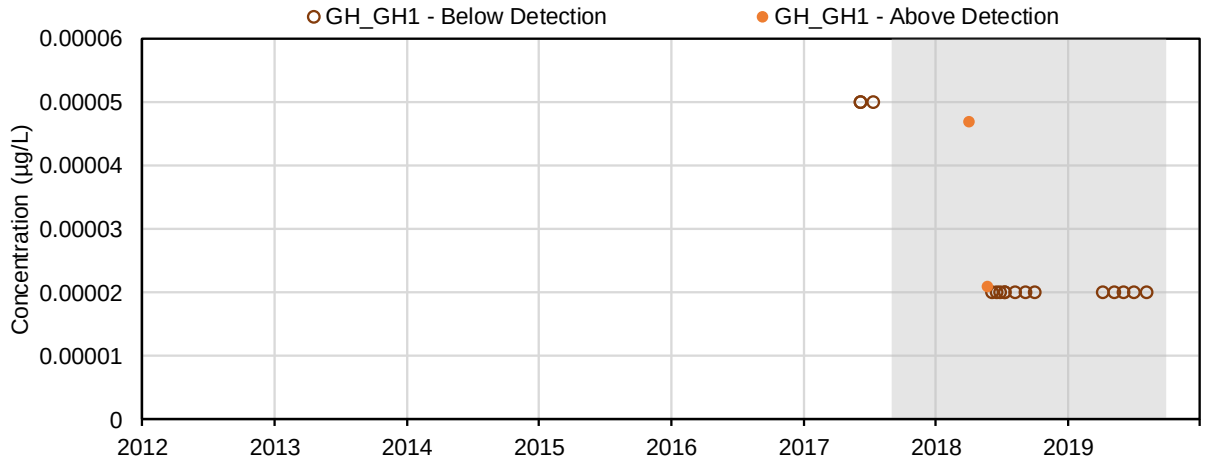
(66) Manganese (mg/L); Total Metals



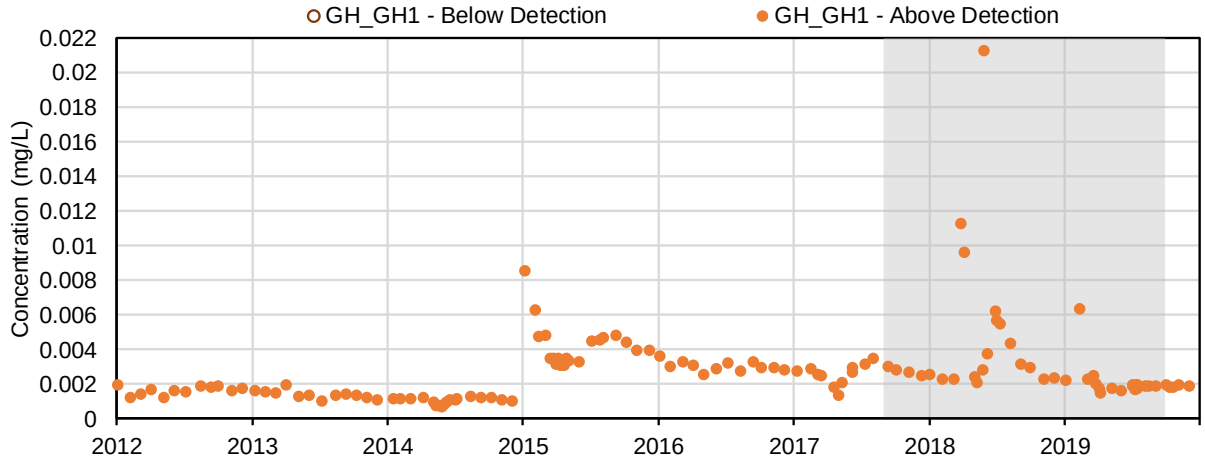
(67) Mercury (mg/L); Total Metals



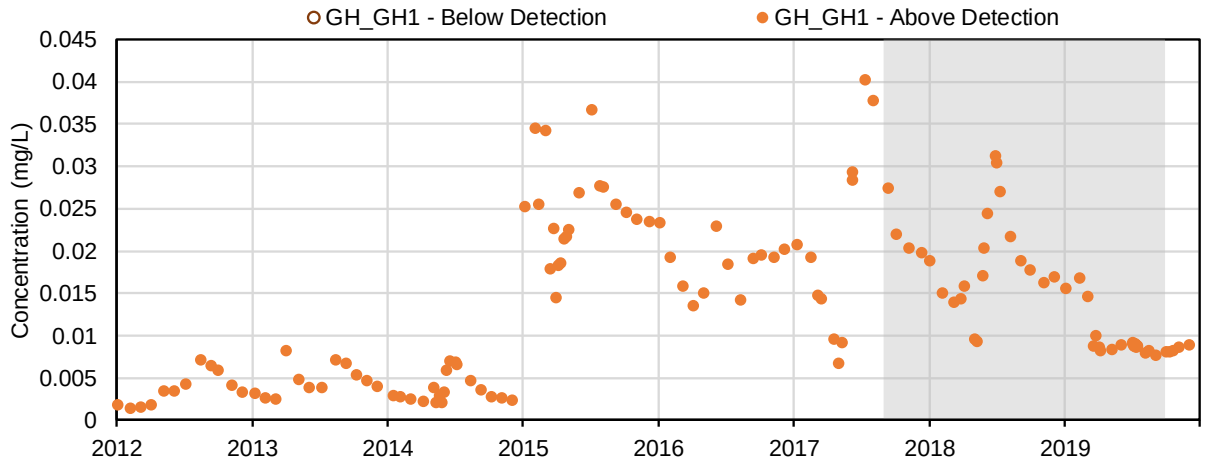
(68) Methyl mercury (µg/L); Total Metals



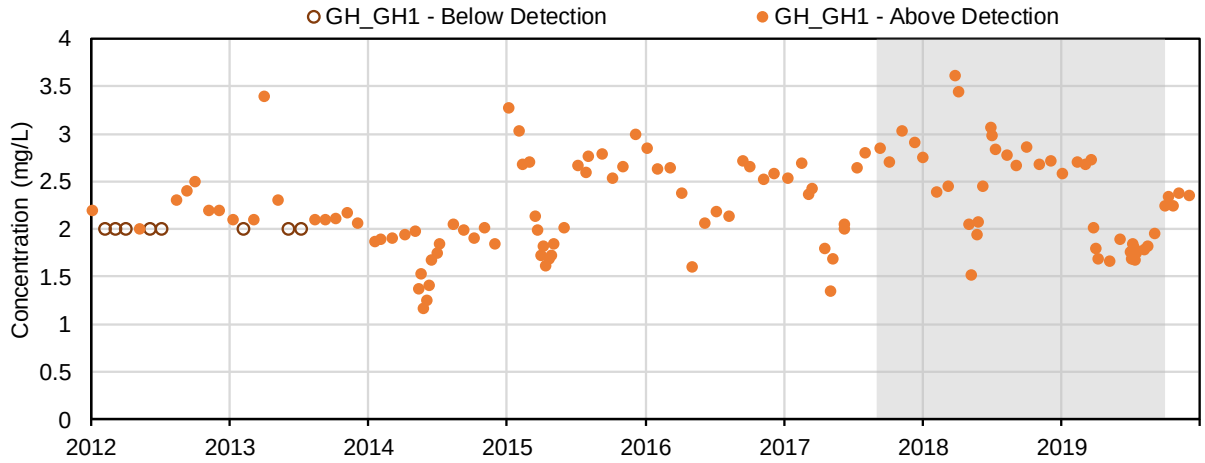
(69) Molybdenum (mg/L); Total Metals



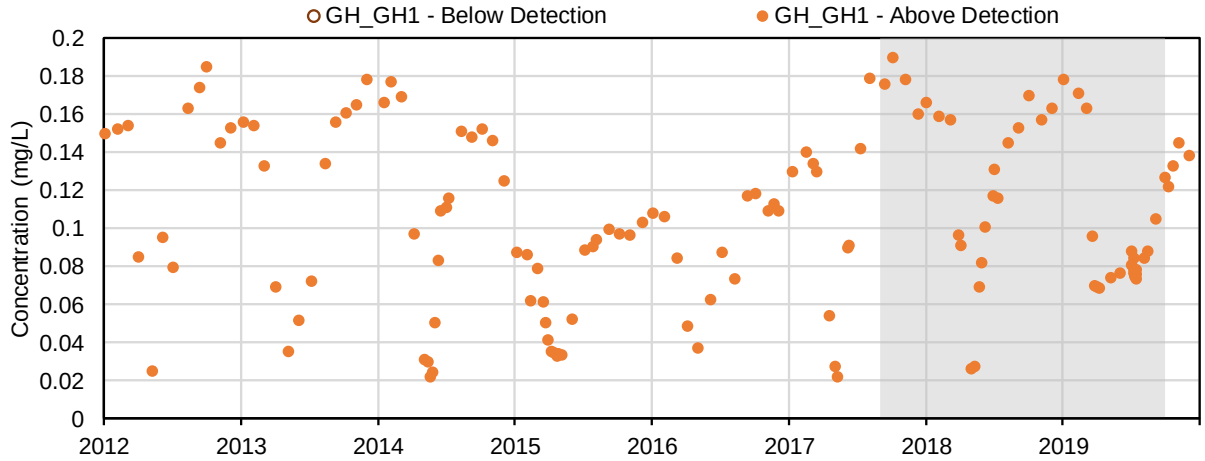
(70) Nickel (mg/L); Total Metals



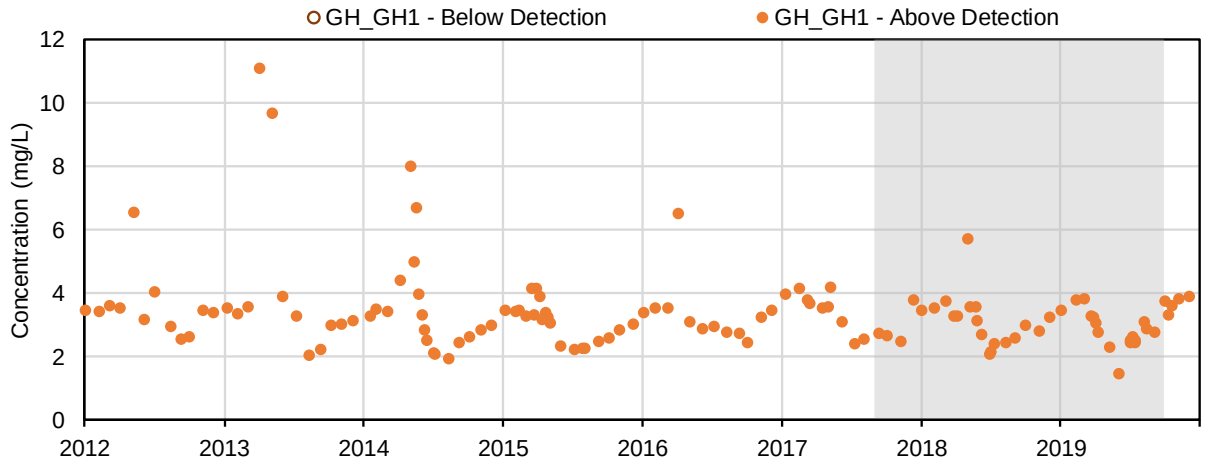
(71) Potassium (mg/L); Total Metals



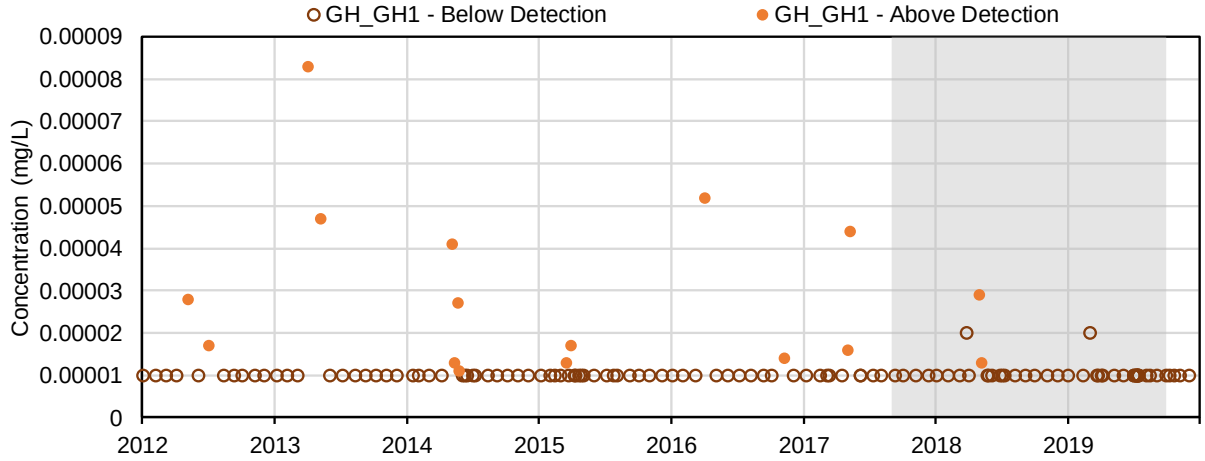
(72) Selenium (mg/L); Total Metals



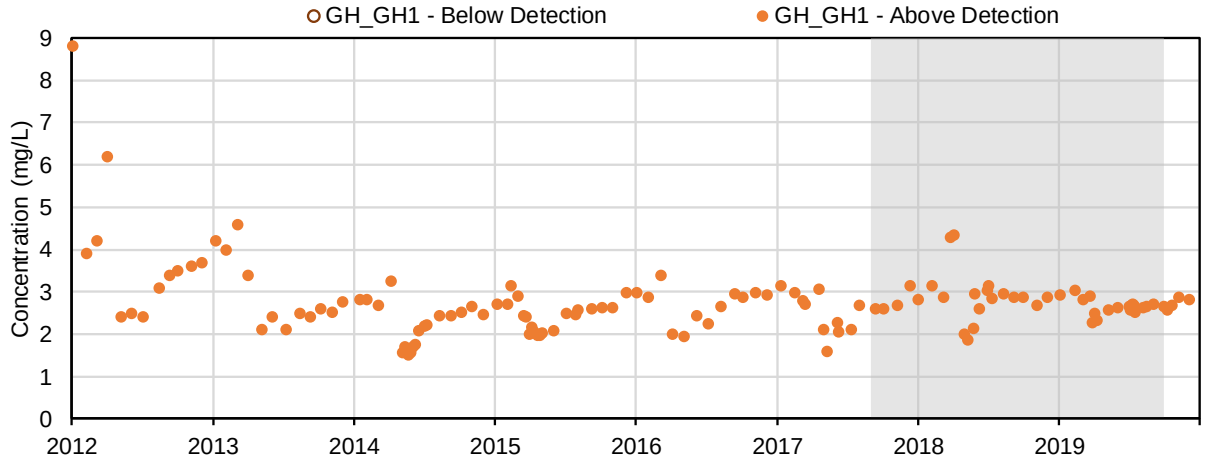
(73) Silicon (mg/L); Total Metals



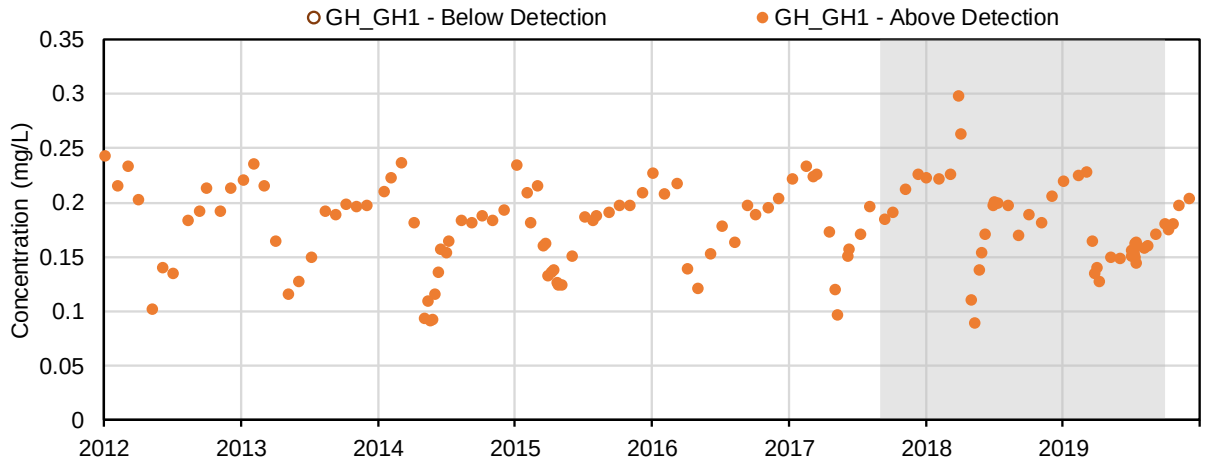
(74) Silver (mg/L); Total Metals



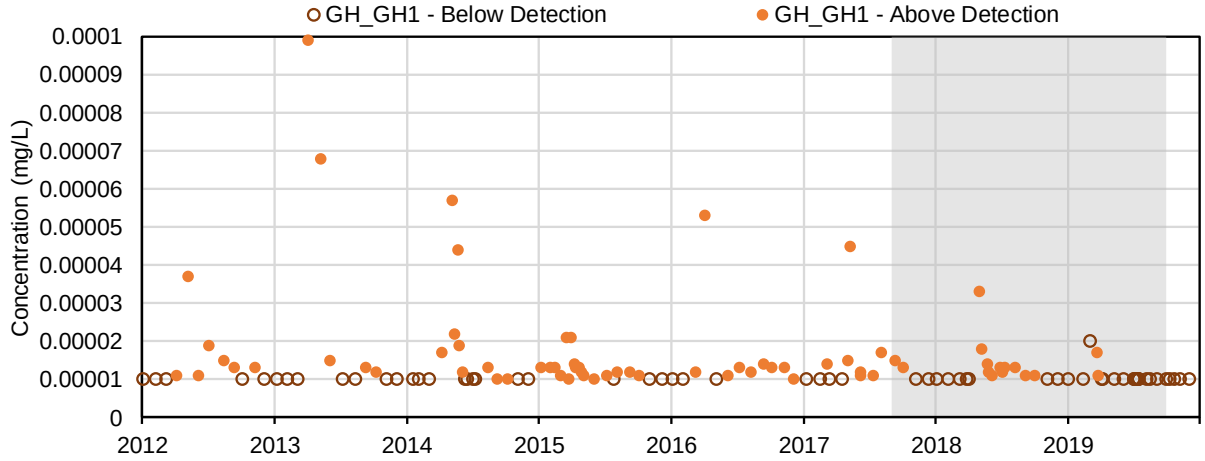
(75) Sodium (mg/L); Total Metals



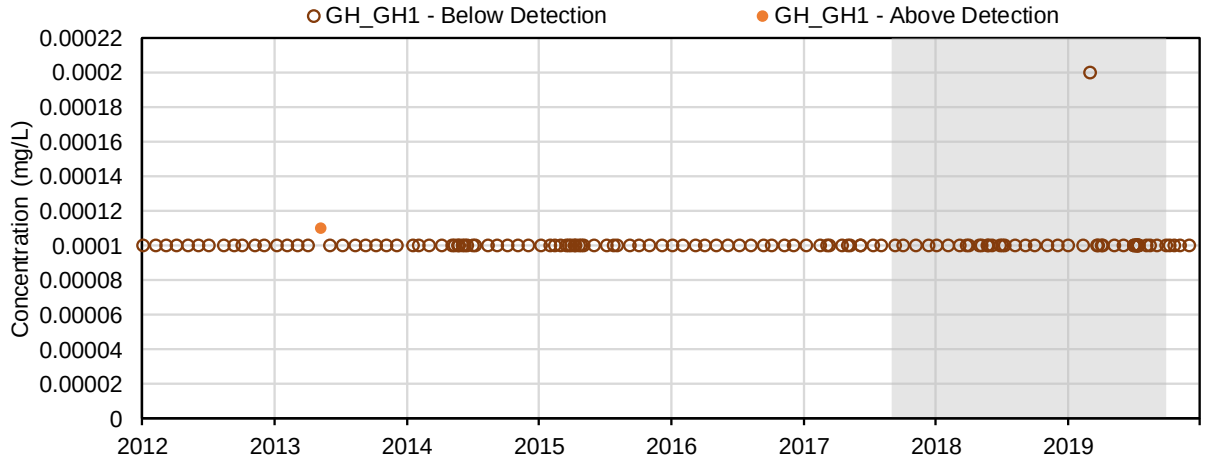
(76) Strontium (mg/L); Total Metals



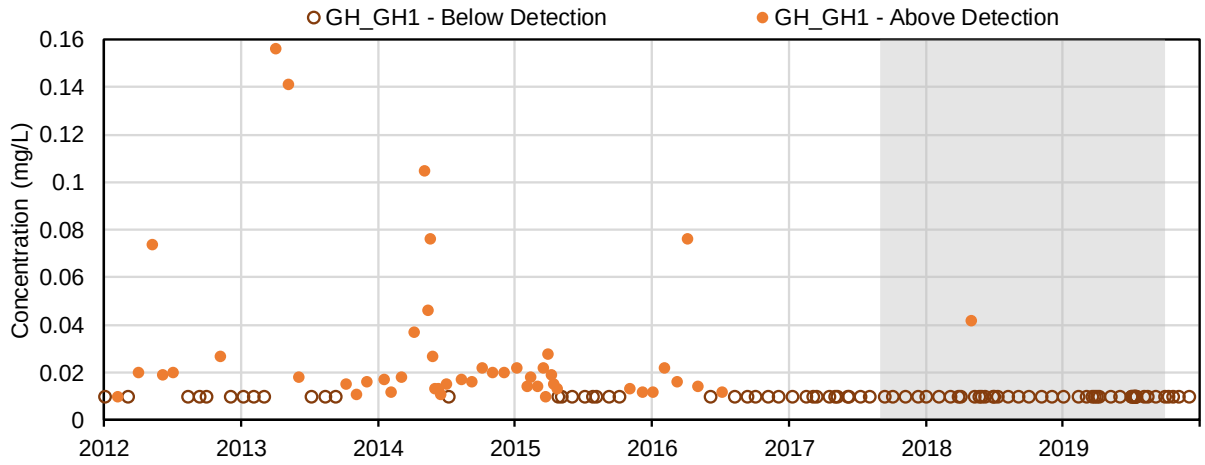
(77) Thallium (mg/L); Total Metals



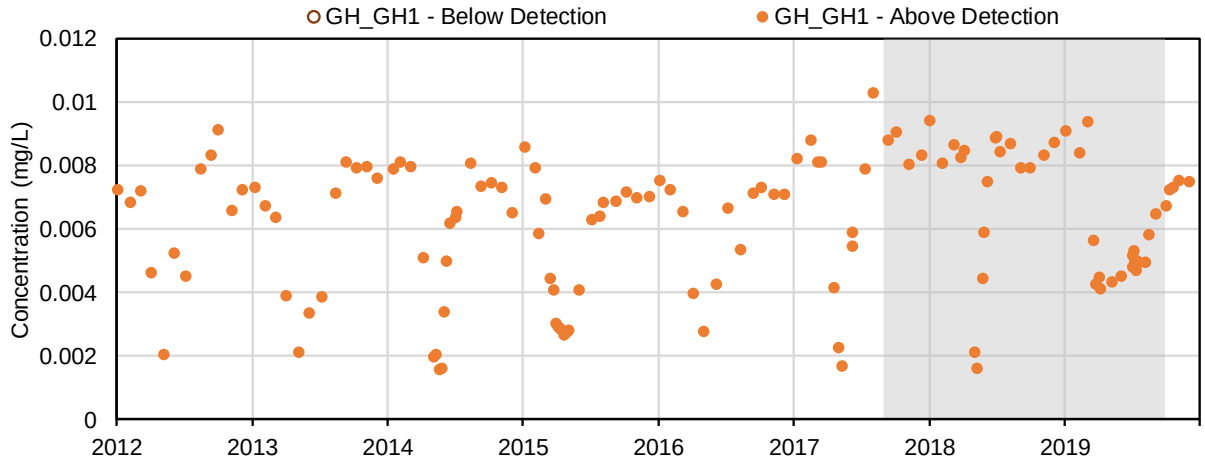
(78) Tin (mg/L); Total Metals



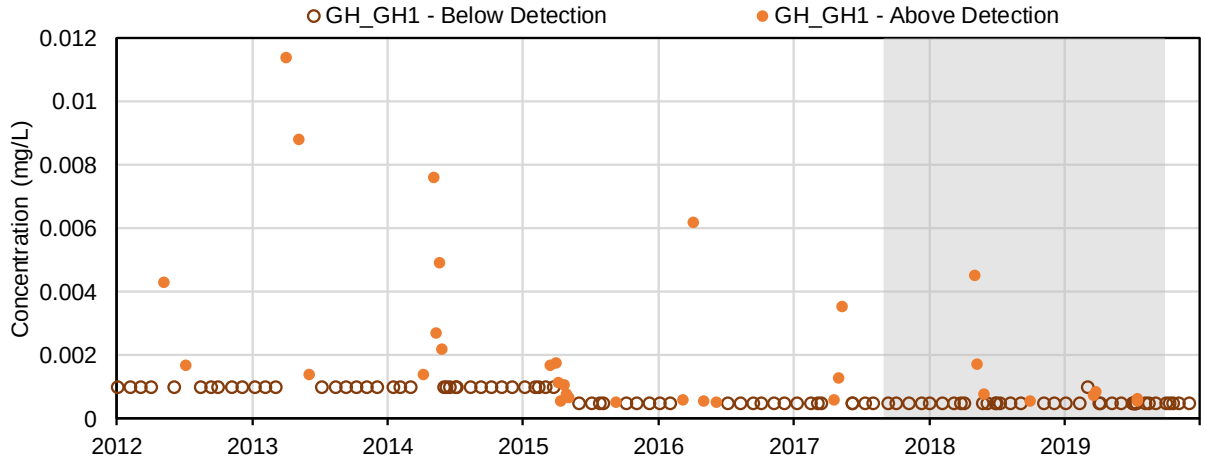
(79) Titanium (mg/L); Total Metals



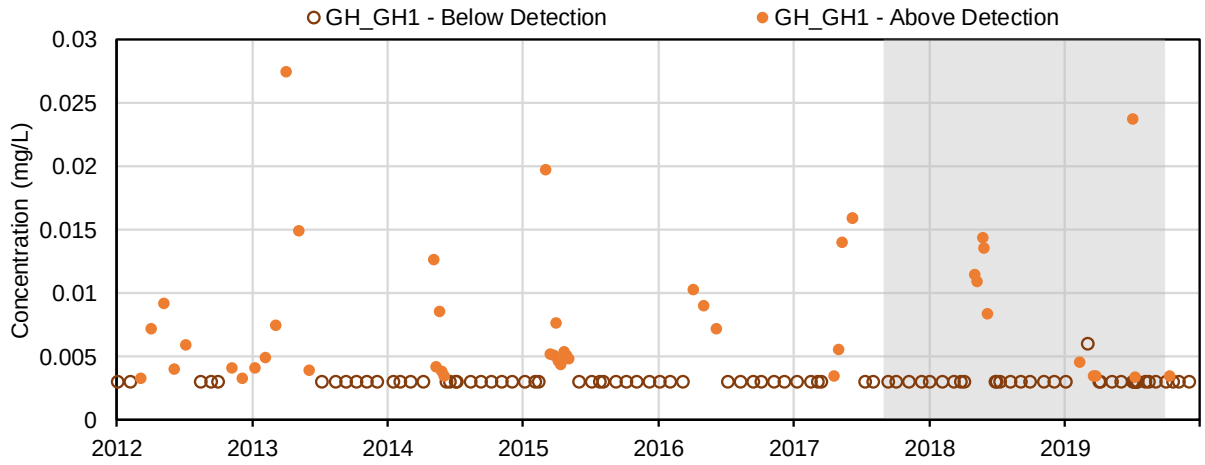
(80) Uranium (mg/L); Total Metals



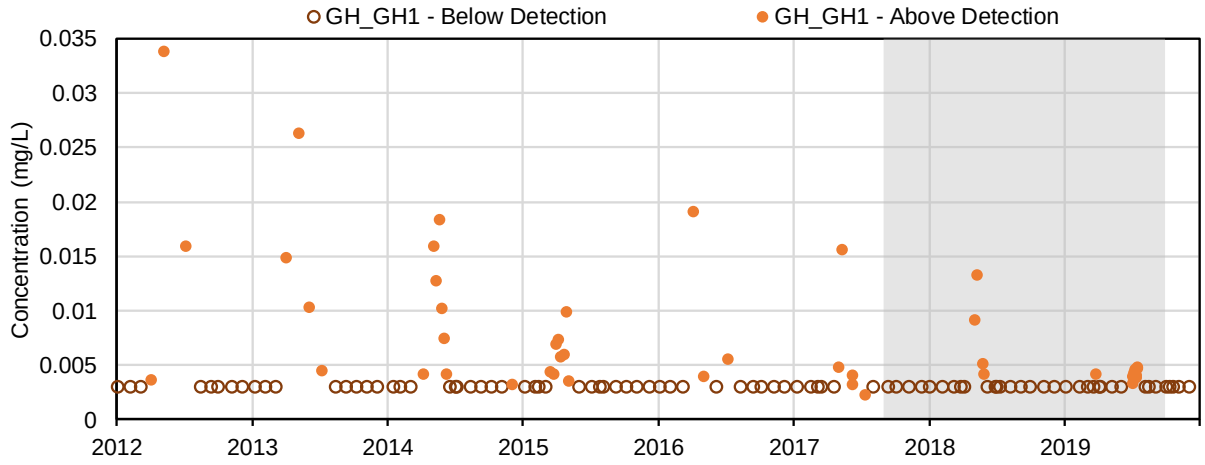
(81) Vanadium (mg/L); Total Metals



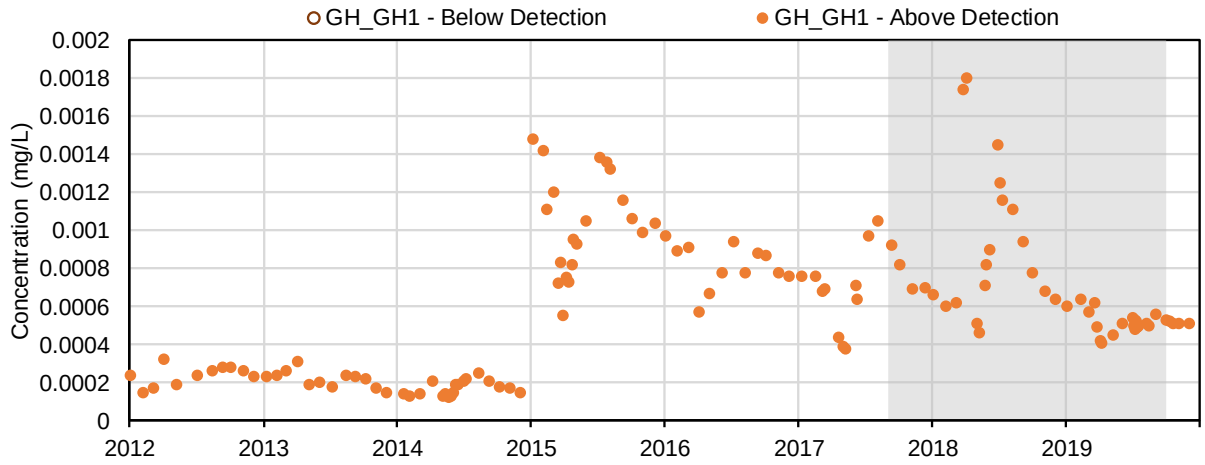
(82) Zinc (mg/L); Total Metals



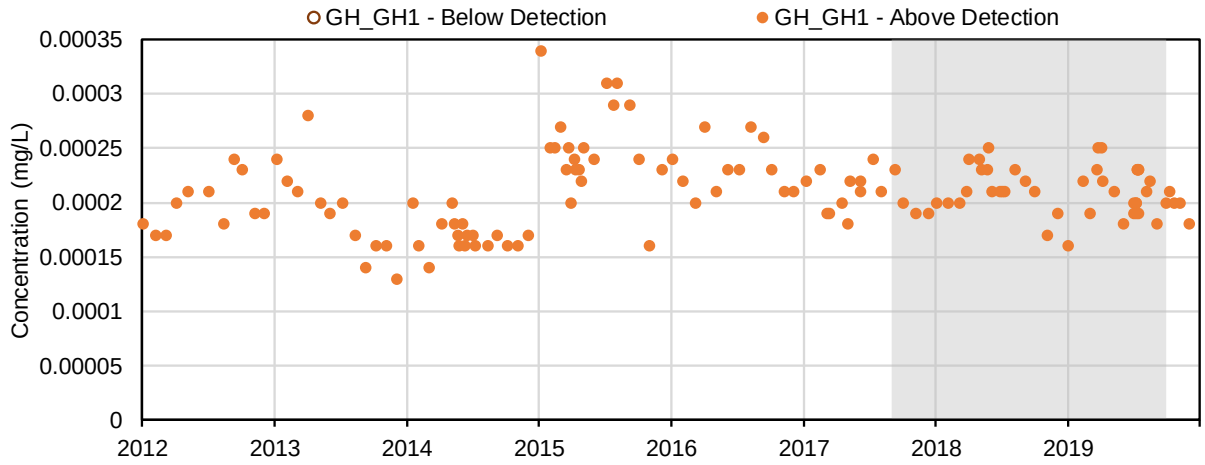
(83) Aluminum (mg/L); Dissolved Metals



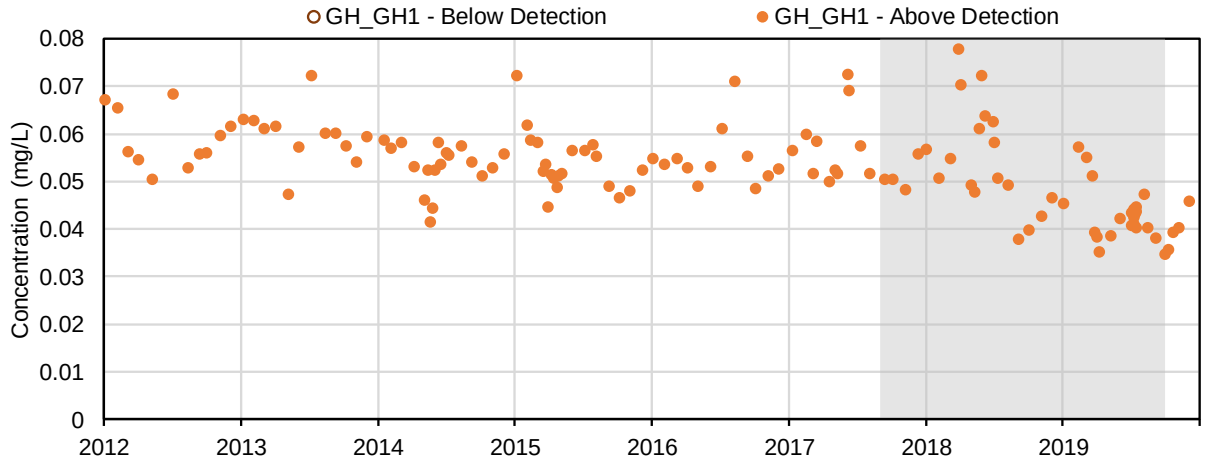
(84) Antimony (mg/L); Dissolved Metals



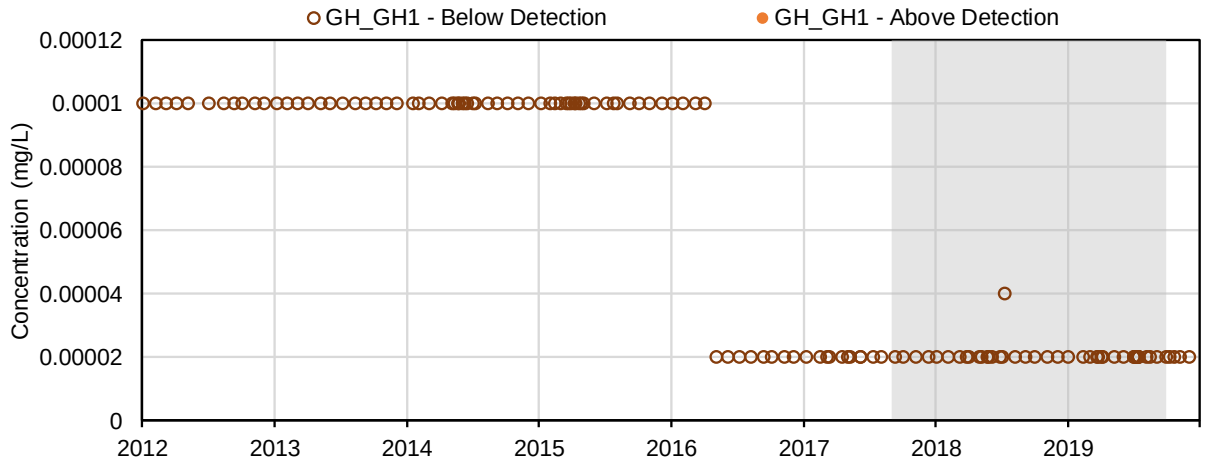
(85) Arsenic (mg/L); Dissolved Metals



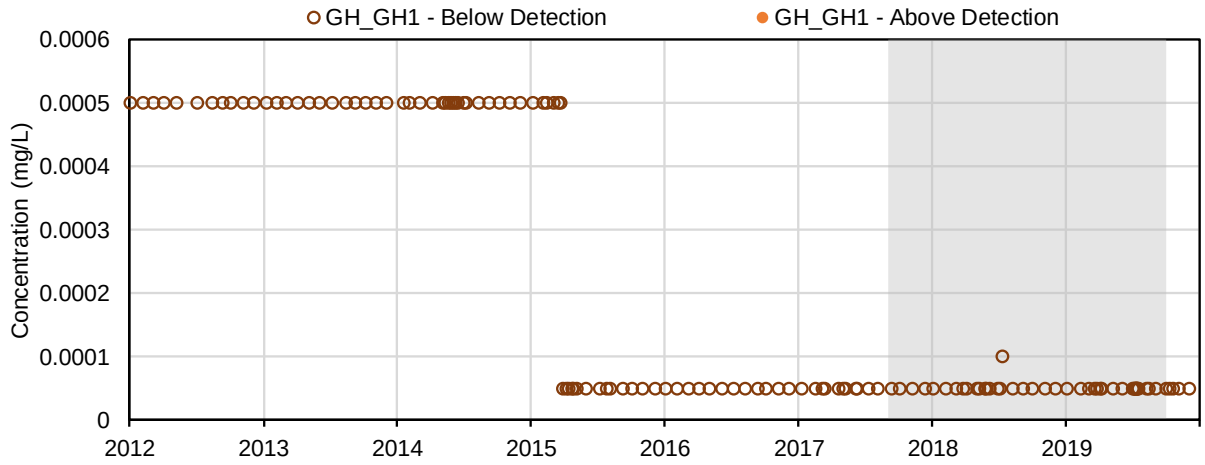
(86) Barium (mg/L); Dissolved Metals



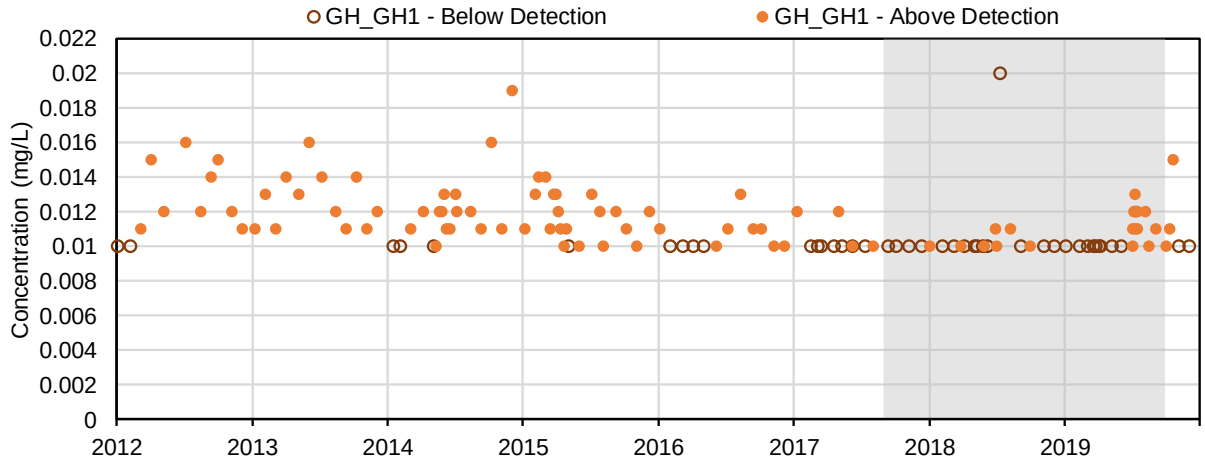
(87) Beryllium (mg/L); Dissolved Metals



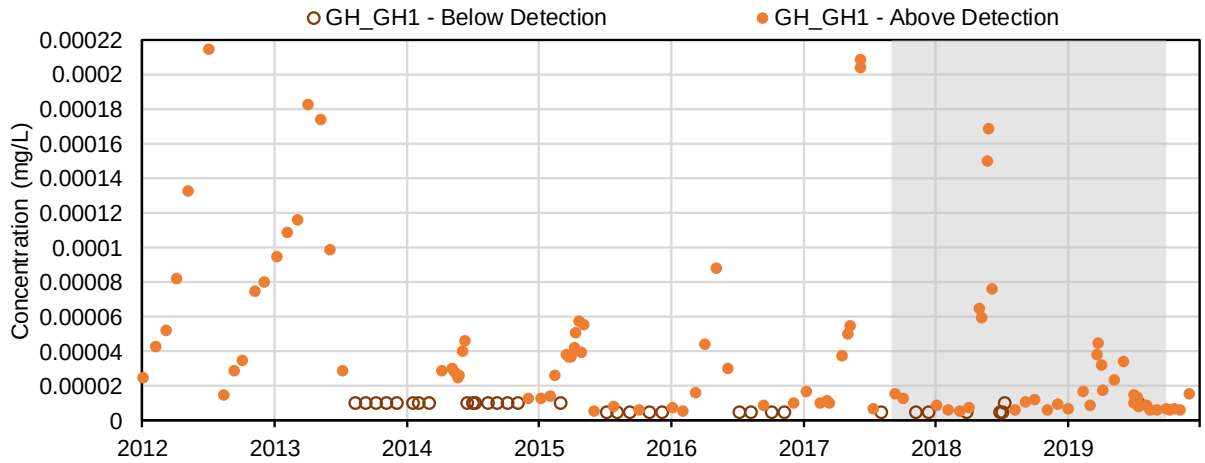
(88) Bismuth (mg/L); Dissolved Metals



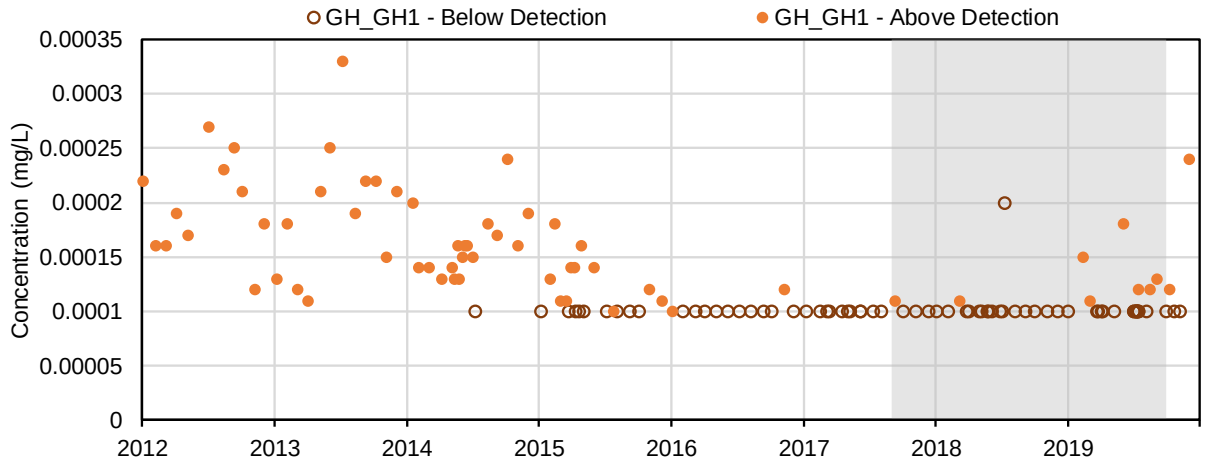
(89) Boron (mg/L); Dissolved Metals



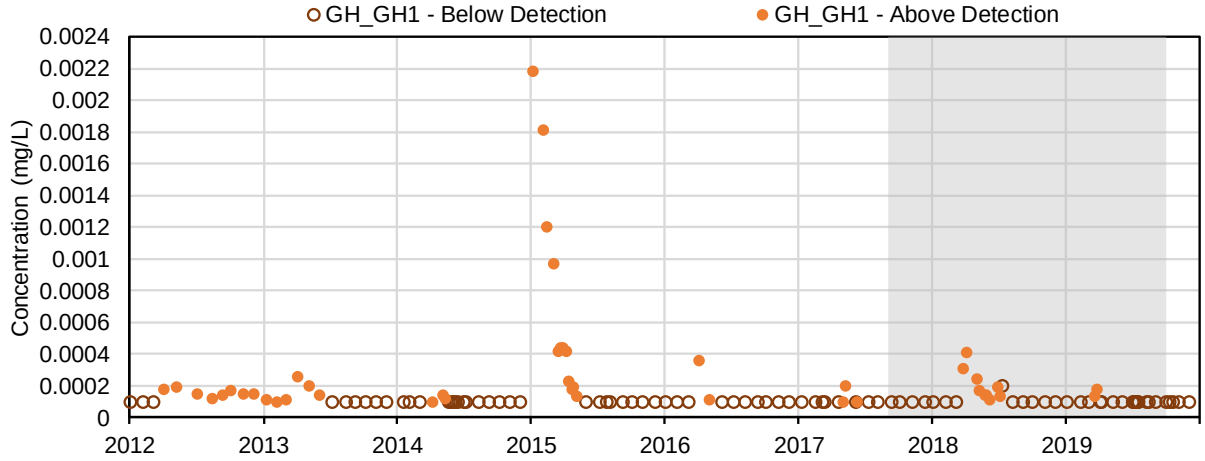
(90) Cadmium (mg/L); Dissolved Metals



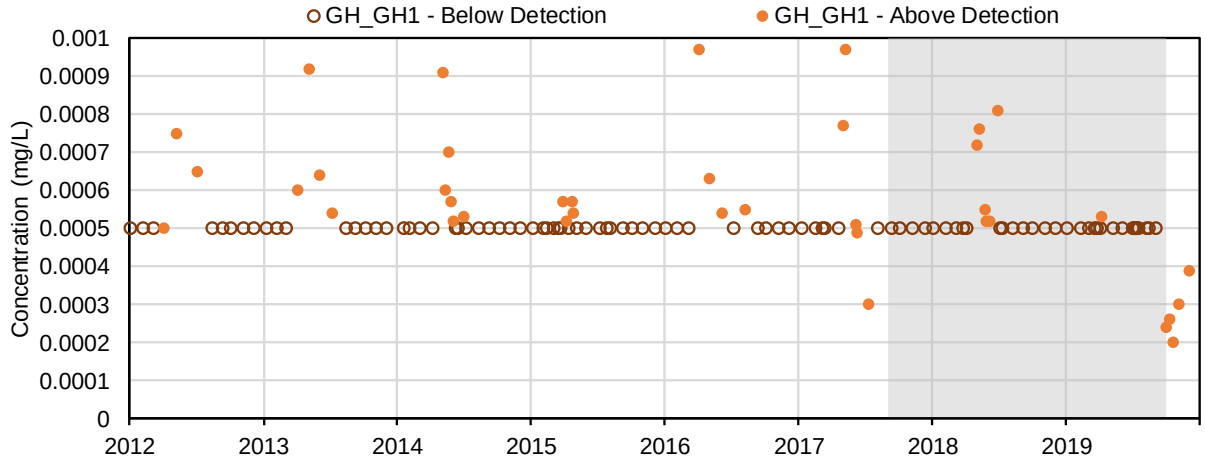
(91) Chromium (mg/L); Dissolved Metals



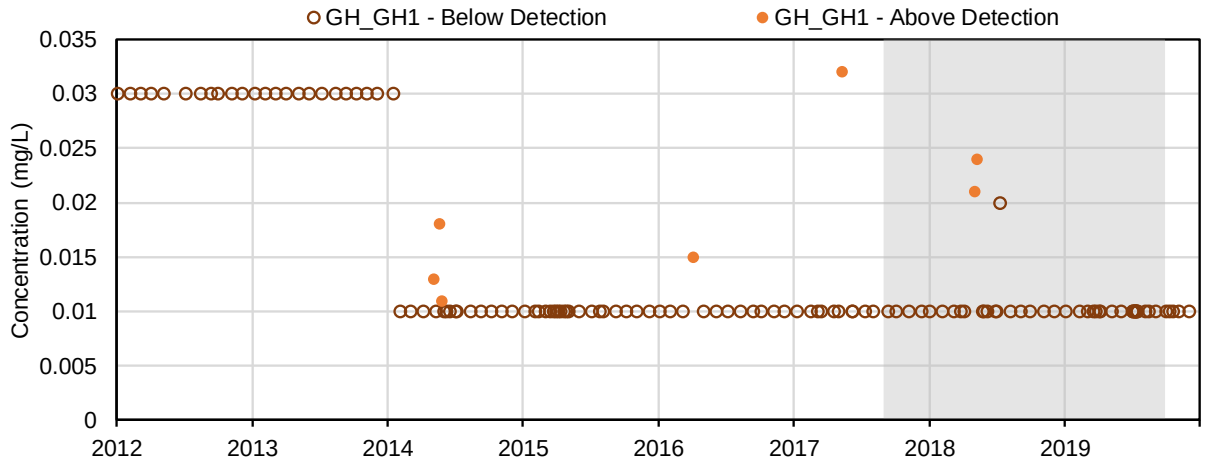
(92) Cobalt (mg/L); Dissolved Metals



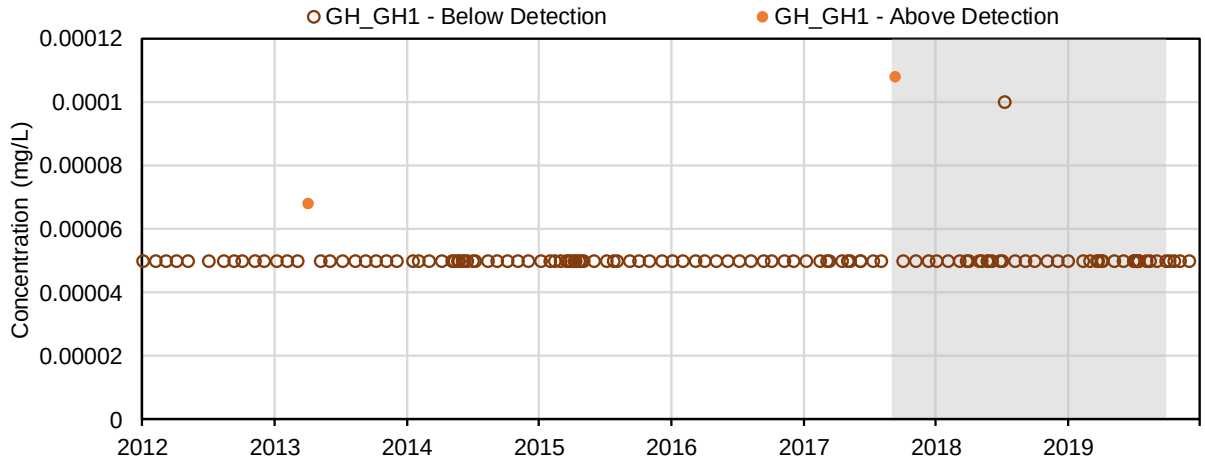
(93) Copper (mg/L); Dissolved Metals



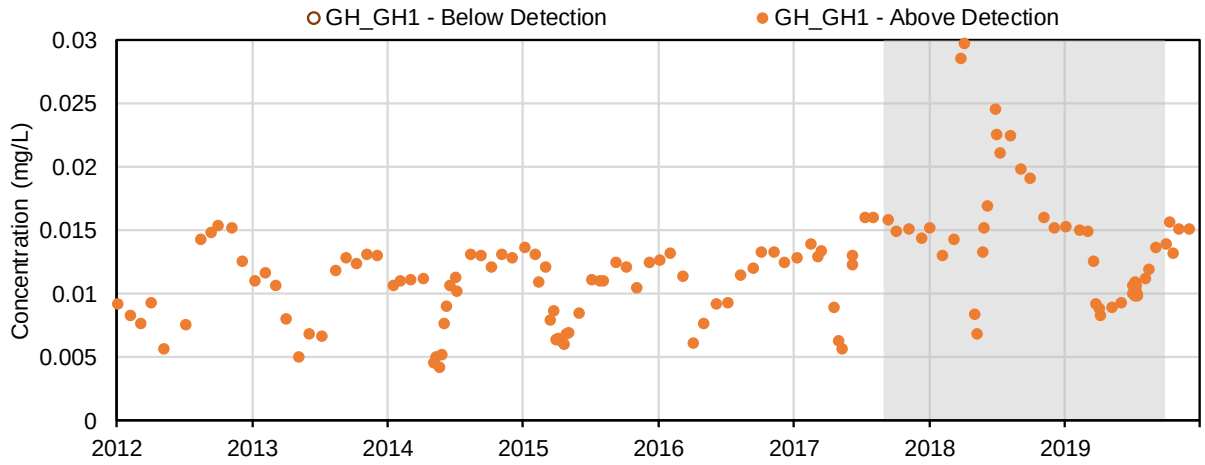
(94) Iron (mg/L); Dissolved Metals



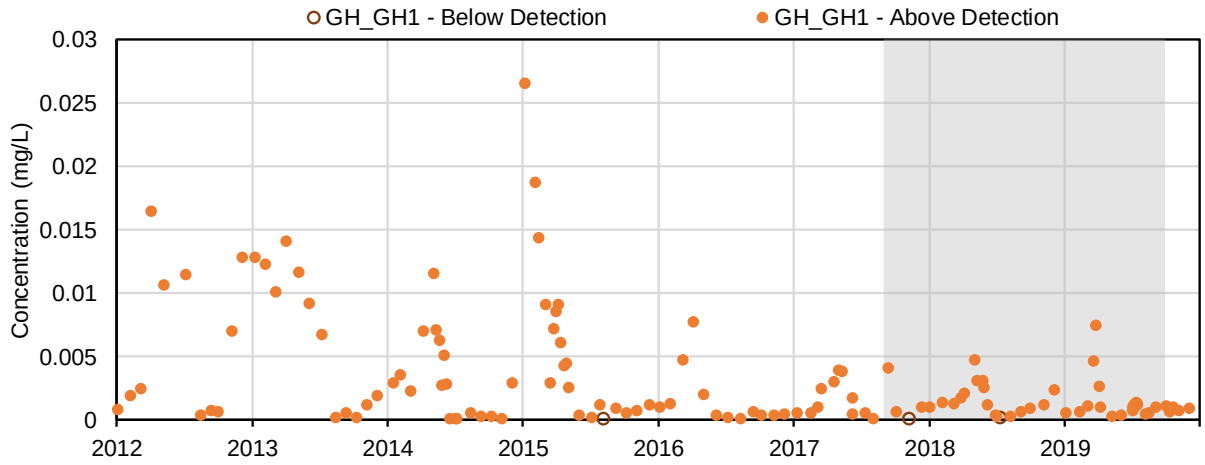
(95) Lead (mg/L); Dissolved Metals



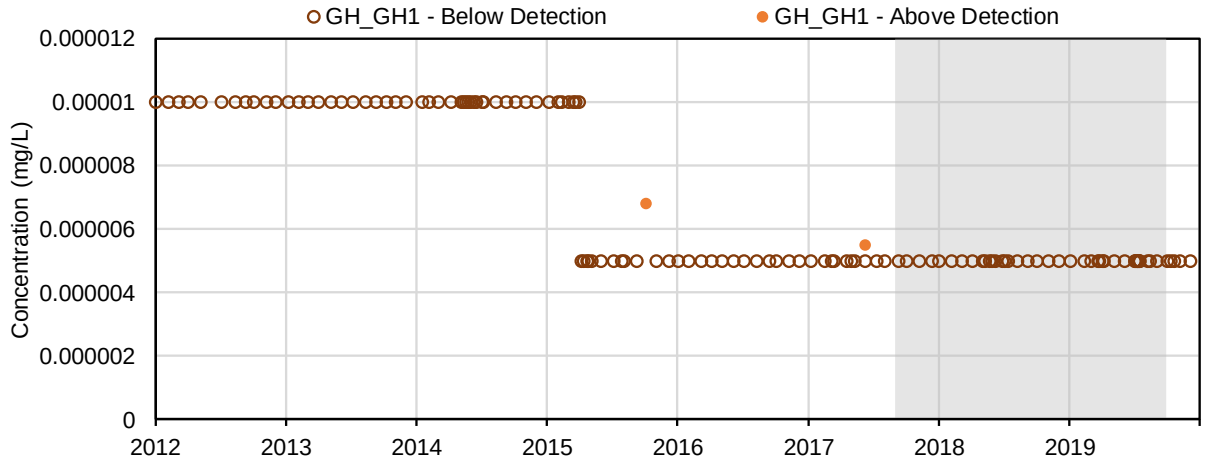
(96) Lithium (mg/L); Dissolved Metals



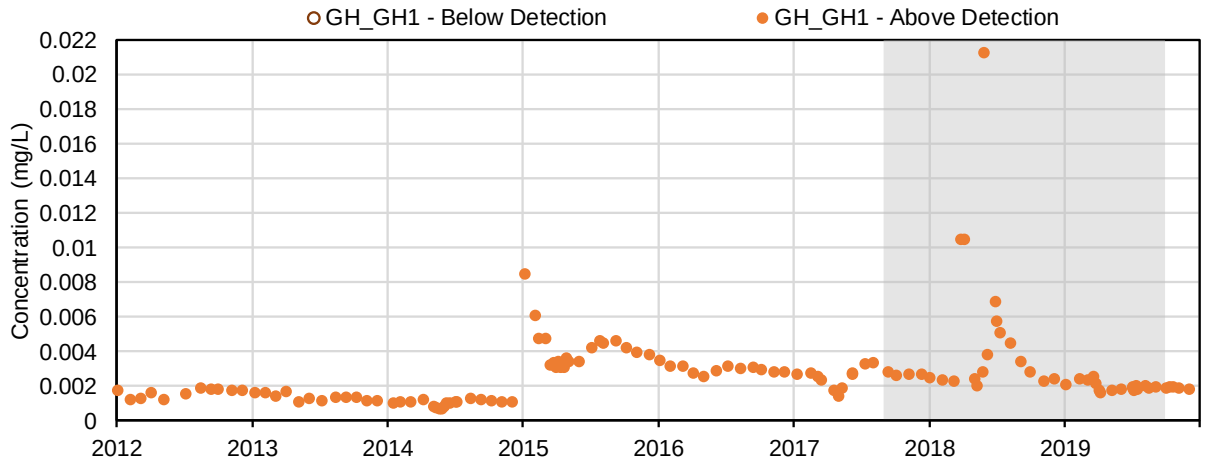
(97) Manganese (mg/L); Dissolved Metals



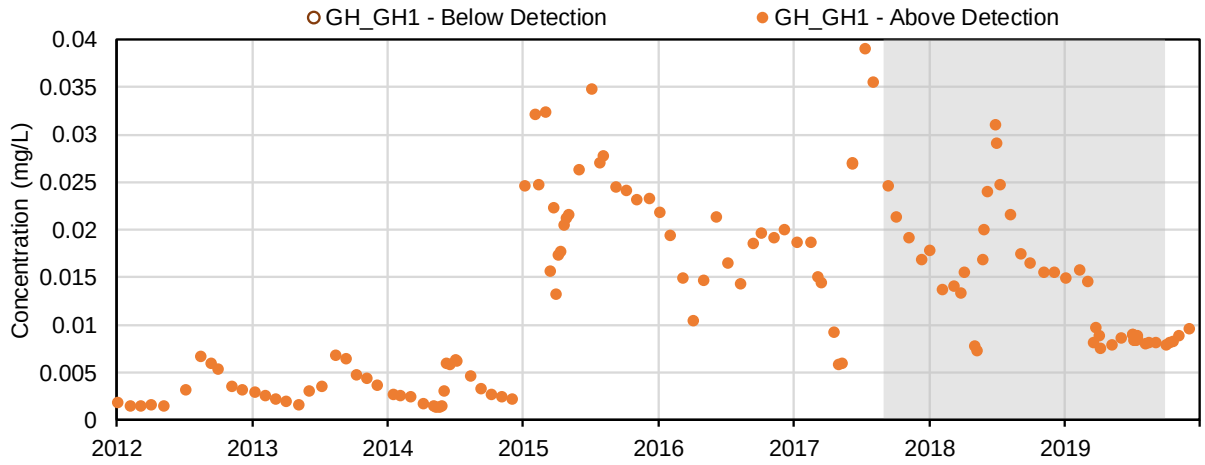
(98) Mercury (mg/L); Dissolved Metals



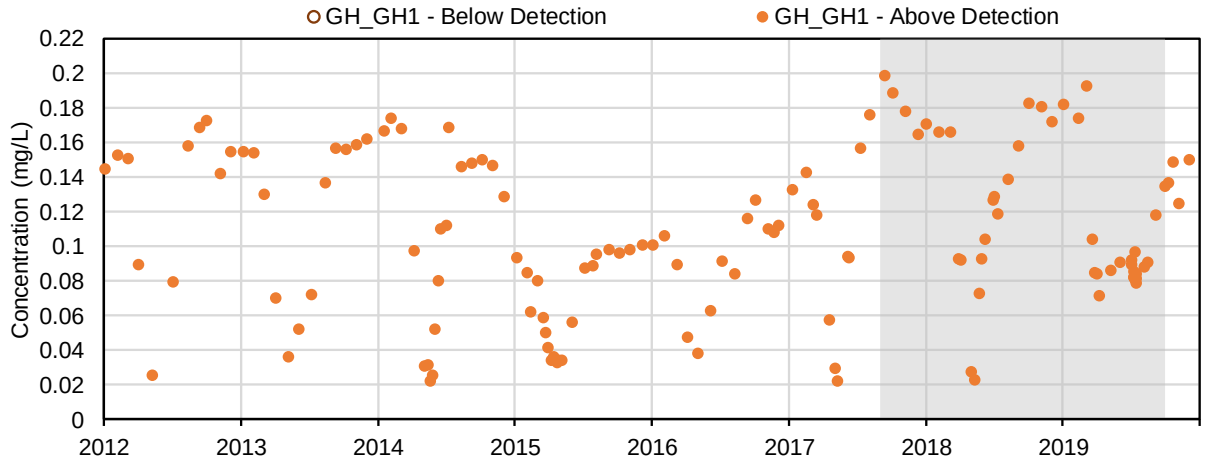
(99) Molybdenum (mg/L); Dissolved Metals



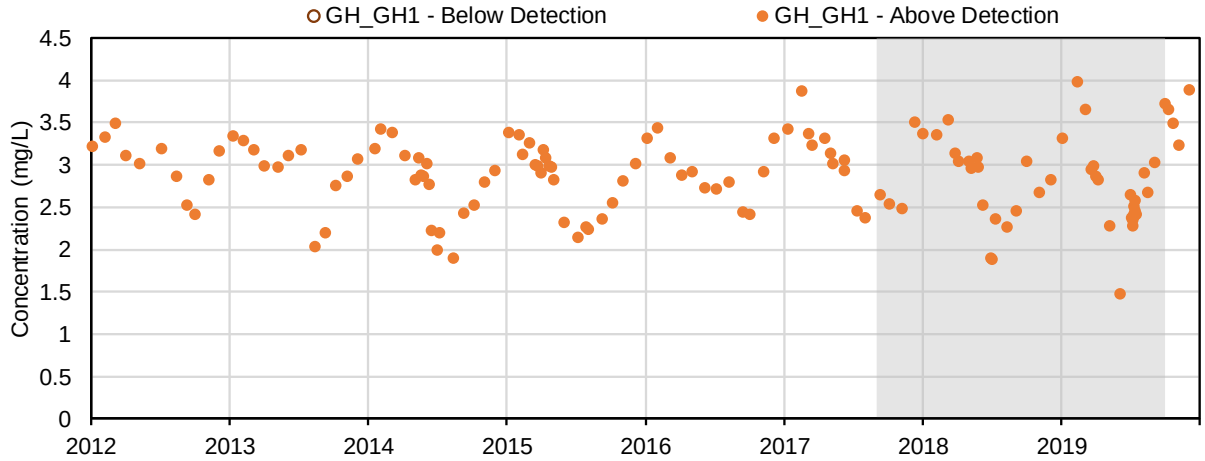
(100) Nickel (mg/L); Dissolved Metals



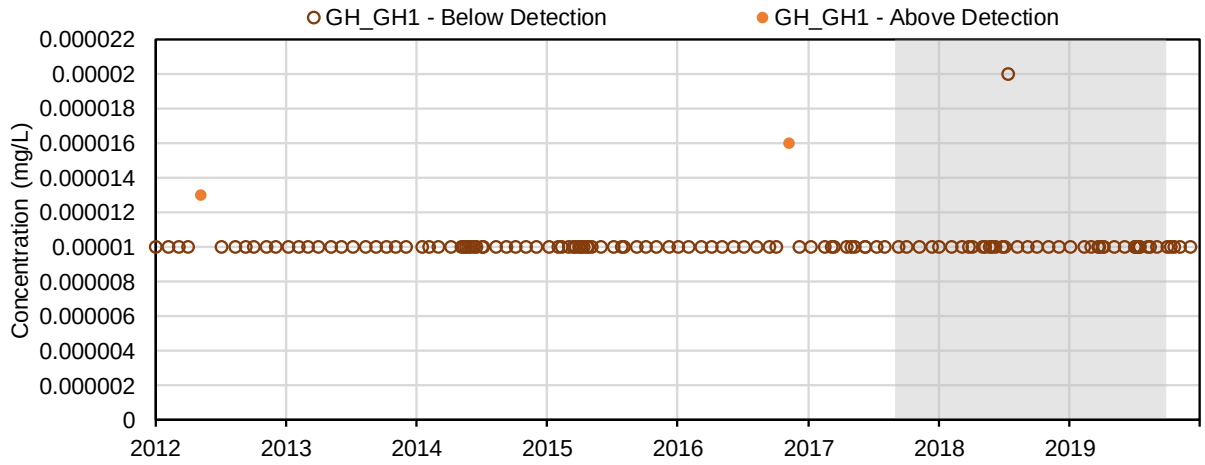
(101) Selenium (mg/L); Dissolved Metals



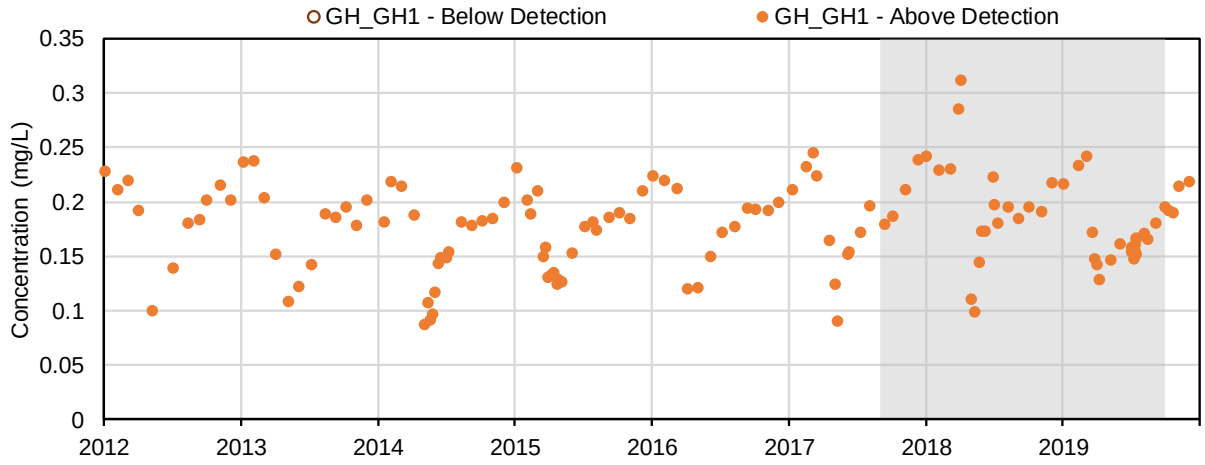
(102) Silicon (mg/L); Dissolved Metals



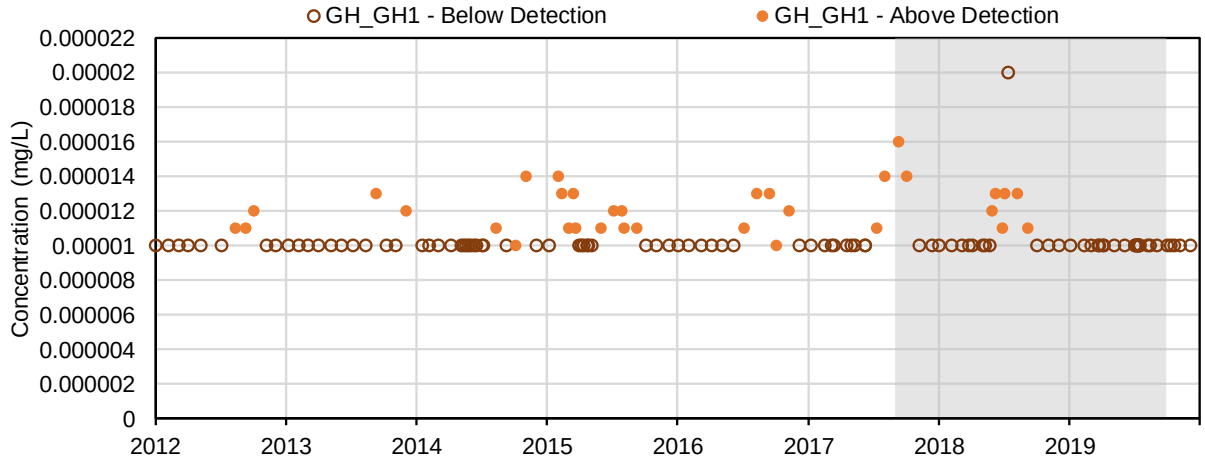
(103) Silver (mg/L); Dissolved Metals



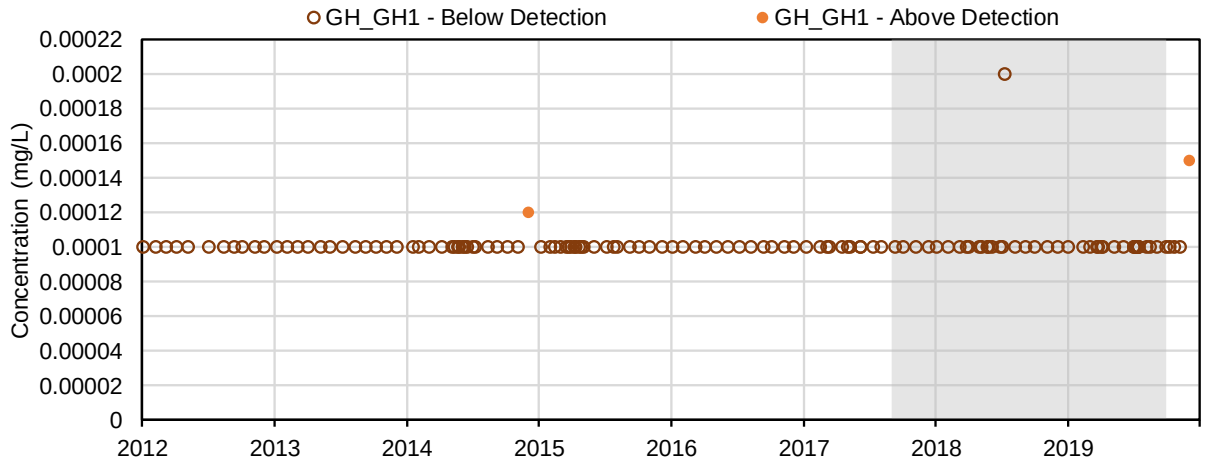
(104) Strontium (mg/L); Dissolved Metals



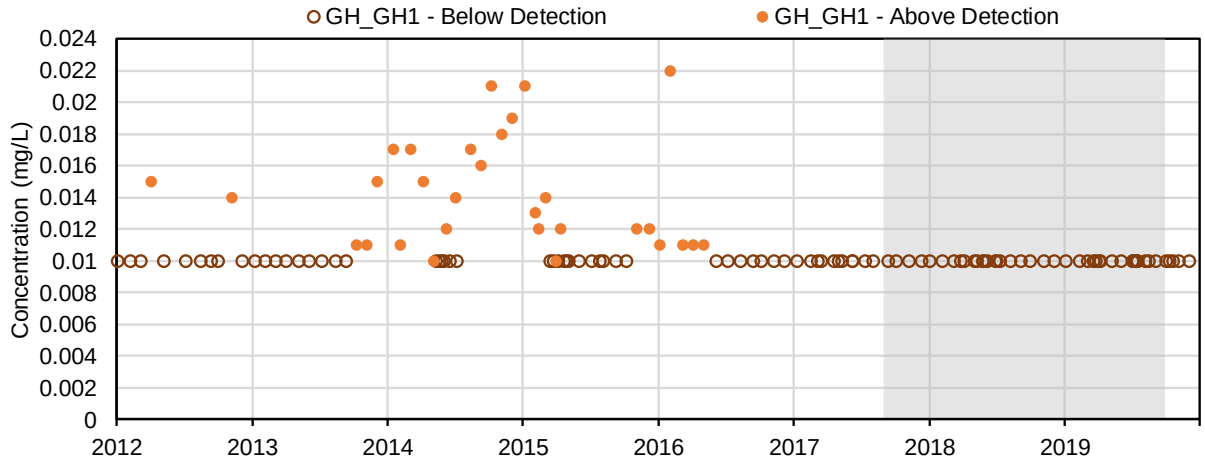
(105) Thallium (mg/L); Dissolved Metals



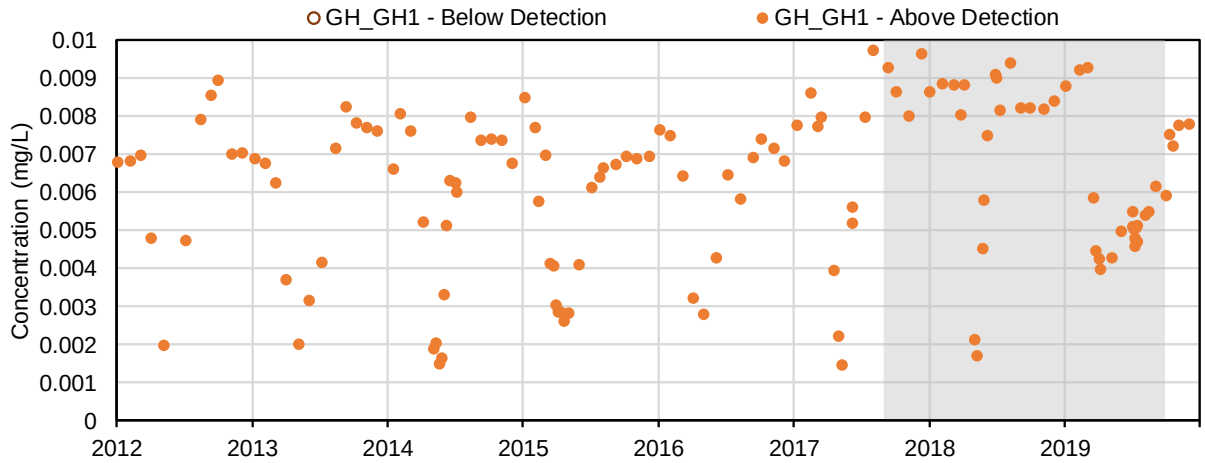
(106) Tin (mg/L); Dissolved Metals



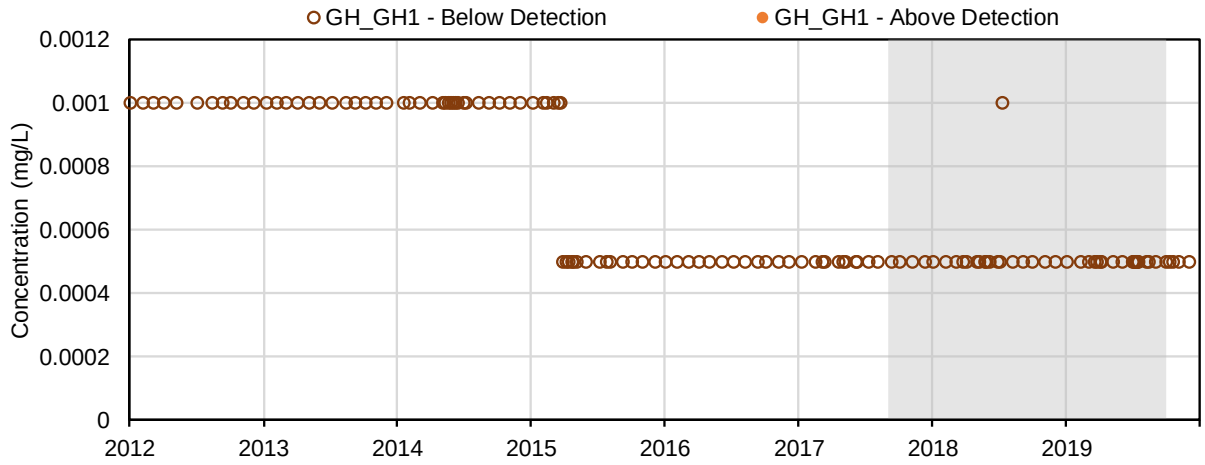
(107) Titanium (mg/L); Dissolved Metals



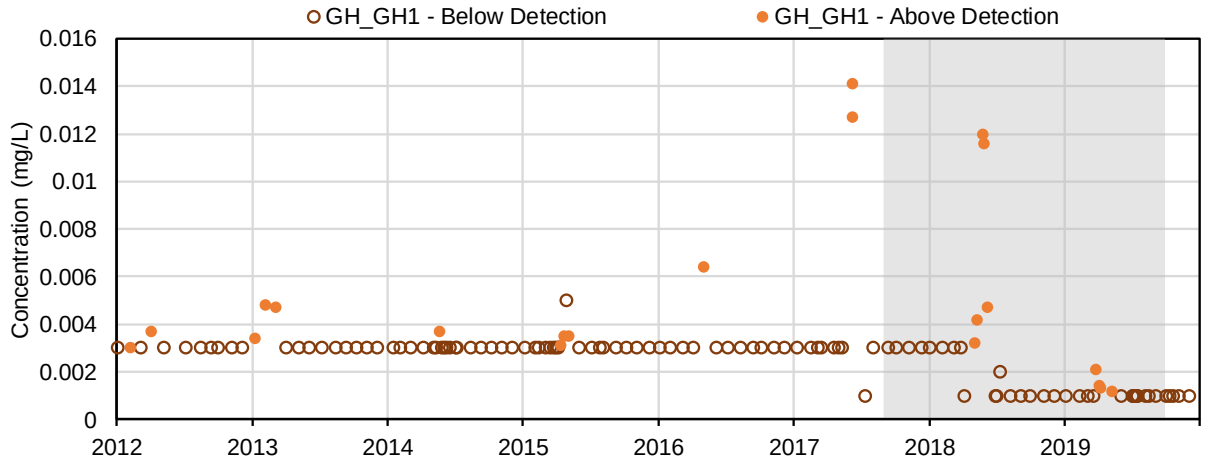
(108) Uranium (mg/L); Dissolved Metals



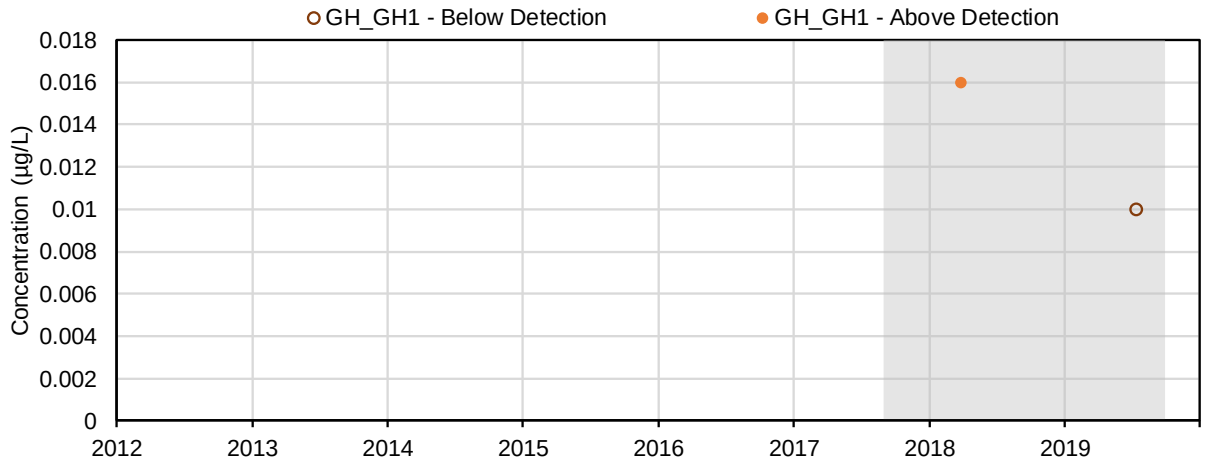
(109) Vanadium (mg/L); Dissolved Metals



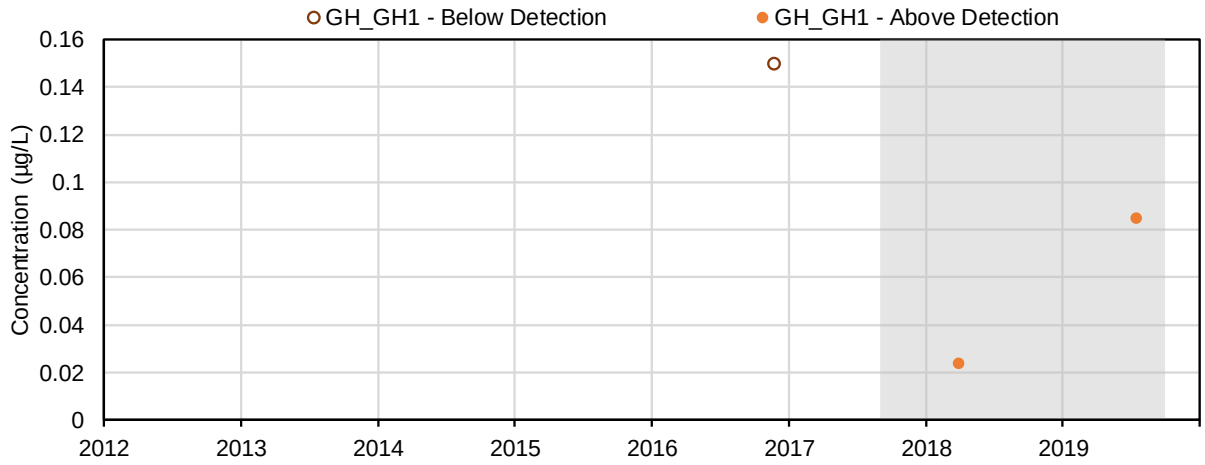
(110) Zinc (mg/L); Dissolved Metals



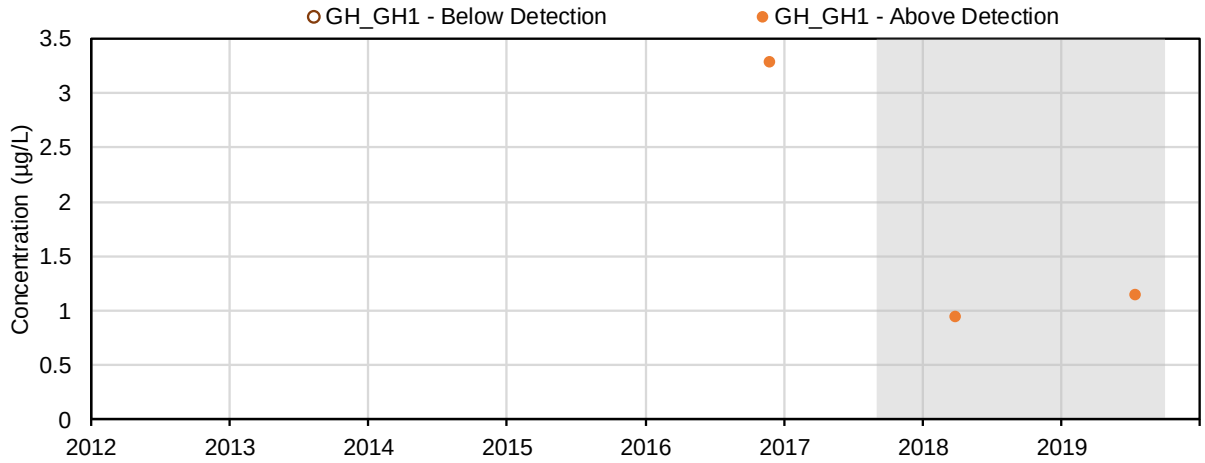
(111) Dissolved Dimethylseleneoxide (µg/L); Speciation of Selenium



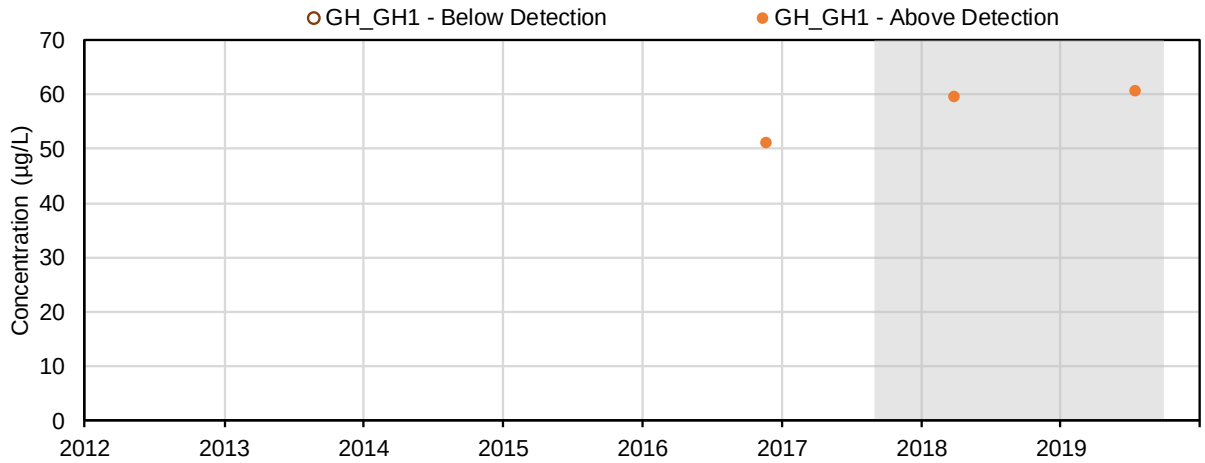
(112) Dissolved Methylseleninic Acid (µg/L); Speciation of Selenium



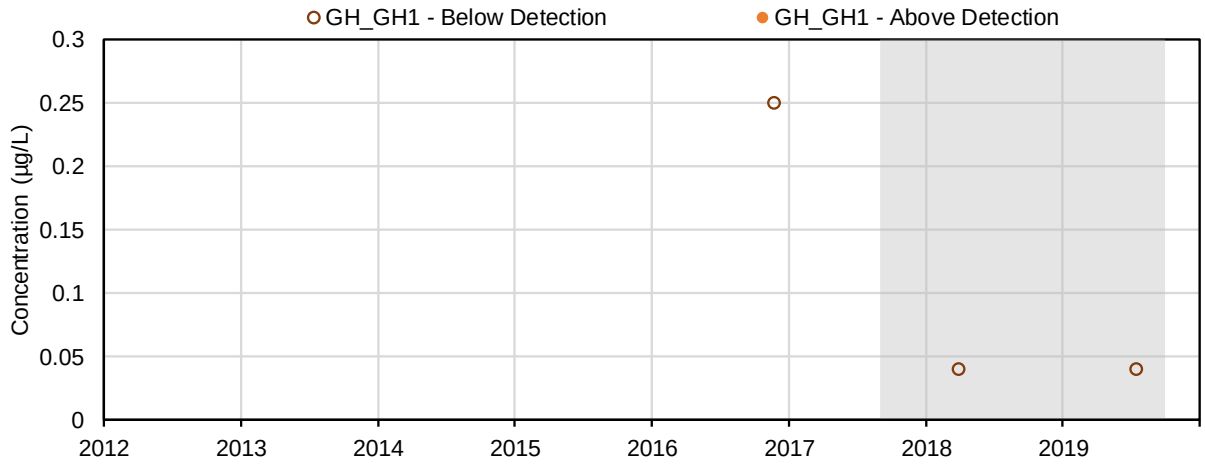
(113) Dissolved Selenite (µg/L); Speciation of Selenium



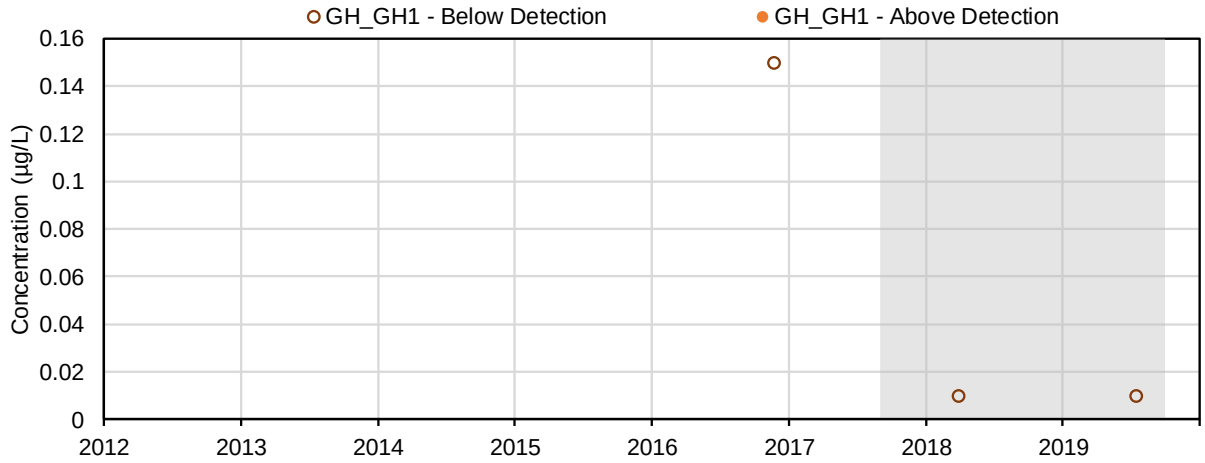
(114) Dissolved Selenate (µg/L); Speciation of Selenium



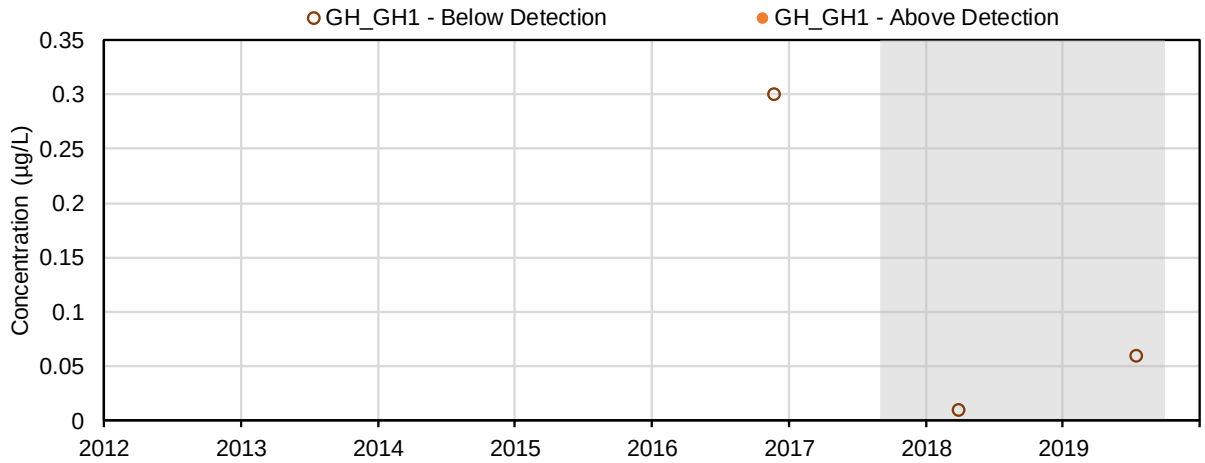
(115) Dissolved Selenocyanate (µg/L); Speciation of Selenium



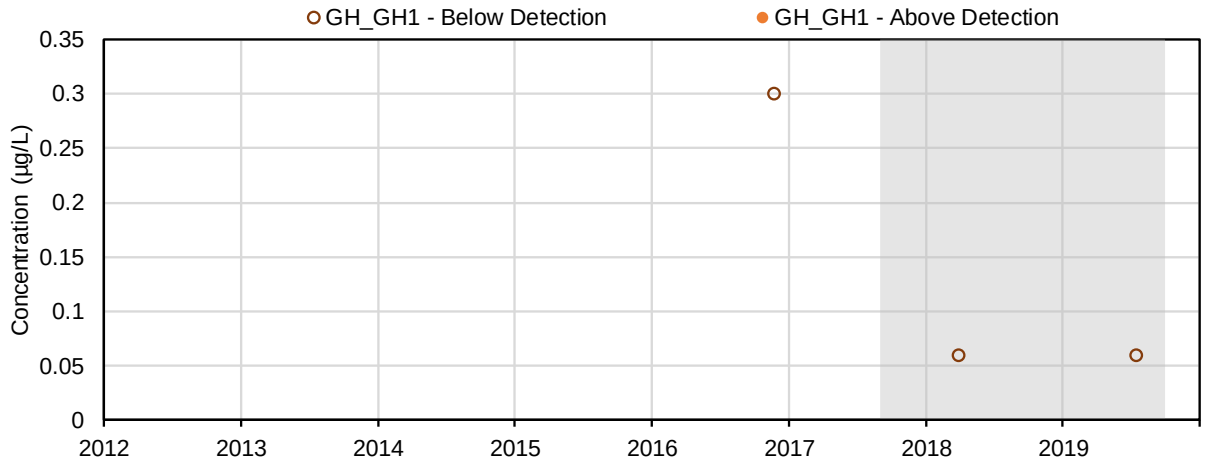
(116) Dissolved Selenomethionine (µg/L); Speciation of Selenium



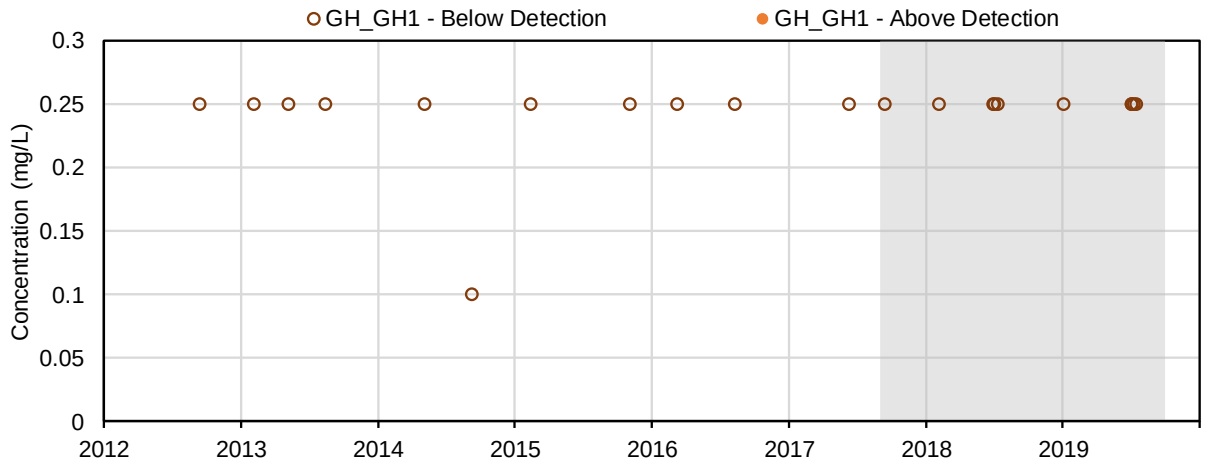
(117) Dissolved Selenosulphate (µg/L); Speciation of Selenium



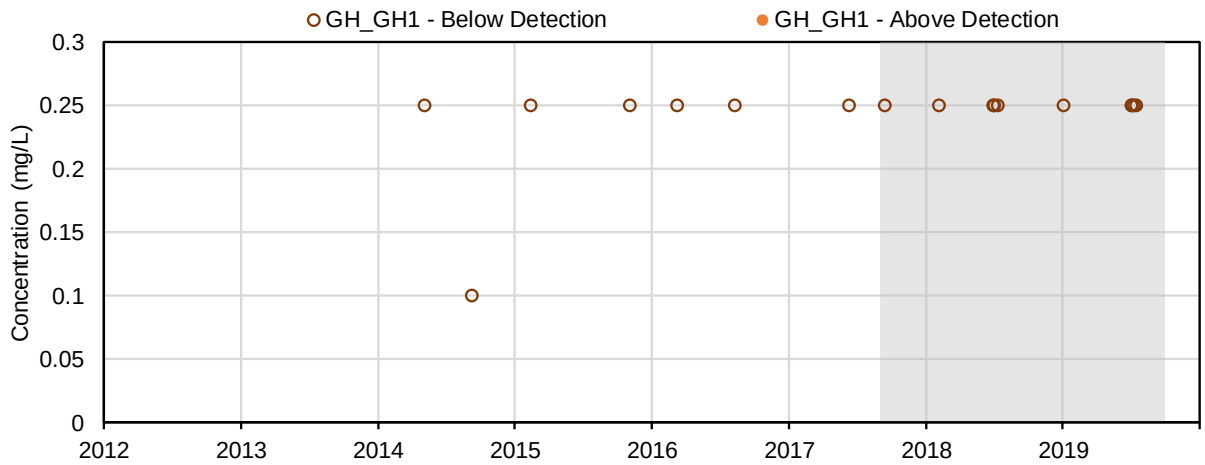
(118) Unknown Dissolved Selenium Species (µg/L); Speciation of Selenium



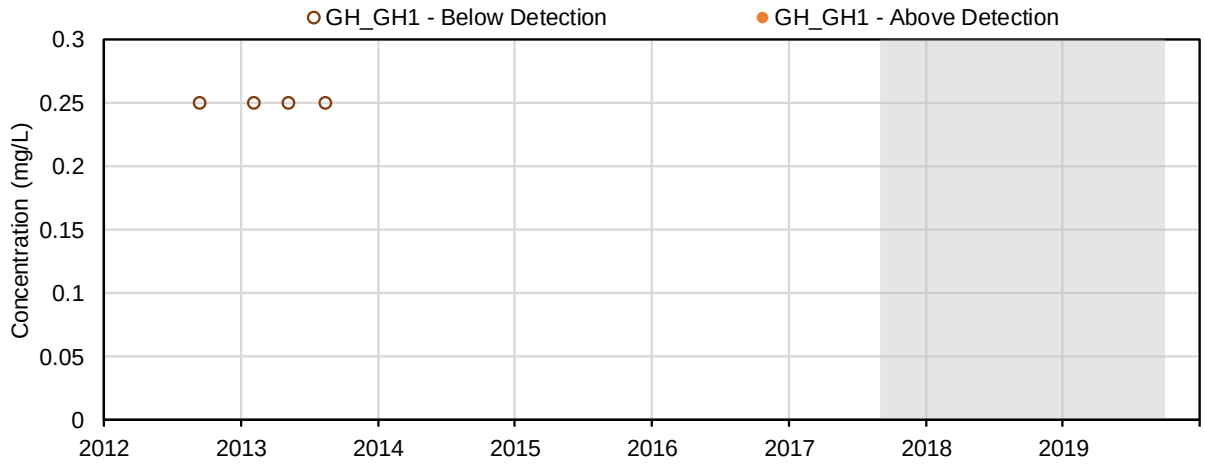
(119) Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L); Volatile Organics



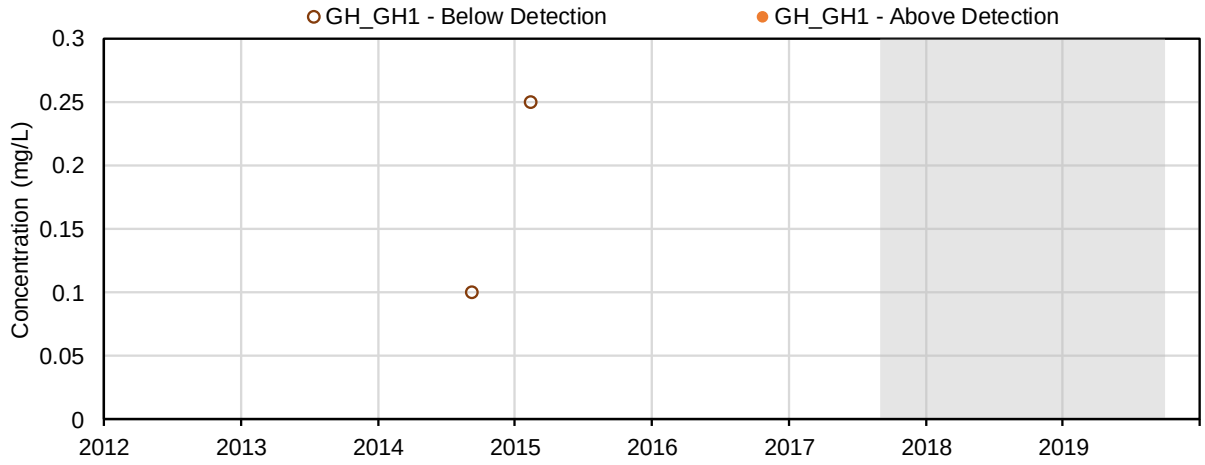
(120) Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



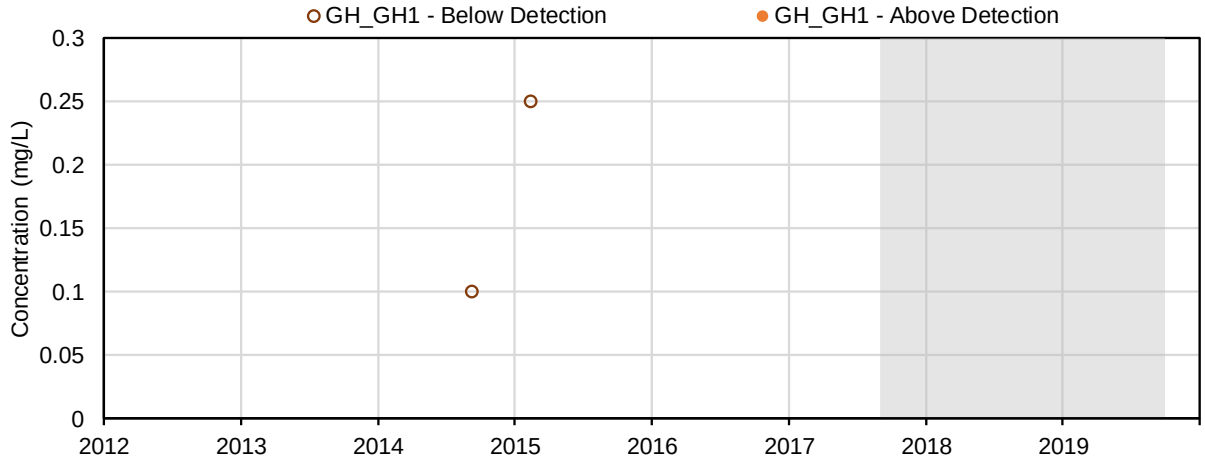
(121) Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L); Volatile Organics



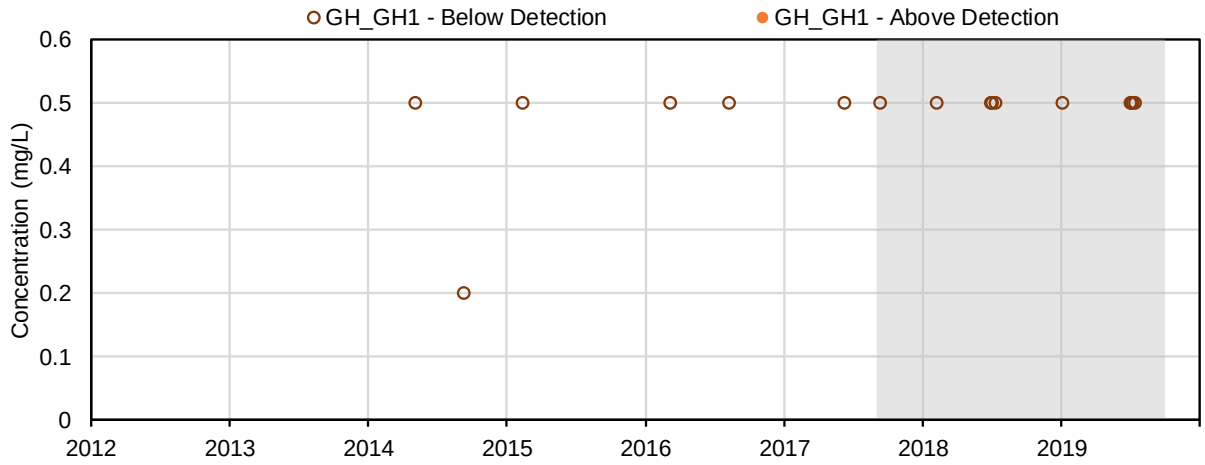
(122) Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L); Volatile Organics



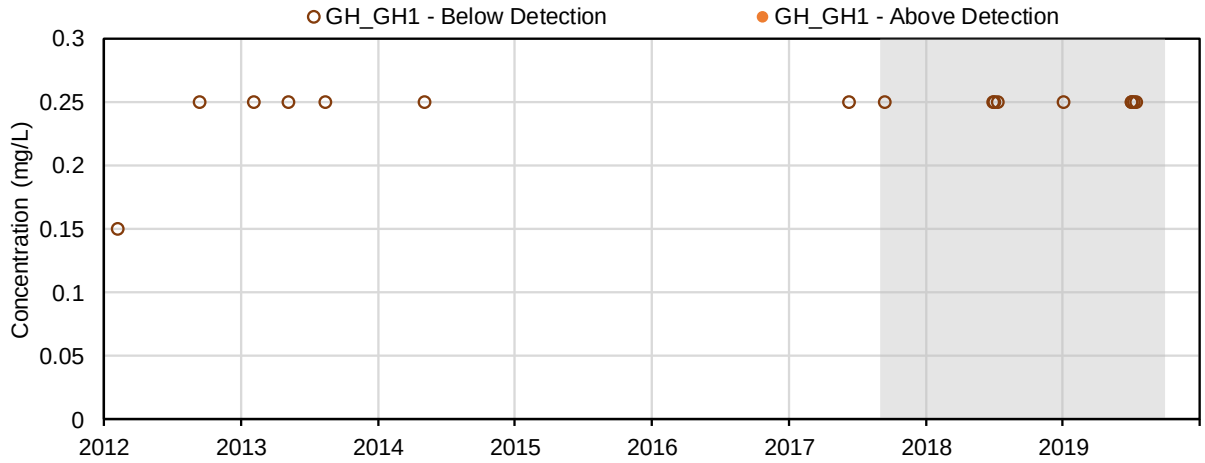
(123) Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L); Volatile Organics



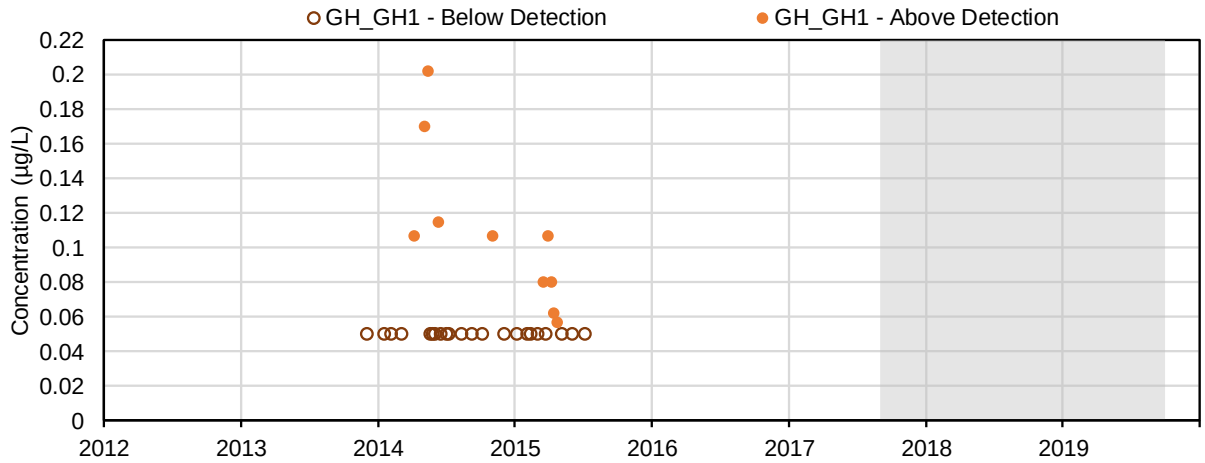
(124) Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L); Volatile Organics



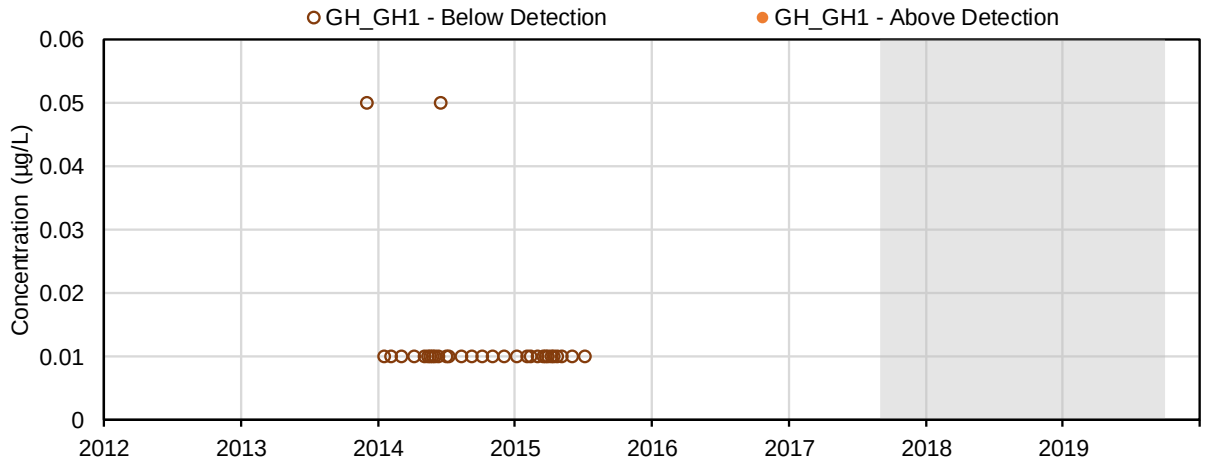
(125) Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L); Volatile Organics



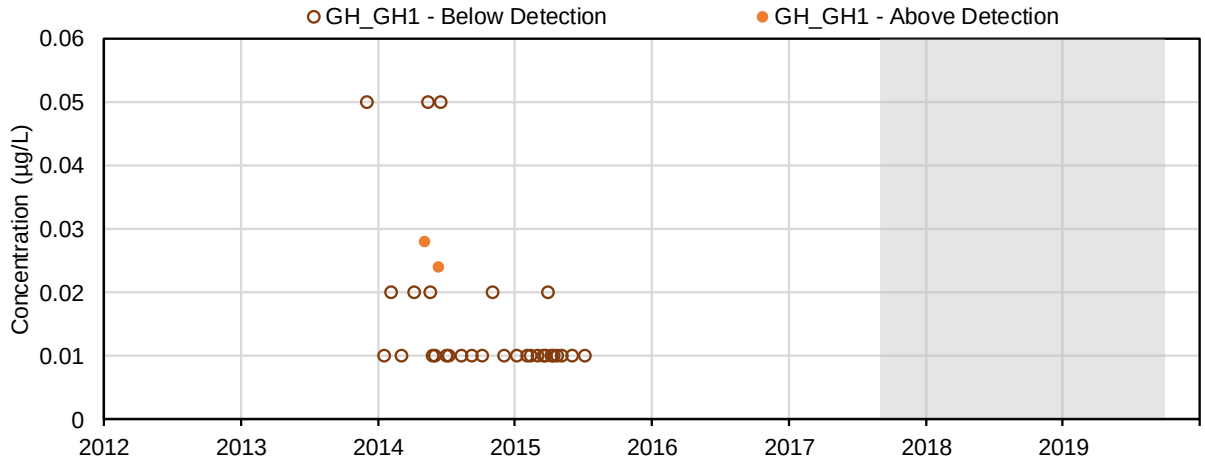
(126) Naphthalene (µg/L); Parent PAHs



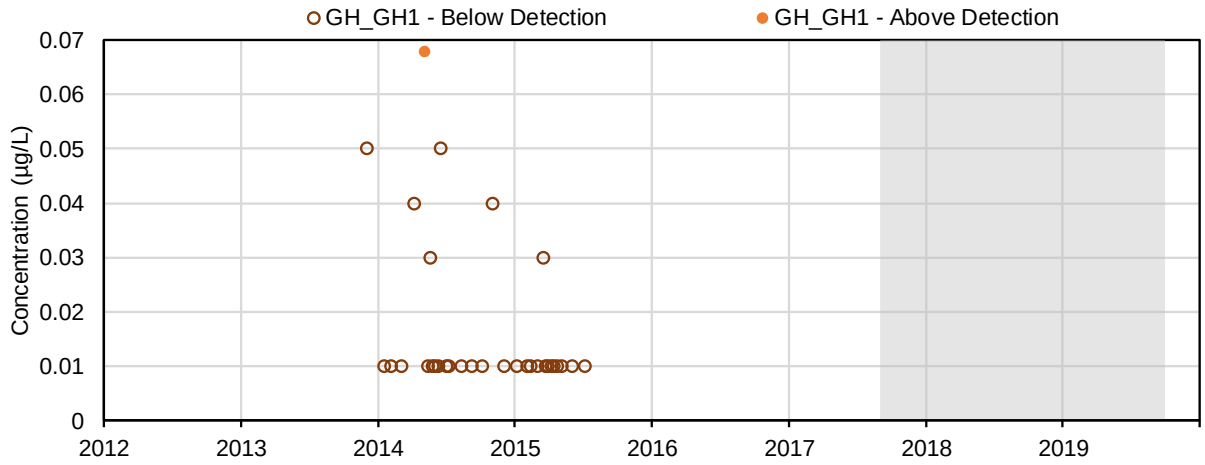
(127) Acenaphthylene (µg/L); Parent PAHs



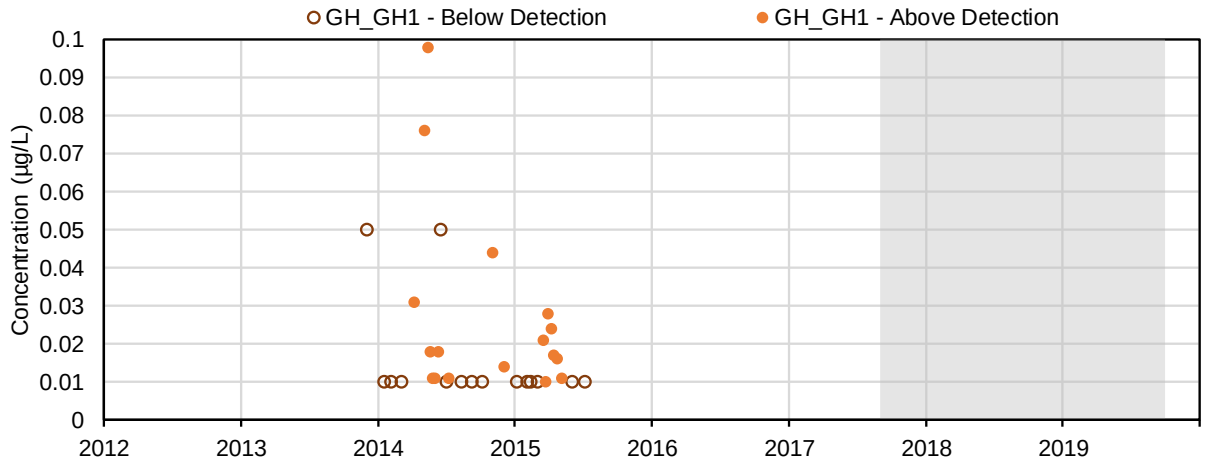
(128) Acenaphthene (µg/L); Parent PAHs



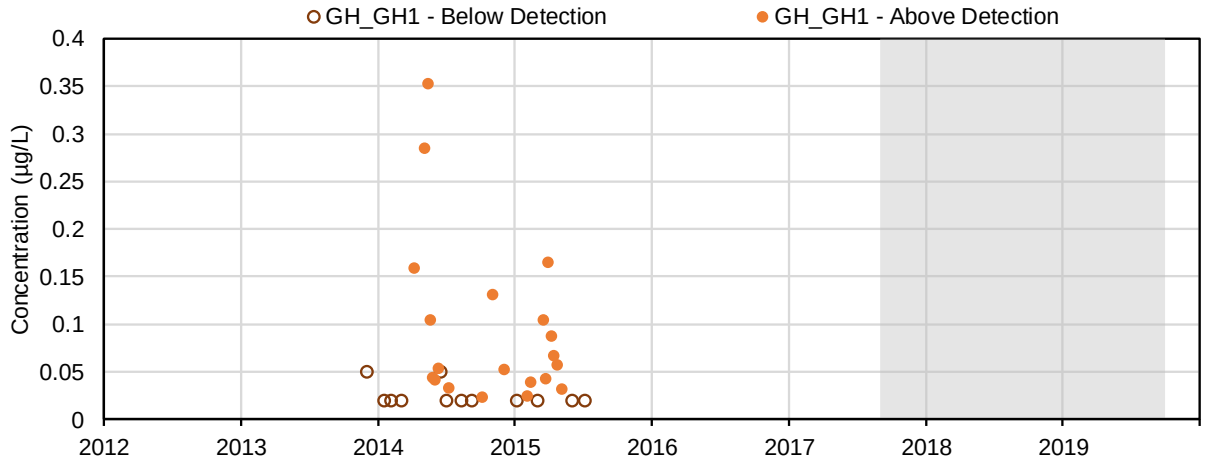
(129) Acridine (µg/L); Parent PAHs



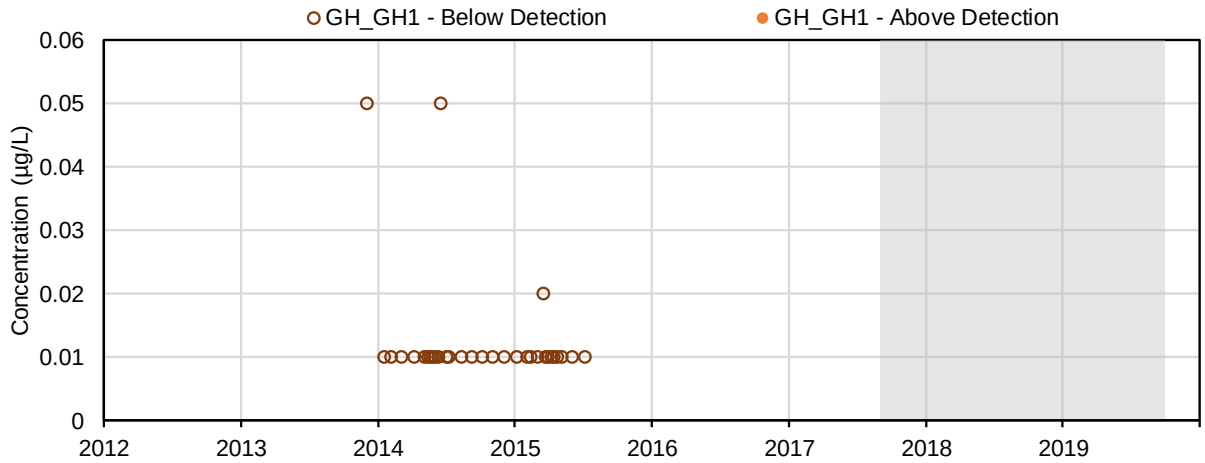
(130) Fluorene (µg/L); Parent PAHs



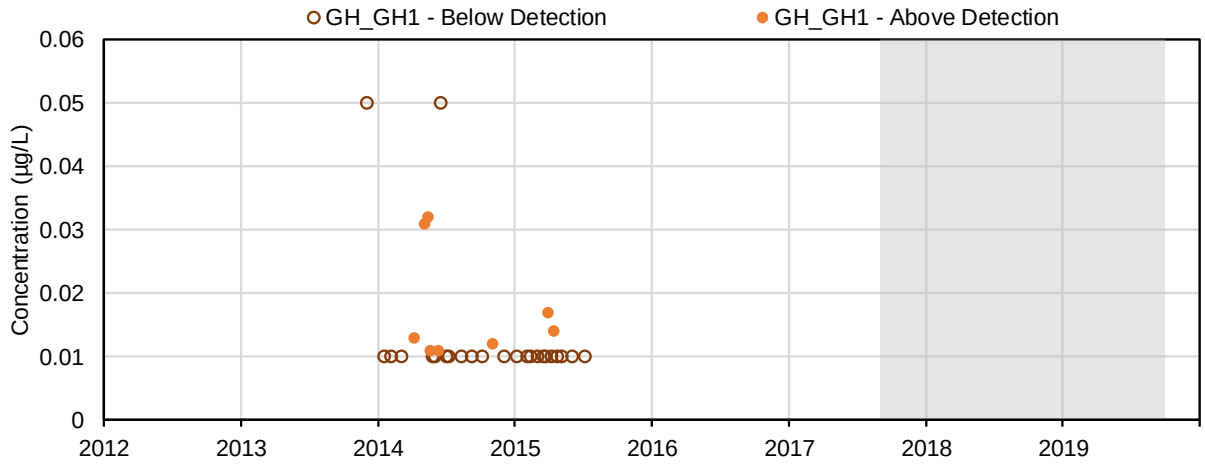
(131) Phenanthrene (µg/L); Parent PAHs



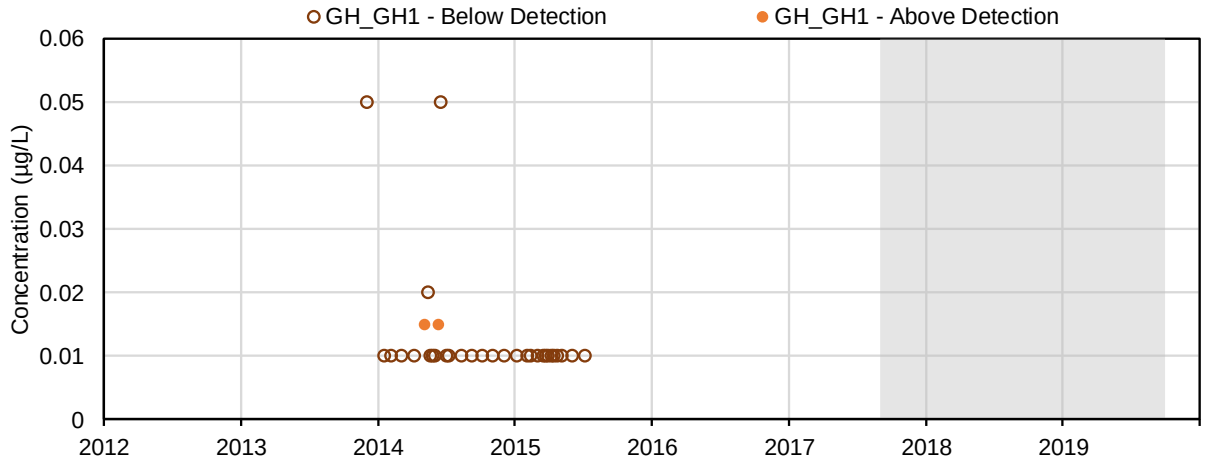
(133) Anthracene (µg/L); Parent PAHs



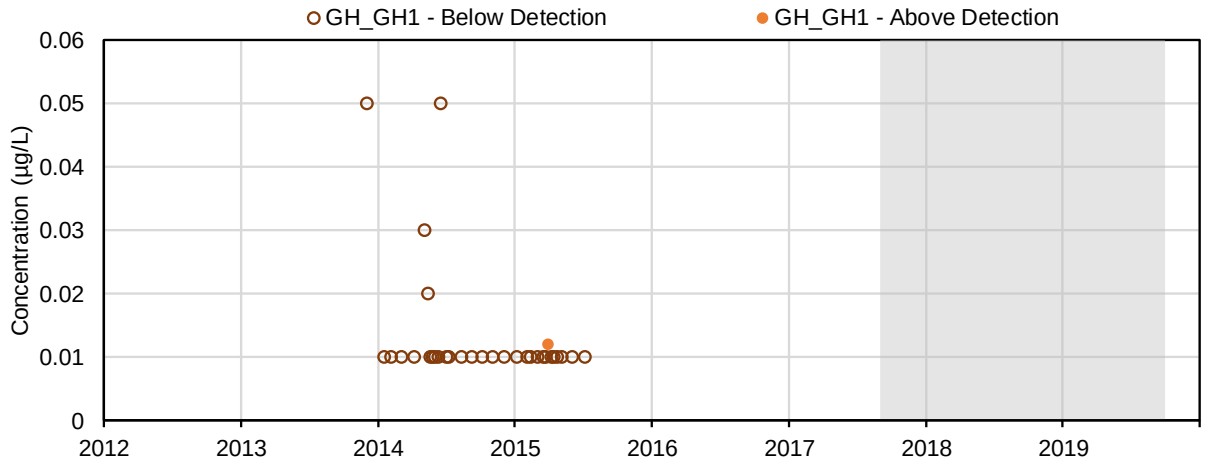
(134) Pyrene (µg/L); Parent PAHs



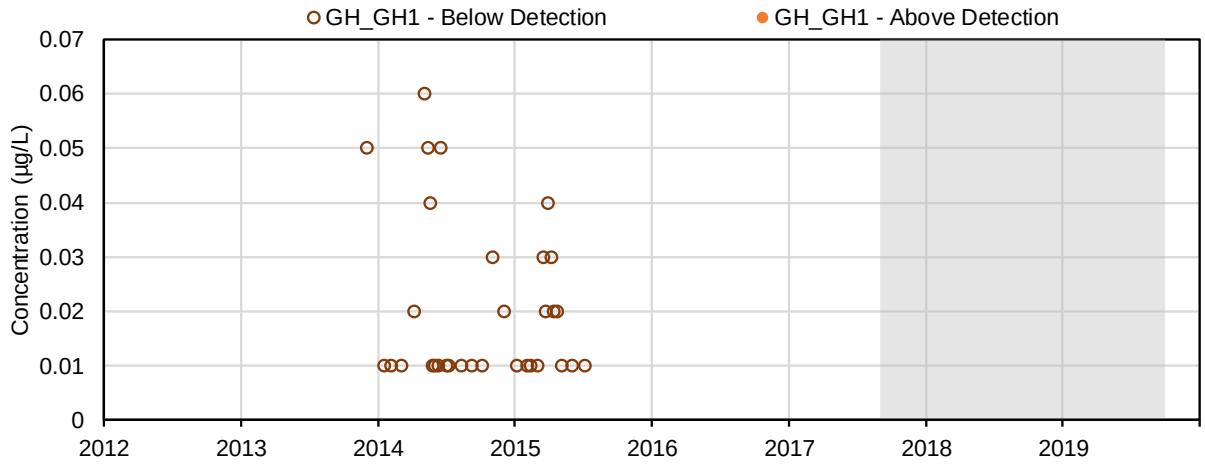
(135) Fluoranthene (µg/L); Parent PAHs



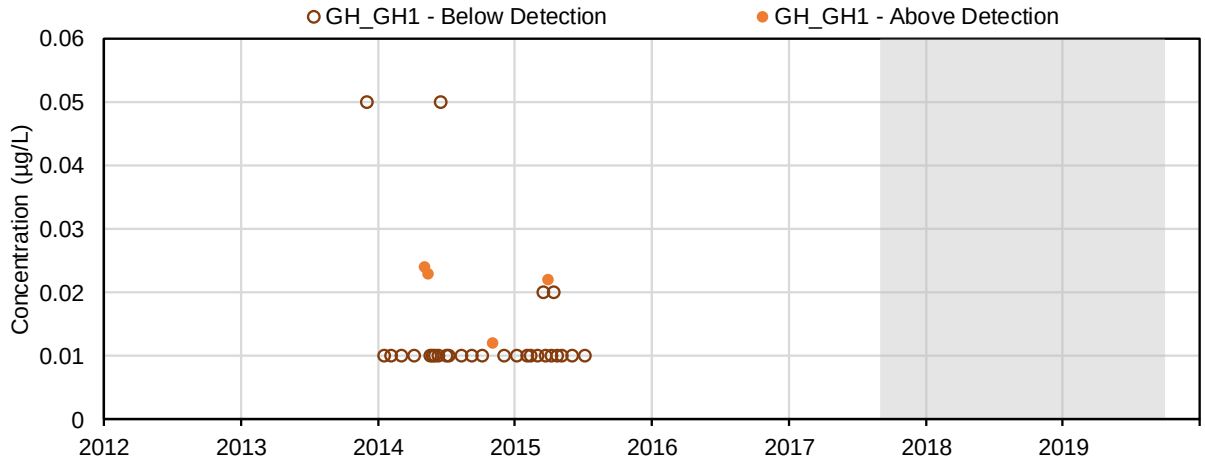
(136) Benzo(a)anthracene (µg/L); Parent PAHs



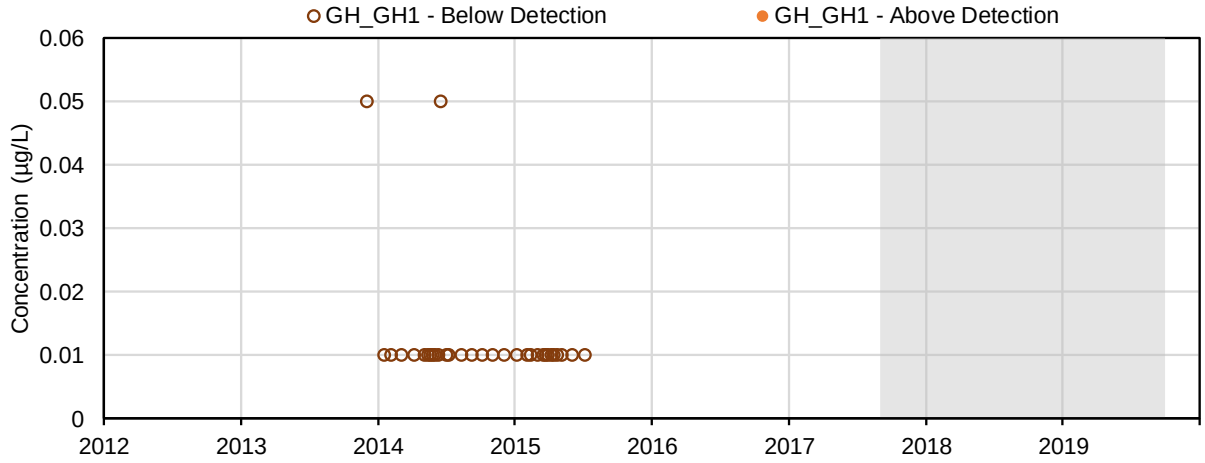
(137) Chrysene (µg/L); Parent PAHs



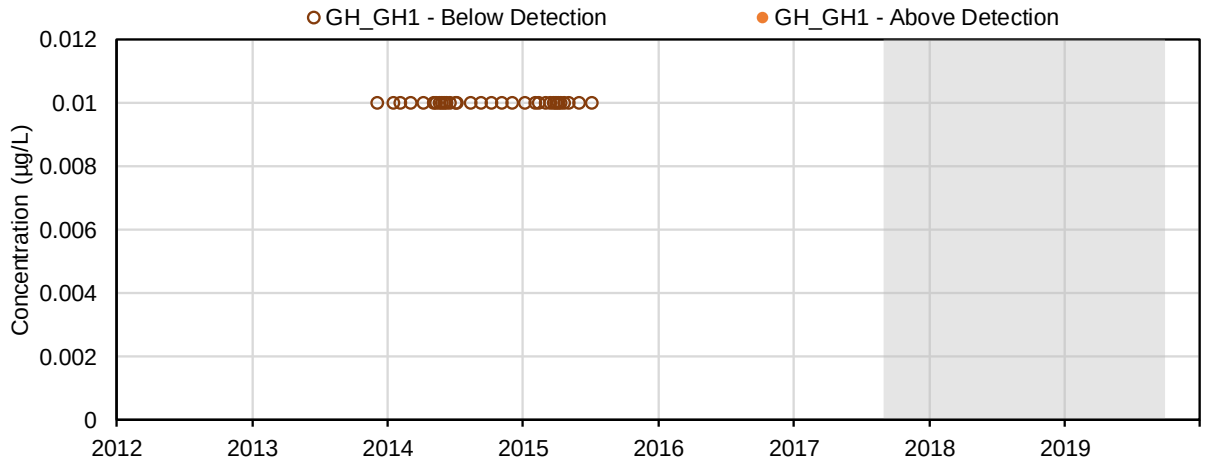
(138) Benzo(b)fluoranthene (µg/L); Parent PAHs



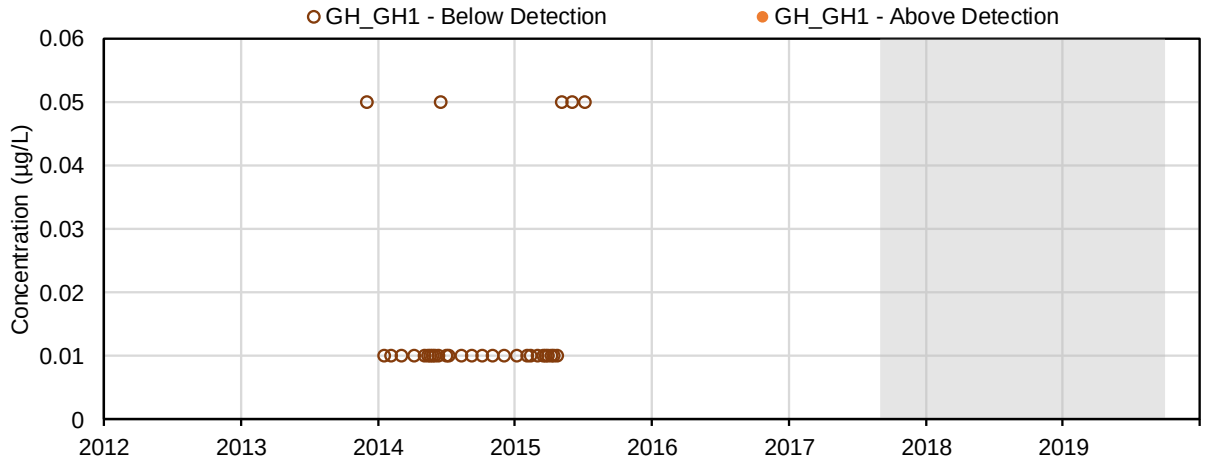
(139) Benzo(k)fluoranthene (µg/L); Parent PAHs



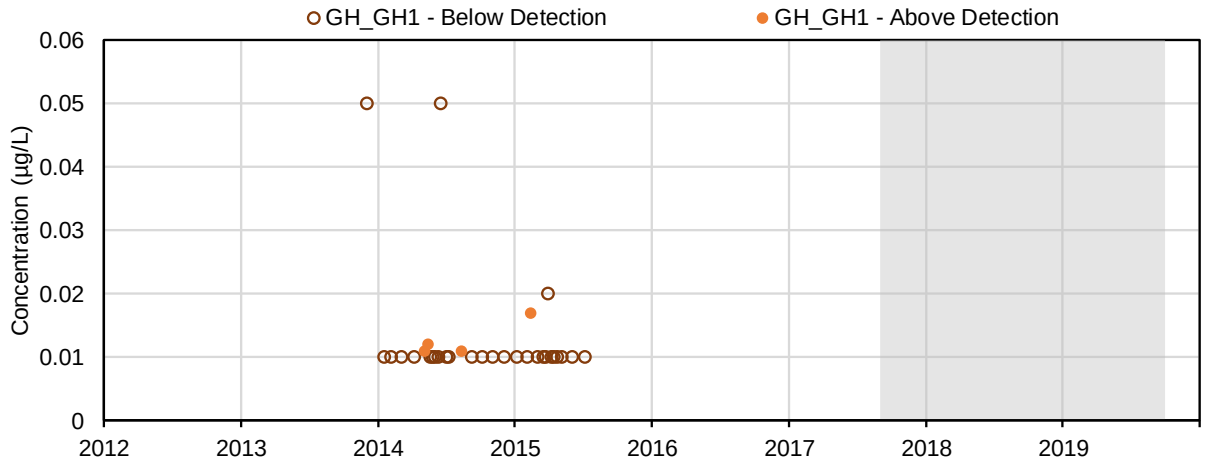
(140) Benzo(a)pyrene (µg/L); Parent PAHs



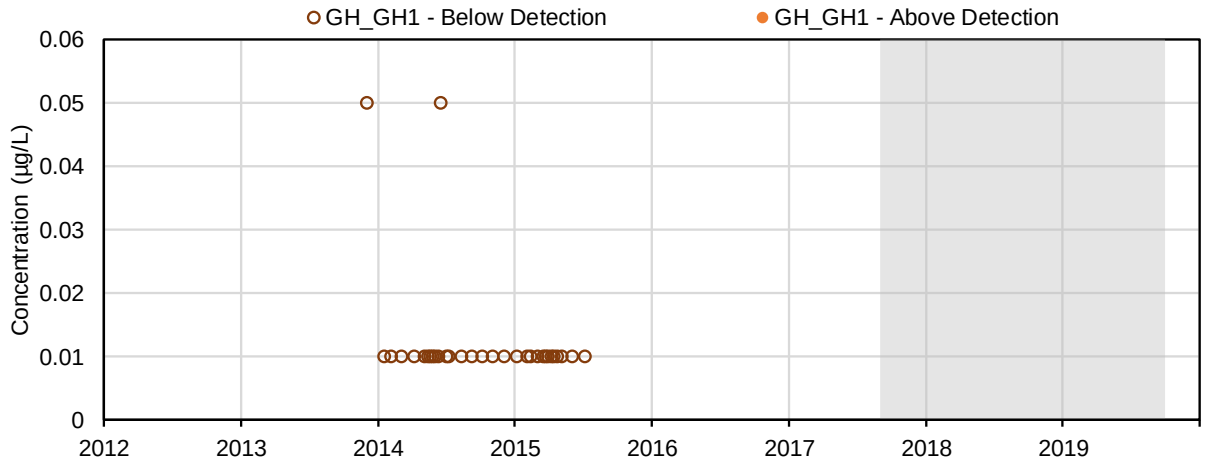
(141) Quinoline (µg/L); Parent PAHs



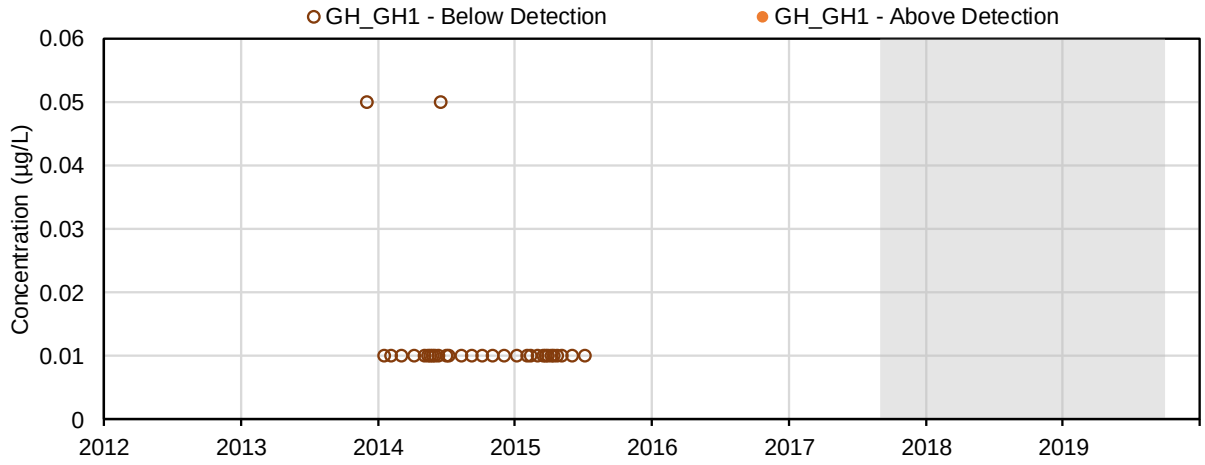
(142) Benzo(g,h,i)perylene (µg/L); Parent PAHs



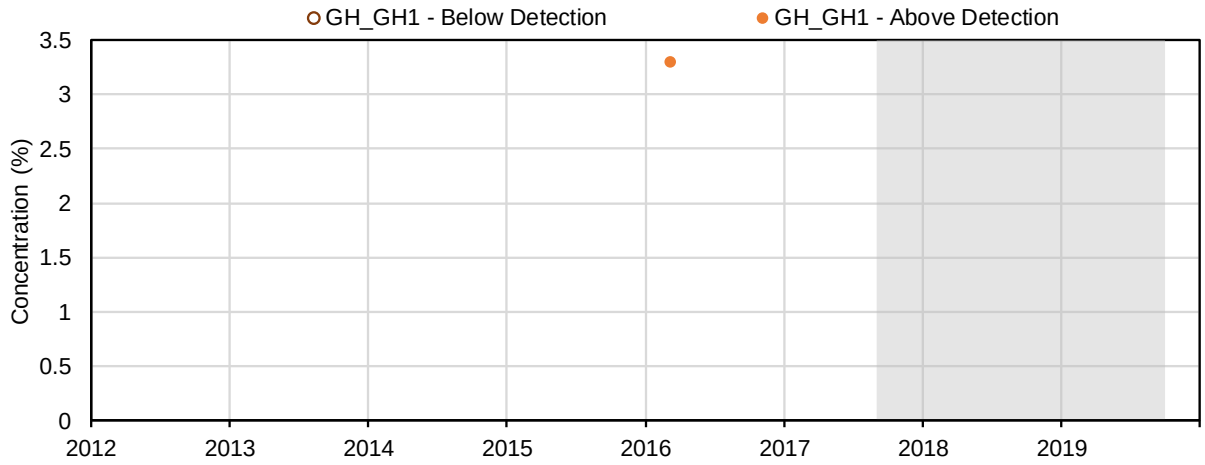
(143) Indeno(c,d-123)pyrene (µg/L); Parent PAHs



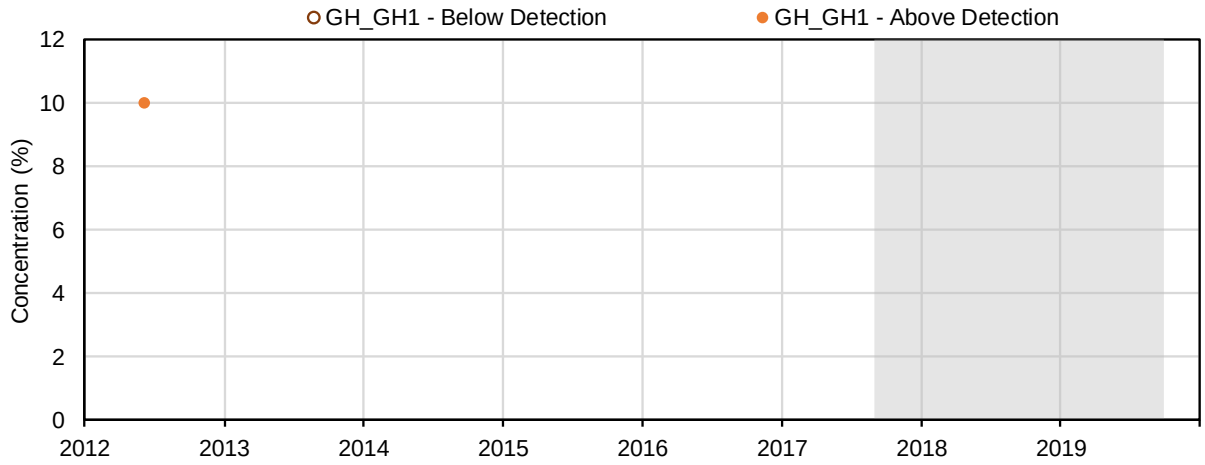
(144) Dibenzo(a,h)anthracene (µg/L); Parent PAHs



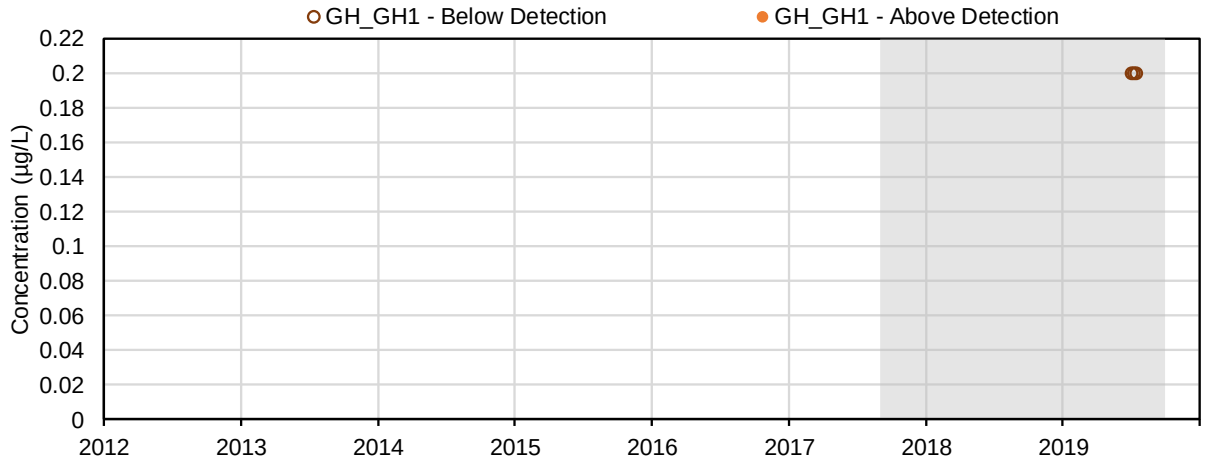
(145) Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%); Toxicity



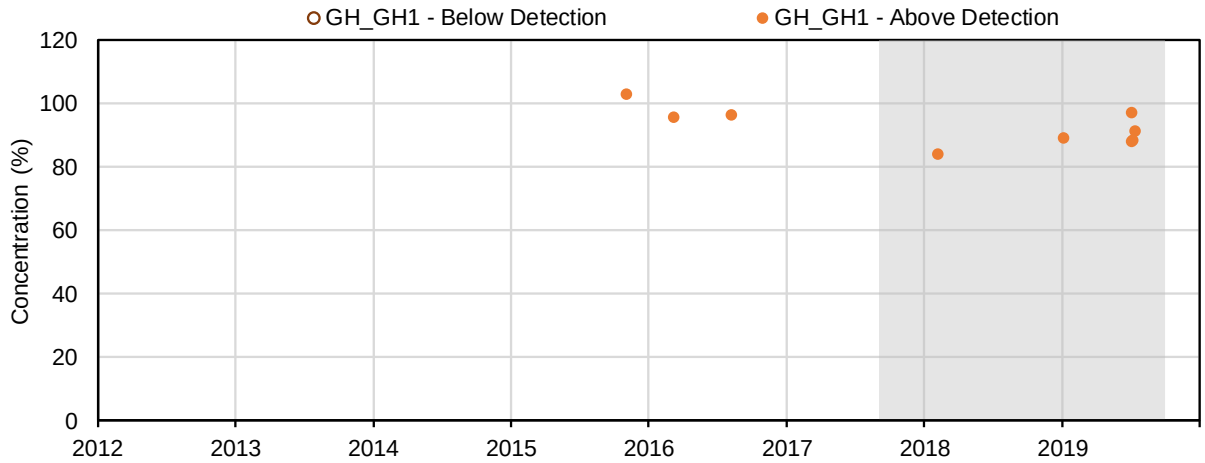
(146) Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality (%); Toxicity

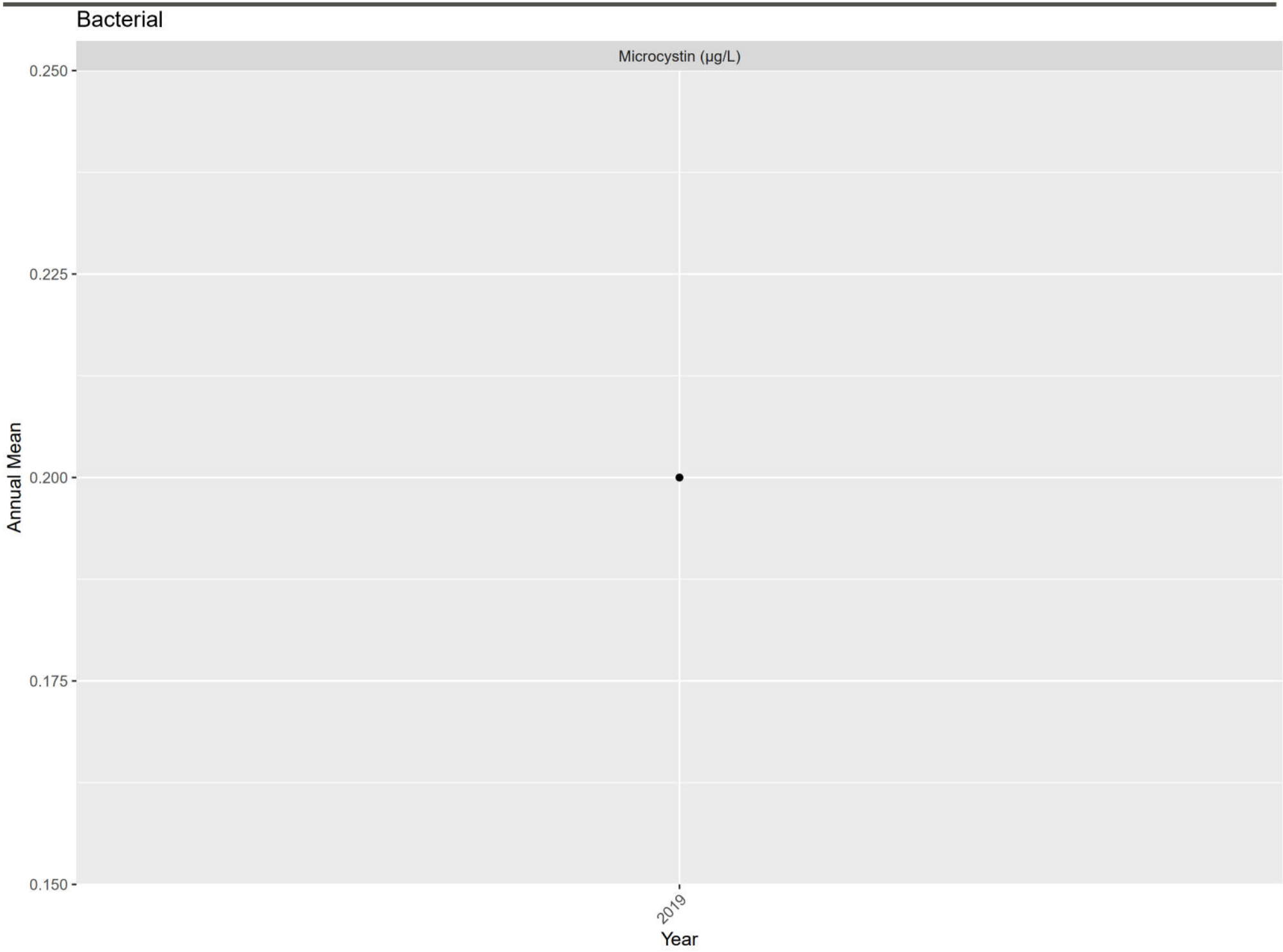


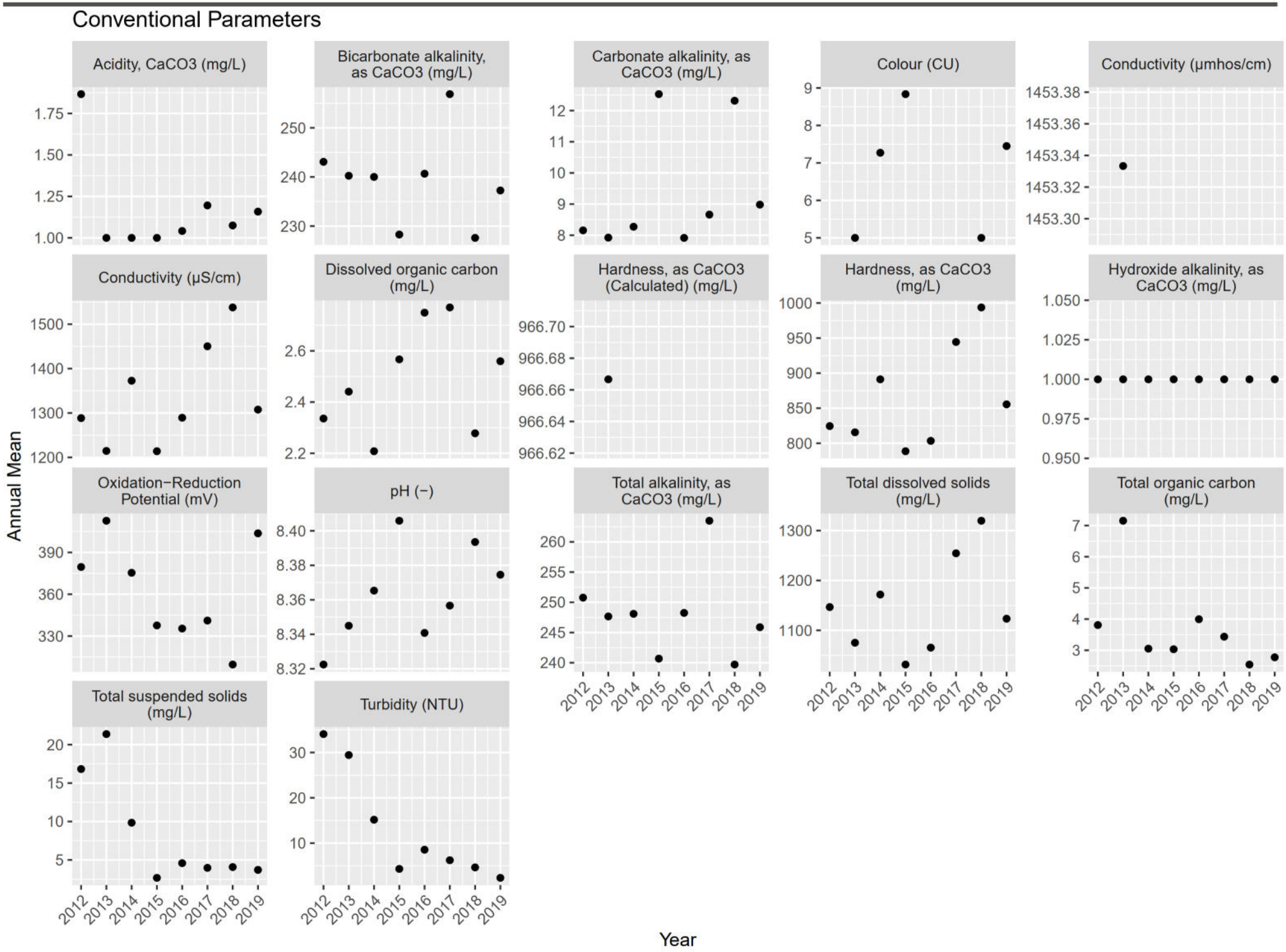
(147) Microcystin (µg/L); Bacterial

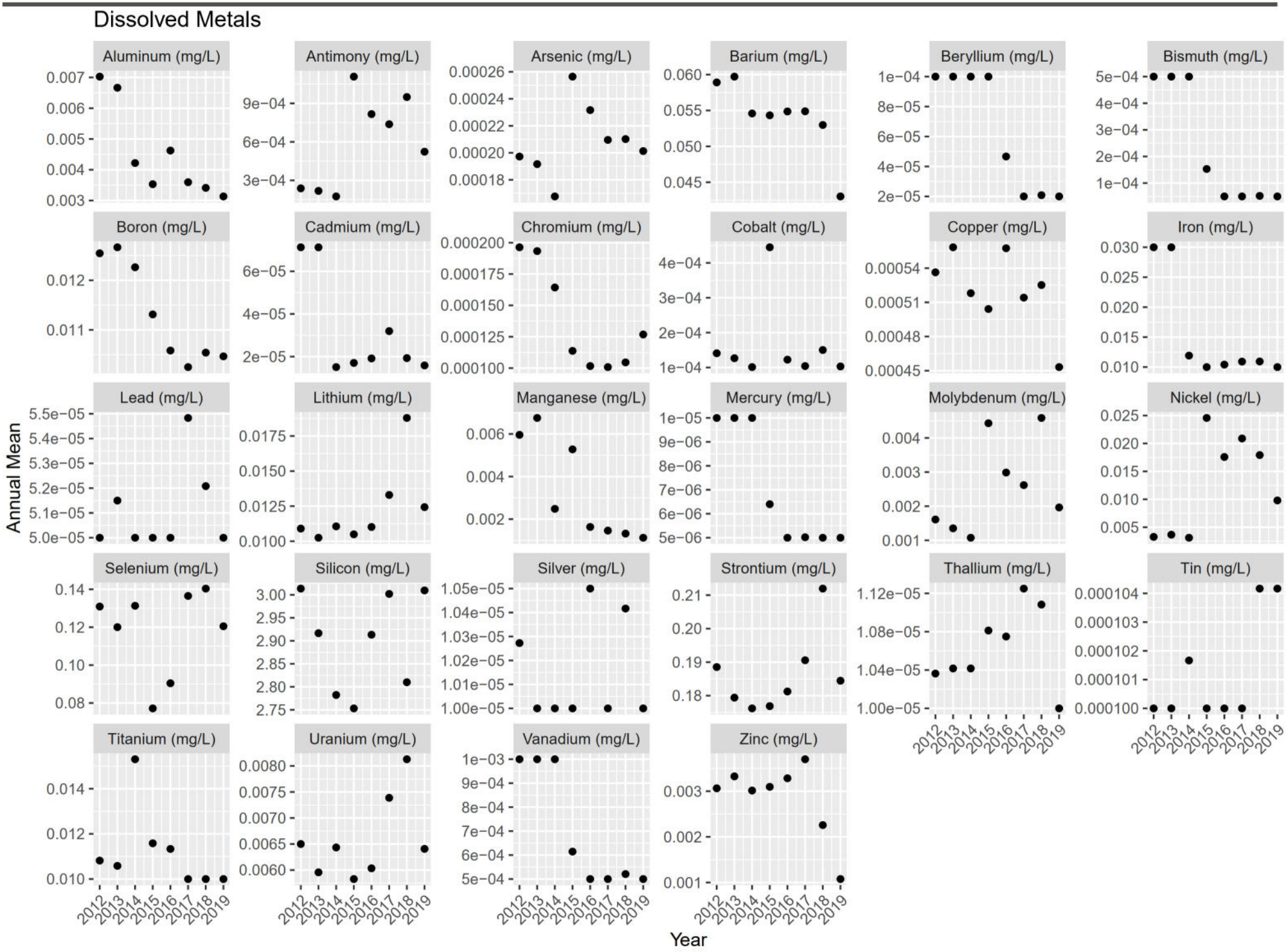


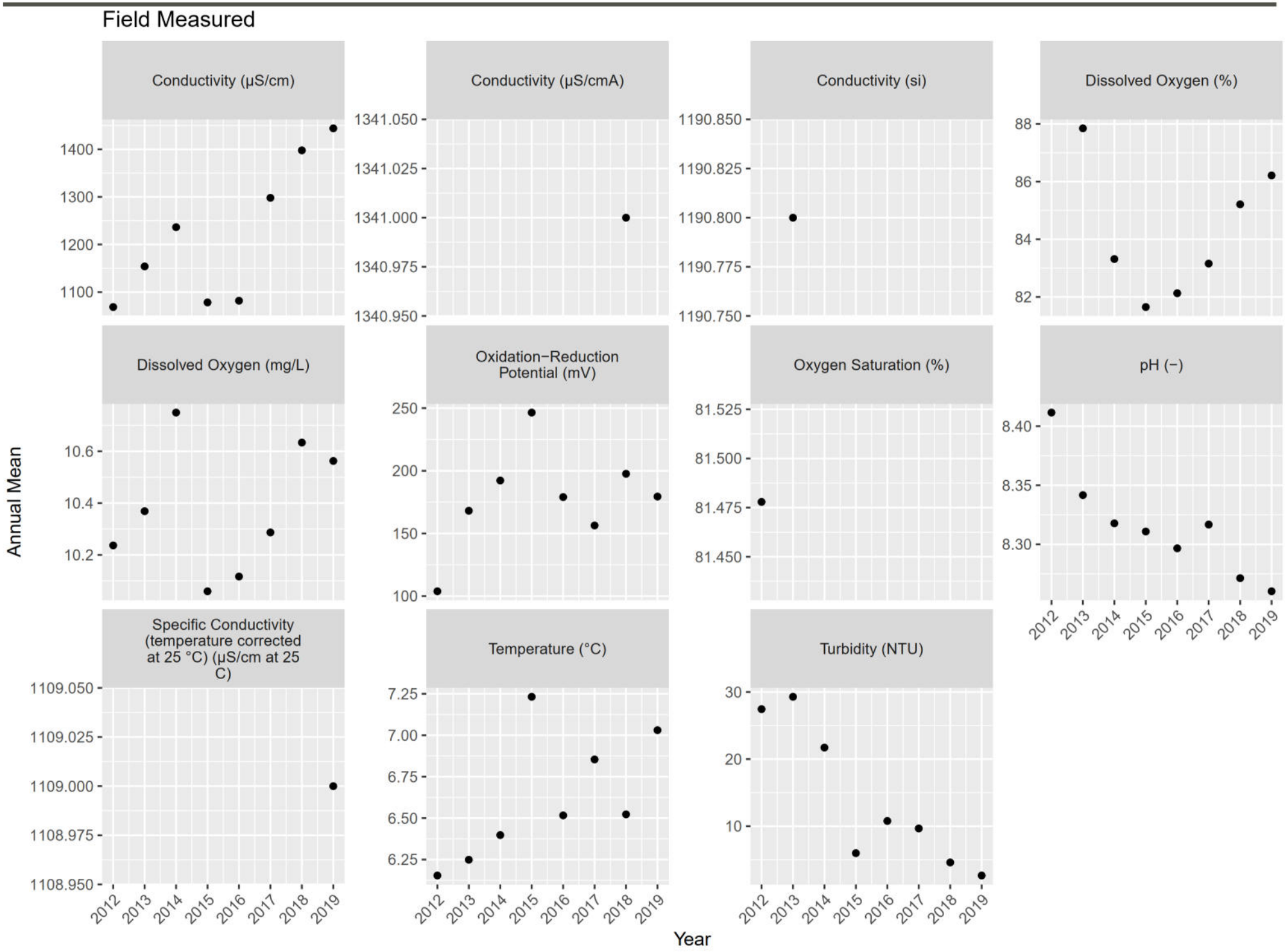
(148) 2-Bromobenzotrifluoride (%); Unknown

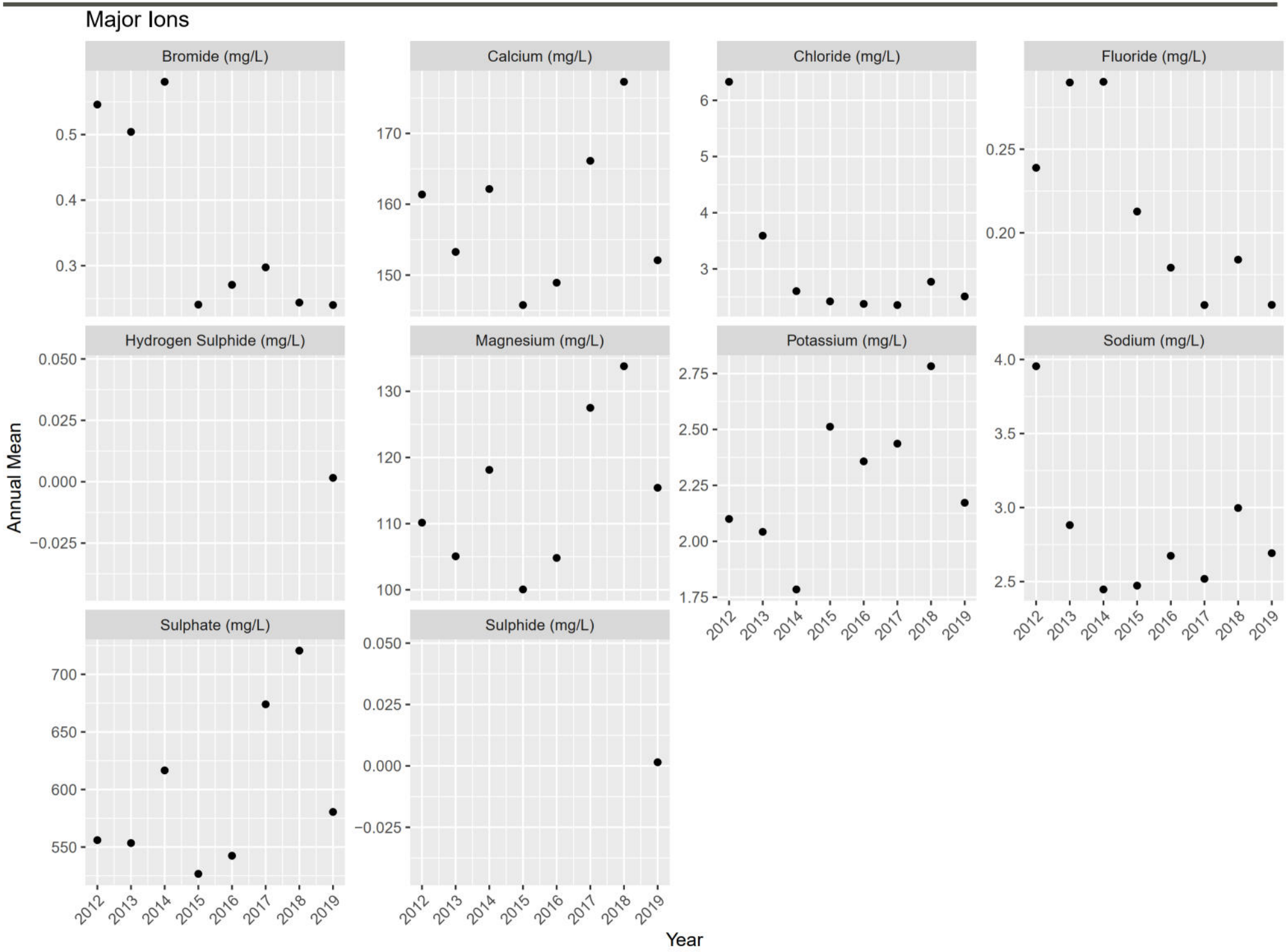


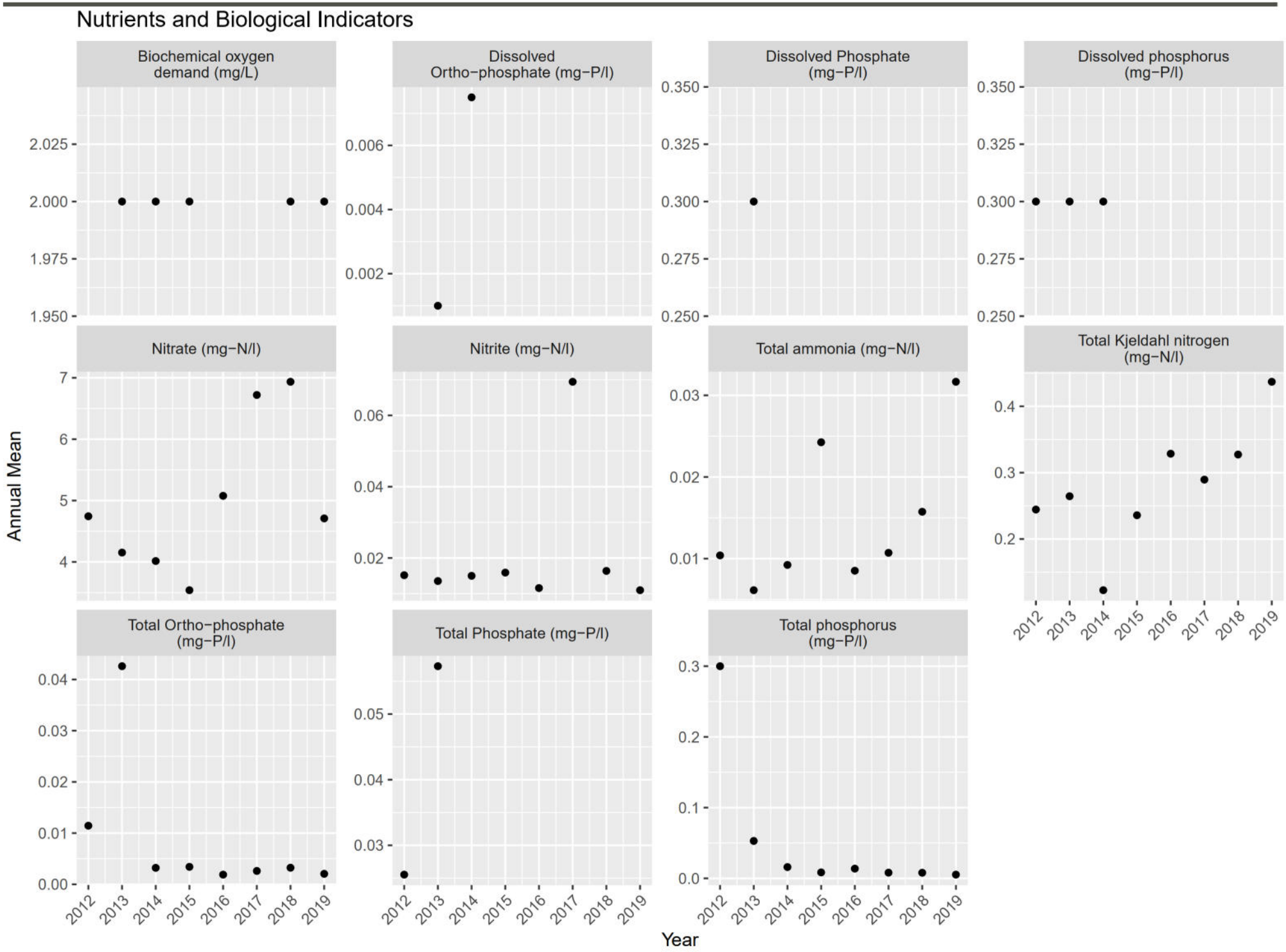

Bacterial
Microcystin (µg/L)
0.250
0.225
0.200
0.175
0.150
Annual Mean
2019
Year

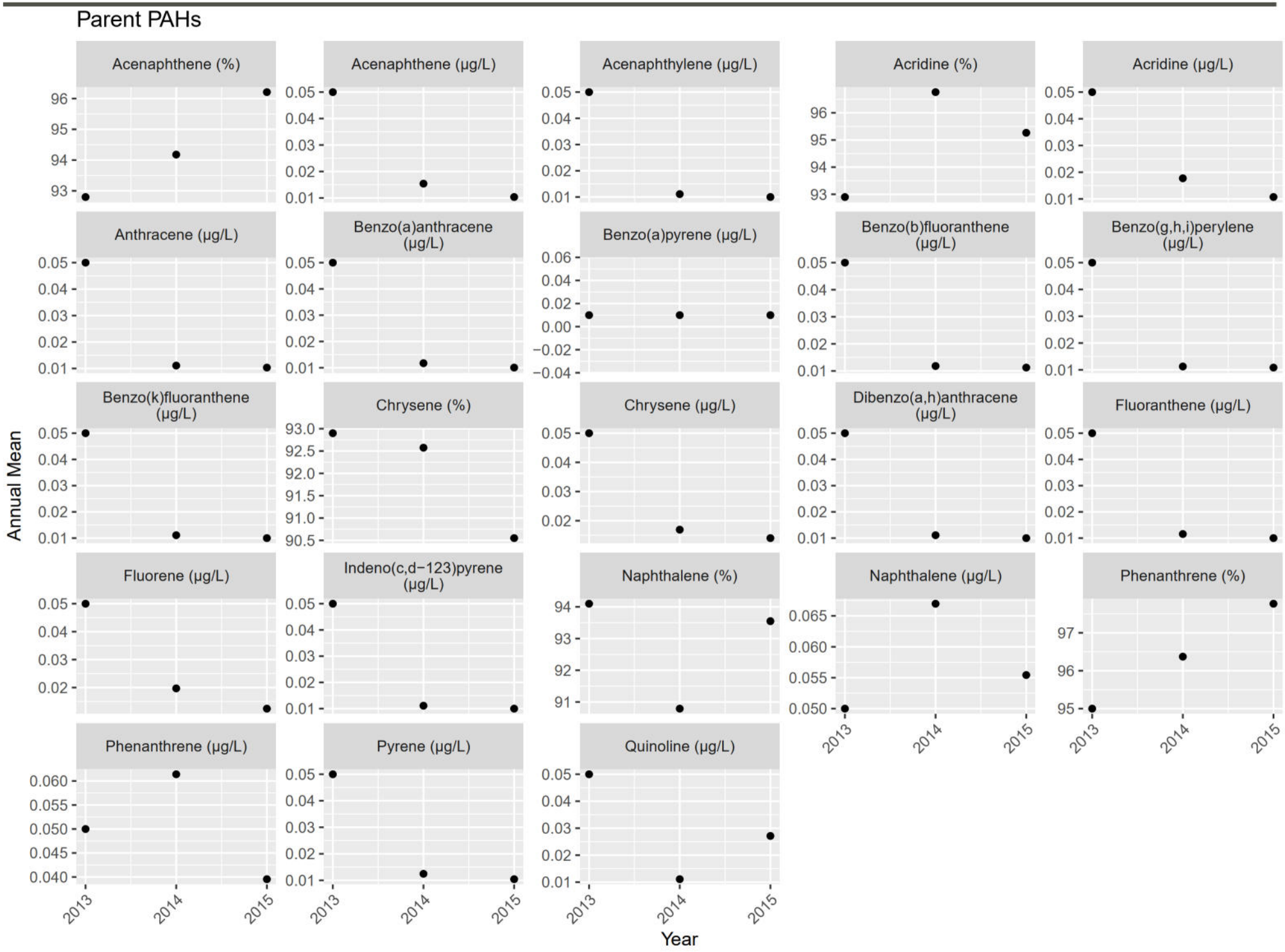

Conventional Parameters
Acidity, CaCO3 (mg/L)
Bicarbonate alkalinity, as CaCO3 (mg/L)
Carbonate alkalinity, as CaCO3 (mg/L)
Colour (CU)
Conductivity (µmhos/cm)
Conductivity (µS/cm)
Dissolved organic carbon (mg/L)
Hardness, as CaCO3 (Calculated) (mg/L)
Hardness, as CaCO3 (mg/L)
Hydroxide alkalinity, as CaCO3 (mg/L)
Oxidation−Reduction Potential (mV)
pH (−)
Total alkalinity, as CaCO3 (mg/L)
Total dissolved solids (mg/L)
Total organic carbon (mg/L)
Total suspended solids (mg/L)
Turbidity (NTU)
Annual Mean
Year

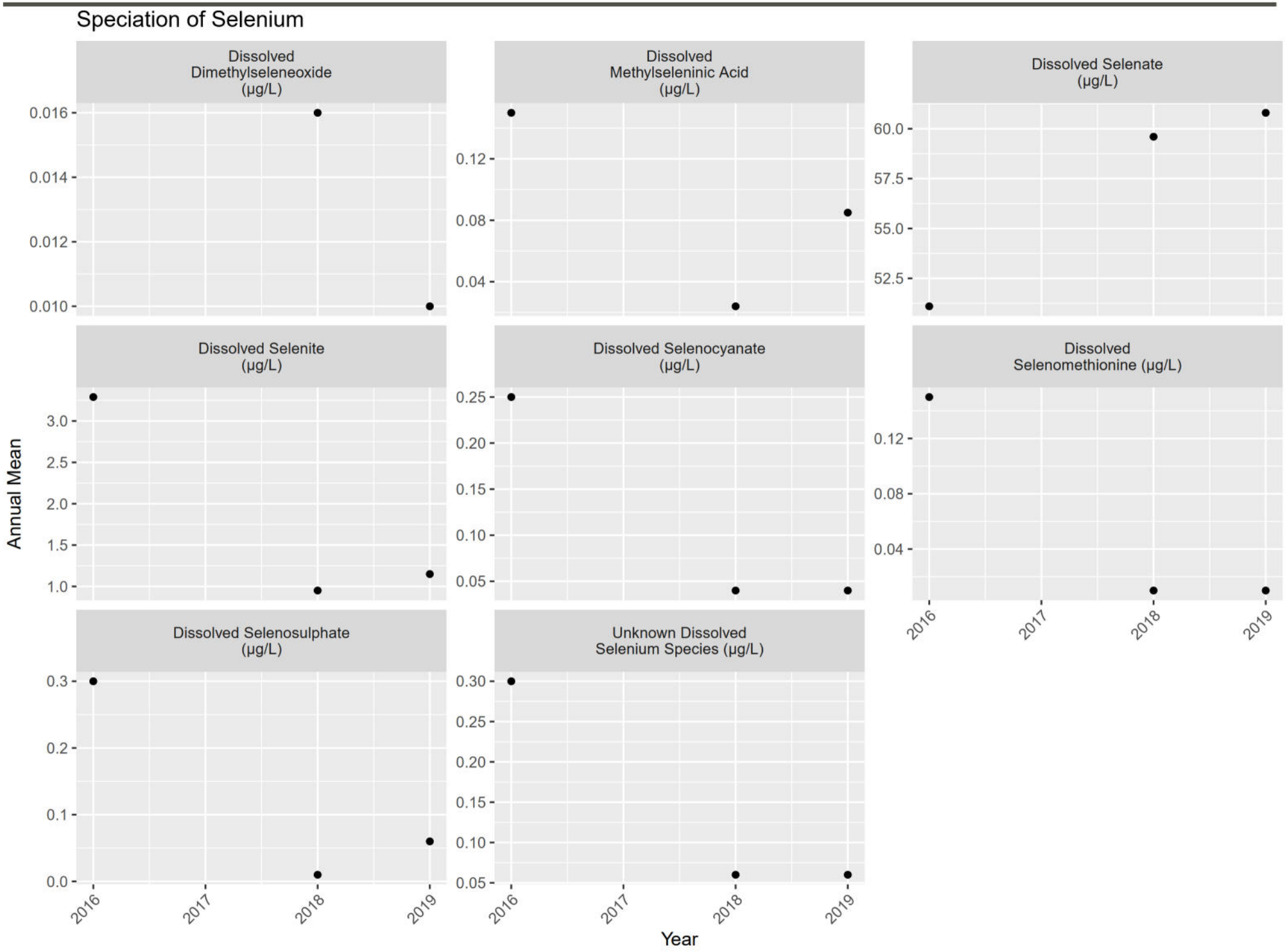

Dissolved Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Molybdenum (mg/L)
Nickel (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

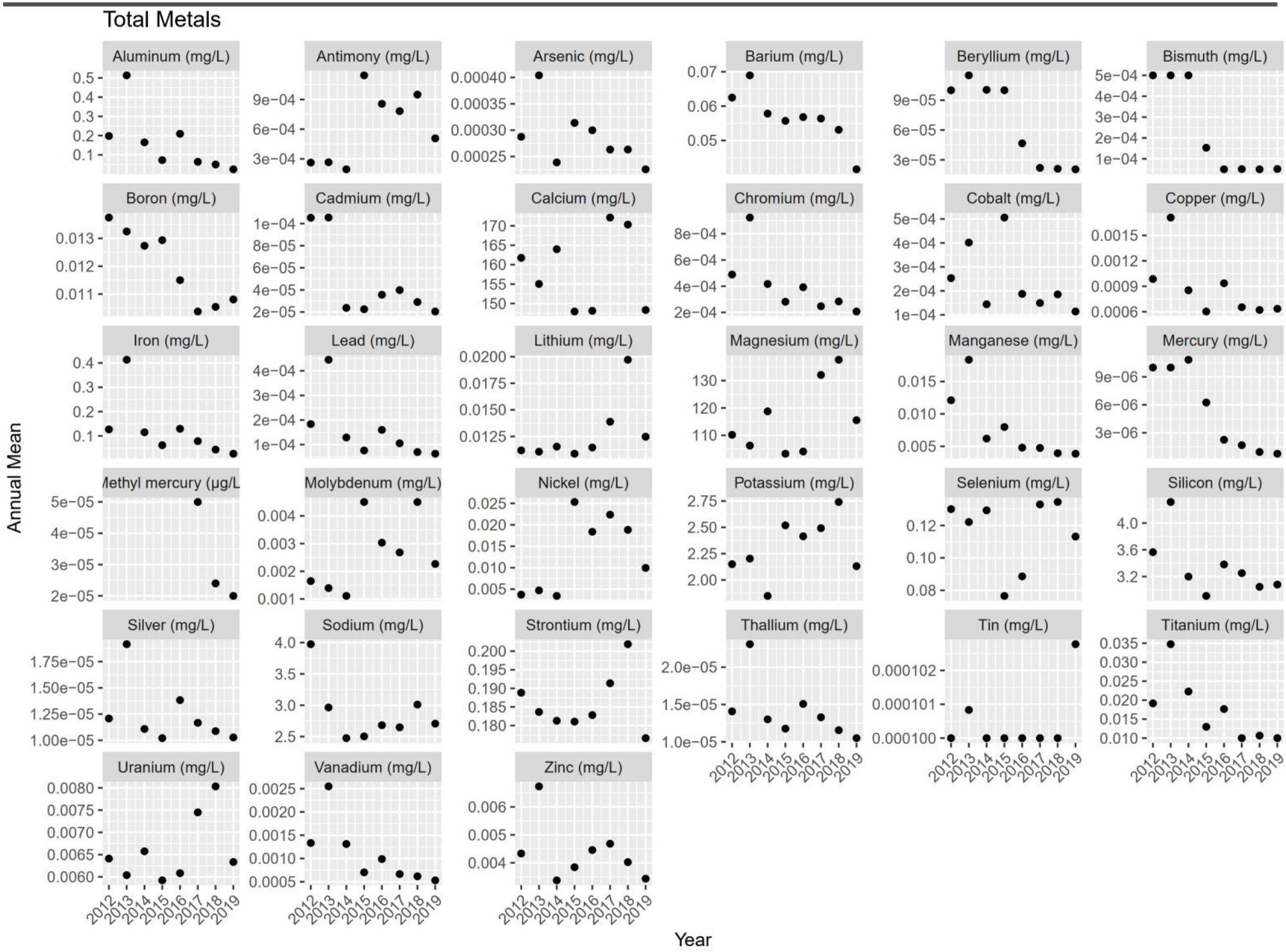

Field Measured
Conductivity (µS/cm)
Conductivity (µS/cmA)
Conductivity (si)
Dissolved Oxygen (%)
Dissolved Oxygen (mg/L)
Oxidation−Reduction Potential (mV)
Oxygen Saturation (%)
pH (−)
Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)
Temperature (°C)
Turbidity (NTU)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

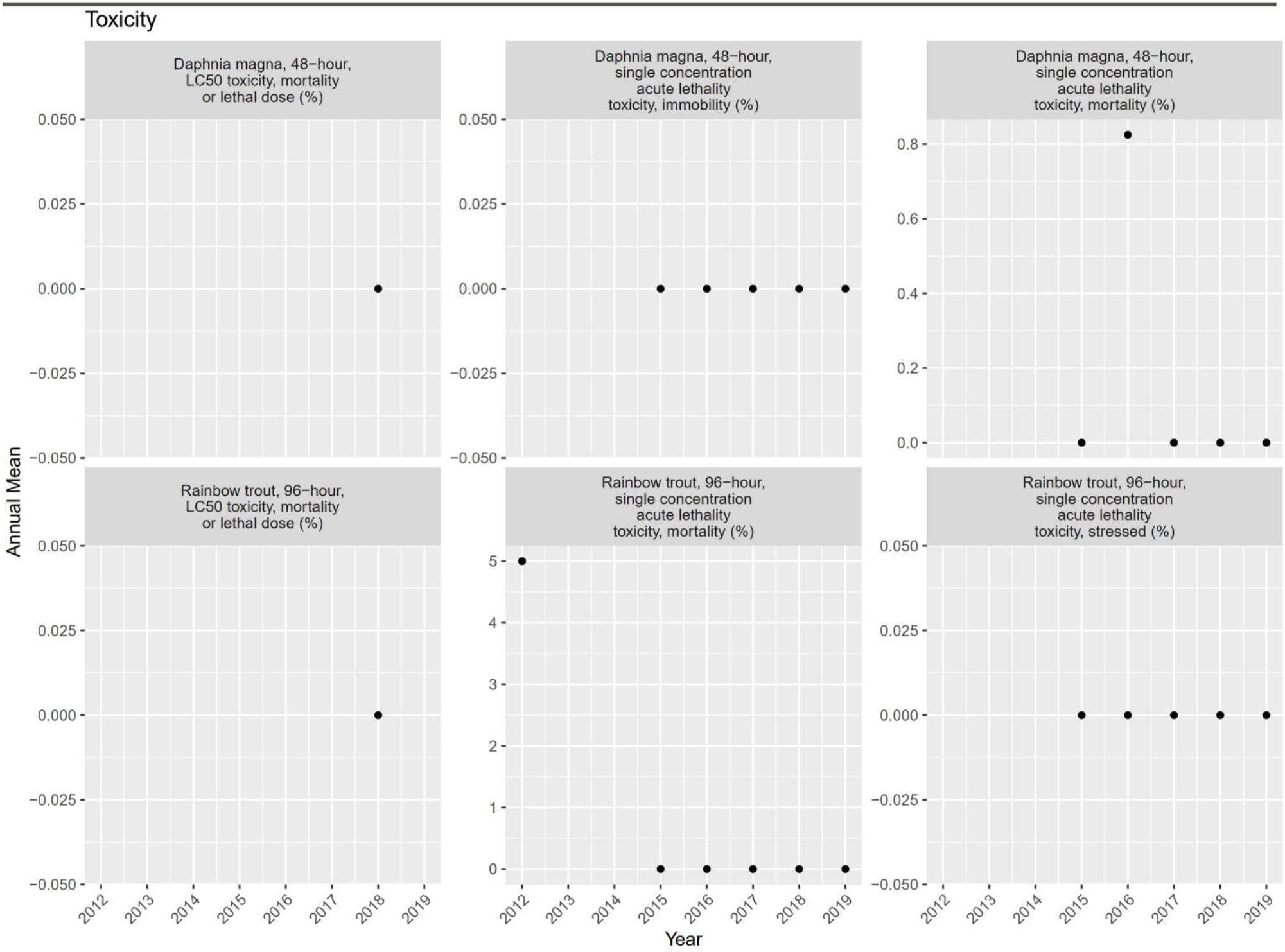

Major Ions
Bromide (mg/L)
Calcium (mg/L)
Chloride (mg/L)
Fluoride (mg/L)
Hydrogen Sulphide (mg/L)
Magnesium (mg/L)
Potassium (mg/L)
Sodium (mg/L)
Sulphate (mg/L)
Sulphide (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

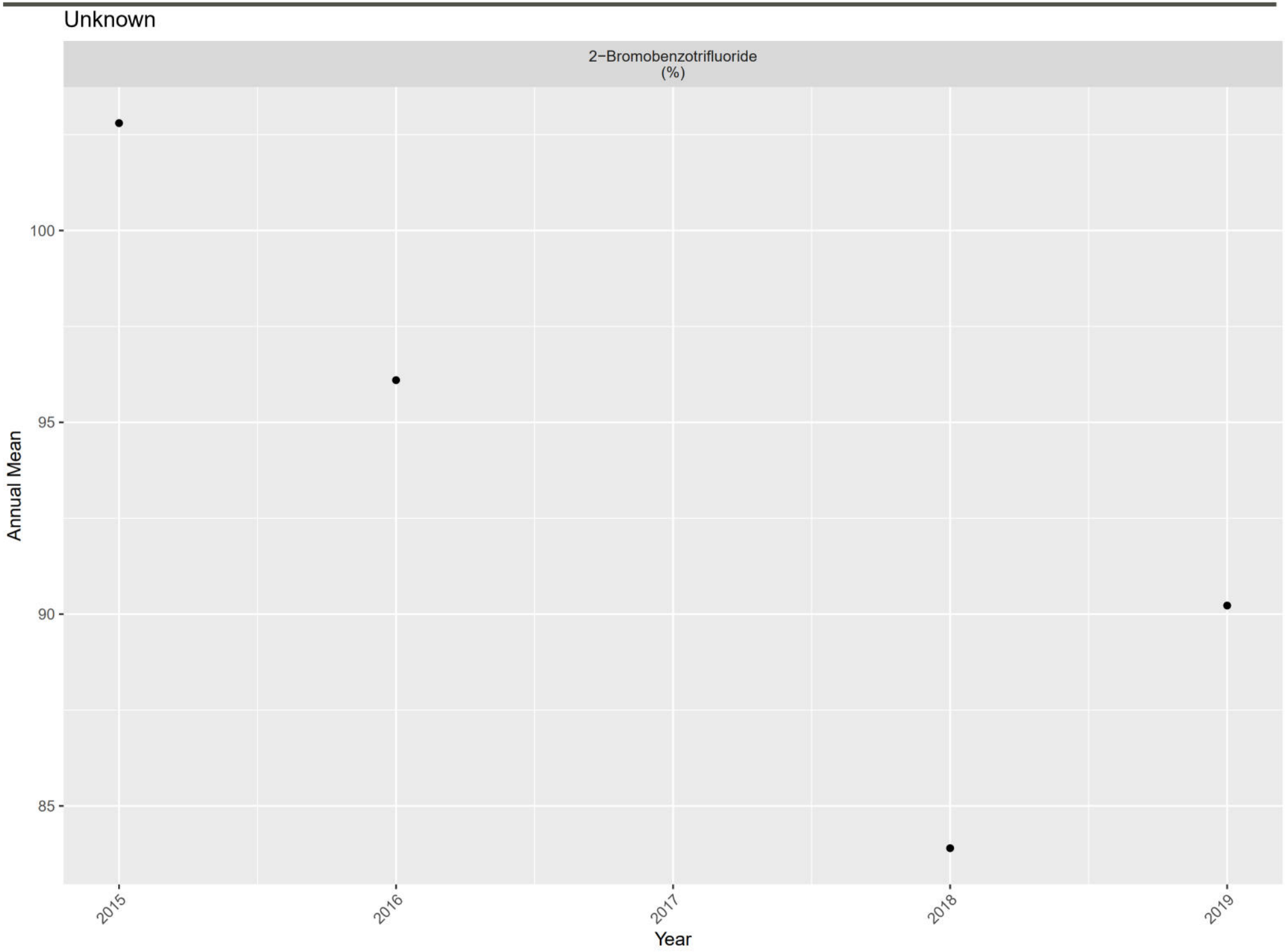

Nutrients and Biological Indicators
Biochemical oxygen demand (mg/L)
Dissolved Ortho−phosphate (mg−P/l)
Dissolved Phosphate (mg−P/l)
Dissolved phosphorus (mg−P/l)
Nitrate (mg−N/l)
Nitrite (mg−N/l)
Total ammonia (mg−N/l)
Total Kjeldahl nitrogen (mg−N/l)
Total Ortho−phosphate (mg−P/l)
Total Phosphate (mg−P/l)
Total phosphorus (mg−P/l)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

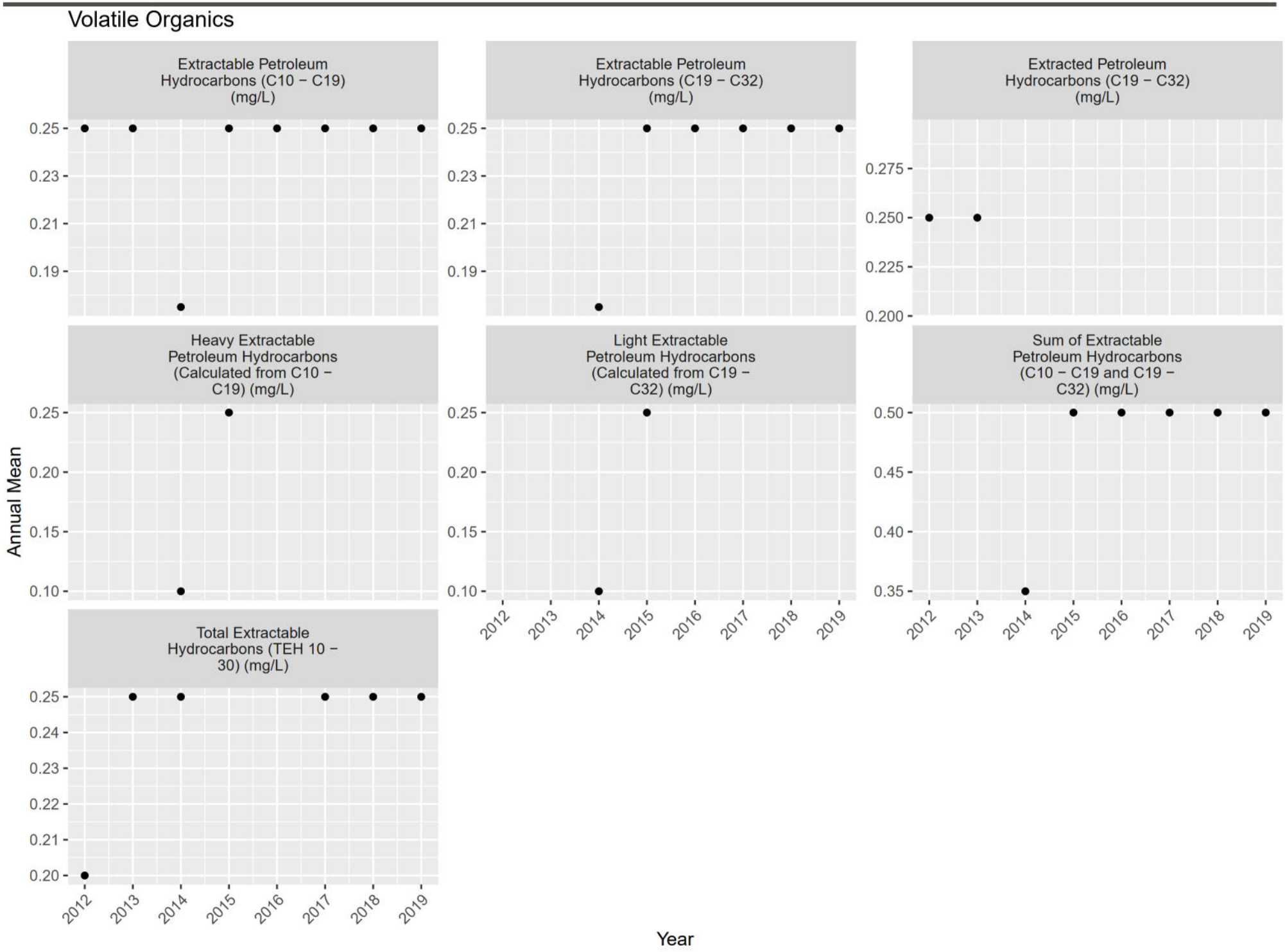

Parent PAHs
Acenaphthene (%)
Acenaphthene (µg/L)
Acenaphthylene (µg/L)
Acridine (%)
Acridine (µg/L)
Anthracene (µg/L)
Benzo(a)anthracene (µg/L)
Benzo(a)pyrene (µg/L)
Benzo(b)fluoranthene (µg/L)
Benzo(g,h,i)perylene (µg/L)
Benzo(k)fluoranthene (µg/L)
Chrysene (%)
Chrysene (µg/L)
Dibenzo(a,h)anthracene (µg/L)
Fluoranthene (µg/L)
Fluorene (µg/L)
Indeno(c,d−123)pyrene (µg/L)
Naphthalene (%)
Naphthalene (µg/L)
Phenanthrene (%)
Phenanthrene (µg/L)
Pyrene (µg/L)
Quinoline (µg/L)
Annual Mean
Year
2013
2014
2015


Speciation of Selenium
Dissolved Dimethylseleneoxide (µg/L)
Dissolved Methylseleninic Acid (µg/L)
Dissolved Selenate (µg/L)
Dissolved Selenite (µg/L)
Dissolved Selenocyanate (µg/L)
Dissolved Selenomethionine (µg/L)
Dissolved Selenosulphate (µg/L)
Unknown Dissolved Selenium Species (µg/L)
Annual Mean
Year
0.016
0.014
0.012
0.010
0.12
0.08
0.04
60.0
57.5
55.0
52.5
3.0
2.5
2.0
1.5
1.0
0.25
0.20
0.15
0.10
0.05
0.12
0.08
0.04
0.3
0.2
0.1
0.0
0.30
0.25
0.20
0.15
0.10
0.05
2016
2017
2018
2019


Total Metals
Aluminum (mg/L)
Antimony (mg/L)
Arsenic (mg/L)
Barium (mg/L)
Beryllium (mg/L)
Bismuth (mg/L)
Boron (mg/L)
Cadmium (mg/L)
Calcium (mg/L)
Chromium (mg/L)
Cobalt (mg/L)
Copper (mg/L)
Iron (mg/L)
Lead (mg/L)
Lithium (mg/L)
Magnesium (mg/L)
Manganese (mg/L)
Mercury (mg/L)
Methyl mercury (µg/L
Molybdenum (mg/L)
Nickel (mg/L)
Potassium (mg/L)
Selenium (mg/L)
Silicon (mg/L)
Silver (mg/L)
Sodium (mg/L)
Strontium (mg/L)
Thallium (mg/L)
Tin (mg/L)
Titanium (mg/L)
Uranium (mg/L)
Vanadium (mg/L)
Zinc (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019


Toxicity
Daphnia magna, 48−hour, LC50 toxicity, mortality or lethal dose (%)
Daphnia magna, 48−hour, single concentration acute lethality toxicity, immobility (%)
Daphnia magna, 48−hour, single concentration acute lethality toxicity, mortality (%)
Rainbow trout, 96−hour, LC50 toxicity, mortality or lethal dose (%)
Rainbow trout, 96−hour, single concentration acute lethality toxicity, mortality (%)
Rainbow trout, 96−hour, single concentration acute lethality toxicity, stressed (%)
Annual Mean
Year
0.050
0.025
0.000
−0.025
−0.050
0.8
0.6
0.4
0.2
0.0
5
4
3
2
1
0
2012
2013
2014
2015
2016
2017
2018
2019


Unknown
2−Bromobenzotrifluoride
(%)
Annual Mean
100
95
90
85
2015
2016
2017
2018
2019
Year


Volatile Organics
Extractable Petroleum Hydrocarbons (C10 − C19) (mg/L)
Extractable Petroleum Hydrocarbons (C19 − C32) (mg/L)
Extracted Petroleum Hydrocarbons (C19 − C32) (mg/L)
Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 − C19) (mg/L)
Light Extractable Petroleum Hydrocarbons (Calculated from C19 − C32) (mg/L)
Sum of Extractable Petroleum Hydrocarbons (C10 − C19 and C19 − C32) (mg/L)
Total Extractable Hydrocarbons (TEH 10 − 30) (mg/L)
Annual Mean
Year
2012
2013
2014
2015
2016
2017
2018
2019

ATTACHMENT F27

Raw Statistical Output

ATTACHMENT F27

Raw Statistical Output

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
FR_CC1	1-Methylnaphthalene (µg/L)_Alkylated PAHs	0.05	-	-	0
FR_CC1	2-Bromobenzotrifluoride (%)_Unknown	92.8	97.6	0.950819672	0
FR_CC1	2-Methylnaphthalene (µg/L)_Alkylated PAHs	0.035	-	-	0
FR_CC1	Acenaphthene (%)_Parent PAHs	94.6	-	-	0
FR_CC1	Acenaphthene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
FR_CC1	Acenaphthylene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
FR_CC1	Acidity, CaCO3 (mg/L)_Conventional Parameters	7.7	19	0.405263158	0
FR_CC1	Acridine (µg/L)_Parent PAHs	0.01	0.05	0.2	0
FR_CC1	Aluminum (mg/L)_Dissolved Metals	0.003	0.0306	0.098039216	0
FR_CC1	Aluminum (mg/L)_Total Metals	0.0505	0.459	0.110021786	0
FR_CC1	Anthracene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
FR_CC1	Antimony (mg/L)_Dissolved Metals	0.00099	0.00439	0.225512528	0
FR_CC1	Antimony (mg/L)_Total Metals	0.00103	0.00456	0.225877193	0
FR_CC1	Arsenic (mg/L)_Dissolved Metals	0.0002	0.00052	0.384615385	0
FR_CC1	Arsenic (mg/L)_Total Metals	0.00028	0.00073	0.383561644	0
FR_CC1	Barium (mg/L)_Dissolved Metals	0.0761	0.26	0.292692308	0
FR_CC1	Barium (mg/L)_Total Metals	0.0797	2.92	0.027294521	0
FR_CC1	Benzo(a)anthracene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
FR_CC1	Benzo(a)pyrene (µg/L)_Parent PAHs	0.005	0.01	0.5	0
FR_CC1	Benzo(b,j)fluoranthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_CC1	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
FR_CC1	Benzo(k)fluoranthene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
FR_CC1	Beryllium (mg/L)_Dissolved Metals	0.00004	0.0001	0.4	0
FR_CC1	Beryllium (mg/L)_Total Metals	0.00004	0.0001	0.4	0
FR_CC1	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	260	308	0.844155844	0
FR_CC1	Bismuth (mg/L)_Dissolved Metals	0.0001	0.0005	0.2	0
FR_CC1	Bismuth (mg/L)_Total Metals	0.0001	0.0005	0.2	0
FR_CC1	Boron (mg/L)_Dissolved Metals	0.027	0.057	0.473684211	0
FR_CC1	Boron (mg/L)_Total Metals	0.028	0.059	0.474576271	0
FR_CC1	Bromide (mg/L)_Major Ions	0.25	0.5	0.5	0
FR_CC1	Cadmium (mg/L)_Dissolved Metals	0.00088	0.000721	1.220527046	1
FR_CC1	Cadmium (mg/L)_Total Metals	0.000824	0.00178	0.462921348	0
FR_CC1	Calcium (mg/L)_Major Ions	267	232	1.150862069	1
FR_CC1	Calcium (mg/L)_Total Metals	287	254	1.12992126	1
FR_CC1	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	9.6	0.104166667	0
FR_CC1	Chloride (mg/L)_Major Ions	3.4	3.9	0.871794872	0
FR_CC1	Chromium (mg/L)_Dissolved Metals	0.0002	0.00019	1.052631579	1
FR_CC1	Chromium (mg/L)_Total Metals	0.00029	0.00143	0.202797203	0
FR_CC1	Chrysene (%)_Parent PAHs	97.8	76.9	1.271781534	1
FR_CC1	Chrysene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
FR_CC1	Cobalt (mg/L)_Dissolved Metals	0.0006	0.00382	0.157068063	0
FR_CC1	Cobalt (mg/L)_Total Metals	0.00065	0.00518	0.125482625	0
FR_CC1	Conductivity (µS/cm)_Conventional Parameters	2190	1940	1.128865979	1
FR_CC1	Conductivity (µS/cm)_Field Measured	1974	1897	1.040590406	1
FR_CC1	Copper (mg/L)_Dissolved Metals	0.00066	0.00084	0.785714286	0
FR_CC1	Copper (mg/L)_Total Metals	0.001	0.00336	0.297619048	0
FR_CC1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility (%)_Toxicity	0	0	-	0
FR_CC1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	0	3.3	0	0
FR_CC1	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	0.005	0.05	0.1	0
FR_CC1	Dissolved organic carbon (mg/L)_Conventional Parameters	1.94	3.59	0.540389972	0
FR_CC1	Dissolved Oxygen (%)_Field Measured	97.4	102.1	0.953966699	0
FR_CC1	Dissolved Oxygen (mg/L)_Field Measured	11.37	13.73	0.82811362	0
FR_CC1	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_CC1	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_CC1	Fluoranthene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
FR_CC1	Fluorene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
FR_CC1	Fluoride (mg/L)_Major Ions	0.31	0.57	0.543859649	0
FR_CC1	Hardness, as CaCO3 (mg/L)_Conventional Parameters	1230	1050	1.171428571	1
FR_CC1	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	2	0.5	0
FR_CC1	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
FR_CC1	Iron (mg/L)_Dissolved Metals	0.02	0.03	0.666666667	0
FR_CC1	Iron (mg/L)_Total Metals	0.056	0.411	0.136253041	0
FR_CC1	Lead (mg/L)_Dissolved Metals	0.0001	0.00005	2	1
FR_CC1	Lead (mg/L)_Total Metals	0.0001	0.000396	0.252525253	0
FR_CC1	Lithium (mg/L)_Dissolved Metals	0.308	0.38	0.810526316	0
FR_CC1	Lithium (mg/L)_Total Metals	0.302	0.386	0.78238342	0
FR_CC1	Magnesium (mg/L)_Major Ions	140	115	1.217391304	1
FR_CC1	Magnesium (mg/L)_Total Metals	140	115	1.217391304	1
FR_CC1	Manganese (mg/L)_Dissolved Metals	0.00609	0.0171	0.356140351	0
FR_CC1	Manganese (mg/L)_Total Metals	0.0156	0.0459	0.339869281	0
FR_CC1	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
FR_CC1	Mercury (mg/L)_Total Metals	0.00000092	0.00001	0.092	0
FR_CC1	Methyl mercury (µg/L)_Total Metals	0.000029	-	-	0
FR_CC1	Molybdenum (mg/L)_Dissolved Metals	0.00546	0.0175	0.312	0
FR_CC1	Molybdenum (mg/L)_Total Metals	0.00551	0.017	0.324117647	0
FR_CC1	Naphthalene (µg/L)_Parent PAHs	0.05	0.05	1	0
FR_CC1	Nickel (mg/L)_Dissolved Metals	0.0599	0.0655	0.914503817	0
FR_CC1	Nickel (mg/L)_Total Metals	0.0582	0.0686	0.848396501	0
FR_CC1	Nitrate (mg-N/l)_Nutrients and Biological Indicators	112	88.5	1.265536723	1
FR_CC1	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.108	0.458	0.23580786	0
FR_CC1	Oxidation-Reduction Potential (mV)_Conventional Parameters	484	506	0.956521739	0
FR_CC1	Oxidation-Reduction Potential (mV)_Field Measured	313.6	1736	0.180645161	0
FR_CC1	pH (-)_Conventional Parameters	8.28	8.39	0.986889154	0
FR_CC1	pH (-)_Field Measured	8.23	8.7	0.945977011	0
FR_CC1	Phenanthrene (%)_Parent PAHs	112.1	95.4	1.175052411	1
FR_CC1	Phenanthrene (µg/L)_Parent PAHs	0.023	0.05	0.46	0
FR_CC1	Potassium (mg/L)_Major Ions	5.84	8.9	0.656179775	0
FR_CC1	Potassium (mg/L)_Total Metals	5.75	9.5	0.605263158	0
FR_CC1	Pyrene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
FR_CC1	Quinoline (µg/L)_Parent PAHs	0.05	0.05	1	0
FR_CC1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	0	0	-	0
FR_CC1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed (%)_Toxicity	0	0	-	0
FR_CC1	Selenium (mg/L)_Dissolved Metals	0.243	0.237	1.025316456	1
FR_CC1	Selenium (mg/L)_Total Metals	0.23	0.202	1.138613861	1
FR_CC1	Silicon (mg/L)_Dissolved Metals	1.83	2.3	0.795652174	0
FR_CC1	Silicon (mg/L)_Total Metals	1.86	2.63	0.707224335	0
FR_CC1	Silver (mg/L)_Dissolved Metals	0.00002	0.000017	1.176470588	1
FR_CC1	Silver (mg/L)_Total Metals	0.00002	0.000018	1.111111111	1
FR_CC1	Sodium (mg/L)_Major Ions	5.89	12.4	0.475	0
FR_CC1	Sodium (mg/L)_Total Metals	6.08	12.5	0.4864	0
FR_CC1	Strontium (mg/L)_Dissolved Metals	0.41	0.476	0.861344538	0
FR_CC1	Strontium (mg/L)_Total Metals	0.396	0.494	0.801619433	0
FR_CC1	Sulphate (mg/L)_Major Ions	699	612	1.142156863	1
FR_CC1	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	0.5	0.5	1	0
FR_CC1	Temperature (°C)_Field Measured	18.4	17.7	1.039548023	1
FR_CC1	Thallium (mg/L)_Dissolved Metals	0.000044	0.000057	0.771929825	0
FR_CC1	Thallium (mg/L)_Total Metals	0.000042	0.000061	0.68852459	0
FR_CC1	Tin (mg/L)_Dissolved Metals	0.0002	0.0001	2	1
FR_CC1	Tin (mg/L)_Total Metals	0.0002	0.00158	0.126582278	0
FR_CC1	Titanium (mg/L)_Dissolved Metals	0.01	0.027	0.37037037	0
FR_CC1	Titanium (mg/L)_Total Metals	0.01	0.027	0.37037037	0
FR_CC1	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	260	308	0.844155844	0
FR_CC1	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.0515	3.14	0.016401274	0
FR_CC1	Total dissolved solids (mg/L)_Conventional Parameters	1840	1710	1.076023392	1
FR_CC1	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_CC1	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.743	2.49	0.298393574	0
FR_CC1	Total organic carbon (mg/L)_Conventional Parameters	4.98	10.1	0.493069307	0
FR_CC1	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0042	0.0111	0.378378378	0
FR_CC1	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0062	0.3	0.020666667	0
FR_CC1	Total suspended solids (mg/L)_Conventional Parameters	5.8	47.4	0.122362869	0
FR_CC1	Turbidity (NTU)_Conventional Parameters	5	19.8	0.252525253	0
FR_CC1	Uranium (mg/L)_Dissolved Metals	0.0157	0.0122	1.286885246	1
FR_CC1	Uranium (mg/L)_Total Metals	0.0155	0.0125	1.24	1
FR_CC1	Vanadium (mg/L)_Dissolved Metals	0.001	0.001	1	0
FR_CC1	Vanadium (mg/L)_Total Metals	0.001	0.0023	0.434782609	0
FR_CC1	Zinc (mg/L)_Dissolved Metals	0.0405	0.0397	1.020151134	1
FR_CC1	Zinc (mg/L)_Total Metals	0.0399	0.0816	0.488970588	0
FR_FC1	Acidity, CaCO3 (mg/L)_Conventional Parameters	3	3.9	0.769230769	0
FR_FC1	Aluminum (mg/L)_Dissolved Metals	0.003	0.0033	0.909090909	0
FR_FC1	Aluminum (mg/L)_Total Metals	0.049	0.0701	0.699001427	0
FR_FC1	Antimony (mg/L)_Dissolved Metals	0.0001	0.00012	0.833333333	0
FR_FC1	Antimony (mg/L)_Total Metals	0.0001	0.00017	0.588235294	0
FR_FC1	Arsenic (mg/L)_Dissolved Metals	0.0001	0.00011	0.909090909	0
FR_FC1	Arsenic (mg/L)_Total Metals	0.0001	0.00013	0.769230769	0
FR_FC1	Barium (mg/L)_Dissolved Metals	0.104	0.0888	1.171171171	1
FR_FC1	Barium (mg/L)_Total Metals	0.0888	0.0904	0.982300885	0
FR_FC1	Beryllium (mg/L)_Dissolved Metals	0.00002	0.0001	0.2	0
FR_FC1	Beryllium (mg/L)_Total Metals	0.00002	0.0001	0.2	0
FR_FC1	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	143	156	0.916666667	0
FR_FC1	Bismuth (mg/L)_Dissolved Metals	0.00005	0.0005	0.1	0
FR_FC1	Bismuth (mg/L)_Total Metals	0.00005	0.0005	0.1	0
FR_FC1	Boron (mg/L)_Dissolved Metals	0.01	0.011	0.909090909	0
FR_FC1	Boron (mg/L)_Total Metals	0.01	0.012	0.833333333	0
FR_FC1	Bromide (mg/L)_Major Ions	0.05	0.05	1	0
FR_FC1	Cadmium (mg/L)_Dissolved Metals	0.0000146	0.000013	1.123076923	1
FR_FC1	Cadmium (mg/L)_Total Metals	0.0000135	0.00124	0.010887097	0

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
FR_FC1	Calcium (mg/L)_Major Ions	97.9	84	1.16547619	1
FR_FC1	Calcium (mg/L)_Total Metals	103	86	1.197674419	1
FR_FC1	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	7	13.8	0.507246377	0
FR_FC1	Chloride (mg/L)_Major Ions	0.5	1.3	0.384615385	0
FR_FC1	Chromium (mg/L)_Dissolved Metals	0.0001	0.00023	0.434782609	0
FR_FC1	Chromium (mg/L)_Total Metals	0.0002	0.041	0.004878049	0
FR_FC1	Cobalt (mg/L)_Dissolved Metals	0.0001	0.0001	1	0
FR_FC1	Cobalt (mg/L)_Total Metals	0.0001	0.0001	1	0
FR_FC1	Conductivity (µS/cm)_Conventional Parameters	678	560	1.210714286	1
FR_FC1	Conductivity (µS/cm)_Field Measured	514.6	533.8	0.964031472	0
FR_FC1	Copper (mg/L)_Dissolved Metals	0.0005	0.0005	1	0
FR_FC1	Copper (mg/L)_Total Metals	0.0005	0.00301	0.166112957	0
FR_FC1	Dissolved organic carbon (mg/L)_Conventional Parameters	0.5	1.27	0.393700787	0
FR_FC1	Dissolved Oxygen (%)_Field Measured	73.8	94.9	0.777660695	0
FR_FC1	Dissolved Oxygen (mg/L)_Field Measured	10.19	12.61	0.808088818	0
FR_FC1	Fluoride (mg/L)_Major Ions	0.18	0.242	0.743801653	0
FR_FC1	Hardness, as CaCO3 (mg/L)_Conventional Parameters	373	315	1.184126984	1
FR_FC1	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	1	1	0
FR_FC1	Iron (mg/L)_Dissolved Metals	0.01	0.03	0.333333333	0
FR_FC1	Iron (mg/L)_Total Metals	0.028	0.405	0.069135802	0
FR_FC1	Lead (mg/L)_Dissolved Metals	0.00005	0.00005	1	0
FR_FC1	Lead (mg/L)_Total Metals	0.00005	0.000115	0.434782609	0
FR_FC1	Lithium (mg/L)_Dissolved Metals	0.0064	0.00706	0.906515581	0
FR_FC1	Lithium (mg/L)_Total Metals	0.0062	0.00731	0.848153215	0
FR_FC1	Magnesium (mg/L)_Major Ions	31.1	25.6	1.21484375	1
FR_FC1	Magnesium (mg/L)_Total Metals	28.4	26.3	1.079847909	1
FR_FC1	Manganese (mg/L)_Dissolved Metals	0.00029	0.0045	0.064444444	0
FR_FC1	Manganese (mg/L)_Total Metals	0.0011	0.00926	0.118790497	0
FR_FC1	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
FR_FC1	Mercury (mg/L)_Total Metals	0.000005	0.000013	0.384615385	0
FR_FC1	Molybdenum (mg/L)_Dissolved Metals	0.000713	0.000938	0.760127932	0
FR_FC1	Molybdenum (mg/L)_Total Metals	0.000756	0.000948	0.797468354	0
FR_FC1	Nickel (mg/L)_Dissolved Metals	0.0005	0.0005	1	0
FR_FC1	Nickel (mg/L)_Total Metals	0.0005	0.00093	0.537634409	0
FR_FC1	Nitrate (mg-N/l)_Nutrients and Biological Indicators	5.98	7.3	0.819178082	0
FR_FC1	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0012	0.0031	0.387096774	0
FR_FC1	Oxidation-Reduction Potential (mV)_Conventional Parameters	366	515	0.710679612	0
FR_FC1	Oxidation-Reduction Potential (mV)_Field Measured	177.4	271.6	0.653166421	0
FR_FC1	pH (-)_Conventional Parameters	8.33	8.44	0.986966825	0
FR_FC1	pH (-)_Field Measured	7.88	8.28	0.951690821	0
FR_FC1	Potassium (mg/L)_Major Ions	0.648	2	0.324	0
FR_FC1	Potassium (mg/L)_Total Metals	0.634	2	0.317	0
FR_FC1	Selenium (mg/L)_Dissolved Metals	0.0331	0.0273	1.212454212	1
FR_FC1	Selenium (mg/L)_Total Metals	0.0302	0.0265	1.139622642	1
FR_FC1	Silicon (mg/L)_Dissolved Metals	1.62	1.86	0.870967742	0
FR_FC1	Silicon (mg/L)_Total Metals	1.53	1.91	0.80104712	0
FR_FC1	Silver (mg/L)_Dissolved Metals	0.00001	0.00001	1	0
FR_FC1	Silver (mg/L)_Total Metals	0.00001	0.000011	0.909090909	0
FR_FC1	Sodium (mg/L)_Major Ions	0.772	2	0.386	0
FR_FC1	Sodium (mg/L)_Total Metals	0.712	2	0.356	0
FR_FC1	Strontium (mg/L)_Dissolved Metals	0.181	0.144	1.256944444	1
FR_FC1	Strontium (mg/L)_Total Metals	0.182	0.148	1.22972973	1
FR_FC1	Sulphate (mg/L)_Major Ions	188	144	1.305555556	1
FR_FC1	Temperature (°C)_Field Measured	2	10.6	0.188679245	0
FR_FC1	Thallium (mg/L)_Dissolved Metals	0.00001	0.00001	1	0
FR_FC1	Thallium (mg/L)_Total Metals	0.00001	0.00001	1	0
FR_FC1	Tin (mg/L)_Dissolved Metals	0.0001	0.0001	1	0
FR_FC1	Tin (mg/L)_Total Metals	0.0001	0.00283	0.035335689	0
FR_FC1	Titanium (mg/L)_Dissolved Metals	0.01	0.015	0.666666667	0
FR_FC1	Titanium (mg/L)_Total Metals	0.01	0.016	0.625	0
FR_FC1	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	149	156	0.955128205	0
FR_FC1	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.0149	0.0076	1.960526316	1
FR_FC1	Total dissolved solids (mg/L)_Conventional Parameters	449	400	1.1225	1
FR_FC1	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.265	0.415	0.638554217	0
FR_FC1	Total organic carbon (mg/L)_Conventional Parameters	0.9	1.34	0.671641791	0
FR_FC1	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0016	0.0045	0.355555556	0
FR_FC1	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0108	0.3	0.036	0
FR_FC1	Total suspended solids (mg/L)_Conventional Parameters	6.8	6.3	1.079365079	1
FR_FC1	Turbidity (NTU)_Conventional Parameters	1.21	0.67	1.805970149	1
FR_FC1	Uranium (mg/L)_Dissolved Metals	0.00118	0.00103	1.145631068	1
FR_FC1	Uranium (mg/L)_Total Metals	0.00128	0.00106	1.20754717	1
FR_FC1	Vanadium (mg/L)_Dissolved Metals	0.0005	0.001	0.5	0
FR_FC1	Vanadium (mg/L)_Total Metals	0.0005	0.001	0.5	0
FR_FC1	Zinc (mg/L)_Dissolved Metals	0.003	0.0035	0.857142857	0
FR_FC1	Zinc (mg/L)_Total Metals	0.003	0.003	1	0
FR_FR1	Acidity, CaCO3 (mg/L)_Conventional Parameters	1.8	3.2	0.5625	0
FR_FR1	Aluminum (mg/L)_Dissolved Metals	0.0403	0.02	2.015	1
FR_FR1	Aluminum (mg/L)_Total Metals	0.277	0.429	0.645687646	0
FR_FR1	Antimony (mg/L)_Dissolved Metals	0.0001	0.00012	0.833333333	0
FR_FR1	Antimony (mg/L)_Total Metals	0.00013	0.00085	0.152941176	0
FR_FR1	Arsenic (mg/L)_Dissolved Metals	0.00017	0.00017	1	0
FR_FR1	Arsenic (mg/L)_Total Metals	0.00026	0.00032	0.8125	0
FR_FR1	Barium (mg/L)_Dissolved Metals	0.0576	0.0577	0.998266898	0
FR_FR1	Barium (mg/L)_Total Metals	0.0568	0.06	0.946666667	0
FR_FR1	Beryllium (mg/L)_Dissolved Metals	0.00002	0.0001	0.2	0
FR_FR1	Beryllium (mg/L)_Total Metals	0.00002	0.0001	0.2	0
FR_FR1	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	186	152	1.223684211	1
FR_FR1	Bismuth (mg/L)_Dissolved Metals	0.00005	0.0005	0.1	0
FR_FR1	Bismuth (mg/L)_Total Metals	0.00005	0.0005	0.1	0
FR_FR1	Boron (mg/L)_Dissolved Metals	0.01	0.011	0.909090909	0
FR_FR1	Boron (mg/L)_Total Metals	0.01	0.012	0.833333333	0
FR_FR1	Bromide (mg/L)_Major Ions	0.05	0.25	0.2	0
FR_FR1	Cadmium (mg/L)_Dissolved Metals	0.0000373	0.000029	1.286206897	1
FR_FR1	Cadmium (mg/L)_Total Metals	0.0000532	0.000063	0.844444444	0
FR_FR1	Calcium (mg/L)_Major Ions	90.3	99.4	0.908450704	0
FR_FR1	Calcium (mg/L)_Total Metals	95.6	97.5	0.980512821	0
FR_FR1	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	11.6	9.6	1.208333333	1
FR_FR1	Chloride (mg/L)_Major Ions	0.5	3.5	0.142857143	0
FR_FR1	Chromium (mg/L)_Dissolved Metals	0.00015	0.0003	0.5	0
FR_FR1	Chromium (mg/L)_Total Metals	0.00056	0.00093	0.602150538	0
FR_FR1	Cobalt (mg/L)_Dissolved Metals	0.0001	0.0001	1	0
FR_FR1	Cobalt (mg/L)_Total Metals	0.00025	0.00028	0.892857143	0
FR_FR1	Conductivity (µS/cm)_Conventional Parameters	742	684	1.084795322	1
FR_FR1	Conductivity (µS/cm)_Field Measured	656.5	633	1.037124803	1
FR_FR1	Copper (mg/L)_Dissolved Metals	0.00053	0.00054	0.981481481	0
FR_FR1	Copper (mg/L)_Total Metals	0.00278	0.0105	0.264761905	0
FR_FR1	Dissolved organic carbon (mg/L)_Conventional Parameters	2.67	2.16	1.236111111	1
FR_FR1	Dissolved Oxygen (%)_Field Measured	98.6	115	0.857391304	0
FR_FR1	Dissolved Oxygen (mg/L)_Field Measured	12.76	15.6	0.817948718	0
FR_FR1	Fluoride (mg/L)_Major Ions	0.252	0.262	0.961832061	0
FR_FR1	Hardness, as CaCO3 (mg/L)_Conventional Parameters	385	394	0.97715736	0
FR_FR1	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	2	0.5	0
FR_FR1	Iron (mg/L)_Dissolved Metals	0.011	0.03	0.366666667	0
FR_FR1	Iron (mg/L)_Total Metals	0.159	0.492	0.323170732	0
FR_FR1	Lead (mg/L)_Dissolved Metals	0.00005	0.000065	0.769230769	0
FR_FR1	Lead (mg/L)_Total Metals	0.000187	0.000382	0.489528796	0
FR_FR1	Lithium (mg/L)_Dissolved Metals	0.0105	0.0102	1.029411765	1
FR_FR1	Lithium (mg/L)_Total Metals	0.0105	0.00926	1.133909287	1
FR_FR1	Magnesium (mg/L)_Major Ions	38.8	35.3	1.099150142	1
FR_FR1	Magnesium (mg/L)_Total Metals	38.9	35.5	1.095774648	1
FR_FR1	Manganese (mg/L)_Dissolved Metals	0.00549	0.00836	0.656698565	0
FR_FR1	Manganese (mg/L)_Total Metals	0.00932	0.0221	0.421719457	0
FR_FR1	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
FR_FR1	Mercury (mg/L)_Total Metals	0.00000304	0.00001	0.304	0
FR_FR1	Methyl mercury (µg/L)_Total Metals	0.00002	0.00005	0.4	0
FR_FR1	Molybdenum (mg/L)_Dissolved Metals	0.000922	0.00103	0.895145631	0
FR_FR1	Molybdenum (mg/L)_Total Metals	0.000973	0.00106	0.917924528	0
FR_FR1	Nickel (mg/L)_Dissolved Metals	0.00191	0.00139	1.374100719	1
FR_FR1	Nickel (mg/L)_Total Metals	0.00257	0.0017	1.511764706	1
FR_FR1	Nitrate (mg-N/l)_Nutrients and Biological Indicators	7.44	11.1	0.67027027	0
FR_FR1	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.04	0.0143	2.797202797	1
FR_FR1	Oxidation-Reduction Potential (mV)_Conventional Parameters	455	510	0.892156863	0
FR_FR1	Oxidation-Reduction Potential (mV)_Field Measured	291.5	410.5	0.710109622	0
FR_FR1	pH (-)_Conventional Parameters	8.46	8.46	1	0
FR_FR1	pH (-)_Field Measured	8.86	8.93	0.992161254	0
FR_FR1	Potassium (mg/L)_Major Ions	0.961	2	0.4805	0
FR_FR1	Potassium (mg/L)_Total Metals	0.922	2	0.461	0
FR_FR1	Selenium (mg/L)_Dissolved Metals	0.0398	0.0414	0.961352657	0
FR_FR1	Selenium (mg/L)_Total Metals	0.038	0.0443	0.85778781	0
FR_FR1	Silicon (mg/L)_Dissolved Metals	1.79	1.8	0.994444444	0
FR_FR1	Silicon (mg/L)_Total Metals	2.16	2.39	0.90376569	0
FR_FR1	Silver (mg/L)_Dissolved Metals	0.00001	0.00001	1	0
FR_FR1	Silver (mg/L)_Total Metals	0.000013	0.000016	0.8125	0
FR_FR1	Sodium (mg/L)_Major Ions	0.84	2	0.42	0
FR_FR1	Sodium (mg/L)_Total Metals	0.81	2	0.405	0
FR_FR1	Strontium (mg/L)_Dissolved Metals	0.148	0.145	1.020689655	1

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
FR_FR1	Strontium (mg/L)_Total Metals	0.144	0.138	1.043478261	1
FR_FR1	Sulphate (mg/L)_Major Ions	222	196	1.132653061	1
FR_FR1	Temperature (°C)_Field Measured	10.7	14.9	0.718120805	0
FR_FR1	Thallium (mg/L)_Dissolved Metals	0.00001	0.000012	0.833333333	0
FR_FR1	Thallium (mg/L)_Total Metals	0.000013	0.000018	0.722222222	0
FR_FR1	Tin (mg/L)_Dissolved Metals	0.0001	0.0001	1	0
FR_FR1	Tin (mg/L)_Total Metals	0.00019	0.0001	1.9	1
FR_FR1	Titanium (mg/L)_Dissolved Metals	0.01	0.016	0.625	0
FR_FR1	Titanium (mg/L)_Total Metals	0.01	0.017	0.588235294	0
FR_FR1	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	186	156	1.192307692	1
FR_FR1	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.459	0.0354	12.96610169	1
FR_FR1	Total dissolved solids (mg/L)_Conventional Parameters	519	492	1.054878049	1
FR_FR1	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	1.17	0.437	2.677345538	1
FR_FR1	Total organic carbon (mg/L)_Conventional Parameters	3.91	11.7	0.334188034	0
FR_FR1	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0058	0.0043	1.348837209	1
FR_FR1	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0254	0.3	0.084666667	0
FR_FR1	Total suspended solids (mg/L)_Conventional Parameters	15.4	230	0.066956522	0
FR_FR1	Turbidity (NTU)_Conventional Parameters	22	80.2	0.274314214	0
FR_FR1	Uranium (mg/L)_Dissolved Metals	0.00162	0.00145	1.117241379	1
FR_FR1	Uranium (mg/L)_Total Metals	0.0016	0.00143	1.118881119	1
FR_FR1	Vanadium (mg/L)_Dissolved Metals	0.0005	0.001	0.5	0
FR_FR1	Vanadium (mg/L)_Total Metals	0.00109	0.0017	0.641176471	0
FR_FR1	Zinc (mg/L)_Dissolved Metals	0.003	0.003	1	0
FR_FR1	Zinc (mg/L)_Total Metals	0.0054	0.0065	0.830769231	0
FR_FR2	1-Methylnaphthalene (µg/L)_Alkylated PAHs	0.05	-	-	0
FR_FR2	2-Bromobenzotrifluoride (%)_Unknown	90.7	-	-	0
FR_FR2	2-Methylnaphthalene (µg/L)_Alkylated PAHs	0.02	-	-	0
FR_FR2	Acenaphthene (%)_Parent PAHs	117.4	-	-	0
FR_FR2	Acenaphthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_FR2	Acenaphthylene (µg/L)_Parent PAHs	0.01	-	-	0
FR_FR2	Acidity, CaCO3 (mg/L)_Conventional Parameters	7.3	4	1.825	1
FR_FR2	Acridine (µg/L)_Parent PAHs	0.02	-	-	0
FR_FR2	Aluminum (mg/L)_Dissolved Metals	0.111	0.0224	4.955357143	1
FR_FR2	Aluminum (mg/L)_Total Metals	0.618	1.97	0.313705584	0
FR_FR2	Anthracene (µg/L)_Parent PAHs	0.01	-	-	0
FR_FR2	Antimony (mg/L)_Dissolved Metals	0.00051	0.00047	1.085106383	1
FR_FR2	Antimony (mg/L)_Total Metals	0.00053	0.00053	1	0
FR_FR2	Arsenic (mg/L)_Dissolved Metals	0.0005	0.00018	2.777777778	1
FR_FR2	Arsenic (mg/L)_Total Metals	0.0005	0.00128	0.390625	0
FR_FR2	Barium (mg/L)_Dissolved Metals	0.118	0.106	1.113207547	1
FR_FR2	Barium (mg/L)_Total Metals	0.11	0.138	0.797101449	0
FR_FR2	Benzo(a)anthracene (µg/L)_Parent PAHs	0.01	-	-	0
FR_FR2	Benzo(a)pyrene (µg/L)_Parent PAHs	0.005	-	-	0
FR_FR2	Benzo(b,j)fluoranthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_FR2	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	0.01	-	-	0
FR_FR2	Benzo(k)fluoranthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_FR2	Beryllium (mg/L)_Dissolved Metals	0.0001	0.00011	0.909090909	0
FR_FR2	Beryllium (mg/L)_Total Metals	0.0001	0.00015	0.666666667	0
FR_FR2	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	321	231	1.38961039	1
FR_FR2	Bismuth (mg/L)_Dissolved Metals	0.00025	0.0005	0.5	0
FR_FR2	Bismuth (mg/L)_Total Metals	0.00025	0.0005	0.5	0
FR_FR2	Boron (mg/L)_Dissolved Metals	0.05	0.016	3.125	1
FR_FR2	Boron (mg/L)_Total Metals	0.05	0.019	2.631578947	1
FR_FR2	Bromide (mg/L)_Major Ions	0.25	0.5	0.5	0
FR_FR2	Cadmium (mg/L)_Dissolved Metals	0.000118	0.000195	0.605128205	0
FR_FR2	Cadmium (mg/L)_Total Metals	0.000201	0.000574	0.350174216	0
FR_FR2	Calcium (mg/L)_Major Ions	146	143	1.020979021	1
FR_FR2	Calcium (mg/L)_Total Metals	146	141	1.035460993	1
FR_FR2	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	16.2	14	1.157142857	1
FR_FR2	Chloride (mg/L)_Major Ions	2.5	4.8	0.520833333	0
FR_FR2	Chromium (mg/L)_Dissolved Metals	0.0006	0.00021	2.857142857	1
FR_FR2	Chromium (mg/L)_Total Metals	0.00142	0.00575	0.246956522	0
FR_FR2	Chrysene (%)_Parent PAHs	112	-	-	0
FR_FR2	Chrysene (µg/L)_Parent PAHs	0.01	-	-	0
FR_FR2	Cobalt (mg/L)_Dissolved Metals	0.0005	0.00036	1.388888889	1
FR_FR2	Cobalt (mg/L)_Total Metals	0.0005	0.0015	0.333333333	0
FR_FR2	Conductivity (µS/cm)_Conventional Parameters	1130	1060	1.066037736	1
FR_FR2	Conductivity (µS/cm)_Field Measured	1027	1070	0.959813084	0
FR_FR2	Copper (mg/L)_Dissolved Metals	0.001	0.00076	1.315789474	1
FR_FR2	Copper (mg/L)_Total Metals	0.00808	0.00385	2.098701299	1
FR_FR2	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	0.005	-	-	0
FR_FR2	Dissolved organic carbon (mg/L)_Conventional Parameters	3.33	2.94	1.132653061	1
FR_FR2	Dissolved Oxygen (%)_Field Measured	105.6	110.7	0.953929539	0
FR_FR2	Dissolved Oxygen (mg/L)_Field Measured	12.75	15.18	0.839920949	0
FR_FR2	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_FR2	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_FR2	Fluoranthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_FR2	Fluorene (µg/L)_Parent PAHs	0.01	-	-	0
FR_FR2	Fluoride (mg/L)_Major Ions	0.24	0.35	0.685714286	0
FR_FR2	Hardness, as CaCO3 (mg/L)_Conventional Parameters	627	612	1.024509804	1
FR_FR2	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	2	0.5	0
FR_FR2	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	0.01	-	-	0
FR_FR2	Iron (mg/L)_Dissolved Metals	0.127	0.04	3.175	1
FR_FR2	Iron (mg/L)_Total Metals	0.559	2.9	0.192758621	0
FR_FR2	Lead (mg/L)_Dissolved Metals	0.00025	0.000062	4.032258065	1
FR_FR2	Lead (mg/L)_Total Metals	0.000436	0.00213	0.204694836	0
FR_FR2	Lithium (mg/L)_Dissolved Metals	0.0606	0.0669	0.905829596	0
FR_FR2	Lithium (mg/L)_Total Metals	0.0628	0.0664	0.945783133	0
FR_FR2	Magnesium (mg/L)_Major Ions	63.6	63.1	1.00792393	1
FR_FR2	Magnesium (mg/L)_Total Metals	68.1	64.6	1.054179567	1
FR_FR2	Manganese (mg/L)_Dissolved Metals	0.029	0.04	0.725	0
FR_FR2	Manganese (mg/L)_Total Metals	0.033	0.274	0.120437956	0
FR_FR2	Mercury (mg/L)_Dissolved Metals	0.000005	0.00005	0.1	0
FR_FR2	Mercury (mg/L)_Total Metals	0.000005	0.0000107	0.46728972	0
FR_FR2	Methyl mercury (µg/L)_Total Metals	0.000032	0.00005	0.64	0
FR_FR2	Molybdenum (mg/L)_Dissolved Metals	0.00254	0.00258	0.984496124	0
FR_FR2	Molybdenum (mg/L)_Total Metals	0.00253	0.00295	0.857627119	0
FR_FR2	Naphthalene (µg/L)_Parent PAHs	0.05	-	-	0
FR_FR2	Nickel (mg/L)_Dissolved Metals	0.00969	0.00579	1.67357513	1
FR_FR2	Nickel (mg/L)_Total Metals	0.00967	0.0121	0.799173554	0
FR_FR2	Nitrate (mg-N/l)_Nutrients and Biological Indicators	24.2	24.2	1	0
FR_FR2	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0173	0.039	0.443589744	0
FR_FR2	Oxidation-Reduction Potential (mV)_Conventional Parameters	472	511	0.923679061	0
FR_FR2	Oxidation-Reduction Potential (mV)_Field Measured	281.2	977	0.287819857	0
FR_FR2	pH (-)_Conventional Parameters	8.61	8.51	1.011750881	1
FR_FR2	pH (-)_Field Measured	8.96	8.73	1.026345934	1
FR_FR2	Phenanthrene (%)_Parent PAHs	112.8	-	-	0
FR_FR2	Phenanthrene (µg/L)_Parent PAHs	0.02	-	-	0
FR_FR2	Potassium (mg/L)_Major Ions	2.39	2.22	1.076576577	1
FR_FR2	Potassium (mg/L)_Total Metals	2.23	2.28	0.978070175	0
FR_FR2	Pyrene (µg/L)_Parent PAHs	0.01	-	-	0
FR_FR2	Quinoline (µg/L)_Parent PAHs	0.05	-	-	0
FR_FR2	Selenium (mg/L)_Dissolved Metals	0.0703	0.0557	1.262118492	1
FR_FR2	Selenium (mg/L)_Total Metals	0.0718	0.0576	1.246527778	1
FR_FR2	Silicon (mg/L)_Dissolved Metals	2.2	2.08	1.057692308	1
FR_FR2	Silicon (mg/L)_Total Metals	2.95	5.45	0.541284404	0
FR_FR2	Silver (mg/L)_Dissolved Metals	0.00005	0.00001	5	1
FR_FR2	Silver (mg/L)_Total Metals	0.00005	0.000057	0.877192982	0
FR_FR2	Sodium (mg/L)_Major Ions	3.09	4	0.7725	0
FR_FR2	Sodium (mg/L)_Total Metals	3.19	4.1	0.77804878	0
FR_FR2	Strontium (mg/L)_Dissolved Metals	0.226	0.214	1.056074766	1
FR_FR2	Strontium (mg/L)_Total Metals	0.216	0.216	1	0
FR_FR2	Sulphate (mg/L)_Major Ions	317	296	1.070945946	1
FR_FR2	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	0.5	0.5	1	0
FR_FR2	Temperature (°C)_Field Measured	13	13.8	0.942028986	0
FR_FR2	Thallium (mg/L)_Dissolved Metals	0.00005	0.000023	2.173913043	1
FR_FR2	Thallium (mg/L)_Total Metals	0.00005	0.000111	0.45045045	0
FR_FR2	Tin (mg/L)_Dissolved Metals	0.0005	0.00014	3.571428571	1
FR_FR2	Tin (mg/L)_Total Metals	0.0005	0.00113	0.442477876	0
FR_FR2	Titanium (mg/L)_Dissolved Metals	0.01	0.021	0.476190476	0
FR_FR2	Titanium (mg/L)_Total Metals	0.021	0.052	0.403846154	0
FR_FR2	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	321	231	1.38961039	1
FR_FR2	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.0574	0.121	0.474380165	0
FR_FR2	Total dissolved solids (mg/L)_Conventional Parameters	861	788	1.092639594	1
FR_FR2	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_FR2	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.705	1.24	0.568548387	0
FR_FR2	Total organic carbon (mg/L)_Conventional Parameters	8.48	12.2	0.695081967	0
FR_FR2	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0041	0.0156	0.262820513	0
FR_FR2	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0434	0.3	0.144666667	0
FR_FR2	Total suspended solids (mg/L)_Conventional Parameters	70.4	8080	0.008712871	0
FR_FR2	Total Suspended Solids (mg/L)_Field Measured	27.6	-	-	0
FR_FR2	Turbidity (NTU)_Conventional Parameters	71.5	706	0.101274788	0
FR_FR2	Uranium (mg/L)_Dissolved Metals	0.00423	0.00373	1.134048257	1
FR_FR2	Uranium (mg/L)_Total Metals	0.00452	0.00385	1.174025974	1
FR_FR2	Vanadium (mg/L)_Dissolved Metals	0.0025	0.001	2.5	1
FR_FR2	Vanadium (mg/L)_Total Metals	0.00399	0.0099	0.403030303	0

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
FR_FR2	Zinc (mg/L)_Dissolved Metals	0.005	0.0052	0.961538462	0
FR_FR2	Zinc (mg/L)_Total Metals	0.015	0.0374	0.401069519	0
FR_FR3	Acidity, CaCO3 (mg/L)_Conventional Parameters	2.7	1.6	1.6875	1
FR_FR3	Aluminum (mg/L)_Dissolved Metals	0.0116	0.0207	0.560386473	0
FR_FR3	Aluminum (mg/L)_Total Metals	0.456	2.17	0.210138249	0
FR_FR3	Antimony (mg/L)_Dissolved Metals	0.0003	0.00024	1.25	1
FR_FR3	Antimony (mg/L)_Total Metals	0.00031	0.00034	0.911764706	0
FR_FR3	Arsenic (mg/L)_Dissolved Metals	0.00013	0.00019	0.684210526	0
FR_FR3	Arsenic (mg/L)_Total Metals	0.00046	0.00152	0.302631579	0
FR_FR3	Barium (mg/L)_Dissolved Metals	0.111	0.0844	1.315165877	1
FR_FR3	Barium (mg/L)_Total Metals	0.106	0.0993	1.067472306	1
FR_FR3	Beryllium (mg/L)_Dissolved Metals	0.00002	0.0001	0.2	0
FR_FR3	Beryllium (mg/L)_Total Metals	0.000045	0.00016	0.28125	0
FR_FR3	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	223	197	1.131979695	1
FR_FR3	Bismuth (mg/L)_Dissolved Metals	0.00005	0.0005	0.1	0
FR_FR3	Bismuth (mg/L)_Total Metals	0.0001	0.0005	0.2	0
FR_FR3	Boron (mg/L)_Dissolved Metals	0.014	0.012	1.166666667	1
FR_FR3	Boron (mg/L)_Total Metals	0.02	0.014	1.428571429	1
FR_FR3	Bromide (mg/L)_Major Ions	0.25	0.5	0.5	0
FR_FR3	Cadmium (mg/L)_Dissolved Metals	0.000108	0.000075	1.44	1
FR_FR3	Cadmium (mg/L)_Total Metals	0.000223	0.000443	0.503386005	0
FR_FR3	Calcium (mg/L)_Major Ions	152	104	1.461538462	1
FR_FR3	Calcium (mg/L)_Total Metals	133	108	1.231481481	1
FR_FR3	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	13.4	2.4	5.583333333	1
FR_FR3	Chloride (mg/L)_Major Ions	2.5	2.3	1.086956522	1
FR_FR3	Chromium (mg/L)_Dissolved Metals	0.0001	0.00012	0.833333333	0
FR_FR3	Chromium (mg/L)_Total Metals	0.00145	0.00389	0.372750643	0
FR_FR3	Cobalt (mg/L)_Dissolved Metals	0.00016	0.00015	1.066666667	1
FR_FR3	Cobalt (mg/L)_Total Metals	0.00045	0.00197	0.228426396	0
FR_FR3	Conductivity (µmhos/cm)_Conventional Parameters	458	-	-	0
FR_FR3	Conductivity (µS/cm)_Conventional Parameters	1050	749	1.401869159	1
FR_FR3	Conductivity (µS/cm)_Field Measured	985	970	1.015463918	1
FR_FR3	Copper (mg/L)_Dissolved Metals	0.0005	0.00051	0.980392157	0
FR_FR3	Copper (mg/L)_Total Metals	0.00162	0.00439	0.369020501	0
FR_FR3	Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility (%)_Toxicity	0	-	-	0
FR_FR3	Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	0	-	-	0
FR_FR3	Dissolved organic carbon (mg/L)_Conventional Parameters	3.2	2.36	1.355932203	1
FR_FR3	Dissolved Oxygen (%)_Field Measured	102.4	105	0.975238095	0
FR_FR3	Dissolved Oxygen (mg/L)_Field Measured	14.39	13.81	1.041998552	1
FR_FR3	Fluoride (mg/L)_Major Ions	0.227	0.21	1.080952381	1
FR_FR3	Hardness, as CaCO3 (mg/L)_Conventional Parameters	659	454	1.45154185	1
FR_FR3	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	1	1	0
FR_FR3	Iron (mg/L)_Dissolved Metals	0.014	0.03	0.466666667	0
FR_FR3	Iron (mg/L)_Total Metals	0.645	3.52	0.183238636	0
FR_FR3	Lead (mg/L)_Dissolved Metals	0.00005	0.00005	1	0
FR_FR3	Lead (mg/L)_Total Metals	0.000586	0.00265	0.221132075	0
FR_FR3	Lithium (mg/L)_Dissolved Metals	0.0559	0.0293	1.907849829	1
FR_FR3	Lithium (mg/L)_Total Metals	0.0567	0.0339	1.672566372	1
FR_FR3	Magnesium (mg/L)_Major Ions	68.1	47	1.44893617	1
FR_FR3	Magnesium (mg/L)_Total Metals	63.3	49.1	1.289205703	1
FR_FR3	Manganese (mg/L)_Dissolved Metals	0.0209	0.0147	1.421768707	1
FR_FR3	Manganese (mg/L)_Total Metals	0.0546	0.147	0.371428571	0
FR_FR3	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
FR_FR3	Mercury (mg/L)_Total Metals	0.00000504	0.00001	0.504	0
FR_FR3	Molybdenum (mg/L)_Dissolved Metals	0.00172	0.00131	1.312977099	1
FR_FR3	Molybdenum (mg/L)_Total Metals	0.0016	0.00148	1.081081081	1
FR_FR3	Nickel (mg/L)_Dissolved Metals	0.00481	0.00336	1.431547619	1
FR_FR3	Nickel (mg/L)_Total Metals	0.00588	0.01	0.588	0
FR_FR3	Nitrate (mg-N/l)_Nutrients and Biological Indicators	22.1	10.2	2.166666667	1
FR_FR3	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0158	0.023	0.686956522	0
FR_FR3	Oxidation-Reduction Potential (mV)_Conventional Parameters	441	433	1.018475751	1
FR_FR3	Oxidation-Reduction Potential (mV)_Field Measured	260.1	250.2	1.039568345	1
FR_FR3	pH (-)_Conventional Parameters	8.46	8.33	1.015606242	1
FR_FR3	pH (-)_Field Measured	8.53	8.53	1	0
FR_FR3	Potassium (mg/L)_Major Ions	2.3	2	1.15	1
FR_FR3	Potassium (mg/L)_Total Metals	2.06	2	1.03	1
FR_FR3	Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	0	-	-	0
FR_FR3	Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed (%)_Toxicity	0	-	-	0
FR_FR3	Selenium (mg/L)_Dissolved Metals	0.0543	0.0449	1.20935412	1
FR_FR3	Selenium (mg/L)_Total Metals	0.0592	0.0458	1.292576419	1
FR_FR3	Silicon (mg/L)_Dissolved Metals	2.04	1.79	1.139664804	1
FR_FR3	Silicon (mg/L)_Total Metals	2.52	5.4	0.466666667	0
FR_FR3	Silver (mg/L)_Dissolved Metals	0.00001	0.00001	1	0
FR_FR3	Silver (mg/L)_Total Metals	0.000028	0.000066	0.424242424	0
FR_FR3	Sodium (mg/L)_Major Ions	3.1	2.1	1.476190476	1
FR_FR3	Sodium (mg/L)_Total Metals	2.81	2.2	1.277272727	1
FR_FR3	Strontium (mg/L)_Dissolved Metals	0.225	0.151	1.490066225	1
FR_FR3	Strontium (mg/L)_Total Metals	0.219	0.171	1.280701754	1
FR_FR3	Sulphate (mg/L)_Major Ions	298	218	1.366972477	1
FR_FR3	Temperature (°C)_Field Measured	12.9	16.4	0.786585366	0
FR_FR3	Thallium (mg/L)_Dissolved Metals	0.000011	0.000011	1	0
FR_FR3	Thallium (mg/L)_Total Metals	0.000038	0.000091	0.417582418	0
FR_FR3	Tin (mg/L)_Dissolved Metals	0.0001	0.0001	1	0
FR_FR3	Tin (mg/L)_Total Metals	0.0002	0.0001	2	1
FR_FR3	Titanium (mg/L)_Dissolved Metals	0.01	0.013	0.769230769	0
FR_FR3	Titanium (mg/L)_Total Metals	0.01	0.043	0.23255814	0
FR_FR3	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	223	197	1.131979695	1
FR_FR3	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.184	0.0378	4.867724868	1
FR_FR3	Total dissolved solids (mg/L)_Conventional Parameters	783	572	1.368881119	1
FR_FR3	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.669	0.126	5.30952381	1
FR_FR3	Total organic carbon (mg/L)_Conventional Parameters	5.58	11.7	0.476923077	0
FR_FR3	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0027	0.0035	0.771428571	0
FR_FR3	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0485	0.321	0.151090343	0
FR_FR3	Total suspended solids (mg/L)_Conventional Parameters	25.4	241	0.105394191	0
FR_FR3	Turbidity (NTU)_Conventional Parameters	29.2	56.7	0.514991182	0
FR_FR3	Uranium (mg/L)_Dissolved Metals	0.00415	0.00238	1.743697479	1
FR_FR3	Uranium (mg/L)_Total Metals	0.00438	0.00262	1.671755725	1
FR_FR3	Vanadium (mg/L)_Dissolved Metals	0.0005	0.001	0.5	0
FR_FR3	Vanadium (mg/L)_Total Metals	0.0037	0.0087	0.425287356	0
FR_FR3	Zinc (mg/L)_Dissolved Metals	0.0032	0.003	1.066666667	1
FR_FR3	Zinc (mg/L)_Total Metals	0.0129	0.0297	0.434343434	0
FR_FR4	Acidity, CaCO3 (mg/L)_Conventional Parameters	3.9	5.1	0.764705882	0
FR_FR4	Aluminum (mg/L)_Dissolved Metals	0.0103	0.0177	0.581920904	0
FR_FR4	Aluminum (mg/L)_Total Metals	1.56	1.53	1.019607843	1
FR_FR4	Antimony (mg/L)_Dissolved Metals	0.0003	0.00046	0.652173913	0
FR_FR4	Antimony (mg/L)_Total Metals	0.00031	0.00051	0.607843137	0
FR_FR4	Arsenic (mg/L)_Dissolved Metals	0.00013	0.00015	0.866666667	0
FR_FR4	Arsenic (mg/L)_Total Metals	0.00045	0.001	0.45	0
FR_FR4	Barium (mg/L)_Dissolved Metals	0.127	0.101	1.257425743	1
FR_FR4	Barium (mg/L)_Total Metals	0.101	0.109	0.926605505	0
FR_FR4	Beryllium (mg/L)_Dissolved Metals	0.00002	0.0001	0.2	0
FR_FR4	Beryllium (mg/L)_Total Metals	0.000065	0.00012	0.541666667	0
FR_FR4	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	239	234	1.021367521	1
FR_FR4	Bismuth (mg/L)_Dissolved Metals	0.00005	0.0005	0.1	0
FR_FR4	Bismuth (mg/L)_Total Metals	0.00005	0.0005	0.1	0
FR_FR4	Boron (mg/L)_Dissolved Metals	0.017	0.017	1	0
FR_FR4	Boron (mg/L)_Total Metals	0.014	0.019	0.736842105	0
FR_FR4	Bromide (mg/L)_Major Ions	0.25	0.5	0.5	0
FR_FR4	Cadmium (mg/L)_Dissolved Metals	0.000124	0.000158	0.784810127	0
FR_FR4	Cadmium (mg/L)_Total Metals	0.000197	0.000514	0.383268482	0
FR_FR4	Calcium (mg/L)_Major Ions	163	160	1.01875	1
FR_FR4	Calcium (mg/L)_Total Metals	141	157	0.898089172	0
FR_FR4	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	15.4	15.8	0.974683544	0
FR_FR4	Chloride (mg/L)_Major Ions	2.5	4.7	0.531914894	0
FR_FR4	Chromium (mg/L)_Dissolved Metals	0.00012	0.00028	0.428571429	0
FR_FR4	Chromium (mg/L)_Total Metals	0.00293	0.00285	1.028070175	1
FR_FR4	Cobalt (mg/L)_Dissolved Metals	0.00018	0.00028	0.642857143	0
FR_FR4	Cobalt (mg/L)_Total Metals	0.00051	0.00206	0.247572816	0
FR_FR4	Conductivity (µS/cm)_Conventional Parameters	1130	1170	0.965811966	0
FR_FR4	Conductivity (µS/cm)_Field Measured	1188	1100	1.08	1
FR_FR4	Copper (mg/L)_Dissolved Metals	0.0005	0.0005	1	0
FR_FR4	Copper (mg/L)_Total Metals	0.00159	0.00958	0.165970772	0
FR_FR4	Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility (%)_Toxicity	0	-	-	0
FR_FR4	Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	0	-	-	0
FR_FR4	Dissolved organic carbon (mg/L)_Conventional Parameters	3.18	8.41	0.378121284	0
FR_FR4	Dissolved Oxygen (%)_Field Measured	93.7	124.8	0.750801282	0
FR_FR4	Dissolved Oxygen (mg/L)_Field Measured	12.15	15.65	0.776357827	0
FR_FR4	Fluoride (mg/L)_Major Ions	0.24	0.34	0.705882353	0
FR_FR4	Hardness, as CaCO3 (mg/L)_Conventional Parameters	712	744	0.956989247	0
FR_FR4	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	1	1	0
FR_FR4	Iron (mg/L)_Dissolved Metals	0.011	0.03	0.366666667	0
FR_FR4	Iron (mg/L)_Total Metals	0.817	2.37	0.344725738	0
FR_FR4	Lead (mg/L)_Dissolved Metals	0.00005	0.00005	1	0
FR_FR4	Lead (mg/L)_Total Metals	0.000519	0.00172	0.301744186	0
FR_FR4	Lithium (mg/L)_Dissolved Metals	0.0677	0.0607	1.115321252	1
FR_FR4	Lithium (mg/L)_Total Metals	0.0648	0.0623	1.040128411	1

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
FR_FR4	Magnesium (mg/L)_Major Ions	74.2	83.9	0.884386174	0
FR_FR4	Magnesium (mg/L)_Total Metals	66.3	81.3	0.815498155	0
FR_FR4	Manganese (mg/L)_Dissolved Metals	0.0187	0.019	0.984210526	0
FR_FR4	Manganese (mg/L)_Total Metals	0.0365	0.196	0.18622449	0
FR_FR4	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
FR_FR4	Mercury (mg/L)_Total Metals	0.00000497	0.00001	0.497	0
FR_FR4	Molybdenum (mg/L)_Dissolved Metals	0.00198	0.00255	0.776470588	0
FR_FR4	Molybdenum (mg/L)_Total Metals	0.00181	0.00295	0.613559322	0
FR_FR4	Nickel (mg/L)_Dissolved Metals	0.00522	0.00845	0.617751479	0
FR_FR4	Nickel (mg/L)_Total Metals	0.00692	0.0128	0.540625	0
FR_FR4	Nitrate (mg-N/l)_Nutrients and Biological Indicators	22.9	24.7	0.927125506	0
FR_FR4	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0168	0.043	0.390697674	0
FR_FR4	Oxidation-Reduction Potential (mV)_Conventional Parameters	456	505	0.902970297	0
FR_FR4	Oxidation-Reduction Potential (mV)_Field Measured	313.1	1054	0.297058824	0
FR_FR4	pH (-)_Conventional Parameters	8.51	8.48	1.003537736	1
FR_FR4	pH (-)_Field Measured	8.63	9.42	0.916135881	0
FR_FR4	Potassium (mg/L)_Major Ions	2.84	2.6	1.092307692	1
FR_FR4	Potassium (mg/L)_Total Metals	2.33	2.5	0.932	0
FR_FR4	Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	0	-	-	0
FR_FR4	Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed (%)_Toxicity	0	-	-	0
FR_FR4	Selenium (mg/L)_Dissolved Metals	0.0875	0.111	0.788288288	0
FR_FR4	Selenium (mg/L)_Total Metals	0.0824	0.105	0.784761905	0
FR_FR4	Silicon (mg/L)_Dissolved Metals	2.23	2.15	1.037209302	1
FR_FR4	Silicon (mg/L)_Total Metals	4.88	4.44	1.099099099	1
FR_FR4	Silver (mg/L)_Dissolved Metals	0.00001	0.00001	1	0
FR_FR4	Silver (mg/L)_Total Metals	0.000026	0.000044	0.590909091	0
FR_FR4	Sodium (mg/L)_Major Ions	3.19	3.5	0.911428571	0
FR_FR4	Sodium (mg/L)_Total Metals	2.9	3.6	0.805555556	0
FR_FR4	Strontium (mg/L)_Dissolved Metals	0.252	0.203	1.24137931	1
FR_FR4	Strontium (mg/L)_Total Metals	0.233	0.211	1.104265403	1
FR_FR4	Sulphate (mg/L)_Major Ions	354	423	0.836879433	0
FR_FR4	Temperature (°C)_Field Measured	12.3	16.4	0.75	0
FR_FR4	Thallium (mg/L)_Dissolved Metals	0.000011	0.000014	0.785714286	0
FR_FR4	Thallium (mg/L)_Total Metals	0.00005	0.000068	0.735294118	0
FR_FR4	Tin (mg/L)_Dissolved Metals	0.0001	0.00011	0.909090909	0
FR_FR4	Tin (mg/L)_Total Metals	0.0001	0.00033	0.303030303	0
FR_FR4	Titanium (mg/L)_Dissolved Metals	0.01	0.024	0.416666667	0
FR_FR4	Titanium (mg/L)_Total Metals	0.051	0.038	1.342105263	1
FR_FR4	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	239	240	0.995833333	0
FR_FR4	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.0777	0.118	0.658474576	0
FR_FR4	Total dissolved solids (mg/L)_Conventional Parameters	851	957	0.8892372	0
FR_FR4	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.85	2.5	0.34	0
FR_FR4	Total organic carbon (mg/L)_Conventional Parameters	4.67	10.2	0.457843137	0
FR_FR4	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0029	0.0041	0.707317073	0
FR_FR4	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0514	0.3	0.171333333	0
FR_FR4	Total suspended solids (mg/L)_Conventional Parameters	29.3	152	0.192763158	0
FR_FR4	Turbidity (NTU)_Conventional Parameters	30.1	63.5	0.474015748	0
FR_FR4	Turbidity (NTU)_Field Measured	0.75	-	-	0
FR_FR4	Uranium (mg/L)_Dissolved Metals	0.00457	0.00441	1.036281179	1
FR_FR4	Uranium (mg/L)_Total Metals	0.00447	0.00432	1.034722222	1
FR_FR4	Vanadium (mg/L)_Dissolved Metals	0.0005	0.001	0.5	0
FR_FR4	Vanadium (mg/L)_Total Metals	0.00753	0.0066	1.140909091	1
FR_FR4	Zinc (mg/L)_Dissolved Metals	0.0034	0.0059	0.576271186	0
FR_FR4	Zinc (mg/L)_Total Metals	0.0161	0.0266	0.605263158	0
FR_FR5	Acidity, CaCO3 (mg/L)_Conventional Parameters	3.1	33.3	0.093093093	0
FR_FR5	Aluminum (mg/L)_Dissolved Metals	0.005	0.0157	0.318471338	0
FR_FR5	Aluminum (mg/L)_Total Metals	0.137	0.392	0.349489796	0
FR_FR5	Antimony (mg/L)_Dissolved Metals	0.0005	0.0005	1	0
FR_FR5	Antimony (mg/L)_Total Metals	0.00015	0.0005	0.3	0
FR_FR5	Arsenic (mg/L)_Dissolved Metals	0.0005	0.0005	1	0
FR_FR5	Arsenic (mg/L)_Total Metals	0.00017	0.0005	0.34	0
FR_FR5	Barium (mg/L)_Dissolved Metals	0.145	0.172	0.843023256	0
FR_FR5	Barium (mg/L)_Total Metals	0.146	0.175	0.834285714	0
FR_FR5	Beryllium (mg/L)_Dissolved Metals	0.0001	0.0001	1	0
FR_FR5	Beryllium (mg/L)_Total Metals	0.00002	0.0001	0.2	0
FR_FR5	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	232	220	1.054545455	1
FR_FR5	Bismuth (mg/L)_Dissolved Metals	0.00025	0.0005	0.5	0
FR_FR5	Bismuth (mg/L)_Total Metals	0.00005	0.0005	0.1	0
FR_FR5	Boron (mg/L)_Dissolved Metals	0.05	0.05	1	0
FR_FR5	Boron (mg/L)_Total Metals	0.013	0.05	0.26	0
FR_FR5	Bromide (mg/L)_Major Ions	0.25	0.5	0.5	0
FR_FR5	Cadmium (mg/L)_Dissolved Metals	0.0000494	0.00006	0.823333333	0
FR_FR5	Cadmium (mg/L)_Total Metals	0.0000833	0.000139	0.599280576	0
FR_FR5	Calcium (mg/L)_Major Ions	168	138	1.217391304	1
FR_FR5	Calcium (mg/L)_Total Metals	148	139	1.064748201	1
FR_FR5	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	12.4	17	0.729411765	0
FR_FR5	Chloride (mg/L)_Major Ions	3.8	4.4	0.863636364	0
FR_FR5	Chromium (mg/L)_Dissolved Metals	0.0005	0.0005	1	0
FR_FR5	Chromium (mg/L)_Total Metals	0.00245	0.0008	3.0625	1
FR_FR5	Cobalt (mg/L)_Dissolved Metals	0.0005	0.0005	1	0
FR_FR5	Cobalt (mg/L)_Total Metals	0.00026	0.0005	0.52	0
FR_FR5	Conductivity (µS/cm)_Conventional Parameters	1120	1020	1.098039216	1
FR_FR5	Conductivity (µS/cm)_Field Measured	982	1026	0.95711501	0
FR_FR5	Copper (mg/L)_Dissolved Metals	0.001	0.001	1	0
FR_FR5	Copper (mg/L)_Total Metals	0.00097	0.0025	0.388	0
FR_FR5	Dissolved organic carbon (mg/L)_Conventional Parameters	1.82	1.92	0.947916667	0
FR_FR5	Dissolved Oxygen (%)_Field Measured	94.7	107.5	0.880930233	0
FR_FR5	Dissolved Oxygen (mg/L)_Field Measured	12.79	15.15	0.844224422	0
FR_FR5	Fluoride (mg/L)_Major Ions	0.2	0.32	0.625	0
FR_FR5	Hardness, as CaCO3 (mg/L)_Conventional Parameters	728	573	1.270506108	1
FR_FR5	Hydrogen Sulphide (mg/L)_Major Ions	0.021	0.0016	13.125	1
FR_FR5	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	1	1	0
FR_FR5	Iron (mg/L)_Dissolved Metals	0.05	0.05	1	0
FR_FR5	Iron (mg/L)_Total Metals	0.215	0.56	0.383928571	0
FR_FR5	Lead (mg/L)_Dissolved Metals	0.00025	0.00025	1	0
FR_FR5	Lead (mg/L)_Total Metals	0.000146	0.000366	0.398907104	0
FR_FR5	Lithium (mg/L)_Dissolved Metals	0.0327	0.0297	1.101010101	1
FR_FR5	Lithium (mg/L)_Total Metals	0.0289	0.0293	0.986348123	0
FR_FR5	Magnesium (mg/L)_Major Ions	74.8	55.8	1.340501792	1
FR_FR5	Magnesium (mg/L)_Total Metals	66.7	57.5	1.16	1
FR_FR5	Manganese (mg/L)_Dissolved Metals	0.00275	0.00433	0.635103926	0
FR_FR5	Manganese (mg/L)_Total Metals	0.0116	0.0252	0.46031746	0
FR_FR5	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
FR_FR5	Mercury (mg/L)_Total Metals	0.00000151	0.00001	0.151	0
FR_FR5	Molybdenum (mg/L)_Dissolved Metals	0.00102	0.00141	0.723404255	0
FR_FR5	Molybdenum (mg/L)_Total Metals	0.00102	0.00146	0.698630137	0
FR_FR5	Nickel (mg/L)_Dissolved Metals	0.0025	0.00353	0.708215297	0
FR_FR5	Nickel (mg/L)_Total Metals	0.00305	0.0124	0.245967742	0
FR_FR5	Nitrate (mg-N/l)_Nutrients and Biological Indicators	20.8	24.6	0.845528455	0
FR_FR5	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.014	0.021	0.666666667	0
FR_FR5	Oxidation-Reduction Potential (mV)_Conventional Parameters	532	521	1.021113244	1
FR_FR5	Oxidation-Reduction Potential (mV)_Field Measured	289.8	1039	0.27892204	0
FR_FR5	pH (-)_Conventional Parameters	8.48	8.47	1.001180638	1
FR_FR5	pH (-)_Field Measured	8.38	9.29	0.90204521	0
FR_FR5	Potassium (mg/L)_Major Ions	1.83	2	0.915	0
FR_FR5	Potassium (mg/L)_Total Metals	1.63	2	0.815	0
FR_FR5	Selenium (mg/L)_Dissolved Metals	0.0988	0.0857	1.15285881	1
FR_FR5	Selenium (mg/L)_Total Metals	0.0818	0.0849	0.963486455	0
FR_FR5	Silicon (mg/L)_Dissolved Metals	2.5	2.34	1.068376068	1
FR_FR5	Silicon (mg/L)_Total Metals	2.57	2.46	1.044715447	1
FR_FR5	Silver (mg/L)_Dissolved Metals	0.00005	0.00005	1	0
FR_FR5	Silver (mg/L)_Total Metals	0.00002	0.0001	0.2	0
FR_FR5	Sodium (mg/L)_Major Ions	3.57	2.7	1.322222222	1
FR_FR5	Sodium (mg/L)_Total Metals	3.06	2.8	1.092857143	1
FR_FR5	Strontium (mg/L)_Dissolved Metals	0.221	0.197	1.121827411	1
FR_FR5	Strontium (mg/L)_Total Metals	0.189	0.197	0.959390863	0
FR_FR5	Sulphate (mg/L)_Major Ions	353	289	1.221453287	1
FR_FR5	Sulphide (mg/L)_Major Ions	0.02	0.0021	9.523809524	1
FR_FR5	Temperature (°C)_Field Measured	10.3	8.8	1.170454545	1
FR_FR5	Thallium (mg/L)_Dissolved Metals	0.00005	0.00005	1	0
FR_FR5	Thallium (mg/L)_Total Metals	0.00001	0.00005	0.2	0
FR_FR5	Tin (mg/L)_Dissolved Metals	0.0005	0.0005	1	0
FR_FR5	Tin (mg/L)_Total Metals	0.0001	0.0005	0.2	0
FR_FR5	Titanium (mg/L)_Dissolved Metals	0.01	0.023	0.434782609	0
FR_FR5	Titanium (mg/L)_Total Metals	0.01	0.023	0.434782609	0
FR_FR5	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	232	222	1.045045045	1
FR_FR5	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.243	0.016	15.1875	1
FR_FR5	Total dissolved solids (mg/L)_Conventional Parameters	870	769	1.131339402	1
FR_FR5	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.513	0.676	0.75887574	0
FR_FR5	Total organic carbon (mg/L)_Conventional Parameters	2.3	3.32	0.692771084	0
FR_FR5	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0034	0.0031	1.096774194	1
FR_FR5	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0161	0.3	0.053666667	0
FR_FR5	Total suspended solids (mg/L)_Conventional Parameters	12.6	52.8	0.238636364	0
FR_FR5	Turbidity (NTU)_Conventional Parameters	6.99	23.3	0.3	0
FR_FR5	Uranium (mg/L)_Dissolved Metals	0.00301	0.00256	1.17578125	1
FR_FR5	Uranium (mg/L)_Total Metals	0.0029	0.00267	1.086142322	1

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
FR_FR5	Vanadium (mg/L)_Dissolved Metals	0.0025	0.0025	1	0
FR_FR5	Vanadium (mg/L)_Total Metals	0.00087	0.0025	0.348	0
FR_FR5	Zinc (mg/L)_Dissolved Metals	0.005	0.005	1	0
FR_FR5	Zinc (mg/L)_Total Metals	0.0195	0.015	1.3	1
FR_FRABCH	Acidity, CaCO3 (mg/L)_Conventional Parameters	5.7	8.6	0.662790698	0
FR_FRABCH	Aluminum (mg/L)_Dissolved Metals	0.162	0.0173	9.36416185	1
FR_FRABCH	Aluminum (mg/L)_Total Metals	1.14	2.3	0.495652174	0
FR_FRABCH	Antimony (mg/L)_Dissolved Metals	0.0005	0.0005	1	0
FR_FRABCH	Antimony (mg/L)_Total Metals	0.00023	0.0005	0.46	0
FR_FRABCH	Arsenic (mg/L)_Dissolved Metals	0.0005	0.0005	1	0
FR_FRABCH	Arsenic (mg/L)_Total Metals	0.00083	0.00159	0.522012579	0
FR_FRABCH	Barium (mg/L)_Dissolved Metals	0.134	0.131	1.022900763	1
FR_FRABCH	Barium (mg/L)_Total Metals	0.13	0.137	0.948905109	0
FR_FRABCH	Beryllium (mg/L)_Dissolved Metals	0.0001	0.0001	1	0
FR_FRABCH	Beryllium (mg/L)_Total Metals	0.000071	0.00019	0.373684211	0
FR_FRABCH	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	278	235	1.182978723	1
FR_FRABCH	Bismuth (mg/L)_Dissolved Metals	0.00025	0.0005	0.5	0
FR_FRABCH	Bismuth (mg/L)_Total Metals	0.0001	0.0005	0.2	0
FR_FRABCH	Boron (mg/L)_Dissolved Metals	0.05	0.05	1	0
FR_FRABCH	Boron (mg/L)_Total Metals	0.02	0.05	0.4	0
FR_FRABCH	Bromide (mg/L)_Major Ions	0.32	0.25	1.28	1
FR_FRABCH	Cadmium (mg/L)_Dissolved Metals	0.000117	0.0000468	2.5	1
FR_FRABCH	Cadmium (mg/L)_Total Metals	0.000297	0.000527	0.563567362	0
FR_FRABCH	Calcium (mg/L)_Major Ions	176	157	1.121019108	1
FR_FRABCH	Calcium (mg/L)_Total Metals	194	160	1.2125	1
FR_FRABCH	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	17	17.2	0.988372093	0
FR_FRABCH	Chloride (mg/L)_Major Ions	3.6	2.9	1.24137931	1
FR_FRABCH	Chromium (mg/L)_Dissolved Metals	0.0005	0.0005	1	0
FR_FRABCH	Chromium (mg/L)_Total Metals	0.00185	0.0041	0.451219512	0
FR_FRABCH	Cobalt (mg/L)_Dissolved Metals	0.0005	0.0005	1	0
FR_FRABCH	Cobalt (mg/L)_Total Metals	0.0009	0.00213	0.422535211	0
FR_FRABCH	Conductivity (µmhos/cm)_Conventional Parameters	620	-	-	0
FR_FRABCH	Conductivity (µS/cm)_Conventional Parameters	1270	1110	1.144144144	1
FR_FRABCH	Conductivity (µS/cm)_Field Measured	1147	1016	1.128937008	1
FR_FRABCH	Copper (mg/L)_Dissolved Metals	0.001	0.001	1	0
FR_FRABCH	Copper (mg/L)_Total Metals	0.00265	0.00518	0.511583012	0
FR_FRABCH	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	0.01	0.005	2	1
FR_FRABCH	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	0.01	0.005	2	1
FR_FRABCH	Dissolved organic carbon (mg/L)_Conventional Parameters	2.52	2.51	1.003984064	1
FR_FRABCH	Dissolved Oxygen (%)_Field Measured	88.7	94.3	0.940615058	0
FR_FRABCH	Dissolved Oxygen (mg/L)_Field Measured	11.81	12.39	0.953188055	0
FR_FRABCH	Dissolved Selenate (µg/L)_Speciation of Selenium	99.5	74	1.344594595	1
FR_FRABCH	Dissolved Selenite (µg/L)_Speciation of Selenium	0.191	29.4	0.006496599	0
FR_FRABCH	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	0.04	0.025	1.6	1
FR_FRABCH	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	0.01	0.005	2	1
FR_FRABCH	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	0.06	0.03	2	1
FR_FRABCH	Fluoride (mg/L)_Major Ions	0.228	0.201	1.134328358	1
FR_FRABCH	Hardness, as CaCO3 (mg/L)_Conventional Parameters	770	654	1.177370031	1
FR_FRABCH	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	1	1	0
FR_FRABCH	Iron (mg/L)_Dissolved Metals	0.255	0.05	5.1	1
FR_FRABCH	Iron (mg/L)_Total Metals	1.89	3.7	0.510810811	0
FR_FRABCH	Lead (mg/L)_Dissolved Metals	0.000368	0.00025	1.472	1
FR_FRABCH	Lead (mg/L)_Total Metals	0.00192	0.00266	0.721804511	0
FR_FRABCH	Lithium (mg/L)_Dissolved Metals	0.0399	0.0365	1.093150685	1
FR_FRABCH	Lithium (mg/L)_Total Metals	0.0413	0.0359	1.150417827	1
FR_FRABCH	Magnesium (mg/L)_Major Ions	80.7	66.3	1.21719457	1
FR_FRABCH	Magnesium (mg/L)_Total Metals	82.8	69	1.2	1
FR_FRABCH	Manganese (mg/L)_Dissolved Metals	0.0193	0.00957	2.016718913	1
FR_FRABCH	Manganese (mg/L)_Total Metals	0.0875	0.17	0.514705882	0
FR_FRABCH	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
FR_FRABCH	Mercury (mg/L)_Total Metals	0.00000718	0.00001	0.718	0
FR_FRABCH	Methyl mercury (µg/L)_Total Metals	0.000094	-	-	0
FR_FRABCH	Molybdenum (mg/L)_Dissolved Metals	0.00127	0.00142	0.894366197	0
FR_FRABCH	Molybdenum (mg/L)_Total Metals	0.00128	0.00161	0.795031056	0
FR_FRABCH	Nickel (mg/L)_Dissolved Metals	0.00304	0.0027	1.125925926	1
FR_FRABCH	Nickel (mg/L)_Total Metals	0.00663	0.0119	0.557142857	0
FR_FRABCH	Nitrate (mg-N/l)_Nutrients and Biological Indicators	25.4	27	0.940740741	0
FR_FRABCH	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.015	0.0133	1.127819549	1
FR_FRABCH	Oxidation-Reduction Potential (mV)_Conventional Parameters	501	520	0.963461538	0
FR_FRABCH	Oxidation-Reduction Potential (mV)_Field Measured	307.3	255.4	1.20321065	1
FR_FRABCH	pH (-)_Conventional Parameters	8.57	8.45	1.014201183	1
FR_FRABCH	pH (-)_Field Measured	8.19	8.84	0.926470588	0
FR_FRABCH	Potassium (mg/L)_Major Ions	2.07	2	1.035	1
FR_FRABCH	Potassium (mg/L)_Total Metals	2.03	2.4	0.845833333	0
FR_FRABCH	Selenium (mg/L)_Dissolved Metals	0.126	0.0906	1.390728477	1
FR_FRABCH	Selenium (mg/L)_Total Metals	0.116	0.0863	1.34414832	1
FR_FRABCH	Silicon (mg/L)_Dissolved Metals	2.56	2.49	1.02811245	1
FR_FRABCH	Silicon (mg/L)_Total Metals	3.48	5.86	0.593856655	0
FR_FRABCH	Silver (mg/L)_Dissolved Metals	0.00005	0.00005	1	0
FR_FRABCH	Silver (mg/L)_Total Metals	0.000038	0.000066	0.575757576	0
FR_FRABCH	Sodium (mg/L)_Major Ions	3.21	2.61	1.229885057	1
FR_FRABCH	Sodium (mg/L)_Total Metals	3.27	2.65	1.233962264	1
FR_FRABCH	Strontium (mg/L)_Dissolved Metals	0.224	0.199	1.125628141	1
FR_FRABCH	Strontium (mg/L)_Total Metals	0.227	0.196	1.158163265	1
FR_FRABCH	Sulphate (mg/L)_Major Ions	429	345	1.243478261	1
FR_FRABCH	Temperature (°C)_Field Measured	8.3	8.7	0.954022989	0
FR_FRABCH	Thallium (mg/L)_Dissolved Metals	0.00005	0.00005	1	0
FR_FRABCH	Thallium (mg/L)_Total Metals	0.000054	0.000097	0.556701031	0
FR_FRABCH	Tin (mg/L)_Dissolved Metals	0.0005	0.0005	1	0
FR_FRABCH	Tin (mg/L)_Total Metals	0.00061	0.0005	1.22	1
FR_FRABCH	Titanium (mg/L)_Dissolved Metals	0.01	0.016	0.625	0
FR_FRABCH	Titanium (mg/L)_Total Metals	0.02	0.052	0.384615385	0
FR_FRABCH	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	278	235	1.182978723	1
FR_FRABCH	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.287	0.0253	11.34387352	1
FR_FRABCH	Total dissolved solids (mg/L)_Conventional Parameters	1000	822	1.216545012	1
FR_FRABCH	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	1.08	0.763	1.415465269	1
FR_FRABCH	Total organic carbon (mg/L)_Conventional Parameters	3.88	11.1	0.34954955	0
FR_FRABCH	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0042	0.0153	0.274509804	0
FR_FRABCH	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.152	0.336	0.452380952	0
FR_FRABCH	Total suspended solids (mg/L)_Conventional Parameters	121	265	0.456603774	0
FR_FRABCH	Turbidity (NTU)_Conventional Parameters	54.7	115	0.475652174	0
FR_FRABCH	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	0.06	0.03	2	1
FR_FRABCH	Uranium (mg/L)_Dissolved Metals	0.0039	0.00313	1.24600639	1
FR_FRABCH	Uranium (mg/L)_Total Metals	0.00373	0.00332	1.123493976	1
FR_FRABCH	Vanadium (mg/L)_Dissolved Metals	0.0025	0.0025	1	0
FR_FRABCH	Vanadium (mg/L)_Total Metals	0.00527	0.0095	0.554736842	0
FR_FRABCH	Zinc (mg/L)_Dissolved Metals	0.0058	0.005	1.16	1
FR_FRABCH	Zinc (mg/L)_Total Metals	0.0201	0.0332	0.605421687	0
FR_FRCP1	Acidity, CaCO3 (mg/L)_Conventional Parameters	18.6	13	1.430769231	1
FR_FRCP1	Aluminum (mg/L)_Dissolved Metals	0.0065	0.014	0.464285714	0
FR_FRCP1	Aluminum (mg/L)_Total Metals	1.18	0.665	1.77443609	1
FR_FRCP1	Antimony (mg/L)_Dissolved Metals	0.00053	0.00048	1.104166667	1
FR_FRCP1	Antimony (mg/L)_Total Metals	0.00062	0.00066	0.939393939	0
FR_FRCP1	Arsenic (mg/L)_Dissolved Metals	0.0002	0.0002	1	0
FR_FRCP1	Arsenic (mg/L)_Total Metals	0.00084	0.00066	1.272727273	1
FR_FRCP1	Barium (mg/L)_Dissolved Metals	0.118	0.0983	1.200406918	1
FR_FRCP1	Barium (mg/L)_Total Metals	0.11	0.101	1.089108911	1
FR_FRCP1	Beryllium (mg/L)_Dissolved Metals	0.00004	0.0002	0.2	0
FR_FRCP1	Beryllium (mg/L)_Total Metals	0.000106	0.0002	0.53	0
FR_FRCP1	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	431	366	1.177595628	1
FR_FRCP1	Bismuth (mg/L)_Dissolved Metals	0.0001	0.001	0.1	0
FR_FRCP1	Bismuth (mg/L)_Total Metals	0.0001	0.001	0.1	0
FR_FRCP1	Boron (mg/L)_Dissolved Metals	0.02	0.02	1	0
FR_FRCP1	Boron (mg/L)_Total Metals	0.02	0.02	1	0
FR_FRCP1	Bromide (mg/L)_Major Ions	0.5	1	0.5	0
FR_FRCP1	Cadmium (mg/L)_Dissolved Metals	0.000109	0.0000919	1.186071817	1
FR_FRCP1	Cadmium (mg/L)_Total Metals	0.00028	0.000247	1.133603239	1
FR_FRCP1	Calcium (mg/L)_Major Ions	456	349	1.306590258	1
FR_FRCP1	Calcium (mg/L)_Total Metals	450	346	1.300578035	1
FR_FRCP1	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	17.6	17.2	1.023255814	1
FR_FRCP1	Chloride (mg/L)_Major Ions	7	6.3	1.111111111	1
FR_FRCP1	Chromium (mg/L)_Dissolved Metals	0.0004	0.00032	1.25	1
FR_FRCP1	Chromium (mg/L)_Total Metals	0.00199	0.00402	0.495024876	0
FR_FRCP1	Cobalt (mg/L)_Dissolved Metals	0.00033	0.0002	1.65	1
FR_FRCP1	Cobalt (mg/L)_Total Metals	0.00103	0.0005	2.06	1
FR_FRCP1	Conductivity (µS/cm)_Conventional Parameters	3480	2920	1.191780822	1
FR_FRCP1	Conductivity (µS/cm)_Field Measured	3307	2807	1.178126113	1
FR_FRCP1	Copper (mg/L)_Dissolved Metals	0.00055	0.00105	0.523809524	0
FR_FRCP1	Copper (mg/L)_Total Metals	0.00299	0.00254	1.177165354	1
FR_FRCP1	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	0.012	0.005	2.4	1
FR_FRCP1	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	0.02	0.005	4	1
FR_FRCP1	Dissolved organic carbon (mg/L)_Conventional Parameters	2.73	2.91	0.93814433	0
FR_FRCP1	Dissolved Oxygen (%)_Field Measured	96.1	100.8	0.953373016	0
FR_FRCP1	Dissolved Oxygen (mg/L)_Field Measured	12.92	14.33	0.901605024	0
FR_FRCP1	Dissolved Selenate (µg/L)_Speciation of Selenium	578	22.4	25.80357143	1
FR_FRCP1	Dissolved Selenite (µg/L)_Speciation of Selenium	0.771	0.1	7.71	1

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
FR_FRCP1	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	0.04	0.015	2.666666667	1
FR_FRCP1	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	0.01	0.005	2	1
FR_FRCP1	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	0.06	0.02	3	1
FR_FRCP1	Fluoride (mg/L)_Major Ions	0.234	0.45	0.52	0
FR_FRCP1	Hardness, as CaCO3 (mg/L)_Conventional Parameters	2800	1980	1.414141414	1
FR_FRCP1	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	1	1	0
FR_FRCP1	Iron (mg/L)_Dissolved Metals	0.02	0.024	0.833333333	0
FR_FRCP1	Iron (mg/L)_Total Metals	2	1.05	1.904761905	1
FR_FRCP1	Lead (mg/L)_Dissolved Metals	0.0001	0.0001	1	0
FR_FRCP1	Lead (mg/L)_Total Metals	0.00146	0.000813	1.795817958	1
FR_FRCP1	Lithium (mg/L)_Dissolved Metals	0.0866	0.0681	1.271659325	1
FR_FRCP1	Lithium (mg/L)_Total Metals	0.0869	0.0663	1.310708899	1
FR_FRCP1	Magnesium (mg/L)_Major Ions	418	270	1.548148148	1
FR_FRCP1	Magnesium (mg/L)_Total Metals	386	266	1.45112782	1
FR_FRCP1	Manganese (mg/L)_Dissolved Metals	0.0142	0.00963	1.474558671	1
FR_FRCP1	Manganese (mg/L)_Total Metals	0.097	0.0461	2.104121475	1
FR_FRCP1	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
FR_FRCP1	Mercury (mg/L)_Total Metals	0.00000712	0.0000107	0.665420561	0
FR_FRCP1	Methyl mercury (µg/L)_Total Metals	0.000085	0.00005	1.7	1
FR_FRCP1	Molybdenum (mg/L)_Dissolved Metals	0.0031	0.00287	1.080139373	1
FR_FRCP1	Molybdenum (mg/L)_Total Metals	0.00302	0.00311	0.971061093	0
FR_FRCP1	Nickel (mg/L)_Dissolved Metals	0.0444	0.0325	1.366153846	1
FR_FRCP1	Nickel (mg/L)_Total Metals	0.0456	0.0326	1.398773006	1
FR_FRCP1	Nitrate (mg-N/l)_Nutrients and Biological Indicators	30.6	35	0.874285714	0
FR_FRCP1	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.031	0.044	0.704545455	0
FR_FRCP1	Oxidation-Reduction Potential (mV)_Conventional Parameters	504	509	0.990176817	0
FR_FRCP1	Oxidation-Reduction Potential (mV)_Field Measured	333.8	302.1	1.104932142	1
FR_FRCP1	pH (-)_Conventional Parameters	8.54	8.49	1.005889282	1
FR_FRCP1	pH (-)_Field Measured	8.6	9.23	0.931744312	0
FR_FRCP1	Potassium (mg/L)_Major Ions	5.51	3.92	1.405612245	1
FR_FRCP1	Potassium (mg/L)_Total Metals	5.69	3.98	1.429648241	1
FR_FRCP1	Selenium (mg/L)_Dissolved Metals	0.798	0.508	1.570866142	1
FR_FRCP1	Selenium (mg/L)_Total Metals	0.689	0.497	1.386317907	1
FR_FRCP1	Silicon (mg/L)_Dissolved Metals	2.94	2.53	1.162055336	1
FR_FRCP1	Silicon (mg/L)_Total Metals	3.44	2.76	1.246376812	1
FR_FRCP1	Silver (mg/L)_Dissolved Metals	0.00002	0.00002	1	0
FR_FRCP1	Silver (mg/L)_Total Metals	0.000039	0.000044	0.886363636	0
FR_FRCP1	Sodium (mg/L)_Major Ions	2.94	2.73	1.076923077	1
FR_FRCP1	Sodium (mg/L)_Total Metals	2.97	2.91	1.020618557	1
FR_FRCP1	Strontium (mg/L)_Dissolved Metals	0.278	0.238	1.168067227	1
FR_FRCP1	Strontium (mg/L)_Total Metals	0.266	0.233	1.141630901	1
FR_FRCP1	Sulphate (mg/L)_Major Ions	2070	1770	1.169491525	1
FR_FRCP1	Temperature (°C)_Field Measured	12.3	14.5	0.848275862	0
FR_FRCP1	Thallium (mg/L)_Dissolved Metals	0.000045	0.000034	1.323529412	1
FR_FRCP1	Thallium (mg/L)_Total Metals	0.000056	0.000057	0.98245614	0
FR_FRCP1	Tin (mg/L)_Dissolved Metals	0.0002	0.0002	1	0
FR_FRCP1	Tin (mg/L)_Total Metals	0.0002	0.0002	1	0
FR_FRCP1	Titanium (mg/L)_Dissolved Metals	0.01	0.021	0.476190476	0
FR_FRCP1	Titanium (mg/L)_Total Metals	0.01	0.021	0.476190476	0
FR_FRCP1	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	431	366	1.177595628	1
FR_FRCP1	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.147	0.0349	4.212034384	1
FR_FRCP1	Total dissolved solids (mg/L)_Conventional Parameters	3670	2740	1.339416058	1
FR_FRCP1	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	1.13	1	1.13	1
FR_FRCP1	Total organic carbon (mg/L)_Conventional Parameters	5.84	7.9	0.739240506	0
FR_FRCP1	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.015	0.0147	1.020408163	1
FR_FRCP1	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.147	0.121	1.214876033	1
FR_FRCP1	Total suspended solids (mg/L)_Conventional Parameters	112	66.2	1.6918429	1
FR_FRCP1	Turbidity (NTU)_Conventional Parameters	31	71.6	0.432960894	0
FR_FRCP1	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	0.06	0.018	3.333333333	1
FR_FRCP1	Uranium (mg/L)_Dissolved Metals	0.0231	0.0166	1.391566265	1
FR_FRCP1	Uranium (mg/L)_Total Metals	0.0245	0.0162	1.512345679	1
FR_FRCP1	Vanadium (mg/L)_Dissolved Metals	0.001	0.002	0.5	0
FR_FRCP1	Vanadium (mg/L)_Total Metals	0.00473	0.00616	0.767857143	0
FR_FRCP1	Zinc (mg/L)_Dissolved Metals	0.0046	0.0035	1.314285714	1
FR_FRCP1	Zinc (mg/L)_Total Metals	0.0258	0.017	1.517647059	1
FR_FRRD	Acidity, CaCO3 (mg/L)_Conventional Parameters	6.9	11.4	0.605263158	0
FR_FRRD	Aluminum (mg/L)_Dissolved Metals	0.005	0.151	0.033112583	0
FR_FRRD	Aluminum (mg/L)_Total Metals	0.642	0.41	1.565853659	1
FR_FRRD	Antimony (mg/L)_Dissolved Metals	0.0005	0.00027	1.851851852	1
FR_FRRD	Antimony (mg/L)_Total Metals	0.00041	0.00024	1.708333333	1
FR_FRRD	Arsenic (mg/L)_Dissolved Metals	0.0005	0.00011	4.545454545	1
FR_FRRD	Arsenic (mg/L)_Total Metals	0.00047	0.00032	1.46875	1
FR_FRRD	Barium (mg/L)_Dissolved Metals	0.155	0.157	0.987261146	0
FR_FRRD	Barium (mg/L)_Total Metals	0.147	0.158	0.930379747	0
FR_FRRD	Beryllium (mg/L)_Dissolved Metals	0.0001	0.0001	1	0
FR_FRRD	Beryllium (mg/L)_Total Metals	0.00004	0.0001	0.4	0
FR_FRRD	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	302	265	1.139622642	1
FR_FRRD	Bismuth (mg/L)_Dissolved Metals	0.00025	0.0005	0.5	0
FR_FRRD	Bismuth (mg/L)_Total Metals	0.0001	0.0005	0.2	0
FR_FRRD	Boron (mg/L)_Dissolved Metals	0.05	0.018	2.777777778	1
FR_FRRD	Boron (mg/L)_Total Metals	0.02	0.019	1.052631579	1
FR_FRRD	Bromide (mg/L)_Major Ions	0.25	0.25	1	0
FR_FRRD	Cadmium (mg/L)_Dissolved Metals	0.0000711	0.00007	1.015714286	1
FR_FRRD	Cadmium (mg/L)_Total Metals	0.000192	0.000136	1.411764706	1
FR_FRRD	Calcium (mg/L)_Major Ions	192	173	1.10982659	1
FR_FRRD	Calcium (mg/L)_Total Metals	182	177	1.028248588	1
FR_FRRD	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	16.2	12.4	1.306451613	1
FR_FRRD	Chloride (mg/L)_Major Ions	7.7	4.95	1.555555556	1
FR_FRRD	Chromium (mg/L)_Dissolved Metals	0.0006	0.0003	2	1
FR_FRRD	Chromium (mg/L)_Total Metals	0.00117	0.00275	0.425454545	0
FR_FRRD	Cobalt (mg/L)_Dissolved Metals	0.0009	0.00012	7.5	1
FR_FRRD	Cobalt (mg/L)_Total Metals	0.00087	0.00026	3.346153846	1
FR_FRRD	Conductivity (µS/cm)_Conventional Parameters	1300	1230	1.056910569	1
FR_FRRD	Conductivity (µS/cm)_Field Measured	1300	1121	1.159678858	1
FR_FRRD	Copper (mg/L)_Dissolved Metals	0.001	0.00087	1.149425287	1
FR_FRRD	Copper (mg/L)_Total Metals	0.00153	0.00105	1.457142857	1
FR_FRRD	Dissolved organic carbon (mg/L)_Conventional Parameters	1.65	1.92	0.859375	0
FR_FRRD	Dissolved Oxygen (%)_Field Measured	103.9	93.6	1.110042735	1
FR_FRRD	Dissolved Oxygen (mg/L)_Field Measured	12.66	12.49	1.013610889	1
FR_FRRD	Fluoride (mg/L)_Major Ions	0.236	0.25	0.944	0
FR_FRRD	Hardness, as CaCO3 (mg/L)_Conventional Parameters	828	721	1.148404993	1
FR_FRRD	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	1	1	0
FR_FRRD	Iron (mg/L)_Dissolved Metals	0.05	0.047	1.063829787	1
FR_FRRD	Iron (mg/L)_Total Metals	1	0.415	2.409638554	1
FR_FRRD	Lead (mg/L)_Dissolved Metals	0.00025	0.000052	4.807692308	1
FR_FRRD	Lead (mg/L)_Total Metals	0.000635	0.000304	2.088815789	1
FR_FRRD	Lithium (mg/L)_Dissolved Metals	0.0505	0.0454	1.112334802	1
FR_FRRD	Lithium (mg/L)_Total Metals	0.0489	0.0432	1.131944444	1
FR_FRRD	Magnesium (mg/L)_Major Ions	92.2	69.9	1.319027182	1
FR_FRRD	Magnesium (mg/L)_Total Metals	87.5	72.2	1.211911357	1
FR_FRRD	Manganese (mg/L)_Dissolved Metals	0.00668	0.00471	1.418259023	1
FR_FRRD	Manganese (mg/L)_Total Metals	0.0521	0.0193	2.699481865	1
FR_FRRD	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
FR_FRRD	Mercury (mg/L)_Total Metals	0.00000407	0.00001	0.407	0
FR_FRRD	Methyl mercury (µg/L)_Total Metals	0.000043	0.00005	0.86	0
FR_FRRD	Molybdenum (mg/L)_Dissolved Metals	0.00127	0.00163	0.779141104	0
FR_FRRD	Molybdenum (mg/L)_Total Metals	0.00131	0.00142	0.922535211	0
FR_FRRD	Nickel (mg/L)_Dissolved Metals	0.00746	0.00472	1.580508475	1
FR_FRRD	Nickel (mg/L)_Total Metals	0.00724	0.00528	1.371212121	1
FR_FRRD	Nitrate (mg-N/l)_Nutrients and Biological Indicators	38.7	37.4	1.034759358	1
FR_FRRD	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0108	0.0093	1.161290323	1
FR_FRRD	Oxidation-Reduction Potential (mV)_Conventional Parameters	463	512	0.904296875	0
FR_FRRD	Oxidation-Reduction Potential (mV)_Field Measured	312.3	310.9	1.004503056	1
FR_FRRD	pH (-)_Conventional Parameters	8.57	8.45	1.014201183	1
FR_FRRD	pH (-)_Field Measured	8.56	10.88	0.786764706	0
FR_FRRD	Potassium (mg/L)_Major Ions	2.57	2.47	1.04048583	1
FR_FRRD	Potassium (mg/L)_Total Metals	2.33	2.45	0.951020408	0
FR_FRRD	Selenium (mg/L)_Dissolved Metals	0.131	0.098	1.336734694	1
FR_FRRD	Selenium (mg/L)_Total Metals	0.125	0.0924	1.352813853	1
FR_FRRD	Silicon (mg/L)_Dissolved Metals	2.43	2.43	1	0
FR_FRRD	Silicon (mg/L)_Total Metals	2.78	2.7	1.02962963	1
FR_FRRD	Silver (mg/L)_Dissolved Metals	0.00005	0.00001	5	1
FR_FRRD	Silver (mg/L)_Total Metals	0.00002	0.00002	1	0
FR_FRRD	Sodium (mg/L)_Major Ions	3.44	4.08	0.843137255	0
FR_FRRD	Sodium (mg/L)_Total Metals	3.38	4.18	0.80861244	0
FR_FRRD	Strontium (mg/L)_Dissolved Metals	0.221	0.196	1.12755102	1
FR_FRRD	Strontium (mg/L)_Total Metals	0.222	0.198	1.121212121	1
FR_FRRD	Sulphate (mg/L)_Major Ions	483	318	1.518867925	1
FR_FRRD	Temperature (°C)_Field Measured	8.5	11.6	0.732758621	0
FR_FRRD	Thallium (mg/L)_Dissolved Metals	0.00005	0.000016	3.125	1
FR_FRRD	Thallium (mg/L)_Total Metals	0.000029	0.000045	0.644444444	0
FR_FRRD	Tin (mg/L)_Dissolved Metals	0.0005	0.0001	5	1
FR_FRRD	Tin (mg/L)_Total Metals	0.00113	0.0001	11.3	1
FR_FRRD	Titanium (mg/L)_Dissolved Metals	0.01	0.017	0.588235294	0
FR_FRRD	Titanium (mg/L)_Total Metals	0.01	0.018	0.555555556	0
FR_FRRD	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	302	273	1.106227106	1

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
FR_FRRD	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.177	0.0444	3.986486486	1
FR_FRRD	Total dissolved solids (mg/L)_Conventional Parameters	1050	923	1.1375948	1
FR_FRRD	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.81	0.802	1.009975062	1
FR_FRRD	Total organic carbon (mg/L)_Conventional Parameters	1.91	2.3	0.830434783	0
FR_FRRD	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0115	0.0201	0.572139303	0
FR_FRRD	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0689	0.0368	1.872282609	1
FR_FRRD	Total suspended solids (mg/L)_Conventional Parameters	66.7	21.5	3.102325581	1
FR_FRRD	Turbidity (NTU)_Conventional Parameters	31.7	21.9	1.447488584	1
FR_FRRD	Uranium (mg/L)_Dissolved Metals	0.00486	0.00391	1.242966752	1
FR_FRRD	Uranium (mg/L)_Total Metals	0.00506	0.00416	1.216346154	1
FR_FRRD	Vanadium (mg/L)_Dissolved Metals	0.0025	0.001	2.5	1
FR_FRRD	Vanadium (mg/L)_Total Metals	0.00322	0.00317	1.015772871	1
FR_FRRD	Zinc (mg/L)_Dissolved Metals	0.005	0.003	1.666666667	1
FR_FRRD	Zinc (mg/L)_Total Metals	0.0127	0.0272	0.466911765	0
FR_HC1	1-Methylnaphthalene (µg/L)_Alkylated PAHs	0.05	-	-	0
FR_HC1	2-Bromobenzotrifluoride (%)_Unknown	87.2	-	-	0
FR_HC1	2-Methylnaphthalene (µg/L)_Alkylated PAHs	0.02	-	-	0
FR_HC1	Acenaphthene (%)_Parent PAHs	112.9	-	-	0
FR_HC1	Acenaphthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC1	Acenaphthylene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC1	Acidity, CaCO3 (mg/L)_Conventional Parameters	10	6.4	1.5625	1
FR_HC1	Acridine (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC1	Aluminum (mg/L)_Dissolved Metals	0.0044	0.0457	0.096280088	0
FR_HC1	Aluminum (mg/L)_Total Metals	0.0708	0.762	0.092913386	0
FR_HC1	Anthracene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC1	Antimony (mg/L)_Dissolved Metals	0.0002	0.00012	1.666666667	1
FR_HC1	Antimony (mg/L)_Total Metals	0.0002	0.00015	1.333333333	1
FR_HC1	Arsenic (mg/L)_Dissolved Metals	0.0002	0.0002	1	0
FR_HC1	Arsenic (mg/L)_Total Metals	0.00035	0.00052	0.673076923	0
FR_HC1	Barium (mg/L)_Dissolved Metals	0.0457	0.0472	0.968220339	0
FR_HC1	Barium (mg/L)_Total Metals	0.0421	0.0483	0.871635611	0
FR_HC1	Benzo(a)anthracene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC1	Benzo(a)pyrene (µg/L)_Parent PAHs	0.005	-	-	0
FR_HC1	Benzo(b,j)fluoranthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC1	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC1	Benzo(k)fluoranthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC1	Beryllium (mg/L)_Dissolved Metals	0.00004	0.0001	0.4	0
FR_HC1	Beryllium (mg/L)_Total Metals	0.00004	0.0001	0.4	0
FR_HC1	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	222	157	1.414012739	1
FR_HC1	Bismuth (mg/L)_Dissolved Metals	0.0001	0.0005	0.2	0
FR_HC1	Bismuth (mg/L)_Total Metals	0.0001	0.0005	0.2	0
FR_HC1	Boron (mg/L)_Dissolved Metals	0.02	0.013	1.538461538	1
FR_HC1	Boron (mg/L)_Total Metals	0.02	0.012	1.666666667	1
FR_HC1	Bromide (mg/L)_Major Ions	0.05	0.25	0.2	0
FR_HC1	Cadmium (mg/L)_Dissolved Metals	0.0000535	0.000045	1.188888889	1
FR_HC1	Cadmium (mg/L)_Total Metals	0.0000543	0.000111	0.489189189	0
FR_HC1	Calcium (mg/L)_Major Ions	114	102	1.117647059	1
FR_HC1	Calcium (mg/L)_Total Metals	114	105	1.085714286	1
FR_HC1	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	9.6	8.2	1.170731707	1
FR_HC1	Chloride (mg/L)_Major Ions	0.51	1.7	0.3	0
FR_HC1	Chromium (mg/L)_Dissolved Metals	0.0003	0.00027	1.111111111	1
FR_HC1	Chromium (mg/L)_Total Metals	0.00037	0.00167	0.221556886	0
FR_HC1	Chrysene (%)_Parent PAHs	102.7	-	-	0
FR_HC1	Chrysene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC1	Cobalt (mg/L)_Dissolved Metals	0.0002	0.00013	1.538461538	1
FR_HC1	Cobalt (mg/L)_Total Metals	0.0002	0.00054	0.37037037	0
FR_HC1	Conductivity (µS/cm)_Conventional Parameters	873	760	1.148684211	1
FR_HC1	Conductivity (µS/cm)_Field Measured	780.4	787.2	0.991361789	0
FR_HC1	Copper (mg/L)_Dissolved Metals	0.0005	0.00057	0.877192982	0
FR_HC1	Copper (mg/L)_Total Metals	0.00265	0.0031	0.85483871	0
FR_HC1	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	0.005	-	-	0
FR_HC1	Dissolved organic carbon (mg/L)_Conventional Parameters	1.9	2.03	0.935960591	0
FR_HC1	Dissolved Oxygen (%)_Field Measured	92.5	117.9	0.784563189	0
FR_HC1	Dissolved Oxygen (mg/L)_Field Measured	12.01	15.52	0.773840206	0
FR_HC1	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_HC1	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_HC1	Fluoranthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC1	Fluorene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC1	Fluoride (mg/L)_Major Ions	0.299	0.33	0.906060606	0
FR_HC1	Hardness, as CaCO3 (mg/L)_Conventional Parameters	468	418	1.119617225	1
FR_HC1	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	2	0.5	0
FR_HC1	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC1	Iron (mg/L)_Dissolved Metals	0.02	0.03	0.666666667	0
FR_HC1	Iron (mg/L)_Total Metals	0.069	0.899	0.076751947	0
FR_HC1	Lead (mg/L)_Dissolved Metals	0.0001	0.00005	2	1
FR_HC1	Lead (mg/L)_Total Metals	0.0001	0.000736	0.135869565	0
FR_HC1	Lithium (mg/L)_Dissolved Metals	0.0149	0.0125	1.192	1
FR_HC1	Lithium (mg/L)_Total Metals	0.0151	0.0118	1.279661017	1
FR_HC1	Magnesium (mg/L)_Major Ions	47.6	41.4	1.149758454	1
FR_HC1	Magnesium (mg/L)_Total Metals	47.8	39.9	1.197994987	1
FR_HC1	Manganese (mg/L)_Dissolved Metals	0.0145	0.0203	0.714285714	0
FR_HC1	Manganese (mg/L)_Total Metals	0.016	0.0402	0.39800995	0
FR_HC1	Mercury (mg/L)_Dissolved Metals	0.000025	0.0000617	0.405186386	0
FR_HC1	Mercury (mg/L)_Total Metals	0.00000103	0.00001	0.103	0
FR_HC1	Methyl mercury (µg/L)_Total Metals	0.000079	-	-	0
FR_HC1	Molybdenum (mg/L)_Dissolved Metals	0.00103	0.0011	0.936363636	0
FR_HC1	Molybdenum (mg/L)_Total Metals	0.00108	0.00114	0.947368421	0
FR_HC1	Naphthalene (µg/L)_Parent PAHs	0.02	-	-	0
FR_HC1	Nickel (mg/L)_Dissolved Metals	0.00245	0.0025	0.98	0
FR_HC1	Nickel (mg/L)_Total Metals	0.00242	0.00364	0.664835165	0
FR_HC1	Nitrate (mg-N/l)_Nutrients and Biological Indicators	9.69	10.9	0.888990826	0
FR_HC1	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0125	0.0272	0.459558824	0
FR_HC1	Oxidation-Reduction Potential (mV)_Conventional Parameters	477	510	0.935294118	0
FR_HC1	Oxidation-Reduction Potential (mV)_Field Measured	295	760	0.388157895	0
FR_HC1	pH (-)_Conventional Parameters	8.43	8.37	1.007168459	1
FR_HC1	pH (-)_Field Measured	8.14	9.61	0.847034339	0
FR_HC1	Phenanthrene (%)_Parent PAHs	106.8	-	-	0
FR_HC1	Phenanthrene (µg/L)_Parent PAHs	0.02	-	-	0
FR_HC1	Potassium (mg/L)_Major Ions	1.18	2	0.59	0
FR_HC1	Potassium (mg/L)_Total Metals	1.5	2	0.75	0
FR_HC1	Pyrene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC1	Quinoline (µg/L)_Parent PAHs	0.05	-	-	0
FR_HC1	Selenium (mg/L)_Dissolved Metals	0.0555	0.0505	1.099009901	1
FR_HC1	Selenium (mg/L)_Total Metals	0.0504	0.0444	1.135135135	1
FR_HC1	Silicon (mg/L)_Dissolved Metals	1.65	1.64	1.006097561	1
FR_HC1	Silicon (mg/L)_Total Metals	1.62	2.77	0.584837545	0
FR_HC1	Silver (mg/L)_Dissolved Metals	0.00002	0.00001	2	1
FR_HC1	Silver (mg/L)_Total Metals	0.00002	0.000021	0.952380952	0
FR_HC1	Sodium (mg/L)_Major Ions	0.98	2	0.49	0
FR_HC1	Sodium (mg/L)_Total Metals	1.83	2	0.915	0
FR_HC1	Strontium (mg/L)_Dissolved Metals	0.172	0.163	1.055214724	1
FR_HC1	Strontium (mg/L)_Total Metals	0.168	0.168	1	0
FR_HC1	Sulphate (mg/L)_Major Ions	266	242	1.099173554	1
FR_HC1	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	0.5	-	-	0
FR_HC1	Temperature (°C)_Field Measured	9.5	10.4	0.913461538	0
FR_HC1	Thallium (mg/L)_Dissolved Metals	0.00002	0.00001	2	1
FR_HC1	Thallium (mg/L)_Total Metals	0.000023	0.000027	0.851851852	0
FR_HC1	Tin (mg/L)_Dissolved Metals	0.0002	0.0001	2	1
FR_HC1	Tin (mg/L)_Total Metals	0.0002	0.00017	1.176470588	1
FR_HC1	Titanium (mg/L)_Dissolved Metals	0.01	0.014	0.714285714	0
FR_HC1	Titanium (mg/L)_Total Metals	0.01	0.021	0.476190476	0
FR_HC1	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	222	162	1.37037037	1
FR_HC1	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.091	0.0477	1.907756813	1
FR_HC1	Total dissolved solids (mg/L)_Conventional Parameters	627	581	1.079173838	1
FR_HC1	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_HC1	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.651	1.06	0.614150943	0
FR_HC1	Total organic carbon (mg/L)_Conventional Parameters	3.1	4.84	0.640495868	0
FR_HC1	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0036	0.012	0.3	0
FR_HC1	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0183	0.3	0.061	0
FR_HC1	Total suspended solids (mg/L)_Conventional Parameters	8.8	131	0.067175573	0
FR_HC1	Turbidity (NTU)_Conventional Parameters	7.29	49	0.14877551	0
FR_HC1	Uranium (mg/L)_Dissolved Metals	0.00207	0.00172	1.203488372	1
FR_HC1	Uranium (mg/L)_Total Metals	0.00207	0.00178	1.162921348	1
FR_HC1	Vanadium (mg/L)_Dissolved Metals	0.001	0.001	1	0
FR_HC1	Vanadium (mg/L)_Total Metals	0.001	0.0026	0.384615385	0
FR_HC1	Zinc (mg/L)_Dissolved Metals	0.003	0.003	1	0
FR_HC1	Zinc (mg/L)_Total Metals	0.0099	0.0147	0.673469388	0
FR_HC3	1-Methylnaphthalene (µg/L)_Alkylated PAHs	0.05	-	-	0
FR_HC3	2-Bromobenzotrifluoride (%)_Unknown	83.3	-	-	0
FR_HC3	2-Methylnaphthalene (µg/L)_Alkylated PAHs	0.02	-	-	0
FR_HC3	Acenaphthene (%)_Parent PAHs	114.7	-	-	0
FR_HC3	Acenaphthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC3	Acenaphthylene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC3	Acidity, CaCO3 (mg/L)_Conventional Parameters	5.1	4.4	1.159090909	1
FR_HC3	Acridine (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC3	Aluminum (mg/L)_Dissolved Metals	0.0033	0.0235	0.140425532	0

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
FR_HC3	Aluminum (mg/L)_Total Metals	0.0398	0.229	0.173799127	0
FR_HC3	Anthracene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC3	Antimony (mg/L)_Dissolved Metals	0.0002	0.0001	2	1
FR_HC3	Antimony (mg/L)_Total Metals	0.0002	0.00012	1.666666667	1
FR_HC3	Arsenic (mg/L)_Dissolved Metals	0.0002	0.00028	0.714285714	0
FR_HC3	Arsenic (mg/L)_Total Metals	0.00021	0.00037	0.567567568	0
FR_HC3	Barium (mg/L)_Dissolved Metals	0.0171	0.0177	0.966101695	0
FR_HC3	Barium (mg/L)_Total Metals	0.0176	0.018	0.977777778	0
FR_HC3	Benzo(a)anthracene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC3	Benzo(a)pyrene (µg/L)_Parent PAHs	0.005	-	-	0
FR_HC3	Benzo(b,j)fluoranthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC3	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC3	Benzo(k)fluoranthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC3	Beryllium (mg/L)_Dissolved Metals	0.00004	0.0001	0.4	0
FR_HC3	Beryllium (mg/L)_Total Metals	0.00004	0.0001	0.4	0
FR_HC3	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	133	120	1.108333333	1
FR_HC3	Bismuth (mg/L)_Dissolved Metals	0.0001	0.0005	0.2	0
FR_HC3	Bismuth (mg/L)_Total Metals	0.0001	0.0005	0.2	0
FR_HC3	Boron (mg/L)_Dissolved Metals	0.02	0.01	2	1
FR_HC3	Boron (mg/L)_Total Metals	0.02	0.01	2	1
FR_HC3	Bromide (mg/L)_Major Ions	0.05	0.05	1	0
FR_HC3	Cadmium (mg/L)_Dissolved Metals	0.00001	0.000011	0.909090909	0
FR_HC3	Cadmium (mg/L)_Total Metals	0.0000104	0.000034	0.305882353	0
FR_HC3	Calcium (mg/L)_Major Ions	63.4	60.3	1.051409619	1
FR_HC3	Calcium (mg/L)_Total Metals	59.4	60.4	0.983443709	0
FR_HC3	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	5.6	4.9	1.142857143	1
FR_HC3	Chloride (mg/L)_Major Ions	0.5	1.4	0.357142857	0
FR_HC3	Chromium (mg/L)_Dissolved Metals	0.0004	0.00025	1.6	1
FR_HC3	Chromium (mg/L)_Total Metals	0.00039	0.00075	0.52	0
FR_HC3	Chrysene (%)_Parent PAHs	100.6	-	-	0
FR_HC3	Chrysene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC3	Cobalt (mg/L)_Dissolved Metals	0.0002	0.0001	2	1
FR_HC3	Cobalt (mg/L)_Total Metals	0.0002	0.00011	1.818181818	1
FR_HC3	Conductivity (µS/cm)_Conventional Parameters	395	391	1.010230179	1
FR_HC3	Conductivity (µS/cm)_Field Measured	1602	402.7	3.978147504	1
FR_HC3	Copper (mg/L)_Dissolved Metals	0.0005	0.0005	1	0
FR_HC3	Copper (mg/L)_Total Metals	0.001	0.00078	1.282051282	1
FR_HC3	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	0.005	-	-	0
FR_HC3	Dissolved organic carbon (mg/L)_Conventional Parameters	1.12	1.68	0.666666667	0
FR_HC3	Dissolved Oxygen (%)_Field Measured	96.6	113.1	0.854111406	0
FR_HC3	Dissolved Oxygen (mg/L)_Field Measured	13.1	148.5	0.088215488	0
FR_HC3	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_HC3	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	0.25	-	-	0
FR_HC3	Fluoranthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC3	Fluorene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC3	Fluoride (mg/L)_Major Ions	0.417	0.427	0.976580796	0
FR_HC3	Hardness, as CaCO3 (mg/L)_Conventional Parameters	217	210	1.033333333	1
FR_HC3	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	1	1	0
FR_HC3	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC3	Iron (mg/L)_Dissolved Metals	0.02	0.03	0.666666667	0
FR_HC3	Iron (mg/L)_Total Metals	0.026	0.22	0.118181818	0
FR_HC3	Lead (mg/L)_Dissolved Metals	0.0001	0.00005	2	1
FR_HC3	Lead (mg/L)_Total Metals	0.0001	0.000183	0.546448087	0
FR_HC3	Lithium (mg/L)_Dissolved Metals	0.002	0.0014	1.428571429	1
FR_HC3	Lithium (mg/L)_Total Metals	0.002	0.0018	1.111111111	1
FR_HC3	Magnesium (mg/L)_Major Ions	14.5	14.9	0.973154362	0
FR_HC3	Magnesium (mg/L)_Total Metals	14.5	15.7	0.923566879	0
FR_HC3	Manganese (mg/L)_Dissolved Metals	0.00021	0.000437	0.480549199	0
FR_HC3	Manganese (mg/L)_Total Metals	0.00184	0.0125	0.1472	0
FR_HC3	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
FR_HC3	Mercury (mg/L)_Total Metals	0.00000054	0.00001	0.054	0
FR_HC3	Methyl mercury (µg/L)_Total Metals	0.00005	-	-	0
FR_HC3	Molybdenum (mg/L)_Dissolved Metals	0.000718	0.000867	0.828143022	0
FR_HC3	Molybdenum (mg/L)_Total Metals	0.000816	0.000881	0.926220204	0
FR_HC3	Naphthalene (µg/L)_Parent PAHs	0.02	-	-	0
FR_HC3	Nickel (mg/L)_Dissolved Metals	0.001	0.0005	2	1
FR_HC3	Nickel (mg/L)_Total Metals	0.001	0.00088	1.136363636	1
FR_HC3	Nitrate (mg-N/l)_Nutrients and Biological Indicators	0.331	0.335	0.988059701	0
FR_HC3	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0024	0.0018	1.333333333	1
FR_HC3	Oxidation-Reduction Potential (mV)_Conventional Parameters	495	498	0.993975904	0
FR_HC3	Oxidation-Reduction Potential (mV)_Field Measured	276.7	404.7	0.683716333	0
FR_HC3	pH (-)_Conventional Parameters	8.37	8.32	1.006009615	1
FR_HC3	pH (-)_Field Measured	8.36	8.92	0.937219731	0
FR_HC3	Phenanthrene (%)_Parent PAHs	108.8	-	-	0
FR_HC3	Phenanthrene (µg/L)_Parent PAHs	0.02	-	-	0
FR_HC3	Potassium (mg/L)_Major Ions	0.325	2	0.1625	0
FR_HC3	Potassium (mg/L)_Total Metals	0.25	2	0.125	0
FR_HC3	Pyrene (µg/L)_Parent PAHs	0.01	-	-	0
FR_HC3	Quinoline (µg/L)_Parent PAHs	0.05	-	-	0
FR_HC3	Selenium (mg/L)_Dissolved Metals	0.00146	0.00166	0.879518072	0
FR_HC3	Selenium (mg/L)_Total Metals	0.00143	0.00133	1.07518797	1
FR_HC3	Silicon (mg/L)_Dissolved Metals	1.35	1.48	0.912162162	0
FR_HC3	Silicon (mg/L)_Total Metals	1.4	1.74	0.804597701	0
FR_HC3	Silver (mg/L)_Dissolved Metals	0.00002	0.00001	2	1
FR_HC3	Silver (mg/L)_Total Metals	0.00002	0.000046	0.434782609	0
FR_HC3	Sodium (mg/L)_Major Ions	0.56	2	0.28	0
FR_HC3	Sodium (mg/L)_Total Metals	0.443	2	0.2215	0
FR_HC3	Strontium (mg/L)_Dissolved Metals	0.208	0.189	1.100529101	1
FR_HC3	Strontium (mg/L)_Total Metals	0.188	0.193	0.974093264	0
FR_HC3	Sulphate (mg/L)_Major Ions	95	90.6	1.048565121	1
FR_HC3	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	0.5	-	-	0
FR_HC3	Temperature (°C)_Field Measured	9.9	10.9	0.908256881	0
FR_HC3	Thallium (mg/L)_Dissolved Metals	0.00002	0.00001	2	1
FR_HC3	Thallium (mg/L)_Total Metals	0.00002	0.00001	2	1
FR_HC3	Tin (mg/L)_Dissolved Metals	0.0002	0.0001	2	1
FR_HC3	Tin (mg/L)_Total Metals	0.0002	0.0001	2	1
FR_HC3	Titanium (mg/L)_Dissolved Metals	0.01	0.011	0.909090909	0
FR_HC3	Titanium (mg/L)_Total Metals	0.01	0.013	0.769230769	0
FR_HC3	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	133	122	1.090163934	1
FR_HC3	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.0307	0.0119	2.579831933	1
FR_HC3	Total dissolved solids (mg/L)_Conventional Parameters	267	247	1.08097166	1
FR_HC3	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_HC3	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.186	0.102	1.823529412	1
FR_HC3	Total organic carbon (mg/L)_Conventional Parameters	1.42	11.1	0.127927928	0
FR_HC3	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0054	0.0021	2.571428571	1
FR_HC3	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0112	0.3	0.037333333	0
FR_HC3	Total suspended solids (mg/L)_Conventional Parameters	7.9	83	0.095180723	0
FR_HC3	Turbidity (NTU)_Conventional Parameters	3.49	9.13	0.382256298	0
FR_HC3	Turbidity (NTU)_Field Measured	0.41	-	-	0
FR_HC3	Uranium (mg/L)_Dissolved Metals	0.00106	0.00108	0.981481481	0
FR_HC3	Uranium (mg/L)_Total Metals	0.00107	0.00112	0.955357143	0
FR_HC3	Vanadium (mg/L)_Dissolved Metals	0.001	0.001	1	0
FR_HC3	Vanadium (mg/L)_Total Metals	0.001	0.001	1	0
FR_HC3	Zinc (mg/L)_Dissolved Metals	0.003	0.0041	0.731707317	0
FR_HC3	Zinc (mg/L)_Total Metals	0.006	0.0044	1.363636364	1
FR_KC1	1-Methylnaphthalene (µg/L)_Alkylated PAHs	0.05	-	-	0
FR_KC1	2-Bromobenzotrifluoride (%)_Unknown	90.6	109.6	0.826642336	0
FR_KC1	2-Methylnaphthalene (µg/L)_Alkylated PAHs	0.02	-	-	0
FR_KC1	Acenaphthene (%)_Parent PAHs	93.9	-	-	0
FR_KC1	Acenaphthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_KC1	Acenaphthylene (µg/L)_Parent PAHs	0.01	-	-	0
FR_KC1	Acidity, CaCO3 (mg/L)_Conventional Parameters	13.8	26.4	0.522727273	0
FR_KC1	Acridine (µg/L)_Parent PAHs	0.01	-	-	0
FR_KC1	Aluminum (mg/L)_Dissolved Metals	0.003	0.0312	0.096153846	0
FR_KC1	Aluminum (mg/L)_Total Metals	0.0613	1.87	0.032780749	0
FR_KC1	Anthracene (µg/L)_Parent PAHs	0.01	-	-	0
FR_KC1	Antimony (mg/L)_Dissolved Metals	0.00071	0.0006	1.183333333	1
FR_KC1	Antimony (mg/L)_Total Metals	0.00075	0.0006	1.25	1
FR_KC1	Arsenic (mg/L)_Dissolved Metals	0.0002	0.00021	0.952380952	0
FR_KC1	Arsenic (mg/L)_Total Metals	0.0009	0.00092	0.97826087	0
FR_KC1	Barium (mg/L)_Dissolved Metals	0.0456	0.144	0.316666667	0
FR_KC1	Barium (mg/L)_Total Metals	0.0412	0.246	0.167479675	0
FR_KC1	Benzo(a)anthracene (µg/L)_Parent PAHs	0.01	-	-	0
FR_KC1	Benzo(a)pyrene (µg/L)_Parent PAHs	0.005	-	-	0
FR_KC1	Benzo(b,j)fluoranthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_KC1	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	0.01	-	-	0
FR_KC1	Benzo(k)fluoranthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_KC1	Beryllium (mg/L)_Dissolved Metals	0.00004	0.0002	0.2	0
FR_KC1	Beryllium (mg/L)_Total Metals	0.00004	0.0002	0.2	0
FR_KC1	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	408	378	1.079365079	1
FR_KC1	Bismuth (mg/L)_Dissolved Metals	0.0001	0.001	0.1	0
FR_KC1	Bismuth (mg/L)_Total Metals	0.0001	0.001	0.1	0
FR_KC1	Boron (mg/L)_Dissolved Metals	0.028	0.024	1.166666667	1
FR_KC1	Boron (mg/L)_Total Metals	0.029	0.029	1	0
FR_KC1	Bromide (mg/L)_Major Ions	0.41	1	0.41	0
FR_KC1	Cadmium (mg/L)_Dissolved Metals	0.0011	0.000948	1.160337553	1

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
FR_KC1	Cadmium (mg/L)_Total Metals	0.00131	0.000938	1.396588486	1
FR_KC1	Calcium (mg/L)_Major Ions	380	326	1.165644172	1
FR_KC1	Calcium (mg/L)_Total Metals	378	366	1.032786885	1
FR_KC1	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	12.4	10.1	1.227722772	1
FR_KC1	Chloride (mg/L)_Major Ions	3	3.5	0.857142857	0
FR_KC1	Chromium (mg/L)_Dissolved Metals	0.0002	0.00022	0.909090909	0
FR_KC1	Chromium (mg/L)_Total Metals	0.0003	0.00305	0.098360656	0
FR_KC1	Chrysene (%)_Parent PAHs	93.1	-	-	0
FR_KC1	Chrysene (µg/L)_Parent PAHs	0.01	-	-	0
FR_KC1	Cobalt (mg/L)_Dissolved Metals	0.0002	0.00218	0.091743119	0
FR_KC1	Cobalt (mg/L)_Total Metals	0.0002	0.0033	0.060606061	0
FR_KC1	Conductivity (µS/cm)_Conventional Parameters	2500	2430	1.028806584	1
FR_KC1	Conductivity (µS/cm)_Field Measured	2282	2302	0.991311903	0
FR_KC1	Copper (mg/L)_Dissolved Metals	0.0005	0.001	0.5	0
FR_KC1	Copper (mg/L)_Total Metals	0.0031	0.00391	0.792838875	0
FR_KC1	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	0.005	-	-	0
FR_KC1	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	0.01	-	-	0
FR_KC1	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	0.01	-	-	0
FR_KC1	Dissolved organic carbon (mg/L)_Conventional Parameters	1.92	1.81	1.060773481	1
FR_KC1	Dissolved Oxygen (%)_Field Measured	90	113.3	0.79435128	0
FR_KC1	Dissolved Oxygen (mg/L)_Field Measured	11.92	14.37	0.829505915	0
FR_KC1	Dissolved Selenate (µg/L)_Speciation of Selenium	234	-	-	0
FR_KC1	Dissolved Selenite (µg/L)_Speciation of Selenium	0.064	-	-	0
FR_KC1	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	0.04	-	-	0
FR_KC1	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	0.01	-	-	0
FR_KC1	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	0.06	-	-	0
FR_KC1	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_KC1	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_KC1	Fluoranthene (µg/L)_Parent PAHs	0.01	-	-	0
FR_KC1	Fluorene (µg/L)_Parent PAHs	0.01	-	-	0
FR_KC1	Fluoride (mg/L)_Major Ions	0.25	0.5	0.5	0
FR_KC1	Hardness, as CaCO3 (mg/L)_Conventional Parameters	1600	1480	1.081081081	1
FR_KC1	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	2	0.5	0
FR_KC1	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	0.01	-	-	0
FR_KC1	Iron (mg/L)_Dissolved Metals	0.02	0.03	0.666666667	0
FR_KC1	Iron (mg/L)_Total Metals	0.044	2.24	0.019642857	0
FR_KC1	Lead (mg/L)_Dissolved Metals	0.0001	0.0001	1	0
FR_KC1	Lead (mg/L)_Total Metals	0.0001	0.0226	0.004424779	0
FR_KC1	Lithium (mg/L)_Dissolved Metals	0.109	0.106	1.028301887	1
FR_KC1	Lithium (mg/L)_Total Metals	0.102	0.104	0.980769231	0
FR_KC1	Magnesium (mg/L)_Major Ions	167	162	1.030864198	1
FR_KC1	Magnesium (mg/L)_Total Metals	178	169	1.053254438	1
FR_KC1	Manganese (mg/L)_Dissolved Metals	0.00165	0.0123	0.134146341	0
FR_KC1	Manganese (mg/L)_Total Metals	0.00183	0.0452	0.040486726	0
FR_KC1	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
FR_KC1	Mercury (mg/L)_Total Metals	0.000005	0.000012	0.416666667	0
FR_KC1	Methyl mercury (µg/L)_Total Metals	0.000023	-	-	0
FR_KC1	Molybdenum (mg/L)_Dissolved Metals	0.00333	0.00292	1.140410959	1
FR_KC1	Molybdenum (mg/L)_Total Metals	0.00312	0.00313	0.996805112	0
FR_KC1	Naphthalene (µg/L)_Parent PAHs	0.05	-	-	0
FR_KC1	Nickel (mg/L)_Dissolved Metals	0.0453	0.0285	1.589473684	1
FR_KC1	Nickel (mg/L)_Total Metals	0.0515	0.0264	1.950757576	1
FR_KC1	Nitrate (mg-N/l)_Nutrients and Biological Indicators	104	126	0.825396825	0
FR_KC1	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0185	0.057	0.324561404	0
FR_KC1	Oxidation-Reduction Potential (mV)_Conventional Parameters	458	518	0.884169884	0
FR_KC1	Oxidation-Reduction Potential (mV)_Field Measured	303.5	2090	0.145215311	0
FR_KC1	pH (-)_Conventional Parameters	8.36	8.33	1.003601441	1
FR_KC1	pH (-)_Field Measured	7.99	8.63	0.925840093	0
FR_KC1	Phenanthrene (%)_Parent PAHs	123.2	-	-	0
FR_KC1	Phenanthrene (µg/L)_Parent PAHs	0.02	-	-	0
FR_KC1	Potassium (mg/L)_Major Ions	4.76	3.93	1.211195929	1
FR_KC1	Potassium (mg/L)_Total Metals	4.62	4.9	0.942857143	0
FR_KC1	Pyrene (µg/L)_Parent PAHs	0.01	-	-	0
FR_KC1	Quinoline (µg/L)_Parent PAHs	0.05	-	-	0
FR_KC1	Selenium (mg/L)_Dissolved Metals	0.356	0.279	1.275985663	1
FR_KC1	Selenium (mg/L)_Total Metals	0.306	0.295	1.037288136	1
FR_KC1	Silicon (mg/L)_Dissolved Metals	2.1	1.95	1.076923077	1
FR_KC1	Silicon (mg/L)_Total Metals	2.22	7.02	0.316239316	0
FR_KC1	Silver (mg/L)_Dissolved Metals	0.00002	0.00002	1	0
FR_KC1	Silver (mg/L)_Total Metals	0.00004	0.000063	0.634920635	0
FR_KC1	Sodium (mg/L)_Major Ions	4.36	4.35	1.002298851	1
FR_KC1	Sodium (mg/L)_Total Metals	4.42	4.31	1.025522042	1
FR_KC1	Strontium (mg/L)_Dissolved Metals	0.333	0.28	1.189285714	1
FR_KC1	Strontium (mg/L)_Total Metals	0.327	0.318	1.028301887	1
FR_KC1	Sulphate (mg/L)_Major Ions	863	749	1.152202937	1
FR_KC1	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	0.5	0.5	1	0
FR_KC1	Temperature (°C)_Field Measured	7.7	8.6	0.895348837	0
FR_KC1	Thallium (mg/L)_Dissolved Metals	0.000035	0.000038	0.921052632	0
FR_KC1	Thallium (mg/L)_Total Metals	0.000035	0.000072	0.486111111	0
FR_KC1	Tin (mg/L)_Dissolved Metals	0.0002	0.0002	1	0
FR_KC1	Tin (mg/L)_Total Metals	0.0002	0.00115	0.173913043	0
FR_KC1	Titanium (mg/L)_Dissolved Metals	0.01	0.032	0.3125	0
FR_KC1	Titanium (mg/L)_Total Metals	0.01	0.086	0.11627907	0
FR_KC1	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	408	378	1.079365079	1
FR_KC1	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.0509	0.129	0.394573643	0
FR_KC1	Total dissolved solids (mg/L)_Conventional Parameters	2250	2250	1	0
FR_KC1	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_KC1	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.835	1.21	0.690082645	0
FR_KC1	Total organic carbon (mg/L)_Conventional Parameters	2.55	11.6	0.219827586	0
FR_KC1	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0025	0.0317	0.078864353	0
FR_KC1	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0408	0.3	0.136	0
FR_KC1	Total suspended solids (mg/L)_Conventional Parameters	3.4	147	0.023129252	0
FR_KC1	Turbidity (NTU)_Conventional Parameters	2.65	90.5	0.029281768	0
FR_KC1	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	0.06	-	-	0
FR_KC1	Uranium (mg/L)_Dissolved Metals	0.0143	0.0133	1.07518797	1
FR_KC1	Uranium (mg/L)_Total Metals	0.0148	0.0137	1.080291971	1
FR_KC1	Vanadium (mg/L)_Dissolved Metals	0.001	0.002	0.5	0
FR_KC1	Vanadium (mg/L)_Total Metals	0.001	0.0055	0.181818182	0
FR_KC1	Zinc (mg/L)_Dissolved Metals	0.0197	0.0384	0.513020833	0
FR_KC1	Zinc (mg/L)_Total Metals	0.0244	0.0613	0.398042414	0
FR_MULTIPLATE	Acidity, CaCO3 (mg/L)_Conventional Parameters	2.7	1.6	1.6875	1
FR_MULTIPLATE	Aluminum (mg/L)_Dissolved Metals	0.0086	0.0167	0.51497006	0
FR_MULTIPLATE	Aluminum (mg/L)_Total Metals	0.264	1.12	0.235714286	0
FR_MULTIPLATE	Antimony (mg/L)_Dissolved Metals	0.00037	0.0005	0.74	0
FR_MULTIPLATE	Antimony (mg/L)_Total Metals	0.00038	0.00043	0.88372093	0
FR_MULTIPLATE	Arsenic (mg/L)_Dissolved Metals	0.0001	0.0005	0.2	0
FR_MULTIPLATE	Arsenic (mg/L)_Total Metals	0.00021	0.00077	0.272727273	0
FR_MULTIPLATE	Barium (mg/L)_Dissolved Metals	0.116	0.0954	1.215932914	1
FR_MULTIPLATE	Barium (mg/L)_Total Metals	0.113	0.0992	1.139112903	1
FR_MULTIPLATE	Beryllium (mg/L)_Dissolved Metals	0.00002	0.0001	0.2	0
FR_MULTIPLATE	Beryllium (mg/L)_Total Metals	0.00004	0.0001	0.4	0
FR_MULTIPLATE	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	230	178	1.292134831	1
FR_MULTIPLATE	Bismuth (mg/L)_Dissolved Metals	0.00005	0.0005	0.1	0
FR_MULTIPLATE	Bismuth (mg/L)_Total Metals	0.0001	0.0005	0.2	0
FR_MULTIPLATE	Boron (mg/L)_Dissolved Metals	0.015	0.05	0.3	0
FR_MULTIPLATE	Boron (mg/L)_Total Metals	0.02	0.016	1.25	1
FR_MULTIPLATE	Bromide (mg/L)_Major Ions	0.25	0.5	0.5	0
FR_MULTIPLATE	Cadmium (mg/L)_Dissolved Metals	0.000107	0.00006	1.783333333	1
FR_MULTIPLATE	Cadmium (mg/L)_Total Metals	0.000134	0.000185	0.724324324	0
FR_MULTIPLATE	Calcium (mg/L)_Major Ions	146	104	1.403846154	1
FR_MULTIPLATE	Calcium (mg/L)_Total Metals	146	109	1.339449541	1
FR_MULTIPLATE	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	16.8	10.8	1.555555556	1
FR_MULTIPLATE	Chloride (mg/L)_Major Ions	2.5	2	1.25	1
FR_MULTIPLATE	Chromium (mg/L)_Dissolved Metals	0.00011	0.0005	0.22	0
FR_MULTIPLATE	Chromium (mg/L)_Total Metals	0.00059	0.00221	0.266968326	0
FR_MULTIPLATE	Cobalt (mg/L)_Dissolved Metals	0.00017	0.0005	0.34	0
FR_MULTIPLATE	Cobalt (mg/L)_Total Metals	0.00023	0.00092	0.25	0
FR_MULTIPLATE	Conductivity (µS/cm)_Conventional Parameters	1050	787	1.334180432	1
FR_MULTIPLATE	Conductivity (µS/cm)_Field Measured	997	835.1	1.193868998	1
FR_MULTIPLATE	Copper (mg/L)_Dissolved Metals	0.0005	0.001	0.5	0
FR_MULTIPLATE	Copper (mg/L)_Total Metals	0.001	0.00204	0.490196078	0
FR_MULTIPLATE	Dissolved organic carbon (mg/L)_Conventional Parameters	2.17	2.2	0.986363636	0
FR_MULTIPLATE	Dissolved Oxygen (%)_Field Measured	88.2	111.1	0.793879388	0
FR_MULTIPLATE	Dissolved Oxygen (mg/L)_Field Measured	11.97	14.75	0.811525424	0
FR_MULTIPLATE	Fluoride (mg/L)_Major Ions	0.214	0.28	0.764285714	0
FR_MULTIPLATE	Hardness, as CaCO3 (mg/L)_Conventional Parameters	622	444	1.400900901	1
FR_MULTIPLATE	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	1	1	0
FR_MULTIPLATE	Iron (mg/L)_Dissolved Metals	0.01	0.05	0.2	0
FR_MULTIPLATE	Iron (mg/L)_Total Metals	0.308	1.5	0.205333333	0
FR_MULTIPLATE	Lead (mg/L)_Dissolved Metals	0.00005	0.00025	0.2	0
FR_MULTIPLATE	Lead (mg/L)_Total Metals	0.00022	0.00102	0.215686275	0
FR_MULTIPLATE	Lithium (mg/L)_Dissolved Metals	0.0582	0.0455	1.279120879	1
FR_MULTIPLATE	Lithium (mg/L)_Total Metals	0.0672	0.0444	1.513513514	1
FR_MULTIPLATE	Magnesium (mg/L)_Major Ions	62.3	46.1	1.351409978	1
FR_MULTIPLATE	Magnesium (mg/L)_Total Metals	58.8	46.8	1.256410256	1
FR_MULTIPLATE	Manganese (mg/L)_Dissolved Metals	0.00475	0.00211	2.251184834	1

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
FR_MULTIPLATE	Manganese (mg/L)_Total Metals	0.00665	0.0633	0.105055292	0
FR_MULTIPLATE	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
FR_MULTIPLATE	Mercury (mg/L)_Total Metals	0.00000268	0.00001	0.268	0
FR_MULTIPLATE	Molybdenum (mg/L)_Dissolved Metals	0.00187	0.00198	0.944444444	0
FR_MULTIPLATE	Molybdenum (mg/L)_Total Metals	0.0018	0.00197	0.913705584	0
FR_MULTIPLATE	Nickel (mg/L)_Dissolved Metals	0.00714	0.0052	1.373076923	1
FR_MULTIPLATE	Nickel (mg/L)_Total Metals	0.00708	0.00587	1.206132879	1
FR_MULTIPLATE	Nitrate (mg-N/l)_Nutrients and Biological Indicators	27.7	19.1	1.45026178	1
FR_MULTIPLATE	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0126	0.0381	0.330708661	0
FR_MULTIPLATE	Oxidation-Reduction Potential (mV)_Conventional Parameters	465	498	0.93373494	0
FR_MULTIPLATE	Oxidation-Reduction Potential (mV)_Field Measured	303.7	208.5	1.456594724	1
FR_MULTIPLATE	pH (-)_Conventional Parameters	8.49	8.39	1.011918951	1
FR_MULTIPLATE	pH (-)_Field Measured	8.55	9.19	0.930359086	0
FR_MULTIPLATE	Potassium (mg/L)_Major Ions	1.98	2	0.99	0
FR_MULTIPLATE	Potassium (mg/L)_Total Metals	1.81	2	0.905	0
FR_MULTIPLATE	Selenium (mg/L)_Dissolved Metals	0.0825	0.0566	1.457597173	1
FR_MULTIPLATE	Selenium (mg/L)_Total Metals	0.0721	0.0582	1.238831615	1
FR_MULTIPLATE	Silicon (mg/L)_Dissolved Metals	1.94	1.79	1.083798883	1
FR_MULTIPLATE	Silicon (mg/L)_Total Metals	2.33	3.91	0.595907928	0
FR_MULTIPLATE	Silver (mg/L)_Dissolved Metals	0.00001	0.00005	0.2	0
FR_MULTIPLATE	Silver (mg/L)_Total Metals	0.00002	0.000031	0.64516129	0
FR_MULTIPLATE	Sodium (mg/L)_Major Ions	2.46	2.3	1.069565217	1
FR_MULTIPLATE	Sodium (mg/L)_Total Metals	2.23	2.5	0.892	0
FR_MULTIPLATE	Strontium (mg/L)_Dissolved Metals	0.232	0.168	1.380952381	1
FR_MULTIPLATE	Strontium (mg/L)_Total Metals	0.208	0.168	1.238095238	1
FR_MULTIPLATE	Sulphate (mg/L)_Major Ions	306	223	1.372197309	1
FR_MULTIPLATE	Temperature (°C)_Field Measured	12	13.3	0.902255639	0
FR_MULTIPLATE	Thallium (mg/L)_Dissolved Metals	0.00001	0.00005	0.2	0
FR_MULTIPLATE	Thallium (mg/L)_Total Metals	0.000026	0.000046	0.565217391	0
FR_MULTIPLATE	Tin (mg/L)_Dissolved Metals	0.0001	0.0005	0.2	0
FR_MULTIPLATE	Tin (mg/L)_Total Metals	0.0002	0.0001	2	1
FR_MULTIPLATE	Titanium (mg/L)_Dissolved Metals	0.01	0.016	0.625	0
FR_MULTIPLATE	Titanium (mg/L)_Total Metals	0.01	0.026	0.384615385	0
FR_MULTIPLATE	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	247	178	1.387640449	1
FR_MULTIPLATE	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.205	0.159	1.289308176	1
FR_MULTIPLATE	Total dissolved solids (mg/L)_Conventional Parameters	802	582	1.378006873	1
FR_MULTIPLATE	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.395	0.416	0.949519231	0
FR_MULTIPLATE	Total organic carbon (mg/L)_Conventional Parameters	2.68	5.83	0.459691252	0
FR_MULTIPLATE	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0048	0.004	1.2	1
FR_MULTIPLATE	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0254	0.3	0.084666667	0
FR_MULTIPLATE	Total suspended solids (mg/L)_Conventional Parameters	14	178	0.078651685	0
FR_MULTIPLATE	Turbidity (NTU)_Conventional Parameters	16.5	124	0.133064516	0
FR_MULTIPLATE	Uranium (mg/L)_Dissolved Metals	0.0039	0.00262	1.488549618	1
FR_MULTIPLATE	Uranium (mg/L)_Total Metals	0.00415	0.00274	1.51459854	1
FR_MULTIPLATE	Vanadium (mg/L)_Dissolved Metals	0.0005	0.0025	0.2	0
FR_MULTIPLATE	Vanadium (mg/L)_Total Metals	0.00237	0.0047	0.504255319	0
FR_MULTIPLATE	Zinc (mg/L)_Dissolved Metals	0.0043	0.005	0.86	0
FR_MULTIPLATE	Zinc (mg/L)_Total Metals	0.01	0.0155	0.64516129	0
FR_NGD1	Acidity, CaCO3 (mg/L)_Conventional Parameters	2.9	4.7	0.617021277	0
FR_NGD1	Aluminum (mg/L)_Dissolved Metals	0.637	0.0788	8.083756345	1
FR_NGD1	Aluminum (mg/L)_Total Metals	15.3	4.76	3.214285714	1
FR_NGD1	Antimony (mg/L)_Dissolved Metals	0.00221	0.00211	1.047393365	1
FR_NGD1	Antimony (mg/L)_Total Metals	0.00233	0.00213	1.093896714	1
FR_NGD1	Arsenic (mg/L)_Dissolved Metals	0.00075	0.0005	1.5	1
FR_NGD1	Arsenic (mg/L)_Total Metals	0.00271	0.00306	0.885620915	0
FR_NGD1	Barium (mg/L)_Dissolved Metals	0.317	0.386	0.821243523	0
FR_NGD1	Barium (mg/L)_Total Metals	0.294	0.372	0.790322581	0
FR_NGD1	Beryllium (mg/L)_Dissolved Metals	0.000173	0.0001	1.73	1
FR_NGD1	Beryllium (mg/L)_Total Metals	0.000371	0.00761	0.048751643	0
FR_NGD1	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	314	218	1.440366972	1
FR_NGD1	Bismuth (mg/L)_Dissolved Metals	0.0001	0.0005	0.2	0
FR_NGD1	Bismuth (mg/L)_Total Metals	0.000068	0.0005	0.136	0
FR_NGD1	Boron (mg/L)_Dissolved Metals	0.024	0.05	0.48	0
FR_NGD1	Boron (mg/L)_Total Metals	0.025	0.05	0.5	0
FR_NGD1	Bromide (mg/L)_Major Ions	0.25	0.25	1	0
FR_NGD1	Cadmium (mg/L)_Dissolved Metals	0.000691	0.0000625	11.056	1
FR_NGD1	Cadmium (mg/L)_Total Metals	0.000926	0.000985	0.940101523	0
FR_NGD1	Calcium (mg/L)_Major Ions	152	90.3	1.683277962	1
FR_NGD1	Calcium (mg/L)_Total Metals	149	91.5	1.628415301	1
FR_NGD1	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	19.8	18	1.1	1
FR_NGD1	Chloride (mg/L)_Major Ions	2.5	2.4	1.041666667	1
FR_NGD1	Chromium (mg/L)_Dissolved Metals	0.00051	0.0005	1.02	1
FR_NGD1	Chromium (mg/L)_Total Metals	0.025	0.00936	2.670940171	1
FR_NGD1	Cobalt (mg/L)_Dissolved Metals	0.00351	0.00054	6.5	1
FR_NGD1	Cobalt (mg/L)_Total Metals	0.00351	0.00244	1.43852459	1
FR_NGD1	Conductivity (µS/cm)_Conventional Parameters	1160	667	1.739130435	1
FR_NGD1	Conductivity (µS/cm)_Field Measured	1111	651.8	1.704510586	1
FR_NGD1	Copper (mg/L)_Dissolved Metals	0.00496	0.001	4.96	1
FR_NGD1	Copper (mg/L)_Total Metals	0.00987	0.386	0.025569948	0
FR_NGD1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility (%)_Toxicity	3	100	0.03	0
FR_NGD1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	3	93.3	0.032154341	0
FR_NGD1	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	0.01	-	-	0
FR_NGD1	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	0.029	-	-	0
FR_NGD1	Dissolved organic carbon (mg/L)_Conventional Parameters	4.82	6.95	0.69352518	0
FR_NGD1	Dissolved Oxygen (%)_Field Measured	95.3	112.4	0.847864769	0
FR_NGD1	Dissolved Oxygen (mg/L)_Field Measured	12.39	16.11	0.769087523	0
FR_NGD1	Dissolved Selenate (µg/L)_Speciation of Selenium	26	-	-	0
FR_NGD1	Dissolved Selenite (µg/L)_Speciation of Selenium	5.25	-	-	0
FR_NGD1	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	0.04	-	-	0
FR_NGD1	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	0.01	-	-	0
FR_NGD1	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	0.06	-	-	0
FR_NGD1	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_NGD1	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	0.25	0.25	1	0
FR_NGD1	Fluoride (mg/L)_Major Ions	0.265	0.226	1.172566372	1
FR_NGD1	Hardness, as CaCO3 (mg/L)_Conventional Parameters	644	404	1.594059406	1
FR_NGD1	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	312	1	312	1
FR_NGD1	Iron (mg/L)_Dissolved Metals	0.623	0.056	11.125	1
FR_NGD1	Iron (mg/L)_Total Metals	5.36	6.55	0.818320611	0
FR_NGD1	Lead (mg/L)_Dissolved Metals	0.00197	0.00025	7.88	1
FR_NGD1	Lead (mg/L)_Total Metals	0.00405	0.00444	0.912162162	0
FR_NGD1	Lithium (mg/L)_Dissolved Metals	0.0368	0.0442	0.832579186	0
FR_NGD1	Lithium (mg/L)_Total Metals	0.0339	0.0417	0.81294964	0
FR_NGD1	Magnesium (mg/L)_Major Ions	64.2	43.3	1.482678984	1
FR_NGD1	Magnesium (mg/L)_Total Metals	66.5	43.7	1.52173913	1
FR_NGD1	Manganese (mg/L)_Dissolved Metals	0.0464	0.0483	0.960662526	0
FR_NGD1	Manganese (mg/L)_Total Metals	0.0566	0.0804	0.7039801	0
FR_NGD1	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
FR_NGD1	Mercury (mg/L)_Total Metals	0.0000364	0.000046	0.791304348	0
FR_NGD1	Methyl mercury (µg/L)_Total Metals	0.000031	0.00005	0.62	0
FR_NGD1	Molybdenum (mg/L)_Dissolved Metals	0.00937	0.00815	1.149693252	1
FR_NGD1	Molybdenum (mg/L)_Total Metals	0.00981	0.00829	1.183353438	1
FR_NGD1	Nickel (mg/L)_Dissolved Metals	0.0476	0.00551	8.638838475	1
FR_NGD1	Nickel (mg/L)_Total Metals	0.0479	0.0172	2.784883721	1
FR_NGD1	Nitrate (mg-N/l)_Nutrients and Biological Indicators	41.4	2.28	18.15789474	1
FR_NGD1	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.184	0.0527	3.491461101	1
FR_NGD1	Oxidation-Reduction Potential (mV)_Conventional Parameters	451	530	0.850943396	0
FR_NGD1	Oxidation-Reduction Potential (mV)_Field Measured	293.1	630.6	0.464795433	0
FR_NGD1	pH (-)_Conventional Parameters	8.56	8.63	0.99188876	0
FR_NGD1	pH (-)_Field Measured	8.85	9	0.983333333	0
FR_NGD1	Potassium (mg/L)_Major Ions	5.69	3.03	1.877887789	1
FR_NGD1	Potassium (mg/L)_Total Metals	6.22	3.08	2.019480519	1
FR_NGD1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	0	0	-	0
FR_NGD1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed (%)_Toxicity	10	0	Inf	1
FR_NGD1	Selenium (mg/L)_Dissolved Metals	0.0966	0.0454	2.127753304	1
FR_NGD1	Selenium (mg/L)_Total Metals	0.0948	0.0415	2.284337349	1
FR_NGD1	Silicon (mg/L)_Dissolved Metals	3.07	2.78	1.104316547	1
FR_NGD1	Silicon (mg/L)_Total Metals	30.7	9.34	3.286937901	1
FR_NGD1	Silver (mg/L)_Dissolved Metals	0.00003	0.00005	0.6	0
FR_NGD1	Silver (mg/L)_Total Metals	0.000242	0.000249	0.97188755	0
FR_NGD1	Sodium (mg/L)_Major Ions	1.47	3.25	0.452307692	0
FR_NGD1	Sodium (mg/L)_Total Metals	1.5	3.2	0.46875	0
FR_NGD1	Strontium (mg/L)_Dissolved Metals	0.184	0.178	1.033707865	1
FR_NGD1	Strontium (mg/L)_Total Metals	0.174	0.176	0.988636364	0
FR_NGD1	Sulphate (mg/L)_Major Ions	275	166	1.656626506	1
FR_NGD1	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	0.5	0.5	1	0
FR_NGD1	Temperature (°C)_Field Measured	16.9	16.6	1.018072289	1
FR_NGD1	Thallium (mg/L)_Dissolved Metals	0.000067	0.000051	1.31372549	1
FR_NGD1	Thallium (mg/L)_Total Metals	0.00039	0.000314	1.242038217	1
FR_NGD1	Tin (mg/L)_Dissolved Metals	0.0002	0.0005	0.4	0
FR_NGD1	Tin (mg/L)_Total Metals	0.00039	0.0005	0.78	0
FR_NGD1	Titanium (mg/L)_Dissolved Metals	0.01	0.016	0.625	0
FR_NGD1	Titanium (mg/L)_Total Metals	0.511	0.118	4.330508475	1
FR_NGD1	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	314	225	1.395555556	1
FR_NGD1	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	3.11	0.219	14.20091324	1
FR_NGD1	Total dissolved solids (mg/L)_Conventional Parameters	966	463	2.086393089	1
FR_NGD1	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	0.25	0.25	1	0

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
FR_NGD1	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	1.01	1.23	0.821138211	0
FR_NGD1	Total organic carbon (mg/L)_Conventional Parameters	20.5	26	0.788461538	0
FR_NGD1	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0198	0.0234	0.846153846	0
FR_NGD1	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.336	0.513	0.65497076	0
FR_NGD1	Total suspended solids (mg/L)_Conventional Parameters	151	146	1.034246575	1
FR_NGD1	Total Suspended Solids (mg/L)_Field Measured	166.4	184.4	0.902386117	0
FR_NGD1	Turbidity (NTU)_Conventional Parameters	345	346	0.997109827	0
FR_NGD1	Turbidity (NTU)_Field Measured	112	6.54	17.12538226	1
FR_NGD1	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	0.06	-	-	0
FR_NGD1	Uranium (mg/L)_Dissolved Metals	0.00386	0.00194	1.989690722	1
FR_NGD1	Uranium (mg/L)_Total Metals	0.0042	0.00191	2.19895288	1
FR_NGD1	Vanadium (mg/L)_Dissolved Metals	0.0053	0.0025	2.12	1
FR_NGD1	Vanadium (mg/L)_Total Metals	0.0693	0.0435	1.593103448	1
FR_NGD1	Zinc (mg/L)_Dissolved Metals	0.0186	0.005	3.72	1
FR_NGD1	Zinc (mg/L)_Total Metals	0.074	0.0888	0.833333333	0
FR_UFR1	Acidity, CaCO3 (mg/L)_Conventional Parameters	17.4	3.4	5.117647059	1
FR_UFR1	Aluminum (mg/L)_Dissolved Metals	0.106	0.0885	1.197740113	1
FR_UFR1	Aluminum (mg/L)_Total Metals	0.651	0.603	1.07960199	1
FR_UFR1	Antimony (mg/L)_Dissolved Metals	0.0002	0.0001	2	1
FR_UFR1	Antimony (mg/L)_Total Metals	0.0002	0.00026	0.769230769	0
FR_UFR1	Arsenic (mg/L)_Dissolved Metals	0.0002	0.00019	1.052631579	1
FR_UFR1	Arsenic (mg/L)_Total Metals	0.00031	0.0004	0.775	0
FR_UFR1	Barium (mg/L)_Dissolved Metals	0.085	0.0867	0.980392157	0
FR_UFR1	Barium (mg/L)_Total Metals	0.0842	0.0978	0.860940695	0
FR_UFR1	Beryllium (mg/L)_Dissolved Metals	0.00004	0.0001	0.4	0
FR_UFR1	Beryllium (mg/L)_Total Metals	0.00004	0.0001	0.4	0
FR_UFR1	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	182	160	1.1375	1
FR_UFR1	Bismuth (mg/L)_Dissolved Metals	0.0001	0.0005	0.2	0
FR_UFR1	Bismuth (mg/L)_Total Metals	0.0001	0.0005	0.2	0
FR_UFR1	Boron (mg/L)_Dissolved Metals	0.02	0.011	1.818181818	1
FR_UFR1	Boron (mg/L)_Total Metals	0.02	0.01	2	1
FR_UFR1	Bromide (mg/L)_Major Ions	0.25	0.05	5	1
FR_UFR1	Cadmium (mg/L)_Dissolved Metals	0.0000222	0.0000158	1.405063291	1
FR_UFR1	Cadmium (mg/L)_Total Metals	0.0000487	0.000063	0.773015873	0
FR_UFR1	Calcium (mg/L)_Major Ions	59.3	59.3	1	0
FR_UFR1	Calcium (mg/L)_Total Metals	55.4	59.5	0.931092437	0
FR_UFR1	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	18.2	14	1.3	1
FR_UFR1	Chloride (mg/L)_Major Ions	2.5	1.3	1.923076923	1
FR_UFR1	Chromium (mg/L)_Dissolved Metals	0.0003	0.00033	0.909090909	0
FR_UFR1	Chromium (mg/L)_Total Metals	0.00121	0.00117	1.034188034	1
FR_UFR1	Cobalt (mg/L)_Dissolved Metals	0.0002	0.0001	2	1
FR_UFR1	Cobalt (mg/L)_Total Metals	0.00025	0.00034	0.735294118	0
FR_UFR1	Conductivity (µS/cm)_Conventional Parameters	436	372	1.172043011	1
FR_UFR1	Conductivity (µS/cm)_Field Measured	535.1	986.9	0.542202857	0
FR_UFR1	Copper (mg/L)_Dissolved Metals	0.00062	0.00103	0.601941748	0
FR_UFR1	Copper (mg/L)_Total Metals	0.00333	0.00239	1.393305439	1
FR_UFR1	Dissolved organic carbon (mg/L)_Conventional Parameters	3.2	3.71	0.862533693	0
FR_UFR1	Dissolved Oxygen (%)_Field Measured	97.9	163.2	0.599877451	0
FR_UFR1	Dissolved Oxygen (mg/L)_Field Measured	13.07	17.25	0.757681159	0
FR_UFR1	Fluoride (mg/L)_Major Ions	0.179	0.183	0.978142077	0
FR_UFR1	Hardness, as CaCO3 (mg/L)_Conventional Parameters	208	205	1.014634146	1
FR_UFR1	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	1	1	0
FR_UFR1	Iron (mg/L)_Dissolved Metals	0.063	0.054	1.166666667	1
FR_UFR1	Iron (mg/L)_Total Metals	0.509	0.692	0.735549133	0
FR_UFR1	Lead (mg/L)_Dissolved Metals	0.0001	0.000055	1.818181818	1
FR_UFR1	Lead (mg/L)_Total Metals	0.000367	0.000521	0.704414587	0
FR_UFR1	Lithium (mg/L)_Dissolved Metals	0.0022	0.0021	1.047619048	1
FR_UFR1	Lithium (mg/L)_Total Metals	0.0023	0.0029	0.793103448	0
FR_UFR1	Magnesium (mg/L)_Major Ions	16.1	15.6	1.032051282	1
FR_UFR1	Magnesium (mg/L)_Total Metals	15.5	15.8	0.981012658	0
FR_UFR1	Manganese (mg/L)_Dissolved Metals	0.00087	0.0166	0.052409639	0
FR_UFR1	Manganese (mg/L)_Total Metals	0.021	0.0292	0.719178082	0
FR_UFR1	Mercury (mg/L)_Dissolved Metals	0.0000051	0.00005	0.102	0
FR_UFR1	Mercury (mg/L)_Total Metals	0.00000406	0.00001	0.406	0
FR_UFR1	Methyl mercury (µg/L)_Total Metals	0.00005	0.00005	1	0
FR_UFR1	Molybdenum (mg/L)_Dissolved Metals	0.00071	0.000705	1.007092199	1
FR_UFR1	Molybdenum (mg/L)_Total Metals	0.00075	0.000733	1.02319236	1
FR_UFR1	Nickel (mg/L)_Dissolved Metals	0.001	0.00096	1.041666667	1
FR_UFR1	Nickel (mg/L)_Total Metals	0.00121	0.00136	0.889705882	0
FR_UFR1	Nitrate (mg-N/l)_Nutrients and Biological Indicators	0.269	0.218	1.233944954	1
FR_UFR1	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.005	0.0057	0.877192982	0
FR_UFR1	Oxidation-Reduction Potential (mV)_Conventional Parameters	486	510	0.952941176	0
FR_UFR1	Oxidation-Reduction Potential (mV)_Field Measured	276.1	1904	0.145010504	0
FR_UFR1	pH (-)_Conventional Parameters	8.49	8.47	1.002361275	1
FR_UFR1	pH (-)_Field Measured	8.78	10.26	0.855750487	0
FR_UFR1	Potassium (mg/L)_Major Ions	0.493	2	0.2465	0
FR_UFR1	Potassium (mg/L)_Total Metals	0.542	2	0.271	0
FR_UFR1	Selenium (mg/L)_Dissolved Metals	0.00112	0.0012	0.933333333	0
FR_UFR1	Selenium (mg/L)_Total Metals	0.000976	0.00107	0.912149533	0
FR_UFR1	Silicon (mg/L)_Dissolved Metals	2.1	2.19	0.95890411	0
FR_UFR1	Silicon (mg/L)_Total Metals	2.99	3.11	0.961414791	0
FR_UFR1	Silver (mg/L)_Dissolved Metals	0.00002	0.00001	2	1
FR_UFR1	Silver (mg/L)_Total Metals	0.000048	0.000021	2.285714286	1
FR_UFR1	Sodium (mg/L)_Major Ions	0.858	2	0.429	0
FR_UFR1	Sodium (mg/L)_Total Metals	0.986	2	0.493	0
FR_UFR1	Strontium (mg/L)_Dissolved Metals	0.111	0.105	1.057142857	1
FR_UFR1	Strontium (mg/L)_Total Metals	0.109	0.111	0.981981982	0
FR_UFR1	Sulphate (mg/L)_Major Ions	53.1	49.9	1.064128257	1
FR_UFR1	Temperature (°C)_Field Measured	9.9	12.4	0.798387097	0
FR_UFR1	Thallium (mg/L)_Dissolved Metals	0.00002	0.00001	2	1
FR_UFR1	Thallium (mg/L)_Total Metals	0.00002	0.000035	0.571428571	0
FR_UFR1	Tin (mg/L)_Dissolved Metals	0.0002	0.00011	1.818181818	1
FR_UFR1	Tin (mg/L)_Total Metals	0.0002	0.00017	1.176470588	1
FR_UFR1	Titanium (mg/L)_Dissolved Metals	0.01	0.011	0.909090909	0
FR_UFR1	Titanium (mg/L)_Total Metals	0.017	0.023	0.739130435	0
FR_UFR1	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	182	165	1.103030303	1
FR_UFR1	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.162	0.0267	6.06741573	1
FR_UFR1	Total dissolved solids (mg/L)_Conventional Parameters	376	276	1.362318841	1
FR_UFR1	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.32	0.183	1.74863388	1
FR_UFR1	Total organic carbon (mg/L)_Conventional Parameters	4.08	10.1	0.403960396	0
FR_UFR1	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.014	0.0134	1.044776119	1
FR_UFR1	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0472	0.3	0.157333333	0
FR_UFR1	Total suspended solids (mg/L)_Conventional Parameters	23.9	242	0.098760331	0
FR_UFR1	Turbidity (NTU)_Conventional Parameters	21.3	93.6	0.227564103	0
FR_UFR1	Uranium (mg/L)_Dissolved Metals	0.000576	0.000529	1.088846881	1
FR_UFR1	Uranium (mg/L)_Total Metals	0.000568	0.000597	0.951423786	0
FR_UFR1	Vanadium (mg/L)_Dissolved Metals	0.001	0.001	1	0
FR_UFR1	Vanadium (mg/L)_Total Metals	0.00245	0.0021	1.166666667	1
FR_UFR1	Zinc (mg/L)_Dissolved Metals	0.003	0.005	0.6	0
FR_UFR1	Zinc (mg/L)_Total Metals	0.0137	0.0141	0.971631206	0
GH_CC1	Acidity, CaCO3 (mg/L)_Conventional Parameters	30.8	32.4	0.950617284	0
GH_CC1	Aluminum (mg/L)_Dissolved Metals	0.0031	0.015	0.206666667	0
GH_CC1	Aluminum (mg/L)_Total Metals	0.0099	0.015	0.66	0
GH_CC1	Antimony (mg/L)_Dissolved Metals	0.00059	0.00071	0.830985915	0
GH_CC1	Antimony (mg/L)_Total Metals	0.00095	0.00081	1.172839506	1
GH_CC1	Arsenic (mg/L)_Dissolved Metals	0.00028	0.0005	0.56	0
GH_CC1	Arsenic (mg/L)_Total Metals	0.00037	0.00113	0.327433628	0
GH_CC1	Barium (mg/L)_Dissolved Metals	0.0261	0.0299	0.872909699	0
GH_CC1	Barium (mg/L)_Total Metals	0.0427	0.0308	1.386363636	1
GH_CC1	Beryllium (mg/L)_Dissolved Metals	0.00004	0.0005	0.08	0
GH_CC1	Beryllium (mg/L)_Total Metals	0.00004	0.0005	0.08	0
GH_CC1	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	640	496	1.290322581	1
GH_CC1	Bismuth (mg/L)_Dissolved Metals	0.0001	0.0025	0.04	0
GH_CC1	Bismuth (mg/L)_Total Metals	0.0001	0.0025	0.04	0
GH_CC1	Boron (mg/L)_Dissolved Metals	0.02	0.05	0.4	0
GH_CC1	Boron (mg/L)_Total Metals	0.02	0.05	0.4	0
GH_CC1	Bromide (mg/L)_Major Ions	0.25	2.5	0.1	0
GH_CC1	Cadmium (mg/L)_Dissolved Metals	0.000853	0.000751	1.135818908	1
GH_CC1	Cadmium (mg/L)_Total Metals	0.0009	0.0011	0.818181818	0
GH_CC1	Calcium (mg/L)_Major Ions	476	486	0.979423868	0
GH_CC1	Calcium (mg/L)_Total Metals	882	499	1.76753507	1
GH_CC1	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	7	0.142857143	0
GH_CC1	Chloride (mg/L)_Major Ions	9	11	0.818181818	0
GH_CC1	Chromium (mg/L)_Dissolved Metals	0.00037	0.0005	0.74	0
GH_CC1	Chromium (mg/L)_Total Metals	0.00065	0.0005	1.3	1
GH_CC1	Cobalt (mg/L)_Dissolved Metals	0.0002	0.0005	0.4	0
GH_CC1	Cobalt (mg/L)_Total Metals	0.0002	0.0005	0.4	0
GH_CC1	Conductivity (µS/cm)_Conventional Parameters	3500	3420	1.023391813	1
GH_CC1	Conductivity (µS/cm)_Field Measured	3295	3240	1.016975309	1
GH_CC1	Copper (mg/L)_Dissolved Metals	0.0006	0.0025	0.24	0
GH_CC1	Copper (mg/L)_Total Metals	0.001	0.0025	0.4	0
GH_CC1	Daphnia magna, 48-hour, LC50 toxicity, mortality or lethal dose (%)_Toxicity	100	-	-	0
GH_CC1	Daphnia magna, 48-hour, LC50 toxicity, mortality or lethal dose (%v/v)_Toxicity	100	89.1	1.122334456	1
GH_CC1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility (%)_Toxicity	100	100	1	0
GH_CC1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility, 10 °C water (%)_Toxicity	63	100	0.63	0
GH_CC1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	100	100	1	0

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
GH_CC1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality, 10 °C water (%)_Toxicity	20	53.3	0.375234522	0
GH_CC1	Dissolved organic carbon (mg/L)_Conventional Parameters	2.66	2.9	0.917241379	0
GH_CC1	Dissolved Oxygen (%)_Field Measured	94.7	98.9	0.957532861	0
GH_CC1	Dissolved Oxygen (mg/L)_Field Measured	12.24	382.4	0.032008368	0
GH_CC1	Fluoride (mg/L)_Major Ions	0.19	1	0.19	0
GH_CC1	Hardness, as CaCO3 (mg/L)_Conventional Parameters	2870	2600	1.103846154	1
GH_CC1	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	2	0.5	0
GH_CC1	Iron (mg/L)_Dissolved Metals	0.02	0.05	0.4	0
GH_CC1	Iron (mg/L)_Total Metals	0.02	0.05	0.4	0
GH_CC1	Lead (mg/L)_Dissolved Metals	0.0001	0.00025	0.4	0
GH_CC1	Lead (mg/L)_Total Metals	0.0001	0.00025	0.4	0
GH_CC1	Lithium (mg/L)_Dissolved Metals	0.0904	0.0828	1.09178744	1
GH_CC1	Lithium (mg/L)_Total Metals	0.147	0.0822	1.788321168	1
GH_CC1	Magnesium (mg/L)_Major Ions	416	369	1.127371274	1
GH_CC1	Magnesium (mg/L)_Total Metals	736	382	1.926701571	1
GH_CC1	Manganese (mg/L)_Dissolved Metals	0.00142	0.00132	1.075757576	1
GH_CC1	Manganese (mg/L)_Total Metals	0.00255	0.00222	1.148648649	1
GH_CC1	Mercury (mg/L)_Dissolved Metals	0.0000052	0.00001	0.52	0
GH_CC1	Mercury (mg/L)_Total Metals	0.00000067	0.000059	0.011355932	0
GH_CC1	Methyl mercury (µg/L)_Total Metals	0.00002	-	-	0
GH_CC1	Molybdenum (mg/L)_Dissolved Metals	0.00325	0.00457	0.711159737	0
GH_CC1	Molybdenum (mg/L)_Total Metals	0.00566	0.00511	1.107632094	1
GH_CC1	Nickel (mg/L)_Dissolved Metals	0.0627	0.0602	1.041528239	1
GH_CC1	Nickel (mg/L)_Total Metals	0.0801	0.0623	1.285714286	1
GH_CC1	Nitrate (mg-N/l)_Nutrients and Biological Indicators	31.8	37.3	0.852546917	0
GH_CC1	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0301	0.072	0.418055556	0
GH_CC1	Oxidation-Reduction Potential (mV)_Conventional Parameters	498	516	0.965116279	0
GH_CC1	Oxidation-Reduction Potential (mV)_Field Measured	292.1	378.4	0.771934461	0
GH_CC1	pH (-)_Conventional Parameters	8.17	8.32	0.981971154	0
GH_CC1	pH (-)_Field Measured	8.28	10.5	0.788571429	0
GH_CC1	Potassium (mg/L)_Major Ions	5.63	5.14	1.095330739	1
GH_CC1	Potassium (mg/L)_Total Metals	9.99	5.15	1.939805825	1
GH_CC1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	10	10	1	0
GH_CC1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed (%)_Toxicity	0	0	-	0
GH_CC1	Selenium (mg/L)_Dissolved Metals	0.754	0.746	1.010723861	1
GH_CC1	Selenium (mg/L)_Total Metals	1.27	0.713	1.781206171	1
GH_CC1	Silicon (mg/L)_Dissolved Metals	2.93	3	0.976666667	0
GH_CC1	Silicon (mg/L)_Total Metals	5.41	3.09	1.750809061	1
GH_CC1	Silver (mg/L)_Dissolved Metals	0.00002	0.00005	0.4	0
GH_CC1	Silver (mg/L)_Total Metals	0.00002	0.00005	0.4	0
GH_CC1	Sodium (mg/L)_Major Ions	2.34	3.09	0.757281553	0
GH_CC1	Sodium (mg/L)_Total Metals	4.06	3.09	1.313915858	1
GH_CC1	Strontium (mg/L)_Dissolved Metals	0.276	0.267	1.033707865	1
GH_CC1	Strontium (mg/L)_Total Metals	0.509	0.273	1.864468864	1
GH_CC1	Sulphate (mg/L)_Major Ions	2050	2110	0.971563981	0
GH_CC1	Temperature (°C)_Field Measured	10.2	9.4	1.085106383	1
GH_CC1	Thallium (mg/L)_Dissolved Metals	0.000073	0.000067	1.089552239	1
GH_CC1	Thallium (mg/L)_Total Metals	0.000094	0.00008	1.175	1
GH_CC1	Tin (mg/L)_Dissolved Metals	0.0002	0.0005	0.4	0
GH_CC1	Tin (mg/L)_Total Metals	0.0002	0.0005	0.4	0
GH_CC1	Titanium (mg/L)_Dissolved Metals	0.01	0.031	0.322580645	0
GH_CC1	Titanium (mg/L)_Total Metals	0.01	0.03	0.333333333	0
GH_CC1	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	640	496	1.290322581	1
GH_CC1	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.0854	0.0188	4.542553191	1
GH_CC1	Total dissolved solids (mg/L)_Conventional Parameters	3770	3890	0.969151671	0
GH_CC1	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	2.16	2.77	0.779783394	0
GH_CC1	Total organic carbon (mg/L)_Conventional Parameters	2.62	9.92	0.264112903	0
GH_CC1	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0021	0.0041	0.512195122	0
GH_CC1	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0068	0.3	0.022666667	0
GH_CC1	Total suspended solids (mg/L)_Conventional Parameters	6.7	37.4	0.179144385	0
GH_CC1	Turbidity (NTU)_Conventional Parameters	5.93	34.4	0.172383721	0
GH_CC1	Turbidity (NTU)_Field Measured	0.39	3.42	0.114035088	0
GH_CC1	Uranium (mg/L)_Dissolved Metals	0.025	0.0221	1.131221719	1
GH_CC1	Uranium (mg/L)_Total Metals	0.0382	0.0241	1.585062241	1
GH_CC1	Vanadium (mg/L)_Dissolved Metals	0.001	0.005	0.2	0
GH_CC1	Vanadium (mg/L)_Total Metals	0.001	0.005	0.2	0
GH_CC1	Zinc (mg/L)_Dissolved Metals	0.0428	0.0428	1	0
GH_CC1	Zinc (mg/L)_Total Metals	0.044	0.0575	0.765217391	0
GH_FR1	Acidity, CaCO3 (mg/L)_Conventional Parameters	3.3	7.2	0.458333333	0
GH_FR1	Aluminum (mg/L)_Dissolved Metals	0.0189	0.273	0.069230769	0
GH_FR1	Aluminum (mg/L)_Total Metals	0.881	1.43	0.616083916	0
GH_FR1	Antimony (mg/L)_Dissolved Metals	0.00048	0.00065	0.738461538	0
GH_FR1	Antimony (mg/L)_Total Metals	0.00047	0.00091	0.516483516	0
GH_FR1	Arsenic (mg/L)_Dissolved Metals	0.0002	0.0005	0.4	0
GH_FR1	Arsenic (mg/L)_Total Metals	0.00061	0.00059	1.033898305	1
GH_FR1	Barium (mg/L)_Dissolved Metals	0.147	0.151	0.973509934	0
GH_FR1	Barium (mg/L)_Total Metals	0.133	0.143	0.93006993	0
GH_FR1	Beryllium (mg/L)_Dissolved Metals	0.00004	0.0001	0.4	0
GH_FR1	Beryllium (mg/L)_Total Metals	0.0001	0.0001	1	0
GH_FR1	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	281	216	1.300925926	1
GH_FR1	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	2	2.8	0.714285714	0
GH_FR1	Bismuth (mg/L)_Dissolved Metals	0.0001	0.0005	0.2	0
GH_FR1	Bismuth (mg/L)_Total Metals	0.0001	0.0005	0.2	0
GH_FR1	Boron (mg/L)_Dissolved Metals	0.02	0.05	0.4	0
GH_FR1	Boron (mg/L)_Total Metals	0.02	0.05	0.4	0
GH_FR1	Bromide (mg/L)_Major Ions	0.25	-	-	0
GH_FR1	Cadmium (mg/L)_Dissolved Metals	0.0000377	0.000165	0.228484848	0
GH_FR1	Cadmium (mg/L)_Total Metals	0.000163	0.000197	0.827411168	0
GH_FR1	Calcium (mg/L)_Major Ions	135	128	1.0546875	1
GH_FR1	Calcium (mg/L)_Total Metals	139	131	1.061068702	1
GH_FR1	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	20.8	16.2	1.283950617	1
GH_FR1	Cesium (mg/L)_Total Metals	0.00003	-	-	0
GH_FR1	Chloride (mg/L)_Major Ions	3.6	5.44	0.661764706	0
GH_FR1	Chromium (mg/L)_Dissolved Metals	0.00055	0.0005	1.1	1
GH_FR1	Chromium (mg/L)_Total Metals	0.0023	0.00211	1.090047393	1
GH_FR1	Cobalt (mg/L)_Dissolved Metals	0.0002	0.00057	0.350877193	0
GH_FR1	Cobalt (mg/L)_Total Metals	0.00077	0.0009	0.855555556	0
GH_FR1	Colour (CU)_Conventional Parameters	15.7	8.1	1.938271605	1
GH_FR1	Conductivity (µS/cm at 25 C)_Field Measured	849	715	1.187412587	1
GH_FR1	Conductivity (µS/cm)_Conventional Parameters	1040	985	1.055837563	1
GH_FR1	Conductivity (µS/cm)_Field Measured	1005	976	1.029713115	1
GH_FR1	Conductivity (µS/cmA)_Field Measured	548	-	-	0
GH_FR1	Copper (mg/L)_Dissolved Metals	0.00066	0.00122	0.540983607	0
GH_FR1	Copper (mg/L)_Total Metals	0.00232	0.00268	0.865671642	0
GH_FR1	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	0.01	0.005	2	1
GH_FR1	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	0.039	0.005	7.8	1
GH_FR1	Dissolved organic carbon (mg/L)_Conventional Parameters	4.04	3.39	1.191740413	1
GH_FR1	Dissolved Oxygen (%)_Field Measured	90.6	96.5	0.938860104	0
GH_FR1	Dissolved Oxygen (mg/L)_Field Measured	13.01	13.3	0.978195489	0
GH_FR1	Dissolved Selenate (µg/L)_Speciation of Selenium	56.5	17.8	3.174157303	1
GH_FR1	Dissolved Selenite (µg/L)_Speciation of Selenium	0.444	0.107	4.14953271	1
GH_FR1	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	0.04	0.015	2.666666667	1
GH_FR1	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	0.01	0.005	2	1
GH_FR1	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	0.06	0.02	3	1
GH_FR1	Fluoride (mg/L)_Major Ions	0.23	0.38	0.605263158	0
GH_FR1	Hardness, as CaCO3 (mg/L)_Conventional Parameters	608	549	1.107468124	1
GH_FR1	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	2	0.5	0
GH_FR1	Iron (mg/L)_Dissolved Metals	0.02	0.253	0.079051383	0
GH_FR1	Iron (mg/L)_Total Metals	1.05	1.17	0.897435897	0
GH_FR1	Lead (mg/L)_Dissolved Metals	0.000303	0.000732	0.413934426	0
GH_FR1	Lead (mg/L)_Total Metals	0.00084	0.00113	0.743362832	0
GH_FR1	Lithium (mg/L)_Dissolved Metals	0.0248	0.0203	1.221674877	1
GH_FR1	Lithium (mg/L)_Total Metals	0.0236	0.0212	1.113207547	1
GH_FR1	Magnesium (mg/L)_Major Ions	71.6	59.5	1.203361345	1
GH_FR1	Magnesium (mg/L)_Total Metals	74	60	1.233333333	1
GH_FR1	Manganese (mg/L)_Dissolved Metals	0.00521	0.028	0.186071429	0
GH_FR1	Manganese (mg/L)_Total Metals	0.0446	0.0406	1.098522167	1
GH_FR1	Mercury (mg/L)_Dissolved Metals	0.000025	0.00001	2.5	1
GH_FR1	Mercury (mg/L)_Total Metals	0.00000845	0.00001	0.845	0
GH_FR1	Methyl mercury (µg/L)_Total Metals	0.00005	0.000071	0.704225352	0
GH_FR1	Molybdenum (mg/L)_Dissolved Metals	0.00359	0.00164	2.18902439	1
GH_FR1	Molybdenum (mg/L)_Total Metals	0.00339	0.00162	2.092592593	1
GH_FR1	Nickel (mg/L)_Dissolved Metals	0.00578	0.00489	1.18200409	1
GH_FR1	Nickel (mg/L)_Total Metals	0.00791	0.00578	1.368512111	1
GH_FR1	Nitrate (mg-N/l)_Nutrients and Biological Indicators	13.3	16.2	0.820987654	0
GH_FR1	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0154	-	-	0
GH_FR1	Oxidation-Reduction Potential (mV)_Conventional Parameters	488	521	0.936660269	0
GH_FR1	Oxidation-Reduction Potential (mV)_Field Measured	273.4	369.7	0.739518529	0
GH_FR1	pH (-)_Conventional Parameters	8.56	8.46	1.011820331	1
GH_FR1	pH (-)_Field Measured	8.62	9.56	0.90167364	0
GH_FR1	Potassium (mg/L)_Major Ions	1.76	2	0.88	0
GH_FR1	Potassium (mg/L)_Total Metals	1.69	2.2	0.768181818	0
GH_FR1	Rubidium (mg/L)_Total Metals	0.00063	-	-	0
GH_FR1	Selenium (mg/L)_Dissolved Metals	0.082	0.0678	1.209439528	1
GH_FR1	Selenium (mg/L)_Total Metals	0.075	0.0697	1.076040172	1
GH_FR1	Silicon (mg/L)_Dissolved Metals	2.58	3.12	0.826923077	0

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
GH_FR1	Silicon (mg/L)_Total Metals	3.94	6.07	0.649093904	0
GH_FR1	Silver (mg/L)_Dissolved Metals	0.00002	0.00005	0.4	0
GH_FR1	Silver (mg/L)_Total Metals	0.000037	0.00005	0.74	0
GH_FR1	Sodium (mg/L)_Major Ions	3.24	2.9	1.117241379	1
GH_FR1	Sodium (mg/L)_Total Metals	3.18	3.4	0.935294118	0
GH_FR1	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	953	-	-	0
GH_FR1	Specific Conductivity (temperature corrected at 25 °C) (µS/cm)_Field Measured	972	-	-	0
GH_FR1	Strontium (mg/L)_Dissolved Metals	0.206	0.2	1.03	1
GH_FR1	Strontium (mg/L)_Total Metals	0.206	0.19	1.084210526	1
GH_FR1	Sulphate (mg/L)_Major Ions	328	305	1.075409836	1
GH_FR1	Sulphur (mg/L)_Total Metals	33.3	-	-	0
GH_FR1	Tellurium (mg/L)_Total Metals	0.0002	-	-	0
GH_FR1	Temperature (°C)_Field Measured	11.1	12.2	0.909836066	0
GH_FR1	Thallium (mg/L)_Dissolved Metals	0.00002	0.00005	0.4	0
GH_FR1	Thallium (mg/L)_Total Metals	0.000039	0.00005	0.78	0
GH_FR1	Thorium (mg/L)_Total Metals	0.0001	-	-	0
GH_FR1	Tin (mg/L)_Dissolved Metals	0.0002	0.0005	0.4	0
GH_FR1	Tin (mg/L)_Total Metals	0.0002	0.0005	0.4	0
GH_FR1	Titanium (mg/L)_Dissolved Metals	0.01	0.023	0.434782609	0
GH_FR1	Titanium (mg/L)_Total Metals	0.01	0.069	0.144927536	0
GH_FR1	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	281	228	1.23245614	1
GH_FR1	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.15	0.0433	3.464203233	1
GH_FR1	Total dissolved solids (mg/L)_Conventional Parameters	794	788	1.007614213	1
GH_FR1	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.941	-	-	0
GH_FR1	Total organic carbon (mg/L)_Conventional Parameters	7.01	51.8	0.135328185	0
GH_FR1	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0077	0.0134	0.574626866	0
GH_FR1	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0873	0.3	0.291	0
GH_FR1	Total suspended solids (mg/L)_Conventional Parameters	66.9	111	0.602702703	0
GH_FR1	Tungsten (mg/L)_Total Metals	0.0001	-	-	0
GH_FR1	Turbidity (NTU)_Conventional Parameters	109	177.8	0.613048369	0
GH_FR1	Turbidity (NTU)_Field Measured	62.4	146	0.42739726	0
GH_FR1	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	0.06	0.015	4	1
GH_FR1	Uranium (mg/L)_Dissolved Metals	0.00361	0.00313	1.153354633	1
GH_FR1	Uranium (mg/L)_Total Metals	0.00349	0.00313	1.115015974	1
GH_FR1	Vanadium (mg/L)_Dissolved Metals	0.001	0.0025	0.4	0
GH_FR1	Vanadium (mg/L)_Total Metals	0.00381	0.0053	0.718867925	0
GH_FR1	Zinc (mg/L)_Dissolved Metals	0.003	0.0068	0.441176471	0
GH_FR1	Zinc (mg/L)_Total Metals	0.0115	0.015	0.766666667	0
GH_FR1	Zirconium (mg/L)_Total Metals	0.000113	-	-	0
GH_GH1	2-Bromobenzotrifluoride (%)_Unknown	97.1	102.8	0.944552529	0
GH_GH1	Acidity, CaCO3 (mg/L)_Conventional Parameters	2.9	10.1	0.287128713	0
GH_GH1	Aluminum (mg/L)_Dissolved Metals	0.0133	0.0338	0.393491124	0
GH_GH1	Aluminum (mg/L)_Total Metals	1.42	2.94	0.482993197	0
GH_GH1	Antimony (mg/L)_Dissolved Metals	0.0018	0.00148	1.216216216	1
GH_GH1	Antimony (mg/L)_Total Metals	0.00182	0.00151	1.205298013	1
GH_GH1	Arsenic (mg/L)_Dissolved Metals	0.00025	0.00034	0.735294118	0
GH_GH1	Arsenic (mg/L)_Total Metals	0.00051	0.0015	0.34	0
GH_GH1	Barium (mg/L)_Dissolved Metals	0.0778	0.0725	1.073103448	1
GH_GH1	Barium (mg/L)_Total Metals	0.0766	0.126	0.607936508	0
GH_GH1	Beryllium (mg/L)_Dissolved Metals	0.00004	0.0001	0.4	0
GH_GH1	Beryllium (mg/L)_Total Metals	0.000051	0.00024	0.2125	0
GH_GH1	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	319	331	0.963746224	0
GH_GH1	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	2	2	1	0
GH_GH1	Bismuth (mg/L)_Dissolved Metals	0.0001	0.0005	0.2	0
GH_GH1	Bismuth (mg/L)_Total Metals	0.0001	0.0005	0.2	0
GH_GH1	Boron (mg/L)_Dissolved Metals	0.02	0.019	1.052631579	1
GH_GH1	Boron (mg/L)_Total Metals	0.02	0.02	1	0
GH_GH1	Bromide (mg/L)_Major Ions	0.5	1	0.5	0
GH_GH1	Cadmium (mg/L)_Dissolved Metals	0.000169	0.000215	0.786046512	0
GH_GH1	Cadmium (mg/L)_Total Metals	0.000193	0.000428	0.450934579	0
GH_GH1	Calcium (mg/L)_Major Ions	222	219	1.01369863	1
GH_GH1	Calcium (mg/L)_Total Metals	214	218	0.981651376	0
GH_GH1	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	35.4	23.3	1.519313305	1
GH_GH1	Chloride (mg/L)_Major Ions	7.6	15.7	0.484076433	0
GH_GH1	Chromium (mg/L)_Dissolved Metals	0.0002	0.00033	0.606060606	0
GH_GH1	Chromium (mg/L)_Total Metals	0.00215	0.0045	0.477777778	0
GH_GH1	Cobalt (mg/L)_Dissolved Metals	0.00041	0.00218	0.188073394	0
GH_GH1	Cobalt (mg/L)_Total Metals	0.0007	0.00232	0.301724138	0
GH_GH1	Colour (CU)_Conventional Parameters	7.7	23.3	0.330472103	0
GH_GH1	Conductivity (µS/cm)_Conventional Parameters	1840	1700	1.082352941	1
GH_GH1	Conductivity (µS/cm)_Field Measured	3257	6182.1	0.526843629	0
GH_GH1	Conductivity (µS/cmA)_Field Measured	1341	-	-	0
GH_GH1	Copper (mg/L)_Dissolved Metals	0.00081	0.00097	0.835051546	0
GH_GH1	Copper (mg/L)_Total Metals	0.00194	0.007	0.277142857	0
GH_GH1	Daphnia magna, 48-hour, LC50 toxicity, mortality or lethal dose (%)_Toxicity	0	-	-	0
GH_GH1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility (%)_Toxicity	0	0	-	0
GH_GH1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	0	3.3	0	0
GH_GH1	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	0.016	-	-	0
GH_GH1	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	0.085	0.15	0.566666667	0
GH_GH1	Dissolved organic carbon (mg/L)_Conventional Parameters	6.6	6.51	1.013824885	1
GH_GH1	Dissolved Oxygen (%)_Field Measured	101.5	101.5	1	0
GH_GH1	Dissolved Oxygen (mg/L)_Field Measured	13.1	14.65	0.894197952	0
GH_GH1	Dissolved Selenate (µg/L)_Speciation of Selenium	60.8	51.1	1.189823875	1
GH_GH1	Dissolved Selenite (µg/L)_Speciation of Selenium	1.15	3.29	0.349544073	0
GH_GH1	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	0.04	0.25	0.16	0
GH_GH1	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	0.01	0.15	0.066666667	0
GH_GH1	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	0.06	0.3	0.2	0
GH_GH1	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	0.25	0.25	1	0
GH_GH1	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	0.25	0.25	1	0
GH_GH1	Fluoride (mg/L)_Major Ions	0.27	0.93	0.290322581	0
GH_GH1	Hardness, as CaCO3 (mg/L)_Conventional Parameters	1250	1160	1.077586207	1
GH_GH1	Hydrogen Sulphide (mg/L)_Major Ions	0.0016	-	-	0
GH_GH1	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	1	1	0
GH_GH1	Iron (mg/L)_Dissolved Metals	0.024	0.032	0.75	0
GH_GH1	Iron (mg/L)_Total Metals	0.71	2.89	0.24567474	0
GH_GH1	Lead (mg/L)_Dissolved Metals	0.000108	0.000068	1.588235294	1
GH_GH1	Lead (mg/L)_Total Metals	0.000607	0.00286	0.212237762	0
GH_GH1	Lithium (mg/L)_Dissolved Metals	0.0297	0.016	1.85625	1
GH_GH1	Lithium (mg/L)_Total Metals	0.0341	0.017	2.005882353	1
GH_GH1	Magnesium (mg/L)_Major Ions	184	150	1.226666667	1
GH_GH1	Magnesium (mg/L)_Total Metals	188	162	1.160493827	1
GH_GH1	Manganese (mg/L)_Dissolved Metals	0.00752	0.0266	0.282706767	0
GH_GH1	Manganese (mg/L)_Total Metals	0.0176	0.0761	0.231274639	0
GH_GH1	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
GH_GH1	Mercury (mg/L)_Total Metals	0.00000931	0.00005	0.1862	0
GH_GH1	Methyl mercury (µg/L)_Total Metals	0.000047	0.00005	0.94	0
GH_GH1	Microcystin (µg/L)_Bacterial	0.2	-	-	0
GH_GH1	Molybdenum (mg/L)_Dissolved Metals	0.0213	0.0085	2.505882353	1
GH_GH1	Molybdenum (mg/L)_Total Metals	0.0213	0.00853	2.497069168	1
GH_GH1	Nickel (mg/L)_Dissolved Metals	0.0311	0.039	0.797435897	0
GH_GH1	Nickel (mg/L)_Total Metals	0.0312	0.0402	0.776119403	0
GH_GH1	Nitrate (mg-N/l)_Nutrients and Biological Indicators	8.75	8.82	0.992063492	0
GH_GH1	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0395	1.31	0.030152672	0
GH_GH1	Oxidation-Reduction Potential (mV)_Conventional Parameters	451	509	0.886051081	0
GH_GH1	Oxidation-Reduction Potential (mV)_Field Measured	274.8	389.6	0.705338809	0
GH_GH1	pH (-)_Conventional Parameters	8.67	8.59	1.009313155	1
GH_GH1	pH (-)_Field Measured	8.68	8.8	0.986363636	0
GH_GH1	Potassium (mg/L)_Major Ions	3.81	3.27	1.165137615	1
GH_GH1	Potassium (mg/L)_Total Metals	3.61	3.4	1.061764706	1
GH_GH1	Rainbow trout, 96-hour, LC50 toxicity, mortality or lethal dose (%)_Toxicity	0	-	-	0
GH_GH1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	0	10	0	0
GH_GH1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed (%)_Toxicity	0	0	-	0
GH_GH1	Selenium (mg/L)_Dissolved Metals	0.199	0.176	1.130681818	1
GH_GH1	Selenium (mg/L)_Total Metals	0.19	0.185	1.027027027	1
GH_GH1	Silicon (mg/L)_Dissolved Metals	3.99	3.87	1.031007752	1
GH_GH1	Silicon (mg/L)_Total Metals	5.72	11.1	0.515315315	0
GH_GH1	Silver (mg/L)_Dissolved Metals	0.00002	0.000016	1.25	1
GH_GH1	Silver (mg/L)_Total Metals	0.000029	0.000083	0.34939759	0
GH_GH1	Sodium (mg/L)_Major Ions	4.75	8.2	0.579268293	0
GH_GH1	Sodium (mg/L)_Total Metals	4.33	8.8	0.492045455	0
GH_GH1	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	1109	-	-	0
GH_GH1	Strontium (mg/L)_Dissolved Metals	0.312	0.245	1.273469388	1
GH_GH1	Strontium (mg/L)_Total Metals	0.298	0.243	1.226337449	1
GH_GH1	Sulphate (mg/L)_Major Ions	906	825	1.098181818	1
GH_GH1	Sulphide (mg/L)_Major Ions	0.0015	-	-	0
GH_GH1	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	0.5	0.5	1	0
GH_GH1	Temperature (°C)_Field Measured	18.4	18.82	0.977683316	0
GH_GH1	Thallium (mg/L)_Dissolved Metals	0.00002	0.000014	1.428571429	1
GH_GH1	Thallium (mg/L)_Total Metals	0.000033	0.000099	0.333333333	0
GH_GH1	Tin (mg/L)_Dissolved Metals	0.0002	0.00012	1.666666667	1
GH_GH1	Tin (mg/L)_Total Metals	0.0002	0.00011	1.818181818	1
GH_GH1	Titanium (mg/L)_Dissolved Metals	0.01	0.022	0.454545455	0
GH_GH1	Titanium (mg/L)_Total Metals	0.042	0.156	0.269230769	0
GH_GH1	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	319	334	0.95508982	0
GH_GH1	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.152	0.174	0.873563218	0
GH_GH1	Total dissolved solids (mg/L)_Conventional Parameters	1770	1640	1.079268293	1

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
GH_GH1	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	0.25	0.25	1	0
GH_GH1	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.769	0.878	0.875854214	0
GH_GH1	Total organic carbon (mg/L)_Conventional Parameters	9.2	39.6	0.232323232	0
GH_GH1	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0148	0.0638	0.231974922	0
GH_GH1	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0476	0.3	0.158666667	0
GH_GH1	Total suspended solids (mg/L)_Conventional Parameters	39.7	362	0.109668508	0
GH_GH1	Turbidity (NTU)_Conventional Parameters	56.1	511.1	0.109763256	0
GH_GH1	Turbidity (NTU)_Field Measured	38.7	790	0.048987342	0
GH_GH1	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	0.06	0.3	0.2	0
GH_GH1	Uranium (mg/L)_Dissolved Metals	0.00963	0.00973	0.989722508	0
GH_GH1	Uranium (mg/L)_Total Metals	0.00942	0.0103	0.914563107	0
GH_GH1	Vanadium (mg/L)_Dissolved Metals	0.001	0.001	1	0
GH_GH1	Vanadium (mg/L)_Total Metals	0.0045	0.0114	0.394736842	0
GH_GH1	Zinc (mg/L)_Dissolved Metals	0.012	0.0141	0.85106383	0
GH_GH1	Zinc (mg/L)_Total Metals	0.0237	0.0275	0.861818182	0
GH_PC1	2-Bromobenzotrifluoride (%)_Unknown	100.8	102.2	0.98630137	0
GH_PC1	Acidity, CaCO3 (mg/L)_Conventional Parameters	7.9	10.3	0.766990291	0
GH_PC1	Aluminum (mg/L)_Dissolved Metals	0.0034	0.017	0.2	0
GH_PC1	Aluminum (mg/L)_Total Metals	0.138	0.281	0.491103203	0
GH_PC1	Antimony (mg/L)_Dissolved Metals	0.0001	0.0005	0.2	0
GH_PC1	Antimony (mg/L)_Total Metals	0.00034	0.0005	0.68	0
GH_PC1	Arsenic (mg/L)_Dissolved Metals	0.00026	0.0005	0.52	0
GH_PC1	Arsenic (mg/L)_Total Metals	0.00038	0.00076	0.5	0
GH_PC1	Barium (mg/L)_Dissolved Metals	0.105	0.102	1.029411765	1
GH_PC1	Barium (mg/L)_Total Metals	0.0965	0.0947	1.019007392	1
GH_PC1	Beryllium (mg/L)_Dissolved Metals	0.00002	0.0001	0.2	0
GH_PC1	Beryllium (mg/L)_Total Metals	0.00004	0.0001	0.4	0
GH_PC1	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	299	219	1.365296804	1
GH_PC1	Bismuth (mg/L)_Dissolved Metals	0.00005	0.0005	0.1	0
GH_PC1	Bismuth (mg/L)_Total Metals	0.0001	0.0005	0.2	0
GH_PC1	Boron (mg/L)_Dissolved Metals	0.01	0.05	0.2	0
GH_PC1	Boron (mg/L)_Total Metals	0.02	0.05	0.4	0
GH_PC1	Bromide (mg/L)_Major Ions	0.34	1	0.34	0
GH_PC1	Cadmium (mg/L)_Dissolved Metals	0.0000324	0.0000424	0.764150943	0
GH_PC1	Cadmium (mg/L)_Total Metals	0.0000483	0.00015	0.322	0
GH_PC1	Calcium (mg/L)_Major Ions	142	135	1.051851852	1
GH_PC1	Calcium (mg/L)_Total Metals	154	139	1.107913669	1
GH_PC1	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	28.4	18.2	1.56043956	1
GH_PC1	Chloride (mg/L)_Major Ions	2.5	5	0.5	0
GH_PC1	Chromium (mg/L)_Dissolved Metals	0.00052	0.0005	1.04	1
GH_PC1	Chromium (mg/L)_Total Metals	0.00099	0.00078	1.269230769	1
GH_PC1	Cobalt (mg/L)_Dissolved Metals	0.0002	0.0005	0.4	0
GH_PC1	Cobalt (mg/L)_Total Metals	0.0002	0.00051	0.392156863	0
GH_PC1	Conductivity (µS/cm)_Conventional Parameters	3100	1180	2.627118644	1
GH_PC1	Conductivity (µS/cm)_Field Measured	1164	1124	1.035587189	1
GH_PC1	Copper (mg/L)_Dissolved Metals	0.0005	0.001	0.5	0
GH_PC1	Copper (mg/L)_Total Metals	0.001	0.00354	0.282485876	0
GH_PC1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility (%)_Toxicity	0	87	0	0
GH_PC1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	0	40	0	0
GH_PC1	Dissolved organic carbon (mg/L)_Conventional Parameters	3.74	4.55	0.821978022	0
GH_PC1	Dissolved Oxygen (%)_Field Measured	110.8	103.1	1.074684772	1
GH_PC1	Dissolved Oxygen (mg/L)_Field Measured	13.78	169.8	0.081154299	0
GH_PC1	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	0.25	0.25	1	0
GH_PC1	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	0.25	0.25	1	0
GH_PC1	Fluoride (mg/L)_Major Ions	0.444	0.62	0.716129032	0
GH_PC1	Hardness, as CaCO3 (mg/L)_Conventional Parameters	743	716	1.037709497	1
GH_PC1	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	248	2	124	1
GH_PC1	Iron (mg/L)_Dissolved Metals	0.01	0.05	0.2	0
GH_PC1	Iron (mg/L)_Total Metals	0.166	0.394	0.421319797	0
GH_PC1	Lead (mg/L)_Dissolved Metals	0.00005	0.00025	0.2	0
GH_PC1	Lead (mg/L)_Total Metals	0.000136	0.0005	0.272	0
GH_PC1	Lithium (mg/L)_Dissolved Metals	0.0099	0.012	0.825	0
GH_PC1	Lithium (mg/L)_Total Metals	0.01	0.0116	0.862068966	0
GH_PC1	Magnesium (mg/L)_Major Ions	100	92	1.086956522	1
GH_PC1	Magnesium (mg/L)_Total Metals	99.1	94.6	1.04756871	1
GH_PC1	Manganese (mg/L)_Dissolved Metals	0.00068	0.0043	0.158139535	0
GH_PC1	Manganese (mg/L)_Total Metals	0.00308	0.00957	0.32183908	0
GH_PC1	Mercury (mg/L)_Dissolved Metals	0.0000077	0.00001	0.77	0
GH_PC1	Mercury (mg/L)_Total Metals	0.00000275	0.00001	0.275	0
GH_PC1	Methyl mercury (µg/L)_Total Metals	0.00002	-	-	0
GH_PC1	Molybdenum (mg/L)_Dissolved Metals	0.00331	0.00324	1.021604938	1
GH_PC1	Molybdenum (mg/L)_Total Metals	0.00363	0.00338	1.073964497	1
GH_PC1	Nickel (mg/L)_Dissolved Metals	0.00148	0.0025	0.592	0
GH_PC1	Nickel (mg/L)_Total Metals	0.00168	0.00304	0.552631579	0
GH_PC1	Nitrate (mg-N/l)_Nutrients and Biological Indicators	28.1	3.96	7.095959596	1
GH_PC1	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0103	0.021	0.49047619	0
GH_PC1	Oxidation-Reduction Potential (mV)_Conventional Parameters	433	506	0.855731225	0
GH_PC1	Oxidation-Reduction Potential (mV)_Field Measured	277.4	1381	0.200868936	0
GH_PC1	pH (-)_Conventional Parameters	8.57	8.51	1.007050529	1
GH_PC1	pH (-)_Field Measured	9.14	10.32	0.885658915	0
GH_PC1	Potassium (mg/L)_Major Ions	1.34	2	0.67	0
GH_PC1	Potassium (mg/L)_Total Metals	1.32	2	0.66	0
GH_PC1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	10	10	1	0
GH_PC1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed (%)_Toxicity	10	0	Inf	1
GH_PC1	Selenium (mg/L)_Dissolved Metals	0.112	0.12	0.933333333	0
GH_PC1	Selenium (mg/L)_Total Metals	0.105	0.116	0.905172414	0
GH_PC1	Silicon (mg/L)_Dissolved Metals	2.71	2.67	1.014981273	1
GH_PC1	Silicon (mg/L)_Total Metals	2.77	2.91	0.951890034	0
GH_PC1	Silver (mg/L)_Dissolved Metals	0.00001	0.00005	0.2	0
GH_PC1	Silver (mg/L)_Total Metals	0.00002	0.00005	0.4	0
GH_PC1	Sodium (mg/L)_Major Ions	1.1	2	0.55	0
GH_PC1	Sodium (mg/L)_Total Metals	1.09	2	0.545	0
GH_PC1	Strontium (mg/L)_Dissolved Metals	0.168	0.155	1.083870968	1
GH_PC1	Strontium (mg/L)_Total Metals	0.169	0.164	1.030487805	1
GH_PC1	Sulphate (mg/L)_Major Ions	1770	471	3.757961783	1
GH_PC1	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	0.5	0.5	1	0
GH_PC1	Temperature (°C)_Field Measured	8.6	10.3	0.834951456	0
GH_PC1	Thallium (mg/L)_Dissolved Metals	0.000013	0.00005	0.26	0
GH_PC1	Thallium (mg/L)_Total Metals	0.00002	0.00005	0.4	0
GH_PC1	Tin (mg/L)_Dissolved Metals	0.0001	0.0005	0.2	0
GH_PC1	Tin (mg/L)_Total Metals	0.0002	0.0005	0.4	0
GH_PC1	Titanium (mg/L)_Dissolved Metals	0.01	0.021	0.476190476	0
GH_PC1	Titanium (mg/L)_Total Metals	0.01	0.021	0.476190476	0
GH_PC1	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	299	247	1.210526316	1
GH_PC1	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.0344	0.0197	1.746192893	1
GH_PC1	Total dissolved solids (mg/L)_Conventional Parameters	3070	998	3.076152305	1
GH_PC1	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	0.25	0.25	1	0
GH_PC1	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	1.96	0.344	5.697674419	1
GH_PC1	Total organic carbon (mg/L)_Conventional Parameters	4.95	9.29	0.532831001	0
GH_PC1	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0058	0.0055	1.054545455	1
GH_PC1	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0146	0.3	0.048666667	0
GH_PC1	Total suspended solids (mg/L)_Conventional Parameters	6.5	39.6	0.164141414	0
GH_PC1	Turbidity (NTU)_Conventional Parameters	9.08	34.8	0.26091954	0
GH_PC1	Turbidity (NTU)_Field Measured	0.26	154	0.001688312	0
GH_PC1	Uranium (mg/L)_Dissolved Metals	0.00609	0.00571	1.066549912	1
GH_PC1	Uranium (mg/L)_Total Metals	0.00615	0.00573	1.073298429	1
GH_PC1	Vanadium (mg/L)_Dissolved Metals	0.001	0.0025	0.4	0
GH_PC1	Vanadium (mg/L)_Total Metals	0.00128	0.0025	0.512	0
GH_PC1	Zinc (mg/L)_Dissolved Metals	0.0071	0.0099	0.717171717	0
GH_PC1	Zinc (mg/L)_Total Metals	0.0076	0.015	0.506666667	0
GH_PC2	Acidity, CaCO3 (mg/L)_Conventional Parameters	6.3	11.9	0.529411765	0
GH_PC2	Aluminum (mg/L)_Dissolved Metals	0.005	0.0132	0.378787879	0
GH_PC2	Aluminum (mg/L)_Total Metals	0.18	0.616	0.292207792	0
GH_PC2	Antimony (mg/L)_Dissolved Metals	0.0002	0.00032	0.625	0
GH_PC2	Antimony (mg/L)_Total Metals	0.00021	0.00035	0.6	0
GH_PC2	Arsenic (mg/L)_Dissolved Metals	0.00022	0.00011	2	1
GH_PC2	Arsenic (mg/L)_Total Metals	0.00026	0.00041	0.634146341	0
GH_PC2	Barium (mg/L)_Dissolved Metals	0.113	0.15	0.753333333	0
GH_PC2	Barium (mg/L)_Total Metals	0.117	0.156	0.75	0
GH_PC2	Beryllium (mg/L)_Dissolved Metals	0.00004	0.0001	0.4	0
GH_PC2	Beryllium (mg/L)_Total Metals	0.00004	0.0001	0.4	0
GH_PC2	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	244	234	1.042735043	1
GH_PC2	Bismuth (mg/L)_Dissolved Metals	0.0001	0.0005	0.2	0
GH_PC2	Bismuth (mg/L)_Total Metals	0.0001	0.0005	0.2	0
GH_PC2	Boron (mg/L)_Dissolved Metals	0.02	0.02	1	0
GH_PC2	Boron (mg/L)_Total Metals	0.02	0.021	0.952380952	0
GH_PC2	Bromide (mg/L)_Major Ions	0.25	0.5	0.5	0
GH_PC2	Cadmium (mg/L)_Dissolved Metals	0.0000747	0.000094	0.794680851	0
GH_PC2	Cadmium (mg/L)_Total Metals	0.000112	0.00107	0.104672897	0
GH_PC2	Calcium (mg/L)_Major Ions	162	168	0.964285714	0
GH_PC2	Calcium (mg/L)_Total Metals	158	171	0.923976608	0
GH_PC2	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	19	12.4	1.532258065	1
GH_PC2	Chloride (mg/L)_Major Ions	2.5	5	0.5	0
GH_PC2	Chromium (mg/L)_Dissolved Metals	0.00023	0.00031	0.741935484	0
GH_PC2	Chromium (mg/L)_Total Metals	0.00051	0.00108	0.472222222	0
GH_PC2	Cobalt (mg/L)_Dissolved Metals	0.00033	0.00018	1.833333333	1

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
GH_PC2	Cobalt (mg/L)_Total Metals	0.00032	0.00048	0.666666667	0
GH_PC2	Conductivity (µS/cm)_Conventional Parameters	1260	1230	1.024390244	1
GH_PC2	Conductivity (µS/cm)_Field Measured	1215	1217	0.998356615	0
GH_PC2	Copper (mg/L)_Dissolved Metals	0.0005	0.0005	1	0
GH_PC2	Copper (mg/L)_Total Metals	0.0159	0.00337	4.71810089	1
GH_PC2	Dissolved organic carbon (mg/L)_Conventional Parameters	2.62	1.85	1.416216216	1
GH_PC2	Dissolved Oxygen (%)_Field Measured	88	98	0.897959184	0
GH_PC2	Dissolved Oxygen (mg/L)_Field Measured	12.51	12.78	0.978873239	0
GH_PC2	Fluoride (mg/L)_Major Ions	0.42	0.4	1.05	1
GH_PC2	Hardness, as CaCO3 (mg/L)_Conventional Parameters	733	720	1.018055556	1
GH_PC2	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	2	0.5	0
GH_PC2	Iron (mg/L)_Dissolved Metals	0.02	0.03	0.666666667	0
GH_PC2	Iron (mg/L)_Total Metals	0.278	0.814	0.341523342	0
GH_PC2	Lead (mg/L)_Dissolved Metals	0.0001	0.00005	2	1
GH_PC2	Lead (mg/L)_Total Metals	0.000741	0.000579	1.279792746	1
GH_PC2	Lithium (mg/L)_Dissolved Metals	0.0375	0.0324	1.157407407	1
GH_PC2	Lithium (mg/L)_Total Metals	0.0397	0.031	1.280645161	1
GH_PC2	Magnesium (mg/L)_Major Ions	92.5	72.7	1.272352132	1
GH_PC2	Magnesium (mg/L)_Total Metals	83.7	75.2	1.113031915	1
GH_PC2	Manganese (mg/L)_Dissolved Metals	0.00231	0.00279	0.827956989	0
GH_PC2	Manganese (mg/L)_Total Metals	0.0128	0.0317	0.403785489	0
GH_PC2	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
GH_PC2	Mercury (mg/L)_Total Metals	0.00000218	0.00001	0.218	0
GH_PC2	Molybdenum (mg/L)_Dissolved Metals	0.00301	0.00175	1.72	1
GH_PC2	Molybdenum (mg/L)_Total Metals	0.00291	0.00176	1.653409091	1
GH_PC2	Nickel (mg/L)_Dissolved Metals	0.00356	0.00485	0.734020619	0
GH_PC2	Nickel (mg/L)_Total Metals	0.00451	0.00552	0.817028986	0
GH_PC2	Nitrate (mg-N/l)_Nutrients and Biological Indicators	22.4	31.5	0.711111111	0
GH_PC2	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0071	0.021	0.338095238	0
GH_PC2	Oxidation-Reduction Potential (mV)_Conventional Parameters	470	513	0.916179337	0
GH_PC2	Oxidation-Reduction Potential (mV)_Field Measured	281.7	399.3	0.705484598	0
GH_PC2	pH (-)_Conventional Parameters	8.52	8.42	1.011876485	1
GH_PC2	pH (-)_Field Measured	8.17	9.17	0.890948746	0
GH_PC2	Potassium (mg/L)_Major Ions	2.07	2	1.035	1
GH_PC2	Potassium (mg/L)_Total Metals	1.93	2.1	0.919047619	0
GH_PC2	Selenium (mg/L)_Dissolved Metals	0.134	0.103	1.300970874	1
GH_PC2	Selenium (mg/L)_Total Metals	0.104	0.109	0.95412844	0
GH_PC2	Silicon (mg/L)_Dissolved Metals	2.55	2.25	1.133333333	1
GH_PC2	Silicon (mg/L)_Total Metals	2.73	2.81	0.971530249	0
GH_PC2	Silver (mg/L)_Dissolved Metals	0.00002	0.00001	2	1
GH_PC2	Silver (mg/L)_Total Metals	0.00002	0.000021	0.952380952	0
GH_PC2	Sodium (mg/L)_Major Ions	2.85	2.69	1.059479554	1
GH_PC2	Sodium (mg/L)_Total Metals	2.63	2.64	0.996212121	0
GH_PC2	Strontium (mg/L)_Dissolved Metals	0.215	0.209	1.028708134	1
GH_PC2	Strontium (mg/L)_Total Metals	0.193	0.211	0.914691943	0
GH_PC2	Sulphate (mg/L)_Major Ions	432	382	1.130890052	1
GH_PC2	Temperature (°C)_Field Measured	7.9	11.62	0.679862306	0
GH_PC2	Thallium (mg/L)_Dissolved Metals	0.00002	0.000023	0.869565217	0
GH_PC2	Thallium (mg/L)_Total Metals	0.00002	0.00003	0.666666667	0
GH_PC2	Tin (mg/L)_Dissolved Metals	0.0002	0.0001	2	1
GH_PC2	Tin (mg/L)_Total Metals	0.0002	0.0001	2	1
GH_PC2	Titanium (mg/L)_Dissolved Metals	0.01	0.019	0.526315789	0
GH_PC2	Titanium (mg/L)_Total Metals	0.01	0.025	0.4	0
GH_PC2	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	244	243	1.004115226	1
GH_PC2	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.0539	0.028	1.925	1
GH_PC2	Total dissolved solids (mg/L)_Conventional Parameters	931	987	0.943262411	0
GH_PC2	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.378	0.268	1.410447761	1
GH_PC2	Total organic carbon (mg/L)_Conventional Parameters	2.8	4.58	0.611353712	0
GH_PC2	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0053	0.0049	1.081632653	1
GH_PC2	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0207	0.3	0.069	0
GH_PC2	Total suspended solids (mg/L)_Conventional Parameters	9.8	136	0.072058824	0
GH_PC2	Turbidity (NTU)_Conventional Parameters	10.5	77	0.136363636	0
GH_PC2	Uranium (mg/L)_Dissolved Metals	0.00571	0.00324	1.762345679	1
GH_PC2	Uranium (mg/L)_Total Metals	0.00509	0.00335	1.519402985	1
GH_PC2	Vanadium (mg/L)_Dissolved Metals	0.001	0.001	1	0
GH_PC2	Vanadium (mg/L)_Total Metals	0.00137	0.0024	0.570833333	0
GH_PC2	Zinc (mg/L)_Dissolved Metals	0.0041	0.004	1.025	1
GH_PC2	Zinc (mg/L)_Total Metals	0.0104	0.0591	0.175972927	0
GH_SC1-2	Acidity, CaCO3 (mg/L)_Conventional Parameters	13.8	24.4	0.56557377	0
GH_SC1-2	Aluminum (mg/L)_Dissolved Metals	0.0204	0.0197	1.035532995	1
GH_SC1-2	Aluminum (mg/L)_Total Metals	0.38	0.4	0.95	0
GH_SC1-2	Antimony (mg/L)_Dissolved Metals	0.00093	0.00115	0.808695652	0
GH_SC1-2	Antimony (mg/L)_Total Metals	0.00103	0.00121	0.851239669	0
GH_SC1-2	Arsenic (mg/L)_Dissolved Metals	0.00025	0.00062	0.403225806	0
GH_SC1-2	Arsenic (mg/L)_Total Metals	0.0006	0.00105	0.571428571	0
GH_SC1-2	Barium (mg/L)_Dissolved Metals	0.0916	0.0443	2.06772009	1
GH_SC1-2	Barium (mg/L)_Total Metals	0.0949	0.0466	2.036480687	1
GH_SC1-2	Beryllium (mg/L)_Dissolved Metals	0.00004	0.0005	0.08	0
GH_SC1-2	Beryllium (mg/L)_Total Metals	0.00004	0.0005	0.08	0
GH_SC1-2	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	408	350	1.165714286	1
GH_SC1-2	Bismuth (mg/L)_Dissolved Metals	0.0001	0.0025	0.04	0
GH_SC1-2	Bismuth (mg/L)_Total Metals	0.0001	0.0025	0.04	0
GH_SC1-2	Boron (mg/L)_Dissolved Metals	0.02	0.05	0.4	0
GH_SC1-2	Boron (mg/L)_Total Metals	0.02	0.05	0.4	0
GH_SC1-2	Bromide (mg/L)_Major Ions	0.5	2.5	0.2	0
GH_SC1-2	Cadmium (mg/L)_Dissolved Metals	0.000563	0.0013	0.433076923	0
GH_SC1-2	Cadmium (mg/L)_Total Metals	0.00071	0.00134	0.529850746	0
GH_SC1-2	Calcium (mg/L)_Major Ions	399	450	0.886666667	0
GH_SC1-2	Calcium (mg/L)_Total Metals	427	457	0.934354486	0
GH_SC1-2	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	16.6	19	0.873684211	0
GH_SC1-2	Chloride (mg/L)_Major Ions	11.9	10	1.19	1
GH_SC1-2	Chromium (mg/L)_Dissolved Metals	0.0002	0.0005	0.4	0
GH_SC1-2	Chromium (mg/L)_Total Metals	0.00072	0.00161	0.447204969	0
GH_SC1-2	Cobalt (mg/L)_Dissolved Metals	0.00041	0.0005	0.82	0
GH_SC1-2	Cobalt (mg/L)_Total Metals	0.00049	0.0005	0.98	0
GH_SC1-2	Conductivity (µS/cm)_Conventional Parameters	3160	3220	0.98136646	0
GH_SC1-2	Conductivity (µS/cm)_Field Measured	2896	3323	0.871501655	0
GH_SC1-2	Copper (mg/L)_Dissolved Metals	0.00088	0.0025	0.352	0
GH_SC1-2	Copper (mg/L)_Total Metals	0.00158	0.00289	0.546712803	0
GH_SC1-2	Daphnia magna, 48-hour, LC50 toxicity, mortality or lethal dose (%v/v)_Toxicity	0	70.7	0	0
GH_SC1-2	Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility (%)_Toxicity	93	93.3	0.996784566	0
GH_SC1-2	Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility, 10 °C water (%)_Toxicity	0	50	0	0
GH_SC1-2	Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	93	100	0.93	0
GH_SC1-2	Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality, 10 °C water (%)_Toxicity	0	23.3	0	0
GH_SC1-2	Dissolved organic carbon (mg/L)_Conventional Parameters	5.56	4.72	1.177966102	1
GH_SC1-2	Dissolved Oxygen (%)_Field Measured	110	121	0.909090909	0
GH_SC1-2	Dissolved Oxygen (mg/L)_Field Measured	13.51	16.65	0.811411411	0
GH_SC1-2	Fluoride (mg/L)_Major Ions	0.23	1	0.23	0
GH_SC1-2	Hardness, as CaCO3 (mg/L)_Conventional Parameters	2170	2390	0.907949791	0
GH_SC1-2	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	2	0.5	0
GH_SC1-2	Iron (mg/L)_Dissolved Metals	0.02	0.05	0.4	0
GH_SC1-2	Iron (mg/L)_Total Metals	0.472	0.261	1.808429119	1
GH_SC1-2	Lead (mg/L)_Dissolved Metals	0.0001	0.00025	0.4	0
GH_SC1-2	Lead (mg/L)_Total Metals	0.000329	0.00068	0.483823529	0
GH_SC1-2	Lithium (mg/L)_Dissolved Metals	0.0835	0.0665	1.255639098	1
GH_SC1-2	Lithium (mg/L)_Total Metals	0.0741	0.0656	1.129573171	1
GH_SC1-2	Magnesium (mg/L)_Major Ions	304	306	0.993464052	0
GH_SC1-2	Magnesium (mg/L)_Total Metals	306	310	0.987096774	0
GH_SC1-2	Manganese (mg/L)_Dissolved Metals	0.0473	0.0348	1.359195402	1
GH_SC1-2	Manganese (mg/L)_Total Metals	0.0483	0.0506	0.954545455	0
GH_SC1-2	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
GH_SC1-2	Mercury (mg/L)_Total Metals	0.00000575	0.00001	0.575	0
GH_SC1-2	Methyl mercury (µg/L)_Total Metals	0.000041	-	-	0
GH_SC1-2	Molybdenum (mg/L)_Dissolved Metals	0.00541	0.00716	0.755586592	0
GH_SC1-2	Molybdenum (mg/L)_Total Metals	0.00551	0.00716	0.769553073	0
GH_SC1-2	Nickel (mg/L)_Dissolved Metals	0.0517	0.0941	0.549415515	0
GH_SC1-2	Nickel (mg/L)_Total Metals	0.0537	0.096	0.559375	0
GH_SC1-2	Nitrate (mg-N/l)_Nutrients and Biological Indicators	30.3	68.4	0.442982456	0
GH_SC1-2	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0572	0.125	0.4576	0
GH_SC1-2	Oxidation-Reduction Potential (mV)_Conventional Parameters	471	510	0.923529412	0
GH_SC1-2	Oxidation-Reduction Potential (mV)_Field Measured	302.8	5234.1	0.057851398	0
GH_SC1-2	pH (-)_Conventional Parameters	8.49	8.42	1.008313539	1
GH_SC1-2	pH (-)_Field Measured	8.3	10.48	0.791984733	0
GH_SC1-2	Potassium (mg/L)_Major Ions	5.61	4.94	1.13562753	1
GH_SC1-2	Potassium (mg/L)_Total Metals	4.92	5.33	0.923076923	0
GH_SC1-2	Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	20	10	2	1
GH_SC1-2	Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed (%)_Toxicity	10	0	Inf	1
GH_SC1-2	Selenium (mg/L)_Dissolved Metals	0.765	0.852	0.897887324	0
GH_SC1-2	Selenium (mg/L)_Total Metals	0.72	0.858	0.839160839	0
GH_SC1-2	Silicon (mg/L)_Dissolved Metals	2.59	3.09	0.838187702	0
GH_SC1-2	Silicon (mg/L)_Total Metals	2.72	3.13	0.869009585	0
GH_SC1-2	Silver (mg/L)_Dissolved Metals	0.00002	0.00005	0.4	0
GH_SC1-2	Silver (mg/L)_Total Metals	0.000024	0.00005	0.48	0
GH_SC1-2	Sodium (mg/L)_Major Ions	2.05	3.36	0.610119048	0
GH_SC1-2	Sodium (mg/L)_Total Metals	1.95	3.43	0.56851312	0
GH_SC1-2	Strontium (mg/L)_Dissolved Metals	0.243	0.239	1.016736402	1

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
GH_SC1-2	Strontium (mg/L)_Total Metals	0.225	0.253	0.889328063	0
GH_SC1-2	Sulphate (mg/L)_Major Ions	1850	1880	0.984042553	0
GH_SC1-2	Temperature (°C)_Field Measured	17.4	14.8	1.175675676	1
GH_SC1-2	Thallium (mg/L)_Dissolved Metals	0.000057	0.000057	1	0
GH_SC1-2	Thallium (mg/L)_Total Metals	0.000259	0.000061	4.245901639	1
GH_SC1-2	Tin (mg/L)_Dissolved Metals	0.0002	0.0005	0.4	0
GH_SC1-2	Tin (mg/L)_Total Metals	0.0002	0.0005	0.4	0
GH_SC1-2	Titanium (mg/L)_Dissolved Metals	0.01	0.027	0.37037037	0
GH_SC1-2	Titanium (mg/L)_Total Metals	0.01	0.028	0.357142857	0
GH_SC1-2	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	408	350	1.165714286	1
GH_SC1-2	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	1.19	0.439	2.71070615	1
GH_SC1-2	Total dissolved solids (mg/L)_Conventional Parameters	3080	4490	0.68596882	0
GH_SC1-2	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	1.67	1.99	0.83919598	0
GH_SC1-2	Total organic carbon (mg/L)_Conventional Parameters	7.5	7.44	1.008064516	1
GH_SC1-2	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0243	0.0425	0.571764706	0
GH_SC1-2	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0551	0.3	0.183666667	0
GH_SC1-2	Total suspended solids (mg/L)_Conventional Parameters	50.5	131.5	0.384030418	0
GH_SC1-2	Total Suspended Solids (mg/L)_Field Measured	55.6	-	-	0
GH_SC1-2	Turbidity (NTU)_Conventional Parameters	80.5	61.7	1.304700162	1
GH_SC1-2	Turbidity (NTU)_Field Measured	5.01	22.1	0.226696833	0
GH_SC1-2	Uranium (mg/L)_Dissolved Metals	0.0181	0.0186	0.97311828	0
GH_SC1-2	Uranium (mg/L)_Total Metals	0.0175	0.02	0.875	0
GH_SC1-2	Vanadium (mg/L)_Dissolved Metals	0.001	0.005	0.2	0
GH_SC1-2	Vanadium (mg/L)_Total Metals	0.00305	0.005	0.61	0
GH_SC1-2	Zinc (mg/L)_Dissolved Metals	0.0453	0.0775	0.584516129	0
GH_SC1-2	Zinc (mg/L)_Total Metals	0.0431	0.084	0.513095238	0
LC_DC1	Acidity, CaCO3 (mg/L)_Conventional Parameters	2.7	10.5	0.257142857	0
LC_DC1	Aluminum (mg/L)_Dissolved Metals	0.105	0.037	2.837837838	1
LC_DC1	Aluminum (mg/L)_Total Metals	0.141	0.58	0.243103448	0
LC_DC1	Antimony (mg/L)_Dissolved Metals	0.00034	0.0005	0.68	0
LC_DC1	Antimony (mg/L)_Total Metals	0.00038	0.0005	0.76	0
LC_DC1	Arsenic (mg/L)_Dissolved Metals	0.0003	0.0005	0.6	0
LC_DC1	Arsenic (mg/L)_Total Metals	0.00091	0.0005	1.82	1
LC_DC1	Barium (mg/L)_Dissolved Metals	0.261	0.218	1.197247706	1
LC_DC1	Barium (mg/L)_Total Metals	0.262	0.208	1.259615385	1
LC_DC1	Beryllium (mg/L)_Dissolved Metals	0.00004	0.0005	0.08	0
LC_DC1	Beryllium (mg/L)_Total Metals	0.00004	0.0005	0.08	0
LC_DC1	Bicarbonate (mg/L)_Major Ions	144	-	-	0
LC_DC1	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	218	193	1.129533679	1
LC_DC1	Bismuth (mg/L)_Dissolved Metals	0.0001	0.0005	0.2	0
LC_DC1	Bismuth (mg/L)_Total Metals	0.0001	0.0025	0.04	0
LC_DC1	Boron (mg/L)_Dissolved Metals	0.02	0.05	0.4	0
LC_DC1	Boron (mg/L)_Total Metals	0.02	0.05	0.4	0
LC_DC1	Bromide (mg/L)_Major Ions	0.1	0.05	2	1
LC_DC1	Cadmium (mg/L)_Dissolved Metals	0.000165	0.000045	3.666666667	1
LC_DC1	Cadmium (mg/L)_Total Metals	0.000242	0.000244	0.991803279	0
LC_DC1	Calcium (mg/L)_Major Ions	62.5	51	1.225490196	1
LC_DC1	Calcium (mg/L)_Total Metals	62.9	52.1	1.207293666	1
LC_DC1	Carbonate (mg/L)_Major Ions	0.6	-	-	0
LC_DC1	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	21	14.6	1.438356164	1
LC_DC1	Chloride (mg/L)_Major Ions	4.62	1.7	2.717647059	1
LC_DC1	Chromium (mg/L)_Dissolved Metals	0.0004	0.0005	0.8	0
LC_DC1	Chromium (mg/L)_Total Metals	0.00107	0.00109	0.981651376	0
LC_DC1	Cobalt (mg/L)_Dissolved Metals	0.00049	0.0005	0.98	0
LC_DC1	Cobalt (mg/L)_Total Metals	0.00042	0.0005	0.84	0
LC_DC1	Conductivity (µS/cm)_Conventional Parameters	475	367	1.294277929	1
LC_DC1	Conductivity (µS/cm)_Field Measured	418.4	362.4	1.154525386	1
LC_DC1	Copper (mg/L)_Dissolved Metals	0.00076	0.001	0.76	0
LC_DC1	Copper (mg/L)_Total Metals	0.001	0.003	0.333333333	0
LC_DC1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility (%)_Toxicity	0	-	-	0
LC_DC1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	0	-	-	0
LC_DC1	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	0.01	0.005	2	1
LC_DC1	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	0.019	0.009	2.111111111	1
LC_DC1	Dissolved organic carbon (mg/L)_Conventional Parameters	4.31	4.38	0.984018265	0
LC_DC1	Dissolved Oxygen (%)_Field Measured	116.2	120	0.968333333	0
LC_DC1	Dissolved Oxygen (mg/L)_Field Measured	15.91	16.57	0.96016898	0
LC_DC1	Dissolved Selenate (µg/L)_Speciation of Selenium	15.7	3.29	4.772036474	1
LC_DC1	Dissolved Selenite (µg/L)_Speciation of Selenium	0.366	0.066	5.545454545	1
LC_DC1	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	0.04	0.015	2.666666667	1
LC_DC1	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	0.01	0.005	2	1
LC_DC1	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	0.06	0.015	4	1
LC_DC1	Fluoride (mg/L)_Major Ions	0.142	0.153	0.928104575	0
LC_DC1	Hardness, as CaCO3 (mg/L)_Conventional Parameters	258	206	1.252427184	1
LC_DC1	Hydrogen Sulphide (mg/L)_Major Ions	0.021	0.021	1	0
LC_DC1	Hydroxide (mg/L)_Conventional Parameters	0.34	-	-	0
LC_DC1	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	2	0.5	0
LC_DC1	Iron (mg/L)_Dissolved Metals	0.166	0.05	3.32	1
LC_DC1	Iron (mg/L)_Total Metals	0.203	0.615	0.330081301	0
LC_DC1	Lead (mg/L)_Dissolved Metals	0.000206	0.00025	0.824	0
LC_DC1	Lead (mg/L)_Total Metals	0.000249	0.000423	0.588652482	0
LC_DC1	Lithium (mg/L)_Dissolved Metals	0.0137	0.0119	1.151260504	1
LC_DC1	Lithium (mg/L)_Total Metals	0.0139	0.0114	1.219298246	1
LC_DC1	Magnesium (mg/L)_Major Ions	24.6	19.2	1.28125	1
LC_DC1	Magnesium (mg/L)_Total Metals	24.7	19.5	1.266666667	1
LC_DC1	Manganese (mg/L)_Dissolved Metals	0.0217	0.00218	9.95412844	1
LC_DC1	Manganese (mg/L)_Total Metals	0.0318	0.0252	1.261904762	1
LC_DC1	Mercury (mg/L)_Dissolved Metals	0.000005	0.000023	0.217391304	0
LC_DC1	Mercury (mg/L)_Total Metals	0.00000387	0.00001	0.387	0
LC_DC1	Methyl mercury (µg/L)_Total Metals	0.0008	0.00005	16	1
LC_DC1	Molybdenum (mg/L)_Dissolved Metals	0.00245	0.00129	1.899224806	1
LC_DC1	Molybdenum (mg/L)_Total Metals	0.00241	0.00144	1.673611111	1
LC_DC1	Nickel (mg/L)_Dissolved Metals	0.00302	0.0025	1.208	1
LC_DC1	Nickel (mg/L)_Total Metals	0.00387	0.0025	1.548	1
LC_DC1	Nitrate (mg-N/l)_Nutrients and Biological Indicators	9.34	1.73	5.398843931	1
LC_DC1	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0453	0.036	1.258333333	1
LC_DC1	Oxidation-Reduction Potential (mV)_Conventional Parameters	512	517	0.99032882	0
LC_DC1	Oxidation-Reduction Potential (mV)_Field Measured	388	372.1	1.042730449	1
LC_DC1	pH (-)_Conventional Parameters	8.58	8.59	0.998835856	0
LC_DC1	pH (-)_Field Measured	9.23	9.63	0.958463136	0
LC_DC1	Potassium (mg/L)_Major Ions	1.83	2	0.915	0
LC_DC1	Potassium (mg/L)_Total Metals	1.68	2	0.84	0
LC_DC1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	0	-	-	0
LC_DC1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed (%)_Toxicity	0	-	-	0
LC_DC1	Selenium (mg/L)_Dissolved Metals	0.0181	0.00484	3.739669421	1
LC_DC1	Selenium (mg/L)_Total Metals	0.0171	0.00434	3.940092166	1
LC_DC1	Silicon (mg/L)_Dissolved Metals	2.99	3.13	0.955271565	0
LC_DC1	Silicon (mg/L)_Total Metals	3.08	4.03	0.76426799	0
LC_DC1	Silver (mg/L)_Dissolved Metals	0.00002	0.00005	0.4	0
LC_DC1	Silver (mg/L)_Total Metals	0.00003	0.00005	0.6	0
LC_DC1	Sodium (mg/L)_Major Ions	1.97	2	0.985	0
LC_DC1	Sodium (mg/L)_Total Metals	1.78	2	0.89	0
LC_DC1	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	676	610.6	1.107107763	1
LC_DC1	Strontium (mg/L)_Dissolved Metals	0.0815	0.0589	1.383701188	1
LC_DC1	Strontium (mg/L)_Total Metals	0.0857	0.0611	1.402618658	1
LC_DC1	Sulphate (mg/L)_Major Ions	52.5	15.9	3.301886792	1
LC_DC1	Sulphide (mg/L)_Major Ions	0.02	0.02	1	0
LC_DC1	Temperature (°C)_Field Measured	10.4	12	0.866666667	0
LC_DC1	Thallium (mg/L)_Dissolved Metals	0.00002	0.00005	0.4	0
LC_DC1	Thallium (mg/L)_Total Metals	0.00002	0.00005	0.4	0
LC_DC1	Tin (mg/L)_Dissolved Metals	0.0002	0.0005	0.4	0
LC_DC1	Tin (mg/L)_Total Metals	0.0002	0.0005	0.4	0
LC_DC1	Titanium (mg/L)_Dissolved Metals	0.01	0.011	0.909090909	0
LC_DC1	Titanium (mg/L)_Total Metals	0.01	0.02	0.5	0
LC_DC1	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	218	196	1.112244898	1
LC_DC1	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.0893	0.047	1.9	1
LC_DC1	Total dissolved solids (mg/L)_Conventional Parameters	331	221	1.497737557	1
LC_DC1	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.712	0.48	1.483333333	1
LC_DC1	Total organic carbon (mg/L)_Conventional Parameters	5.16	5.62	0.918149466	0
LC_DC1	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0272	0.0286	0.951048951	0
LC_DC1	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0418	0.3	0.139333333	0
LC_DC1	Total suspended solids (mg/L)_Conventional Parameters	37.9	575	0.065913043	0
LC_DC1	Turbidity (NTU)_Conventional Parameters	14.5	2200	0.006590909	0
LC_DC1	Turbidity (NTU)_Field Measured	38	168	0.226190476	0
LC_DC1	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	0.06	0.015	4	1
LC_DC1	Uranium (mg/L)_Dissolved Metals	0.000836	0.000481	1.738045738	1
LC_DC1	Uranium (mg/L)_Total Metals	0.000881	0.000511	1.72407045	1
LC_DC1	Vanadium (mg/L)_Dissolved Metals	0.00138	0.0025	0.552	0
LC_DC1	Vanadium (mg/L)_Total Metals	0.00182	0.005	0.364	0
LC_DC1	Zinc (mg/L)_Dissolved Metals	0.0331	0.0083	3.987951807	1
LC_DC1	Zinc (mg/L)_Total Metals	0.0246	0.0161	1.527950311	1
LC_FRB	Acidity, CaCO3 (mg/L)_Conventional Parameters	2	3.2	0.625	0
LC_FRB	Aluminum (mg/L)_Dissolved Metals	0.265	0.0124	21.37096774	1
LC_FRB	Aluminum (mg/L)_Total Metals	0.369	1.25	0.2952	0
LC_FRB	Antimony (mg/L)_Dissolved Metals	0.00016	0.0002	0.8	0
LC_FRB	Antimony (mg/L)_Total Metals	0.00026	0.00023	1.130434783	1
LC_FRB	Arsenic (mg/L)_Dissolved Metals	0.00033	0.00016	2.0625	1

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
LC_FRB	Arsenic (mg/L)_Total Metals	0.00039	0.00097	0.402061856	0
LC_FRB	Barium (mg/L)_Dissolved Metals	0.147	0.149	0.986577181	0
LC_FRB	Barium (mg/L)_Total Metals	0.134	0.153	0.875816993	0
LC_FRB	Beryllium (mg/L)_Dissolved Metals	0.000025	0.0001	0.25	0
LC_FRB	Beryllium (mg/L)_Total Metals	0.00004	0.00011	0.363636364	0
LC_FRB	Bicarbonate (mg/L)_Major Ions	66	-	-	0
LC_FRB	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	241	198	1.217171717	1
LC_FRB	Bismuth (mg/L)_Dissolved Metals	0.00005	0.0005	0.1	0
LC_FRB	Bismuth (mg/L)_Total Metals	0.0001	0.0005	0.2	0
LC_FRB	Boron (mg/L)_Dissolved Metals	0.01	0.015	0.666666667	0
LC_FRB	Boron (mg/L)_Total Metals	0.02	0.015	1.333333333	1
LC_FRB	Bromide (mg/L)_Major Ions	0.25	0.5	0.5	0
LC_FRB	Cadmium (mg/L)_Dissolved Metals	0.000161	0.000046	3.5	1
LC_FRB	Cadmium (mg/L)_Total Metals	0.0000993	0.000329	0.301823708	0
LC_FRB	Calcium (mg/L)_Major Ions	127	120	1.058333333	1
LC_FRB	Calcium (mg/L)_Total Metals	127	119	1.067226891	1
LC_FRB	Carbonate (mg/L)_Major Ions	0.6	-	-	0
LC_FRB	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	19.6	13.1	1.496183206	1
LC_FRB	Chloride (mg/L)_Major Ions	3.3	3.4	0.970588235	0
LC_FRB	Chromium (mg/L)_Dissolved Metals	0.0006	0.0002	3	1
LC_FRB	Chromium (mg/L)_Total Metals	0.00084	0.00251	0.334661355	0
LC_FRB	Cobalt (mg/L)_Dissolved Metals	0.00038	0.0001	3.8	1
LC_FRB	Cobalt (mg/L)_Total Metals	0.00029	0.00114	0.254385965	0
LC_FRB	Conductivity (µS/cm)_Conventional Parameters	927	874	1.060640732	1
LC_FRB	Conductivity (µS/cm)_Field Measured	844	840.9	1.003686526	1
LC_FRB	Copper (mg/L)_Dissolved Metals	0.00112	0.0005	2.24	1
LC_FRB	Copper (mg/L)_Total Metals	0.001	0.00281	0.355871886	0
LC_FRB	Dissolved organic carbon (mg/L)_Conventional Parameters	2.39	2.15	1.111627907	1
LC_FRB	Dissolved Oxygen (%)_Field Measured	121.7	118.3	1.02874049	1
LC_FRB	Dissolved Oxygen (mg/L)_Field Measured	16.79	13.99	1.200142959	1
LC_FRB	Fluoride (mg/L)_Major Ions	0.217	0.27	0.803703704	0
LC_FRB	Hardness, as CaCO3 (mg/L)_Conventional Parameters	525	495	1.060606061	1
LC_FRB	Hydrogen Sulphide (mg/L)_Major Ions	0.021	0.0017	12.35294118	1
LC_FRB	Hydroxide (mg/L)_Conventional Parameters	0.34	-	-	0
LC_FRB	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	1	1	0
LC_FRB	Iron (mg/L)_Dissolved Metals	0.51	0.03	17	1
LC_FRB	Iron (mg/L)_Total Metals	0.495	2.18	0.22706422	0
LC_FRB	Lead (mg/L)_Dissolved Metals	0.000504	0.000053	9.509433962	1
LC_FRB	Lead (mg/L)_Total Metals	0.000338	0.00149	0.226845638	0
LC_FRB	Lithium (mg/L)_Dissolved Metals	0.0236	0.022	1.072727273	1
LC_FRB	Lithium (mg/L)_Total Metals	0.0244	0.0228	1.070175439	1
LC_FRB	Magnesium (mg/L)_Major Ions	55.9	49.5	1.129292929	1
LC_FRB	Magnesium (mg/L)_Total Metals	52.9	49.1	1.077393075	1
LC_FRB	Manganese (mg/L)_Dissolved Metals	0.0414	0.00627	6.602870813	1
LC_FRB	Manganese (mg/L)_Total Metals	0.0223	0.104	0.214423077	0
LC_FRB	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
LC_FRB	Mercury (mg/L)_Total Metals	0.0000032	0.00001	0.32	0
LC_FRB	Methyl mercury (µg/L)_Total Metals	0.00002	-	-	0
LC_FRB	Molybdenum (mg/L)_Dissolved Metals	0.00135	0.00115	1.173913043	1
LC_FRB	Molybdenum (mg/L)_Total Metals	0.00113	0.00112	1.008928571	1
LC_FRB	Nickel (mg/L)_Dissolved Metals	0.00325	0.00218	1.490825688	1
LC_FRB	Nickel (mg/L)_Total Metals	0.00291	0.00676	0.430473373	0
LC_FRB	Nitrate (mg-N/l)_Nutrients and Biological Indicators	15.9	18.2	0.873626374	0
LC_FRB	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0123	0.012	1.025	1
LC_FRB	Oxidation-Reduction Potential (mV)_Conventional Parameters	479	507	0.944773176	0
LC_FRB	Oxidation-Reduction Potential (mV)_Field Measured	316.4	372.5	0.849395973	0
LC_FRB	pH (-)_Conventional Parameters	8.56	8.42	1.016627078	1
LC_FRB	pH (-)_Field Measured	8.66	8.95	0.967597765	0
LC_FRB	Potassium (mg/L)_Major Ions	1.42	2	0.71	0
LC_FRB	Potassium (mg/L)_Total Metals	1.4	2	0.7	0
LC_FRB	Selenium (mg/L)_Dissolved Metals	0.0759	0.0726	1.045454545	1
LC_FRB	Selenium (mg/L)_Total Metals	0.0654	0.0606	1.079207921	1
LC_FRB	Silicon (mg/L)_Dissolved Metals	2.35	2.38	0.987394958	0
LC_FRB	Silicon (mg/L)_Total Metals	2.71	3.89	0.696658098	0
LC_FRB	Silver (mg/L)_Dissolved Metals	0.000014	0.00001	1.4	1
LC_FRB	Silver (mg/L)_Total Metals	0.00002	0.000161	0.124223602	0
LC_FRB	Sodium (mg/L)_Major Ions	2.57	2.6	0.988461538	0
LC_FRB	Sodium (mg/L)_Total Metals	2.69	2.6	1.034615385	1
LC_FRB	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	1356	790	1.716455696	1
LC_FRB	Strontium (mg/L)_Dissolved Metals	0.187	0.173	1.080924855	1
LC_FRB	Strontium (mg/L)_Total Metals	0.177	0.176	1.005681818	1
LC_FRB	Sulphate (mg/L)_Major Ions	270	240	1.125	1
LC_FRB	Sulphide (mg/L)_Major Ions	0.02	0.02	1	0
LC_FRB	Temperature (°C)_Field Measured	11.92	9.9	1.204040404	1
LC_FRB	Thallium (mg/L)_Dissolved Metals	0.00001	0.00001	1	0
LC_FRB	Thallium (mg/L)_Total Metals	0.00002	0.000061	0.327868852	0
LC_FRB	Tin (mg/L)_Dissolved Metals	0.0001	0.0001	1	0
LC_FRB	Tin (mg/L)_Total Metals	0.00046	0.0001	4.6	1
LC_FRB	Titanium (mg/L)_Dissolved Metals	0.01	0.015	0.666666667	0
LC_FRB	Titanium (mg/L)_Total Metals	0.01	0.02	0.5	0
LC_FRB	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	242	200	1.21	1
LC_FRB	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.0476	0.0122	3.901639344	1
LC_FRB	Total dissolved solids (mg/L)_Conventional Parameters	681	640	1.0640625	1
LC_FRB	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.695	0.735	0.945578231	0
LC_FRB	Total organic carbon (mg/L)_Conventional Parameters	3.86	10.5	0.367619048	0
LC_FRB	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0422	0.0047	8.978723404	1
LC_FRB	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.054	0.3	0.18	0
LC_FRB	Total suspended solids (mg/L)_Conventional Parameters	40.2	130	0.309230769	0
LC_FRB	Turbidity (NTU)_Conventional Parameters	16.9	76	0.222368421	0
LC_FRB	Turbidity (NTU)_Field Measured	30.1	18.87	1.595124536	1
LC_FRB	Uranium (mg/L)_Dissolved Metals	0.00249	0.00202	1.232673267	1
LC_FRB	Uranium (mg/L)_Total Metals	0.00252	0.00218	1.155963303	1
LC_FRB	Vanadium (mg/L)_Dissolved Metals	0.00117	0.001	1.17	1
LC_FRB	Vanadium (mg/L)_Total Metals	0.00189	0.0058	0.325862069	0
LC_FRB	Zinc (mg/L)_Dissolved Metals	0.0076	0.0032	2.375	1
LC_FRB	Zinc (mg/L)_Total Metals	0.0078	0.0237	0.329113924	0
LC_FRUS	Acidity, CaCO3 (mg/L)_Conventional Parameters	1.1	1.4	0.785714286	0
LC_FRUS	Aluminum (mg/L)_Dissolved Metals	0.003	0.0065	0.461538462	0
LC_FRUS	Aluminum (mg/L)_Total Metals	0.0084	0.297	0.028282828	0
LC_FRUS	Antimony (mg/L)_Dissolved Metals	0.0001	0.00016	0.625	0
LC_FRUS	Antimony (mg/L)_Total Metals	0.0001	0.00017	0.588235294	0
LC_FRUS	Arsenic (mg/L)_Dissolved Metals	0.0001	0.00011	0.909090909	0
LC_FRUS	Arsenic (mg/L)_Total Metals	0.00013	0.00028	0.464285714	0
LC_FRUS	Barium (mg/L)_Dissolved Metals	0.113	0.15	0.753333333	0
LC_FRUS	Barium (mg/L)_Total Metals	0.107	0.152	0.703947368	0
LC_FRUS	Beryllium (mg/L)_Dissolved Metals	0.00002	0.0001	0.2	0
LC_FRUS	Beryllium (mg/L)_Total Metals	0.00002	0.0001	0.2	0
LC_FRUS	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	198	197	1.005076142	1
LC_FRUS	Bismuth (mg/L)_Dissolved Metals	0.00005	0.0005	0.1	0
LC_FRUS	Bismuth (mg/L)_Total Metals	0.00005	0.0005	0.1	0
LC_FRUS	Boron (mg/L)_Dissolved Metals	0.01	0.013	0.769230769	0
LC_FRUS	Boron (mg/L)_Total Metals	0.01	0.015	0.666666667	0
LC_FRUS	Bromide (mg/L)_Major Ions	0.05	0.5	0.1	0
LC_FRUS	Cadmium (mg/L)_Dissolved Metals	0.0000193	0.000138	0.139855072	0
LC_FRUS	Cadmium (mg/L)_Total Metals	0.0000309	0.000078	0.396153846	0
LC_FRUS	Calcium (mg/L)_Major Ions	99.9	121	0.825619835	0
LC_FRUS	Calcium (mg/L)_Total Metals	96.8	122	0.793442623	0
LC_FRUS	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	13.4	7	1.914285714	1
LC_FRUS	Chloride (mg/L)_Major Ions	1.23	2.7	0.455555556	0
LC_FRUS	Chromium (mg/L)_Dissolved Metals	0.00012	0.0002	0.6	0
LC_FRUS	Chromium (mg/L)_Total Metals	0.0003	0.00063	0.476190476	0
LC_FRUS	Cobalt (mg/L)_Dissolved Metals	0.0001	0.0001	1	0
LC_FRUS	Cobalt (mg/L)_Total Metals	0.0001	0.0002	0.5	0
LC_FRUS	Conductivity (µS/cm)_Conventional Parameters	752	876	0.858447489	0
LC_FRUS	Conductivity (µS/cm)_Field Measured	872	843.3	1.034032966	1
LC_FRUS	Copper (mg/L)_Dissolved Metals	0.0005	0.0014	0.357142857	0
LC_FRUS	Copper (mg/L)_Total Metals	0.0005	0.00069	0.724637681	0
LC_FRUS	Dissolved organic carbon (mg/L)_Conventional Parameters	1.94	1.54	1.25974026	1
LC_FRUS	Dissolved Oxygen (%)_Field Measured	103.5	98.6	1.04969574	1
LC_FRUS	Dissolved Oxygen (mg/L)_Field Measured	11.58	13.08	0.885321101	0
LC_FRUS	Fluoride (mg/L)_Major Ions	0.181	0.37	0.489189189	0
LC_FRUS	Hardness, as CaCO3 (mg/L)_Conventional Parameters	413	492	0.839430894	0
LC_FRUS	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	1	2	0.5	0
LC_FRUS	Iron (mg/L)_Dissolved Metals	0.01	0.03	0.333333333	0
LC_FRUS	Iron (mg/L)_Total Metals	0.018	0.387	0.046511628	0
LC_FRUS	Lead (mg/L)_Dissolved Metals	0.00005	0.00005	1	0
LC_FRUS	Lead (mg/L)_Total Metals	0.00005	0.000247	0.20242915	0
LC_FRUS	Lithium (mg/L)_Dissolved Metals	0.0206	0.018	1.144444444	1
LC_FRUS	Lithium (mg/L)_Total Metals	0.021	0.0178	1.179775281	1
LC_FRUS	Magnesium (mg/L)_Major Ions	39.7	46.3	0.857451404	0
LC_FRUS	Magnesium (mg/L)_Total Metals	40	46.5	0.860215054	0
LC_FRUS	Manganese (mg/L)_Dissolved Metals	0.00132	0.00533	0.247654784	0
LC_FRUS	Manganese (mg/L)_Total Metals	0.00398	0.0149	0.267114094	0
LC_FRUS	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
LC_FRUS	Mercury (mg/L)_Total Metals	0.0000005	0.00001	0.05	0
LC_FRUS	Molybdenum (mg/L)_Dissolved Metals	0.000826	0.00113	0.730973451	0

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
LC_FRUS	Molybdenum (mg/L)_Total Metals	0.000924	0.00111	0.832432432	0
LC_FRUS	Nickel (mg/L)_Dissolved Metals	0.00054	0.00134	0.402985075	0
LC_FRUS	Nickel (mg/L)_Total Metals	0.00063	0.00207	0.304347826	0
LC_FRUS	Nitrate (mg-N/l)_Nutrients and Biological Indicators	11.9	18.8	0.632978723	0
LC_FRUS	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0076	0.011	0.690909091	0
LC_FRUS	Oxidation-Reduction Potential (mV)_Conventional Parameters	309	481	0.642411642	0
LC_FRUS	pH (-)_Conventional Parameters	8.43	8.44	0.998815166	0
LC_FRUS	pH (-)_Field Measured	8.61	8.79	0.979522184	0
LC_FRUS	Potassium (mg/L)_Major Ions	1.3	1.24	1.048387097	1
LC_FRUS	Potassium (mg/L)_Total Metals	1.21	1.22	0.991803279	0
LC_FRUS	Selenium (mg/L)_Dissolved Metals	0.0523	0.0579	0.90328152	0
LC_FRUS	Selenium (mg/L)_Total Metals	0.0502	0.0595	0.843697479	0
LC_FRUS	Silicon (mg/L)_Dissolved Metals	2.22	2.36	0.940677966	0
LC_FRUS	Silicon (mg/L)_Total Metals	2.13	2.38	0.894957983	0
LC_FRUS	Silver (mg/L)_Dissolved Metals	0.00001	0.00001	1	0
LC_FRUS	Silver (mg/L)_Total Metals	0.00001	0.000033	0.303030303	0
LC_FRUS	Sodium (mg/L)_Major Ions	1.96	2.35	0.834042553	0
LC_FRUS	Sodium (mg/L)_Total Metals	2.09	2.49	0.83935743	0
LC_FRUS	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	785	-	-	0
LC_FRUS	Strontium (mg/L)_Dissolved Metals	0.15	0.171	0.877192982	0
LC_FRUS	Strontium (mg/L)_Total Metals	0.148	0.172	0.860465116	0
LC_FRUS	Sulphate (mg/L)_Major Ions	193	229	0.84279476	0
LC_FRUS	Temperature (°C)_Field Measured	8.8	9.2	0.956521739	0
LC_FRUS	Thallium (mg/L)_Dissolved Metals	0.00001	0.00001	1	0
LC_FRUS	Thallium (mg/L)_Total Metals	0.00001	0.000014	0.714285714	0
LC_FRUS	Tin (mg/L)_Dissolved Metals	0.0001	0.0001	1	0
LC_FRUS	Tin (mg/L)_Total Metals	0.0001	0.0001	1	0
LC_FRUS	Titanium (mg/L)_Dissolved Metals	0.01	0.016	0.625	0
LC_FRUS	Titanium (mg/L)_Total Metals	0.01	0.017	0.588235294	0
LC_FRUS	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	198	199	0.994974874	0
LC_FRUS	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.0701	0.0062	11.30645161	1
LC_FRUS	Total dissolved solids (mg/L)_Conventional Parameters	529	641	0.825273011	0
LC_FRUS	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.485	0.156	3.108974359	1
LC_FRUS	Total organic carbon (mg/L)_Conventional Parameters	1.9	1.82	1.043956044	1
LC_FRUS	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0014	0.0031	0.451612903	0
LC_FRUS	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.061	0.0452	1.349557522	1
LC_FRUS	Total suspended solids (mg/L)_Conventional Parameters	3.5	21.3	0.164319249	0
LC_FRUS	Turbidity (NTU)_Conventional Parameters	0.35	9.17	0.038167939	0
LC_FRUS	Uranium (mg/L)_Dissolved Metals	0.00219	0.00204	1.073529412	1
LC_FRUS	Uranium (mg/L)_Total Metals	0.00206	0.00205	1.004878049	1
LC_FRUS	Vanadium (mg/L)_Dissolved Metals	0.0005	0.001	0.5	0
LC_FRUS	Vanadium (mg/L)_Total Metals	0.0005	0.0013	0.384615385	0
LC_FRUS	Zinc (mg/L)_Dissolved Metals	0.003	0.003	1	0
LC_FRUS	Zinc (mg/L)_Total Metals	0.003	0.0112	0.267857143	0
RG_CH1	1-Methylnaphthalene (µg/L)_Alkylated PAHs	0.05	-	-	0
RG_CH1	2-Bromobenzotrifluoride (%)_Unknown	98.6	-	-	0
RG_CH1	2-Methylnaphthalene (µg/L)_Alkylated PAHs	0.02	-	-	0
RG_CH1	Acenaphthene (%)_Parent PAHs	116.8	129.7	0.900539707	0
RG_CH1	Acenaphthene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
RG_CH1	Acenaphthylene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
RG_CH1	Acidity, CaCO3 (mg/L)_Conventional Parameters	3.4	2	1.7	1
RG_CH1	Acridine (µg/L)_Parent PAHs	0.01	0.05	0.2	0
RG_CH1	Aluminum (mg/L)_Dissolved Metals	0.0165	0.0159	1.037735849	1
RG_CH1	Aluminum (mg/L)_Total Metals	0.11	0.331	0.332326284	0
RG_CH1	Anthracene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
RG_CH1	Antimony (mg/L)_Dissolved Metals	0.0005	0.00011	4.545454545	1
RG_CH1	Antimony (mg/L)_Total Metals	0.0001	0.00011	0.909090909	0
RG_CH1	Arsenic (mg/L)_Dissolved Metals	0.0005	0.00015	3.333333333	1
RG_CH1	Arsenic (mg/L)_Total Metals	0.00053	0.00036	1.472222222	1
RG_CH1	Barium (mg/L)_Dissolved Metals	0.0829	0.0741	1.118758435	1
RG_CH1	Barium (mg/L)_Total Metals	0.0795	0.0787	1.010165184	1
RG_CH1	Benzo(a)anthracene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
RG_CH1	Benzo(a)pyrene (µg/L)_Parent PAHs	0.005	0.01	0.5	0
RG_CH1	Benzo(b,j)fluoranthene (µg/L)_Parent PAHs	0.01	-	-	0
RG_CH1	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
RG_CH1	Benzo(k)fluoranthene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
RG_CH1	Beryllium (mg/L)_Dissolved Metals	0.0001	0.0001	1	0
RG_CH1	Beryllium (mg/L)_Total Metals	0.00002	0.0001	0.2	0
RG_CH1	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	183	140	1.307142857	1
RG_CH1	Bismuth (mg/L)_Dissolved Metals	0.00025	0.0005	0.5	0
RG_CH1	Bismuth (mg/L)_Total Metals	0.00005	0.0005	0.1	0
RG_CH1	Boron (mg/L)_Dissolved Metals	0.05	0.01	5	1
RG_CH1	Boron (mg/L)_Total Metals	0.01	0.01	1	0
RG_CH1	Bromide (mg/L)_Major Ions	0.05	0.05	1	0
RG_CH1	Cadmium (mg/L)_Dissolved Metals	0.000025	0.000013	1.923076923	1
RG_CH1	Cadmium (mg/L)_Total Metals	0.0000199	0.000143	0.139160839	0
RG_CH1	Calcium (mg/L)_Major Ions	49.9	55.2	0.903985507	0
RG_CH1	Calcium (mg/L)_Total Metals	49.5	56.4	0.877659574	0
RG_CH1	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	9.2	10.7	0.859813084	0
RG_CH1	Chloride (mg/L)_Major Ions	0.5	2.1	0.238095238	0
RG_CH1	Chromium (mg/L)_Dissolved Metals	0.0005	0.00048	1.041666667	1
RG_CH1	Chromium (mg/L)_Total Metals	0.00071	0.00145	0.489655172	0
RG_CH1	Chrysene (%)_Parent PAHs	106.7	129.4	0.824574961	0
RG_CH1	Chrysene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
RG_CH1	Cobalt (mg/L)_Dissolved Metals	0.0005	0.0001	5	1
RG_CH1	Cobalt (mg/L)_Total Metals	0.0001	0.0002	0.5	0
RG_CH1	Conductivity (µS/cm)_Conventional Parameters	323	370	0.872972973	0
RG_CH1	Conductivity (µS/cm)_Field Measured	315.3	302.8	1.041281374	1
RG_CH1	Copper (mg/L)_Dissolved Metals	0.001	0.0005	2	1
RG_CH1	Copper (mg/L)_Total Metals	0.0005	0.00127	0.393700787	0
RG_CH1	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	0.005	0.05	0.1	0
RG_CH1	Dissolved organic carbon (mg/L)_Conventional Parameters	2.29	2.17	1.055299539	1
RG_CH1	Dissolved Oxygen (%)_Field Measured	112	140	0.8	0
RG_CH1	Dissolved Oxygen (mg/L)_Field Measured	16.4	18.43	0.8898535	0
RG_CH1	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	0.25	0.25	1	0
RG_CH1	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	0.25	0.25	1	0
RG_CH1	Fluoranthene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
RG_CH1	Fluorene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
RG_CH1	Fluoride (mg/L)_Major Ions	0.208	0.231	0.9004329	0
RG_CH1	Hardness, as CaCO3 (mg/L)_Conventional Parameters	180	199	0.904522613	0
RG_CH1	Hydrogen Sulphide (mg/L)_Major Ions	0.0061	0.0016	3.8125	1
RG_CH1	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	159	1	159	1
RG_CH1	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
RG_CH1	Iron (mg/L)_Dissolved Metals	0.05	0.03	1.666666667	1
RG_CH1	Iron (mg/L)_Total Metals	0.14	0.448	0.3125	0
RG_CH1	Lead (mg/L)_Dissolved Metals	0.00025	0.00005	5	1
RG_CH1	Lead (mg/L)_Total Metals	0.000167	0.000365	0.457534247	0
RG_CH1	Lithium (mg/L)_Dissolved Metals	0.0054	0.0055	0.981818182	0
RG_CH1	Lithium (mg/L)_Total Metals	0.0052	0.0054	0.962962963	0
RG_CH1	Magnesium (mg/L)_Major Ions	13.6	14.8	0.918918919	0
RG_CH1	Magnesium (mg/L)_Total Metals	13.6	15	0.906666667	0
RG_CH1	Manganese (mg/L)_Dissolved Metals	0.00477	0.00129	3.697674419	1
RG_CH1	Manganese (mg/L)_Total Metals	0.00477	0.014	0.340714286	0
RG_CH1	Mercury (mg/L)_Dissolved Metals	0.000005	0.00001	0.5	0
RG_CH1	Mercury (mg/L)_Total Metals	0.000005	0.0000153	0.326797386	0
RG_CH1	Methyl mercury (µg/L)_Total Metals	0.00002	-	-	0
RG_CH1	Molybdenum (mg/L)_Dissolved Metals	0.000661	0.000802	0.824189526	0
RG_CH1	Molybdenum (mg/L)_Total Metals	0.000629	0.000778	0.80848329	0
RG_CH1	Naphthalene (µg/L)_Parent PAHs	0.02	0.05	0.4	0
RG_CH1	Nickel (mg/L)_Dissolved Metals	0.0025	0.0005	5	1
RG_CH1	Nickel (mg/L)_Total Metals	0.0005	0.00454	0.110132159	0
RG_CH1	Nitrate (mg-N/l)_Nutrients and Biological Indicators	0.4	0.222	1.801801802	1
RG_CH1	Nitrite (mg-N/l)_Nutrients and Biological Indicators	0.0037	0.0027	1.37037037	1
RG_CH1	Oxidation-Reduction Potential (mV)_Conventional Parameters	565	546	1.034798535	1
RG_CH1	Oxidation-Reduction Potential (mV)_Field Measured	260.2	347.5	0.748776978	0
RG_CH1	pH (-)_Conventional Parameters	8.46	8.46	1	0
RG_CH1	pH (-)_Field Measured	8.53	9.16	0.931222707	0
RG_CH1	Phenanthrene (%)_Parent PAHs	109.5	143.6	0.762534819	0
RG_CH1	Phenanthrene (µg/L)_Parent PAHs	0.02	0.05	0.4	0
RG_CH1	Potassium (mg/L)_Major Ions	0.415	2	0.2075	0
RG_CH1	Potassium (mg/L)_Total Metals	0.352	2	0.176	0
RG_CH1	Pyrene (µg/L)_Parent PAHs	0.01	0.05	0.2	0
RG_CH1	Quinoline (µg/L)_Parent PAHs	0.05	0.05	1	0
RG_CH1	Selenium (mg/L)_Dissolved Metals	0.0011	0.00129	0.852713178	0
RG_CH1	Selenium (mg/L)_Total Metals	0.00103	0.00132	0.78030303	0
RG_CH1	Silicon (mg/L)_Dissolved Metals	2	1.95	1.025641026	1
RG_CH1	Silicon (mg/L)_Total Metals	1.96	2.51	0.780876494	0
RG_CH1	Silver (mg/L)_Dissolved Metals	0.00005	0.00001	5	1
RG_CH1	Silver (mg/L)_Total Metals	0.000012	0.000012	1	0
RG_CH1	Sodium (mg/L)_Major Ions	1.52	2	0.76	0
RG_CH1	Sodium (mg/L)_Total Metals	1.49	2	0.745	0
RG_CH1	Strontium (mg/L)_Dissolved Metals	0.0878	0.138	0.636231884	0
RG_CH1	Strontium (mg/L)_Total Metals	0.0825	0.129	0.639534884	0
RG_CH1	Sulphate (mg/L)_Major Ions	34.9	57.2	0.61013986	0
RG_CH1	Sulphide (mg/L)_Major Ions	0.0057	0.02	0.285	0
RG_CH1	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	0.5	0.5	1	0

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
RG_CH1	Temperature (°C)_Field Measured	8.1	7.8	1.038461538	1
RG_CH1	Thallium (mg/L)_Dissolved Metals	0.00005	0.00001	5	1
RG_CH1	Thallium (mg/L)_Total Metals	0.00001	0.000014	0.714285714	0
RG_CH1	Tin (mg/L)_Dissolved Metals	0.0005	0.0001	5	1
RG_CH1	Tin (mg/L)_Total Metals	0.00012	0.0001	1.2	1
RG_CH1	Titanium (mg/L)_Dissolved Metals	0.01	0.011	0.909090909	0
RG_CH1	Titanium (mg/L)_Total Metals	0.01	0.011	0.909090909	0
RG_CH1	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	183	142	1.288732394	1
RG_CH1	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	0.217	0.0213	10.18779343	1
RG_CH1	Total dissolved solids (mg/L)_Conventional Parameters	206	238	0.865546218	0
RG_CH1	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	0.25	0.25	1	0
RG_CH1	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	0.75	0.35	2.142857143	1
RG_CH1	Total organic carbon (mg/L)_Conventional Parameters	2.83	2.99	0.946488294	0
RG_CH1	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	0.0118	0.0069	1.710144928	1
RG_CH1	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	0.0302	0.3	0.100666667	0
RG_CH1	Total suspended solids (mg/L)_Conventional Parameters	14.2	19.3	0.735751295	0
RG_CH1	Turbidity (NTU)_Conventional Parameters	6.38	6.39	0.998435055	0
RG_CH1	Turbidity (NTU)_Field Measured	5.21	6.26	0.832268371	0
RG_CH1	Uranium (mg/L)_Dissolved Metals	0.000856	0.000881	0.971623156	0
RG_CH1	Uranium (mg/L)_Total Metals	0.000803	0.000902	0.890243902	0
RG_CH1	Vanadium (mg/L)_Dissolved Metals	0.0025	0.001	2.5	1
RG_CH1	Vanadium (mg/L)_Total Metals	0.001	0.0015	0.666666667	0
RG_CH1	Zinc (mg/L)_Dissolved Metals	0.0174	0.0032	5.4375	1
RG_CH1	Zinc (mg/L)_Total Metals	0.0031	0.0051	0.607843137	0
FR_CC1	Acridine (%)_Parent PAHs	-	86.9	-	0
FR_CC1	Benzo(b)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
FR_CC1	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.001	-	0
FR_CC1	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_CC1	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_CC1	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
FR_CC1	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_CC1	Naphthalene (%)_Parent PAHs	-	96.8	-	0
FR_CC1	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0055	-	0
FR_CC1	Total Suspended Solids (mg/L)_Field Measured	-	9.8	-	0
FR_CC1	Turbidity (NTU)_Field Measured	-	1.38	-	0
FR_FC1	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.001	-	0
FR_FC1	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_FC1	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FC1	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FC1	Silica (mg/L)_Major Ions	-	2.91	-	0
FR_FC1	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FC1	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0065	-	0
FR_FR1	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0018	-	0
FR_FR1	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_FR1	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FR1	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FR1	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FR1	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0202	-	0
FR_FR1	Total Selenium 4+ (µg/L)_Speciation of Selenium	-	0.25	-	0
FR_FR1	Total Selenium 6+ (µg/L)_Speciation of Selenium	-	21.4	-	0
FR_FR1	Total Selenocyanate (µg/L)_Speciation of Selenium	-	0.081	-	0
FR_FR1	Turbidity (NTU)_Field Measured	-	62	-	0
FR_FR2	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0022	-	0
FR_FR2	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_FR2	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FR2	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0555	-	0
FR_FR2	Total Selenium 4+ (µg/L)_Speciation of Selenium	-	0.58	-	0
FR_FR2	Total Selenium 6+ (µg/L)_Speciation of Selenium	-	42.1	-	0
FR_FR2	Total Selenocyanate (µg/L)_Speciation of Selenium	-	0.087	-	0
FR_FR2	Total Suspended Solids (ppm)_Field Measured	-	2.3	-	0
FR_FR3	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_FR3	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FR3	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FR3	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FR3	Total Selenium 4+ (µg/L)_Speciation of Selenium	-	0.58	-	0
FR_FR3	Total Selenium 6+ (µg/L)_Speciation of Selenium	-	43.2	-	0
FR_FR3	Total Selenocyanate (µg/L)_Speciation of Selenium	-	0.087	-	0
FR_FR4	Acenaphthene (%)_Parent PAHs	-	82	-	0
FR_FR4	Acenaphthene (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Acenaphthylene (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Acridine (%)_Parent PAHs	-	87.3	-	0
FR_FR4	Acridine (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Anthracene (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Benzo(a)anthracene (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Benzo(a)pyrene (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Benzo(b)fluoranthene (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Benzo(k)fluoranthene (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	-	2	-	0
FR_FR4	Chrysene (%)_Parent PAHs	-	84.3	-	0
FR_FR4	Chrysene (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Colour (CU)_Conventional Parameters	-	5	-	0
FR_FR4	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.002	-	0
FR_FR4	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_FR4	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	-	0.53	-	0
FR_FR4	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FR4	Extracted Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FR4	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.48	-	0
FR_FR4	Fluoranthene (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Fluorene (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FR4	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FR4	Naphthalene (%)_Parent PAHs	-	86	-	0
FR_FR4	Naphthalene (µg/L)_Parent PAHs	-	0.05	-	0
FR_FR4	Phenanthrene (%)_Parent PAHs	-	87.3	-	0
FR_FR4	Phenanthrene (µg/L)_Parent PAHs	-	0.02	-	0
FR_FR4	Pyrene (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Quinoline (µg/L)_Parent PAHs	-	0.01	-	0
FR_FR4	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	-	0.5	-	0
FR_FR4	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	-	0.94	-	0
FR_FR4	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.099	-	0
FR_FR4	Total Selenium 4+ (µg/L)_Speciation of Selenium	-	0.58	-	0
FR_FR4	Total Selenium 6+ (µg/L)_Speciation of Selenium	-	59	-	0
FR_FR4	Total Selenocyanate (µg/L)_Speciation of Selenium	-	0.087	-	0
FR_FR5	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0012	-	0
FR_FR5	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_FR5	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FR5	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FR5	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FR5	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	-	0.5	-	0
FR_FR5	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FR5	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0153	-	0
FR_FRABCH	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_FRABCH	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FRABCH	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FRABCH	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	-	0.25	-	0
FR_FRABEC1	Acidity, CaCO3 (mg/L)_Conventional Parameters	-	2.1	-	0
FR_FRABEC1	Aluminum (mg/L)_Dissolved Metals	-	0.0034	-	0
FR_FRABEC1	Aluminum (mg/L)_Total Metals	-	0.0137	-	0
FR_FRABEC1	Antimony (mg/L)_Dissolved Metals	-	0.00043	-	0
FR_FRABEC1	Antimony (mg/L)_Total Metals	-	0.00045	-	0
FR_FRABEC1	Arsenic (mg/L)_Dissolved Metals	-	0.00016	-	0
FR_FRABEC1	Arsenic (mg/L)_Total Metals	-	0.00057	-	0
FR_FRABEC1	Barium (mg/L)_Dissolved Metals	-	0.0903	-	0
FR_FRABEC1	Barium (mg/L)_Total Metals	-	0.0945	-	0
FR_FRABEC1	Beryllium (mg/L)_Dissolved Metals	-	0.0001	-	0
FR_FRABEC1	Beryllium (mg/L)_Total Metals	-	0.0001	-	0
FR_FRABEC1	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	-	182	-	0
FR_FRABEC1	Bismuth (mg/L)_Dissolved Metals	-	0.0005	-	0
FR_FRABEC1	Bismuth (mg/L)_Total Metals	-	0.0005	-	0
FR_FRABEC1	Boron (mg/L)_Dissolved Metals	-	0.013	-	0
FR_FRABEC1	Boron (mg/L)_Total Metals	-	0.014	-	0
FR_FRABEC1	Bromide (mg/L)_Major Ions	-	0.05	-	0
FR_FRABEC1	Cadmium (mg/L)_Dissolved Metals	-	0.0000286	-	0
FR_FRABEC1	Cadmium (mg/L)_Total Metals	-	0.0000309	-	0
FR_FRABEC1	Calcium (mg/L)_Major Ions	-	87.6	-	0
FR_FRABEC1	Calcium (mg/L)_Total Metals	-	89.4	-	0
FR_FRABEC1	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	-	11.5	-	0
FR_FRABEC1	Chloride (mg/L)_Major Ions	-	1.4	-	0
FR_FRABEC1	Chromium (mg/L)_Dissolved Metals	-	0.00029	-	0
FR_FRABEC1	Chromium (mg/L)_Total Metals	-	0.00024	-	0
FR_FRABEC1	Cobalt (mg/L)_Dissolved Metals	-	0.0001	-	0
FR_FRABEC1	Cobalt (mg/L)_Total Metals	-	0.0001	-	0
FR_FRABEC1	Conductivity (µS/cm)_Conventional Parameters	-	627	-	0

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
FR_FRABEC1	Conductivity (µS/cm)_Field Measured	-	837	-	0
FR_FRABEC1	Copper (mg/L)_Dissolved Metals	-	0.0005	-	0
FR_FRABEC1	Copper (mg/L)_Total Metals	-	0.001	-	0
FR_FRABEC1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility (%)_Toxicity	-	0	-	0
FR_FRABEC1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	-	0	-	0
FR_FRABEC1	Dissolved organic carbon (mg/L)_Conventional Parameters	-	2.28	-	0
FR_FRABEC1	Dissolved Oxygen (%)_Field Measured	-	107.5	-	0
FR_FRABEC1	Dissolved Oxygen (mg/L)_Field Measured	-	14.45	-	0
FR_FRABEC1	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_FRABEC1	Fluoride (mg/L)_Major Ions	-	0.217	-	0
FR_FRABEC1	Hardness, as CaCO3 (mg/L)_Conventional Parameters	-	341	-	0
FR_FRABEC1	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	-	2	-	0
FR_FRABEC1	Iron (mg/L)_Dissolved Metals	-	0.03	-	0
FR_FRABEC1	Iron (mg/L)_Total Metals	-	0.03	-	0
FR_FRABEC1	Lead (mg/L)_Dissolved Metals	-	0.00005	-	0
FR_FRABEC1	Lead (mg/L)_Total Metals	-	0.00005	-	0
FR_FRABEC1	Lithium (mg/L)_Dissolved Metals	-	0.0309	-	0
FR_FRABEC1	Lithium (mg/L)_Total Metals	-	0.0316	-	0
FR_FRABEC1	Magnesium (mg/L)_Major Ions	-	30.5	-	0
FR_FRABEC1	Magnesium (mg/L)_Total Metals	-	30.9	-	0
FR_FRABEC1	Manganese (mg/L)_Dissolved Metals	-	0.00126	-	0
FR_FRABEC1	Manganese (mg/L)_Total Metals	-	0.00263	-	0
FR_FRABEC1	Mercury (mg/L)_Dissolved Metals	-	0.00001	-	0
FR_FRABEC1	Mercury (mg/L)_Total Metals	-	0.00001	-	0
FR_FRABEC1	Molybdenum (mg/L)_Dissolved Metals	-	0.002	-	0
FR_FRABEC1	Molybdenum (mg/L)_Total Metals	-	0.00194	-	0
FR_FRABEC1	Nickel (mg/L)_Dissolved Metals	-	0.00331	-	0
FR_FRABEC1	Nickel (mg/L)_Total Metals	-	0.00328	-	0
FR_FRABEC1	Nitrate (mg-N/l)_Nutrients and Biological Indicators	-	11.9	-	0
FR_FRABEC1	Nitrite (mg-N/l)_Nutrients and Biological Indicators	-	0.0406	-	0
FR_FRABEC1	Oxidation-Reduction Potential (mV)_Conventional Parameters	-	496	-	0
FR_FRABEC1	Oxidation-Reduction Potential (mV)_Field Measured	-	223.8	-	0
FR_FRABEC1	pH (-)_Conventional Parameters	-	8.38	-	0
FR_FRABEC1	pH (-)_Field Measured	-	8.67	-	0
FR_FRABEC1	Potassium (mg/L)_Major Ions	-	2	-	0
FR_FRABEC1	Potassium (mg/L)_Total Metals	-	2	-	0
FR_FRABEC1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	-	0	-	0
FR_FRABEC1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed (%)_Toxicity	-	0	-	0
FR_FRABEC1	Selenium (mg/L)_Dissolved Metals	-	0.0505	-	0
FR_FRABEC1	Selenium (mg/L)_Total Metals	-	0.0546	-	0
FR_FRABEC1	Silicon (mg/L)_Dissolved Metals	-	1.79	-	0
FR_FRABEC1	Silicon (mg/L)_Total Metals	-	1.86	-	0
FR_FRABEC1	Silver (mg/L)_Dissolved Metals	-	0.00001	-	0
FR_FRABEC1	Silver (mg/L)_Total Metals	-	0.000024	-	0
FR_FRABEC1	Sodium (mg/L)_Major Ions	-	2	-	0
FR_FRABEC1	Sodium (mg/L)_Total Metals	-	2	-	0
FR_FRABEC1	Strontium (mg/L)_Dissolved Metals	-	0.148	-	0
FR_FRABEC1	Strontium (mg/L)_Total Metals	-	0.154	-	0
FR_FRABEC1	Sulphate (mg/L)_Major Ions	-	136	-	0
FR_FRABEC1	Temperature (°C)_Field Measured	-	12.8	-	0
FR_FRABEC1	Thallium (mg/L)_Dissolved Metals	-	0.00001	-	0
FR_FRABEC1	Thallium (mg/L)_Total Metals	-	0.00001	-	0
FR_FRABEC1	Tin (mg/L)_Dissolved Metals	-	0.0001	-	0
FR_FRABEC1	Tin (mg/L)_Total Metals	-	0.00034	-	0
FR_FRABEC1	Titanium (mg/L)_Dissolved Metals	-	0.016	-	0
FR_FRABEC1	Titanium (mg/L)_Total Metals	-	0.016	-	0
FR_FRABEC1	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	-	182	-	0
FR_FRABEC1	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	-	0.18	-	0
FR_FRABEC1	Total dissolved solids (mg/L)_Conventional Parameters	-	424	-	0
FR_FRABEC1	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	-	0.237	-	0
FR_FRABEC1	Total organic carbon (mg/L)_Conventional Parameters	-	1.15	-	0
FR_FRABEC1	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0012	-	0
FR_FRABEC1	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0032	-	0
FR_FRABEC1	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_FRABEC1	Total Selenium 4+ (µg/L)_Speciation of Selenium	-	0.58	-	0
FR_FRABEC1	Total Selenium 6+ (µg/L)_Speciation of Selenium	-	41.4	-	0
FR_FRABEC1	Total Selenocyanate (µg/L)_Speciation of Selenium	-	0.087	-	0
FR_FRABEC1	Total suspended solids (mg/L)_Conventional Parameters	-	45.1	-	0
FR_FRABEC1	Turbidity (NTU)_Conventional Parameters	-	23.4	-	0
FR_FRABEC1	Uranium (mg/L)_Dissolved Metals	-	0.00167	-	0
FR_FRABEC1	Uranium (mg/L)_Total Metals	-	0.00169	-	0
FR_FRABEC1	Vanadium (mg/L)_Dissolved Metals	-	0.001	-	0
FR_FRABEC1	Vanadium (mg/L)_Total Metals	-	0.001	-	0
FR_FRABEC1	Zinc (mg/L)_Dissolved Metals	-	0.003	-	0
FR_FRABEC1	Zinc (mg/L)_Total Metals	-	0.0031	-	0
FR_HC1	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.001	-	0
FR_HC1	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_HC1	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_HC1	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_HC1	Silica (mg/L)_Major Ions	-	2.87	-	0
FR_HC1	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.242	-	0
FR_HC1	Total Suspended Solids (ppm)_Field Measured	-	1	-	0
FR_HC3	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.001	-	0
FR_HC3	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_HC3	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_HC3	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0091	-	0
FR_KC1	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.001	-	0
FR_KC1	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_KC1	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_KC1	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_KC1	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0928	-	0
FR_MULTIPLATE	Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility (%)_Toxicity	-	0	-	0
FR_MULTIPLATE	Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	-	3	-	0
FR_MULTIPLATE	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_MULTIPLATE	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
FR_MULTIPLATE	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_MULTIPLATE	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_MULTIPLATE	Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	-	0	-	0
FR_MULTIPLATE	Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed (%)_Toxicity	-	0	-	0
FR_MULTIPLATE	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	-	0.5	-	0
FR_MULTIPLATE	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	-	0.25	-	0
FR_MULTIPLATE	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0085	-	0
FR_MULTIPLATE	Total Selenium 4+ (µg/L)_Speciation of Selenium	-	0.58	-	0
FR_MULTIPLATE	Total Selenium 6+ (µg/L)_Speciation of Selenium	-	52.1	-	0
FR_MULTIPLATE	Total Selenocyanate (µg/L)_Speciation of Selenium	-	0.087	-	0
FR_MULTIPLATE	Total Suspended Solids (ppm)_Field Measured	-	1.4	-	0
FR_NGD1	Daphnia magna, 48-hour, LC50 toxicity, mortality or lethal dose (%)_Toxicity	-	0	-	0
FR_NGD1	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0114	-	0
FR_NGD1	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_NGD1	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_NGD1	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_NGD1	Silica (mg/L)_Major Ions	-	4.96	-	0
FR_NGD1	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0426	-	0
FR_UFR1	Acenaphthene (%)_Parent PAHs	-	115.1	-	0
FR_UFR1	Acenaphthene (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Acenaphthylene (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Acridine (%)_Parent PAHs	-	110.3	-	0
FR_UFR1	Acridine (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Anthracene (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Benzo(a)anthracene (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Benzo(a)pyrene (µg/L)_Parent PAHs	-	0.025	-	0
FR_UFR1	Benzo(b)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Benzo(k)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	-	2	-	0
FR_UFR1	Chrysene (%)_Parent PAHs	-	105.8	-	0
FR_UFR1	Chrysene (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Colour (CU)_Conventional Parameters	-	9.1	-	0
FR_UFR1	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0052	-	0
FR_UFR1	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
FR_UFR1	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
FR_UFR1	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_UFR1	Extracted Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
FR_UFR1	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_UFR1	Fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Fluorene (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
FR_UFR1	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
FR_UFR1	Naphthalene (%)_Parent PAHs	-	111.1	-	0
FR_UFR1	Naphthalene (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Phenanthrene (%)_Parent PAHs	-	108.7	-	0
FR_UFR1	Phenanthrene (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Pyrene (µg/L)_Parent PAHs	-	0.05	-	0
FR_UFR1	Quinoline (µg/L)_Parent PAHs	-	0.05	-	0

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
FR_UFR1	Silica (mg/L)_Major Ions	-	3.48	-	0
FR_UFR1	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	-	0.5	-	0
FR_UFR1	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	-	0.25	-	0
FR_UFR1	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0175	-	0
FR_UFR1	Total Suspended Solids (ppm)_Field Measured	-	1	-	0
FR_UFR1	Turbidity (NTU)_Field Measured	-	17.6	-	0
GH_CC1	2-Bromobenzotrifluoride (%)_Unknown	-	134.4	-	0
GH_CC1	Acenaphthene (%)_Parent PAHs	-	112.5	-	0
GH_CC1	Acenaphthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Acenaphthylene (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Acridine (%)_Parent PAHs	-	114.9	-	0
GH_CC1	Acridine (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Benzo(a)anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Benzo(a)pyrene (µg/L)_Parent PAHs	-	0.01	-	0
GH_CC1	Benzo(b)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Benzo(k)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	-	2	-	0
GH_CC1	Chrysene (%)_Parent PAHs	-	116.8	-	0
GH_CC1	Chrysene (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Colour (CU)_Conventional Parameters	-	6.8	-	0
GH_CC1	Conductivity (si)_Field Measured	-	3652	-	0
GH_CC1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility (%v/v)_Toxicity	-	0	-	0
GH_CC1	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0011	-	0
GH_CC1	Dissolved Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
GH_CC1	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
GH_CC1	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
GH_CC1	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
GH_CC1	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
GH_CC1	Fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Fluorene (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	-	2200	-	0
GH_CC1	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	-	0.1	-	0
GH_CC1	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	-	0.1	-	0
GH_CC1	Naphthalene (%)_Parent PAHs	-	121.1	-	0
GH_CC1	Naphthalene (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Oxygen Saturation (%)_Field Measured	-	96	-	0
GH_CC1	Phenanthrene (%)_Parent PAHs	-	116	-	0
GH_CC1	Phenanthrene (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Pyrene (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Quinoline (µg/L)_Parent PAHs	-	0.05	-	0
GH_CC1	Silica (mg/L)_Major Ions	-	4.49	-	0
GH_CC1	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	-	0.5	-	0
GH_CC1	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	-	0.27	-	0
GH_CC1	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0043	-	0
GH_FR1	Acenaphthene (%)_Parent PAHs	-	123.9	-	0
GH_FR1	Acenaphthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_FR1	Acenaphthylene (µg/L)_Parent PAHs	-	0.05	-	0
GH_FR1	Acridine (%)_Parent PAHs	-	108.7	-	0
GH_FR1	Acridine (µg/L)_Parent PAHs	-	0.1	-	0
GH_FR1	Anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_FR1	Benzo(a)anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_FR1	Benzo(a)pyrene (µg/L)_Parent PAHs	-	0.013	-	0
GH_FR1	Benzo(b)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_FR1	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	-	0.05	-	0
GH_FR1	Benzo(k)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_FR1	Chrysene (%)_Parent PAHs	-	106.3	-	0
GH_FR1	Chrysene (µg/L)_Parent PAHs	-	0.05	-	0
GH_FR1	Conductivity (µmhos/cm)_Conventional Parameters	-	852	-	0
GH_FR1	Conductivity (si)_Field Measured	-	922	-	0
GH_FR1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, immobility (%)_Toxicity	-	0	-	0
GH_FR1	Daphnia magna, 48-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	-	0	-	0
GH_FR1	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_FR1	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0034	-	0
GH_FR1	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
GH_FR1	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
GH_FR1	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
GH_FR1	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
GH_FR1	Fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_FR1	Fluorene (µg/L)_Parent PAHs	-	0.05	-	0
GH_FR1	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	-	518	-	0
GH_FR1	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
GH_FR1	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	-	0.05	-	0
GH_FR1	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
GH_FR1	Naphthalene (%)_Parent PAHs	-	121.5	-	0
GH_FR1	Naphthalene (µg/L)_Parent PAHs	-	0.11	-	0
GH_FR1	Oxygen Saturation (%)_Field Measured	-	95.4	-	0
GH_FR1	Phenanthrene (%)_Parent PAHs	-	109	-	0
GH_FR1	Phenanthrene (µg/L)_Parent PAHs	-	0.159	-	0
GH_FR1	Pyrene (µg/L)_Parent PAHs	-	0.05	-	0
GH_FR1	Quinoline (µg/L)_Parent PAHs	-	0.5	-	0
GH_FR1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, mortality (%)_Toxicity	-	0	-	0
GH_FR1	Rainbow trout, 96-hour, single concentration acute lethality toxicity, stressed (%)_Toxicity	-	0	-	0
GH_FR1	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	-	0.5	-	0
GH_FR1	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	-	0.25	-	0
GH_FR1	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0184	-	0
GH_FR1	Turbidity (Wedge Unit)_Field Measured	-	0.47	-	0
GH_GH1	Acenaphthene (%)_Parent PAHs	-	111.3	-	0
GH_GH1	Acenaphthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_GH1	Acenaphthylene (µg/L)_Parent PAHs	-	0.05	-	0
GH_GH1	Acridine (%)_Parent PAHs	-	116.7	-	0
GH_GH1	Acridine (µg/L)_Parent PAHs	-	0.068	-	0
GH_GH1	Anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_GH1	Benzo(a)anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_GH1	Benzo(a)pyrene (µg/L)_Parent PAHs	-	0.01	-	0
GH_GH1	Benzo(b)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_GH1	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	-	0.05	-	0
GH_GH1	Benzo(k)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_GH1	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	-	0.05	-	0
GH_GH1	Benzo(k)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_GH1	Chrysene (%)_Parent PAHs	-	117.1	-	0
GH_GH1	Chrysene (µg/L)_Parent PAHs	-	0.06	-	0
GH_GH1	Conductivity (µmhos/cm)_Conventional Parameters	-	1460	-	0
GH_GH1	Conductivity (si)_Field Measured	-	1676	-	0
GH_GH1	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_GH1	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0128	-	0
GH_GH1	Dissolved Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
GH_GH1	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
GH_GH1	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
GH_GH1	Fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_GH1	Fluorene (µg/L)_Parent PAHs	-	0.098	-	0
GH_GH1	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	-	989	-	0
GH_GH1	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
GH_GH1	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	-	0.05	-	0
GH_GH1	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
GH_GH1	Naphthalene (%)_Parent PAHs	-	107.9	-	0
GH_GH1	Naphthalene (µg/L)_Parent PAHs	-	0.202	-	0
GH_GH1	Oxygen Saturation (%)_Field Measured	-	92.1	-	0
GH_GH1	Phenanthrene (%)_Parent PAHs	-	126.8	-	0
GH_GH1	Phenanthrene (µg/L)_Parent PAHs	-	0.353	-	0
GH_GH1	Pyrene (µg/L)_Parent PAHs	-	0.05	-	0
GH_GH1	Quinoline (µg/L)_Parent PAHs	-	0.05	-	0
GH_GH1	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0691	-	0
GH_PC1	Acenaphthene (%)_Parent PAHs	-	108.9	-	0
GH_PC1	Acenaphthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC1	Acenaphthylene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC1	Acridine (%)_Parent PAHs	-	128.3	-	0
GH_PC1	Acridine (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC1	Anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC1	Benzo(a)anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC1	Benzo(a)pyrene (µg/L)_Parent PAHs	-	0.01	-	0
GH_PC1	Benzo(b)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC1	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC1	Benzo(k)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC1	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	-	2	-	0
GH_PC1	Chrysene (%)_Parent PAHs	-	113.4	-	0
GH_PC1	Chrysene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC1	Colour (CU)_Conventional Parameters	-	9.8	-	0
GH_PC1	Conductivity (si)_Field Measured	-	1241	-	0
GH_PC1	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC1	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0082	-	0
GH_PC1	Dissolved Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
GH_PC1	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
GH_PC1	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
GH_PC1	Fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0

Table F27-1. Raw Output of Comparisons of Highest Maximum Values

Station	Constituent	in_max_conc	out_max_conc	comparison	m_check
GH_PC1	Fluorene (µg/L)_Parent PAHs	-	0.065	-	0
GH_PC1	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	-	646	-	0
GH_PC1	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	-	0.1	-	0
GH_PC1	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC1	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	-	0.1	-	0
GH_PC1	Naphthalene (%)_Parent PAHs	-	108.8	-	0
GH_PC1	Naphthalene (µg/L)_Parent PAHs	-	0.104	-	0
GH_PC1	Oxygen Saturation (%)_Field Measured	-	100.1	-	0
GH_PC1	Phenanthrene (%)_Parent PAHs	-	108.6	-	0
GH_PC1	Phenanthrene (µg/L)_Parent PAHs	-	0.204	-	0
GH_PC1	Pyrene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC1	Quinoline (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC1	Silica (mg/L)_Major Ions	-	4.85	-	0
GH_PC1	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0103	-	0
GH_PC2	Acenaphthene (%)_Parent PAHs	-	112.2	-	0
GH_PC2	Acenaphthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Acenaphthylene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Acridine (%)_Parent PAHs	-	116.8	-	0
GH_PC2	Acridine (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Benzo(a)anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Benzo(a)pyrene (µg/L)_Parent PAHs	-	0.01	-	0
GH_PC2	Benzo(b)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Benzo(k)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	-	2	-	0
GH_PC2	Chrysene (%)_Parent PAHs	-	101.2	-	0
GH_PC2	Chrysene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Colour (CU)_Conventional Parameters	-	5.9	-	0
GH_PC2	Conductivity (µmhos/cm)_Conventional Parameters	-	1170	-	0
GH_PC2	Conductivity (µS/cm at 25 C)_Field Measured	-	856	-	0
GH_PC2	Conductivity (si)_Field Measured	-	1172	-	0
GH_PC2	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0037	-	0
GH_PC2	Dissolved Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
GH_PC2	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
GH_PC2	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
GH_PC2	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
GH_PC2	Fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Fluorene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	-	678	-	0
GH_PC2	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Naphthalene (%)_Parent PAHs	-	111.3	-	0
GH_PC2	Naphthalene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Oxygen Saturation (%)_Field Measured	-	767	-	0
GH_PC2	Phenanthrene (%)_Parent PAHs	-	106.2	-	0
GH_PC2	Phenanthrene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Pyrene (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Quinoline (µg/L)_Parent PAHs	-	0.05	-	0
GH_PC2	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	-	0.25	-	0
GH_PC2	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0111	-	0
GH_PC2	Turbidity (NTU)_Field Measured	-	107.3	-	0
GH_SC1-2	2-Bromobenzotrifluoride (%)_Unknown	-	117.7	-	0
GH_SC1-2	Acenaphthene (%)_Parent PAHs	-	113.4	-	0
GH_SC1-2	Acenaphthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Acenaphthylene (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Acridine (%)_Parent PAHs	-	114.7	-	0
GH_SC1-2	Acridine (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Benzo(a)anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Benzo(a)pyrene (µg/L)_Parent PAHs	-	0.01	-	0
GH_SC1-2	Benzo(b)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Benzo(k)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	-	2	-	0
GH_SC1-2	Chrysene (%)_Parent PAHs	-	109.9	-	0
GH_SC1-2	Chrysene (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Colour (CU)_Conventional Parameters	-	80.7	-	0
GH_SC1-2	Conductivity (µmhos/cm)_Conventional Parameters	-	3120	-	0
GH_SC1-2	Conductivity (µS/cm at 25 C)_Field Measured	-	2669	-	0
GH_SC1-2	Conductivity (si)_Field Measured	-	3185	-	0
GH_SC1-2	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0066	-	0
GH_SC1-2	Dissolved Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
GH_SC1-2	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
GH_SC1-2	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	-	0.92	-	0
GH_SC1-2	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
GH_SC1-2	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.59	-	0
GH_SC1-2	Fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Fluorene (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	-	2280	-	0
GH_SC1-2	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	-	0.1	-	0
GH_SC1-2	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	-	0.1	-	0
GH_SC1-2	Naphthalene (%)_Parent PAHs	-	118.1	-	0
GH_SC1-2	Naphthalene (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Oxygen Saturation (%)_Field Measured	-	119	-	0
GH_SC1-2	Phenanthrene (%)_Parent PAHs	-	106.5	-	0
GH_SC1-2	Phenanthrene (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Pyrene (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Quinoline (µg/L)_Parent PAHs	-	0.05	-	0
GH_SC1-2	Sulphide (mg/L)_Major Ions	-	0.002	-	0
GH_SC1-2	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	-	0.5	-	0
GH_SC1-2	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	-	1.47	-	0
GH_SC1-2	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0224	-	0
LC_DC1	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	-	2	-	0
LC_DC1	Colour (CU)_Conventional Parameters	-	12.4	-	0
LC_DC1	Conductivity (µS/cm at 25 C)_Field Measured	-	434.7	-	0
LC_DC1	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0347	-	0
LC_DC1	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
LC_DC1	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.096	-	0
LC_DC1	Turbidity (FNU)_Field Measured	-	25.3	-	0
LC_DC1	Turbidity (Wedge Unit)_Field Measured	-	57	-	0
LC_FRB	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	-	2	-	0
LC_FRB	Colour (CU)_Conventional Parameters	-	5	-	0
LC_FRB	Conductivity (µS/cm at 25 C)_Field Measured	-	808.4	-	0
LC_FRB	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0019	-	0
LC_FRB	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
LC_FRB	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.18	-	0
LC_FRB	Turbidity (FNU)_Field Measured	-	13.66	-	0
LC_FRB	Turbidity (Wedge Unit)_Field Measured	-	57	-	0
LC_FRUS	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	-	2	-	0
LC_FRUS	Chlorophyll a (µg/L)_Nutrients and Biological Indicators	-	0.229	-	0
LC_FRUS	Colour (CU)_Conventional Parameters	-	5	-	0
LC_FRUS	Conductivity (µS/cm at 25 C)_Field Measured	-	815.6	-	0
LC_FRUS	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0017	-	0
LC_FRUS	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
LC_FRUS	Oxidation-Reduction Potential (mV)_Field Measured	-	318.4	-	0
LC_FRUS	Sulphide (mg/L)_Major Ions	-	0.02	-	0
LC_FRUS	Turbidity (FNU)_Field Measured	-	11.7	-	0
LC_FRUS	Turbidity (NTU)_Field Measured	-	18.42	-	0
RG_CH1	Acridine (%)_Parent PAHs	-	150.1	-	0
RG_CH1	Benzo(b)fluoranthene (µg/L)_Parent PAHs	-	0.05	-	0
RG_CH1	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	-	2	-	0
RG_CH1	Colour (CU)_Conventional Parameters	-	5.5	-	0
RG_CH1	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0037	-	0
RG_CH1	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	-	0.3	-	0
RG_CH1	Extracted Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
RG_CH1	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
RG_CH1	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	-	0.25	-	0
RG_CH1	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	-	0.25	-	0
RG_CH1	Naphthalene (%)_Parent PAHs	-	117	-	0
RG_CH1	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	-	0.0108	-	0
RG_CH1	Turbidity (FNU)_Field Measured	-	3.9	-	0

Notes: "-" = data was not available; Inf = infinite

The raw output for the comparison of observed maximum values during the period of September 2017 to September 2019 to maximum values observed prior to September 2017 is provided

The "m_check" column contains a value of 1 if the maximum value observed during September 2017 to September 2019 was higher than that observed prior to September 2017

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_CC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.482379402	1.482379402	3.205632753	0.077771874	0
FR_CC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	8.824122115	0.80219292	1.734735314	0.083754104	0
FR_CC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	5.252760034	0.477523639	1.032640778	0.428108006	0
FR_CC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	69	31.9076409	0.462429578			0
FR_CC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.983243488	0.983243488	5.193644225	0.025767803	1
FR_CC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	4.756744745	0.43243134	2.284169243	0.019061164	0
FR_CC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	11.22720585	1.020655077	5.391258025	4.11462E-06	0
FR_CC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	13.06285101	0.189316681			0
FR_CC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.226867534	1.226867534	4.174704577	0.044852782	1
FR_CC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.227330446	0.202484586	0.689001302	0.744364524	0
FR_CC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.870710302	0.079155482	0.269345095	0.989529893	0
FR_CC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	20.27780847	0.293881282			0
FR_CC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	1.906861356	1.906861356	39.47853366	2.57779E-08	1
FR_CC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	0.532212802	0.048382982	1.001692744	0.454118713	0
FR_CC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.262500839	0.023863713	0.494060242	0.900743613	0
FR_CC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	69	3.332784209	0.04830122			0
FR_CC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.006306068	1.006306068	8.175095864	0.005612491	1
FR_CC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	2.275609458	0.206873587	1.680613344	0.096302931	0
FR_CC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.816277919	0.074207084	0.602848419	0.820087603	0
FR_CC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	69	8.4934929	0.1230941			0
FR_CC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	2.386517227	2.386517227	44.77634108	4.797E-09	1
FR_CC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.600952078	0.054632007	1.025017274	0.4344354	0
FR_CC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.221713105	0.020155737	0.378166199	0.960392203	0
FR_CC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	3.677604839	0.053298621			0
FR_CC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.001899324	0.001899324	0.340962998	0.561178008	0
FR_CC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.063730302	0.005793664	1.040067374	0.421995654	0
FR_CC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.025294815	0.002299529	0.412806957	0.945720902	0
FR_CC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	0.384362411	0.00557047			0
FR_CC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.258776668	0.258776668	7.836876002	0.006632892	1
FR_CC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.341234784	0.031021344	0.939460378	0.508833102	0
FR_CC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.41176233	0.037432939	1.13363119	0.349605316	0
FR_CC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	69	2.278406613	0.033020386			0
FR_CC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000212838	0.000212838	1.030369692	0.31361807	0
FR_CC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.006037017	0.00054882	2.656896173	0.006745103	0
FR_CC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.00130135	0.000118305	0.572725139	0.844416683	0
FR_CC1	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	69	0.014252931	0.000206564			0
FR_CC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.01870664	1.01870664	5.400447789	0.023083337	1
FR_CC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	4.760386007	0.432762364	2.294193895	0.018540012	0
FR_CC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	11.21706096	1.019732814	5.405887827	3.96468E-06	0
FR_CC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	13.01572775	0.188633735			0
FR_CC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	2.774470075	2.774470075	43.24675548	7.72809E-09	1
FR_CC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	0.680096151	0.061826923	0.963720546	0.487148394	0
FR_CC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.338139204	0.030739928	0.479155334	0.910067425	0
FR_CC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	69	4.426654278	0.06415441			0
FR_CC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.001744193	0.001744193	0.004980296	0.943943163	0
FR_CC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	3.158361595	0.287123781	0.81984125	0.620539482	0
FR_CC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.369471657	0.124497423	0.355484741	0.968527836	0
FR_CC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	69	24.16509405	0.350218754			0
FR_CC1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.877215848	1.877215848	4.861021849	0.03080654	1
FR_CC1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(Month)	11	5.356181589	0.486925599	1.260886423	0.265676874	0
FR_CC1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.841943584	0.167449417	0.433607714	0.935599367	0
FR_CC1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	Residuals	69	26.64622738	0.386177208			0
FR_CC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	2.824377479	2.824377479	3.744990864	0.057065522	0
FR_CC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	17.47305739	1.588459763	2.106222466	0.031079908	0
FR_CC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	2.444639567	0.222239961	0.29467967	0.9848705	0
FR_CC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	69	52.03805647	0.754174731			0
FR_CC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.010830906	0.010830906	0.050738869	0.822448343	0
FR_CC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	1.262911775	0.114810161	0.537843973	0.870785767	0
FR_CC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.437362191	0.039760199	0.186262115	0.997902624	0
FR_CC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	69	14.7289949	0.213463694			0
FR_CC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	9.511141157	9.511141157	27.57910359	1.58761E-06	1
FR_CC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	2.805082547	0.255007504	0.739435811	0.697237982	0
FR_CC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.772285654	0.070207787	0.203578918	0.996869792	0
FR_CC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	69	23.79586913	0.344867669			0
FR_CC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.280883826	3.280883826	12.23689416	0.000824647	1
FR_CC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.640451904	0.0582229	0.217157177	0.995833364	0
FR_CC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.528968693	0.138997154	0.518425385	0.884529334	0
FR_CC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	69	18.49987269	0.268114097			0
FR_CC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	15.80963369	15.80963369	52.49732906	4.7664E-10	1
FR_CC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.77904142	0.252640129	0.838914566	0.602366068	0
FR_CC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.466186323	0.133289666	0.442600479	0.930921175	0
FR_CC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	69	20.77943286	0.301151201			0
FR_CC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	21.1596586	21.1596586	45.59495643	3.72674E-09	1
FR_CC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.076444849	0.097858623	0.210866334	0.996340186	0
FR_CC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.562292917	0.051117538	0.11014837	0.999826973	0
FR_CC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	69	32.02144619	0.46407893			0
FR_CC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	24.84153827	24.84153827	19.54370166	3.57202E-05	1
FR_CC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	1.694364928	0.154033175	0.121183253	0.999723868	0
FR_CC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.751622124	0.068329284	0.053757023	0.999995493	0
FR_CC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	69	87.70427271	1.271076416			0
FR_CC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.877213824	0.877213824	7.650522481	0.007276471	1
FR_CC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	1.341998964	0.121999906	1.064008565	0.402646385	0
FR_CC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.885182198	0.080471109	0.701819797	0.732523871	0
FR_CC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	69	7.911584339	0.114660643			0
FR_CC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.076781343	0.076781343	0.03750527	0.847008926	0
FR_CC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	138.0740042	12.5521822	6.131346104	6.53857E-07	0
FR_CC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	10.9819435	0.9983585	0.487666718	0.904799736	0
FR_CC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	69	141.2578179	2.047214752			0
FR_CC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.220533562	0.220533562	7.129243224	0.0094491	1
FR_CC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.26918988	0.024471807	0.791106191	0.648004619	0
FR_CC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.570958555	0.051905323	1.677956275	0.096961388	0
FR_CC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	69	2.134422306	0.030933657			0
FR_CC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	19.33555556	19.33555556	33.67867092	1.80083E-07	1
FR_CC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	10.11925439	0.919932217	1.602337947	0.117511776	0
FR_CC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	3.053407715	0.27758252	0.483493236	0.907401682	0
FR_CC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	69	39.61419192	0.574118723			0
FR_CC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.086606108	0.086606108	1.835275435	0.179924984	0
FR_CC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.19045879	0.017314435	0.366911282	0.964573169	0
FR_CC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.159752021	0.014522911	0.307755914	0.981995481	0
FR_CC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	69	3.256089688	0.047189706			0
FR_CC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.133839018	1.133839018	3.882245577	0.052813323	0
FR_CC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.301324793	0.027393163	0.093793726	0.999922113	0
FR_CC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.594368538	0.054033503	0.1850098	0.997966003	0
FR_CC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	69	20.15196893	0.292057521			0
FR_CC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.438305985	0.438305985	23.56605875	7.23329E-06	1
FR_CC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.185559739	0.016869067	0.906986083	0.53847882	0
FR_CC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.498325882	0.045302353	2.435736559	0.012515368	0
FR_CC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	69	1.283333512	0.018599036			0
FR_CC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.82221233	0.82221233	2.979425815	0.088804708	0
FR_CC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.841801038	0.167436458	0.606734401	0.816854658	0
FR_CC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.205652875	0.109604807	0.397171605	0.952681214	0
FR_CC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	69	19.04147117	0.27596335			0
FR_CC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.296458374	1.296458374	2.486089401	0.1194309	0
FR_CC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	34.07553377	3.097775797	5.940296835	1.0434E-06	0
FR_CC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	5.881222105	0.534656555	1.025257749	0.434234998	0
FR_CC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	69	35.98246619	0.521485017			0
FR_CC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.888871893	2.888871893	25.4529924	3.51367E-06	1
FR_CC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.1193942	0.010854018	0.095631531	0.999914174	0
FR_CC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.040285773	0.003662343	0.032267816	0.999999695	0
FR_CC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	69	7.831384127	0.113498321			0
FR_CC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.910409474	3.910409474	17.43041212	8.55734E-05	1
FR_CC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	2.893555482	0.263050498	1.172531579	0.322144919	0
FR_CC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.810051122	0.073641011	0.328250323	0.976800958	0
FR_CC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	69	15.47974035	0.224344063			0
FR_CC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.552518755	0.552518755	8.569898131	0.00462564	1
FR_CC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	1.172648646	0.106604422	1.653498693	0.103218682	0
FR_CC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.709093969	0.064463088	0.999861259	0.455684452	0
FR_CC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	69	4.448570277	0.064472033			0
FR_CC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.886652593	4.886652593	44.2543938	5.64039E-09	1
FR_CC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.609737631	0.146339785	1.325279081	0.229604185	0
FR_CC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.250097566	0.022736142	0.205902543	0.996707412	0
FR_CC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	69	7.619108522	0.110421863			0
FR_CC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.206008382	0.206008382	10.2585774	0.002059451	1
FR_CC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	1.426059592	0.129641781	6.455757916	2.99193E-07	0
FR_CC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.080103931	0.007282176	0.362629719	0.966089045	0
FR_CC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	69	1.385628614	0.020081574			0
FR_CC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.42498296	0.42498296	22.47025393	1.10863E-05	1
FR_CC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.175626529	0.015966048	0.844177738	0.597365502	0
FR_CC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.5122112	0.046564655	2.46202721	0.011631211	0
FR_CC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	69	1.305006358	0.018913136			0
FR_CC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.150685066	0.150685066	2.883405696	0.094002393	0
FR_CC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.639563012	0.058142092	1.112567052	0.365132601	0
FR_CC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.414079671	0.037643606	0.720322142	0.715254933	0
FR_CC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	69	3.605898935	0.052259405			0
FR_CC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.018883012	0.018883012	0.208152051	0.649652504	0
FR_CC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.176425267	0.197856842	2.181024289	0.025326253	0
FR_CC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.880815715	0.080074156	0.882676974	0.561065452	0
FR_CC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	69	6.25950027	0.090717395			0
FR_CC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.438305985	0.438305985	23.56605875	7.23329E-06	1
FR_CC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.185559739	0.016869067	0.906986083	0.53847882	0
FR_CC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.498325882	0.045302353	2.435736559	0.012515368	0
FR_CC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	69	1.283333512	0.018599036			0
FR_CC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.409475193	0.409475193	8.679444999	0.004385287	1
FR_CC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.318810542	0.028982777	0.61433371	0.81047445	0
FR_CC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.118565541	0.010778686	0.228470515	0.994797956	0
FR_CC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	69	3.255252882	0.047177578			0
FR_CC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	7.908130023	7.908130023	43.0475447	8.22741E-09	1
FR_CC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.104645383	0.100422308	0.546644246	0.864330038	0
FR_CC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.485377801	0.044125255	0.240193809	0.993544035	0
FR_CC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	69	12.67577455	0.183706878			0
FR_CC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.076658081	1.076658081	8.150489188	0.005680868	1
FR_CC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.362530612	0.032957328	0.249492716	0.992408336	0
FR_CC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.481034981	0.043730453	0.331047145	0.97602465	0
FR_CC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	69	9.114717639	0.132097357			0
FR_CC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.066798982	1.066798982	1.650428859	0.203196797	0
FR_CC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	41.79164329	3.799240299	5.877748236	1.21729E-06	0
FR_CC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	6.575187209	0.597744292	0.924761315	0.52217001	0
FR_CC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	69	44.60000159	0.646376835			0
FR_CC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	2.88570273	2.88570273	6.395801038	0.014132496	1
FR_CC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	2.494727428	0.226793403	0.502659357	0.893931024	0
FR_CC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	1.62661325	0.147873932	0.32774417	0.97641027	0
FR_CC1	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	59	26.62003712	0.45118707			0
FR_CC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.015323657	0.015323657	1.14981669	0.287954074	0
FR_CC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	1.097619156	0.09978356	7.487299178	7.32593E-08	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_CC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.074210725	0.00674643	0.50622103	0.89156601	0
FR_CC1	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	59	0.786295549	0.013327043			0
FR_CC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.009051981	0.009051981	0.748166264	0.390560798	0
FR_CC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.557148268	0.050649843	4.186321509	0.000141638	0
FR_CC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.0678503	0.006168209	0.509816123	0.889153673	0
FR_CC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	59	0.713834497	0.01209889			0
FR_CC1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.001095992	0.001095992	2.842258829	0.097009234	0
FR_CC1	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.012990602	0.001180964	3.062618695	0.002585009	0
FR_CC1	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.001909636	0.000173603	0.450209111	0.925871852	0
FR_CC1	Field Measured	pH (-)_Field Measured	Residuals	60	0.023136354	0.000385606			0
FR_CC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	3.960733215	3.960733215	15.138446	0.000227459	1
FR_CC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	2.702109878	0.245646353	0.938892837	0.509345383	0
FR_CC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	1.580718886	0.143701717	0.549246961	0.862394503	0
FR_CC1	Major Ions	Bromide (mg/L)_Major Ions	Residuals	69	18.05275071	0.261634068			0
FR_CC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	1.889688966	1.889688966	40.51567596	1.84229E-08	1
FR_CC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	0.756340608	0.068758237	1.474203694	0.161390709	0
FR_CC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.215069695	0.01955179	0.419198091	0.942715461	0
FR_CC1	Major Ions	Calcium (mg/L)_Major Ions	Residuals	69	3.218224442	0.046640934			0
FR_CC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.263392826	0.263392826	6.581093437	0.012483735	1
FR_CC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	0.447457402	0.040677946	1.016373016	0.441673886	0
FR_CC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.577009837	0.05245544	1.310643709	0.237436145	0
FR_CC1	Major Ions	Chloride (mg/L)_Major Ions	Residuals	69	2.76156313	0.040022654			0
FR_CC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.961134291	0.961134291	10.95845791	0.001484204	1
FR_CC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.470280956	0.042752814	0.487450005	0.904935739	0
FR_CC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.729068136	0.066278921	0.755685004	0.681815459	0
FR_CC1	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	69	6.051788186	0.087707075			0
FR_CC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	3.0728394	3.0728394	47.14205599	2.32458E-09	1
FR_CC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	0.684247809	0.062204346	0.954309807	0.49550944	0
FR_CC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.257195044	0.023381368	0.358705939	0.967442367	0
FR_CC1	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	69	4.497595919	0.06518255			0
FR_CC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.004046019	0.004046019	0.066303578	0.797563196	0
FR_CC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	1.285476899	0.116861536	1.9150523	0.052087188	0
FR_CC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.498400189	0.045309108	0.742496757	0.694339159	0
FR_CC1	Major Ions	Potassium (mg/L)_Major Ions	Residuals	69	4.210561771	0.061022634			0
FR_CC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.642091628	0.642091628	3.73838813	0.057279233	0
FR_CC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	1.011320267	0.091938206	0.535282946	0.872638354	0
FR_CC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.98207545	0.089279586	0.519803921	0.883577095	0
FR_CC1	Major Ions	Sodium (mg/L)_Major Ions	Residuals	69	11.85118313	0.171756277			0
FR_CC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	5.151679421	5.151679421	78.34008338	5.57312E-13	1
FR_CC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	1.180934764	0.107357706	1.632557257	0.10886668	0
FR_CC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.135206722	0.01229152	0.186913556	0.997869086	0
FR_CC1	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	69	4.537471301	0.065760454			0
FR_CC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	4.894204682	4.894204682	20.60832048	2.32183E-05	1
FR_CC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.170165899	0.106378718	0.447935233	0.928060513	0
FR_CC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.877061147	0.079732832	0.335735804	0.97468608	0
FR_CC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	16.3865912	0.237486829			0
FR_CC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	26.19497042	26.19497042	31.90046017	3.34656E-07	1
FR_CC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	37.61378612	3.419435102	4.164217463	0.000102978	0
FR_CC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	5.86872605	0.53352055	0.649725912	0.779837901	0
FR_CC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	56.65915004	0.821147102			0
FR_CC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	111.2903721	111.2903721	20.69506689	2.24234E-05	1
FR_CC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	10.88696094	0.989723722	0.184044659	0.998013876	0
FR_CC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	8.563151883	0.778468353	0.144760543	0.99935064	0
FR_CC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	371.056335	5.377628044			0
FR_CC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.989215566	0.989215566	0.684036587	0.411051321	0
FR_CC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	7.853131854	0.713921078	0.493672111	0.900992248	0
FR_CC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	12.37759683	1.125236076	0.778093947	0.660443609	0
FR_CC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	99.78395222	1.446144235			0
FR_CC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.22237501	0.22237501	1.959892874	0.166590356	0
FR_CC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.654803916	0.15043672	1.325867752	0.232520433	0
FR_CC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.842769936	0.076615449	0.675247061	0.756174988	0
FR_CC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	61	6.921233193	0.113462839			0
FR_CC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	20.5576037	20.5576037	8.26441345	0.005371441	1
FR_CC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	10.78617322	0.980561201	0.39419785	0.953941955	0
FR_CC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	4.980717499	0.4527925	0.18202824	0.998111208	0
FR_CC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	69	171.6364584	2.487484904			0
FR_CC1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	as.factor(new_year)	1	1.726860263	1.726860263	-	-	-
FR_CC1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	as.factor(Month)	1	1.2326E-32	1.2326E-32	-	-	0
FR_CC1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	as.factor(new_year)	1	1.726860263	1.726860263	-	-	-
FR_CC1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	as.factor(Month)	1	1.2326E-32	1.2326E-32	-	-	0
FR_CC1	Parent PAHs	Acridine (µg/L)_Parent PAHs	as.factor(new_year)	1	1.726860263	1.726860263	-	-	-
FR_CC1	Parent PAHs	Acridine (µg/L)_Parent PAHs	as.factor(Month)	1	1.2326E-32	1.2326E-32	-	-	0
FR_CC1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	as.factor(new_year)	1	1.726860263	1.726860263	-	-	-
FR_CC1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	as.factor(Month)	1	1.2326E-32	1.2326E-32	-	-	0
FR_CC1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	as.factor(new_year)	1	1.726860263	1.726860263	-	-	-
FR_CC1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	as.factor(Month)	1	1.2326E-32	1.2326E-32	-	-	0
FR_CC1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.320302009	0.320302009	-	-	-
FR_CC1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	as.factor(Month)	1	3.08149E-33	3.08149E-33	-	-	0
FR_CC1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	as.factor(new_year)	1	1.726860263	1.726860263	-	-	-
FR_CC1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	as.factor(Month)	1	1.2326E-32	1.2326E-32	-	-	0
FR_CC1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	as.factor(new_year)	1	1.726860263	1.726860263	-	-	-
FR_CC1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	as.factor(Month)	1	1.2326E-32	1.2326E-32	-	-	0
FR_CC1	Parent PAHs	Chrysene (%)_Parent PAHs	as.factor(new_year)	1	0.033390006	0.033390006	-	-	-
FR_CC1	Parent PAHs	Chrysene (%)_Parent PAHs	as.factor(Month)	1	0.01000412	0.01000412	-	-	0
FR_CC1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	as.factor(new_year)	1	1.726860263	1.726860263	-	-	-
FR_CC1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	as.factor(Month)	1	1.2326E-32	1.2326E-32	-	-	0
FR_CC1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	as.factor(new_year)	1	3.53459874	3.53459874	-	-	-
FR_CC1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	as.factor(Month)	1	4.93038E-32	4.93038E-32	-	-	0
FR_CC1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	as.factor(new_year)	1	1.726860263	1.726860263	-	-	-
FR_CC1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	as.factor(Month)	1	1.2326E-32	1.2326E-32	-	-	0
FR_CC1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	as.factor(new_year)	1	1.726860263	1.726860263	-	-	-
FR_CC1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	as.factor(Month)	1	1.2326E-32	1.2326E-32	-	-	0
FR_CC1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	as.factor(new_year)	1	1.726860263	1.726860263	-	-	-
FR_CC1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	as.factor(Month)	1	1.2326E-32	1.2326E-32	-	-	0
FR_CC1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.139931451	0.139931451	-	-	-
FR_CC1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	as.factor(Month)	1	0.419794353	0.419794353	-	-	0
FR_CC1	Parent PAHs	Phenanthrene (%)_Parent PAHs	as.factor(new_year)	1	0.012200212	0.012200212	-	-	-
FR_CC1	Parent PAHs	Phenanthrene (%)_Parent PAHs	as.factor(Month)	1	0.001957997	0.001957997	-	-	0
FR_CC1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.477606322	0.477606322	-	-	-
FR_CC1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	as.factor(Month)	1	0.0097667	0.0097667	-	-	0
FR_CC1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	as.factor(new_year)	1	1.726860263	1.726860263	-	-	-
FR_CC1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	as.factor(Month)	1	1.2326E-32	1.2326E-32	-	-	0
FR_CC1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	as.factor(new_year)	1	1.57772E-30	1.57772E-30	-	-	-
FR_CC1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	as.factor(Month)	1	3.88938E-62	3.88938E-62	-	-	0
FR_CC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	8.858844882	8.858844882	7.162498559	0.009291965	1
FR_CC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	7.661090362	0.69646276	0.56309977	0.851897447	0
FR_CC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	3.959588019	0.359962547	0.291034696	0.985613287	0
FR_CC1	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	69	85.34176891	1.236837231			0
FR_CC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	9.545553419	9.545553419	27.85813479	1.43248E-06	1
FR_CC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	2.668307251	0.242573386	0.707936125	0.726836807	0
FR_CC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.756789642	0.068799058	0.200785995	0.997057172	0
FR_CC1	Total Metals	Antimony (mg/L)_Total Metals	Residuals	69	23.64275968	0.342648691			0
FR_CC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	3.368261496	3.368261496	12.35349193	0.00078212	1
FR_CC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	0.841535429	0.076503221	0.280584486	0.987605862	0
FR_CC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.109792163	0.100890197	0.370026565	0.963444424	0
FR_CC1	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	69	18.81330757	0.272656631			0
FR_CC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	23.95640123	23.95640123	35.41819932	9.93161E-08	1
FR_CC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	4.750509873	0.431864534	0.638487559	0.789719905	0
FR_CC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.087769034	0.098888094	0.146200516	0.999319409	0
FR_CC1	Total Metals	Barium (mg/L)_Total Metals	Residuals	69	46.67068673	0.676386764			0
FR_CC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	22.26427859	22.26427859	48.33783091	1.62127E-09	1
FR_CC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	0.949429367	0.086311761	0.187390904	0.997844261	0
FR_CC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.644528737	0.058593522	0.127212015	0.999650513	0
FR_CC1	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	69	31.78121968	0.460597387			0
FR_CC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	26.03723701	26.03723701	20.54066135	2.38584E-05	1
FR_CC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	1.459489043	0.132680822	0.104671315	0.999865491	0
FR_CC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.941718346	0.085610759	0.06753795	0.999985304	0
FR_CC1	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	69	87.46404621	1.267594873			0
FR_CC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.942068504	0.942068504	8.796433966	0.004142957	1
FR_CC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	1.315650434	0.119604585	1.11679122	0.361982088	0
FR_CC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.729932345	0.066357486	0.619603819	0.806006145	0
FR_CC1	Total Metals	Boron (mg/L)_Total Metals	Residuals	69	7.389668021	0.107096638			0
FR_CC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	3.265096314	3.265096314	4.714484001	0.033351201	1
FR_CC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	34.0746278	3.097693436	4.472770399	4.49497E-05	0
FR_CC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.931162616	0.175560238	0.253492042	0.991879439	0
FR_CC1	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	69	47.787127	0.692567058			0
FR_CC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	1.72670551	1.72670551	37.02139137	5.79266E-08	1
FR_CC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	0.638053435	0.058004858	1.243651872	0.27605067	0
FR_CC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.149085956	0.013553269	0.29058856	0.985702483	0
FR_CC1	Total Metals	Calcium (mg/L)_Total Metals	Residuals	69	3.218211844	0.046640751			0
FR_CC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.075053215	0.075053215	0.353848834	0.553888221	0
FR_CC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	1.652017005	0.150183364	0.70806038	0.72672104	0
FR_CC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.393715656	0.126701423	0.597351501	0.824625444	0
FR_CC1	Total Metals	Chromium (mg/L)_Total Metals	Residuals	69	14.63526616	0.212105307			0
FR_CC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	30.45254937	30.45254937	41.39914803	1.3875E-08	1
FR_CC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	6.069341978	0.551758362	0.750095692	0.68712935	0
FR_CC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.570829301	0.142802664	0.194135097	0.997470354	0
FR_CC1	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	69	50.75529345	0.735583963			0
FR_CC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.098058105	0.098058105	0.609025876	0.437823867	0
FR_CC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	0.867088855	0.07882626	0.489579438	0.903595138	0
FR_CC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.904235019	0.082203184	0.510553065	0.889896743	0
FR_CC1	Total Metals	Copper (mg/L)_Total Metals	Residuals	69	11.10955952	0.161008109			0
FR_CC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	4.060289522	4.060289522	6.306844981	0.014372541	1
FR_CC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	2.919907034	0.265446094	0.412317239	0.945947358	0
FR_CC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.560807779	0.141891616	0.220400152	0.995553263	0
FR_CC1	Total Metals	Iron (mg/L)_Total Metals	Residuals	69	44.42157337	0.643790918			0
FR_CC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.000109898	0.000109898	0.000707201	0.978860914	0
FR_CC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	1.001814416	0.091074038	0.586068213	0.833805671	0
FR_CC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.415402039	0.037763822	0.243013004	0.993213319	0
FR_CC1	Total Metals	Lead (mg/L)_Total Metals	Residuals	69	10.72248668	0.155398358			0
FR_CC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.775012806	0.775012806	2.760311556	0.101166833	0
FR_CC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	1.42452216	0.129502015	0.46123871	0.920652497	0
FR_CC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.363773802	0.123979437	0.441569312	0.931466801	0
FR_CC1	Total Metals	Lithium (mg/L)_Total Metals	Residuals	69	19.37313326	0.280770047			0
FR_CC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	2.84569334	2.84569334	44.30564489	5.55121E-09	1
FR_CC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	0.610516824	0.055501529	0.864123699	0.578490144	0
FR_CC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.246157355	0.022377941	0.348410389	0.97083145	0
FR_CC1	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	69	4.431779313	0.064228686			0
FR_CC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	4.008129699	4.008129699	5.592802332	0.020852057	1
FR_CC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	6.662517928	0.605683448	0.845149248	0.596443276	0
FR_CC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	3.739539093	0.339958099	0.474365501	0.912964648	0
FR_CC1	Total Metals	Manganese (mg/L)_Total Metals	Residuals	69	49.44944105	0.716658566			0
FR_CC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	73.91330844	73.91330844	46.0054717	3.28591E-09	1
FR_CC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	1.610325364	0.146393215	0.091118759	0.99993263	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_CC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.838187059	0.076198824	0.047428033	0.99999766	0
FR_CC1	Total Metals	Mercury (mg/L)_Total Metals	Residuals	69	110.8567762	1.606619946			0
FR_CC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	4.226145174	4.226145174	19.43235168	3.73795E-05	1
FR_CC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	2.775940055	0.252358187	1.16037496	0.330556099	0
FR_CC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.707620087	0.064329099	0.295793358	0.984638523	0
FR_CC1	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	69	15.00611052	0.217479863			0
FR_CC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.34593699	0.34593699	5.572700743	0.021074142	1
FR_CC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	0.965193975	0.087744907	1.413483153	0.186773183	0
FR_CC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.649356974	0.059032452	0.950954074	0.498506655	0
FR_CC1	Total Metals	Nickel (mg/L)_Total Metals	Residuals	69	4.283318523	0.06207708			0
FR_CC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.004636957	0.004636957	0.076508578	0.782912731	0
FR_CC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	1.133355659	0.103032333	1.700006411	0.091619948	0
FR_CC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.591961998	0.053814727	0.887928854	0.556160545	0
FR_CC1	Total Metals	Potassium (mg/L)_Total Metals	Residuals	69	4.181884792	0.060607026			0
FR_CC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	3.648448598	3.648448598	35.29231591	1.0365E-07	1
FR_CC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	1.636749328	0.148795393	1.439333429	0.175577222	0
FR_CC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.226098023	0.020554366	0.198827296	0.997183615	0
FR_CC1	Total Metals	Selenium (mg/L)_Total Metals	Residuals	69	7.133081147	0.103377988			0
FR_CC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.240454711	0.240454711	9.392394774	0.003123063	1
FR_CC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	1.389593738	0.126326703	4.934443852	1.39485E-05	0
FR_CC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.052810643	0.004800968	0.187530461	0.997830416	0
FR_CC1	Total Metals	Silicon (mg/L)_Total Metals	Residuals	68	1.740868089	0.025601001			0
FR_CC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.200579165	0.200579165	8.615644359	0.004523638	1
FR_CC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	0.328857364	0.029896124	1.284153178	0.252157903	0
FR_CC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.397999747	0.036181795	1.554146864	0.132582183	0
FR_CC1	Total Metals	Silver (mg/L)_Total Metals	Residuals	69	1.606375773	0.023280808			0
FR_CC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.854701722	0.854701722	4.931946271	0.029650138	1
FR_CC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	0.818082709	0.074371155	0.429149179	0.937851352	0
FR_CC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.058206748	0.096200613	0.555113257	0.857988982	0
FR_CC1	Total Metals	Sodium (mg/L)_Total Metals	Residuals	69	11.95763611	0.173299074			0
FR_CC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.044860438	0.044860438	0.831742999	0.364944422	0
FR_CC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	0.494894898	0.044990445	0.834153416	0.606895592	0
FR_CC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.432973421	0.03936122	0.729783757	0.706355739	0
FR_CC1	Total Metals	Strontium (mg/L)_Total Metals	Residuals	69	3.721546499	0.053935457			0
FR_CC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.124138516	0.124138516	1.247171154	0.267967243	0
FR_CC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	1.523700102	0.138518191	1.391638133	0.196701586	0
FR_CC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.003547325	0.091231575	0.91656798	0.529663932	0
FR_CC1	Total Metals	Thallium (mg/L)_Total Metals	Residuals	69	6.867988855	0.09953607			0
FR_CC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.136879131	0.136879131	1.323294733	0.253972822	0
FR_CC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.973065797	0.088460527	0.855202312	0.586916578	0
FR_CC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.077546799	0.0979588	0.947027956	0.502023602	0
FR_CC1	Total Metals	Tin (mg/L)_Total Metals	Residuals	69	7.1372309	0.103438129			0
FR_CC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.671984421	0.671984421	10.64439487	0.001718301	1
FR_CC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.426221387	0.038747399	0.613768118	0.810951896	0
FR_CC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.154778393	0.014070763	0.222884271	0.995329758	0
FR_CC1	Total Metals	Titanium (mg/L)_Total Metals	Residuals	69	4.355994457	0.063130354			0
FR_CC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	7.296620942	7.296620942	39.62150444	2.46065E-08	1
FR_CC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	0.998643207	0.090785746	0.492977211	0.901436626	0
FR_CC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.488107424	0.044373402	0.240952759	0.993456147	0
FR_CC1	Total Metals	Uranium (mg/L)_Total Metals	Residuals	69	12.70690884	0.184158099			0
FR_CC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	1.610501192	1.610501192	10.2407012	0.002076872	1
FR_CC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	0.74832402	0.068029456	0.432579212	0.936122836	0
FR_CC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.437869591	0.039806326	0.253116668	0.991930142	0
FR_CC1	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	69	10.85126693	0.157264738			0
FR_CC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.271041186	0.271041186	0.819810161	0.368386496	0
FR_CC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	12.3637543	1.123977664	3.399661586	0.000842227	0
FR_CC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.909201041	0.08265464	0.250003015	0.992342231	0
FR_CC1	Total Metals	Zinc (mg/L)_Total Metals	Residuals	69	22.81240554	0.330614573			0
FR_CC1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	as.factor(new_year)	1	0.000826194	0.000826194	-	-	-
FR_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	1	6.16298E-32	6.16298E-32	0.277777778	0.691207715	0
FR_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(Month)	5	1.10934E-31	2.21867E-32	0.1	0.974968984	0
FR_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year):as.factor(Month)	1	0	0	0	1	0
FR_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Residuals	1	2.21867E-31	2.21867E-31			0
FR_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	1	4.93038E-31	4.93038E-31	-	-	-
FR_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(Month)	5	6.90253E-31	1.38051E-31	-	-	0
FR_CC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	1	2.46519E-31	2.46519E-31	-	-	-
FR_CC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(Month)	4	2.18778E-62	5.46945E-63	-	-	0
FR_CC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	1	6.16298E-32	6.16298E-32	-	-	-
FR_CC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(Month)	5	1.84889E-31	3.69779E-32	-	-	0
FR_CC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year):as.factor(Month)	2	1.47911E-31	7.39557E-32	-	-	0
FR_FC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.130668972	0.130668972	0.969676222	0.339418579	0
FR_FC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.040847753	0.185531614	1.376804236	0.272421041	0
FR_FC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	1	0.90434252	0.90434252	6.710999741	0.019715078	0
FR_FC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	16	2.156084173	0.134755261			0
FR_FC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.005001472	0.005001472	2.606093974	0.125999155	0
FR_FC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.092574896	0.0084159	4.385234189	0.003925502	0
FR_FC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	1	5.4236E-05	5.4236E-05	0.028260489	0.868604489	0
FR_FC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	16	0.030706318	0.001919145			0
FR_FC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.258301049	1.258301049	3.503882109	0.079621692	0
FR_FC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.796670846	0.254242804	0.707967949	0.715516927	0
FR_FC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	1	1.081876088	1.081876088	3.012606778	0.10183391	0
FR_FC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	16	5.745860208	0.359116263			0
FR_FC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.217398017	0.217398017	30.01174179	5.05578E-05	1
FR_FC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	1.102503399	0.100227582	13.83639255	3.6544E-06	0
FR_FC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	1	0.006099319	0.006099319	0.842009447	0.372448247	0
FR_FC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	16	0.115900246	0.007243765			0
FR_FC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.182894216	0.182894216	2.949748281	0.105180516	0
FR_FC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	1.716493186	0.156044835	2.516717003	0.04569603	0
FR_FC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	1	0.004905259	0.004905259	0.079112827	0.78210832	0
FR_FC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	16	0.992053282	0.06200333			0
FR_FC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.212367058	0.212367058	27.47347891	8.06785E-05	1
FR_FC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.164124877	0.105829534	13.69094391	3.92912E-06	0
FR_FC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	1	0.005334173	0.005334173	0.690070692	0.418364357	0
FR_FC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	16	0.123678291	0.007729893			0
FR_FC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0	0	-	-	-
FR_FC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0	0	-	-	0
FR_FC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	1	0	0	-	-	0
FR_FC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	16	0	0			0
FR_FC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.108170196	0.108170196	2.607591038	0.125898204	0
FR_FC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.3298053	0.0299823	0.722764489	0.703292973	0
FR_FC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	1	0.022397546	0.022397546	0.539923584	0.473097461	0
FR_FC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	16	0.663724916	0.041482807			0
FR_FC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000148143	0.000148143	1.312541515	0.268782308	0
FR_FC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.002796299	0.000254209	2.252280442	0.068123069	0
FR_FC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	1	0.000930562	0.000930562	8.244737415	0.011079788	0
FR_FC1	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	16	0.001805878	0.000112867			0
FR_FC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.009322346	0.009322346	5.86328037	0.027710874	1
FR_FC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.074028981	0.006729907	4.232768423	0.004689333	0
FR_FC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	1	0.000336954	0.000336954	0.21192701	0.651455859	0
FR_FC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	16	0.025439265	0.001589954			0
FR_FC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.318074852	0.318074852	20.49252864	0.000343905	1
FR_FC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	1.330060043	0.120914549	7.790131312	0.00015494	0
FR_FC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	1	2.07132E-05	2.07132E-05	0.001334485	0.971311167	0
FR_FC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	16	0.248344054	0.015521503			0
FR_FC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.026086145	0.026086145	0.469792032	0.502893383	0
FR_FC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	1.783336887	0.162121535	2.919687983	0.025498063	0
FR_FC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	1	0.319691516	0.319691516	5.757405869	0.028950413	0
FR_FC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	16	0.888432112	0.055527007			0
FR_FC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.123918308	0.123918308	0.280945103	0.60336106	0
FR_FC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	2.289613078	0.208146643	0.471905895	0.894888453	0
FR_FC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	1	1.737795508	1.737795508	3.93989512	0.064572846	0
FR_FC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	16	7.057225456	0.441076591			0
FR_FC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	1.925374494	1.925374494	9.415935935	0.007348242	1
FR_FC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	2.572276382	0.233843307	1.143597574	0.392361576	0
FR_FC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	1	0.882197052	0.882197052	4.314335184	0.054258501	0
FR_FC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	16	3.271686651	0.204480416			0
FR_FC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.024388979	0.024388979	0.17577587	0.680603584	0
FR_FC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	1.044089246	0.094917204	0.684085805	0.735196246	0
FR_FC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	4.93038E-32	4.93038E-32	3.55342E-31	1	0
FR_FC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	16	2.220006986	0.138750437			0
FR_FC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000734089	0.000734089	0.353096194	0.56067456	0
FR_FC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	0.040374914	0.003670447	1.765480971	0.146230565	0
FR_FC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	4.69521E-33	4.69521E-33	2.25839E-30	1	0
FR_FC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	16	0.033264107	0.002079007			0
FR_FC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.16286E-05	2.16286E-05	0.057142857	0.814105159	0
FR_FC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.00270358	0.00024578	0.649350649	0.763575072	0
FR_FC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	5.48439E-34	5.48439E-34	1.44897E-30	1	0
FR_FC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	16	0.00605602	0.000378501			0
FR_FC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.24752683	0.24752683	28.23269687	6.99486E-05	1
FR_FC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.817793324	0.074344848	8.479709224	9.16159E-05	0
FR_FC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	0.010840705	0.010840705	1.236481467	0.282579834	0
FR_FC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	16	0.140278107	0.008767382			0
FR_FC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.466943232	2.466943232	3.13111546	0.095863967	0
FR_FC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.195579477	0.199598134	0.253335705	0.987107811	0
FR_FC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	1.97215E-31	1.97215E-31	2.50311E-31	1	0
FR_FC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	16	12.60607992	0.787879995			0
FR_FC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	5.049426772	5.049426772	3.13111546	0.095863967	0
FR_FC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	4.493989827	0.40854453	0.253335705	0.987107811	0
FR_FC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	1.97215E-31	1.97215E-31	1.22292E-31	1	0
FR_FC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	16	25.8025708	1.612660675			0
FR_FC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.16286E-05	2.16286E-05	0.076190476	0.786061381	0
FR_FC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.004217586	0.000383417	1.350649351	0.283975236	0
FR_FC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	3.00927E-34	3.00927E-34	1.06006E-30	1	0
FR_FC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	16	0.004542015	0.000283876			0
FR_FC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.004856535	0.004856535	0.150687681	0.702995296	0
FR_FC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.289636057	0.026330551	0.816979498	0.625940525	0
FR_FC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	0.181990187	0.181990187	5.64675817	0.03031459	0
FR_FC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	16	0.515666318	0.032229145			0
FR_FC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.160279244	0.160279244	1.665705696	0.215173798	0
FR_FC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.754535815	0.068594165	0.712866424	0.711471604	0
FR_FC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	0.093006124	0.093006124	0.966568268	0.340171537	0
FR_FC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	16	1.539568429	0.096223027			0
FR_FC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.60622E-30	3.60622E-30	0.047619048	0.83001824	0
FR_FC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	2.48829E-28	2.26208E-29	0.298701299	0.976149591	0
FR_FC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	8.96114E-59	8.96114E-59	1.18329E-30	1	0
FR_FC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	16	1.21169E-27	7.57306E-29			0
FR_FC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.031984332	0.031984332	0.231464738	0.636953139	0
FR_FC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.667672923	0.060697538	0.439256946	0.914683053	0
FR_FC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	9.3215E-32	9.3215E-32	6.7458E-31	1	0
FR_FC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	16	2.210916924	0.138182308			0
FR_FC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.6465798	0.6465798	1.461038961	0.244325478	0
FR_FC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	1.238559529	0.112596321	0.254427391	0.986892755	0
FR_FC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	0.08621064	0.08621064	0.194805195	0.664853428	0
FR_FC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	16	7.080767237	0.442547952			0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	9.01555E-31	9.01555E-31	0.047619048	0.83001824	0
FR_FC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	6.22073E-29	5.65521E-30	0.298701299	0.976149591	0
FR_FC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	2.24029E-59	2.24029E-59	1.18329E-30	1	0
FR_FC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	16	3.02923E-28	1.89327E-29			0
FR_FC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.020528989	0.020528989	1.58375627	0.226274863	0
FR_FC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.223569717	0.02032452	1.56798203	0.200659847	0
FR_FC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	0.007228033	0.007228033	0.557623286	0.466051673	0
FR_FC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	16	0.207395435	0.012962215			0
FR_FC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.24319804	2.24319804	3.000481106	0.102469453	0
FR_FC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	5.255247464	0.477749769	0.639033706	0.771918336	0
FR_FC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	0.000111566	0.000111566	0.00014923	0.990404326	0
FR_FC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	16	11.96180458	0.747612786			0
FR_FC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.457574299	0.457574299	3.13111546	0.095863967	0
FR_FC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.407241126	0.037021921	0.253335705	0.987107811	0
FR_FC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	3.08149E-33	3.08149E-33	2.10862E-32	1	0
FR_FC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	16	2.338204668	0.146137792			0
FR_FC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.006156705	0.006156705	2.162896585	0.160770212	0
FR_FC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.270915963	0.024628724	8.652254798	8.07404E-05	0
FR_FC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	0.006135829	0.006135829	2.155562709	0.161438563	0
FR_FC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	16	0.045544149	0.002846509			0
FR_FC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0	0	-	-	-
FR_FC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	0	0	-	-	0
FR_FC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	0	0	-	-	0
FR_FC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	16	0	0			0
FR_FC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.806955939	0.806955939	13.52994175	0.002033427	1
FR_FC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	6.574175553	0.597652323	10.02062285	3.15923E-05	0
FR_FC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	0.011561288	0.011561288	0.193843982	0.665626323	0
FR_FC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	16	0.954275728	0.059642233			0
FR_FC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000966355	0.000966355	0.848821039	0.37056993	0
FR_FC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.161391736	0.014671976	12.88748547	5.9358E-06	0
FR_FC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	0.00225031	0.00225031	1.976614251	0.178870037	0
FR_FC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	16	0.018215471	0.001138467			0
FR_FC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	9.01555E-31	9.01555E-31	0.047619048	0.83001824	0
FR_FC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	6.22073E-29	5.65521E-30	0.298701299	0.976149591	0
FR_FC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	2.24029E-59	2.24029E-59	1.18329E-30	1	0
FR_FC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	16	3.02923E-28	1.89327E-29			0
FR_FC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.286992	0.286992	27.56617996	7.92739E-05	1
FR_FC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.091489991	0.099226363	9.530899046	4.36609E-05	0
FR_FC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	0.014456733	0.014456733	1.388599325	0.255870834	0
FR_FC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	16	0.16657629	0.010411018			0
FR_FC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	9.01555E-31	9.01555E-31	0.047619048	0.83001824	0
FR_FC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	6.22073E-29	5.65521E-30	0.298701299	0.976149591	0
FR_FC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	2.24029E-59	2.24029E-59	1.18329E-30	1	0
FR_FC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	16	3.02923E-28	1.89327E-29			0
FR_FC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.60622E-30	3.60622E-30	0.047619048	0.83001824	0
FR_FC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	2.48829E-28	2.26208E-29	0.298701299	0.976149591	0
FR_FC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	8.96114E-59	8.96114E-59	1.18329E-30	1	0
FR_FC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	16	1.21169E-27	7.57306E-29			0
FR_FC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000597085	0.000597085	0.082600625	0.777492589	0
FR_FC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.04887238	0.004442944	0.614635511	0.791433962	0
FR_FC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	8.61327E-33	8.61327E-33	1.19156E-30	1	0
FR_FC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	16	0.115657323	0.007228583			0
FR_FC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.211035073	0.211035073	21.11330575	0.000298872	1
FR_FC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.007379768	0.091579979	9.162250005	5.61921E-05	0
FR_FC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	0.001677561	0.001677561	0.167833945	0.687476518	0
FR_FC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	16	0.159925745	0.009995359			0
FR_FC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.457574299	0.457574299	3.13111546	0.095863967	0
FR_FC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.407241126	0.037021921	0.253335705	0.987107811	0
FR_FC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	3.08149E-33	3.08149E-33	2.10862E-32	1	0
FR_FC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	16	2.338204668	0.146137792			0
FR_FC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.042150307	0.042150307	0.202621088	0.658652543	0
FR_FC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	0.891974465	0.081088588	0.389801616	0.940956275	0
FR_FC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	1	6.24001E-32	6.24001E-32	2.99964E-31	1	0
FR_FC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	16	3.328404373	0.208025273			0
FR_FC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.060096832	0.060096832	4.094968844	0.065866013	0
FR_FC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	10	1.245531331	0.124553133	8.486989839	0.000485232	0
FR_FC1	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	12	0.176109271	0.014675773			0
FR_FC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.007160412	0.007160412	1.898535216	0.195626042	0
FR_FC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	10	0.038510515	0.003851052	1.021080531	0.482889303	0
FR_FC1	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	11	0.041486999	0.003771545			0
FR_FC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.000307739	0.000307739	0.081686584	0.780335102	0
FR_FC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	10	0.23875722	0.023875722	6.33759202	0.002622703	0
FR_FC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	11	0.041440494	0.003767318			0
FR_FC1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	4.66369E-05	4.66369E-05	0.147261444	0.707878879	0
FR_FC1	Field Measured	pH (-)_Field Measured	as.factor(Month)	10	0.004070666	0.000407067	1.28536095	0.335482494	0
FR_FC1	Field Measured	pH (-)_Field Measured	Residuals	12	0.003800333	0.000316694			0
FR_FC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	3.5217E-31	3.5217E-31	0.047619048	0.83001824	0
FR_FC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	2.42997E-29	2.20907E-30	0.298701299	0.976149591	0
FR_FC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	1	3.04928E-59	3.04928E-59	4.12311E-30	1	0
FR_FC1	Major Ions	Bromide (mg/L)_Major Ions	Residuals	16	1.18329E-28	7.39557E-30			0
FR_FC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.17764462	0.17764462	19.14516788	0.000470573	1
FR_FC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	1.127732194	0.102521109	11.04893487	1.66566E-05	0
FR_FC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	1	0.006849843	0.006849843	0.738223247	0.402920282	0
FR_FC1	Major Ions	Calcium (mg/L)_Major Ions	Residuals	16	0.148461164	0.009278823			0
FR_FC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.318802389	0.318802389	0.615894904	0.444042269	0
FR_FC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	2.061434561	0.187403142	0.362044464	0.953554265	0
FR_FC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	1	0.000367656	0.000367656	0.000710276	0.979067673	0
FR_FC1	Major Ions	Chloride (mg/L)_Major Ions	Residuals	16	8.281994521	0.517624658			0
FR_FC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.161964946	0.161964946	21.81600421	0.000255731	1
FR_FC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.181556413	0.016505128	2.223172119	0.071237594	0
FR_FC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	1	0.025655838	0.025655838	3.455734593	0.081524923	0
FR_FC1	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	16	0.118786149	0.007424134			0
FR_FC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.284915509	0.284915509	39.44596766	1.0957E-05	1
FR_FC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	1.257193797	0.114290345	15.82326381	1.44192E-06	0
FR_FC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	1	0.00237419	0.00237419	0.3287017	0.574395098	0
FR_FC1	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	16	0.115566898	0.007222931			0
FR_FC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.596966096	0.596966096	1.275266245	0.275428227	0
FR_FC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	1.54260345	0.140236677	0.299579996	0.975895146	0
FR_FC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	1	0.095732278	0.095732278	0.204507665	0.657177572	0
FR_FC1	Major Ions	Potassium (mg/L)_Major Ions	Residuals	16	7.489775231	0.468110952			0
FR_FC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.275432542	0.275432542	0.548410855	0.46969672	0
FR_FC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	1.635470836	0.148679167	0.296033535	0.976912047	0
FR_FC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	1	0.092475717	0.092475717	0.184127433	0.673571805	0
FR_FC1	Major Ions	Sodium (mg/L)_Major Ions	Residuals	16	8.035801315	0.502237582			0
FR_FC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.91468701	0.91468701	32.36445867	3.35584E-05	1
FR_FC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	5.257903054	0.477991187	16.91280825	9.03228E-07	0
FR_FC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	1	0.004587487	0.004587487	0.1623195	0.692362067	0
FR_FC1	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	16	0.452193324	0.028262083			0
FR_FC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.328031618	0.328031618	4.043593967	0.061502556	0
FR_FC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	6.359878659	0.578170787	7.127020005	0.00026563	0
FR_FC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	1	0.013379237	0.013379237	0.164923746	0.690042883	0
FR_FC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	16	1.297980444	0.081123778			0
FR_FC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.0556145	0.0556145	0.661105212	0.428103915	0
FR_FC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.217679461	0.201607224	2.396561788	0.054701414	0
FR_FC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	1	0.009497471	0.009497471	0.112899115	0.741233355	0
FR_FC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	16	1.345976388	0.084123524			0
FR_FC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.448182112	0.448182112	51.01558618	2.33665E-06	1
FR_FC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	0.481035847	0.043730532	4.977750431	0.002031811	0
FR_FC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	1	0.340656141	0.340656141	38.77614089	1.21017E-05	0
FR_FC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	16	0.140563195	0.0087852			0
FR_FC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	2.522268843	2.522268843	5.532608267	0.031800184	1
FR_FC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.797225232	0.163384112	0.358383798	0.955094863	0
FR_FC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	1	0.011409433	0.011409433	0.025026645	0.876280111	0
FR_FC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	16	7.29426331	0.455891457			0
FR_FC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.006910734	0.006910734	0.04420093	0.836509252	0
FR_FC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.092165686	0.09928779	0.635042927	0.772746924	0
FR_FC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	1	0.040112909	0.040112909	0.256561448	0.62037539	0
FR_FC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	14	2.188874163	0.156348154			0
FR_FC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.048876152	0.048876152	0.020452098	0.888067161	0
FR_FC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	11.69360835	1.063055304	0.444832709	0.911432783	0
FR_FC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	1	1.617782801	1.617782801	0.676956978	0.422730167	0
FR_FC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	16	38.23658764	2.389786727			0
FR_FC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	1.39733748	1.39733748	1.472564383	0.242552072	0
FR_FC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	5.477002881	0.497909353	0.524714745	0.859360962	0
FR_FC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	3.343296261	3.343296261	3.523285581	0.078869565	0
FR_FC1	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	16	15.18262966	0.948914354			0
FR_FC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.020687495	0.020687495	1.26407205	0.277467073	0
FR_FC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	0.309585786	0.028144162	1.719698232	0.157336811	0
FR_FC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	3.47871E-33	3.47871E-33	2.1256E-31	1	0
FR_FC1	Total Metals	Antimony (mg/L)_Total Metals	Residuals	16	0.261852102	0.016365756			0
FR_FC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.007199166	0.007199166	1.12299658	0.305010387	0
FR_FC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	0.090423397	0.008220309	1.28228451	0.316359258	0
FR_FC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	1.73334E-33	1.73334E-33	2.70383E-31	1	0
FR_FC1	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	16	0.102570795	0.006410675			0
FR_FC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.163062813	0.163062813	17.61368478	0.000682956	1
FR_FC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	0.770184991	0.070016817	7.563061907	0.000185617	0
FR_FC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	0.000511195	0.000511195	0.055218195	0.817200922	0
FR_FC1	Total Metals	Barium (mg/L)_Total Metals	Residuals	16	0.148123748	0.009257734			0
FR_FC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	2.466943232	2.466943232	3.13111546	0.095863967	0
FR_FC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	2.195579477	0.199598134	0.253335705	0.987107811	0
FR_FC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	1.97215E-31	1.97215E-31	2.50311E-31	1	0
FR_FC1	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	16	12.60607992	0.787879995			0
FR_FC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	5.049426772	5.049426772	3.13111546	0.095863967	0
FR_FC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	4.493989827	0.40854453	0.253335705	0.987107811	0
FR_FC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	1.97215E-31	1.97215E-31	1.22292E-31	1	0
FR_FC1	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	16	25.8025708	1.612660675			0
FR_FC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.000616238	0.000616238	0.210942182	0.652208242	0
FR_FC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.021961496	0.0019965	0.683414668	0.735747816	0
FR_FC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	6.93335E-33	6.93335E-33	2.37333E-30	1	0
FR_FC1	Total Metals	Boron (mg/L)_Total Metals	Residuals	16	0.046741746	0.002921359			0
FR_FC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.079497659	0.079497659	0.1083606	0.746288043	0
FR_FC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	10.11507992	0.91955272	1.253411559	0.331019344	0
FR_FC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	0.024054142	0.024054142	0.032787396	0.858584211	0
FR_FC1	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	16	11.73823826	0.733639891			0
FR_FC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.250099628	0.250099628	25.86553864	0.000110115	1
FR_FC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	1.079152338	0.098104758	10.14608631	2.91384E-05	0
FR_FC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	0.010944385	0.010944385	1.131878578	0.303168643	0
FR_FC1	Total Metals	Calcium (mg/L)_Total Metals	Residuals	16	0.154707547	0.009669222			0
FR_FC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.099537017	0.099537017	0.0764952	0.785645395	0
FR_FC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	10.55805302	0.959823002	0.73763364	0.691004288	0
FR_FC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	0.057517563	0.057517563	0.044202827	0.836130711	0
FR_FC1	Total Metals	Chromium (mg/L)_Total Metals	Residuals	16	20.81950605	1.301219128			0
FR_FC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	3.60622E-30	3.60622E-30	0.047619048	0.83001824	0
FR_FC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	2.48829E-28	2.26208E-29	0.298701299	0.976149591	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	8.96114E-59	8.96114E-59	1.18329E-30	1	0
FR_FC1	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	16	1.21169E-27	7.57306E-29			0
FR_FC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.010872989	0.010872989	0.094947518	0.761954477	0
FR_FC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	1.331120939	0.121010994	1.056718979	0.447315339	0
FR_FC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	7.32335E-32	7.32335E-32	6.39506E-31	1	0
FR_FC1	Total Metals	Copper (mg/L)_Total Metals	Residuals	16	1.832252424	0.114515777			0
FR_FC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	0.262764479	0.262764479	0.310817421	0.584895232	0
FR_FC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	6.330803474	0.575527589	0.680776952	0.737914619	0
FR_FC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	0.712287408	0.712287408	0.842546666	0.372299597	0
FR_FC1	Total Metals	Iron (mg/L)_Total Metals	Residuals	16	13.5263707	0.845398169			0
FR_FC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.011436256	0.011436256	0.23697009	0.633004328	0
FR_FC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	0.367153543	0.033377595	0.691615457	0.729001695	0
FR_FC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	4.33334E-32	4.33334E-32	8.9791E-31	1	0
FR_FC1	Total Metals	Lead (mg/L)_Total Metals	Residuals	16	0.772165387	0.048260337			0
FR_FC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.035860649	0.035860649	2.958714776	0.104695175	0
FR_FC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	0.237862526	0.021623866	1.784096314	0.14194817	0
FR_FC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	0.024160192	0.024160192	1.993358123	0.177142636	0
FR_FC1	Total Metals	Lithium (mg/L)_Total Metals	Residuals	16	0.193925549	0.012120347			0
FR_FC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.201883929	0.201883929	23.04348298	0.000196182	1
FR_FC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	1.18671775	0.107883432	12.31405607	8.07616E-06	0
FR_FC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	0.003451664	0.003451664	0.393980633	0.53907021	0
FR_FC1	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	16	0.140175983	0.008760999			0
FR_FC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	0.537736327	0.537736327	0.543343849	0.471722027	0
FR_FC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	9.280848103	0.843713464	0.85251172	0.597414957	0
FR_FC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	0.161050854	0.161050854	0.162730295	0.691994797	0
FR_FC1	Total Metals	Manganese (mg/L)_Total Metals	Residuals	16	15.83487372	0.989679607			0
FR_FC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	5.117591919	5.117591919	32.68287302	3.17984E-05	1
FR_FC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	1.54652904	0.140593549	0.897883455	0.561838799	0
FR_FC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	1.514828032	1.514828032	9.674263401	0.006732334	0
FR_FC1	Total Metals	Mercury (mg/L)_Total Metals	Residuals	16	2.505332706	0.156583294			0
FR_FC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.002152071	0.002152071	0.419392174	0.526424489	0
FR_FC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	0.243037668	0.022094333	4.305707718	0.004305042	0
FR_FC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	0.003925944	0.003925944	0.765081599	0.394683471	0
FR_FC1	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	16	0.082102492	0.005131406			0
FR_FC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.000916941	0.000916941	0.057142857	0.814105159	0
FR_FC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	0.114617612	0.010419783	0.649350649	0.763575072	0
FR_FC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	2.65899E-32	2.65899E-32	1.65705E-30	1	0
FR_FC1	Total Metals	Nickel (mg/L)_Total Metals	Residuals	16	0.256743451	0.016046466			0
FR_FC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.708343593	0.708343593	1.506978021	0.237356013	0
FR_FC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	1.494250881	0.135840989	0.288997299	0.978850813	0
FR_FC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	0.066227598	0.066227598	0.140897068	0.712320416	0
FR_FC1	Total Metals	Potassium (mg/L)_Total Metals	Residuals	16	7.520678687	0.470042418			0
FR_FC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.793441338	0.793441338	13.5816354	0.0020035	1
FR_FC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	5.974481727	0.543134702	9.297042071	5.11933E-05	0
FR_FC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	0.005103582	0.005103582	0.087359936	0.771361972	0
FR_FC1	Total Metals	Selenium (mg/L)_Total Metals	Residuals	16	0.93472259	0.058420162			0
FR_FC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.003162975	0.003162975	2.987138965	0.103174244	0
FR_FC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.206755721	0.018795975	17.75106901	6.41461E-07	0
FR_FC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	0.000233299	0.000233299	0.220329506	0.645121918	0
FR_FC1	Total Metals	Silicon (mg/L)_Total Metals	Residuals	16	0.01694183	0.001058864			0
FR_FC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	2.16286E-05	2.16286E-05	0.057142857	0.814105159	0
FR_FC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	0.00270358	0.00024578	0.649350649	0.763575072	0
FR_FC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	4.33334E-34	4.33334E-34	1.14487E-30	1	0
FR_FC1	Total Metals	Silver (mg/L)_Total Metals	Residuals	16	0.00605602	0.000378501			0
FR_FC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.402626602	0.402626602	0.795587648	0.385633957	0
FR_FC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	1.610130302	0.146375482	0.289237037	0.978786472	0
FR_FC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	0.079342492	0.079342492	0.156780268	0.697368396	0
FR_FC1	Total Metals	Sodium (mg/L)_Total Metals	Residuals	16	8.097191621	0.506074476			0
FR_FC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.22700456	0.22700456	23.61269131	0.000174006	1
FR_FC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	1.14904616	0.104458742	10.86564968	1.86019E-05	0
FR_FC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	0.026149153	0.026149153	2.719997638	0.118590066	0
FR_FC1	Total Metals	Strontium (mg/L)_Total Metals	Residuals	16	0.153818678	0.009613667			0
FR_FC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	9.01555E-31	9.01555E-31	0.047619048	0.83001824	0
FR_FC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	6.22073E-29	5.65521E-30	0.298701299	0.976149591	0
FR_FC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	2.24029E-59	2.24029E-59	1.18329E-30	1	0
FR_FC1	Total Metals	Thallium (mg/L)_Total Metals	Residuals	16	3.02923E-28	1.89327E-29			0
FR_FC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.030946798	0.030946798	0.066158908	0.800292332	0
FR_FC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	3.295123887	0.299556717	0.64040052	0.770815782	0
FR_FC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	6.70416E-31	6.70416E-31	1.43323E-30	1	0
FR_FC1	Total Metals	Tin (mg/L)_Total Metals	Residuals	16	7.4842342	0.467764638			0
FR_FC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.001039105	0.001039105	0.128366869	0.724814659	0
FR_FC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.093968004	0.008542546	1.055312004	0.448251956	0
FR_FC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	1.32709E-33	1.32709E-33	1.63943E-31	1	0
FR_FC1	Total Metals	Titanium (mg/L)_Total Metals	Residuals	16	0.129516895	0.008094806			0
FR_FC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.204946825	0.204946825	24.37893395	0.000148481	1
FR_FC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	0.951885081	0.086535007	10.29355407	2.65237E-05	0
FR_FC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	0.011299449	0.011299449	1.344097575	0.263322602	0
FR_FC1	Total Metals	Uranium (mg/L)_Total Metals	Residuals	16	0.13450749	0.008406718			0
FR_FC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	0.529996297	0.529996297	4.831900026	0.042999678	1
FR_FC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	0.409238045	0.037203459	0.339178582	0.962707673	0
FR_FC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	2.77334E-32	2.77334E-32	2.52841E-31	1	0
FR_FC1	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	16	1.754990938	0.109686934			0
FR_FC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	2.76101E-30	2.76101E-30	0.047619048	0.83001824	0
FR_FC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	1.9051E-28	1.73191E-29	0.298701299	0.976149591	0
FR_FC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	2.01626E-58	2.01626E-58	3.47743E-30	1	0
FR_FC1	Total Metals	Zinc (mg/L)_Total Metals	Residuals	16	9.277E-28	5.79813E-29			0
FR_FR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.000485956	0.000485956	0.014763497	0.903777961	0
FR_FR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	10	0.604316432	0.060431643	1.835933798	0.078141649	0
FR_FR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.151753763	0.016861529	0.512258972	0.858727205	0
FR_FR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	50	1.64580126	0.032916025			0
FR_FR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.006920511	0.006920511	0.195506149	0.660279583	0
FR_FR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	10	1.177676922	0.117767692	3.326966681	0.002234798	0
FR_FR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.71957172	0.079952413	2.258675621	0.032955033	0
FR_FR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	50	1.769895877	0.035397918			0
FR_FR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.108241881	0.108241881	0.157272018	0.693368186	0
FR_FR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	10	7.407116902	0.74071169	1.076230576	0.397774368	0
FR_FR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	1.732609741	0.192512193	0.279714107	0.977349339	0
FR_FR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	50	34.412314	0.68824628			0
FR_FR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.003136797	0.003136797	0.056191884	0.813587905	0
FR_FR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	10	4.394164111	0.439416411	7.871607725	1.98689E-07	0
FR_FR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	1.132983766	0.125887085	2.255113207	0.033221176	0
FR_FR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	50	2.791147796	0.055822956			0
FR_FR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.24462843	0.24462843	3.45500003	0.068951544	0
FR_FR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	10	8.268851314	0.826885131	11.67847971	5.0811E-10	0
FR_FR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	1.131939136	0.125771015	1.776321997	0.096474181	0
FR_FR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	50	3.540208794	0.070804176			0
FR_FR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.012212368	0.012212368	0.183077345	0.670579219	0
FR_FR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	10	5.031307403	0.50313074	7.542504358	3.56549E-07	0
FR_FR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	1.305837123	0.145093014	2.175109967	0.039787469	0
FR_FR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	50	3.335302947	0.066706059			0
FR_FR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.002653703	0.002653703	0.345208506	0.559482291	0
FR_FR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	10	0.071648084	0.007164808	0.932038116	0.51250292	0
FR_FR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.015021872	0.001669097	0.217125405	0.990679511	0
FR_FR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	50	0.384362411	0.007687248			0
FR_FR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.014372436	0.014372436	0.378325045	0.541290439	0
FR_FR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	10	0.266316177	0.026631618	0.701022989	0.718844674	0
FR_FR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.146197521	0.016244169	0.427594602	0.913966826	0
FR_FR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	50	1.899482475	0.03798965			0
FR_FR1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000182817	0.000182817	1.09702183	0.299957467	0
FR_FR1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	10	0.006602208	0.000660221	3.961757741	0.000512679	0
FR_FR1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.001890185	0.000210021	1.260261354	0.281686058	0
FR_FR1	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	50	0.008332423	0.000166648			0
FR_FR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.004810659	0.004810659	0.141118089	0.708761081	0
FR_FR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	10	1.261750827	0.126175083	3.701277845	0.000932423	0
FR_FR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.726819504	0.080757723	2.368984139	0.025679221	0
FR_FR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	50	1.70448002	0.0340896			0
FR_FR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.008570153	0.008570153	0.153062932	0.697287613	0
FR_FR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	10	5.694328949	0.569432895	10.17007183	4.61293E-09	0
FR_FR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	1.365929028	0.151769892	2.710610359	0.011834667	0
FR_FR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	50	2.799551981	0.05599104			0
FR_FR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.258282541	0.258282541	2.60035946	0.113134366	0
FR_FR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	10	10.97194072	1.097194072	11.04642602	1.25184E-09	0
FR_FR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	1.618104408	0.179789379	1.810099162	0.089613154	0
FR_FR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	50	4.966285341	0.099325707			0
FR_FR1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.534221529	1.534221529	2.541263612	0.117208552	0
FR_FR1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	10	12.79897348	1.279897348	2.120004508	0.040014451	0
FR_FR1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	8.509621833	0.945513537	1.566135725	0.151459937	0
FR_FR1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	50	30.18619402	0.60372388			0
FR_FR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.229843145	0.229843145	0.263824966	0.60976691	0
FR_FR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	10	42.92611066	4.292611066	4.927264497	6.05829E-05	0
FR_FR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	9.035892626	1.00398807	1.152425574	0.34540498	0
FR_FR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	50	43.55977915	0.871195583			0
FR_FR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.331950519	0.331950519	1.531414093	0.221680441	0
FR_FR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	10	6.656919809	0.665691981	3.071090483	0.004096967	0
FR_FR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	5.565288691	0.61836541	2.852754998	0.008577456	0
FR_FR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	50	10.8380392	0.216760784			0
FR_FR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000183602	0.000183602	0.331400166	0.56741783	0
FR_FR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	10	0.003657973	0.000365797	0.660261154	0.754957142	0
FR_FR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.001230431	0.000136715	0.246768652	0.985294725	0
FR_FR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	50	0.027700958	0.000554019			0
FR_FR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.013037593	0.013037593	1.55907887	0.217615028	0
FR_FR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	10	0.106264298	0.01062643	1.270743894	0.272230978	0
FR_FR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.116908189	0.012989799	1.553363433	0.155586281	0
FR_FR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	50	0.418118468	0.008362369			0
FR_FR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.52106E-05	2.52106E-05	0.001168906	0.972862353	0
FR_FR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	10	2.586198155	0.258619815	11.99108399	3.29007E-10	0
FR_FR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.212468212	0.023607579	1.094581493	0.383727015	0
FR_FR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	50	1.078383804	0.021567676			0
FR_FR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	19.58634382	19.58634382	38.51331297	1.04655E-07	1
FR_FR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	10	0.591320314	0.059132031	0.116273382	0.999543641	0
FR_FR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.28988632	0.032209591	0.063334846	0.999930871	0
FR_FR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	50	25.42801737	0.508560347			0
FR_FR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	22.95878552	22.95878552	17.53156072	0.000114399	1
FR_FR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	10	1.135191587	0.113519159	0.086684377	0.999878709	0
FR_FR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.335825242	0.037313916	0.028493283	0.999997795	0
FR_FR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	50	65.47844166	1.309568833			0
FR_FR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000618823	0.000618823	1.535404849	0.221088288	0
FR_FR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	10	0.004855965	0.000485596	1.204846695	0.310818918	0
FR_FR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.00242799	0.000269777	0.669361408	0.732324246	0
FR_FR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	50	0.020151794	0.000403036			0
FR_FR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.456364273	0.456364273	7.679727485	0.007821449	1
FR_FR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	10	5.197913899	0.51979139	8.747083117	4.44837E-08	0
FR_FR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.678382011	0.075375779	1.268428483	0.277265743	0
FR_FR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	50	2.971226996	0.05942454			0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.165158827	0.165158827	2.797125244	0.100680488	0
FR_FR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	10	0.767756676	0.076775668	1.300270548	0.256228333	0
FR_FR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.234229941	0.026025549	0.440767966	0.906181125	0
FR_FR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	50	2.952295879	0.059045918			0
FR_FR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.97989E-29	1.97989E-29	0.331400166	0.56741783	0
FR_FR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	10	3.9446E-28	3.9446E-29	0.660261154	0.754957142	0
FR_FR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	1.32684E-28	1.47427E-29	0.246768652	0.985294725	0
FR_FR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	50	2.98715E-27	5.97431E-29			0
FR_FR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.112510494	0.112510494	1.858019416	0.178960727	0
FR_FR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	10	0.33636042	0.033636042	0.555471914	0.841620088	0
FR_FR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.232893702	0.025877078	0.427338925	0.914114735	0
FR_FR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	50	3.027699618	0.060553992			0
FR_FR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.107143065	2.107143065	7.74523574	0.007580005	1
FR_FR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	10	0.243004348	0.024300435	0.089321223	0.9998609	0
FR_FR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.220197384	0.024466376	0.089931174	0.999700888	0
FR_FR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	50	13.60283364	0.272056673			0
FR_FR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000380199	0.000380199	0.331400166	0.56741783	0
FR_FR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	10	0.007574847	0.000757485	0.660261154	0.754957142	0
FR_FR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.002547948	0.000283105	0.246768652	0.985294725	0
FR_FR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	50	0.057362506	0.00114725			0
FR_FR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.225358864	0.225358864	2.133041302	0.1504101	0
FR_FR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	10	7.668776508	0.766877651	7.258563847	5.96575E-07	0
FR_FR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	1.659918754	0.184435417	1.745697308	0.103119877	0
FR_FR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	50	5.282571504	0.10565143			0
FR_FR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	7.836511495	7.836511495	9.796996107	0.002916569	1
FR_FR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	10	19.24639103	1.924639103	2.406132092	0.020174933	0
FR_FR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	8.71444981	0.968272201	1.210507889	0.309839555	0
FR_FR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	50	39.99446059	0.799889212			0
FR_FR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.080503523	2.080503523	17.53156072	0.000114399	1
FR_FR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	10	0.102869993	0.010286999	0.086684377	0.999878709	0
FR_FR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.030432167	0.003381352	0.028493283	0.999997795	0
FR_FR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	50	5.933594722	0.118671894			0
FR_FR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000131131	0.000131131	0.003567498	0.952609934	0
FR_FR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	10	1.62426635	0.162426635	4.418921019	0.000183463	0
FR_FR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.240170362	0.026685596	0.725998787	0.682922098	0
FR_FR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	50	1.837854018	0.03675708			0
FR_FR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.011748424	0.011748424	0.234012923	0.630676101	0
FR_FR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	10	3.927873182	0.392787318	7.82379882	2.16136E-07	0
FR_FR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.449565845	0.049951761	0.994972361	0.45629841	0
FR_FR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	50	2.51020845	0.050204169			0
FR_FR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.135666775	0.135666775	0.655006169	0.422163264	0
FR_FR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	10	23.45180019	2.345180019	11.32264974	8.40887E-10	0
FR_FR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	2.425226024	0.269469558	1.301012886	0.260185537	0
FR_FR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	50	10.35614486	0.207122897			0
FR_FR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.011784048	0.011784048	0.75680686	0.388487009	0
FR_FR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	10	0.376798932	0.037679893	2.419915675	0.019517824	0
FR_FR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.216493886	0.024054876	1.544876244	0.158384071	0
FR_FR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	50	0.778537319	0.015570746			0
FR_FR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.45474E-29	4.45474E-29	0.331400166	0.56741783	0
FR_FR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	10	8.87536E-28	8.87536E-29	0.660261154	0.754957142	0
FR_FR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	2.9854E-28	3.31711E-29	0.246768652	0.985294725	0
FR_FR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	50	6.72109E-27	1.34422E-28			0
FR_FR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.015908461	0.015908461	0.27082441	0.605076164	0
FR_FR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	10	3.827849468	0.382784947	6.516501301	2.40028E-06	0
FR_FR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	1.354246921	0.15047188	2.561621639	0.016592323	0
FR_FR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	50	2.937043431	0.058740869			0
FR_FR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000183602	0.000183602	0.331400166	0.56741783	0
FR_FR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	10	0.003657973	0.000365797	0.660261154	0.754957142	0
FR_FR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.001230431	0.000136715	0.246768652	0.985294725	0
FR_FR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	50	0.027700958	0.000554019			0
FR_FR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.97989E-29	1.97989E-29	0.331400166	0.56741783	0
FR_FR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	10	3.9446E-28	3.9446E-29	0.660261154	0.754957142	0
FR_FR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	1.32684E-28	1.47427E-29	0.246768652	0.985294725	0
FR_FR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	50	2.98715E-27	5.97431E-29			0
FR_FR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.009626115	0.009626115	1.272841674	0.264618814	0
FR_FR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	10	0.056340534	0.005634053	0.744979483	0.679170906	0
FR_FR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.018733481	0.002081498	0.27523226	0.978557609	0
FR_FR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	50	0.378134801	0.007562696			0
FR_FR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000316261	0.000316261	0.002905581	0.957226899	0
FR_FR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	10	5.846268217	0.584626822	5.371140744	2.37317E-05	0
FR_FR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	2.168438259	0.240937584	2.213565352	0.036485861	0
FR_FR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	50	5.442296614	0.108845932			0
FR_FR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.080503523	2.080503523	17.53156072	0.000114399	1
FR_FR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	10	0.102869993	0.010286999	0.086684377	0.999878709	0
FR_FR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.030432167	0.003381352	0.028493283	0.999997795	0
FR_FR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	50	5.933594722	0.118671894			0
FR_FR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	8.29632087	8.29632087	73.94359572	1.99807E-11	1
FR_FR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	10	0.930848994	0.093084899	0.829648742	0.602406763	0
FR_FR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	1.615693686	0.179521521	1.600042592	0.140982465	0
FR_FR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	50	5.609898186	0.112197964			0
FR_FR1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.041868636	0.041868636	0.561049902	0.457915622	0
FR_FR1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	10	3.373301603	0.33733016	4.52030613	0.0002214	0
FR_FR1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	9	1.944519844	0.21605776	2.895226498	0.009101681	0
FR_FR1	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	43	3.208897025	0.074625512			0
FR_FR1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.119849809	0.119849809	20.91986534	4.19294E-05	1
FR_FR1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	10	0.05346233	0.005346233	0.933188592	0.513360015	0
FR_FR1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	9	0.060372696	0.006708077	1.170899435	0.338034949	0
FR_FR1	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	42	0.2406178	0.005728995			0
FR_FR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.085396686	0.085396686	13.99095537	0.000550475	1
FR_FR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	10	0.443810789	0.044381079	7.271168501	1.56017E-06	0
FR_FR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	9	0.090041076	0.010004564	1.639096495	0.135381693	0
FR_FR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	42	0.256355675	0.006103707			0
FR_FR1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.000194845	0.000194845	0.562995011	0.457142262	0
FR_FR1	Field Measured	pH (-)_Field Measured	as.factor(Month)	10	0.005329838	0.000532984	1.540027818	0.158449145	0
FR_FR1	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	9	0.001353446	0.000150383	0.434523349	0.908799685	0
FR_FR1	Field Measured	pH (-)_Field Measured	Residuals	43	0.014881747	0.000346087			0
FR_FR1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	0.057228178	0.057228178	0.697684559	0.407536439	0
FR_FR1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	10	0.67772115	0.067772115	0.826228618	0.605486093	0
FR_FR1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	0.198406483	0.022045165	0.268758708	0.980230954	0
FR_FR1	Major Ions	Bromide (mg/L)_Major Ions	Residuals	50	4.101293124	0.082025862			0
FR_FR1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.062538101	0.062538101	1.130400125	0.292798108	0
FR_FR1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	10	4.165646346	0.416564635	7.529565295	3.64935E-07	0
FR_FR1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	0.982088538	0.109120949	1.972402935	0.062632924	0
FR_FR1	Major Ions	Calcium (mg/L)_Major Ions	Residuals	50	2.766193122	0.055323862			0
FR_FR1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	2.301484737	2.301484737	5.135628757	0.027800212	1
FR_FR1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	10	1.084154895	0.10841549	0.241922832	0.990168748	0
FR_FR1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	0.319858402	0.035539822	0.079305038	0.999822323	0
FR_FR1	Major Ions	Chloride (mg/L)_Major Ions	Residuals	50	22.40703959	0.448140792			0
FR_FR1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.295994152	0.295994152	6.448570731	0.014260431	1
FR_FR1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	10	2.364586875	0.236458687	5.151522633	3.75997E-05	0
FR_FR1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	1.465173313	0.162797035	3.546719379	0.001814818	0
FR_FR1	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	50	2.295036869	0.045900737			0
FR_FR1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.019342616	0.019342616	0.202075707	0.654993296	0
FR_FR1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	10	6.971955153	0.697195515	7.283723897	5.69753E-07	0
FR_FR1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	2.101759344	0.233528816	2.439716522	0.021876649	0
FR_FR1	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	50	4.78598259	0.095719652			0
FR_FR1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	1.475974348	1.475974348	4.280118106	0.043750338	1
FR_FR1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	10	1.750169731	0.175016973	0.507524617	0.876694952	0
FR_FR1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	0.451294304	0.050143812	0.145410004	0.997939767	0
FR_FR1	Major Ions	Potassium (mg/L)_Major Ions	Residuals	50	17.24221518	0.344844304			0
FR_FR1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	1.754131177	1.754131177	4.849304473	0.032297562	1
FR_FR1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	10	1.807082031	0.180708203	0.499568737	0.882157933	0
FR_FR1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	0.450067247	0.050007472	0.138245908	0.998309084	0
FR_FR1	Major Ions	Sodium (mg/L)_Major Ions	Residuals	50	18.0864203	0.361728406			0
FR_FR1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.012824138	0.012824138	0.081936213	0.775873163	0
FR_FR1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	10	18.57615718	1.857615718	11.86871201	3.89688E-10	0
FR_FR1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	2.987844066	0.331982674	2.121109717	0.04492278	0
FR_FR1	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	50	7.825683682	0.156513674			0
FR_FR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	1.438275226	1.438275226	9.443532297	0.003426169	1
FR_FR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	10	22.64388268	2.264388268	14.86768551	8.22923E-12	0
FR_FR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	9	2.214555786	0.246061754	1.615610197	0.136396896	0
FR_FR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	50	7.615133726	0.152302675			0
FR_FR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.025454983	0.025454983	0.077008638	0.782537094	0
FR_FR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	10	19.69230263	1.969230263	5.957487412	7.18118E-06	0
FR_FR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	9	3.59679619	0.399644021	1.209038003	0.310703588	0
FR_FR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	50	16.52735563	0.330547113			0
FR_FR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	13.76444764	13.76444764	44.62396716	1.90022E-08	1
FR_FR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	10	6.246949983	0.624694998	2.025244298	0.050106436	0
FR_FR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	9	6.111943904	0.679104878	2.201639658	0.03747987	0
FR_FR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	50	15.42270725	0.308454145			0
FR_FR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	8.180043813	8.180043813	17.85297266	0.000100996	1
FR_FR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	10	3.332958418	0.333295842	0.727419276	0.695079083	0
FR_FR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	9	7.422558781	0.824728753	1.79997323	0.091620039	0
FR_FR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	50	22.90947275	0.458189455			0
FR_FR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.162853963	0.162853963	1.097368891	0.300564736	0
FR_FR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	10	3.71423985	0.371423985	2.502789112	0.017802745	0
FR_FR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	9	3.138080091	0.348675566	2.349502037	0.029115195	0
FR_FR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	44	6.529777225	0.148404028			0
FR_FR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	5.839038148	5.839038148	2.977055775	0.09062915	0
FR_FR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	10	32.83865442	3.283865442	1.674291267	0.113343975	0
FR_FR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	9	8.292136107	0.921348456	0.469753009	0.887953668	0
FR_FR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	50	98.06732876	1.961346575			0
FR_FR1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	0.644548184	0.644548184	0.706043187	0.404760721	0
FR_FR1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	10	60.43100695	6.043100695	6.619660371	1.96968E-06	0
FR_FR1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	10.47525244	1.163916938	1.274963834	0.273769011	0
FR_FR1	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	50	45.64509625	0.912901925			0
FR_FR1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.037878387	0.037878387	0.707253565	0.404361109	0
FR_FR1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	10	1.203204554	0.120320455	2.246586467	0.029579297	0
FR_FR1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.961523883	0.106835987	1.994808629	0.059586667	0
FR_FR1	Total Metals	Antimony (mg/L)_Total Metals	Residuals	50	2.677850532	0.053557011			0
FR_FR1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.014813514	0.014813514	0.248663454	0.620204505	0
FR_FR1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	10	1.088585229	0.108858523	1.827327137	0.079720471	0
FR_FR1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.757395708	0.084155079	1.412648774	0.20815301	0
FR_FR1	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	50	2.978627109	0.059572542			0
FR_FR1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.029769695	0.029769695	1.3456517	0.251549027	0
FR_FR1	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	10	2.426214375	0.242621438	10.96698996	1.40521E-09	0
FR_FR1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.174103292	0.01934481	0.874425369	0.553884777	0
FR_FR1	Total Metals	Barium (mg/L)_Total Metals	Residuals	50	1.106144158	0.022122883			0
FR_FR1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	19.58634382	19.58634382	38.51331297	1.04655E-07	1
FR_FR1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	10	0.591320314	0.059132031	0.116273382	0.999543641	0
FR_FR1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.28988632	0.032209591	0.063334846	0.999930871	0
FR_FR1	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	50	25.42801737	0.508560347			0
FR_FR1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	23.72831543	23.72831543	18.70250973	7.2892E-05	1
FR_FR1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	10	1.419272179	0.141927218	0.111866145	0.999615737	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FR1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.51046673	0.056718526	0.044705187	0.999984388	0
FR_FR1	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	50	63.43617987	1.268723597			0
FR_FR1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.000768217	0.000768217	1.12389548	0.294175613	0
FR_FR1	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	10	0.009493378	0.000949338	1.388873977	0.212795671	0
FR_FR1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.005012134	0.000556904	0.814745976	0.605116016	0
FR_FR1	Total Metals	Boron (mg/L)_Total Metals	Residuals	50	0.034176529	0.000683531			0
FR_FR1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.070041093	0.070041093	0.658933225	0.420784566	0
FR_FR1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	10	3.886331909	0.388633191	3.656186854	0.001035053	0
FR_FR1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	1.73736945	0.19304105	1.816093339	0.088444829	0
FR_FR1	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	50	5.314733716	0.106294674			0
FR_FR1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.160684404	0.160684404	2.689443656	0.107292382	0
FR_FR1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	10	4.035665909	0.403566591	6.754666796	1.52377E-06	0
FR_FR1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	1.23418801	0.137132001	2.295237008	0.030342248	0
FR_FR1	Total Metals	Calcium (mg/L)_Total Metals	Residuals	50	2.987316792	0.059746336			0
FR_FR1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.004532321	0.004532321	0.022642943	0.880994718	0
FR_FR1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	10	3.299282535	0.329928253	1.648282669	0.12023157	0
FR_FR1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	3.090020029	0.343335559	1.715263986	0.110147409	0
FR_FR1	Total Metals	Chromium (mg/L)_Total Metals	Residuals	50	10.00824251	0.20016485			0
FR_FR1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.009035239	0.009035239	0.551361196	0.461236391	0
FR_FR1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	10	0.653700472	0.065370047	3.989103995	0.000481725	0
FR_FR1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.709340126	0.07881557	4.809595785	0.000122519	0
FR_FR1	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	50	0.819357521	0.01638715			0
FR_FR1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.019336673	0.019336673	0.16243643	0.688641425	0
FR_FR1	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	10	1.008862581	0.100886258	0.847488282	0.586404126	0
FR_FR1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	2.733232857	0.30369254	2.551148924	0.016991243	0
FR_FR1	Total Metals	Copper (mg/L)_Total Metals	Residuals	50	5.952073923	0.119041478			0
FR_FR1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	2.238682691	2.238682691	3.596227045	0.06369612	0
FR_FR1	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	10	20.57667756	2.057667756	3.305444073	0.00235111	0
FR_FR1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	7.516635929	0.83518177	1.34163867	0.240111679	0
FR_FR1	Total Metals	Iron (mg/L)_Total Metals	Residuals	50	31.12543595	0.622508719			0
FR_FR1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.004013924	0.004013924	0.043361474	0.835892049	0
FR_FR1	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	10	2.434617971	0.243461797	2.630060224	0.011777205	0
FR_FR1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	2.14304028	0.238115587	2.572306378	0.016194975	0
FR_FR1	Total Metals	Lead (mg/L)_Total Metals	Residuals	50	4.628445288	0.092568906			0
FR_FR1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.096339956	0.096339956	0.968218475	0.329862542	0
FR_FR1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	10	7.122207773	0.712220777	7.157832978	7.17769E-07	0
FR_FR1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	1.663619912	0.184846657	1.857712579	0.080722478	0
FR_FR1	Total Metals	Lithium (mg/L)_Total Metals	Residuals	50	4.975114531	0.099502291			0
FR_FR1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.017427112	0.017427112	0.181648723	0.671789457	0
FR_FR1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	10	6.950323608	0.695032361	7.244559013	6.12068E-07	0
FR_FR1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	2.165329387	0.240592154	2.507773964	0.01874806	0
FR_FR1	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	50	4.796926628	0.095938533			0
FR_FR1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	1.380563661	1.380563661	4.600066063	0.03685406	1
FR_FR1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	10	7.67728675	0.767728675	2.558087486	0.014001854	0
FR_FR1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	1.022207214	0.113578579	0.378446125	0.940056052	0
FR_FR1	Total Metals	Manganese (mg/L)_Total Metals	Residuals	50	15.00591124	0.300118225			0
FR_FR1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	45.27255832	45.27255832	30.67026477	1.13234E-06	1
FR_FR1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	10	1.539931206	0.153993121	0.104323899	0.999718888	0
FR_FR1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	5.382093448	0.598010383	0.405127023	0.926486251	0
FR_FR1	Total Metals	Mercury (mg/L)_Total Metals	Residuals	50	73.80529425	1.476105885			0
FR_FR1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	1	0.671670964	0.671670964	Inf	0	1
FR_FR1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(Month)	2	0	0	-	-	0
FR_FR1	Total Metals	Methyl mercury (µg/L)_Total Metals	Residuals	1	0	0			0
FR_FR1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.01427792	0.01427792	0.773015277	0.383491878	0
FR_FR1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	10	1.179117783	0.117911778	6.383815436	3.10165E-06	0
FR_FR1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.177342032	0.01970467	1.066822836	0.403132616	0
FR_FR1	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	50	0.923521204	0.018470424			0
FR_FR1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.013094806	0.013094806	0.155094558	0.695388113	0
FR_FR1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	10	4.77524235	0.477524235	5.655785307	1.32042E-05	0
FR_FR1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.882536914	0.098059657	1.161416169	0.339708393	0
FR_FR1	Total Metals	Nickel (mg/L)_Total Metals	Residuals	50	4.221555532	0.084431111			0
FR_FR1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	1.810391666	1.810391666	5.631395377	0.021526988	1
FR_FR1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	10	1.69922171	0.169922171	0.528559066	0.861744884	0
FR_FR1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.442698789	0.049188754	0.153006296	0.997489618	0
FR_FR1	Total Metals	Potassium (mg/L)_Total Metals	Residuals	50	16.07409483	0.321481897			0
FR_FR1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.047599202	0.047599202	0.247667601	0.620903918	0
FR_FR1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	10	22.907136	2.2907136	11.91901361	3.63447E-10	0
FR_FR1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	2.681467442	0.297940827	1.550242147	0.156609986	0
FR_FR1	Total Metals	Selenium (mg/L)_Total Metals	Residuals	50	9.609493185	0.192189864			0
FR_FR1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.013450558	0.013450558	0.628678081	0.431663121	0
FR_FR1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	10	0.338714974	0.033871497	1.583151268	0.139860909	0
FR_FR1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.101626111	0.01129179	0.527777431	0.847240965	0
FR_FR1	Total Metals	Silicon (mg/L)_Total Metals	Residuals	49	1.048354259	0.021394985			0
FR_FR1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	6.05836E-07	6.05836E-07	0.000140978	0.990573858	0
FR_FR1	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	10	0.052120786	0.005212079	1.212850074	0.305917728	0
FR_FR1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.032716886	0.00363521	0.845912828	0.578183373	0
FR_FR1	Total Metals	Silver (mg/L)_Total Metals	Residuals	50	0.21486904	0.004297381			0
FR_FR1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	2.180601953	2.180601953	6.042538415	0.017473432	1
FR_FR1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	10	2.175470815	0.217547081	0.602831982	0.803857747	0
FR_FR1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.699046888	0.077671876	0.21523199	0.99097049	0
FR_FR1	Total Metals	Sodium (mg/L)_Total Metals	Residuals	50	18.04375747	0.360875149			0
FR_FR1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.069484334	0.069484334	1.385081923	0.244809768	0
FR_FR1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	10	3.342196374	0.334219637	6.662243833	1.81603E-06	0
FR_FR1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	1.37135121	0.152372357	3.037349335	0.005654762	0
FR_FR1	Total Metals	Strontium (mg/L)_Total Metals	Residuals	50	2.508311357	0.050166227			0
FR_FR1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.001368142	0.001368142	0.141468731	0.708416501	0
FR_FR1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	10	0.074334967	0.007433497	0.768638792	0.657677607	0
FR_FR1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.052003434	0.005778159	0.597473513	0.792919439	0
FR_FR1	Total Metals	Thallium (mg/L)_Total Metals	Residuals	50	0.483549413	0.009670988			0
FR_FR1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.014796336	0.014796336	3.591549296	0.063862956	0
FR_FR1	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	10	0.090060299	0.00900603	2.186054753	0.034184638	0
FR_FR1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.095329086	0.010592121	2.571050274	0.016241189	0
FR_FR1	Total Metals	Tin (mg/L)_Total Metals	Residuals	50	0.205988206	0.004119764			0
FR_FR1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.038256403	0.038256403	2.97138577	0.090928186	0
FR_FR1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	10	0.089944924	0.008994492	0.698604789	0.721009752	0
FR_FR1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.033203121	0.003689236	0.286543984	0.975428991	0
FR_FR1	Total Metals	Titanium (mg/L)_Total Metals	Residuals	50	0.643746831	0.012874937			0
FR_FR1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.000591432	0.000591432	0.007225122	0.932600267	0
FR_FR1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	10	5.509050907	0.550905091	6.730037085	1.59655E-06	0
FR_FR1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	1.790003757	0.198889306	2.429696929	0.022379197	0
FR_FR1	Total Metals	Uranium (mg/L)_Total Metals	Residuals	50	4.092883024	0.08185766			0
FR_FR1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	1.206384332	1.206384332	9.172727394	0.003879708	1
FR_FR1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	10	0.464393705	0.04643937	0.353101142	0.96069695	0
FR_FR1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.763079871	0.084786652	0.644674195	0.753493718	0
FR_FR1	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	50	6.575930366	0.131518607			0
FR_FR1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.000851098	0.000851098	0.051308443	0.821725431	0
FR_FR1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	10	0.101456728	0.010145673	0.611632138	0.796557903	0
FR_FR1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.151809921	0.016867769	1.016873874	0.43965699	0
FR_FR1	Total Metals	Zinc (mg/L)_Total Metals	Residuals	50	0.829393373	0.016587867			0
FR_FR2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.44179178	0.44179178	4.357017941	0.040606871	1
FR_FR2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.566027791	0.233275254	2.300596146	0.018382787	0
FR_FR2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	2.674155979	0.243105089	2.397539482	0.014062074	0
FR_FR2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	68	6.895046433	0.101397742			0
FR_FR2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.042883362	0.042883362	5.03771852	0.028108163	1
FR_FR2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.162049328	0.196549939	23.08968355	1.14965E-18	0
FR_FR2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.151338113	0.01375801	1.616220821	0.114224057	0
FR_FR2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	67	0.570334621	0.008512457			0
FR_FR2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.072942982	1.072942982	1.572326322	0.21422699	0
FR_FR2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	11.69473239	1.06315749	1.557986336	0.132095951	0
FR_FR2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	9.021464312	0.820133119	1.201850343	0.303135141	0
FR_FR2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	67	45.72026735	0.68239205			0
FR_FR2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.179566648	0.179566648	10.1978466	0.002130986	1
FR_FR2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	6.878298794	0.62529989	35.51167454	6.84555E-24	0
FR_FR2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.080216768	0.007292433	0.414147721	0.945017237	0
FR_FR2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	68	1.197363771	0.017608291			0
FR_FR2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.04747832	0.04747832	0.469648654	0.495478471	0
FR_FR2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	7.318423637	0.66531124	6.581162336	2.39246E-07	0
FR_FR2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.141292181	0.103753835	1.026317891	0.433541613	0
FR_FR2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	68	6.874342555	0.101093273			0
FR_FR2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.21536195	0.21536195	11.31979294	0.001263624	1
FR_FR2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	7.984552393	0.725868399	38.15288624	8.86999E-25	0
FR_FR2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.123755303	0.011250482	0.591344606	0.829425342	0
FR_FR2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	1.293717357	0.019025255			0
FR_FR2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.000611061	0.000611061	0.311287977	0.578750493	0
FR_FR2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.025252509	0.002295683	1.169471622	0.324845686	0
FR_FR2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.005210206	0.000473655	0.24129041	0.993381999	0
FR_FR2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	67	0.131521563	0.001963008			0
FR_FR2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.06551958	0.06551958	1.59999599	0.210221551	0
FR_FR2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.07510577	0.006827797	0.166735626	0.998734919	0
FR_FR2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.153242507	0.013931137	0.340200032	0.973317014	0
FR_FR2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	68	2.784589141	0.04094984			0
FR_FR2	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.00027213	0.00027213	4.658300325	0.034437488	1
FR_FR2	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.002467256	0.000224296	3.839479474	0.000256906	0
FR_FR2	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.001879409	0.000170855	2.924687336	0.003234427	0
FR_FR2	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	68	0.003972447	5.84183E-05			0
FR_FR2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.045067733	0.045067733	5.487153729	0.022091162	1
FR_FR2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.053057459	0.186641587	22.72426446	1.2389E-18	0
FR_FR2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.12020181	0.010927437	1.330453611	0.227252171	0
FR_FR2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	0.558505555	0.008213317			0
FR_FR2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.280262604	0.280262604	11.93872245	0.000951473	1
FR_FR2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	9.570072384	0.87000658	37.06083852	2.03446E-24	0
FR_FR2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.173460301	0.015769118	0.671738305	0.760032299	0
FR_FR2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	68	1.596306231	0.023475092			0
FR_FR2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.123302826	0.123302826	0.544104407	0.463274549	0
FR_FR2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	8.796774702	0.799706791	3.528905248	0.000602639	0
FR_FR2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	2.592782504	0.2357075	1.040118009	0.422155175	0
FR_FR2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	68	15.4098957	0.226616113			0
FR_FR2	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	4.553787927	4.553787927	4.437195924	0.038857004	1
FR_FR2	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(Month)	11	27.77621785	2.525110714	2.460459544	0.011810178	0
FR_FR2	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	4.592546595	0.417504236	0.406814749	0.94837624	0
FR_FR2	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	Residuals	68	69.78677172	1.026276055			0
FR_FR2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.002602542	0.002602542	0.001719544	0.967044808	0
FR_FR2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	58.92567606	5.356879641	3.539382237	0.000585464	0
FR_FR2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	7.378892043	0.670808368	0.443214591	0.930503749	0
FR_FR2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	68	102.9184731	1.513506958			0
FR_FR2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.057936881	0.057936881	0.548239836	0.461586803	0
FR_FR2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	3.282117759	0.298374342	2.823429525	0.004292247	0
FR_FR2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.781576246	0.161961477	1.532594302	0.140247567	0
FR_FR2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	68	7.186102949	0.105677985			0
FR_FR2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.057081638	0.057081638	0.745008765	0.391095239	0
FR_FR2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	2.133516683	0.193956062	2.53144392	0.009695008	0
FR_FR2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.433720902	0.039429173	0.514615212	0.887032996	0
FR_FR2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	68	5.21007482	0.076618747			0
FR_FR2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.131729119	0.131729119	9.286360031	0.003285764	1

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FR2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.223231967	0.020293815	1.430630342	0.17966496	0
FR_FR2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.517634849	0.047057714	3.317374879	0.001082525	0
FR_FR2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	68	0.964595391	0.014185226			0
FR_FR2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.023376011	0.023376011	1.367376736	0.246345738	0
FR_FR2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	5.2477556	0.477068691	27.90607132	5.42738E-21	0
FR_FR2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.189050235	0.017186385	1.005315366	0.451201722	0
FR_FR2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	68	1.162495093	0.017095516			0
FR_FR2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	24.05137306	24.05137306	51.98280751	5.93195E-10	1
FR_FR2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.027712323	0.093428393	0.201929019	0.99697272	0
FR_FR2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.473927278	0.043084298	0.093119123	0.999924588	0
FR_FR2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	68	31.46219773	0.462679378			0
FR_FR2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	27.87462096	27.87462096	21.76437241	1.49246E-05	1
FR_FR2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	1.604036932	0.145821539	0.113856769	0.999795651	0
FR_FR2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.719887222	0.065444293	0.051098595	0.999996527	0
FR_FR2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	68	87.09069069	1.280745451			0
FR_FR2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.0048E-05	1.0048E-05	0.000552244	0.981320364	0
FR_FR2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.724224041	0.065838549	3.618520378	0.000470747	0
FR_FR2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.640366524	0.058215139	3.199533826	0.001502291	0
FR_FR2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	68	1.237251937	0.018194881			0
FR_FR2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.190781504	0.190781504	1.332464315	0.252407987	0
FR_FR2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	14.91659433	1.35605403	9.471010357	4.57902E-10	0
FR_FR2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	3.356541418	0.305140129	2.131172694	0.02925162	0
FR_FR2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	68	9.736202429	0.143179447			0
FR_FR2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.116734467	0.116734467	2.024903149	0.159310531	0
FR_FR2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.740654378	0.067332216	1.167960248	0.325583757	0
FR_FR2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.127557609	0.102505237	1.778079634	0.075149083	0
FR_FR2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	68	3.920159703	0.057649407			0
FR_FR2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.400523609	0.400523609	10.39588333	0.001941638	1
FR_FR2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	2.887766529	0.26252423	6.814008482	1.38868E-07	0
FR_FR2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.467811603	0.133437418	3.463465834	0.000722081	0
FR_FR2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	68	2.619845232	0.038527136			0
FR_FR2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.081014827	0.081014827	2.348387578	0.13005218	0
FR_FR2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.230837912	0.020985265	0.608302659	0.815436566	0
FR_FR2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.091738411	0.008339856	0.241748501	0.993345853	0
FR_FR2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	68	2.345868424	0.034498065			0
FR_FR2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.14346327	1.14346327	3.887323602	0.052722038	0
FR_FR2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.617300289	0.056118208	0.190779748	0.997654847	0
FR_FR2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.044015002	0.094910455	0.322658069	0.978260046	0
FR_FR2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	68	20.00232302	0.294151809			0
FR_FR2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.090838209	0.090838209	8.998963231	0.003772783	1
FR_FR2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.158040527	0.014367321	1.423310648	0.182830661	0
FR_FR2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.39490888	0.035900807	3.556543522	0.000558393	0
FR_FR2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	68	0.686412208	0.010094297			0
FR_FR2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.306376383	0.306376383	3.411312453	0.069102134	0
FR_FR2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	16.39080326	1.490073024	16.591046	2.96144E-15	0
FR_FR2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.323189594	0.029380872	0.327137928	0.977059416	0
FR_FR2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	68	6.107207807	0.08981188			0
FR_FR2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.441216936	0.441216936	2.629011325	0.109555154	0
FR_FR2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	39.40068095	3.581880086	21.34279656	6.16994E-18	0
FR_FR2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.089631131	0.099057376	0.59023791	0.830324195	0
FR_FR2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	68	11.41218046	0.167826183			0
FR_FR2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.303179777	3.303179777	23.70064251	7.01831E-06	1
FR_FR2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.313460562	0.028496415	0.204464602	0.996799382	0
FR_FR2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.108103197	0.009827563	0.070513742	0.999981587	0
FR_FR2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	68	9.477220913	0.139370896			0
FR_FR2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.001071982	0.001071982	0.030472262	0.861941672	0
FR_FR2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	1.310450028	0.119131821	3.386453223	0.000893715	0
FR_FR2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.07510021	0.006827292	0.194073291	0.997466472	0
FR_FR2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	68	2.39216764	0.035178936			0
FR_FR2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.606407613	0.606407613	6.402250075	0.013718197	1
FR_FR2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	3.277050394	0.297913672	3.145273558	0.001747432	0
FR_FR2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.38832877	0.035302615	0.372713283	0.962389166	0
FR_FR2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	68	6.440816461	0.094717889			0
FR_FR2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.46524683	1.46524683	25.67748163	3.30899E-06	1
FR_FR2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	16.15688584	1.468807804	25.73988535	4.73722E-20	0
FR_FR2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.37826812	0.034388011	0.602627148	0.820162414	0
FR_FR2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	68	3.88031762	0.057063494			0
FR_FR2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.010807165	0.010807165	3.093432243	0.083107697	0
FR_FR2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.45568642	0.041426038	11.85774779	5.24207E-12	0
FR_FR2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.046110299	0.004191845	1.199869635	0.304110454	0
FR_FR2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	68	0.237563713	0.003493584			0
FR_FR2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.079773436	0.079773436	8.099412591	0.005847515	1
FR_FR2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.158916927	0.014446993	1.46680607	0.164700652	0
FR_FR2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.402905796	0.0366278	3.718827675	0.000357369	0
FR_FR2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	68	0.66975149	0.009849287			0
FR_FR2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.20895172	0.20895172	14.54362494	0.000297714	1
FR_FR2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	5.691500345	0.517409122	36.01312405	4.60022E-24	0
FR_FR2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.080122883	0.007283898	0.506979735	0.892185043	0
FR_FR2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	68	0.97697218	0.014367238			0
FR_FR2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.028889177	0.028889177	1.744629833	0.190981179	0
FR_FR2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.205221204	0.018656473	1.126672456	0.354951347	0
FR_FR2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.415809454	0.037800859	2.282810202	0.019306154	0
FR_FR2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	68	1.126006201	0.016558915			0
FR_FR2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.077103463	0.077103463	7.771059657	0.006877155	1
FR_FR2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.157025996	0.014275091	1.438749659	0.176208388	0
FR_FR2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.405696791	0.036881526	3.717194185	0.000358974	0
FR_FR2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	68	0.674687325	0.009921872			0
FR_FR2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.090964694	0.090964694	6.596592357	0.012418214	1
FR_FR2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.205580081	0.018689098	1.355299038	0.214570154	0
FR_FR2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.07531968	0.006847244	0.496549516	0.899035666	0
FR_FR2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	68	0.937696145	0.013789649			0
FR_FR2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.063804145	1.063804145	27.18664587	1.88607E-06	1
FR_FR2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	12.62338442	1.147580402	29.32763719	1.40587E-21	0
FR_FR2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.128981087	0.011725553	0.299658981	0.983779581	0
FR_FR2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	68	2.660816718	0.039129658			0
FR_FR2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.937419624	1.937419624	15.49728652	0.000196912	1
FR_FR2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.312509896	0.028409991	0.227249563	0.994903931	0
FR_FR2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.4089928	0.037181164	0.297409574	0.984263162	0
FR_FR2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	68	8.501135617	0.1250167			0
FR_FR2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	6.268636962	6.268636962	74.79470055	1.45924E-12	1
FR_FR2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	0.849609506	0.077237228	0.921561635	0.525188372	0
FR_FR2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.072887684	0.097535244	1.1637489	0.328497649	0
FR_FR2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	68	5.699164651	0.083811245			0
FR_FR2	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.386867515	0.386867515	8.027635843	0.006295712	1
FR_FR2	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	7.492931814	0.681175619	14.13463163	8.47501E-13	0
FR_FR2	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.249546491	0.022686045	0.470743337	0.913980938	0
FR_FR2	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	59	2.843325713	0.048191961			0
FR_FR2	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.013984888	0.013984888	2.359331932	0.129881308	0
FR_FR2	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.063307551	0.005755232	0.970941115	0.482388944	0
FR_FR2	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.026204851	0.002382259	0.401900988	0.949761073	0
FR_FR2	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	59	0.349721192	0.005927478			0
FR_FR2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.010676011	0.010676011	1.434382066	0.235840096	0
FR_FR2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.637035223	0.057912293	7.780841787	4.02445E-08	0
FR_FR2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.022977288	0.002088844	0.280647973	0.987263081	0
FR_FR2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	59	0.439133114	0.007442934			0
FR_FR2	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	9.02253E-05	9.02253E-05	0.375517285	0.542367061	0
FR_FR2	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.003243614	0.000294874	1.227264639	0.289921708	0
FR_FR2	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.003871148	0.000351923	1.464700753	0.169559905	0
FR_FR2	Field Measured	pH (-)_Field Measured	Residuals	59	0.014175886	0.000240269			0
FR_FR2	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	9.20802892	9.20802892	17.6387112	7.94999E-05	1
FR_FR2	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	29.67145758	2.697405235	5.167094102	7.67086E-06	0
FR_FR2	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	3.797007537	0.345182503	0.661224518	0.769502085	0
FR_FR2	Major Ions	Bromide (mg/L)_Major Ions	Residuals	68	35.49839665	0.522035245			0
FR_FR2	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.11776017	0.11776017	7.414614569	0.008212951	1
FR_FR2	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	6.701651043	0.609241004	38.3600602	7.59461E-25	0
FR_FR2	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.104691078	0.009517371	0.599248757	0.822954743	0
FR_FR2	Major Ions	Calcium (mg/L)_Major Ions	Residuals	68	1.079987572	0.01588217			0
FR_FR2	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	1.285748433	1.285748433	10.2345762	0.002094468	1
FR_FR2	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	15.77927971	1.434479973	11.41848142	1.1457E-11	0
FR_FR2	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	1.029299695	0.0935727	0.744840048	0.69206977	0
FR_FR2	Major Ions	Chloride (mg/L)_Major Ions	Residuals	68	8.54269798	0.125627911			0
FR_FR2	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.141479963	0.141479963	5.792373033	0.018817486	1
FR_FR2	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.108925876	0.009902352	0.405415139	0.949003438	0
FR_FR2	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.350300243	0.031845477	1.303795087	0.241532738	0
FR_FR2	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	68	1.66091469	0.024425216			0
FR_FR2	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.407758696	0.407758696	15.56158692	0.000191541	1
FR_FR2	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	10.19910699	0.927191545	35.38507447	7.57376E-24	0
FR_FR2	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.16082407	0.01462037	0.557967642	0.855711688	0
FR_FR2	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	68	1.781797155	0.026202899			0
FR_FR2	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.002374787	0.002374787	0.05130908	0.821480372	0
FR_FR2	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	2.968448111	0.269858919	5.830507726	1.45499E-06	0
FR_FR2	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.487468817	0.044315347	0.957466864	0.492826337	0
FR_FR2	Major Ions	Potassium (mg/L)_Major Ions	Residuals	68	3.147308496	0.046283948			0
FR_FR2	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.08328841	0.08328841	1.334335072	0.252078459	0
FR_FR2	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	8.576525041	0.779684095	12.49105167	1.74881E-12	0
FR_FR2	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.531240607	0.048294601	0.773711245	0.664601877	0
FR_FR2	Major Ions	Sodium (mg/L)_Major Ions	Residuals	68	4.244519985	0.062419412			0
FR_FR2	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.443793409	0.443793409	10.10863037	0.002222477	1
FR_FR2	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	18.32330553	1.665755048	37.94220851	1.03943E-24	0
FR_FR2	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.185044692	0.016822245	0.383173455	0.958371636	0
FR_FR2	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	68	2.985365052	0.043902427			0
FR_FR2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.295590556	0.295590556	3.588237526	0.062443618	0
FR_FR2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	21.62840968	1.966219062	23.86835738	3.46152E-19	0
FR_FR2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.459073517	0.041733956	0.506617497	0.892426611	0
FR_FR2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	68	5.601679834	0.082377645			0
FR_FR2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	4.365128332	4.365128332	10.41248287	0.001926584	1
FR_FR2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	6.992526432	0.635684221	1.516347415	0.145968986	0
FR_FR2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.764743556	0.160431232	0.382689198	0.958563094	0
FR_FR2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	68	28.50700744	0.419220698			0
FR_FR2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.254038935	0.254038935	0.292266341	0.590538333	0
FR_FR2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	3.523917951	0.320356177	0.368562905	0.963914875	0
FR_FR2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	4.537876498	0.412534227	0.474611772	0.91271604	0
FR_FR2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	68	59.10583995	0.869203529			0
FR_FR2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	14.14245036	14.14245036	30.42941183	5.82284E-07	1
FR_FR2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	12.82972166	1.166338333	2.509536082	0.010304342	0
FR_FR2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	5.738436185	0.521676017	1.122457138	0.358049367	0
FR_FR2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	68	31.60385188	0.464762528			0
FR_FR2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.041578037	0.041578037	0.297852059	0.587289775	0
FR_FR2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.068737425	0.188067039	1.347253461	0.222463842	0
FR_FR2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.032633865	0.093875806	0.672496921	0.758437974	0
FR_FR2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	59	8.235982017	0.139592916			0
FR_FR2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	10.6501137	10.6501137	4.52715441	0.036989564	1
FR_FR2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	38.58340808	3.507582552	1.491004534	0.155304162	0
FR_FR2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	3.994693754	0.363153978	0.154369632	0.999117279	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FR2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	68	159.9697439	2.352496234			0
FR_FR2	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	2.530266001	2.530266001	1.903697268	0.172185216	0
FR_FR2	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	89.74989057	8.159080961	6.138651087	6.86808E-07	0
FR_FR2	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	6.592586603	0.599326055	0.45091519	0.926341166	0
FR_FR2	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	68	90.38101327	1.329132548			0
FR_FR2	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.0177031	0.0177031	0.255654859	0.614756278	0
FR_FR2	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	1.823265846	0.165751441	2.393657631	0.014214091	0
FR_FR2	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.285834062	0.025984915	0.375254593	0.96143583	0
FR_FR2	Total Metals	Antimony (mg/L)_Total Metals	Residuals	68	4.708734369	0.069246094			0
FR_FR2	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.018948943	0.018948943	0.172611245	0.67910957	0
FR_FR2	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	2.208928012	0.200811637	1.829249634	0.065727183	0
FR_FR2	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.169681913	0.106334719	0.968632839	0.48294974	0
FR_FR2	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	68	7.464914079	0.109778148			0
FR_FR2	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.023929791	0.023929791	1.287929937	0.260414351	0
FR_FR2	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	4.42914403	0.402649457	21.67107495	4.18431E-18	0
FR_FR2	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.178414994	0.016219545	0.872955289	0.570231046	0
FR_FR2	Total Metals	Barium (mg/L)_Total Metals	Residuals	68	1.263442776	0.018580041			0
FR_FR2	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	23.09141767	23.09141767	52.22369172	5.53411E-10	1
FR_FR2	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	1.407400235	0.127945476	0.289362272	0.985914079	0
FR_FR2	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.466675462	0.042425042	0.095948735	0.999912407	0
FR_FR2	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	68	30.06712758	0.442163641			0
FR_FR2	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	26.79605739	26.79605739	20.8608792	2.13595E-05	1
FR_FR2	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	1.71980745	0.156346132	0.12171633	0.999716891	0
FR_FR2	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.767037785	0.069730708	0.054285742	0.999995237	0
FR_FR2	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	68	87.34684117	1.28451237			0
FR_FR2	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.001891879	0.001891879	0.078430686	0.780285654	0
FR_FR2	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.821122613	0.07464751	3.094624164	0.002012488	0
FR_FR2	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.609645417	0.055422311	2.297614767	0.018534492	0
FR_FR2	Total Metals	Boron (mg/L)_Total Metals	Residuals	68	1.640273722	0.024121672			0
FR_FR2	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.455020049	0.455020049	3.47491423	0.066623205	0
FR_FR2	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	8.205572267	0.745961115	5.696783916	2.02385E-06	0
FR_FR2	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.474762857	0.04316026	0.329607896	0.976379487	0
FR_FR2	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	68	8.904209215	0.130944253			0
FR_FR2	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.054539109	0.054539109	3.368625597	0.070822413	0
FR_FR2	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	6.335587342	0.575962486	35.57450809	6.51129E-24	0
FR_FR2	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.103944979	0.009449544	0.583654097	0.835634404	0
FR_FR2	Total Metals	Calcium (mg/L)_Total Metals	Residuals	68	1.100941408	0.016190315			0
FR_FR2	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	6.14931E-05	6.14931E-05	0.000133087	0.990829333	0
FR_FR2	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	6.721732847	0.611066622	1.322504071	0.231437007	0
FR_FR2	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	3.174803614	0.28861851	0.624644091	0.801596417	0
FR_FR2	Total Metals	Chromium (mg/L)_Total Metals	Residuals	68	31.41958595	0.462052735			0
FR_FR2	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.191721615	0.191721615	1.22961055	0.271389239	0
FR_FR2	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	3.825741742	0.347794704	2.230588533	0.022287273	0
FR_FR2	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.136397939	0.194217994	1.245621129	0.275185309	0
FR_FR2	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	68	10.60260084	0.155920601			0
FR_FR2	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.121385195	0.121385195	1.37128797	0.24567793	0
FR_FR2	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	1.4770711	0.134279191	1.516951381	0.145752666	0
FR_FR2	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.423849724	0.129440884	1.462293051	0.16650669	0
FR_FR2	Total Metals	Copper (mg/L)_Total Metals	Residuals	68	6.019299693	0.088519113			0
FR_FR2	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	0.011921617	0.011921617	0.017417013	0.895394946	0
FR_FR2	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	18.04165675	1.640150613	2.39619548	0.014114524	0
FR_FR2	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	5.911047929	0.537367994	0.785073485	0.653753295	0
FR_FR2	Total Metals	Iron (mg/L)_Total Metals	Residuals	68	46.5447175	0.68448114			0
FR_FR2	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.070020809	0.070020809	0.18375952	0.669516998	0
FR_FR2	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	7.889113417	0.717192129	1.882167357	0.057158619	0
FR_FR2	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	3.801172677	0.345561152	0.906875431	0.53866441	0
FR_FR2	Total Metals	Lead (mg/L)_Total Metals	Residuals	68	25.91112028	0.381045886			0
FR_FR2	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.298926306	0.298926306	3.430025672	0.068362458	0
FR_FR2	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	15.95372503	1.450338639	16.64189021	2.75504E-15	0
FR_FR2	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.3645104	0.033137309	0.380233585	0.959525774	0
FR_FR2	Total Metals	Lithium (mg/L)_Total Metals	Residuals	68	5.926191448	0.087149874			0
FR_FR2	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.18636407	0.18636407	6.896766313	0.010659181	1
FR_FR2	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	10.30263738	0.936603398	34.66083752	1.3583E-23	0
FR_FR2	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.135042367	0.012276579	0.454318772	0.92445952	0
FR_FR2	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	68	1.837492559	0.027021949			0
FR_FR2	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	0.000123002	0.000123002	0.000664068	0.979516646	0
FR_FR2	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	12.12736973	1.102488157	5.952141598	1.0801E-06	0
FR_FR2	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.403410457	0.21849186	1.179599508	0.317627213	0
FR_FR2	Total Metals	Manganese (mg/L)_Total Metals	Residuals	68	12.59533118	0.185225459			0
FR_FR2	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	54.54509128	54.54509128	36.84854412	6.40538E-08	1
FR_FR2	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	2.809380342	0.255398213	0.172537108	0.998518094	0
FR_FR2	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.636516103	0.239683282	0.161920712	0.998896107	0
FR_FR2	Total Metals	Mercury (mg/L)_Total Metals	Residuals	68	100.6570625	1.480250918			0
FR_FR2	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	1	2.151371953	2.151371953	243.4548734	1.96486E-05	1
FR_FR2	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(Month)	3	0.014151208	0.004717069	0.533795878	0.678932268	0
FR_FR2	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year):as.factor(Month)	2	0.006932213	0.003466106	0.392233649	0.694650872	0
FR_FR2	Total Metals	Methyl mercury (µg/L)_Total Metals	Residuals	5	0.044184204	0.008836841			0
FR_FR2	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.004335207	0.004335207	0.118775419	0.731430099	0
FR_FR2	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	1.392275716	0.12657052	3.467762303	0.000713551	0
FR_FR2	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.105492284	0.009590208	0.262751236	0.990534357	0
FR_FR2	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	68	2.481945007	0.036499191			0
FR_FR2	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.375371824	0.375371824	3.066924895	0.084409759	0
FR_FR2	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	2.756064628	0.25055133	2.047095872	0.036750086	0
FR_FR2	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.43172954	0.03924814	0.320671638	0.978779078	0
FR_FR2	Total Metals	Nickel (mg/L)_Total Metals	Residuals	68	8.322761362	0.122393549			0
FR_FR2	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.067718043	0.067718043	1.561437499	0.21573877	0
FR_FR2	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	2.794429661	0.25403906	5.857613391	1.36127E-06	0
FR_FR2	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.389267621	0.035387966	0.815973028	0.62423747	0
FR_FR2	Total Metals	Potassium (mg/L)_Total Metals	Residuals	68	2.949094611	0.043369038			0
FR_FR2	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	1.016011271	1.016011271	17.92281507	7.06345E-05	1
FR_FR2	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	15.95116369	1.45010579	25.58040314	5.58736E-20	0
FR_FR2	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.30225411	0.027477646	0.484715857	0.90653983	0
FR_FR2	Total Metals	Selenium (mg/L)_Total Metals	Residuals	68	3.854794357	0.056688152			0
FR_FR2	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.002056304	0.002056304	0.110451223	0.740653328	0
FR_FR2	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.24238194	0.022034722	1.18356138	0.314951361	0
FR_FR2	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.152133995	0.013830363	0.742876805	0.693929684	0
FR_FR2	Total Metals	Silicon (mg/L)_Total Metals	Residuals	68	1.265976659	0.018617304			0
FR_FR2	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.084380149	0.084380149	1.93996996	0.168209019	0
FR_FR2	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	0.384827954	0.034984359	0.80431958	0.635364425	0
FR_FR2	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.683493409	0.062135764	1.428553011	0.180558591	0
FR_FR2	Total Metals	Silver (mg/L)_Total Metals	Residuals	68	2.957700521	0.043495596			0
FR_FR2	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.191999198	0.191999198	3.058356718	0.084835442	0
FR_FR2	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	9.039085186	0.821735017	13.08942348	6.38982E-13	0
FR_FR2	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.557377597	0.050670691	0.807133825	0.632676273	0
FR_FR2	Total Metals	Sodium (mg/L)_Total Metals	Residuals	68	4.268941351	0.062778549			0
FR_FR2	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.095332258	0.095332258	6.778066266	0.011321176	1
FR_FR2	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	5.440832745	0.494621159	35.16726732	9.01882E-24	0
FR_FR2	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.112780963	0.010252815	0.728968979	0.707065565	0
FR_FR2	Total Metals	Strontium (mg/L)_Total Metals	Residuals	68	0.956407516	0.014064816			0
FR_FR2	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.024092886	0.024092886	0.287674719	0.593464845	0
FR_FR2	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	0.988145658	0.089831423	1.072608285	0.396058557	0
FR_FR2	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.898886464	0.081716951	0.975719582	0.476731079	0
FR_FR2	Total Metals	Thallium (mg/L)_Total Metals	Residuals	68	5.695030407	0.083750447			0
FR_FR2	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.100867048	0.100867048	3.452838343	0.067472435	0
FR_FR2	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.409804397	0.037254945	1.275295608	0.257587178	0
FR_FR2	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.51121972	0.04647452	1.590896215	0.121321309	0
FR_FR2	Total Metals	Tin (mg/L)_Total Metals	Residuals	68	1.986469848	0.029212792			0
FR_FR2	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.245672975	0.245672975	4.565665419	0.036219756	1
FR_FR2	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.396813807	0.036073982	0.670410469	0.761233629	0
FR_FR2	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.199193452	0.018108496	0.336534095	0.974404034	0
FR_FR2	Total Metals	Titanium (mg/L)_Total Metals	Residuals	68	3.658998361	0.053808799			0
FR_FR2	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.910870228	0.910870228	22.82841183	9.8367E-06	1
FR_FR2	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	12.28252364	1.116593058	27.98427856	5.03161E-21	0
FR_FR2	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.245665369	0.022333215	0.55971951	0.85437624	0
FR_FR2	Total Metals	Uranium (mg/L)_Total Metals	Residuals	68	2.713249434	0.039900727			0
FR_FR2	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	1.279732958	1.279732958	5.935200435	0.017465959	1
FR_FR2	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	1.579866537	0.143624231	0.666106621	0.765116965	0
FR_FR2	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.300211893	0.118201081	0.548198047	0.863063669	0
FR_FR2	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	68	14.6619886	0.215617479			0
FR_FR2	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.073114936	0.073114936	0.587931526	0.445874034	0
FR_FR2	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	1.722982109	0.156634737	1.259530615	0.266823467	0
FR_FR2	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.841385204	0.076489564	0.615067572	0.80974809	0
FR_FR2	Total Metals	Zinc (mg/L)_Total Metals	Residuals	68	8.456453541	0.124359611			0
FR_FR2	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	1	1.18329E-31	1.18329E-31	-	-	-
FR_FR2	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(Month)	6	1.26218E-30	2.10363E-31	-	-	0
FR_FR2	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	1	0	0	-	-	-
FR_FR2	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(Month)	2	0	0	-	-	0
FR_FR2	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	1	0	0	-	-	-
FR_FR2	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(Month)	2	0	0	-	-	0
FR_FR2	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	1	1.18329E-31	1.18329E-31	-	-	-
FR_FR2	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(Month)	6	1.26218E-30	2.10363E-31	-	-	0
FR_FR3	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.019999803	0.019999803	6.49031E+30	2.49889E-16	1
FR_FR3	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.185049604	0.107731782	3.4961E+31	1.31914E-16	0
FR_FR3	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	1	3.08149E-33	3.08149E-33			0
FR_FR3	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.018337319	0.018337319	8.899966119	0.205902487	0
FR_FR3	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.250881251	0.022807386	11.0695009	0.230648017	0
FR_FR3	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	1	0.002060381	0.002060381			0
FR_FR3	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.008276965	1.008276965	0.29939867	0.681263296	0
FR_FR3	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	10.46474476	0.951340433	0.282491885	0.913378237	0
FR_FR3	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	1	3.367673497	3.367673497			0
FR_FR3	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.230066268	0.230066268	128.7505223	0.055960941	0
FR_FR3	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	10	0.483334204	0.04833342	27.04852469	0.148626542	0
FR_FR3	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	1	0.001786915	0.001786915			0
FR_FR3	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.201566087	0.201566087	57.29480557	0.083620881	0
FR_FR3	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	3.989758895	0.362705354	103.0983588	0.076681777	0
FR_FR3	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	1	0.003518052	0.003518052			0
FR_FR3	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.172743828	0.172743828	319.7132199	0.035567033	1
FR_FR3	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.007318386	0.091574399	169.4853363	0.059848257	0
FR_FR3	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	1	0.000540309	0.000540309			0
FR_FR3	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0	0	-	-	-
FR_FR3	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0	0	-	-	0
FR_FR3	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	1	0	0			0
FR_FR3	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.04993731	0.04993731	2.245550689	0.374624941	0
FR_FR3	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	1.007378682	0.09157988	4.118108563	0.368141718	0
FR_FR3	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	1	0.022238336	0.022238336			0
FR_FR3	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	4.95227E-05	4.95227E-05	0.237506333	0.711309846	0
FR_FR3	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.001391484	0.000126499	0.606674768	0.774429533	0
FR_FR3	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	1	0.000208511	0.000208511			0
FR_FR3	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.026180796	0.026180796	1960.527087	0.014375398	1
FR_FR3	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.209464612	0.019042237	1425.962083	0.020652557	0
FR_FR3	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	1	1.3354E-05	1.3354E-05			0
FR_FR3	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.178412987	0.178412987	718.1405347	0.023745097	1
FR_FR3	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	1.136253982	0.103295817	415.7820234	0.038234945	0
FR_FR3	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	1	0.000248437	0.000248437			0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FR3	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	2.880627189	2.880627189	95.88503811	0.064789064	0
FR_FR3	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	7.897820795	0.717983709	23.89892574	0.158344781	0
FR_FR3	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	1	0.03004251	0.03004251			0
FR_FR3	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	7.751575222	7.751575222	7.527746726	0.222505815	0
FR_FR3	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	26.56475869	2.414978063	2.345245023	0.472824564	0
FR_FR3	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	3	5.628848581	1.87628286	1.822104767	0.487482018	0
FR_FR3	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	1	1.029733797	1.029733797			0
FR_FR3	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	1.071991699	1.071991699	1.375067405	0.449521628	0
FR_FR3	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	43.26014216	3.932740197	5.044612623	0.335213143	0
FR_FR3	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	3	6.997523987	2.332507996	2.991959471	0.396280189	0
FR_FR3	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	1	0.77959211	0.77959211			0
FR_FR3	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.795757931	0.795757931	4.80381E+33	9.18517E-18	1
FR_FR3	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	4.867559321	0.442505393	2.6713E+33	1.50911E-17	0
FR_FR3	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	1	1.65651E-34	1.65651E-34			0
FR_FR3	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000193644	0.000193644	0.004300192	0.958312804	0
FR_FR3	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	0.322927339	0.029357031	0.651923808	0.758695855	0
FR_FR3	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	1	0.045031383	0.045031383			0
FR_FR3	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.145287917	0.145287917	1.33054E+32	5.51908E-17	1
FR_FR3	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.273246326	0.024840575	2.27488E+31	1.63532E-16	0
FR_FR3	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	1	1.09195E-33	1.09195E-33			0
FR_FR3	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.050417272	0.050417272	3.32928417	0.319168758	0
FR_FR3	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.009129792	0.091739072	6.057952513	0.307678821	0
FR_FR3	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	1	0.015143577	0.015143577			0
FR_FR3	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.440497818	4.440497818	2.85519E+62	3.76758E-32	1
FR_FR3	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	9.24446E-29	8.40406E-30	5.40372E+32	3.35534E-17	0
FR_FR3	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	1	1.55524E-62	1.55524E-62			0
FR_FR3	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	9.088968189	9.088968189	6.70148E+62	2.4592E-32	1
FR_FR3	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	2.36658E-30	2.15144E-31	1.5863E+31	1.95835E-16	0
FR_FR3	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	1	1.35626E-62	1.35626E-62			0
FR_FR3	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	6.77489E-05	6.77489E-05	1.16288E+28	5.90353E-15	1
FR_FR3	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.142857997	0.012987091	2.22918E+30	5.22408E-16	0
FR_FR3	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	1	5.82594E-33	5.82594E-33			0
FR_FR3	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.331343661	0.331343661	23.18158018	0.130369957	0
FR_FR3	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	11.80696671	1.07336061	75.09482756	0.089790022	0
FR_FR3	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	1	0.014293403	0.014293403			0
FR_FR3	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.03303402	0.03303402	9.75632E+35	6.44521E-19	1
FR_FR3	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.00378549	0.000344135	1.01638E+34	7.73671E-18	0
FR_FR3	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	1	3.38591E-38	3.38591E-38			0
FR_FR3	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.005115801	0.005115801	3.39765E+29	1.09217E-15	1
FR_FR3	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	0.547487803	0.049771618	3.30557E+30	4.29003E-16	0
FR_FR3	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	1	1.50569E-32	1.50569E-32			0
FR_FR3	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.012755303	0.012755303	0.030384647	0.89013346	0
FR_FR3	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.350024699	0.031820427	0.075800036	0.996058286	0
FR_FR3	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	1	0.419794353	0.419794353			0
FR_FR3	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.906914134	1.906914134	419.8387843	0.031045195	1
FR_FR3	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.103687394	0.009426127	2.075318198	0.498019225	0
FR_FR3	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	1	0.004542015	0.004542015			0
FR_FR3	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.89327E-29	1.89327E-29	4.55736E+32	2.98211E-17	1
FR_FR3	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	2.20881E-29	2.00801E-30	4.83357E+31	1.12189E-16	0
FR_FR3	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	1	4.1543E-62	4.1543E-62			0
FR_FR3	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.744642422	0.744642422	638.7765438	0.025175562	1
FR_FR3	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.081831784	0.189257435	162.3506888	0.061146282	0
FR_FR3	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	1	0.001165732	0.001165732			0
FR_FR3	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.048062534	0.048062534	0.490687171	0.610990182	0
FR_FR3	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	17.36497951	1.578634501	16.11683023	0.192120724	0
FR_FR3	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	1	0.09794944	0.09794944			0
FR_FR3	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.823633738	0.823633738	1.9826E+61	1.42976E-31	1
FR_FR3	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	6.99713E-29	6.36103E-30	1.53119E+32	6.30331E-17	0
FR_FR3	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	1	4.1543E-62	4.1543E-62			0
FR_FR3	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.19871E-05	4.19871E-05	0.001132136	0.978587591	0
FR_FR3	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.271309458	0.024664496	0.665050759	0.754286084	0
FR_FR3	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	1	0.037086637	0.037086637			0
FR_FR3	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.002147765	0.002147765	0.013756418	0.925671882	0
FR_FR3	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	0.88911837	0.080828943	0.517708689	0.807929973	0
FR_FR3	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	1	0.156128233	0.156128233			0
FR_FR3	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.223874443	1.223874443	32.0329282	0.001307253	1
FR_FR3	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.297016745	0.208819704	5.465517014	0.02438429	0
FR_FR3	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	8	0.273792195	0.034224024	0.895758321	0.57000441	0
FR_FR3	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	6	0.229240568	0.038206761			0
FR_FR3	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.001935458	0.001935458	0.74559968	0.546555673	0
FR_FR3	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.179356936	0.016305176	6.281270851	0.302472226	0
FR_FR3	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	1	0.00259584	0.00259584			0
FR_FR3	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.89327E-29	1.89327E-29	4.55736E+32	2.98211E-17	1
FR_FR3	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	2.20881E-29	2.00801E-30	4.83357E+31	1.12189E-16	0
FR_FR3	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	1	4.1543E-62	4.1543E-62			0
FR_FR3	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.220753577	0.220753577	155.1437694	0.051001441	0
FR_FR3	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.893526087	0.081229644	57.08751518	0.102903906	0
FR_FR3	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	1	0.001422897	0.001422897			0
FR_FR3	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.00270358	0.00270358	3.24378E+33	1.11778E-17	1
FR_FR3	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.012869043	0.001169913	1.40367E+33	2.08186E-17	0
FR_FR3	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	1	8.33467E-37	8.33467E-37			0
FR_FR3	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.89327E-29	1.89327E-29	4.55736E+32	2.98211E-17	1
FR_FR3	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	2.20881E-29	2.00801E-30	4.83357E+31	1.12189E-16	0
FR_FR3	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	1	4.1543E-62	4.1543E-62			0
FR_FR3	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.029500717	0.029500717	1.70019E+32	4.88237E-17	1
FR_FR3	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.034417504	0.003128864	1.80324E+31	1.83678E-16	0
FR_FR3	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	1	1.73514E-34	1.73514E-34			0
FR_FR3	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.483790117	0.483790117	1048.977095	0.019649847	1
FR_FR3	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.394722521	0.126792956	274.9186113	0.047010407	0
FR_FR3	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	1	0.000461202	0.000461202			0
FR_FR3	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.823633738	0.823633738	3.07133E+63	1.14873E-32	1
FR_FR3	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	3.32801E-31	3.02546E-32	1.12819E+32	7.3433E-17	0
FR_FR3	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	1	2.68169E-64	2.68169E-64			0
FR_FR3	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.638905177	0.638905177	5.784475423	0.250853008	0
FR_FR3	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	2.125583698	0.193234882	1.749496581	0.53449044	0
FR_FR3	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	1	0.110451706	0.110451706			0
FR_FR3	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.21032835	0.21032835	0.129016724	0.730044137	0
FR_FR3	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	4.836949187	0.439722653	0.269728623	0.973845261	0
FR_FR3	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	8	3.331817091	0.416477136	0.255469678	0.962690498	0
FR_FR3	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	7	11.41168682	1.630240975			0
FR_FR3	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.013789274	0.013789274	1.147510735	0.319608848	0
FR_FR3	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.074225723	0.006747793	0.561535352	0.811621612	0
FR_FR3	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	8	0.048965693	0.006120712	0.509351123	0.817671969	0
FR_FR3	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	7	0.08411679	0.012016684			0
FR_FR3	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.021764986	0.021764986	1.377090843	0.278974953	0
FR_FR3	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.313426347	0.028493304	1.802797753	0.222504008	0
FR_FR3	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	8	0.075733196	0.00946665	0.598963686	0.756194249	0
FR_FR3	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	7	0.110635333	0.015805048			0
FR_FR3	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.001774618	0.001774618	8.100742768	0.024823849	1
FR_FR3	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.005565245	0.000505931	2.309465367	0.137956606	0
FR_FR3	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	8	0.003734905	0.000466863	2.131127497	0.167412244	0
FR_FR3	Field Measured	pH (-)_Field Measured	Residuals	7	0.00153348	0.000219069			0
FR_FR3	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	0.961544127	0.961544127	9.57086E+30	2.05781E-16	1
FR_FR3	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	8.479102442	0.770827495	7.67254E+30	2.81588E-16	0
FR_FR3	Major Ions	Bromide (mg/L)_Major Ions	Residuals	1	1.00466E-31	1.00466E-31			0
FR_FR3	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.132102651	0.132102651	24.59129228	0.126678769	0
FR_FR3	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	0.791667348	0.071969759	13.39737972	0.210243735	0
FR_FR3	Major Ions	Calcium (mg/L)_Major Ions	Residuals	1	0.005371928	0.005371928			0
FR_FR3	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.531876004	0.531876004	78.49774642	0.071551285	0
FR_FR3	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	3.589076895	0.326279718	48.15449911	0.111976885	0
FR_FR3	Major Ions	Chloride (mg/L)_Major Ions	Residuals	1	0.006775685	0.006775685			0
FR_FR3	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.001337638	0.001337638	0.109133132	0.796876341	0
FR_FR3	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.171965121	0.015633193	1.275456901	0.605145177	0
FR_FR3	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	1	0.012256935	0.012256935			0
FR_FR3	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.249389842	0.249389842	126.6485995	0.056421	0
FR_FR3	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	1.375226347	0.125020577	63.48967893	0.097609003	0
FR_FR3	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	1	0.001969148	0.001969148			0
FR_FR3	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.03452724	0.03452724	13.68477422	0.168075138	0
FR_FR3	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	0.521456453	0.047405132	18.78889044	0.178218286	0
FR_FR3	Major Ions	Potassium (mg/L)_Major Ions	Residuals	1	0.002523041	0.002523041			0
FR_FR3	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.024548098	0.024548098	12.56044282	0.175077947	0
FR_FR3	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	1.474589082	0.134053553	68.59073019	0.09392927	0
FR_FR3	Major Ions	Sodium (mg/L)_Major Ions	Residuals	1	0.001954398	0.001954398			0
FR_FR3	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.341619629	0.341619629	54.00547236	0.086099761	0
FR_FR3	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	2.159354746	0.196304977	31.03317876	0.139198252	0
FR_FR3	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	1	0.006325648	0.006325648			0
FR_FR3	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.466001402	0.466001402	11508.92887	0.005934035	1
FR_FR3	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.186207944	0.198746177	4908.473663	0.01113253	0
FR_FR3	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	1	4.04904E-05	4.04904E-05			0
FR_FR3	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	1.23862401	1.23862401	2.224585061	0.376004795	0
FR_FR3	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	3.416914395	0.310628581	0.557893029	0.792361931	0
FR_FR3	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	1	0.556788784	0.556788784			0
FR_FR3	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.321529343	0.321529343	1.280862427	0.460703997	0
FR_FR3	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	9.522891707	0.865717428	3.448720782	0.399028808	0
FR_FR3	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	1	0.251025665	0.251025665			0
FR_FR3	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	1.654811566	1.654811566	7.777683205	0.219181659	0
FR_FR3	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	11.80395797	1.073087088	5.043553957	0.335245885	0
FR_FR3	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	1	0.212764074	0.212764074			0
FR_FR3	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.098350271	0.098350271	5.10664E+32	2.81717E-17	1
FR_FR3	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.497703983	0.227063998	1.17898E+33	2.27159E-17	0
FR_FR3	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	1	1.92593E-34	1.92593E-34			0
FR_FR3	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	5.832608995	5.832608995	1284.145639	0.017760709	1
FR_FR3	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	26.02588049	2.365989136	520.9117623	0.034162493	0
FR_FR3	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	1	0.004542015	0.004542015			0
FR_FR3	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	6.547115564	6.547115564	379.6435286	0.032644592	1
FR_FR3	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	50.89243918	4.62658538	268.2789363	0.047587807	0
FR_FR3	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	1	0.017245429	0.017245429			0
FR_FR3	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.148405221	0.148405221	4.311911254	0.285715147	0
FR_FR3	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	0.246433803	0.022403073	0.650920916	0.75903556	0
FR_FR3	Total Metals	Antimony (mg/L)_Total Metals	Residuals	1	0.034417504	0.034417504			0
FR_FR3	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	2.141351385	2.141351385	73.63765941	0.073854285	0
FR_FR3	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	5.392978739	0.490270794	16.85963081	0.187933092	0
FR_FR3	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	1	0.029079569	0.029079569			0
FR_FR3	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.098309703	0.098309703	18.81641769	0.144241333	0
FR_FR3	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	0.924815909	0.084074174	16.09174594	0.192267068	0
FR_FR3	Total Metals	Barium (mg/L)_Total Metals	Residuals	1	0.005224677	0.005224677			0
FR_FR3	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	5.066236487	5.066236487	2.73644E+34	3.84846E-18	1
FR_FR3	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	1.059991801	0.096362891	5.20488E+32	3.41883E-17	0
FR_FR3	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	1	1.85139E-34	1.85139E-34			0
FR_FR3	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	8.638679192	8.638679192	4.13173E+63	9.90408E-33	1
FR_FR3	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	0.440415263	0.040037751	1.91494E+61	1.7824E-31	0
FR_FR3	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	1	2.09081E-63	2.09081E-63			0
FR_FR3	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.047723933	0.047723933	6.19492E+31	8.08839E-17	1
FR_FR3	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.461386508	0.041944228	5.44467E+31	1.05705E-16	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FR3	Total Metals	Boron (mg/L)_Total Metals	Residuals	1	7.70372E-34	7.70372E-34			0
FR_FR3	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	1.906925217	1.906925217	126.1913559	0.05652259	0
FR_FR3	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	3.940482706	0.358225701	23.70569464	0.158979048	0
FR_FR3	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	1	0.015111378	0.015111378			0
FR_FR3	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.013010947	0.013010947	1.883651094	0.400863851	0
FR_FR3	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	0.657707783	0.059791617	8.656291374	0.259656692	0
FR_FR3	Total Metals	Calcium (mg/L)_Total Metals	Residuals	1	0.006907302	0.006907302			0
FR_FR3	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	1.489611816	1.489611816	12.28378219	0.176939645	0
FR_FR3	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	13.70193071	1.245630064	10.27183608	0.239136585	0
FR_FR3	Total Metals	Chromium (mg/L)_Total Metals	Residuals	1	0.121266544	0.121266544			0
FR_FR3	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	3.10188356	3.10188356	1.31477E+33	1.75572E-17	1
FR_FR3	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	5.768995139	0.524454104	2.22296E+32	5.2314E-17	0
FR_FR3	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	1	2.35926E-33	2.35926E-33			0
FR_FR3	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	1.371742719	1.371742719	2.76636E+33	1.21039E-17	1
FR_FR3	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	3.967662451	0.360696586	7.27408E+32	2.89197E-17	0
FR_FR3	Total Metals	Copper (mg/L)_Total Metals	Residuals	1	4.95866E-34	4.95866E-34			0
FR_FR3	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	5.911371145	5.911371145	11729.14553	0.005878068	1
FR_FR3	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	23.05217291	2.095652083	4158.12299	0.012095269	0
FR_FR3	Total Metals	Iron (mg/L)_Total Metals	Residuals	1	0.00050399	0.00050399			0
FR_FR3	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	3.866046844	3.866046844	1.64316E+32	4.96638E-17	1
FR_FR3	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	15.12244267	1.374767516	5.84308E+31	1.02038E-16	0
FR_FR3	Total Metals	Lead (mg/L)_Total Metals	Residuals	1	2.35281E-32	2.35281E-32			0
FR_FR3	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.383406321	0.383406321	221.4810403	0.042712943	1
FR_FR3	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	1.982179999	0.180198182	104.0944778	0.076315282	0
FR_FR3	Total Metals	Lithium (mg/L)_Total Metals	Residuals	1	0.001731102	0.001731102			0
FR_FR3	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.078751903	0.078751903	14.55575103	0.163192977	0
FR_FR3	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	1.041135661	0.094648696	17.49396277	0.184565725	0
FR_FR3	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	1	0.005410363	0.005410363			0
FR_FR3	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	3.257382951	3.257382951	633.5063127	0.025279955	1
FR_FR3	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	8.683468428	0.789406221	153.5262607	0.062874981	0
FR_FR3	Total Metals	Manganese (mg/L)_Total Metals	Residuals	1	0.005141832	0.005141832			0
FR_FR3	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	11.96673142	11.96673142	2.98981E+62	3.68178E-32	1
FR_FR3	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	6.431348312	0.584668028	1.46076E+61	2.04077E-31	0
FR_FR3	Total Metals	Mercury (mg/L)_Total Metals	Residuals	1	4.0025E-62	4.0025E-62			0
FR_FR3	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.02413344	0.02413344	0.926391857	0.5121657	0
FR_FR3	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	0.166965983	0.015178726	0.582654108	0.783130205	0
FR_FR3	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	1	0.026051006	0.026051006			0
FR_FR3	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.776838189	0.776838189	4.236442564	0.287918339	0
FR_FR3	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	1.840107066	0.167282461	0.912265317	0.682431501	0
FR_FR3	Total Metals	Nickel (mg/L)_Total Metals	Residuals	1	0.183370405	0.183370405			0
FR_FR3	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.071332159	0.071332159	10.28371132	0.19243682	0
FR_FR3	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	0.31727336	0.028843033	4.158200551	0.366511368	0
FR_FR3	Total Metals	Potassium (mg/L)_Total Metals	Residuals	1	0.006936422	0.006936422			0
FR_FR3	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.922900123	0.922900123	30.44220969	0.001490459	1
FR_FR3	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	2.499860419	0.227260038	7.496258329	0.011041817	0
FR_FR3	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	8	0.264315432	0.033039429	1.089818063	0.471537762	0
FR_FR3	Total Metals	Selenium (mg/L)_Total Metals	Residuals	6	0.181898778	0.030316463			0
FR_FR3	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.377690569	0.377690569	6.40353E+32	2.51577E-17	1
FR_FR3	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.905453017	0.082313911	1.39559E+32	6.60245E-17	0
FR_FR3	Total Metals	Silicon (mg/L)_Total Metals	Residuals	1	5.89816E-34	5.89816E-34			0
FR_FR3	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	1.097063155	1.097063155	1.33326E+33	1.7435E-17	1
FR_FR3	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	3.073758026	0.279432548	3.39594E+32	4.23256E-17	0
FR_FR3	Total Metals	Silver (mg/L)_Total Metals	Residuals	1	8.22844E-34	8.22844E-34			0
FR_FR3	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.066289199	0.066289199	196.4922325	0.045339038	1
FR_FR3	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	1.292880867	0.117534624	348.3922147	0.041765953	0
FR_FR3	Total Metals	Sodium (mg/L)_Total Metals	Residuals	1	0.000337363	0.000337363			0
FR_FR3	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.038333503	0.038333503	8.325147255	0.212392393	0
FR_FR3	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	0.916907481	0.083355226	18.10282065	0.181498126	0
FR_FR3	Total Metals	Strontium (mg/L)_Total Metals	Residuals	1	0.004604544	0.004604544			0
FR_FR3	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	1.453975328	1.453975328	5.48582E+32	2.71806E-17	1
FR_FR3	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	4.406012963	0.400546633	1.51126E+32	6.34475E-17	0
FR_FR3	Total Metals	Thallium (mg/L)_Total Metals	Residuals	1	2.65042E-33	2.65042E-33			0
FR_FR3	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.005719679	0.005719679	1.68689E+60	4.90158E-31	1
FR_FR3	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.440415263	0.040037751	1.18083E+61	2.26981E-31	0
FR_FR3	Total Metals	Tin (mg/L)_Total Metals	Residuals	1	3.39066E-63	3.39066E-63			0
FR_FR3	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	1.381002115	1.381002115	1.86481E+33	1.47422E-17	1
FR_FR3	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.629602216	0.057236565	7.72884E+31	8.87209E-17	0
FR_FR3	Total Metals	Titanium (mg/L)_Total Metals	Residuals	1	7.40558E-34	7.40558E-34			0
FR_FR3	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.191821072	0.191821072	61.48930026	0.080749988	0
FR_FR3	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	1.135193776	0.103199434	33.0811466	0.134869323	0
FR_FR3	Total Metals	Uranium (mg/L)_Total Metals	Residuals	1	0.003119585	0.003119585			0
FR_FR3	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	3.530630123	3.530630123	4.07321E+35	9.97497E-19	1
FR_FR3	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	7.105697095	0.645972463	7.45244E+34	2.85716E-18	0
FR_FR3	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	1	8.66793E-36	8.66793E-36			0
FR_FR3	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	1.122377761	1.122377761	2.33109E+32	4.16966E-17	1
FR_FR3	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	5.799387983	0.527217089	1.09499E+32	7.45382E-17	0
FR_FR3	Total Metals	Zinc (mg/L)_Total Metals	Residuals	1	4.81482E-33	4.81482E-33			0
FR_FR4	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.019379095	0.019379095	0.207979418	0.650254716	0
FR_FR4	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.155411797	0.105037436	1.127277849	0.3600409	0
FR_FR4	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.808921048	0.080892105	0.868146456	0.567819641	0
FR_FR4	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	52	4.845253263	0.093177947			0
FR_FR4	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.012805222	0.012805222	1.683040524	0.200247226	0
FR_FR4	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.297847838	0.117986167	15.50738422	8.44957E-13	0
FR_FR4	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.081206137	0.008120614	1.067324079	0.403634869	0
FR_FR4	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	52	0.395636079	0.007608386			0
FR_FR4	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.338793549	1.338793549	1.847899966	0.179894018	0
FR_FR4	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	15.85824186	1.441658351	1.989881426	0.048555879	0
FR_FR4	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	8.985446839	0.898544684	1.240236549	0.288536405	0
FR_FR4	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	52	37.67371927	0.724494601			0
FR_FR4	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.065787469	0.065787469	3.261160105	0.07672849	0
FR_FR4	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	4.557204882	0.414291353	20.53689648	3.387E-15	0
FR_FR4	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.166003116	0.016600312	0.822896445	0.608406969	0
FR_FR4	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	52	1.048997368	0.020173026			0
FR_FR4	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.083197389	0.083197389	0.657745864	0.421053475	0
FR_FR4	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	5.859178134	0.532652558	4.211069849	0.000183808	0
FR_FR4	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	1.613858405	0.161385841	1.275891831	0.268274911	0
FR_FR4	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	52	6.577410014	0.126488654			0
FR_FR4	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.133584554	0.133584554	5.66364338	0.021022468	1
FR_FR4	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	5.859753651	0.532704877	22.58532407	4.80198E-16	0
FR_FR4	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.13596496	0.013596496	0.576456651	0.825556705	0
FR_FR4	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	52	1.226489093	0.023586329			0
FR_FR4	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0	0	-	-	-
FR_FR4	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0	0	-	-	0
FR_FR4	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0	0	-	-	0
FR_FR4	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	52	0	0			0
FR_FR4	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.073946324	0.073946324	2.180065563	0.145839158	0
FR_FR4	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.28489879	0.02589989	0.763573562	0.673557218	0
FR_FR4	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.350813827	0.035081383	1.034259847	0.428771056	0
FR_FR4	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	52	1.763804234	0.033919312			0
FR_FR4	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000211475	0.000211475	3.720936486	0.059200331	0
FR_FR4	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.002007264	0.000182479	3.210739727	0.00215948	0
FR_FR4	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.00146186	0.000146186	2.572166654	0.01308719	0
FR_FR4	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	52	0.002955358	5.68338E-05			0
FR_FR4	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.009790476	0.009790476	1.468385114	0.231078342	0
FR_FR4	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.187648403	0.107968037	16.19315191	3.70654E-13	0
FR_FR4	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.072953633	0.007295363	1.094165728	0.383945503	0
FR_FR4	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	52	0.34671063	0.006667512			0
FR_FR4	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.106707547	0.106707547	3.449220792	0.068949196	0
FR_FR4	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	6.315757905	0.57415981	18.55917427	2.59112E-14	0
FR_FR4	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.166867203	0.01668672	0.539382495	0.854119278	0
FR_FR4	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	52	1.608708968	0.030936711			0
FR_FR4	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.017480017	0.017480017	0.09933371	0.753892018	0
FR_FR4	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	6.623832755	0.602166614	3.42193281	0.00126979	0
FR_FR4	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	2.162703431	0.216270343	1.228999691	0.295165601	0
FR_FR4	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	52	9.150578248	0.175972659			0
FR_FR4	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	4.722629853	4.722629853	7.698692742	0.007703846	1
FR_FR4	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	30.41779377	2.76525398	4.507835973	9.63471E-05	0
FR_FR4	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	5.431444275	0.543144428	0.885418123	0.552669275	0
FR_FR4	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	51	31.28506755	0.613432697			0
FR_FR4	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.002582746	0.002582746	0.002625642	0.959329799	0
FR_FR4	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	53.2958533	4.845077572	4.925547049	3.4615E-05	0
FR_FR4	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	11.02180353	1.102180353	1.120485917	0.365278797	0
FR_FR4	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	52	51.1504674	0.983662835			0
FR_FR4	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.083643753	0.083643753	1.105454911	0.297933725	0
FR_FR4	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	2.025081344	0.184098304	2.433085168	0.015723362	0
FR_FR4	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	1.162350248	0.116235025	1.536188594	0.153273277	0
FR_FR4	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	52	3.934556807	0.075664554			0
FR_FR4	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.08891968	0.08891968	1.281840904	0.262750955	0
FR_FR4	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	1.020471541	0.09277014	1.337348047	0.231299834	0
FR_FR4	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.174567447	0.017456745	0.251651484	0.988633614	0
FR_FR4	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	52	3.607174137	0.069368733			0
FR_FR4	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.023141066	0.023141066	10.23322544	0.002350441	1
FR_FR4	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.039215074	0.003565007	1.576483861	0.133702055	0
FR_FR4	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.05263003	0.005263003	2.327355892	0.023736179	0
FR_FR4	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	52	0.117591022	0.002261366			0
FR_FR4	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.087940669	0.087940669	4.553130578	0.037595175	1
FR_FR4	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	3.727964888	0.338905899	17.54686231	7.82854E-14	0
FR_FR4	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.153677351	0.015367735	0.79566491	0.63311237	0
FR_FR4	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	52	1.004345189	0.019314331			0
FR_FR4	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	17.50979688	17.50979688	34.91807621	2.67814E-07	1
FR_FR4	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.51758582	0.137962347	0.275124822	0.987968184	0
FR_FR4	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.347989447	0.034798945	0.069396134	0.99995711	0
FR_FR4	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	52	26.07558997	0.501453653			0
FR_FR4	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	19.87487488	19.87487488	13.42794226	0.000582027	1
FR_FR4	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	1.772564518	0.161142229	0.108871556	0.999822818	0
FR_FR4	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.355437757	0.035543776	0.024014228	0.999999734	0
FR_FR4	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	52	76.96588757	1.480113223			0
FR_FR4	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.050718713	0.050718713	2.351267091	0.131243374	0
FR_FR4	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.595488171	0.054135288	2.509655973	0.012920956	0
FR_FR4	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.103497603	0.01034976	0.479804184	0.895572791	0
FR_FR4	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	52	1.121681625	0.0215708			0
FR_FR4	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.238652914	0.238652914	0.51741339	0.475167553	0
FR_FR4	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	13.12395354	1.193086686	2.586681288	0.010604894	0
FR_FR4	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	3.190105519	0.319010552	0.69163342	0.727440091	0
FR_FR4	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	52	23.98459677	0.461242246			0
FR_FR4	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.071112188	0.071112188	2.11122084	0.152230976	0
FR_FR4	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.266104374	0.024191307	0.718205875	0.715856734	0
FR_FR4	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.106071718	0.010607172	0.314912015	0.973832616	0
FR_FR4	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	52	1.751514423	0.03368297			0
FR_FR4	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.020170939	0.020170939	0.463861969	0.498846448	0
FR_FR4	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	0.998353613	0.090759419	2.087153328	0.037992782	0
FR_FR4	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.222334081	0.022233408	0.511291632	0.874407788	0
FR_FR4	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	52	2.261208961	0.043484788			0
FR_FR4	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.005706459	0.005706459	0.067126028	0.796591096	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FR4	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.361347184	0.032849744	0.386417037	0.955602454	0
FR_FR4	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.328010739	0.032801074	0.385844522	0.947280006	0
FR_FR4	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	52	4.420578092	0.085011117			0
FR_FR4	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.849913967	1.849913967	6.159490518	0.016339376	1
FR_FR4	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	1.073715932	0.097610539	0.325004947	0.976684616	0
FR_FR4	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.31603331	0.031603331	0.105226741	0.999710889	0
FR_FR4	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	52	15.61744855	0.300335549			0
FR_FR4	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.8105E-29	1.8105E-29	0.19095082	0.663935772	0
FR_FR4	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	8.89085E-28	8.08259E-29	0.852459016	0.590298534	0
FR_FR4	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	4.16563E-58	4.16563E-59	4.39343E-31	1	0
FR_FR4	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	52	4.93038E-27	9.4815E-29			0
FR_FR4	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.270403711	0.270403711	3.235615085	0.077858075	0
FR_FR4	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	9.898460175	0.899860016	10.76760608	5.74303E-10	0
FR_FR4	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.280847507	0.028084751	0.336058417	0.967058818	0
FR_FR4	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	52	4.345693971	0.083571038			0
FR_FR4	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.104130689	0.104130689	0.249937996	0.619227824	0
FR_FR4	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	25.70653493	2.336957721	5.609244815	7.54652E-06	0
FR_FR4	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	5.593684379	0.559368438	1.342615008	0.233449147	0
FR_FR4	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	52	21.66455655	0.416626087			0
FR_FR4	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.834326599	1.834326599	13.90168117	0.000476794	1
FR_FR4	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.149278886	0.013570808	0.102848121	0.999866117	0
FR_FR4	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.028220878	0.002822088	0.021387557	0.999999849	0
FR_FR4	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	52	6.861399132	0.131949983			0
FR_FR4	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.030070022	0.030070022	0.712867088	0.402361384	0
FR_FR4	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	1.239892704	0.112717519	2.672183295	0.008517238	0
FR_FR4	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.111176589	0.011117659	0.263565263	0.986436751	0
FR_FR4	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	52	2.193453936	0.042181806			0
FR_FR4	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.004058982	0.004058982	0.032482177	0.857674023	0
FR_FR4	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	3.734956699	0.339541518	2.71719527	0.007589377	0
FR_FR4	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	1.021325818	0.102132582	0.817320279	0.613453284	0
FR_FR4	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	52	6.497935255	0.124960293			0
FR_FR4	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.322220442	0.322220442	4.21064902	0.045221481	1
FR_FR4	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	10.51159339	0.955599399	12.48739416	4.46721E-11	0
FR_FR4	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.936660262	0.093666026	1.223990503	0.298158702	0
FR_FR4	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	52	3.979306497	0.076525125			0
FR_FR4	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	7.27113E-05	7.27113E-05	0.011986804	0.91323983	0
FR_FR4	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.405878971	0.036898088	6.082828753	2.73967E-06	0
FR_FR4	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.074655392	0.007465539	1.230730343	0.294136941	0
FR_FR4	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	52	0.315429	0.006065942			0
FR_FR4	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.41943E-28	1.41943E-28	0.19095082	0.663935772	0
FR_FR4	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	6.97043E-27	6.33675E-28	0.852459016	0.590298534	0
FR_FR4	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	3.70098E-57	3.70098E-58	4.97879E-31	1	0
FR_FR4	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	52	3.86542E-26	7.4335E-28			0
FR_FR4	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.189974486	0.189974486	10.11122058	0.002483897	1
FR_FR4	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.633699481	0.421245407	22.42040666	5.59029E-16	0
FR_FR4	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.090237371	0.009023737	0.480280266	0.895266036	0
FR_FR4	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	52	0.977001065	0.018788482			0
FR_FR4	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.014702815	0.014702815	1.833473631	0.181573398	0
FR_FR4	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.04549033	0.004135485	0.51570409	0.884009493	0
FR_FR4	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.024639163	0.002463916	0.307255824	0.976051211	0
FR_FR4	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	52	0.416993385	0.008019104			0
FR_FR4	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.2E-06	1.2E-06	0.19095082	0.663935772	0
FR_FR4	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	5.0335E-05	4.57591E-06	0.728143142	0.706648	0
FR_FR4	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	8.5937E-06	8.5937E-07	0.136747462	0.999078429	0
FR_FR4	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	52	0.000326787	6.28436E-06			0
FR_FR4	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.160839524	0.160839524	5.764754046	0.019962485	1
FR_FR4	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.703522334	0.063956576	2.29230926	0.022543194	0
FR_FR4	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.127453178	0.012745318	0.456813231	0.909876305	0
FR_FR4	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	52	1.450826031	0.027900501			0
FR_FR4	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.437342972	0.437342972	9.556790386	0.003198743	1
FR_FR4	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	7.974698374	0.724972579	15.84205401	5.63373E-13	0
FR_FR4	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.231246743	0.023124674	0.505318891	0.878555741	0
FR_FR4	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	52	2.379651913	0.045762537			0
FR_FR4	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.801042446	1.801042446	13.42794226	0.000582027	1
FR_FR4	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.160628127	0.014602557	0.108871556	0.999822818	0
FR_FR4	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.032209435	0.003220943	0.024014228	0.999999734	0
FR_FR4	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	52	6.974576252	0.134126466			0
FR_FR4	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.210848406	4.210848406	71.03059315	2.69881E-11	1
FR_FR4	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	0.450803452	0.040982132	0.691306089	0.740544559	0
FR_FR4	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	1.77602074	0.177602074	2.995876234	0.004674766	0
FR_FR4	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	52	3.082673358	0.05928218			0
FR_FR4	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.503960656	0.503960656	6.820764334	0.012277849	1
FR_FR4	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	4.977604731	0.452509521	6.124408255	5.64524E-06	0
FR_FR4	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	10	0.147005459	0.014700546	0.198961879	0.995348537	0
FR_FR4	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	44	3.250994724	0.073886244			0
FR_FR4	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.037379183	0.037379183	4.174644987	0.047192023	1
FR_FR4	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.086117838	0.007828894	0.874359789	0.571060454	0
FR_FR4	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	10	0.036939966	0.003693997	0.412559159	0.933041508	0
FR_FR4	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	43	0.385015944	0.008953859			0
FR_FR4	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.054781746	0.054781746	5.706324765	0.021363584	1
FR_FR4	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.536943329	0.04881303	5.084595166	4.83398E-05	0
FR_FR4	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	10	0.040568207	0.004056821	0.422577554	0.927782294	0
FR_FR4	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	43	0.412807749	0.00960018			0
FR_FR4	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.0089452	0.0089452	54.14349083	3.42402E-09	1
FR_FR4	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.017254978	0.001568634	9.494627648	1.90935E-08	0
FR_FR4	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	10	0.035033168	0.003503317	21.20487022	1.0858E-13	0
FR_FR4	Field Measured	pH (-)_Field Measured	Residuals	44	0.007269365	0.000165213			0
FR_FR4	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	7.518966469	7.518966469	12.23423499	0.000970016	1
FR_FR4	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	25.41731262	2.310664784	3.759720976	0.000549311	0
FR_FR4	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	6.182095601	0.61820956	1.005899024	0.451078159	0
FR_FR4	Major Ions	Bromide (mg/L)_Major Ions	Residuals	52	31.95837392	0.614584114			0
FR_FR4	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.083826312	0.083826312	4.662252298	0.035467234	1
FR_FR4	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	4.916949259	0.446995387	24.86099201	6.42024E-17	0
FR_FR4	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	0.094082779	0.009408278	0.523269652	0.865910454	0
FR_FR4	Major Ions	Calcium (mg/L)_Major Ions	Residuals	52	0.934949021	0.017979789			0
FR_FR4	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.97162595	0.97162595	7.143020967	0.010028548	1
FR_FR4	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	11.39769222	1.036153838	7.617405227	1.27954E-07	0
FR_FR4	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	1.7604501	0.17604501	1.294215328	0.25831468	0
FR_FR4	Major Ions	Chloride (mg/L)_Major Ions	Residuals	52	7.073274688	0.136024513			0
FR_FR4	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.108529641	0.108529641	3.038296372	0.087232005	0
FR_FR4	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.371905767	0.033809615	0.946503002	0.505094453	0
FR_FR4	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	0.511438484	0.051143848	1.431776309	0.1928814	0
FR_FR4	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	52	1.857469005	0.035720558			0
FR_FR4	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.220328655	0.220328655	6.094876711	0.016880851	1
FR_FR4	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	7.38719749	0.671563408	18.57723033	2.54158E-14	0
FR_FR4	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	0.226571997	0.0226572	0.626758416	0.784124127	0
FR_FR4	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	52	1.879790292	0.036149813			0
FR_FR4	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.028867186	0.028867186	0.651441863	0.423274136	0
FR_FR4	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	1.545029771	0.140457252	3.169679695	0.00239568	0
FR_FR4	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	0.178711458	0.017871146	0.403295717	0.939068478	0
FR_FR4	Major Ions	Potassium (mg/L)_Major Ions	Residuals	52	2.304263459	0.044312759			0
FR_FR4	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.051317077	0.051317077	0.75795438	0.387970946	0
FR_FR4	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	5.424615052	0.493146823	7.283789675	2.42435E-07	0
FR_FR4	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	0.282917142	0.028291714	0.417869255	0.931709946	0
FR_FR4	Major Ions	Sodium (mg/L)_Major Ions	Residuals	52	3.520644601	0.067704704			0
FR_FR4	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.161847651	0.161847651	3.09699052	0.084318768	0
FR_FR4	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	13.45829744	1.223481586	23.41159021	2.27153E-16	0
FR_FR4	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	0.372604492	0.037260449	0.71298692	0.708265145	0
FR_FR4	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	52	2.717501968	0.052259653			0
FR_FR4	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.13104837	0.13104837	1.485171716	0.228467131	0
FR_FR4	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	9.328445624	0.848040511	9.610846618	3.70451E-09	0
FR_FR4	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	10	0.421919866	0.042191987	0.478161959	0.896627701	0
FR_FR4	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	52	4.588368573	0.088237857			0
FR_FR4	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	1.599484749	1.599484749	3.558112066	0.064845158	0
FR_FR4	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	7.014522288	0.637683844	1.418550932	0.192864136	0
FR_FR4	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	10	2.714368193	0.271436819	0.603821088	0.803353303	0
FR_FR4	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	52	23.37565693	0.449531864			0
FR_FR4	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.278116483	0.278116483	0.335445552	0.564970684	0
FR_FR4	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	6.069581154	0.551780105	0.665520361	0.763781067	0
FR_FR4	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	10	4.637247575	0.463724758	0.559313874	0.838998352	0
FR_FR4	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	52	43.11297916	0.829095753			0
FR_FR4	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	1.549608566	1.549608566	1.650856956	0.204536327	0
FR_FR4	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	8.480547125	0.77095883	0.82133177	0.619333706	0
FR_FR4	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	10	6.628703868	0.662870387	0.70618104	0.71439598	0
FR_FR4	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	52	48.81079803	0.938669193			0
FR_FR4	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.339898051	0.339898051	3.56592941	0.065735039	0
FR_FR4	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.696304279	0.245118571	2.571581442	0.013316171	0
FR_FR4	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	10	1.632673367	0.163267337	1.712865948	0.108781296	0
FR_FR4	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	43	4.098683546	0.095318222			0
FR_FR4	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	5.454444071	5.454444071	2.474903444	0.12174189	0
FR_FR4	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	44.44924993	4.040840903	1.833494108	0.071713026	0
FR_FR4	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	10	7.445442475	0.744544248	0.337830052	0.966447704	0
FR_FR4	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	52	114.6028919	2.203901766			0
FR_FR4	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	3.381168327	3.381168327	2.689342331	0.107057922	0
FR_FR4	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	87.65599282	7.96872662	6.338233343	1.60827E-06	0
FR_FR4	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	12.11976116	1.211976116	0.963991839	0.485224066	0
FR_FR4	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	52	65.37685848	1.257247278			0
FR_FR4	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.078813634	0.078813634	1.172646837	0.283853974	0
FR_FR4	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	0.785262109	0.071387464	1.062154866	0.408874631	0
FR_FR4	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.245069542	0.024506954	0.364632375	0.956369209	0
FR_FR4	Total Metals	Antimony (mg/L)_Total Metals	Residuals	52	3.494921756	0.067210034			0
FR_FR4	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.058211262	0.058211262	0.530039437	0.469856069	0
FR_FR4	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	2.644125023	0.240375002	2.188721339	0.029359129	0
FR_FR4	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.829414837	0.082941484	0.75521911	0.669952275	0
FR_FR4	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	52	5.710868665	0.109824397			0
FR_FR4	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.008062727	0.008062727	0.409680196	0.524942177	0
FR_FR4	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	3.333468793	0.303042618	15.39808482	9.65863E-13	0
FR_FR4	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.089941307	0.008994131	0.457006308	0.909760431	0
FR_FR4	Total Metals	Barium (mg/L)_Total Metals	Residuals	52	1.023388057	0.01968054			0
FR_FR4	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	15.25412257	15.25412257	29.50942196	1.49264E-06	1
FR_FR4	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	1.78361697	0.162146997	0.313676787	0.979682472	0
FR_FR4	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.646853958	0.064685396	0.125135263	0.999374991	0
FR_FR4	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	52	26.88003767	0.516923801			0
FR_FR4	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	19.87487488	19.87487488	13.42794226	0.000582027	1
FR_FR4	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	1.772564518	0.161142229	0.108871556	0.999822818	0
FR_FR4	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.355437757	0.035543776	0.024014228	0.999999734	0
FR_FR4	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	52	76.96588757	1.480113223			0
FR_FR4	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.07130679	0.07130679	2.84911514	0.097414041	0
FR_FR4	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.496944674	0.045176789	1.805071761	0.076923066	0
FR_FR4	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.046825162	0.004682516	0.187093373	0.99651706	0
FR_FR4	Total Metals	Boron (mg/L)_Total Metals	Residuals	52	1.301440228	0.025027697			0
FR_FR4	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.648020554	0.648020554	3.309421323	0.074643581	0
FR_FR4	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	3.120044538	0.283640413	1.448542988	0.180121685	0
FR_FR4	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	1.836234859	0.183623486	0.937759576	0.507260388	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FR4	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	52	10.18216344	0.195810835			0
FR_FR4	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.036532662	0.036532662	1.910142657	0.172855808	0
FR_FR4	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	4.612059517	0.419278138	21.92232972	8.89533E-16	0
FR_FR4	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.098423004	0.0098423	0.514613414	0.872074926	0
FR_FR4	Total Metals	Calcium (mg/L)_Total Metals	Residuals	52	0.994532217	0.01912562			0
FR_FR4	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.063198724	0.063198724	0.143477606	0.706390201	0
FR_FR4	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	8.934946805	0.812267891	1.844060201	0.069862956	0
FR_FR4	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	3.068946615	0.306894661	0.696731013	0.722879559	0
FR_FR4	Total Metals	Chromium (mg/L)_Total Metals	Residuals	52	22.90485438	0.440477969			0
FR_FR4	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.058487178	0.058487178	0.243614616	0.623685847	0
FR_FR4	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	3.892214663	0.353837697	1.473827905	0.169954881	0
FR_FR4	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.785880965	0.078588097	0.327340277	0.969967428	0
FR_FR4	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	52	12.48419857	0.240080742			0
FR_FR4	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.07678504	0.07678504	0.41460592	0.522470944	0
FR_FR4	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	2.910130496	0.264557318	1.428494789	0.188555617	0
FR_FR4	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.337834048	0.033783405	0.182415736	0.996863165	0
FR_FR4	Total Metals	Copper (mg/L)_Total Metals	Residuals	52	9.630403015	0.185200058			0
FR_FR4	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	0.80867313	0.80867313	1.256333071	0.267496189	0
FR_FR4	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	34.47804563	3.134367785	4.869470447	3.93481E-05	0
FR_FR4	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	6.112462229	0.611246223	0.949615879	0.497240987	0
FR_FR4	Total Metals	Iron (mg/L)_Total Metals	Residuals	52	33.47122168	0.64367734			0
FR_FR4	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.167315817	0.167315817	0.359761028	0.551243821	0
FR_FR4	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	9.490761158	0.862796469	1.855177536	0.067965398	0
FR_FR4	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	1.889310562	0.188931056	0.40623793	0.937619376	0
FR_FR4	Total Metals	Lead (mg/L)_Total Metals	Residuals	52	24.18389373	0.465074879			0
FR_FR4	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.316740413	0.316740413	3.738386774	0.058628074	0
FR_FR4	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	9.648570214	0.877142747	10.35263803	1.10467E-09	0
FR_FR4	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.274052408	0.027405241	0.323455378	0.97121097	0
FR_FR4	Total Metals	Lithium (mg/L)_Total Metals	Residuals	52	4.405777803	0.084726496			0
FR_FR4	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.07190093	0.07190093	2.131456224	0.150319116	0
FR_FR4	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	7.164413566	0.651310324	19.30767024	1.17751E-14	0
FR_FR4	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.227805366	0.022780537	0.675314167	0.741954321	0
FR_FR4	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	52	1.754128615	0.033733243			0
FR_FR4	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	0.104185183	0.104185183	0.451008433	0.504829139	0
FR_FR4	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	7.219769385	0.656342671	2.84124931	0.005524949	0
FR_FR4	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	1.507098321	0.150709832	0.652409519	0.762061748	0
FR_FR4	Total Metals	Manganese (mg/L)_Total Metals	Residuals	52	12.0122577	0.231004956			0
FR_FR4	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	43.64044706	43.64044706	33.21860192	4.53738E-07	1
FR_FR4	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	4.722458398	0.4293144	0.32678914	0.976188016	0
FR_FR4	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	3.879520252	0.387952025	0.29530458	0.979271156	0
FR_FR4	Total Metals	Mercury (mg/L)_Total Metals	Residuals	52	68.31423107	1.313735213			0
FR_FR4	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.038941875	0.038941875	1.053305615	0.309497627	0
FR_FR4	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	1.106156958	0.100559723	2.719954342	0.007535924	0
FR_FR4	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.12309035	0.012309035	0.332936607	0.968119157	0
FR_FR4	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	52	1.922497572	0.036971107			0
FR_FR4	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.034652659	0.034652659	0.230421547	0.633224534	0
FR_FR4	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	2.905192107	0.264108373	1.75617863	0.086731682	0
FR_FR4	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	1.247468506	0.124746851	0.829499461	0.60244184	0
FR_FR4	Total Metals	Nickel (mg/L)_Total Metals	Residuals	52	7.820181375	0.150388103			0
FR_FR4	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.001897042	0.001897042	0.042217543	0.838007908	0
FR_FR4	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	1.356920605	0.123356419	2.745224064	0.007063637	0
FR_FR4	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.07975398	0.007975398	0.177487761	0.997200544	0
FR_FR4	Total Metals	Potassium (mg/L)_Total Metals	Residuals	52	2.336615744	0.044934918			0
FR_FR4	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.102849578	0.102849578	1.524794601	0.222446113	0
FR_FR4	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	10.28215888	0.934741717	13.85799676	6.8554E-12	0
FR_FR4	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.951005719	0.095100572	1.409911844	0.202225115	0
FR_FR4	Total Metals	Selenium (mg/L)_Total Metals	Residuals	52	3.507474429	0.067451431			0
FR_FR4	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.033093828	0.033093828	1.262805676	0.266382511	0
FR_FR4	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.344297536	0.031299776	1.194347634	0.314670292	0
FR_FR4	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.269366339	0.026936634	1.027857355	0.434055859	0
FR_FR4	Total Metals	Silicon (mg/L)_Total Metals	Residuals	51	1.336535974	0.026206588			0
FR_FR4	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.097808521	0.097808521	3.031033868	0.087600202	0
FR_FR4	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	0.245134562	0.02228496	0.690599025	0.741187903	0
FR_FR4	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.323351768	0.032335177	1.002049876	0.454156912	0
FR_FR4	Total Metals	Silver (mg/L)_Total Metals	Residuals	52	1.677989521	0.032269029			0
FR_FR4	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.108913499	0.108913499	1.600491835	0.211473528	0
FR_FR4	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	5.362569738	0.48750634	7.163941299	3.06078E-07	0
FR_FR4	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.214795404	0.02147954	0.315643416	0.973614227	0
FR_FR4	Total Metals	Sodium (mg/L)_Total Metals	Residuals	52	3.538600975	0.068050019			0
FR_FR4	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.12394897	0.12394897	6.768867343	0.012054063	1
FR_FR4	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	4.463606552	0.405782414	22.15982368	7.12079E-16	0
FR_FR4	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.087789036	0.008778904	0.479416922	0.895822007	0
FR_FR4	Total Metals	Strontium (mg/L)_Total Metals	Residuals	52	0.952204576	0.018311626			0
FR_FR4	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.002928477	0.002928477	0.025799826	0.873012529	0
FR_FR4	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	1.363148977	0.123922634	1.091755924	0.386166125	0
FR_FR4	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.8533861	0.08533861	0.751831443	0.673036745	0
FR_FR4	Total Metals	Thallium (mg/L)_Total Metals	Residuals	52	5.902397084	0.113507636			0
FR_FR4	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.010781382	0.010781382	0.456635217	0.502195009	0
FR_FR4	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.325364309	0.029578574	1.252772492	0.277867844	0
FR_FR4	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.056064956	0.005606496	0.237457815	0.990923583	0
FR_FR4	Total Metals	Tin (mg/L)_Total Metals	Residuals	52	1.227745529	0.023610491			0
FR_FR4	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.028532572	0.028532572	0.375349687	0.542772739	0
FR_FR4	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	1.16385021	0.105804565	1.391872761	0.204843661	0
FR_FR4	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.880375795	0.088037579	1.15814577	0.339691721	0
FR_FR4	Total Metals	Titanium (mg/L)_Total Metals	Residuals	52	3.952830683	0.076015975			0
FR_FR4	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.392999841	0.392999841	8.411737513	0.005451585	1
FR_FR4	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	7.459699295	0.678154481	14.51516489	2.91842E-12	0
FR_FR4	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.339916443	0.033991644	0.727554466	0.695093345	0
FR_FR4	Total Metals	Uranium (mg/L)_Total Metals	Residuals	52	2.429461416	0.046720412			0
FR_FR4	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	0.486872266	0.486872266	2.000793625	0.163177001	0
FR_FR4	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	1.852989728	0.168453612	0.692257366	0.739678513	0
FR_FR4	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	3.010485597	0.30104856	1.237154139	0.290343182	0
FR_FR4	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	52	12.65365778	0.243339573			0
FR_FR4	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.001671484	0.001671484	0.012528053	0.911310822	0
FR_FR4	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	2.588281822	0.235298347	1.763600083	0.085170629	0
FR_FR4	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	1.074215056	0.107421506	0.805141976	0.624498525	0
FR_FR4	Total Metals	Zinc (mg/L)_Total Metals	Residuals	52	6.937805334	0.133419333			0
FR_FR5	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.015983652	0.015983652	0.073546143	0.78725716	0
FR_FR5	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.154408521	0.19585532	0.901196002	0.545171929	0
FR_FR5	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.525136205	0.05251362	0.241632777	0.990383014	0
FR_FR5	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	55	11.95305192	0.217328217			0
FR_FR5	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.000156954	0.000156954	0.04602185	0.830944161	0
FR_FR5	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.681039385	0.061912671	18.15390837	2.08779E-14	0
FR_FR5	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.409708149	0.040970815	12.01337953	1.41915E-10	0
FR_FR5	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	54	0.184163332	0.003410432			0
FR_FR5	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.083255588	0.083255588	0.079658391	0.77883983	0
FR_FR5	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	10.27606935	0.934188122	0.893824958	0.552009998	0
FR_FR5	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	7.75270316	0.775270316	0.741773462	0.682287864	0
FR_FR5	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	54	56.43852092	1.045157795			0
FR_FR5	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.050790189	0.050790189	5.279320287	0.025408797	1
FR_FR5	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	1.803080314	0.163916392	17.03807654	5.55339E-14	0
FR_FR5	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.488417986	0.048841799	5.076797332	3.23922E-05	0
FR_FR5	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	55	0.52913259	0.009620593			0
FR_FR5	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.004974873	0.004974873	0.0593997	0.808354078	0
FR_FR5	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	5.395995159	0.490545014	5.857079046	3.44033E-06	0
FR_FR5	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.595611876	0.059561188	0.711157129	0.710147464	0
FR_FR5	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	55	4.606387516	0.0837525			0
FR_FR5	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.085496315	0.085496315	9.90657498	0.002659363	1
FR_FR5	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.37133216	0.215575651	24.97904547	1.61854E-17	0
FR_FR5	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.497296883	0.049729688	5.762246986	7.29603E-06	0
FR_FR5	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	55	0.474664287	0.00863026			0
FR_FR5	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0	0	-	-	-
FR_FR5	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0	0	-	-	0
FR_FR5	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0	0	-	-	0
FR_FR5	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	54	0	0			0
FR_FR5	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.094453462	0.094453462	2.242431799	0.139987101	0
FR_FR5	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.170016277	0.015456025	0.366943481	0.963494314	0
FR_FR5	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.299227602	0.02992276	0.710400098	0.710831654	0
FR_FR5	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	55	2.316654818	0.042120997			0
FR_FR5	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.001783442	0.001783442	21.35462854	2.34756E-05	1
FR_FR5	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.009345277	0.000849571	10.17261207	8.67436E-10	0
FR_FR5	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.029110685	0.002911068	34.85663099	3.01667E-20	0
FR_FR5	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	55	0.004593352	8.35155E-05			0
FR_FR5	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	3.49246E-05	3.49246E-05	0.009823779	0.921407353	0
FR_FR5	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.621107331	0.056464303	15.88256841	2.27657E-13	0
FR_FR5	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.405132642	0.040513264	11.39577852	2.94348E-10	0
FR_FR5	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	55	0.195531137	0.003555112			0
FR_FR5	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.07508389	0.07508389	6.067200561	0.01692948	1
FR_FR5	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	2.514224547	0.228565868	18.46940762	1.06194E-14	0
FR_FR5	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.523033483	0.052303348	4.226404707	0.00022534	0
FR_FR5	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	55	0.680645692	0.012375376			0
FR_FR5	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.200834429	0.200834429	1.561857086	0.216685479	0
FR_FR5	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	8.763583426	0.796689402	6.195725492	1.64509E-06	0
FR_FR5	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	0.549916994	0.054991699	0.427661611	0.926903823	0
FR_FR5	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	55	7.07228188	0.128586943			0
FR_FR5	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	4.626087644	4.626087644	7.545564001	0.008116354	1
FR_FR5	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	25.95040684	2.359127895	3.847949259	0.000391281	0
FR_FR5	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	2.838778008	0.283877801	0.463030163	0.906539625	0
FR_FR5	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	55	33.71978826	0.613087059			0
FR_FR5	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	1.086008463	1.086008463	2.012675549	0.161632082	0
FR_FR5	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	63.80246561	5.800224146	10.74942757	3.35435E-10	0
FR_FR5	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	10	3.756884164	0.375688416	0.696255062	0.723574857	0
FR_FR5	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	55	29.67714568	0.539584467			0
FR_FR5	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.009256286	0.009256286	0.062024313	0.804252276	0
FR_FR5	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.97052006	0.088229096	0.591203531	0.827774286	0
FR_FR5	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.27620927	0.027620927	0.185081682	0.996708235	0
FR_FR5	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	55	8.208002907	0.149236416			0
FR_FR5	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.00054744	0.00054744	0.00660407	0.935525873	0
FR_FR5	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	2.176449455	0.197859041	2.386883019	0.016933082	0
FR_FR5	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.973779672	0.097377967	1.174724262	0.327540032	0
FR_FR5	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	55	4.559187522	0.082894319			0
FR_FR5	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.073671957	0.073671957	1.236343076	0.271013785	0
FR_FR5	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.7682639	0.069842173	1.172072656	0.327494834	0
FR_FR5	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.947281532	0.094728153	1.589702522	0.13422344	0
FR_FR5	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	55	3.27737319	0.059588603			0
FR_FR5	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.01229853	0.01229853	0.855582573	0.359018601	0
FR_FR5	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.417450198	0.401586382	27.9375097	1.31361E-18	0
FR_FR5	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.329702388	0.032970239	2.293669331	0.024853452	0
FR_FR5	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	55	0.790594839	0.014374452			0
FR_FR5	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	16.68597476	16.68597476	32.95773463	4.20202E-07	1
FR_FR5	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.521032417	0.138275674	0.273118775	0.988452803	0
FR_FR5	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	1.137148652	0.113714865	0.224606857	0.992784076	0
FR_FR5	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	55	27.84562174	0.506284032			0
FR_FR5	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	19.09157873	19.09157873	13.93511333	0.000450414	1

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FR5	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	4.154357614	0.377668874	0.275663874	0.98800572	0
FR_FR5	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	2.097827167	0.209782717	0.153122273	0.998518345	0
FR_FR5	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	55	75.35186869	1.370033976			0
FR_FR5	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.004308623	0.004308623	0.061732013	0.804704468	0
FR_FR5	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.762988438	0.069362585	0.993795998	0.463636398	0
FR_FR5	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.988905781	0.098890578	1.416859829	0.19752227	0
FR_FR5	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	55	3.838757854	0.069795597			0
FR_FR5	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.06811374	0.06811374	0.860126916	0.357755327	0
FR_FR5	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	3.422236857	0.311112442	3.928666768	0.000319775	0
FR_FR5	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	1.356683571	0.135668357	1.71319335	0.100905803	0
FR_FR5	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	55	4.355468482	0.079190336			0
FR_FR5	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.110979036	0.110979036	0.968496301	0.329365027	0
FR_FR5	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.869560172	0.079050925	0.689864779	0.742225311	0
FR_FR5	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	1.009909295	0.100990929	0.881331693	0.555824778	0
FR_FR5	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	55	6.30239576	0.114589014			0
FR_FR5	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.287595983	0.287595983	4.301006388	0.042784862	1
FR_FR5	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	0.747290595	0.067935509	1.01597753	0.445078155	0
FR_FR5	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	1.095966685	0.109596669	1.639021402	0.119864448	0
FR_FR5	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	55	3.677692531	0.066867137			0
FR_FR5	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.196987845	0.196987845	1.891720909	0.174584275	0
FR_FR5	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.770808813	0.070073528	0.672932684	0.757559144	0
FR_FR5	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.226780511	0.022678051	0.217782693	0.993618265	0
FR_FR5	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	55	5.727235662	0.104131557			0
FR_FR5	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.878327642	1.878327642	5.596090372	0.021553046	1
FR_FR5	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	1.580228475	0.143657134	0.427996845	0.936949046	0
FR_FR5	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.941105258	0.094110526	0.28038293	0.983037239	0
FR_FR5	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	55	18.46074911	0.335649984			0
FR_FR5	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.067948477	0.067948477	1.151515439	0.287917908	0
FR_FR5	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.787073359	0.071552124	1.212586047	0.300954821	0
FR_FR5	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.948391646	0.094839165	1.607228997	0.128950492	0
FR_FR5	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	55	3.245433018	0.059007873			0
FR_FR5	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.878720429	0.878720429	17.7284584	9.51206E-05	1
FR_FR5	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.93180102	0.084709184	1.70903417	0.095583955	0
FR_FR5	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.713450208	0.071345021	1.43940802	0.188004126	0
FR_FR5	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	55	2.726104126	0.04956553			0
FR_FR5	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.519150086	0.519150086	2.227002189	0.141331012	0
FR_FR5	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	6.968423708	0.633493064	2.717500159	0.00714177	0
FR_FR5	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	3.689154233	0.368915423	1.58253938	0.136434224	0
FR_FR5	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	55	12.82138602	0.233116109			0
FR_FR5	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.080475405	2.080475405	17.06838413	0.000126179	1
FR_FR5	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.258838224	0.023530748	0.193048107	0.997393254	0
FR_FR5	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.072793544	0.007279354	0.059720397	0.999979014	0
FR_FR5	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	54	6.582091838	0.12189059			0
FR_FR5	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.042287155	0.042287155	2.53271212	0.11724034	0
FR_FR5	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	2.936638721	0.266967156	15.98951159	1.99186E-13	0
FR_FR5	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.400194875	0.040019488	2.396894314	0.019265331	0
FR_FR5	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	55	0.91830157	0.016696392			0
FR_FR5	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.080331198	0.080331198	0.50435884	0.480591591	0
FR_FR5	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	13.7954553	1.2541323	7.874060497	5.38258E-08	0
FR_FR5	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.812097817	0.081209782	0.509875022	0.875859192	0
FR_FR5	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	55	8.760064328	0.159273897			0
FR_FR5	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.80088497	0.80088497	35.93445011	1.6419E-07	1
FR_FR5	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.003291775	0.363935616	16.3292192	1.30847E-13	0
FR_FR5	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.549006908	0.054900691	2.463307725	0.016347673	0
FR_FR5	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	55	1.225806245	0.022287386			0
FR_FR5	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.002067317	0.002067317	0.656983525	0.421120369	0
FR_FR5	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.753883535	0.068534867	21.78005455	3.24751E-16	0
FR_FR5	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.343922061	0.034392206	10.92967945	6.02982E-10	0
FR_FR5	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	55	0.173067412	0.00314668			0
FR_FR5	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.070836622	0.070836622	1.203267163	0.277449247	0
FR_FR5	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.792538834	0.072048985	1.223860978	0.293865623	0
FR_FR5	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.946506935	0.094650693	1.607785182	0.128786285	0
FR_FR5	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	55	3.237862992	0.058870236			0
FR_FR5	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.067398511	0.067398511	7.604061123	0.00788865	1
FR_FR5	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.522750518	0.229340956	25.87479498	7.38473E-18	0
FR_FR5	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.476633585	0.047663358	5.377494056	1.671E-05	0
FR_FR5	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	55	0.487491886	0.008863489			0
FR_FR5	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.070836622	0.070836622	1.203267163	0.277449247	0
FR_FR5	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.792538834	0.072048985	1.223860978	0.293865623	0
FR_FR5	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.946506935	0.094650693	1.607785182	0.128786285	0
FR_FR5	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	55	3.237862992	0.058870236			0
FR_FR5	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.070836622	0.070836622	1.203267163	0.277449247	0
FR_FR5	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.792538834	0.072048985	1.223860978	0.293865623	0
FR_FR5	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.946506935	0.094650693	1.607785182	0.128786285	0
FR_FR5	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	55	3.237862992	0.058870236			0
FR_FR5	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.121463974	0.121463974	4.453944238	0.039382772	1
FR_FR5	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.481394292	0.043763117	1.604743185	0.1232295	0
FR_FR5	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.142957417	0.014295742	0.524208407	0.865700366	0
FR_FR5	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	55	1.49910691	0.027271103			0
FR_FR5	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.397211662	0.397211662	36.47599659	1.38876E-07	1
FR_FR5	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.894344591	0.081304054	7.466161428	1.19394E-07	0
FR_FR5	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	0.491003433	0.049100343	4.50889067	0.000117015	0
FR_FR5	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	55	0.598931994	0.010889673			0
FR_FR5	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.275286581	1.275286581	8.152931834	0.006053073	1
FR_FR5	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.26653473	0.115139521	0.736089189	0.699502764	0
FR_FR5	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	1.170751437	0.117075144	0.748463663	0.676231862	0
FR_FR5	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	55	8.603133619	0.156420611			0
FR_FR5	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.65485542	4.65485542	28.94030675	1.57882E-06	1
FR_FR5	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	1.002508906	0.091137173	0.566620768	0.847266253	0
FR_FR5	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	10	1.495473018	0.149547302	0.929769971	0.513560658	0
FR_FR5	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	55	8.846383361	0.160843334			0
FR_FR5	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.507210936	0.507210936	6.471769333	0.014463763	1
FR_FR5	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	2.162403913	0.196582174	2.508294664	0.014831459	0
FR_FR5	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.186715217	0.016974111	0.216581546	0.995458005	0
FR_FR5	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	45	3.526777756	0.078372839			0
FR_FR5	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.034181582	0.034181582	3.429301176	0.07061684	0
FR_FR5	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.135617098	0.012328827	1.236901837	0.291737031	0
FR_FR5	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.03002254	0.002729322	0.27382193	0.987824182	0
FR_FR5	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	45	0.448537791	0.009967506			0
FR_FR5	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.022981669	0.022981669	1.92634493	0.171992921	0
FR_FR5	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.165919311	0.015083574	1.264319221	0.275613675	0
FR_FR5	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.041531153	0.003775559	0.316470909	0.978385367	0
FR_FR5	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	45	0.536858734	0.011930194			0
FR_FR5	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.005327414	0.005327414	3.230454506	0.078993063	0
FR_FR5	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.016938058	0.001539823	0.933723178	0.517811029	0
FR_FR5	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.005228122	0.000475284	0.288204131	0.985035566	0
FR_FR5	Field Measured	pH (-)_Field Measured	Residuals	45	0.07421049	0.001649122			0
FR_FR5	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	2.213997151	2.213997151	3.390156204	0.070982356	0
FR_FR5	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	23.33973465	2.121794059	3.248971341	0.001795373	0
FR_FR5	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	4.064781989	0.406478199	0.622414797	0.788211628	0
FR_FR5	Major Ions	Bromide (mg/L)_Major Ions	Residuals	55	35.91865271	0.653066413			0
FR_FR5	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.031385527	0.031385527	3.671128308	0.060566048	0
FR_FR5	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	2.394797737	0.217708885	25.46515311	1.05435E-17	0
FR_FR5	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	0.481093801	0.04810938	5.627297797	9.73436E-06	0
FR_FR5	Major Ions	Calcium (mg/L)_Major Ions	Residuals	55	0.470210748	0.008549286			0
FR_FR5	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.001634514	0.001634514	0.025842342	0.872874959	0
FR_FR5	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	5.909259932	0.537205448	8.493438891	1.66962E-08	0
FR_FR5	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	0.600778639	0.060077864	0.949855715	0.496459605	0
FR_FR5	Major Ions	Chloride (mg/L)_Major Ions	Residuals	55	3.478720462	0.063249463			0
FR_FR5	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.711259027	0.711259027	12.2460427	0.000932001	1
FR_FR5	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.261051248	0.023731932	0.408602545	0.946293823	0
FR_FR5	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	0.58057398	0.058057398	0.999598385	0.455361678	0
FR_FR5	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	55	3.194439824	0.058080724			0
FR_FR5	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(new_year)	1	0.470542546	0.470542546	0.561666218	0.495259644	0
FR_FR5	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(Month)	11	3.204477191	0.291316108	0.347731396	0.925626582	0
FR_FR5	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	6	0.78952051	0.131586752	0.157069395	0.976234525	0
FR_FR5	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	Residuals	4	3.35104752	0.83776188			0
FR_FR5	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.207992168	0.207992168	20.73576049	2.96445E-05	1
FR_FR5	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	2.372504769	0.215682252	21.50242267	4.28069E-16	0
FR_FR5	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	0.521705443	0.052170544	5.201137722	2.45986E-05	0
FR_FR5	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	55	0.55168313	0.010030602			0
FR_FR5	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.114594385	0.114594385	2.392580582	0.127647458	0
FR_FR5	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	0.290330173	0.026393652	0.551064868	0.859120515	0
FR_FR5	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	0.391675302	0.03916753	0.817766703	0.612955098	0
FR_FR5	Major Ions	Potassium (mg/L)_Major Ions	Residuals	55	2.634264948	0.047895726			0
FR_FR5	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.157129852	0.157129852	10.41352246	0.00210951	1
FR_FR5	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	1.611846887	0.146531535	9.711136443	1.89856E-09	0
FR_FR5	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	0.334345384	0.033434538	2.21581903	0.030097812	0
FR_FR5	Major Ions	Sodium (mg/L)_Major Ions	Residuals	55	0.829896118	0.01508902			0
FR_FR5	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.33140713	0.33140713	15.45890679	0.000238236	1
FR_FR5	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	4.91283325	0.446621205	20.83321373	8.42702E-16	0
FR_FR5	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	0.583938996	0.0583939	2.723857662	0.00857358	0
FR_FR5	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	55	1.179086749	0.021437941			0
FR_FR5	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(new_year)	1	0.281696148	0.281696148	0.483721752	0.512764238	0
FR_FR5	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(Month)	11	2.558845704	0.232622337	0.3994534	0.911062009	0
FR_FR5	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	10	1.648801605	0.164880161	0.283128188	0.961657927	0
FR_FR5	Major Ions	Sulphide (mg/L)_Major Ions	Residuals	6	3.494109752	0.582351625			0
FR_FR5	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.035109857	0.035109857	1.350040818	0.250288419	0
FR_FR5	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	3.888278977	0.353479907	13.59197509	4.69151E-12	0
FR_FR5	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	10	0.718361807	0.071836181	2.762237849	0.007796041	0
FR_FR5	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	55	1.430358337	0.026006515			0
FR_FR5	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.163431137	0.163431137	0.88796956	0.350148987	0
FR_FR5	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	4.406269236	0.400569931	2.176414558	0.029248968	0
FR_FR5	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	10	1.502466564	0.150246656	0.816334391	0.614257333	0
FR_FR5	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	55	10.122771	0.184050382			0
FR_FR5	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	10.60664386	10.60664386	40.59806565	4.01412E-08	1
FR_FR5	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.256997484	0.205181589	0.785354514	0.653187586	0
FR_FR5	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	10	5.007933676	0.500793368	1.916840263	0.062263092	0
FR_FR5	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	55	14.36929083	0.261259833			0
FR_FR5	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	3.318075608	3.318075608	5.012169287	0.029235547	1
FR_FR5	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	3.070902119	0.27917292	0.421708876	0.940071373	0
FR_FR5	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	10	8.651226469	0.865122647	1.306824097	0.250060633	0
FR_FR5	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	55	36.41021442	0.662003899			0
FR_FR5	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.087117904	0.087117904	2.242992031	0.141052181	0
FR_FR5	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	0.763798037	0.069436185	1.787747442	0.084108812	0
FR_FR5	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	10	1.514293044	0.151429304	3.898793559	0.000704156	0
FR_FR5	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	46	1.786641918	0.038840042			0
FR_FR5	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	15.08988716	15.08988716	5.451293928	0.02323165	1
FR_FR5	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	33.24869462	3.022608602	1.091931818	0.384895047	0
FR_FR5	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	10	3.691566469	0.369156647	0.133359605	0.999185003	0
FR_FR5	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	55	152.2471187	2.768129431			0
FR_FR5	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	6.454068872	6.454068872	9.653108215	0.002988833	1
FR_FR5	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	83.44464699	7.585876999	11.34591109	1.29657E-10	0
FR_FR5	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	3.81486076	0.381486076	0.570574385	0.830668581	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FR5	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	55	36.7730041	0.668600074			0
FR_FR5	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.256730602	0.256730602	3.609917254	0.062683574	0
FR_FR5	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	3.297148316	0.299740756	4.214687755	0.000157581	0
FR_FR5	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.246442044	0.024644204	0.34652487	0.96361252	0
FR_FR5	Total Metals	Antimony (mg/L)_Total Metals	Residuals	55	3.911497728	0.071118141			0
FR_FR5	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.41699568	0.41699568	3.811073788	0.056012816	0
FR_FR5	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	1.756396622	0.15967242	1.459303788	0.173901708	0
FR_FR5	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.224683059	0.022468306	0.205345945	0.994962734	0
FR_FR5	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	55	6.017926618	0.109416848			0
FR_FR5	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.067720227	0.067720227	4.646060261	0.035517274	1
FR_FR5	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	4.224670225	0.38406093	26.3491471	4.91703E-18	0
FR_FR5	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.293894615	0.029389461	2.016313517	0.048978331	0
FR_FR5	Total Metals	Barium (mg/L)_Total Metals	Residuals	55	0.801671153	0.014575839			0
FR_FR5	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	19.74534017	19.74534017	40.90298372	3.67024E-08	1
FR_FR5	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	1.255610576	0.114146416	0.236457258	0.993687405	0
FR_FR5	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.269318446	0.026931845	0.055790014	0.999984862	0
FR_FR5	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	55	26.55047654	0.482735937			0
FR_FR5	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	22.35509088	22.35509088	16.60254384	0.000149344	1
FR_FR5	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	4.131358867	0.375578079	0.278932059	0.987414579	0
FR_FR5	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.987573867	0.098757387	0.073344539	0.999945386	0
FR_FR5	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	55	74.0567235	1.346485882			0
FR_FR5	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.141244152	0.141244152	3.054450688	0.086097221	0
FR_FR5	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.700796037	0.063708731	1.377722	0.209670188	0
FR_FR5	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.192184049	0.019218405	0.41560425	0.933257135	0
FR_FR5	Total Metals	Boron (mg/L)_Total Metals	Residuals	55	2.543314386	0.04624208			0
FR_FR5	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.187077418	0.187077418	2.060244623	0.156848713	0
FR_FR5	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	7.286926324	0.662447848	7.295400111	1.67718E-07	0
FR_FR5	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.651576011	0.065157601	0.717567083	0.704346394	0
FR_FR5	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	55	4.994192377	0.090803498			0
FR_FR5	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.014330996	0.014330996	1.643338233	0.205245618	0
FR_FR5	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	2.27835668	0.207123335	23.75087567	4.92773E-17	0
FR_FR5	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.535108153	0.053510815	6.136096272	3.32511E-06	0
FR_FR5	Total Metals	Calcium (mg/L)_Total Metals	Residuals	55	0.479636353	0.008720661			0
FR_FR5	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.266845112	0.266845112	1.180487082	0.281995809	0
FR_FR5	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	3.931589627	0.357417239	1.581166057	0.130415723	0
FR_FR5	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	3.710404318	0.371040432	1.641433241	0.11919964	0
FR_FR5	Total Metals	Chromium (mg/L)_Total Metals	Residuals	55	12.43256396	0.226046617			0
FR_FR5	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.001411259	0.001411259	0.015325314	0.901928546	0
FR_FR5	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	1.325346825	0.120486075	1.308396617	0.244770682	0
FR_FR5	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.459988254	0.045998825	0.499515878	0.882985106	0
FR_FR5	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	55	5.064774734	0.092086813			0
FR_FR5	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.008252352	0.008252352	0.153411965	0.696809343	0
FR_FR5	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	0.795923509	0.072356683	1.345117284	0.225617878	0
FR_FR5	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.385888402	0.03858884	0.717370034	0.704524927	0
FR_FR5	Total Metals	Copper (mg/L)_Total Metals	Residuals	55	2.958565467	0.053792099			0
FR_FR5	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	6.252079482	6.252079482	12.01159026	0.001032927	1
FR_FR5	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	34.46116776	3.132833433	6.018847274	2.4134E-06	0
FR_FR5	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	2.904949523	0.290494952	0.558103324	0.84039491	0
FR_FR5	Total Metals	Iron (mg/L)_Total Metals	Residuals	55	28.62771408	0.520503892			0
FR_FR5	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.350281294	0.350281294	1.564673992	0.216277271	0
FR_FR5	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	4.126348786	0.375122617	1.675637873	0.103742442	0
FR_FR5	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.73226186	0.073226186	0.327094569	0.97027634	0
FR_FR5	Total Metals	Lead (mg/L)_Total Metals	Residuals	55	12.31277012	0.223868548			0
FR_FR5	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.762051653	0.762051653	14.93470152	0.000296018	1
FR_FR5	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	0.956557835	0.086959803	1.704239733	0.09671744	0
FR_FR5	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.588625031	0.058862503	1.153588357	0.341462601	0
FR_FR5	Total Metals	Lithium (mg/L)_Total Metals	Residuals	55	2.806406332	0.05102557			0
FR_FR5	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.130050136	0.130050136	12.85353812	0.000715587	1
FR_FR5	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	2.262399989	0.205672726	20.32771591	1.42142E-15	0
FR_FR5	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.571422188	0.057142219	5.647665645	9.31833E-06	0
FR_FR5	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	55	0.556481604	0.010117847			0
FR_FR5	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	1.19689571	1.19689571	5.50525628	0.0225903	1
FR_FR5	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	26.29520482	2.390473165	10.99524987	2.25849E-10	0
FR_FR5	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	1.255125378	0.125512538	0.577309018	0.825330863	0
FR_FR5	Total Metals	Manganese (mg/L)_Total Metals	Residuals	55	11.95752944	0.217409626			0
FR_FR5	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	56.69142131	56.69142131	37.90563472	8.97063E-08	1
FR_FR5	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	3.851807544	0.350164322	0.234130678	0.993948994	0
FR_FR5	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	1.423395704	0.14233957	0.095172632	0.999819072	0
FR_FR5	Total Metals	Mercury (mg/L)_Total Metals	Residuals	55	82.25764309	1.495593511			0
FR_FR5	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.081944643	0.081944643	5.038766693	0.028828212	1
FR_FR5	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	2.890148148	0.262740741	16.15589808	1.62006E-13	0
FR_FR5	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.436795762	0.043679576	2.685852145	0.009420125	0
FR_FR5	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	55	0.894456047	0.016262837			0
FR_FR5	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.130083217	0.130083217	0.398108536	0.530681085	0
FR_FR5	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	13.75489638	1.250445125	3.826880121	0.000412506	0
FR_FR5	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	1.139541673	0.113954167	0.348746961	0.962798242	0
FR_FR5	Total Metals	Nickel (mg/L)_Total Metals	Residuals	55	17.97142312	0.326753148			0
FR_FR5	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.241370088	0.241370088	5.432591011	0.023458454	1
FR_FR5	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	0.259164687	0.023560426	0.530281776	0.874325465	0
FR_FR5	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.468893604	0.04688936	1.055353296	0.41166817	0
FR_FR5	Total Metals	Potassium (mg/L)_Total Metals	Residuals	55	2.443650699	0.044430013			0
FR_FR5	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.395181397	0.395181397	18.14263445	8.07436E-05	1
FR_FR5	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	3.804224046	0.34583855	15.87732223	2.29158E-13	0
FR_FR5	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.595204235	0.059520423	2.73256103	0.008390705	0
FR_FR5	Total Metals	Selenium (mg/L)_Total Metals	Residuals	55	1.198005555	0.021781919			0
FR_FR5	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.001146311	0.001146311	0.258593489	0.613121896	0
FR_FR5	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.497021465	0.04518377	10.19289445	8.38485E-10	0
FR_FR5	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.38597878	0.038597878	8.707199532	2.40873E-08	0
FR_FR5	Total Metals	Silicon (mg/L)_Total Metals	Residuals	55	0.243807815	0.004432869			0
FR_FR5	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.063548859	0.063548859	0.457428513	0.501662616	0
FR_FR5	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	3.05846651	0.27804241	2.001365993	0.045869609	0
FR_FR5	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.996958591	0.099695859	0.717616791	0.704301356	0
FR_FR5	Total Metals	Silver (mg/L)_Total Metals	Residuals	55	7.640947536	0.138926319			0
FR_FR5	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.070801012	0.070801012	4.408871089	0.040353961	1
FR_FR5	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	1.71168661	0.155607874	9.689904715	1.96924E-09	0
FR_FR5	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.342882508	0.034288251	2.13517398	0.03667233	0
FR_FR5	Total Metals	Sodium (mg/L)_Total Metals	Residuals	55	0.88323191	0.016058762			0
FR_FR5	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.02192992	0.02192992	2.511023952	0.118786072	0
FR_FR5	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	2.61672095	0.237883723	27.23820769	2.33067E-18	0
FR_FR5	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.554357795	0.055435779	6.347518262	2.14983E-06	0
FR_FR5	Total Metals	Strontium (mg/L)_Total Metals	Residuals	55	0.480340149	0.008733457			0
FR_FR5	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.055225585	0.055225585	1.077267186	0.303851376	0
FR_FR5	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	0.548756398	0.049886945	0.973128104	0.481294714	0
FR_FR5	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.135082942	0.013508294	0.263501817	0.986576135	0
FR_FR5	Total Metals	Thallium (mg/L)_Total Metals	Residuals	55	2.819548605	0.05126452			0
FR_FR5	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.008570026	0.008570026	0.242624759	0.624277449	0
FR_FR5	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.484808578	0.044073507	1.247758627	0.279264733	0
FR_FR5	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.120985143	0.012098514	0.342519273	0.965053197	0
FR_FR5	Total Metals	Tin (mg/L)_Total Metals	Residuals	55	1.942717795	0.035322142			0
FR_FR5	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.200750646	0.200750646	5.883797834	0.018589649	1
FR_FR5	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.48053388	0.043684898	1.280360064	0.260268624	0
FR_FR5	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.143161563	0.014316156	0.419592021	0.931189814	0
FR_FR5	Total Metals	Titanium (mg/L)_Total Metals	Residuals	55	1.876557594	0.034119229			0
FR_FR5	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.317254523	0.317254523	28.54199554	1.80693E-06	1
FR_FR5	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	0.871340674	0.079212789	7.126426548	2.35652E-07	0
FR_FR5	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.663100604	0.06631006	5.965624784	4.74689E-06	0
FR_FR5	Total Metals	Uranium (mg/L)_Total Metals	Residuals	55	0.611344738	0.011115359			0
FR_FR5	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	2.366413046	2.366413046	18.94783494	5.88973E-05	1
FR_FR5	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	1.083677123	0.098516102	0.788817001	0.649921645	0
FR_FR5	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	0.524274	0.0524274	0.419785432	0.931088691	0
FR_FR5	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	55	6.869002075	0.124890947			0
FR_FR5	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.089701593	0.089701593	0.953587951	0.333083408	0
FR_FR5	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	1.048928177	0.095357107	1.013709845	0.446956065	0
FR_FR5	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	10	1.482470966	0.148247097	1.575965822	0.138491968	0
FR_FR5	Total Metals	Zinc (mg/L)_Total Metals	Residuals	55	5.173710117	0.094067457			0
FR_FRABCH	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.055403461	0.055403461	0.288300408	0.595553043	0
FR_FRABCH	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	8.836034388	0.803275853	4.179969123	0.001069834	0
FR_FRABCH	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	3.021775774	0.274706889	1.429479433	0.214556184	0
FR_FRABCH	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	28	5.380834938	0.192172676			0
FR_FRABCH	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.012768844	0.012768844	2.77599073	0.107249064	0
FR_FRABCH	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.60033994	0.054576358	11.86508874	1.10753E-07	0
FR_FRABCH	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.085542124	0.007776557	1.690650295	0.129588845	0
FR_FRABCH	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	27	0.124193059	0.004599743			0
FR_FRABCH	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.824072103	0.824072103	1.288057184	0.266381613	0
FR_FRABCH	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	13.23412877	1.203102615	1.880496818	0.088620458	0
FR_FRABCH	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	4.808445077	0.437131371	0.683253565	0.742093207	0
FR_FRABCH	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	27	17.27403647	0.639779129			0
FR_FRABCH	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.061577834	0.061577834	7.815954994	0.009250381	1
FR_FRABCH	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	1.472951642	0.133904695	16.99626319	1.37342E-09	0
FR_FRABCH	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.165554156	0.015050378	1.910315266	0.081698938	0
FR_FRABCH	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	28	0.220597399	0.007878479			0
FR_FRABCH	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.000802405	0.000802405	0.008560884	0.926939742	0
FR_FRABCH	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	4.073943897	0.370358536	3.951368714	0.001592969	0
FR_FRABCH	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.90423316	0.082203015	0.877026957	0.57177792	0
FR_FRABCH	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	28	2.624416946	0.093729177			0
FR_FRABCH	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.109561293	0.109561293	10.39437426	0.003203989	1
FR_FRABCH	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.838793337	0.167163031	15.85920593	3.05881E-09	0
FR_FRABCH	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.176062089	0.016005644	1.518498502	0.180101396	0
FR_FRABCH	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	28	0.295132359	0.010540441			0
FR_FRABCH	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0	0	-	-	-
FR_FRABCH	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0	0	-	-	0
FR_FRABCH	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0	0	-	-	0
FR_FRABCH	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	27	0	0			0
FR_FRABCH	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.006254965	0.006254965	0.134099187	0.716971642	0
FR_FRABCH	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.13969696	0.012699724	0.272267335	0.986424995	0
FR_FRABCH	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.271422728	0.024674793	0.528998934	0.866969303	0
FR_FRABCH	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	28	1.306040849	0.046644316			0
FR_FRABCH	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000192324	0.000192324	2.00389717	0.167922925	0
FR_FRABCH	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.004908699	0.000446245	4.64959356	0.000485824	0
FR_FRABCH	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.001646776	0.000149707	1.559851323	0.165899508	0
FR_FRABCH	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	28	0.002687304	9.59751E-05			0
FR_FRABCH	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.017546863	0.017546863	4.373672735	0.045691981	1
FR_FRABCH	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.511818669	0.04652897	11.59765632	9.95216E-08	0
FR_FRABCH	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.090299397	0.008209036	2.046157049	0.061932487	0
FR_FRABCH	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	28	0.112334003	0.004011929			0
FR_FRABCH	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.106386106	0.106386106	10.46938128	0.003110934	1
FR_FRABCH	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	2.103738547	0.191248959	18.82067439	4.14978E-10	0
FR_FRABCH	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.248868142	0.022624377	2.22644885	0.042906142	0
FR_FRABCH	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	28	0.284525981	0.010161642			0
FR_FRABCH	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.700794808	0.700794808	3.102716398	0.089079494	0
FR_FRABCH	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	6.162423144	0.560220286	2.480333254	0.025693587	0
FR_FRABCH	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.43500513	0.130455012	0.57757977	0.830521439	0
FR_FRABCH	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	28	6.324217916	0.225864926			0
FR_FRABCH	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.686655465	1.686655465	2.290942145	0.141338032	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FRABCH	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	33.88818733	3.080744303	4.184498322	0.001061527	0
FR_FRABCH	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	11.34943919	1.0317672	1.401423712	0.226593317	0
FR_FRABCH	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	28	20.61438047	0.736227874			0
FR_FRABCH	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.738938508	0.738938508	0.696817704	0.410921067	0
FR_FRABCH	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	43.36464551	3.942240501	3.717525807	0.002416779	0
FR_FRABCH	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	5.430014373	0.49363767	0.465499448	0.908999815	0
FR_FRABCH	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	28	29.69252664	1.06044738			0
FR_FRABCH	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.439815667	0.439815667	1.264474482	0.270353757	0
FR_FRABCH	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	5.261150204	0.478286382	1.375078177	0.238441157	0
FR_FRABCH	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.1928443	0.199349482	0.573131773	0.833989609	0
FR_FRABCH	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	28	9.739096241	0.347824866			0
FR_FRABCH	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.012138516	0.012138516	0.187133008	0.668627303	0
FR_FRABCH	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	1.7943606	0.163123691	2.514790703	0.023978938	0
FR_FRABCH	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.686911125	0.244264648	3.765697439	0.00221614	0
FR_FRABCH	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	28	1.816239952	0.064865713			0
FR_FRABCH	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.003730402	0.003730402	0.067226872	0.797314913	0
FR_FRABCH	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	1.216439269	0.110585388	1.992897742	0.069038108	0
FR_FRABCH	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.469971452	0.224542859	4.046564968	0.001348104	0
FR_FRABCH	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	28	1.553712867	0.055489745			0
FR_FRABCH	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.035945511	0.035945511	3.550690049	0.069941751	0
FR_FRABCH	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.120365055	0.19276046	19.04083797	3.6156E-10	0
FR_FRABCH	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.15961446	0.014510405	1.433334821	0.212947754	0
FR_FRABCH	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	28	0.283458789	0.010123528			0
FR_FRABCH	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	7.296092048	7.296092048	11.78494351	0.001876037	1
FR_FRABCH	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.323377342	0.120307031	0.194324791	0.996666509	0
FR_FRABCH	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.345242726	0.122294793	0.197535505	0.996420411	0
FR_FRABCH	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	28	17.33487964	0.619102844			0
FR_FRABCH	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.274278034	0.274278034	0.910939556	0.348033134	0
FR_FRABCH	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	2.578755049	0.234432277	0.778602761	0.658158109	0
FR_FRABCH	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	3.297315081	0.299755916	0.995557382	0.474090914	0
FR_FRABCH	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	28	8.430619687	0.30109356			0
FR_FRABCH	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.00102094	0.00102094	0.022944651	0.880687205	0
FR_FRABCH	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	1.41741957	0.128856325	2.89592198	0.011292414	0
FR_FRABCH	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.208347159	0.200758833	4.511861703	0.000610013	0
FR_FRABCH	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	28	1.245882007	0.044495786			0
FR_FRABCH	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.085499226	0.085499226	1.480574165	0.233842052	0
FR_FRABCH	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.51950113	0.047227375	0.817827665	0.623401476	0
FR_FRABCH	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.398972478	0.036270225	0.628084735	0.789614002	0
FR_FRABCH	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	28	1.616925631	0.057747344			0
FR_FRABCH	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.123808021	0.123808021	1.547854531	0.223767143	0
FR_FRABCH	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.507933683	0.13708488	1.713842536	0.121773284	0
FR_FRABCH	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.362921315	0.214811029	2.685579017	0.017066663	0
FR_FRABCH	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	28	2.239632036	0.079986858			0
FR_FRABCH	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.503504421	0.503504421	6.070661268	0.02014971	1
FR_FRABCH	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	1.233242721	0.112112975	1.351725752	0.249396486	0
FR_FRABCH	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	3.1504477	0.286404336	3.453125014	0.003917911	0
FR_FRABCH	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	28	2.322337415	0.082940622			0
FR_FRABCH	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.458622795	0.458622795	4.460870362	0.043730689	1
FR_FRABCH	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.945440473	0.085949134	0.835998446	0.607419792	0
FR_FRABCH	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.943939627	0.085812693	0.834671334	0.608583557	0
FR_FRABCH	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	28	2.878684478	0.10281016			0
FR_FRABCH	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.05480399	0.05480399	0.399601567	0.53242328	0
FR_FRABCH	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	1.789434127	0.16267583	1.186145701	0.340099693	0
FR_FRABCH	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	3.189393363	0.289944851	2.114123771	0.053920781	0
FR_FRABCH	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	28	3.840104323	0.137146583			0
FR_FRABCH	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.108609545	0.108609545	2.184951679	0.150527329	0
FR_FRABCH	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	1.615907909	0.146900719	2.95527407	0.010062915	0
FR_FRABCH	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	3.041622863	0.276511169	5.562711296	0.000116005	0
FR_FRABCH	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	28	1.391823579	0.049707985			0
FR_FRABCH	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.121189625	0.121189625	7.346246734	0.011344884	1
FR_FRABCH	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.271592606	0.115599328	7.007375305	1.53233E-05	0
FR_FRABCH	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.231265913	0.021024174	1.274438873	0.288820576	0
FR_FRABCH	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	28	0.461910635	0.016496808			0
FR_FRABCH	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.05010811	0.05010811	0.563379478	0.459163454	0
FR_FRABCH	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	5.191255533	0.471932321	5.306066948	0.000171257	0
FR_FRABCH	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.211692933	0.110153903	1.238491109	0.308876897	0
FR_FRABCH	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	28	2.490376605	0.088942022			0
FR_FRABCH	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.049896672	0.049896672	2.04859026	0.163414977	0
FR_FRABCH	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.147589397	0.013417218	0.550866035	0.850968617	0
FR_FRABCH	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.110308022	0.010028002	0.411716181	0.93859991	0
FR_FRABCH	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	28	0.681984506	0.024356589			0
FR_FRABCH	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000778168	0.000778168	0.068521831	0.795417355	0
FR_FRABCH	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	1.755497957	0.159590723	14.05281111	1.20775E-08	0
FR_FRABCH	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.151279046	0.013752641	1.210993068	0.324977856	0
FR_FRABCH	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	28	0.317981948	0.011356498			0
FR_FRABCH	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.146760055	0.146760055	0.974568478	0.331997997	0
FR_FRABCH	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	8.461212448	0.769201132	5.107923775	0.000232923	0
FR_FRABCH	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.994378273	0.181307116	1.203980193	0.329190516	0
FR_FRABCH	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	28	4.216513918	0.150589783			0
FR_FRABCH	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.67352657	0.67352657	35.94842167	1.85136E-06	1
FR_FRABCH	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	3.324391753	0.302217432	16.13038025	2.51659E-09	0
FR_FRABCH	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.346782051	0.031525641	1.682631521	0.12969452	0
FR_FRABCH	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	28	0.524605618	0.018735915			0
FR_FRABCH	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.002411541	0.002411541	0.72293579	0.402394959	0
FR_FRABCH	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.644000293	0.058545481	17.5508605	9.44241E-10	0
FR_FRABCH	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.049215057	0.004474096	1.34125188	0.254451409	0
FR_FRABCH	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	28	0.093401316	0.003335761			0
FR_FRABCH	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.008244439	0.008244439	0.169561143	0.683637424	0
FR_FRABCH	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	1.264265869	0.114933261	2.363801095	0.032486441	0
FR_FRABCH	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.411689352	0.219244487	4.509141685	0.000612781	0
FR_FRABCH	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	28	1.361422207	0.048622222			0
FR_FRABCH	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.122686729	0.122686729	15.03861364	0.00058231	1
FR_FRABCH	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.780687094	0.161880645	19.84289986	2.21301E-10	0
FR_FRABCH	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.114451521	0.010404684	1.275378517	0.288311225	0
FR_FRABCH	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	28	0.2284272	0.008158114			0
FR_FRABCH	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.008770839	0.008770839	0.180361485	0.674308502	0
FR_FRABCH	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.261021938	0.114638358	2.357396397	0.032909363	0
FR_FRABCH	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.411754726	0.21925043	4.508614585	0.000613319	0
FR_FRABCH	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	28	1.361618279	0.048629224			0
FR_FRABCH	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.008244439	0.008244439	0.169561143	0.683637424	0
FR_FRABCH	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	1.264265869	0.114933261	2.363801095	0.032486441	0
FR_FRABCH	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.411689352	0.219244487	4.509141685	0.000612781	0
FR_FRABCH	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	28	1.361422207	0.048622222			0
FR_FRABCH	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.023979971	0.023979971	2.485931912	0.12610088	0
FR_FRABCH	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.078163931	0.007105812	0.736638277	0.69546172	0
FR_FRABCH	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.068418826	0.006219893	0.644797743	0.775553923	0
FR_FRABCH	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	28	0.270095568	0.00964627			0
FR_FRABCH	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.491265168	0.491265168	49.01995608	1.29549E-07	1
FR_FRABCH	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.084979255	0.098634478	9.842052894	5.58831E-07	0
FR_FRABCH	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.155693959	0.014153996	1.412329478	0.221844216	0
FR_FRABCH	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	28	0.28060867	0.010021738			0
FR_FRABCH	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.006816874	0.006816874	0.095184986	0.759969968	0
FR_FRABCH	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.307024115	0.118820374	1.659105965	0.135990164	0
FR_FRABCH	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.442095512	0.222008683	3.099939157	0.007616639	0
FR_FRABCH	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	28	2.005279074	0.07161711			0
FR_FRABCH	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.982740627	1.982740627	6.984644007	0.013309835	1
FR_FRABCH	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	0.657618504	0.0597835	0.210600651	0.995284384	0
FR_FRABCH	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.923773192	0.174888472	0.616083466	0.79956547	0
FR_FRABCH	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	28	7.948399017	0.283871393			0
FR_FRABCH	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	1.030943541	1.030943541	2.976206071	0.095520185	0
FR_FRABCH	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	2.264616517	0.205874229	0.594333351	0.817248617	0
FR_FRABCH	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	1.174534777	0.106775889	0.308248741	0.978055845	0
FR_FRABCH	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	28	9.699066015	0.346395215			0
FR_FRABCH	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.002834628	0.002834628	0.201536936	0.656938531	0
FR_FRABCH	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.240922479	0.021902044	1.55719595	0.166779091	0
FR_FRABCH	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.070985613	0.006453238	0.458813598	0.912997576	0
FR_FRABCH	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	28	0.393821484	0.014065053			0
FR_FRABCH	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.000182211	0.000182211	0.01342957	0.908570026	0
FR_FRABCH	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.220333764	0.020030342	1.476303324	0.195746665	0
FR_FRABCH	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.108941436	0.009903767	0.7299408	0.701401737	0
FR_FRABCH	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	28	0.37990132	0.013567904			0
FR_FRABCH	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.001870207	0.001870207	6.705830274	0.015078858	1
FR_FRABCH	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.004086319	0.000371484	1.331994167	0.258993261	0
FR_FRABCH	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.006419462	0.000583587	2.092515618	0.056347754	0
FR_FRABCH	Field Measured	pH (-)_Field Measured	Residuals	28	0.007808997	0.000278893			0
FR_FRABCH	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	0.418005712	0.418005712	1.115941585	0.299823776	0
FR_FRABCH	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	12.72142422	1.156493111	3.087466795	0.007800663	0
FR_FRABCH	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	5.618323888	0.510756717	1.36355711	0.24379207	0
FR_FRABCH	Major Ions	Bromide (mg/L)_Major Ions	Residuals	28	10.48814749	0.374576696			0
FR_FRABCH	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.060139149	0.060139149	6.074568402	0.020113309	1
FR_FRABCH	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	1.796331414	0.163302856	16.49498504	1.94396E-09	0
FR_FRABCH	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.167772114	0.01525201	1.54058348	0.172381616	0
FR_FRABCH	Major Ions	Calcium (mg/L)_Major Ions	Residuals	28	0.27720425	0.009900152			0
FR_FRABCH	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.002305304	0.002305304	0.038623395	0.845616145	0
FR_FRABCH	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	5.241930337	0.476539122	7.98400624	4.48977E-06	0
FR_FRABCH	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	1.307485312	0.118862301	1.991436402	0.069244173	0
FR_FRABCH	Major Ions	Chloride (mg/L)_Major Ions	Residuals	28	1.671228078	0.059686717			0
FR_FRABCH	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.017046106	0.017046106	0.594488043	0.447146835	0
FR_FRABCH	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	1.010837442	0.091894313	3.204841698	0.006237623	0
FR_FRABCH	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.275138702	0.025012609	0.872322244	0.575827879	0
FR_FRABCH	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	28	0.802860485	0.028673589			0
FR_FRABCH	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.197452966	0.197452966	15.4012512	0.000514387	1
FR_FRABCH	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	1.926345761	0.175122342	13.65947156	1.65913E-08	0
FR_FRABCH	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.201200252	0.018290932	1.426685272	0.215728714	0
FR_FRABCH	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	28	0.358976228	0.01282058			0
FR_FRABCH	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.010976404	0.010976404	0.944849276	0.339356712	0
FR_FRABCH	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	0.26408193	0.024007448	2.066562077	0.059408801	0
FR_FRABCH	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.084995194	0.007726836	0.665126328	0.758178645	0
FR_FRABCH	Major Ions	Potassium (mg/L)_Major Ions	Residuals	28	0.325278663	0.011617095			0
FR_FRABCH	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.04303655	0.04303655	3.165448615	0.086070859	0
FR_FRABCH	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	1.734869247	0.157715386	11.60037096	9.92718E-08	0
FR_FRABCH	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.179171727	0.016288339	1.198049078	0.332787268	0
FR_FRABCH	Major Ions	Sodium (mg/L)_Major Ions	Residuals	28	0.380680137	0.013595719			0
FR_FRABCH	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.22017198	0.22017198	10.90468017	0.002625486	1
FR_FRABCH	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	3.753002637	0.341182058	16.89806862	1.46916E-09	0
FR_FRABCH	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.36887507	0.033534097	1.66087713	0.135506171	0
FR_FRABCH	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	28	0.565336657	0.020190595			0
FR_FRABCH	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.029686311	0.029686311	1.831661991	0.186757316	0
FR_FRABCH	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.993806896	0.272164263	16.7926875	1.57991E-09	0
FR_FRABCH	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.442165427	0.040196857	2.480168595	0.025702077	0
FR_FRABCH	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	28	0.453804632	0.016207308			0
FR_FRABCH	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.003936235	0.003936235	0.028016759	0.868272473	0
FR_FRABCH	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.991214479	0.181019498	1.288434261	0.281311863	0
FR_FRABCH	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.833441363	0.166676488	1.186345667	0.339975814	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FRABCH	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	28	3.933880135	0.140495719			0
FR_FRABCH	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	8.645872856	8.645872856	27.58427989	1.39261E-05	1
FR_FRABCH	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.845294701	0.167754064	0.535212017	0.862495244	0
FR_FRABCH	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.513024938	0.137547722	0.438840001	0.924412875	0
FR_FRABCH	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	28	8.776173999	0.313434786			0
FR_FRABCH	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	2.479372764	2.479372764	4.294231446	0.047564462	1
FR_FRABCH	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	6.947445904	0.631585991	1.093896192	0.401032593	0
FR_FRABCH	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	10.67904448	0.970822226	1.681447578	0.130004557	0
FR_FRABCH	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	28	16.16644055	0.577372877			0
FR_FRABCH	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.006300445	0.006300445	0.023487453	0.87929543	0
FR_FRABCH	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.318054558	0.210732233	0.785589553	0.651950119	0
FR_FRABCH	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.592218763	0.14474716	0.539603532	0.859297732	0
FR_FRABCH	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	28	7.510922833	0.268247244			0
FR_FRABCH	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	3.038512707	3.038512707	4.616991434	0.040448868	1
FR_FRABCH	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	31.24134163	2.840121966	4.315538572	0.000848522	0
FR_FRABCH	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	3.82849003	0.348044548	0.528850412	0.867075529	0
FR_FRABCH	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	28	18.42722843	0.658115301			0
FR_FRABCH	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.192181206	0.192181206	1.2	0.32326019	0
FR_FRABCH	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	as.factor(Month)	3	0.160151005	0.053383668	0.333333333	0.802577062	0
FR_FRABCH	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	Residuals	5	0.800755023	0.160151005			0
FR_FRABCH	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.467630808	0.467630808	5.789039243	0.061162354	0
FR_FRABCH	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(Month)	3	0.120962169	0.040320723	0.499150706	0.698950515	0
FR_FRABCH	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(new_year):as.factor(Month)	1	0.040037751	0.040037751	0.495647653	0.512845483	0
FR_FRABCH	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	Residuals	5	0.403893279	0.080778656			0
FR_FRABCH	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(new_year)	1	15.44754149	15.44754149	302.5323	1.15111E-05	1
FR_FRABCH	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(Month)	3	11.17366333	3.724554443	72.94351808	0.000150717	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(new_year):as.factor(Month)	1	10.65933847	10.65933847	208.7577616	2.86525E-05	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	Residuals	5	0.255304004	0.051060801			0
FR_FRABCH	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(new_year)	1	12.05728729	12.05728729	249.432932	1.85116E-05	1
FR_FRABCH	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(Month)	3	5.896639395	1.965546465	40.66188406	0.000617831	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(new_year):as.factor(Month)	1	9.402557257	9.402557257	194.5136886	3.40643E-05	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	Residuals	5	0.241693973	0.048338795			0
FR_FRABCH	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.259823481	0.259823481	0.810238417	0.409307116	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(Month)	3	0.116986071	0.038995357	0.121603852	0.94343217	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(new_year):as.factor(Month)	1	0.33416068	0.33416068	1.042052932	0.354169328	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	Residuals	5	1.603376706	0.320675341			0
FR_FRABCH	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.349420374	0.349420374	2.181818182	0.199688787	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(Month)	3	0.120113253	0.040037751	0.25	0.858386662	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(new_year):as.factor(Month)	1	0.040037751	0.040037751	0.25	0.638298872	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	Residuals	5	0.800755023	0.160151005			0
FR_FRABCH	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.3079088	0.3079088	0.480653869	0.519006026	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(Month)	3	0.320488675	0.106829558	0.166763797	0.914359512	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(new_year):as.factor(Month)	1	0.40231632	0.40231632	0.628026532	0.464004032	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	Residuals	5	3.203020093	0.640604019			0
FR_FRABCH	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.545969334	0.545969334	0.852272727	0.398272428	0
FR_FRABCH	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(Month)	3	0.240226507	0.080075502	0.125	0.94131051	0
FR_FRABCH	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(new_year):as.factor(Month)	1	0.640604019	0.640604019	1	0.363217468	0
FR_FRABCH	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	Residuals	5	3.203020093	0.640604019			0
FR_FRABCH	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	6.212445272	6.212445272	5.785794602	0.023009214	1
FR_FRABCH	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	69.85795125	6.350722841	5.914575714	6.90679E-05	0
FR_FRABCH	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	8.252544904	0.750231355	0.698707889	0.728962448	0
FR_FRABCH	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	28	30.06474989	1.073741067			0
FR_FRABCH	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.128727312	0.128727312	2.426684981	0.130517239	0
FR_FRABCH	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	2.07608257	0.188734779	3.557907395	0.003230364	0
FR_FRABCH	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.764415354	0.160401396	3.023784568	0.008815541	0
FR_FRABCH	Total Metals	Antimony (mg/L)_Total Metals	Residuals	28	1.485303924	0.053046569			0
FR_FRABCH	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.589977637	0.589977637	2.612563045	0.117233218	0
FR_FRABCH	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	3.862894478	0.351172225	1.555075179	0.167484721	0
FR_FRABCH	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.068401854	0.188036532	0.832671045	0.610338742	0
FR_FRABCH	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	28	6.323052702	0.225823311			0
FR_FRABCH	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.089282632	0.089282632	6.351632005	0.017707017	1
FR_FRABCH	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	1.717310801	0.156119164	11.10643201	1.58E-07	0
FR_FRABCH	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.19213723	0.017467021	1.242616701	0.306518294	0
FR_FRABCH	Total Metals	Barium (mg/L)_Total Metals	Residuals	28	0.393586039	0.014056644			0
FR_FRABCH	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	8.973409474	8.973409474	15.3793545	0.000518236	1
FR_FRABCH	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	1.327708155	0.120700741	0.206866687	0.995631862	0
FR_FRABCH	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.870964465	0.079178588	0.135702664	0.999343254	0
FR_FRABCH	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	28	16.33719187	0.583471138			0
FR_FRABCH	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	0.523454978	0.523454978	2.028736477	0.165399386	0
FR_FRABCH	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	2.559566643	0.232687877	0.901820411	0.550620975	0
FR_FRABCH	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.268721481	0.206247407	0.799345992	0.639744575	0
FR_FRABCH	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	28	7.224565412	0.258020193			0
FR_FRABCH	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.0382395	0.0382395	1.9521726	0.173327879	0
FR_FRABCH	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.986520309	0.089683664	4.578459252	0.000546217	0
FR_FRABCH	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.394109887	0.126737262	6.470090126	3.1526E-05	0
FR_FRABCH	Total Metals	Boron (mg/L)_Total Metals	Residuals	28	0.548468921	0.019588176			0
FR_FRABCH	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.017159907	0.017159907	0.073076772	0.788891194	0
FR_FRABCH	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	4.005827655	0.36416615	1.550829303	0.168905821	0
FR_FRABCH	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.635848608	0.057804419	0.246164523	0.990948211	0
FR_FRABCH	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	28	6.574967468	0.234820267			0
FR_FRABCH	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.053502319	0.053502319	7.806312767	0.009288874	1
FR_FRABCH	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	1.61341876	0.146674433	21.40068911	8.93306E-11	0
FR_FRABCH	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.186183882	0.016925807	2.469577939	0.02625426	0
FR_FRABCH	Total Metals	Calcium (mg/L)_Total Metals	Residuals	28	0.191904293	0.006853725			0
FR_FRABCH	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.062350046	0.062350046	0.201900188	0.656650351	0
FR_FRABCH	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	7.894898858	0.717718078	2.324094736	0.035200996	0
FR_FRABCH	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.428837451	0.220803405	0.714999449	0.71462036	0
FR_FRABCH	Total Metals	Chromium (mg/L)_Total Metals	Residuals	28	8.646853276	0.308816188			0
FR_FRABCH	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.020451344	0.020451344	0.069942007	0.793358257	0
FR_FRABCH	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	4.245544557	0.385958596	1.319948432	0.265007711	0
FR_FRABCH	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	3.121212821	0.28374662	0.97039141	0.494035747	0
FR_FRABCH	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	28	8.187320378	0.292404299			0
FR_FRABCH	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.125916668	0.125916668	0.797603483	0.379422833	0
FR_FRABCH	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	1.755678609	0.159607146	1.011011626	0.462083694	0
FR_FRABCH	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.637326132	0.239756921	1.518710411	0.180025823	0
FR_FRABCH	Total Metals	Copper (mg/L)_Total Metals	Residuals	28	4.420325127	0.157868755			0
FR_FRABCH	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	4.0479725	4.0479725	5.489698089	0.026462155	1
FR_FRABCH	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	39.84859694	3.622599722	4.912824573	0.000317193	0
FR_FRABCH	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	5.320251901	0.483659264	0.655919312	0.766082008	0
FR_FRABCH	Total Metals	Iron (mg/L)_Total Metals	Residuals	28	20.6465325	0.737376161			0
FR_FRABCH	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.293307665	0.293307665	0.645097698	0.4286366	0
FR_FRABCH	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	13.96534681	1.269576983	2.792293855	0.013828755	0
FR_FRABCH	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	4.728152074	0.429832007	0.945367857	0.51432506	0
FR_FRABCH	Total Metals	Lead (mg/L)_Total Metals	Residuals	28	12.73080749	0.454671696			0
FR_FRABCH	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.099767985	0.099767985	7.891329262	0.008955393	1
FR_FRABCH	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	1.136106529	0.103282412	8.169309198	3.59681E-06	0
FR_FRABCH	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.205855342	0.018714122	1.480227331	0.194240703	0
FR_FRABCH	Total Metals	Lithium (mg/L)_Total Metals	Residuals	28	0.353996581	0.012642735			0
FR_FRABCH	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.126147653	0.126147653	13.8612	0.000878396	1
FR_FRABCH	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	1.84145137	0.16740467	18.39455246	5.43927E-10	0
FR_FRABCH	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.204658495	0.018605318	2.044366464	0.062159022	0
FR_FRABCH	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	28	0.25482168	0.009100774			0
FR_FRABCH	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	0.796502387	0.796502387	2.255486831	0.144336164	0
FR_FRABCH	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	7.563310876	0.687573716	1.94702927	0.075807571	0
FR_FRABCH	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.910476387	0.173679672	0.49181549	0.892442022	0
FR_FRABCH	Total Metals	Manganese (mg/L)_Total Metals	Residuals	28	9.887917116	0.353139897			0
FR_FRABCH	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	15.14272953	15.14272953	13.23920767	0.001097397	1
FR_FRABCH	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	7.010725085	0.637338644	0.557221778	0.846189317	0
FR_FRABCH	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	3.151506666	0.286500606	0.250485952	0.990283044	0
FR_FRABCH	Total Metals	Mercury (mg/L)_Total Metals	Residuals	28	32.02581584	1.143779137			0
FR_FRABCH	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.006258412	0.006258412	0.378972622	0.543125579	0
FR_FRABCH	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	1.790073295	0.162733936	9.854210289	5.51784E-07	0
FR_FRABCH	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.134873934	0.012261267	0.742470216	0.690283858	0
FR_FRABCH	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	28	0.462396283	0.016514153			0
FR_FRABCH	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.283455988	0.283455988	1.048921454	0.314523037	0
FR_FRABCH	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	10.79900704	0.981727913	3.63285841	0.002817293	0
FR_FRABCH	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.788450702	0.162586427	0.601646813	0.811356618	0
FR_FRABCH	Total Metals	Nickel (mg/L)_Total Metals	Residuals	28	7.566598658	0.270235666			0
FR_FRABCH	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.000229525	0.000229525	0.015142482	0.902942755	0
FR_FRABCH	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	0.183434891	0.016675899	1.100161068	0.396656573	0
FR_FRABCH	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.084907628	0.007718875	0.509238273	0.880794116	0
FR_FRABCH	Total Metals	Potassium (mg/L)_Total Metals	Residuals	28	0.424415288	0.015157689			0
FR_FRABCH	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.486417099	0.486417099	29.41994423	8.71254E-06	1
FR_FRABCH	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	3.193115184	0.290283199	17.55718608	9.40267E-10	0
FR_FRABCH	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.356230131	0.032384557	1.958713776	0.074022741	0
FR_FRABCH	Total Metals	Selenium (mg/L)_Total Metals	Residuals	28	0.462940332	0.016533583			0
FR_FRABCH	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.00028782	0.00028782	0.006526737	0.936185073	0
FR_FRABCH	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.300083054	0.027280278	0.618619097	0.797473743	0
FR_FRABCH	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.195467582	0.01776978	0.402955041	0.942848478	0
FR_FRABCH	Total Metals	Silicon (mg/L)_Total Metals	Residuals	28	1.234762678	0.044098667			0
FR_FRABCH	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.114921893	0.114921893	1.19856729	0.282936704	0
FR_FRABCH	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	1.325812848	0.120528441	1.257040263	0.298388491	0
FR_FRABCH	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.152823632	0.195711239	2.041152331	0.062567745	0
FR_FRABCH	Total Metals	Silver (mg/L)_Total Metals	Residuals	28	2.684716185	0.095882721			0
FR_FRABCH	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.035302926	0.035302926	2.684056487	0.11254767	0
FR_FRABCH	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	1.823303086	0.165754826	12.60222212	4.04202E-08	0
FR_FRABCH	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.132633523	0.012057593	0.916730264	0.538062029	0
FR_FRABCH	Total Metals	Sodium (mg/L)_Total Metals	Residuals	28	0.368279109	0.013152825			0
FR_FRABCH	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.073554776	0.073554776	15.03812577	0.000582408	1
FR_FRABCH	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	1.730560594	0.15732369	32.16451144	5.7474E-13	0
FR_FRABCH	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.12536489	0.011396808	2.330054464	0.0347792	0
FR_FRABCH	Total Metals	Strontium (mg/L)_Total Metals	Residuals	28	0.13695415	0.00489122			0
FR_FRABCH	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.217854797	0.217854797	1.412416534	0.244638324	0
FR_FRABCH	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	1.933220621	0.175747329	1.139421473	0.370019447	0
FR_FRABCH	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.26791832	0.206174393	1.336689048	0.256681239	0
FR_FRABCH	Total Metals	Thallium (mg/L)_Total Metals	Residuals	28	4.318792769	0.154242599			0
FR_FRABCH	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.001696356	0.001696356	0.058332851	0.810910651	0
FR_FRABCH	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.908159768	0.082559979	2.839002695	0.012619123	0
FR_FRABCH	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.945433192	0.176857563	6.08162822	5.43225E-05	0
FR_FRABCH	Total Metals	Tin (mg/L)_Total Metals	Residuals	28	0.814257561	0.029080627			0
FR_FRABCH	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.144578646	0.144578646	1.852159002	0.184386485	0
FR_FRABCH	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.464202404	0.042200219	0.5406159	0.858556556	0
FR_FRABCH	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.376532689	0.034230244	0.438514658	0.924592135	0
FR_FRABCH	Total Metals	Titanium (mg/L)_Total Metals	Residuals	28	2.185666606	0.078059522			0
FR_FRABCH	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.370949444	0.370949444	42.96712204	4.16732E-07	1
FR_FRABCH	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	0.951597556	0.086508869	10.02033344	4.64448E-07	0
FR_FRABCH	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.153308546	0.013937141	1.614340793	0.148784895	0
FR_FRABCH	Total Metals	Uranium (mg/L)_Total Metals	Residuals	28	0.241733305	0.008633332			0
FR_FRABCH	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	0.418706313	0.418706313	1.454238591	0.237940754	0
FR_FRABCH	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	4.150214139	0.377292194	1.310400278	0.269860073	0
FR_FRABCH	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.130763617	0.193705783	0.672773294	0.751575806	0
FR_FRABCH	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	28	8.061797316	0.287921333			0
FR_FRABCH	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.230443958	0.230443958	1.297101116	0.264393984	0
FR_FRABCH	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	3.501984759	0.318362251	1.791967271	0.103944587	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FRABCH	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.274152729	0.206741157	1.163685035	0.35424013	0
FR_FRABCH	Total Metals	Zinc (mg/L)_Total Metals	Residuals	28	4.974501025	0.177660751			0
FR_FRCP1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	4.512560592	4.512560592	11.5181694	0.001902043	1
FR_FRCP1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	18.14180529	1.649255026	4.209671736	0.000761791	0
FR_FRCP1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	5.504559955	0.500414541	1.277292425	0.282634032	0
FR_FRCP1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	31	12.14510513	0.391777585			0
FR_FRCP1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.230034456	0.230034456	12.06222043	0.001540166	1
FR_FRCP1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.82514653	0.256831503	13.46736597	6.27274E-09	0
FR_FRCP1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.203353912	0.018486719	0.969380359	0.492930583	0
FR_FRCP1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	31	0.591190334	0.019070656			0
FR_FRCP1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	4.699978764	4.699978764	12.06623455	0.001537789	1
FR_FRCP1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	20.41707854	1.856098049	4.765152254	0.000284032	0
FR_FRCP1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	2.223790302	0.202162755	0.51901154	0.875569009	0
FR_FRCP1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	31	12.0749635	0.389514951			0
FR_FRCP1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	1.024360509	1.024360509	12.89959156	0.001119951	1
FR_FRCP1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	10.99599621	0.999636019	12.58824041	1.41032E-08	0
FR_FRCP1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.232227066	0.112020642	1.41065623	0.217384722	0
FR_FRCP1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	31	2.461719476	0.079410306			0
FR_FRCP1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.097756662	0.097756662	1.076923386	0.307414038	0
FR_FRCP1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	2.216730211	0.201520928	2.220028746	0.039928787	0
FR_FRCP1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.523207422	0.047564311	0.523985965	0.872073368	0
FR_FRCP1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	31	2.813994542	0.090774017			0
FR_FRCP1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.732288454	1.732288454	13.62017947	0.000856288	1
FR_FRCP1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	14.77069419	1.342790381	10.55773704	1.09235E-07	0
FR_FRCP1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.811562092	0.164687463	1.294861023	0.273183255	0
FR_FRCP1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	31	3.942748494	0.127185435			0
FR_FRCP1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0	0	-	-	-
FR_FRCP1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0	0	-	-	0
FR_FRCP1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0	0	-	-	0
FR_FRCP1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	31	0	0			0
FR_FRCP1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	1.12764E-05	1.12764E-05	0.000344543	0.985309581	0
FR_FRCP1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.136127324	0.012375211	0.378116873	0.955004726	0
FR_FRCP1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.233460367	0.02122367	0.648476011	0.773674453	0
FR_FRCP1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	31	1.014584581	0.032728535			0
FR_FRCP1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.002401309	0.002401309	19.1119939	0.000128758	1
FR_FRCP1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.00671735	0.000610668	4.860301391	0.00024112	0
FR_FRCP1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.002035662	0.00018506	1.47289204	0.191758709	0
FR_FRCP1	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	31	0.003894967	0.000125644			0
FR_FRCP1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.198140723	0.198140723	10.88838289	0.00243853	1
FR_FRCP1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.551956439	0.23199604	12.74882656	1.2125E-08	0
FR_FRCP1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.205871187	0.018715562	1.028472123	0.446175967	0
FR_FRCP1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	31	0.564120722	0.018197443			0
FR_FRCP1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.598968535	1.598968535	12.76449861	0.001178439	1
FR_FRCP1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	16.70518436	1.518653124	12.12334406	2.20272E-08	0
FR_FRCP1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.999293063	0.181753915	1.450933863	0.200472251	0
FR_FRCP1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	31	3.883272354	0.12526685			0
FR_FRCP1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.007913165	0.007913165	0.075508887	0.785301601	0
FR_FRCP1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	3.754893455	0.34135395	3.257262456	0.00468542	0
FR_FRCP1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.553066882	0.050278807	0.479769669	0.901642879	0
FR_FRCP1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	31	3.248731905	0.104797803			0
FR_FRCP1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.13211475	0.13211475	0.191884101	0.664390383	0
FR_FRCP1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	29.95474671	2.723158791	3.955128981	0.001218713	0
FR_FRCP1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	8.87226763	0.806569785	1.171465851	0.345367427	0
FR_FRCP1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	31	21.3439114	0.688513271			0
FR_FRCP1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	1.109569413	1.109569413	0.962769798	0.334086187	0
FR_FRCP1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	44.07531079	4.006846436	3.476727717	0.003039779	0
FR_FRCP1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	9.077807304	0.825255209	0.716071281	0.714458575	0
FR_FRCP1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	31	35.72676655	1.15247634			0
FR_FRCP1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.008948675	0.008948675	0.126317876	0.724687772	0
FR_FRCP1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	1.180782426	0.107343857	1.515246439	0.175916446	0
FR_FRCP1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.563540346	0.051230941	0.723166676	0.708127418	0
FR_FRCP1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	31	2.196117727	0.070842507			0
FR_FRCP1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.396931578	0.396931578	5.789971829	0.022268494	1
FR_FRCP1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	1.830404397	0.1664004	2.427253664	0.025763003	0
FR_FRCP1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.39195132	0.035631938	0.51975688	0.875047841	0
FR_FRCP1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	31	2.125205316	0.06855501			0
FR_FRCP1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.202858683	0.202858683	4.740546522	0.037193421	1
FR_FRCP1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.570751324	0.051886484	1.212520399	0.319833139	0
FR_FRCP1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.404948043	0.036813458	0.860283178	0.585575663	0
FR_FRCP1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	31	1.326559953	0.042792257			0
FR_FRCP1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.260252765	1.260252765	6.078627573	0.019421046	1
FR_FRCP1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.09356819	0.190324381	0.9179992	0.535673602	0
FR_FRCP1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.238336965	0.112576088	0.542992747	0.858352657	0
FR_FRCP1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	31	6.427081648	0.207325214			0
FR_FRCP1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	7.043196309	7.043196309	11.43473853	0.001965178	1
FR_FRCP1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.805162961	0.255014815	0.41402051	0.938662702	0
FR_FRCP1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.005333804	0.182303073	0.295971869	0.98175829	0
FR_FRCP1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	31	19.09436627	0.615947299			0
FR_FRCP1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.076213734	0.076213734	0.263933065	0.611073548	0
FR_FRCP1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	3.282166623	0.298378784	1.03330493	0.442476572	0
FR_FRCP1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.462845296	0.132985936	0.460538855	0.913377683	0
FR_FRCP1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	31	8.95160957	0.288761599			0
FR_FRCP1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.045968279	0.045968279	1.271639584	0.268111998	0
FR_FRCP1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.683765372	0.062160488	1.719571397	0.115193183	0
FR_FRCP1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.46275632	0.042068756	1.163765473	0.350327565	0
FR_FRCP1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	31	1.120613626	0.036148827			0
FR_FRCP1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.327904163	2.327904163	6.799134105	0.013901825	1
FR_FRCP1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	6.259494069	0.569044915	1.662015452	0.129917021	0
FR_FRCP1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	5.474056317	0.497641483	1.4534667	0.199449247	0
FR_FRCP1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	31	10.61385582	0.342382446			0
FR_FRCP1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.0987543	0.0987543	1.772872134	0.192735778	0
FR_FRCP1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.540219734	0.049110885	0.881655985	0.566897381	0
FR_FRCP1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.678964486	0.061724044	1.108091883	0.387793614	0
FR_FRCP1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	31	1.726793058	0.055703002			0
FR_FRCP1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.294418144	0.294418144	7.231380105	0.011427434	1
FR_FRCP1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	0.805274011	0.073206728	1.79807423	0.097673066	0
FR_FRCP1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.520038954	0.047276269	1.161180702	0.352004639	0
FR_FRCP1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	31	1.262132863	0.040713963			0
FR_FRCP1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.328833735	0.328833735	3.426757623	0.073696043	0
FR_FRCP1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.289868562	0.026351687	0.274609434	0.986401539	0
FR_FRCP1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.270215732	0.024565067	0.25599116	0.98974426	0
FR_FRCP1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	31	2.974778756	0.095960605			0
FR_FRCP1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.087317591	0.087317591	2.777528602	0.105669618	0
FR_FRCP1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.69054873	0.062777157	1.996909763	0.064121752	0
FR_FRCP1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.712427838	0.064766167	2.060179166	0.056061158	0
FR_FRCP1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	31	0.974551735	0.031437153			0
FR_FRCP1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.077230445	0.077230445	2.10046602	0.157295856	0
FR_FRCP1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.591024663	0.053729515	1.461302205	0.196314239	0
FR_FRCP1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.554065519	0.050369593	1.369921112	0.235764544	0
FR_FRCP1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	31	1.139815539	0.036768243			0
FR_FRCP1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.332084109	0.332084109	7.94175398	0.008337375	1
FR_FRCP1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	8.192631113	0.744784647	17.81144073	1.92251E-10	0
FR_FRCP1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.576550765	0.052413706	1.253467859	0.295882305	0
FR_FRCP1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	31	1.296263699	0.041814958			0
FR_FRCP1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.693307623	4.693307623	4.566926205	0.040592823	1
FR_FRCP1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	9.282752637	0.843886603	0.821162419	0.62023301	0
FR_FRCP1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	5.741357663	0.521941606	0.507886759	0.883236739	0
FR_FRCP1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	31	31.8578689	1.02767319			0
FR_FRCP1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.054588751	0.054588751	2.349007649	0.135505841	0
FR_FRCP1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.154449756	0.014040887	0.604193174	0.810727215	0
FR_FRCP1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.117643315	0.010694847	0.460209776	0.913572182	0
FR_FRCP1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	31	0.720411144	0.023239069			0
FR_FRCP1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.296531181	0.296531181	7.831579028	0.008750493	1
FR_FRCP1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	2.200426991	0.200038817	5.283153702	0.000118516	0
FR_FRCP1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.233244642	0.021204058	0.560012805	0.845604277	0
FR_FRCP1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	31	1.173769246	0.037863524			0
FR_FRCP1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.094235715	3.094235715	11.77275522	0.001722485	1
FR_FRCP1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	28.02716172	2.547923792	9.694181659	2.84573E-07	0
FR_FRCP1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.750569192	0.250051745	0.951381295	0.507698622	0
FR_FRCP1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	31	8.147736481	0.262830209			0
FR_FRCP1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.880579592	3.880579592	16.08775213	0.000354346	1
FR_FRCP1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	31.2403273	2.840029755	11.77393574	3.10584E-08	0
FR_FRCP1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	3.718484294	0.338044027	1.401432024	0.221432246	0
FR_FRCP1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	31	7.477611936	0.241213288			0
FR_FRCP1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.120735892	0.120735892	11.72145665	0.001757145	1
FR_FRCP1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.861952685	0.078359335	7.607394416	3.75902E-06	0
FR_FRCP1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.168858431	0.015350766	1.490305336	0.18509429	0
FR_FRCP1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	31	0.319312928	0.010300417			0
FR_FRCP1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.084558193	0.084558193	2.310186551	0.138663446	0
FR_FRCP1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.572929286	0.052084481	1.422982948	0.212078371	0
FR_FRCP1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.579724922	0.052702266	1.439861251	0.205000066	0
FR_FRCP1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	31	1.134671992	0.036602322			0
FR_FRCP1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.289254885	0.289254885	26.73284076	1.31773E-05	1
FR_FRCP1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	3.796862413	0.34516931	31.90043339	7.81591E-14	0
FR_FRCP1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.216997406	0.019727037	1.823166218	0.09263907	0
FR_FRCP1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	31	0.335426434	0.010820208			0
FR_FRCP1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.000208512	1.000208512	8.277934849	0.007201907	1
FR_FRCP1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.431892991	0.402899363	3.334479397	0.004020001	0
FR_FRCP1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.523935178	0.138539562	1.146582389	0.361590698	0
FR_FRCP1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	31	3.74567624	0.120828266			0
FR_FRCP1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.063297513	0.063297513	1.671508501	0.205609562	0
FR_FRCP1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.527618861	0.047965351	1.266629416	0.288501598	0
FR_FRCP1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.603744622	0.054885875	1.449380897	0.201101822	0
FR_FRCP1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	31	1.173923375	0.037868496			0
FR_FRCP1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.071466914	0.071466914	10.17200356	0.003253541	1
FR_FRCP1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.160038199	0.014548927	2.070772764	0.054813932	0
FR_FRCP1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.162874107	0.014806737	2.107467273	0.050704363	0
FR_FRCP1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	31	0.217801175	0.007025844			0
FR_FRCP1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.958257232	2.958257232	19.21639529	0.000124489	1
FR_FRCP1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	20.15456565	1.832233241	11.90191233	2.7362E-08	0
FR_FRCP1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.326455614	0.211495965	1.373846067	0.233936116	0
FR_FRCP1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	31	4.772277674	0.153944441			0
FR_FRCP1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.014435512	0.014435512	0.223709247	0.639541536	0
FR_FRCP1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.037186899	0.094289718	1.461221613	0.196346256	0
FR_FRCP1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.601900148	0.054718195	0.84797591	0.596420647	0
FR_FRCP1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	31	2.000368209	0.064528007			0
FR_FRCP1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.252360835	2.252360835	17.5997388	0.000211733	1
FR_FRCP1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	1.372803908	0.124800355	0.975178409	0.488223421	0
FR_FRCP1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.839229083	0.076293553	0.596150751	0.817249684	0
FR_FRCP1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	31	3.96728535	0.127976947			0
FR_FRCP1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	2.497173959	2.497173959	6.23554275	0.018041823	1
FR_FRCP1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	11.82545203	1.075041093	2.684420391	0.015039685	0
FR_FRCP1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	8.42083662	0.765530602	1.911560377	0.076844708	0
FR_FRCP1	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	31	12.41470002	0.400474194			0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FRCP1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.14247414	0.14247414	3.207486388	0.083071775	0
FR_FRCP1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.628848151	0.057168014	1.287009882	0.277373479	0
FR_FRCP1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.446898899	0.040627173	0.914629866	0.538536614	0
FR_FRCP1	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	31	1.376996751	0.04441925			0
FR_FRCP1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.063814952	0.063814952	1.49647161	0.230432916	0
FR_FRCP1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.577489484	0.052499044	1.231111626	0.308772353	0
FR_FRCP1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.480958563	0.043723506	1.025323742	0.448596434	0
FR_FRCP1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	31	1.321951908	0.04264361			0
FR_FRCP1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.001591794	0.001591794	8.783731822	0.005796594	1
FR_FRCP1	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.002274253	0.00020675	1.14087565	0.365390801	0
FR_FRCP1	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.001676563	0.000152415	0.841045269	0.60255311	0
FR_FRCP1	Field Measured	pH (-)_Field Measured	Residuals	31	0.005617842	0.000181221			0
FR_FRCP1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	2.492332802	2.492332802	10.01507401	0.003468618	1
FR_FRCP1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	22.36201245	2.032910223	8.168951719	1.80063E-06	0
FR_FRCP1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	5.053626433	0.459420585	1.846114272	0.088257108	0
FR_FRCP1	Major Ions	Bromide (mg/L)_Major Ions	Residuals	31	7.71460269	0.248858151			0
FR_FRCP1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	1.059605662	1.059605662	12.98718246	0.001083697	1
FR_FRCP1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	10.4979825	0.954362046	11.6972516	3.35248E-08	0
FR_FRCP1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	1.169279871	0.10629817	1.302856129	0.268970965	0
FR_FRCP1	Major Ions	Calcium (mg/L)_Major Ions	Residuals	31	2.529245708	0.081588571			0
FR_FRCP1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.556569078	0.556569078	3.108760137	0.087728601	0
FR_FRCP1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	23.96446119	2.178587381	12.16867029	2.10784E-08	0
FR_FRCP1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	2.682597119	0.243872465	1.362168738	0.239412601	0
FR_FRCP1	Major Ions	Chloride (mg/L)_Major Ions	Residuals	31	5.55000729	0.179032493			0
FR_FRCP1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.7100263	0.7100263	18.49528098	0.000157391	1
FR_FRCP1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.752400264	0.068400024	1.781733527	0.101093199	0
FR_FRCP1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	1.073167899	0.097560718	2.541332476	0.02027253	0
FR_FRCP1	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	31	1.190077367	0.038389592			0
FR_FRCP1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	2.536847974	2.536847974	14.22488988	0.000686252	1
FR_FRCP1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	20.2142527	1.837659336	10.3043233	1.43821E-07	0
FR_FRCP1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	2.599753065	0.236341188	1.325238014	0.25746989	0
FR_FRCP1	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	31	5.528498839	0.178338672			0
FR_FRCP1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.915896842	0.915896842	16.91853865	0.000266416	1
FR_FRCP1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	5.646281911	0.513298356	9.481698882	3.63455E-07	0
FR_FRCP1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.736050586	0.06691369	1.23603641	0.305894463	0
FR_FRCP1	Major Ions	Potassium (mg/L)_Major Ions	Residuals	31	1.678206535	0.054135695			0
FR_FRCP1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.079856355	0.079856355	4.727000056	0.037447025	1
FR_FRCP1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	3.511457768	0.319223433	18.89604394	8.97912E-11	0
FR_FRCP1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.1758184	0.015983491	0.946123354	0.512055802	0
FR_FRCP1	Major Ions	Sodium (mg/L)_Major Ions	Residuals	31	0.523703611	0.016893665			0
FR_FRCP1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	2.327514608	2.327514608	12.38439119	0.001361296	1
FR_FRCP1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	28.8659467	2.624176972	13.9628916	4.04413E-09	0
FR_FRCP1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	3.494340696	0.317667336	1.690265034	0.12247893	0
FR_FRCP1	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	31	5.826120295	0.187939364			0
FR_FRCP1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.174330526	0.174330526	4.165475114	0.049848599	1
FR_FRCP1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	9.240034545	0.84000314	20.07113876	4.09557E-11	0
FR_FRCP1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.640660199	0.058241836	1.391637627	0.225802734	0
FR_FRCP1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	31	1.297390132	0.041851295			0
FR_FRCP1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.485541198	0.485541198	3.315399219	0.078299042	0
FR_FRCP1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	9.664156071	0.878559643	5.999029468	3.78989E-05	0
FR_FRCP1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	2.484183543	0.225834868	1.542058113	0.166517775	0
FR_FRCP1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	31	4.539959184	0.146450296			0
FR_FRCP1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	7.561811748	7.561811748	24.7677865	2.29591E-05	1
FR_FRCP1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.96910731	0.179009755	0.586324488	0.825119505	0
FR_FRCP1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.453060239	0.132096385	0.432665501	0.929071864	0
FR_FRCP1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	31	9.464558499	0.305308339			0
FR_FRCP1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	4.744878274	4.744878274	9.358478018	0.004549583	1
FR_FRCP1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	4.205505685	0.382318699	0.754059626	0.680436372	0
FR_FRCP1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	3.47482323	0.315893021	0.623046098	0.795172712	0
FR_FRCP1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	31	15.71743035	0.507013882			0
FR_FRCP1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.075744234	0.075744234	0.387350856	0.538246577	0
FR_FRCP1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.484855013	0.134986819	0.690313402	0.737296328	0
FR_FRCP1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.699182888	0.154471172	0.789955052	0.648174802	0
FR_FRCP1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	31	6.061871884	0.195544254			0
FR_FRCP1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	1.561304285	1.561304285	4.28650324	0.046832788	1
FR_FRCP1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	22.78918834	2.071744394	5.687897703	6.16317E-05	0
FR_FRCP1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	3.560939095	0.323721736	0.888766068	0.560732307	0
FR_FRCP1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	31	11.29135571	0.364237281			0
FR_FRCP1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.311724459	0.311724459	4.38833154	0.090343615	0
FR_FRCP1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	as.factor(Month)	3	0.245579779	0.081859926	1.152391117	0.413788091	0
FR_FRCP1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	Residuals	5	0.355174234	0.071034847			0
FR_FRCP1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.728958371	0.728958371	4.335710077	0.091800639	0
FR_FRCP1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(Month)	3	0.110049679	0.036683226	0.218185072	0.879917517	0
FR_FRCP1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	Residuals	5	0.840644737	0.168128947			0
FR_FRCP1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(new_year)	1	2.646537139	2.646537139	4.708708367	0.082147616	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(Month)	3	9.628199515	3.209399838	5.710151445	0.045246632	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	Residuals	5	2.810258072	0.562051614			0
FR_FRCP1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(new_year)	1	1.288660599	1.288660599	4.596174875	0.084900744	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(Month)	3	2.73700982	0.912336607	3.253966631	0.118297184	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	Residuals	5	1.401883778	0.280376756			0
FR_FRCP1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.384810409	0.384810409	1.2	0.32326019	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(Month)	3	0.320675341	0.10689178	0.333333333	0.802577062	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	Residuals	5	1.603376706	0.320675341			0
FR_FRCP1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.192181206	0.192181206	1.2	0.32326019	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(Month)	3	0.160151005	0.053383668	0.333333333	0.802577062	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	Residuals	5	0.800755023	0.160151005			0
FR_FRCP1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.364635258	0.364635258	0.569205386	0.4845711	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(Month)	3	0.640604019	0.213534673	0.333333333	0.802577062	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	Residuals	5	3.203020093	0.640604019			0
FR_FRCP1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.495340242	0.495340242	0.773239361	0.419464253	0
FR_FRCP1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(Month)	3	0.640604019	0.213534673	0.333333333	0.802577062	0
FR_FRCP1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	Residuals	5	3.203020093	0.640604019			0
FR_FRCP1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	2.410486969	2.410486969	3.763408505	0.061530271	0
FR_FRCP1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	60.51495929	5.501359936	8.589079734	1.06026E-06	0
FR_FRCP1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	4.631842167	0.421076561	0.657412021	0.76599822	0
FR_FRCP1	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	31	19.85569622	0.64050633			0
FR_FRCP1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.201373567	0.201373567	3.816938843	0.059811646	0
FR_FRCP1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	1.665006398	0.151364218	2.869035751	0.01027186	0
FR_FRCP1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.547523288	0.049774844	0.94345817	0.514271636	0
FR_FRCP1	Total Metals	Antimony (mg/L)_Total Metals	Residuals	31	1.635494001	0.052757871			0
FR_FRCP1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.158199358	0.158199358	2.355399019	0.134994088	0
FR_FRCP1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	1.831069037	0.166460822	2.478402318	0.023134329	0
FR_FRCP1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.823189735	0.07483543	1.114209953	0.383539101	0
FR_FRCP1	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	31	2.082101615	0.067164568			0
FR_FRCP1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	1.136401683	1.136401683	6.341901903	0.017167833	1
FR_FRCP1	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	1.877068537	0.170642594	0.952302878	0.50693689	0
FR_FRCP1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.97212526	0.088375024	0.49319333	0.893034499	0
FR_FRCP1	Total Metals	Barium (mg/L)_Total Metals	Residuals	31	5.554871823	0.179189414			0
FR_FRCP1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	6.477422654	6.477422654	11.16548622	0.002184762	1
FR_FRCP1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	3.396214181	0.308746744	0.532203578	0.866210754	0
FR_FRCP1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.795030073	0.163184552	0.2812901	0.98504498	0
FR_FRCP1	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	31	17.98399983	0.580129027			0
FR_FRCP1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	0.024283988	0.024283988	0.088007131	0.768704719	0
FR_FRCP1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	4.053536812	0.368503347	1.335485827	0.252345514	0
FR_FRCP1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.85628654	0.077844231	0.282113767	0.984871797	0
FR_FRCP1	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	31	8.553893656	0.275932053			0
FR_FRCP1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.06214236	0.06214236	2.289835796	0.140353129	0
FR_FRCP1	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	1.003482282	0.091225662	3.361503921	0.003811087	0
FR_FRCP1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.256290079	0.023299098	0.858530461	0.587116412	0
FR_FRCP1	Total Metals	Boron (mg/L)_Total Metals	Residuals	31	0.841288777	0.027138348			0
FR_FRCP1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.485459648	0.485459648	1.48822644	0.231691735	0
FR_FRCP1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	3.054654287	0.277695844	0.851305148	0.593481102	0
FR_FRCP1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.040724669	0.185520424	0.568731926	0.838915945	0
FR_FRCP1	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	31	10.11220382	0.326200123			0
FR_FRCP1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	1.098859634	1.098859634	14.17025216	0.000700016	1
FR_FRCP1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	10.79849348	0.981681226	12.65918783	1.31899E-08	0
FR_FRCP1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.280254296	0.116386754	1.500855618	0.181159833	0
FR_FRCP1	Total Metals	Calcium (mg/L)_Total Metals	Residuals	31	2.403955009	0.077546936			0
FR_FRCP1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.03494688	0.03494688	0.161518945	0.69051941	0
FR_FRCP1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	6.431319366	0.584665397	2.702230843	0.014493581	0
FR_FRCP1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.964953721	0.087723066	0.405442112	0.942824102	0
FR_FRCP1	Total Metals	Chromium (mg/L)_Total Metals	Residuals	31	6.707283115	0.216363971			0
FR_FRCP1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.496420381	0.496420381	8.773718427	0.005821348	1
FR_FRCP1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	3.11831611	0.283483283	5.010274751	0.000186816	0
FR_FRCP1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.696644285	0.063331299	1.119315408	0.380014587	0
FR_FRCP1	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	31	1.753991987	0.056580387			0
FR_FRCP1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.054914896	0.054914896	0.958818109	0.335065186	0
FR_FRCP1	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	1.374869658	0.124988151	2.18230228	0.04325583	0
FR_FRCP1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.404900804	0.036809164	0.642690704	0.778612345	0
FR_FRCP1	Total Metals	Copper (mg/L)_Total Metals	Residuals	31	1.775479368	0.057273528			0
FR_FRCP1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	0.538161865	0.538161865	1.579341162	0.21824294	0
FR_FRCP1	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	29.06637022	2.642397293	7.754631248	3.08928E-06	0
FR_FRCP1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	4.034894692	0.366808608	1.076471545	0.410316097	0
FR_FRCP1	Total Metals	Iron (mg/L)_Total Metals	Residuals	31	10.56327676	0.340750863			0
FR_FRCP1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.192363743	0.192363743	1.142289441	0.293421202	0
FR_FRCP1	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	7.051550038	0.641050003	3.80666668	0.001611419	0
FR_FRCP1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.671591248	0.151962841	0.902381841	0.549000679	0
FR_FRCP1	Total Metals	Lead (mg/L)_Total Metals	Residuals	31	5.22045973	0.168401927			0
FR_FRCP1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.2931371	0.2931371	6.758152724	0.014165019	1
FR_FRCP1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	8.267689615	0.751608147	17.32801018	2.7327E-10	0
FR_FRCP1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.587296272	0.05339057	1.230897173	0.308898168	0
FR_FRCP1	Total Metals	Lithium (mg/L)_Total Metals	Residuals	31	1.344635207	0.043375329			0
FR_FRCP1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	2.433002974	2.433002974	14.61229051	0.000596594	1
FR_FRCP1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	20.44051341	1.858228492	11.16027183	5.78573E-08	0
FR_FRCP1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.858777442	0.259888858	1.560857729	0.16020688	0
FR_FRCP1	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	31	5.161620086	0.166503874			0
FR_FRCP1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	3.606333568	3.606333568	3.568017341	0.068289557	0
FR_FRCP1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	12.43363162	1.130330147	1.118320724	0.380699414	0
FR_FRCP1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	6.562745138	0.596613194	0.590274356	0.82196959	0
FR_FRCP1	Total Metals	Manganese (mg/L)_Total Metals	Residuals	31	31.33290282	1.010738801			0
FR_FRCP1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	11.48029374	11.48029374	9.667198508	0.004001944	1
FR_FRCP1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	4.972099635	0.452009058	0.380622777	0.953956319	0
FR_FRCP1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.816491671	0.256044697	0.215607281	0.994986004	0
FR_FRCP1	Total Metals	Mercury (mg/L)_Total Metals	Residuals	31	36.81408896	1.187551257			0
FR_FRCP1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	1	0.343428683	0.343428683	6.27310097	0.087350618	0
FR_FRCP1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(Month)	7	1.528315706	0.218330815	3.988051427	0.141534808	0
FR_FRCP1	Total Metals	Methyl mercury (µg/L)_Total Metals	Residuals	3	0.164238716	0.054746239			0
FR_FRCP1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.271261167	0.271261167	8.171519162	0.007542104	1
FR_FRCP1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	2.153627421	0.195784311	5.897841057	4.4325E-05	0
FR_FRCP1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.262089473	0.023826316	0.71774813	0.712963642	0
FR_FRCP1	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	31	1.029073788	0.033195929			0
FR_FRCP1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	2.982426213	2.982426213	12.33138868	0.001389121	1
FR_FRCP1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	24.4385381	2.221685282	9.185965651	5.14153E-07	0
FR_FRCP1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.886369215	0.262397201	1.084929399	0.404204675	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FRCP1	Total Metals	Nickel (mg/L)_Total Metals	Residuals	31	7.49755076	0.241856476			0
FR_FRCP1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.728121303	0.728121303	12.82158248	0.001153335	1
FR_FRCP1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	5.37357701	0.488507001	8.602183149	1.04318E-06	0
FR_FRCP1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.79423176	0.072202887	1.271430008	0.285847599	0
FR_FRCP1	Total Metals	Potassium (mg/L)_Total Metals	Residuals	31	1.76045043	0.056788724			0
FR_FRCP1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	3.285183966	3.285183966	14.08178569	0.000722933	1
FR_FRCP1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	31.73669805	2.885154368	12.36707774	1.74083E-08	0
FR_FRCP1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	4.038698223	0.367154384	1.573789901	0.155995413	0
FR_FRCP1	Total Metals	Selenium (mg/L)_Total Metals	Residuals	31	7.232087265	0.233293138			0
FR_FRCP1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.130806284	0.130806284	10.01897477	0.00346309	1
FR_FRCP1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.68072443	0.061884039	4.739945253	0.000296703	0
FR_FRCP1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.184432336	0.016766576	1.284218897	0.278875951	0
FR_FRCP1	Total Metals	Silicon (mg/L)_Total Metals	Residuals	31	0.404731513	0.013055855			0
FR_FRCP1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.19283322	0.19283322	4.222954761	0.048390235	1
FR_FRCP1	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	0.805578138	0.073234376	1.603797611	0.146617966	0
FR_FRCP1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.431334941	0.039212267	0.858729793	0.586941122	0
FR_FRCP1	Total Metals	Silver (mg/L)_Total Metals	Residuals	31	1.415556205	0.045663103			0
FR_FRCP1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.022773671	0.022773671	1.376529328	0.249629429	0
FR_FRCP1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	3.57876275	0.325342068	19.66494085	5.34851E-11	0
FR_FRCP1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.192910398	0.017537309	1.060023206	0.422381054	0
FR_FRCP1	Total Metals	Sodium (mg/L)_Total Metals	Residuals	31	0.512872334	0.016544269			0
FR_FRCP1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.241816306	0.241816306	23.57898599	3.24561E-05	1
FR_FRCP1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	3.936002065	0.35781837	34.89009673	2.23698E-14	0
FR_FRCP1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.294808205	0.026800746	2.613282875	0.017441002	0
FR_FRCP1	Total Metals	Strontium (mg/L)_Total Metals	Residuals	31	0.31792315	0.010255585			0
FR_FRCP1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	1.031722048	1.031722048	6.809184552	0.013838092	1
FR_FRCP1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	4.000490585	0.363680962	2.400230561	0.02727297	0
FR_FRCP1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.511409432	0.137400857	0.906821559	0.545197551	0
FR_FRCP1	Total Metals	Thallium (mg/L)_Total Metals	Residuals	31	4.697094526	0.151519178			0
FR_FRCP1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.190297623	0.190297623	7.88059911	0.008564013	1
FR_FRCP1	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.828136922	0.075285175	3.11770727	0.006195531	0
FR_FRCP1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.389357627	0.035396148	1.465824155	0.194525309	0
FR_FRCP1	Total Metals	Tin (mg/L)_Total Metals	Residuals	31	0.748575865	0.024147609			0
FR_FRCP1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.100138367	0.100138367	10.66189248	0.002669487	1
FR_FRCP1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.165953124	0.015086648	1.606299563	0.145860441	0
FR_FRCP1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.147853112	0.013441192	1.43110526	0.208645278	0
FR_FRCP1	Total Metals	Titanium (mg/L)_Total Metals	Residuals	31	0.291157446	0.009392176			0
FR_FRCP1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	2.79917297	2.79917297	17.58301011	0.000212922	1
FR_FRCP1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	20.20531481	1.836846801	11.53815652	3.9331E-08	0
FR_FRCP1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.476857324	0.225168848	1.414398527	0.215761417	0
FR_FRCP1	Total Metals	Uranium (mg/L)_Total Metals	Residuals	31	4.935125529	0.159197598			0
FR_FRCP1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	0.004564201	0.004564201	0.03551108	0.851756958	0
FR_FRCP1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	3.43912704	0.312647913	2.432509827	0.025479358	0
FR_FRCP1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.92367074	0.083970067	0.653316416	0.769523598	0
FR_FRCP1	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	31	3.984397181	0.128528941			0
FR_FRCP1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.337154702	0.337154702	3.245981816	0.081332422	0
FR_FRCP1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	1.686469506	0.15331541	1.476055438	0.190532044	0
FR_FRCP1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.925731887	0.084157444	0.810232014	0.629998135	0
FR_FRCP1	Total Metals	Zinc (mg/L)_Total Metals	Residuals	31	3.219918153	0.103868328			0
FR_FRRD	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.91892979	0.91892979	4.727205137	0.036743064	1
FR_FRRD	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	15.76977289	1.433615717	7.374878534	2.91772E-06	0
FR_FRRD	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	2.387914699	0.217083154	1.11673015	0.378865961	0
FR_FRRD	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	34	6.609320298	0.194391773			0
FR_FRRD	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.059445534	0.059445534	7.39225078	0.010361205	1
FR_FRRD	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.067004639	0.097000422	12.06232652	1.22527E-08	0
FR_FRRD	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.151462362	0.013769306	1.712259157	0.113991061	0
FR_FRRD	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	33	0.265372846	0.008041601			0
FR_FRRD	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.282258271	0.282258271	0.461240968	0.501780536	0
FR_FRRD	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	25.03088451	2.275534956	3.718473662	0.001650535	0
FR_FRRD	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	4.030153601	0.3663776	0.598701177	0.816032991	0
FR_FRRD	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	33	20.1944831	0.611954033			0
FR_FRRD	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.085376505	0.085376505	7.564247967	0.009470347	1
FR_FRRD	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	2.115596293	0.192326936	17.03991791	9.27069E-11	0
FR_FRRD	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.188682833	0.017152985	1.519732281	0.169794858	0
FR_FRRD	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	34	0.383752777	0.011286846			0
FR_FRRD	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.156853957	0.156853957	1.899308256	0.177158363	0
FR_FRRD	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	3.341490885	0.303771899	3.678303596	0.001671348	0
FR_FRRD	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.652536603	0.1502306	1.81910756	0.089325911	0
FR_FRRD	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	34	2.80788257	0.082584781			0
FR_FRRD	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.200384757	0.200384757	13.0445468	0.00096988	1
FR_FRRD	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.68265253	0.243877503	15.87581579	2.43493E-10	0
FR_FRRD	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.239949114	0.021813556	1.420007956	0.20894243	0
FR_FRRD	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	34	0.522293481	0.015361573			0
FR_FRRD	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0	0	-	-	-
FR_FRRD	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0	0	-	-	0
FR_FRRD	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0	0	-	-	0
FR_FRRD	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	33	0	0			0
FR_FRRD	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.005707993	0.005707993	0.234887852	0.631030804	0
FR_FRRD	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.339174738	0.030834067	1.268843215	0.28337607	0
FR_FRRD	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.339043165	0.030822106	1.268351006	0.283650761	0
FR_FRRD	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	34	0.826231538	0.024300928			0
FR_FRRD	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000186439	0.000186439	1.130809535	0.295097351	0
FR_FRRD	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.007994923	0.000726811	4.408323663	0.000401961	0
FR_FRRD	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.001277999	0.000116182	0.704676172	0.725347602	0
FR_FRRD	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	34	0.005605664	0.000164872			0
FR_FRRD	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.084029973	0.084029973	11.33657546	0.001899439	1
FR_FRRD	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.920263769	0.083660343	11.28670828	2.06596E-08	0
FR_FRRD	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.162684413	0.014789492	1.995266546	0.060748005	0
FR_FRRD	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	34	0.252017823	0.007412289			0
FR_FRRD	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.129710504	0.129710504	6.774668781	0.013602461	1
FR_FRRD	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	2.869109183	0.260828108	13.62282921	1.86944E-09	0
FR_FRRD	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.272601539	0.024781958	1.294340496	0.269443374	0
FR_FRRD	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	34	0.650977526	0.019146398			0
FR_FRRD	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.251135787	0.251135787	2.687063596	0.110387996	0
FR_FRRD	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	6.025178333	0.547743485	5.860660469	3.07301E-05	0
FR_FRRD	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.316973237	0.11972484	1.281013202	0.276653484	0
FR_FRRD	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	34	3.177675722	0.093461051			0
FR_FRRD	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.623139063	0.623139063	2.003511648	0.166030442	0
FR_FRRD	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	22.83410802	2.075828002	6.674185309	8.35623E-06	0
FR_FRRD	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	6.108704458	0.555336769	1.785514263	0.096098632	0
FR_FRRD	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	34	10.57479659	0.311023429			0
FR_FRRD	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.269185431	0.269185431	0.421555939	0.520523959	0
FR_FRRD	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	41.32250022	3.756590929	5.882982627	2.96148E-05	0
FR_FRRD	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	13.3665463	1.215140573	1.902962291	0.074378273	0
FR_FRRD	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	34	21.71077151	0.638552103			0
FR_FRRD	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.001361748	0.001361748	0.004968626	0.944217851	0
FR_FRRD	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	2.860839593	0.260076327	0.9489433	0.508297806	0
FR_FRRD	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.846405092	0.167855008	0.612454381	0.805152365	0
FR_FRRD	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	34	9.318359806	0.274069406			0
FR_FRRD	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.040815567	0.040815567	0.695616223	0.410082297	0
FR_FRRD	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	3.142720445	0.285701859	4.869192361	0.000171346	0
FR_FRRD	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.607308466	0.055209861	0.940936935	0.515032111	0
FR_FRRD	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	34	1.994963943	0.05867541			0
FR_FRRD	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.060718955	0.060718955	1.591643294	0.215678565	0
FR_FRRD	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.587013638	0.053364876	1.398868729	0.218207635	0
FR_FRRD	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.599658795	0.054514436	1.429002468	0.205106679	0
FR_FRRD	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	34	1.297052219	0.038148595			0
FR_FRRD	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.023122881	0.023122881	1.339607647	0.255169849	0
FR_FRRD	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.351167659	0.395560696	22.91652709	1.41079E-12	0
FR_FRRD	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.181532419	0.016502947	0.956086485	0.502327029	0
FR_FRRD	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	34	0.586871807	0.017260936			0
FR_FRRD	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	8.318377912	8.318377912	13.64831766	0.00077016	1
FR_FRRD	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.706620115	0.155147283	0.254556769	0.990261962	0
FR_FRRD	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.40800785	0.128000714	0.210016234	0.995665765	0
FR_FRRD	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	34	20.72232315	0.609480093			0
FR_FRRD	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.655821948	0.655821948	1.444771971	0.237673894	0
FR_FRRD	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	2.807079589	0.255189054	0.562180014	0.845245967	0
FR_FRRD	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.883034207	0.262094019	0.577391613	0.833449907	0
FR_FRRD	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	34	15.43354016	0.453927652			0
FR_FRRD	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.114666063	0.114666063	2.722792685	0.108134392	0
FR_FRRD	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	1.566379571	0.142398143	3.381302295	0.003063789	0
FR_FRRD	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.647301334	0.058845576	1.397312329	0.218903848	0
FR_FRRD	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	34	1.431855667	0.042113402			0
FR_FRRD	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.114422568	0.114422568	1.370854355	0.249806023	0
FR_FRRD	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.148675436	0.10442504	1.251077675	0.293429305	0
FR_FRRD	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.600230474	0.054566407	0.653739884	0.770198396	0
FR_FRRD	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	34	2.837914399	0.083468071			0
FR_FRRD	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.120878976	0.120878976	1.255590856	0.270340091	0
FR_FRRD	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.521433149	0.138312104	1.436671776	0.201885525	0
FR_FRRD	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.258623597	0.114420327	1.188503747	0.33114022	0
FR_FRRD	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	34	3.273267862	0.096272584			0
FR_FRRD	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.856632635	2.856632635	12.18190446	0.001356759	1
FR_FRRD	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	2.633757768	0.239432524	1.021042783	0.449791796	0
FR_FRRD	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.887262393	0.262478399	1.11932026	0.37706064	0
FR_FRRD	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	34	7.972933128	0.234498033			0
FR_FRRD	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.247650196	0.247650196	3.79844241	0.059590004	0
FR_FRRD	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.547268059	0.049751642	0.763087407	0.672648753	0
FR_FRRD	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.303528528	0.027593503	0.423227327	0.935065182	0
FR_FRRD	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	34	2.216726161	0.065197828			0
FR_FRRD	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.01094744	0.01094744	0.202824326	0.655309465	0
FR_FRRD	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.66903809	0.060821645	1.126848707	0.371848378	0
FR_FRRD	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.748207217	0.068018838	1.26019183	0.288236061	0
FR_FRRD	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	34	1.835149564	0.053974987			0
FR_FRRD	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.058218646	0.058218646	1.528211079	0.22485354	0
FR_FRRD	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.589638877	0.053603534	1.407066637	0.214572492	0
FR_FRRD	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.601947867	0.054722533	1.436439819	0.201982285	0
FR_FRRD	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	34	1.295262154	0.038095946			0
FR_FRRD	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.193923221	0.193923221	7.400630422	0.010199648	1
FR_FRRD	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.379200474	0.216290952	8.254243042	8.44887E-07	0
FR_FRRD	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.19149258	0.017408416	0.664351876	0.760985585	0
FR_FRRD	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	34	0.890922685	0.026203608			0
FR_FRRD	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.179000029	0.179000029	0.431029607	0.515903427	0
FR_FRRD	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	10.42240919	0.947491745	2.281547083	0.032358535	0
FR_FRRD	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	4.200756908	0.381886992	0.919578621	0.533204435	0
FR_FRRD	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	34	14.11968202	0.415284765			0
FR_FRRD	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.117220636	0.117220636	3.032175363	0.090671328	0
FR_FRRD	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.224933853	0.020448532	0.52894727	0.869847225	0
FR_FRRD	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.160315973	0.014574179	0.376993926	0.95631198	0
FR_FRRD	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	34	1.3144034	0.038658924			0
FR_FRRD	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.001958024	0.001958024	0.104728634	0.748209478	0
FR_FRRD	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	4.55970372	0.41451852	22.17131499	2.27411E-12	0
FR_FRRD	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.372946647	0.033904241	1.813433085	0.090436617	0
FR_FRRD	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	34	0.635669544	0.018696163			0
FR_FRRD	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000132145	0.000132145	0.000427494	0.983625034	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FRRD	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	21.85128084	1.986480077	6.426351492	1.23066E-05	0
FR_FRRD	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	3.055240157	0.277749105	0.898530721	0.551386835	0
FR_FRRD	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	34	10.50990172	0.309114756			0
FR_FRRD	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.78453372	0.78453372	16.80207981	0.000243571	1
FR_FRRD	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	3.809241323	0.346294666	7.41646976	2.74621E-06	0
FR_FRRD	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.405209109	0.036837192	0.788929041	0.649205717	0
FR_FRRD	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	34	1.587550279	0.046692655			0
FR_FRRD	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.042292702	0.042292702	12.3426217	0.001273775	1
FR_FRRD	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.843724332	0.076702212	22.38462765	1.98091E-12	0
FR_FRRD	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.04385243	0.003986585	1.163437245	0.3472642	0
FR_FRRD	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	34	0.116502952	0.003426557			0
FR_FRRD	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.058951437	0.058951437	1.547586207	0.222000686	0
FR_FRRD	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.590216168	0.053656015	1.408571429	0.213911045	0
FR_FRRD	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.601317413	0.054665219	1.435064935	0.202556661	0
FR_FRRD	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	34	1.295145197	0.038092506			0
FR_FRRD	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.163318274	0.163318274	17.93298801	0.000164421	1
FR_FRRD	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.204195412	0.200381401	22.00266491	2.53835E-12	0
FR_FRRD	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.158939725	0.014449066	1.586564193	0.14743011	0
FR_FRRD	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	34	0.309642839	0.009107142			0
FR_FRRD	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.038101745	0.038101745	0.954736144	0.335418138	0
FR_FRRD	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.586308228	0.053300748	1.335585811	0.248118407	0
FR_FRRD	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.630834054	0.05734855	1.437013795	0.201742928	0
FR_FRRD	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	34	1.356876823	0.039908142			0
FR_FRRD	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.058951437	0.058951437	1.547586207	0.222000686	0
FR_FRRD	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.590216168	0.053656015	1.408571429	0.213911045	0
FR_FRRD	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.601317413	0.054665219	1.435064935	0.202556661	0
FR_FRRD	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	34	1.295145197	0.038092506			0
FR_FRRD	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.090948936	0.090948936	6.188466897	0.01792318	1
FR_FRRD	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.104438786	0.009494435	0.646032811	0.776836398	0
FR_FRRD	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.076146324	0.006922393	0.471022556	0.908276046	0
FR_FRRD	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	34	0.499681728	0.014696521			0
FR_FRRD	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.559927423	0.559927423	35.12490777	1.07239E-06	1
FR_FRRD	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.017412831	0.183401166	11.50497152	1.62664E-08	0
FR_FRRD	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.200958972	0.018268997	1.146035764	0.358801434	0
FR_FRRD	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	34	0.541995228	0.015941036			0
FR_FRRD	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.010219105	0.010219105	0.132938752	0.71766234	0
FR_FRRD	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.676501545	0.06150014	0.800045801	0.639133168	0
FR_FRRD	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.899900619	0.081809147	1.064242524	0.416767023	0
FR_FRRD	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	34	2.613606337	0.076870775			0
FR_FRRD	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.897528538	4.897528538	24.4988948	1.99618E-05	1
FR_FRRD	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	0.758058031	0.068914366	0.344730163	0.968332827	0
FR_FRRD	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.012464079	0.092042189	0.460422413	0.91462308	0
FR_FRRD	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	34	6.796876823	0.199908142			0
FR_FRRD	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.125720559	0.125720559	7.432280801	0.010053982	1
FR_FRRD	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	2.188518557	0.198956232	11.76178818	1.23287E-08	0
FR_FRRD	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.15665631	0.014241483	0.84192036	0.601405144	0
FR_FRRD	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	34	0.575126146	0.016915475			0
FR_FRRD	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.001619644	0.001619644	0.127877735	0.722853088	0
FR_FRRD	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.138464349	0.012587668	0.99384974	0.471383658	0
FR_FRRD	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.053680906	0.004880082	0.385303187	0.952841757	0
FR_FRRD	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	34	0.430629196	0.012665565			0
FR_FRRD	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.001196203	0.001196203	0.078564689	0.780950437	0
FR_FRRD	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.109598926	0.009963539	0.654389321	0.769636948	0
FR_FRRD	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.083280462	0.007570951	0.497247984	0.891633754	0
FR_FRRD	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	34	0.51767397	0.015225705			0
FR_FRRD	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.006022192	0.006022192	2.045776632	0.161755486	0
FR_FRRD	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.022406365	0.002036942	0.691962144	0.736676548	0
FR_FRRD	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.021001869	0.001909261	0.648587938	0.774640877	0
FR_FRRD	Field Measured	pH (-)_Field Measured	Residuals	34	0.100086455	0.002943719			0
FR_FRRD	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	0.176337656	0.176337656	0.897656516	0.35009656	0
FR_FRRD	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	14.99517962	1.363198147	6.939434999	5.57068E-06	0
FR_FRRD	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	4.775858507	0.434168955	2.210160899	0.037861502	0
FR_FRRD	Major Ions	Bromide (mg/L)_Major Ions	Residuals	34	6.679036121	0.196442239			0
FR_FRRD	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.14716133	0.14716133	11.13914802	0.002057025	1
FR_FRRD	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	2.699761797	0.245432891	18.57766094	2.79884E-11	0
FR_FRRD	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.231048438	0.021004403	1.589895652	0.146389978	0
FR_FRRD	Major Ions	Calcium (mg/L)_Major Ions	Residuals	34	0.449180244	0.013211184			0
FR_FRRD	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.115645126	0.115645126	1.227838445	0.275605183	0
FR_FRRD	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	12.05923574	1.096294158	11.63967877	1.40576E-08	0
FR_FRRD	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	2.093366629	0.190306057	2.0205356	0.057466981	0
FR_FRRD	Major Ions	Chloride (mg/L)_Major Ions	Residuals	34	3.202322169	0.094185946			0
FR_FRRD	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.031433032	0.031433032	1.129291886	0.295416388	0
FR_FRRD	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.859472123	0.078133829	2.807107473	0.01029273	0
FR_FRRD	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.401899638	0.036536331	1.312637659	0.259800294	0
FR_FRRD	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	34	0.94636569	0.027834285			0
FR_FRRD	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.283734832	0.283734832	13.43805516	0.000834221	1
FR_FRRD	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	2.70791473	0.246174316	11.65913965	1.37657E-08	0
FR_FRRD	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.272045336	0.024731394	1.171311383	0.342136195	0
FR_FRRD	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	34	0.717885452	0.021114278			0
FR_FRRD	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.113584608	0.113584608	8.606200238	0.005961591	1
FR_FRRD	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	1.546600989	0.14060009	10.65313822	4.2155E-08	0
FR_FRRD	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.138306968	0.012573361	0.952671867	0.505176736	0
FR_FRRD	Major Ions	Potassium (mg/L)_Major Ions	Residuals	34	0.448731909	0.013197997			0
FR_FRRD	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.292740207	0.292740207	14.27365201	0.000608754	1
FR_FRRD	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	4.110000198	0.373636382	18.21804988	3.67624E-11	0
FR_FRRD	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.193201941	0.017563813	0.856389886	0.588489036	0
FR_FRRD	Major Ions	Sodium (mg/L)_Major Ions	Residuals	34	0.697310473	0.020509132			0
FR_FRRD	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.277807591	0.277807591	7.915318651	0.008088172	1
FR_FRRD	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	4.006516823	0.364228802	10.37763949	5.80198E-08	0
FR_FRRD	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.341734368	0.031066761	0.885156916	0.563068208	0
FR_FRRD	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	34	1.19331369	0.035097461			0
FR_FRRD	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.000205928	0.000205928	0.005977757	0.938825405	0
FR_FRRD	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	7.302549374	0.663868125	19.27105667	1.67424E-11	0
FR_FRRD	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.655805572	0.059618688	1.730637576	0.108238092	0
FR_FRRD	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	34	1.171265107	0.034448974			0
FR_FRRD	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.007380777	0.007380777	0.07041859	0.792330666	0
FR_FRRD	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	3.406703182	0.309700289	2.954791559	0.007501402	0
FR_FRRD	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.548666277	0.140787843	1.343230038	0.244327549	0
FR_FRRD	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	34	3.563638796	0.104812906			0
FR_FRRD	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	4.764178192	4.764178192	8.924792195	0.005191155	1
FR_FRRD	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.8381011	0.258009191	0.483331714	0.900628071	0
FR_FRRD	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	6.208005164	0.564364106	1.057230054	0.422017819	0
FR_FRRD	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	34	18.14967284	0.533813907			0
FR_FRRD	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	2.724756584	2.724756584	3.765995721	0.060633216	0
FR_FRRD	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	17.94529129	1.631390117	2.25480993	0.034318544	0
FR_FRRD	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	3.146199619	0.286018147	0.395317191	0.948455743	0
FR_FRRD	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	34	24.59952977	0.723515581			0
FR_FRRD	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.000416463	0.000416463	0.00162336	0.968096845	0
FR_FRRD	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	7.723790915	0.70216281	2.737010398	0.011972254	0
FR_FRRD	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	3.156448786	0.28694989	1.1185224	0.377616095	0
FR_FRRD	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	34	8.722486247	0.256543713			0
FR_FRRD	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	2.002631146	2.002631146	5.959549049	0.019996757	1
FR_FRRD	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	11.12950597	1.01177327	3.010895162	0.006657288	0
FR_FRRD	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	3.518326802	0.319847891	0.951822406	0.505886939	0
FR_FRRD	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	34	11.42527034	0.336037363			0
FR_FRRD	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	3.853380865	3.853380865	5.517775572	0.024774646	1
FR_FRRD	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	59.6130969	5.419372446	7.760167485	1.67738E-06	0
FR_FRRD	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	9.53815407	0.867104915	1.241634421	0.298889782	0
FR_FRRD	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	34	23.74416061	0.698357665			0
FR_FRRD	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.055355028	0.055355028	0.928275777	0.342114286	0
FR_FRRD	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	4.017149639	0.365195422	6.124142218	1.9954E-05	0
FR_FRRD	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.314311929	0.028573812	0.479168347	0.903247732	0
FR_FRRD	Total Metals	Antimony (mg/L)_Total Metals	Residuals	34	2.027491181	0.059632094			0
FR_FRRD	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.032347231	0.032347231	0.423398385	0.519619571	0
FR_FRRD	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	1.423565014	0.129415001	1.69393488	0.117161442	0
FR_FRRD	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.421175252	0.038288659	0.501166749	0.889036308	0
FR_FRRD	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	34	2.597567413	0.076399042			0
FR_FRRD	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.108859242	0.108859242	7.439492782	0.010021105	1
FR_FRRD	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	4.135349718	0.375940883	25.69198028	2.65756E-13	0
FR_FRRD	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.207280228	0.018843657	1.287784563	0.272970415	0
FR_FRRD	Total Metals	Barium (mg/L)_Total Metals	Residuals	34	0.497508946	0.014632616			0
FR_FRRD	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	8.558295727	8.558295727	15.20694485	0.000431374	1
FR_FRRD	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	1.890326375	0.171847852	0.305350609	0.979931164	0
FR_FRRD	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.713510541	0.064864595	0.115255694	0.999724511	0
FR_FRRD	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	34	19.13481358	0.562788635			0
FR_FRRD	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	0.711478236	0.711478236	1.654730939	0.207007041	0
FR_FRRD	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	3.005761728	0.273251066	0.635517673	0.785814638	0
FR_FRRD	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.896399019	0.172399911	0.40096162	0.945885665	0
FR_FRRD	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	34	14.61884798	0.429966117			0
FR_FRRD	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.046149758	0.046149758	1.478651434	0.232361027	0
FR_FRRD	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	1.182942183	0.107540198	3.445618688	0.002683589	0
FR_FRRD	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.290810959	0.02643736	0.847060567	0.59680805	0
FR_FRRD	Total Metals	Boron (mg/L)_Total Metals	Residuals	34	1.061164069	0.031210708			0
FR_FRRD	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.062638529	0.062638529	0.984173837	0.328178651	0
FR_FRRD	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	1.730192968	0.15729027	2.471337846	0.021337422	0
FR_FRRD	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.461541568	0.041958324	0.659247359	0.765427175	0
FR_FRRD	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	34	2.163957138	0.063645798			0
FR_FRRD	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.083530251	0.083530251	6.162809549	0.018143535	1
FR_FRRD	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	2.661633619	0.241966693	17.85215084	4.87375E-11	0
FR_FRRD	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.194784464	0.017707679	1.306461416	0.263022459	0
FR_FRRD	Total Metals	Calcium (mg/L)_Total Metals	Residuals	34	0.46083341	0.013553924			0
FR_FRRD	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.057153312	0.057153312	0.278981875	0.6008001	0
FR_FRRD	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	5.016258267	0.456023479	2.225982713	0.036565833	0
FR_FRRD	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.168255911	0.197114174	0.962171387	0.497269413	0
FR_FRRD	Total Metals	Chromium (mg/L)_Total Metals	Residuals	34	6.965372278	0.204863891			0
FR_FRRD	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	3.014447248	3.014447248	17.60844394	0.000183866	1
FR_FRRD	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	4.027181658	0.366107423	2.138561903	0.044324725	0
FR_FRRD	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.952023472	0.26836577	1.567618615	0.153476779	0
FR_FRRD	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	34	5.820571469	0.171193278			0
FR_FRRD	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.051088452	0.051088452	1.423650389	0.24106333	0
FR_FRRD	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	0.501435906	0.045585082	1.270291375	0.282569149	0
FR_FRRD	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.227454955	0.020677723	0.576213359	0.834374704	0
FR_FRRD	Total Metals	Copper (mg/L)_Total Metals	Residuals	34	1.220108104	0.035885532			0
FR_FRRD	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	1.298871019	1.298871019	2.489440274	0.123872495	0
FR_FRRD	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	37.0858297	3.371439063	6.461762608	1.16386E-05	0
FR_FRRD	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	4.91980476	0.447254978	0.857217182	0.587752948	0
FR_FRRD	Total Metals	Iron (mg/L)_Total Metals	Residuals	34	17.73957589	0.521752232			0
FR_FRRD	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.000123493	0.000123493	0.000942234	0.975691596	0
FR_FRRD	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	3.904928481	0.354993498	2.708554698	0.012732069	0
FR_FRRD	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.441605611	0.131055056	0.999933205	0.466501361	0
FR_FRRD	Total Metals	Lead (mg/L)_Total Metals	Residuals	34	4.456169539	0.13106381			0
FR_FRRD	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.171153036	0.171153036	6.206127302	0.017773192	1
FR_FRRD	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	2.384437257	0.216767023	7.860121991	1.45697E-06	0
FR_FRRD	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.191643513	0.017422138	0.631738741	0.789017752	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_FRRD	Total Metals	Lithium (mg/L)_Total Metals	Residuals	34	0.937654505	0.027578074			0
FR_FRRD	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.178959045	0.178959045	9.56917206	0.003940296	1
FR_FRRD	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	2.511160566	0.228287324	12.20681909	7.70479E-09	0
FR_FRRD	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.24265869	0.022059881	1.179570424	0.336819522	0
FR_FRRD	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	34	0.63585517	0.018701623			0
FR_FRRD	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	0.768865135	0.768865135	1.398895487	0.245113637	0
FR_FRRD	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	27.96773259	2.542521144	4.625936584	0.000267547	0
FR_FRRD	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	4.874064097	0.443096736	0.806183031	0.63357954	0
FR_FRRD	Total Metals	Manganese (mg/L)_Total Metals	Residuals	34	18.68718201	0.549623			0
FR_FRRD	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	18.4035694	18.4035694	14.40620752	0.000579417	1
FR_FRRD	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	3.358999341	0.305363576	0.239036839	0.9924913	0
FR_FRRD	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.532485135	0.230225921	0.180219518	0.997788191	0
FR_FRRD	Total Metals	Mercury (mg/L)_Total Metals	Residuals	34	43.43414868	1.277474961			0
FR_FRRD	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	1	0.236100482	0.236100482	-	-	-
FR_FRRD	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(Month)	2	0.224555646	0.112277823	-	-	0
FR_FRRD	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.004409595	0.004409595	0.259994909	0.613417851	0
FR_FRRD	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	4.693382846	0.426671168	25.15703415	3.62089E-13	0
FR_FRRD	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.311224251	0.028293114	1.668195281	0.12383174	0
FR_FRRD	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	34	0.576650635	0.016960313			0
FR_FRRD	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.007092724	0.007092724	0.021882142	0.883274864	0
FR_FRRD	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	22.82937133	2.075397394	6.402919767	1.27708E-05	0
FR_FRRD	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.402948596	0.218449872	0.673951413	0.752585365	0
FR_FRRD	Total Metals	Nickel (mg/L)_Total Metals	Residuals	34	11.02052094	0.324132969			0
FR_FRRD	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.021246511	0.021246511	1.996116739	0.166792139	0
FR_FRRD	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	1.275209994	0.115928181	10.89149096	3.21247E-08	0
FR_FRRD	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.175611092	0.015964645	1.499883648	0.177012594	0
FR_FRRD	Total Metals	Potassium (mg/L)_Total Metals	Residuals	34	0.361893351	0.010643922			0
FR_FRRD	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.418764392	0.418764392	10.44936304	0.002727034	1
FR_FRRD	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	3.641931419	0.331084674	8.261504628	8.36575E-07	0
FR_FRRD	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.41843014	0.038039104	0.949183865	0.508096144	0
FR_FRRD	Total Metals	Selenium (mg/L)_Total Metals	Residuals	34	1.362570069	0.04007559			0
FR_FRRD	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.027776745	0.027776745	4.61170221	0.038969968	1
FR_FRRD	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.675227783	0.061384344	10.1914861	7.22383E-08	0
FR_FRRD	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.03983575	0.003621432	0.601257086	0.814344602	0
FR_FRRD	Total Metals	Silicon (mg/L)_Total Metals	Residuals	34	0.204785413	0.0060231			0
FR_FRRD	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.03458545	0.03458545	1.351949776	0.253033869	0
FR_FRRD	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	0.413077266	0.037552479	1.467931301	0.18921796	0
FR_FRRD	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.15839473	0.014399521	0.562879155	0.84471078	0
FR_FRRD	Total Metals	Silver (mg/L)_Total Metals	Residuals	34	0.869784761	0.025581905			0
FR_FRRD	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.183628335	0.183628335	8.558820299	0.006086286	1
FR_FRRD	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	4.095776263	0.372343297	17.35472561	7.20502E-11	0
FR_FRRD	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.203802125	0.018527466	0.863555461	0.5821227	0
FR_FRRD	Total Metals	Sodium (mg/L)_Total Metals	Residuals	34	0.729465413	0.021454865			0
FR_FRRD	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.044801661	0.044801661	4.407177367	0.043286416	1
FR_FRRD	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	2.175458926	0.197768993	19.45470336	1.46493E-11	0
FR_FRRD	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.161012423	0.014637493	1.439902584	0.200542084	0
FR_FRRD	Total Metals	Strontium (mg/L)_Total Metals	Residuals	34	0.345630856	0.010165613			0
FR_FRRD	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.024895065	0.024895065	0.367804632	0.548231701	0
FR_FRRD	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	1.067373828	0.097033984	1.433599324	0.203170537	0
FR_FRRD	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.378506517	0.034409683	0.508375485	0.884185884	0
FR_FRRD	Total Metals	Thallium (mg/L)_Total Metals	Residuals	34	2.301309309	0.067685568			0
FR_FRRD	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.330556699	0.330556699	3.285960297	0.078712598	0
FR_FRRD	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	1.160622557	0.105511142	1.048853112	0.428346861	0
FR_FRRD	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.678686146	0.152607831	1.51702651	0.17076273	0
FR_FRRD	Total Metals	Tin (mg/L)_Total Metals	Residuals	34	3.420287143	0.100596681			0
FR_FRRD	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.13759321	0.13759321	7.492738569	0.00978193	1
FR_FRRD	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.157192853	0.014290259	0.778186493	0.658949404	0
FR_FRRD	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.115077396	0.010461581	0.569693045	0.839459159	0
FR_FRRD	Total Metals	Titanium (mg/L)_Total Metals	Residuals	34	0.624360387	0.018363541			0
FR_FRRD	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.588357228	0.588357228	28.14256571	6.90201E-06	1
FR_FRRD	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	1.944836772	0.176803343	8.456936469	6.42458E-07	0
FR_FRRD	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.296426182	0.026947835	1.288980865	0.272323968	0
FR_FRRD	Total Metals	Uranium (mg/L)_Total Metals	Residuals	34	0.71081457	0.020906311			0
FR_FRRD	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	0.139860569	0.139860569	1.095335428	0.302675678	0
FR_FRRD	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	2.17941593	0.198128721	1.551669704	0.15874402	0
FR_FRRD	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.699276707	0.06357061	0.497861132	0.891229194	0
FR_FRRD	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	34	4.34137271	0.127687433			0
FR_FRRD	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.055743702	0.055743702	0.383300806	0.539968509	0
FR_FRRD	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	2.089427251	0.189947932	1.306106218	0.263208783	0
FR_FRRD	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.99535104	0.090486458	0.622196433	0.797047143	0
FR_FRRD	Total Metals	Zinc (mg/L)_Total Metals	Residuals	34	4.944643548	0.145430693			0
FR_HC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.010207927	0.010207927	0.072642147	0.788332339	0
FR_HC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	4.378769535	0.398069958	2.832764781	0.004118441	0
FR_HC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.325322674	0.120483879	0.857393239	0.584844628	0
FR_HC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	69	9.69611994	0.140523477			0
FR_HC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.069631591	0.069631591	11.40307138	0.001216069	1
FR_HC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.825526581	0.075047871	12.29005706	2.46865E-12	0
FR_HC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.122382773	0.011125707	1.821977987	0.066995023	0
FR_HC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	0.415234462	0.006106389			0
FR_HC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	4.595748884	4.595748884	17.63292395	7.9692E-05	1
FR_HC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.228205547	0.202564141	0.777196095	0.661275935	0
FR_HC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	4.236104555	0.385100414	1.477549467	0.160469543	0
FR_HC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	17.72314819	0.260634532			0
FR_HC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.123799866	0.123799866	7.929064297	0.006336836	1
FR_HC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	6.70198189	0.609271081	39.02225195	2.79367E-25	0
FR_HC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.066097237	0.00600884	0.384850791	0.957773627	0
FR_HC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	69	1.077326461	0.015613427			0
FR_HC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.000678314	0.000678314	0.012160976	0.912509966	0
FR_HC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	4.266167092	0.387833372	6.953174623	9.28249E-08	0
FR_HC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.818644111	0.074422192	1.334259849	0.224903018	0
FR_HC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	69	3.84867404	0.055777885			0
FR_HC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.098386361	0.098386361	5.719180048	0.019511443	1
FR_HC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	7.678132685	0.698012062	40.57530562	8.93501E-26	0
FR_HC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.065493514	0.005953956	0.346102293	0.971559314	0
FR_HC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	1.186998633	0.017202879			0
FR_HC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.00184317	0.00184317	0.326086957	0.569854848	0
FR_HC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.073769798	0.006706345	1.186462216	0.313002595	0
FR_HC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.015255319	0.001386847	0.245355966	0.992911365	0
FR_HC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	0.384362411	0.005652388			0
FR_HC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.089073159	0.089073159	2.915432454	0.092232148	0
FR_HC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.228860938	0.02080554	0.680981192	0.751713469	0
FR_HC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.149632935	0.013602994	0.445236374	0.929515645	0
FR_HC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	69	2.108108511	0.030552297			0
FR_HC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000215069	0.000215069	1.354711393	0.248465058	0
FR_HC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.003324492	0.000302227	1.903712093	0.053687434	0
FR_HC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.001751723	0.000159248	1.003093358	0.452923273	0
FR_HC1	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	69	0.010954195	0.000158756			0
FR_HC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.105578622	0.105578622	20.15456822	2.7877E-05	1
FR_HC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.811692912	0.073790265	14.08628843	1.03577E-13	0
FR_HC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.11853763	0.010776148	2.057126803	0.035523279	0
FR_HC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	0.361452791	0.005238446			0
FR_HC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.126216282	0.126216282	5.948129173	0.017309833	1
FR_HC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	8.933086981	0.812098816	38.2713591	4.91494E-25	0
FR_HC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.145075554	0.013188687	0.621536388	0.804358899	0
FR_HC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	69	1.464144981	0.021219492			0
FR_HC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.639918722	0.639918722	5.092149135	0.027205035	1
FR_HC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	5.672127675	0.51564797	4.103265423	0.000121473	0
FR_HC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.39380857	0.12670987	1.008292979	0.448500187	0
FR_HC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	69	8.671072009	0.12566771			0
FR_HC1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	4.346678708	4.346678708	8.913375649	0.003914666	1
FR_HC1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(Month)	11	16.6772338	1.516112164	3.108966212	0.001897605	0
FR_HC1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.823864674	0.074896789	0.153584669	0.999141035	0
FR_HC1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	Residuals	69	33.64840019	0.487657974			0
FR_HC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.001315678	0.001315678	0.002199101	0.962732717	0
FR_HC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	47.41854954	4.310777231	7.205287274	5.1953E-08	0
FR_HC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	5.248682343	0.47715294	0.797541562	0.641850378	0
FR_HC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	69	41.28130048	0.598279717			0
FR_HC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.038065495	0.038065495	0.365844342	0.547262245	0
FR_HC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	2.202781719	0.200252884	1.924613982	0.050773206	0
FR_HC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.551511697	0.050137427	0.481866684	0.908405879	0
FR_HC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	69	7.17933523	0.104048337			0
FR_HC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.019432774	0.019432774	3.982492745	0.049924888	1
FR_HC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	0.084383633	0.007671239	1.572120159	0.1267704	0
FR_HC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.164143795	0.014922163	3.058102141	0.002188378	0
FR_HC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	69	0.33668897	0.00487955			0
FR_HC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.005153142	0.005153142	0.417948294	0.520107244	0
FR_HC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.218754203	0.019886746	1.612924948	0.114414879	0
FR_HC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.103901705	0.00944561	0.766091123	0.671902121	0
FR_HC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	69	0.850743524	0.012329616			0
FR_HC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.004220067	0.004220067	0.226398611	0.635710203	0
FR_HC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.006980425	0.364270948	19.54244654	4.23115E-17	0
FR_HC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.116374912	0.010579537	0.567572149	0.848440152	0
FR_HC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	69	1.286159097	0.018639987			0
FR_HC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	26.06416039	26.06416039	58.00772165	1.00523E-10	1
FR_HC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.918154195	0.083468563	0.185765477	0.99792793	0
FR_HC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.268237431	0.024385221	0.054271118	0.999995264	0
FR_HC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	69	31.0032357	0.449322257			0
FR_HC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	29.95861791	29.95861791	23.93943548	6.26206E-06	1
FR_HC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	1.466913187	0.133355744	0.106562367	0.999853035	0
FR_HC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.427274049	0.038843095	0.031038874	0.999999752	0
FR_HC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	69	86.34892988	1.251433766			0
FR_HC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.007878778	0.007878778	1.37905776	0.244298834	0
FR_HC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.078807137	0.007164285	1.253996967	0.269786837	0
FR_HC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.183360032	0.016669094	2.91766624	0.00324515	0
FR_HC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	69	0.394208035	0.00571316			0
FR_HC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.693241769	0.693241769	8.305002027	0.005265502	1
FR_HC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	11.68698861	1.06245351	12.72814038	9.75365E-13	0
FR_HC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.516380091	0.046943645	0.562382535	0.852448845	0
FR_HC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	69	5.759623166	0.0834728			0
FR_HC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.170101321	0.170101321	3.063388151	0.084519809	0
FR_HC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.297622264	0.027056569	0.487267081	0.905050461	0
FR_HC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.428041002	0.038912818	0.7007886	0.733480427	0
FR_HC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	69	3.831375781	0.055527185			0
FR_HC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.010973226	0.010973226	1.971590741	0.164764346	0
FR_HC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	0.08989235	0.008172032	1.468292159	0.163723503	0
FR_HC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.159310486	0.014482771	2.602160673	0.007862671	0
FR_HC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	69	0.384031333	0.005565671			0
FR_HC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.157028744	0.157028744	2.264997516	0.136890536	0
FR_HC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.263209307	0.023928119	0.345141457	0.971858894	0
FR_HC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.100181388	0.009107399	0.131365987	0.99959188	0
FR_HC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	69	4.783662361	0.06932844			0
FR_HC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.4702896	2.4702896	8.916528783	0.003908696	1
FR_HC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.351236653	0.031930605	0.115253757	0.999783859	0
FR_HC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.090341494	0.008212863	0.029644391	0.999999806	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_HC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	69	19.11618148	0.277046108			0
FR_HC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.024555713	0.024555713	6.390784608	0.013764349	1
FR_HC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.058702169	0.005336561	1.388874808	0.197988616	0
FR_HC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.172837312	0.015712483	4.089276303	0.000126175	0
FR_HC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	69	0.265123029	0.003842363			0
FR_HC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.907613551	0.907613551	15.01374451	0.000240115	1
FR_HC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	9.946956369	0.904268761	14.95841499	2.63481E-14	0
FR_HC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.476481921	0.043316538	0.716542232	0.718798111	0
FR_HC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	69	4.171200259	0.060452178			0
FR_HC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.698654572	4.698654572	8.240469664	0.005434978	1
FR_HC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	29.93940671	2.721764246	4.773412338	2.02867E-05	0
FR_HC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	4.532197387	0.412017944	0.722594376	0.71312158	0
FR_HC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	69	39.3432873	0.57019257			0
FR_HC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.121700955	3.121700955	19.06224003	4.34905E-05	1
FR_HC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.752034113	0.068366738	0.417472135	0.94353625	0
FR_HC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.552166402	0.050196946	0.306520785	0.982281359	0
FR_HC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	69	11.29968805	0.163763595			0
FR_HC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.063070768	0.063070768	2.454982462	0.121727472	0
FR_HC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	1.975026682	0.17954788	6.988766971	8.54783E-08	0
FR_HC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.030518342	0.002774395	0.107991239	0.999843044	0
FR_HC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	69	1.772673747	0.025690924			0
FR_HC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.086217157	0.086217157	1.045902076	0.310025032	0
FR_HC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	8.517336198	0.774303291	9.393088865	4.72444E-10	0
FR_HC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.439355284	0.039941389	0.484529803	0.906758834	0
FR_HC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	69	5.687897541	0.082433298			0
FR_HC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.606677961	0.606677961	6.700285527	0.011746114	1
FR_HC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	28.06199288	2.551090261	28.17480483	2.8176E-21	0
FR_HC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.257270959	0.023388269	0.258305214	0.991209495	0
FR_HC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	69	6.247611264	0.090545091			0
FR_HC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.013270388	0.013270388	3.64594922	0.06036432	0
FR_HC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.310094995	0.028190454	7.745136072	1.5421E-08	0
FR_HC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.034170157	0.003106378	0.853456268	0.588568944	0
FR_HC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	69	0.251143597	0.003639762			0
FR_HC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.024555713	0.024555713	6.390784608	0.013764349	1
FR_HC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.058702169	0.005336561	1.388874808	0.197988616	0
FR_HC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.172837312	0.015712483	4.089276303	0.000126175	0
FR_HC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	69	0.265123029	0.003842363			0
FR_HC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.068304439	0.068304439	6.108799663	0.015922676	1
FR_HC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.18437721	0.380397928	34.02084514	1.44942E-23	0
FR_HC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.03223162	0.002930147	0.262057385	0.990661316	0
FR_HC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	69	0.771511023	0.011181319			0
FR_HC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.024555713	0.024555713	6.390784608	0.013764349	1
FR_HC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.058702169	0.005336561	1.388874808	0.197988616	0
FR_HC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.172837312	0.015712483	4.089276303	0.000126175	0
FR_HC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	69	0.265123029	0.003842363			0
FR_HC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.024555713	0.024555713	6.390784608	0.013764349	1
FR_HC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.058702169	0.005336561	1.388874808	0.197988616	0
FR_HC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.172837312	0.015712483	4.089276303	0.000126175	0
FR_HC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	69	0.265123029	0.003842363			0
FR_HC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.009281991	0.009281991	2.5097238	0.117718716	0
FR_HC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.044679072	0.004061734	1.098237471	0.375956049	0
FR_HC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.016938957	0.001539905	0.416369374	0.944057129	0
FR_HC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	69	0.255190376	0.003698411			0
FR_HC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.376364615	0.376364615	16.11147608	0.000149594	1
FR_HC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	7.034461186	0.639496471	27.37566632	6.18823E-21	0
FR_HC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.079067434	0.007187949	0.307702841	0.982007827	0
FR_HC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	69	1.611842284	0.023360033			0
FR_HC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.354904582	2.354904582	20.18574544	2.75279E-05	1
FR_HC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.218092776	0.019826616	0.169949571	0.998622333	0
FR_HC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.158595241	0.014417749	0.123585906	0.999696215	0
FR_HC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	69	8.049661411	0.11666176			0
FR_HC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	5.575604556	5.575604556	71.32775179	3.0619E-12	1
FR_HC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	1.252628067	0.113875279	1.45678689	0.168347546	0
FR_HC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.677981936	0.152543812	1.951466801	0.04724954	0
FR_HC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	69	5.393646999	0.078168797			0
FR_HC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.256362529	0.256362529	2.006694246	0.161864738	0
FR_HC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	5.57055945	0.506414495	3.963992152	0.000249686	0
FR_HC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.448812444	0.040801131	0.319373489	0.978664659	0
FR_HC1	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	59	7.537465789	0.127753657			0
FR_HC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.135752878	0.135752878	16.94388051	0.000123378	1
FR_HC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.350224239	0.031838567	3.973903788	0.000253011	0
FR_HC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.037331006	0.003393728	0.423585259	0.939516197	0
FR_HC1	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	58	0.464690892	0.008011912			0
FR_HC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.130636775	0.130636775	17.12101631	0.000114806	1
FR_HC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.142947199	0.0129952	1.703127085	0.095438302	0
FR_HC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.03693671	0.003357883	0.440077955	0.931094866	0
FR_HC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	58	0.442551586	0.0076302			0
FR_HC1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.005973265	0.005973265	10.42022257	0.002036954	1
FR_HC1	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.006894911	0.00062681	1.093455644	0.382382649	0
FR_HC1	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.001644407	0.000149492	0.260784469	0.990590156	0
FR_HC1	Field Measured	pH (-)_Field Measured	Residuals	59	0.03382103	0.000573238			0
FR_HC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	0.99579427	0.99579427	5.281936402	0.024583193	1
FR_HC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	4.188944219	0.380813111	2.019925895	0.039291347	0
FR_HC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	1.482836877	0.134803352	0.715029957	0.720213608	0
FR_HC1	Major Ions	Bromide (mg/L)_Major Ions	Residuals	69	13.00844982	0.188528258			0
FR_HC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.030889903	0.030889903	2.205938492	0.142034832	0
FR_HC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	6.163101329	0.560281939	40.01137528	1.34581E-25	0
FR_HC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.065269074	0.005933552	0.423732348	0.940526939	0
FR_HC1	Major Ions	Calcium (mg/L)_Major Ions	Residuals	69	0.966211572	0.014003066			0
FR_HC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	4.219332284	4.219332284	14.88198936	0.000254281	1
FR_HC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	1.112663083	0.101151189	0.356769939	0.968097507	0
FR_HC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.375760966	0.034160088	0.120485904	0.99973152	0
FR_HC1	Major Ions	Chloride (mg/L)_Major Ions	Residuals	69	19.5628367	0.283519372			0
FR_HC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.023029801	0.023029801	0.962287863	0.330038236	0
FR_HC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.582727653	0.052975241	2.213541999	0.023160919	0
FR_HC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.284903541	0.025900322	1.08223104	0.388291982	0
FR_HC1	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	69	1.651331505	0.023932341			0
FR_HC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.321504867	0.321504867	12.02839762	0.000906778	1
FR_HC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	10.95067362	0.995515784	37.24503396	1.08009E-24	0
FR_HC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.090240678	0.008203698	0.306923322	0.982188522	0
FR_HC1	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	69	1.844288534	0.026728819			0
FR_HC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.950304461	0.950304461	3.698862786	0.058576869	0
FR_HC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	3.846133188	0.349648472	1.360934072	0.211402714	0
FR_HC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.55266189	0.05024199	0.195556514	0.997385859	0
FR_HC1	Major Ions	Potassium (mg/L)_Major Ions	Residuals	69	17.7273426	0.256918009			0
FR_HC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	1.24815916	1.24815916	3.83362306	0.054279015	0
FR_HC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	2.447187301	0.222471573	0.683304004	0.749590044	0
FR_HC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.311842098	0.028349282	0.087072597	0.999946393	0
FR_HC1	Major Ions	Sodium (mg/L)_Major Ions	Residuals	69	22.46516694	0.32558213			0
FR_HC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.381701064	0.381701064	8.308334151	0.005256903	1
FR_HC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	23.12538759	2.102307962	45.7600952	2.55435E-27	0
FR_HC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.211394549	0.019217686	0.418303678	0.94314165	0
FR_HC1	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	69	3.169994485	0.045941949			0
FR_HC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	1.133925141	1.133925141	14.55539077	0.000293254	1
FR_HC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	27.51816005	2.501650914	32.11191403	7.43027E-23	0
FR_HC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.223976541	0.020361504	0.261366146	0.990764034	0
FR_HC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	5.375385377	0.077904136			0
FR_HC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.244557823	0.244557823	1.030748593	0.313529766	0
FR_HC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	25.32744018	2.302494561	9.704424899	2.53244E-10	0
FR_HC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.619728936	0.147248085	0.620612968	0.805146561	0
FR_HC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	16.37110147	0.23726234			0
FR_HC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	6.444868847	6.444868847	34.02523666	1.59811E-07	1
FR_HC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.115462357	0.19231476	1.015312393	0.442566642	0
FR_HC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	2.084392926	0.189490266	1.000400675	0.455223006	0
FR_HC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	13.0695917	0.189414372			0
FR_HC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	20.33818283	20.33818283	53.32149642	3.75921E-10	1
FR_HC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.586626004	0.235147819	0.616497239	0.808644327	0
FR_HC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	4.121807969	0.374709815	0.982392982	0.470760128	0
FR_HC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	26.31836519	0.381425582			0
FR_HC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.020409926	0.020409926	0.184617315	0.668974011	0
FR_HC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.942688219	0.17660802	1.597502001	0.122769584	0
FR_HC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.285973054	0.116906641	1.057475156	0.410043858	0
FR_HC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	60	6.633156761	0.110552613			0
FR_HC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	12.90713105	12.90713105	5.339763441	0.02383881	1
FR_HC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	25.98316795	2.362106178	0.977218575	0.475273968	0
FR_HC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	7.277440645	0.661585513	0.273702198	0.988810283	0
FR_HC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	69	166.7849245	2.417172819			0
FR_HC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	1.874352841	1.874352841	2.700382936	0.104873739	0
FR_HC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	59.01853573	5.36532143	7.729826594	1.59531E-08	0
FR_HC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	4.910922976	0.446447543	0.643197642	0.785594583	0
FR_HC1	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	69	47.89333553	0.694106312			0
FR_HC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.003959051	0.003959051	0.398703719	0.529845805	0
FR_HC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	0.256833598	0.023348509	2.351356025	0.01582448	0
FR_HC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.139356915	0.01266881	1.275836665	0.25692644	0
FR_HC1	Total Metals	Antimony (mg/L)_Total Metals	Residuals	69	0.685156606	0.009929806			0
FR_HC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.008991256	0.008991256	0.135628862	0.713793235	0
FR_HC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	0.837855445	0.076168677	1.148968585	0.338589243	0
FR_HC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.40899636	0.037181487	0.560865209	0.853612536	0
FR_HC1	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	69	4.57422315	0.066293089			0
FR_HC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.019196339	0.019196339	0.976530738	0.326509514	0
FR_HC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	3.730911428	0.339173766	17.25399903	9.07155E-16	0
FR_HC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.100983793	0.009180345	0.467010353	0.917318101	0
FR_HC1	Total Metals	Barium (mg/L)_Total Metals	Residuals	69	1.356380618	0.01965769			0
FR_HC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	25.74676207	25.74676207	57.19561135	1.25879E-10	1
FR_HC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	0.958377998	0.087125273	0.193546016	0.997504779	0
FR_HC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.270623673	0.024602152	0.054652897	0.999995088	0
FR_HC1	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	69	31.06054016	0.450152756			0
FR_HC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	29.61826215	29.61826215	23.65176661	6.9974E-06	1
FR_HC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	1.431514868	0.130137715	0.103921927	0.999870194	0
FR_HC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.505282413	0.045934765	0.036681367	0.999999397	0
FR_HC1	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	69	86.40623434	1.252264266			0
FR_HC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.031611861	0.031611861	6.599639796	0.012365829	1
FR_HC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.073653	0.006695727	1.397873678	0.19382319	0
FR_HC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.239387923	0.021762538	4.543386946	3.72471E-05	0
FR_HC1	Total Metals	Boron (mg/L)_Total Metals	Residuals	69	0.330505672	0.004789937			0
FR_HC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.29099291	0.29099291	3.027502994	0.086322523	0
FR_HC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	8.045138803	0.731376255	7.609270622	2.08606E-08	0
FR_HC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.048743424	0.095340311	0.991924779	0.462502315	0
FR_HC1	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	69	6.632036642	0.096116473			0
FR_HC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	6.11832E-05	6.11832E-05	0.004185802	0.948601713	0
FR_HC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	5.678424187	0.516220381	35.31683887	4.98526E-24	0
FR_HC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.066385372	0.006035034	0.412882414	0.94568596	0
FR_HC1	Total Metals	Calcium (mg/L)_Total Metals	Residuals	69	1.008561564	0.014616834			0
FR_HC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.14451085	0.14451085	1.021860197	0.315609941	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_HC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	1.790677913	0.162788901	1.151107327	0.337072612	0
FR_HC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.006511942	0.091501086	0.647019357	0.782229938	0
FR_HC1	Total Metals	Chromium (mg/L)_Total Metals	Residuals	69	9.757938223	0.141419395			0
FR_HC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.048895718	0.048895718	0.999297332	0.320973453	0
FR_HC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	1.088946759	0.09899516	2.02319556	0.038945347	0
FR_HC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.333411523	0.030310138	0.619457937	0.806130301	0
FR_HC1	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	69	3.376176862	0.048930099			0
FR_HC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.020325285	0.020325285	0.317491151	0.574945938	0
FR_HC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	1.081057612	0.098277965	1.535151153	0.138981276	0
FR_HC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.755494671	0.068681334	1.072836916	0.395651137	0
FR_HC1	Total Metals	Copper (mg/L)_Total Metals	Residuals	69	4.417271587	0.064018429			0
FR_HC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	4.191957955	4.191957955	8.075700704	0.005894094	1
FR_HC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	13.72637728	1.24785248	2.40395616	0.01367294	0
FR_HC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.815378267	0.255943479	0.493068622	0.901378227	0
FR_HC1	Total Metals	Iron (mg/L)_Total Metals	Residuals	69	35.81671852	0.519082877			0
FR_HC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.170242706	0.170242706	1.463622759	0.230483144	0
FR_HC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	2.111049569	0.191913597	1.649933289	0.104161036	0
FR_HC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.802574266	0.072961297	0.627268074	0.799446679	0
FR_HC1	Total Metals	Lead (mg/L)_Total Metals	Residuals	69	8.025802189	0.116315974			0
FR_HC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.467092321	0.467092321	9.924857344	0.002411318	1
FR_HC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	9.226947647	0.838813422	17.82325073	4.12596E-16	0
FR_HC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.406237874	0.036930716	0.784710152	0.654120244	0
FR_HC1	Total Metals	Lithium (mg/L)_Total Metals	Residuals	69	3.247338381	0.047062875			0
FR_HC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.168337968	0.168337968	6.433529173	0.013465126	1
FR_HC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	10.9357524	0.994159309	37.99471375	6.06633E-25	0
FR_HC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.125947733	0.011449794	0.437587454	0.933551411	0
FR_HC1	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	69	1.805435166	0.026165727			0
FR_HC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	1.808872026	1.808872026	10.07178	0.002249266	1
FR_HC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	13.54910858	1.231737143	6.858299174	1.15739E-07	0
FR_HC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.198806254	0.108982387	0.606812758	0.81678926	0
FR_HC1	Total Metals	Manganese (mg/L)_Total Metals	Residuals	69	12.3922653	0.179598048			0
FR_HC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	75.27576922	75.27576922	48.79262693	1.41506E-09	1
FR_HC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	1.197738275	0.108885298	0.07057782	0.999981576	0
FR_HC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.959938958	0.087267178	0.056565279	0.999994125	0
FR_HC1	Total Metals	Mercury (mg/L)_Total Metals	Residuals	69	106.451085	1.542769348			0
FR_HC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.002178449	0.002178449	0.19438832	0.660667439	0
FR_HC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	1.755898357	0.159627123	14.24391966	8.05562E-14	0
FR_HC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.024463323	0.002223938	0.198447484	0.997207668	0
FR_HC1	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	69	0.773261277	0.011206685			0
FR_HC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.081429105	0.081429105	0.809648847	0.371353749	0
FR_HC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	8.368184609	0.760744055	7.564071167	2.30784E-08	0
FR_HC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.385753766	0.035068524	0.348686015	0.970743754	0
FR_HC1	Total Metals	Nickel (mg/L)_Total Metals	Residuals	69	6.939561866	0.10057336			0
FR_HC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	1.22019652	1.22019652	5.043945747	0.027917306	1
FR_HC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	3.848646305	0.349876937	1.446291855	0.17266348	0
FR_HC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.560722997	0.050974818	0.210715415	0.996351768	0
FR_HC1	Total Metals	Potassium (mg/L)_Total Metals	Residuals	69	16.69200346	0.241913094			0
FR_HC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.334934626	0.334934626	3.648718387	0.060269319	0
FR_HC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	27.29079984	2.480981804	27.02737559	8.76879E-21	0
FR_HC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.177106789	0.016100617	0.175397267	0.998406555	0
FR_HC1	Total Metals	Selenium (mg/L)_Total Metals	Residuals	69	6.333864859	0.091795143			0
FR_HC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.000159875	0.000159875	0.01955357	0.889198462	0
FR_HC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.164014442	0.014910404	1.823625736	0.066385156	0
FR_HC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.045135853	0.004103259	0.501851558	0.895687606	0
FR_HC1	Total Metals	Silicon (mg/L)_Total Metals	Residuals	69	0.56416064	0.008176241			0
FR_HC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.015350551	0.015350551	1.487668634	0.226731282	0
FR_HC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	0.153595308	0.01396321	1.353217135	0.215237829	0
FR_HC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.191787149	0.017435195	1.689697812	0.094082534	0
FR_HC1	Total Metals	Silver (mg/L)_Total Metals	Residuals	69	0.711978478	0.010318529			0
FR_HC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	1.412893741	1.412893741	4.41702735	0.039235162	1
FR_HC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	2.636130939	0.239648267	0.749195017	0.68798483	0
FR_HC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.288176843	0.026197895	0.081900581	0.999960663	0
FR_HC1	Total Metals	Sodium (mg/L)_Total Metals	Residuals	69	22.07132997	0.319874347			0
FR_HC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.008866986	0.008866986	0.890639349	0.34859697	0
FR_HC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	4.064972025	0.369542911	37.11852793	1.19166E-24	0
FR_HC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.032098288	0.002918026	0.293099485	0.9851956	0
FR_HC1	Total Metals	Strontium (mg/L)_Total Metals	Residuals	69	0.686946986	0.009955753			0
FR_HC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.014232352	0.014232352	0.89074316	0.34856906	0
FR_HC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	0.217697836	0.019790712	1.238617578	0.279139124	0
FR_HC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.280520093	0.025501827	1.596052236	0.119386026	0
FR_HC1	Total Metals	Thallium (mg/L)_Total Metals	Residuals	69	1.102486496	0.015978065			0
FR_HC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.023876438	0.023876438	3.008093374	0.087315264	0
FR_HC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.09330397	0.008482179	1.068634535	0.398971416	0
FR_HC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.233018142	0.021183467	2.668817139	0.006523475	0
FR_HC1	Total Metals	Tin (mg/L)_Total Metals	Residuals	69	0.547680557	0.007937399			0
FR_HC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.036243317	0.036243317	3.671044504	0.059509301	0
FR_HC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.10160775	0.009237068	0.935612179	0.512310889	0
FR_HC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.037594553	0.003417687	0.346173613	0.971536997	0
FR_HC1	Total Metals	Titanium (mg/L)_Total Metals	Residuals	69	0.681219975	0.009872753			0
FR_HC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.223439766	0.223439766	12.82647534	0.000631625	1
FR_HC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	6.924877134	0.629534285	36.13817779	2.57727E-24	0
FR_HC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.089297862	0.008117987	0.466010005	0.917901198	0
FR_HC1	Total Metals	Uranium (mg/L)_Total Metals	Residuals	69	1.2019938	0.0174202			0
FR_HC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	2.394917382	2.394917382	19.05603985	4.36012E-05	1
FR_HC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	0.167567936	0.015233449	0.12121053	0.999723566	0
FR_HC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.190047777	0.017277071	0.137471359	0.999492415	0
FR_HC1	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	69	8.671754503	0.125677601			0
FR_HC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.000150431	0.000150431	0.004098172	0.949141819	0
FR_HC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	0.813145408	0.07392231	2.013857416	0.039941355	0
FR_HC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.381937103	0.034721555	0.945915527	0.503022087	0
FR_HC1	Total Metals	Zinc (mg/L)_Total Metals	Residuals	69	2.532770858	0.036706824			0
FR_HC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	1	2.62954E-31	2.62954E-31	-	-	-
FR_HC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(Month)	4	9.20338E-31	2.30084E-31	-	-	0
FR_HC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year):as.factor(Month)	1	4.37556E-62	4.37556E-62	-	-	0
FR_HC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	1	0	0	-	-	-
FR_HC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(Month)	3	0	0	-	-	0
FR_HC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	1	1.97215E-31	1.97215E-31	-	-	-
FR_HC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(Month)	5	1.18329E-30	2.36658E-31	-	-	0
FR_HC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year):as.factor(Month)	1	0	0	-	-	0
FR_HC3	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.035823167	0.035823167	0.528685475	0.470135937	0
FR_HC3	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.19652609	0.108775099	1.605324723	0.12195689	0
FR_HC3	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	2.059253039	0.187204822	2.762806295	0.006103093	0
FR_HC3	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	57	3.862259493	0.067758938			0
FR_HC3	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.01351904	0.01351904	3.076476664	0.084807584	0
FR_HC3	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.328662914	0.029878447	6.799324654	3.77314E-07	0
FR_HC3	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.049233342	0.004475758	1.018531327	0.442439571	0
FR_HC3	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	57	0.250476562	0.004394326			0
FR_HC3	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.455800034	0.455800034	4.420550106	0.039936893	1
FR_HC3	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.886020842	0.17145644	1.662860307	0.10595915	0
FR_HC3	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	4.250737696	0.3864307	3.747775651	0.000467683	0
FR_HC3	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	57	5.877232772	0.103109347			0
FR_HC3	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.053473565	0.053473565	5.89505493	0.018363446	1
FR_HC3	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	3.151726677	0.286520607	31.58672368	2.93149E-20	0
FR_HC3	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.026670484	0.002424589	0.267292602	0.989506845	0
FR_HC3	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	57	0.517042374	0.009070919			0
FR_HC3	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.000182811	0.000182811	0.004267285	0.948144239	0
FR_HC3	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	1.367895781	0.124354162	2.90274396	0.004217937	0
FR_HC3	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.118090228	0.101644566	2.372643956	0.017102669	0
FR_HC3	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	57	2.441891991	0.04284021			0
FR_HC3	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.015157085	0.015157085	2.176448715	0.145640226	0
FR_HC3	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	3.058187634	0.278017058	39.92125665	9.87099E-23	0
FR_HC3	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.044733108	0.004066646	0.583941241	0.833946544	0
FR_HC3	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	57	0.396955748	0.006964136			0
FR_HC3	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0	0	-	-	-
FR_HC3	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0	0	-	-	0
FR_HC3	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0	0	-	-	0
FR_HC3	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	57	0	0			0
FR_HC3	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.075525612	0.075525612	2.065703573	0.156112445	0
FR_HC3	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.134341981	0.012212907	0.334035644	0.974483883	0
FR_HC3	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.222454313	0.020223119	0.553123225	0.857901263	0
FR_HC3	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	57	2.084016276	0.036561689			0
FR_HC3	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000269036	0.000269036	2.523765985	0.117674548	0
FR_HC3	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.003254011	0.000295819	2.775014473	0.005909374	0
FR_HC3	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.003657787	0.000332526	3.119354126	0.002385565	0
FR_HC3	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	57	0.006076254	0.000106601			0
FR_HC3	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.019835858	0.019835858	4.764340253	0.033189477	1
FR_HC3	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.316883313	0.028807574	6.91924111	2.93235E-07	0
FR_HC3	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.053265094	0.004842281	1.163059118	0.332786919	0
FR_HC3	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	57	0.237313845	0.004163401			0
FR_HC3	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.102872824	0.102872824	8.752555025	0.004495357	1
FR_HC3	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	3.811275468	0.346479588	29.47893853	1.50999E-19	0
FR_HC3	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.083445596	0.007585963	0.645423718	0.782258826	0
FR_HC3	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	57	0.669947342	0.011753462			0
FR_HC3	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.042277948	0.042277948	0.368869339	0.546033225	0
FR_HC3	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	2.055033539	0.186821231	1.629989807	0.114846408	0
FR_HC3	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.156334688	0.105121335	0.91716934	0.530426504	0
FR_HC3	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	57	6.533053217	0.114614969			0
FR_HC3	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	4.495247435	4.495247435	9.585092314	0.003040318	1
FR_HC3	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	5.188028604	0.471638964	1.005662775	0.453158493	0
FR_HC3	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.699042932	0.063549357	0.135504545	0.999502421	0
FR_HC3	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	57	26.73204341	0.468983218			0
FR_HC3	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.047928064	0.047928064	0.074126342	0.786404768	0
FR_HC3	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	29.28963613	2.662694194	4.118167176	0.000183078	0
FR_HC3	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	6.666466215	0.606042383	0.937315241	0.512340382	0
FR_HC3	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	57	36.85464007	0.646572633			0
FR_HC3	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.020713786	0.020713786	0.376649364	0.541843514	0
FR_HC3	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.631414284	0.057401299	1.04375718	0.421854624	0
FR_HC3	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.237013132	0.021546648	0.391793732	0.953919507	0
FR_HC3	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	57	3.134708035	0.054994878			0
FR_HC3	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.053146407	0.053146407	6.305185185	0.0148984	1
FR_HC3	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	0.117803887	0.010709444	1.270547395	0.26487526	0
FR_HC3	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.285776644	0.025979695	3.082179878	0.002630098	0
FR_HC3	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	57	0.480453014	0.008429			0
FR_HC3	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.015803811	0.015803811	0.577068681	0.450594066	0
FR_HC3	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.405611073	0.036873734	1.346426946	0.223886208	0
FR_HC3	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.210030905	0.019093719	0.697198101	0.735740242	0
FR_HC3	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	57	1.561022556	0.027386361			0
FR_HC3	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.07029523	0.07029523	5.810137941	0.019182598	1
FR_HC3	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	3.475059082	0.315914462	26.11139608	2.55994E-18	0
FR_HC3	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.068639942	0.006239995	0.515756615	0.884813942	0
FR_HC3	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	57	0.689627022	0.01209872			0
FR_HC3	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	20.69160379	20.69160379	40.52554226	3.59365E-08	1
FR_HC3	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.082453758	0.098404887	0.1927309	0.997446441	0
FR_HC3	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.301736708	0.02743061	0.053724223	0.999995229	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_HC3	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	57	29.10316187	0.510581787			0
FR_HC3	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	19.22737511	19.22737511	15.13558049	0.000264225	1
FR_HC3	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	1.741716471	0.158337861	0.124641841	0.999667005	0
FR_HC3	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.86467649	0.078606954	0.061878539	0.999990072	0
FR_HC3	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	57	72.40953738	1.270342761			0
FR_HC3	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.053146407	0.053146407	6.305185185	0.0148984	1
FR_HC3	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.117803887	0.010709444	1.270547395	0.26487526	0
FR_HC3	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.285776644	0.025979695	3.082179878	0.002630098	0
FR_HC3	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	57	0.480453014	0.008429			0
FR_HC3	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.170882393	1.170882393	9.709371302	0.002869725	1
FR_HC3	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.314626184	0.02860238	0.237181063	0.993653136	0
FR_HC3	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.5203395	0.047303591	0.392258121	0.953723856	0
FR_HC3	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	57	6.873802052	0.120593018			0
FR_HC3	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.213397585	0.213397585	3.303807714	0.074376511	0
FR_HC3	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.571443803	0.051949437	0.804277845	0.635350856	0
FR_HC3	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.271672071	0.115606552	1.789813218	0.077272982	0
FR_HC3	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	57	3.68171013	0.064591406			0
FR_HC3	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.053146407	0.053146407	6.305185185	0.0148984	1
FR_HC3	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	0.117803887	0.010709444	1.270547395	0.26487526	0
FR_HC3	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.285776644	0.025979695	3.082179878	0.002630098	0
FR_HC3	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	57	0.480453014	0.008429			0
FR_HC3	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.030457026	0.030457026	2.695546116	0.106135639	0
FR_HC3	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.044208196	0.004018927	0.355688135	0.967642186	0
FR_HC3	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.020772411	0.001888401	0.167129647	0.99866613	0
FR_HC3	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	57	0.644044074	0.011299019			0
FR_HC3	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.287139609	2.287139609	8.237904613	0.005747033	1
FR_HC3	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.369702509	0.033609319	0.121055297	0.999710914	0
FR_HC3	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.357658628	0.032514421	0.117111651	0.999753915	0
FR_HC3	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	57	15.82525701	0.277636088			0
FR_HC3	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.053146407	0.053146407	6.305185185	0.0148984	1
FR_HC3	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.117803887	0.010709444	1.270547395	0.26487526	0
FR_HC3	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.285776644	0.025979695	3.082179878	0.002630098	0
FR_HC3	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	57	0.480453014	0.008429			0
FR_HC3	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.037885789	1.037885789	13.36512294	0.000560184	1
FR_HC3	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.71971495	0.065428632	0.842541363	0.599305285	0
FR_HC3	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.256905164	0.023355015	0.30074855	0.983066174	0
FR_HC3	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	57	4.426408214	0.077656284			0
FR_HC3	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.479779682	1.479779682	9.902609699	0.002624116	1
FR_HC3	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	1.777265033	0.161569548	1.081215128	0.392380128	0
FR_HC3	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.994396427	0.090399675	0.604949988	0.816815539	0
FR_HC3	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	57	8.517698305	0.149433304			0
FR_HC3	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.930391574	1.930391574	16.88092313	0.000128773	1
FR_HC3	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.138862861	0.012623896	0.110393678	0.999815659	0
FR_HC3	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.060753927	0.005523084	0.048298367	0.999997263	0
FR_HC3	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	57	6.518145889	0.114353437			0
FR_HC3	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.104438158	0.104438158	4.10731808	0.04738554	1
FR_HC3	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	2.157486261	0.196135115	7.713553356	5.79522E-08	0
FR_HC3	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.144967032	0.013178821	0.518293421	0.883066962	0
FR_HC3	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	57	1.449358165	0.025427336			0
FR_HC3	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.053146407	0.053146407	6.305185185	0.0148984	1
FR_HC3	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	0.117803887	0.010709444	1.270547395	0.26487526	0
FR_HC3	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.285776644	0.025979695	3.082179878	0.002630098	0
FR_HC3	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	57	0.480453014	0.008429			0
FR_HC3	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.566229414	0.566229414	12.5598054	0.000794835	1
FR_HC3	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	12.54832077	1.140756434	25.30366398	5.27266E-18	0
FR_HC3	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.19264151	0.017512865	0.388461222	0.955309188	0
FR_HC3	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	57	2.569711516	0.045082658			0
FR_HC3	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.017567675	0.017567675	4.279360256	0.043124471	1
FR_HC3	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.881678973	0.080152634	19.52460907	1.70512E-15	0
FR_HC3	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.056235409	0.00511231	1.245322172	0.27975863	0
FR_HC3	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	57	0.233997009	0.004105211			0
FR_HC3	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.053146407	0.053146407	6.305185185	0.0148984	1
FR_HC3	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.117803887	0.010709444	1.270547395	0.26487526	0
FR_HC3	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.285776644	0.025979695	3.082179878	0.002630098	0
FR_HC3	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	57	0.480453014	0.008429			0
FR_HC3	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.258541181	0.258541181	11.89143318	0.001066983	1
FR_HC3	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	7.517868228	0.683442566	31.4344956	3.28972E-20	0
FR_HC3	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.088891321	0.008081029	0.371681673	0.961924877	0
FR_HC3	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	57	1.23928269	0.021741802			0
FR_HC3	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.053146407	0.053146407	6.305185185	0.0148984	1
FR_HC3	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.117803887	0.010709444	1.270547395	0.26487526	0
FR_HC3	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.285776644	0.025979695	3.082179878	0.002630098	0
FR_HC3	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	57	0.480453014	0.008429			0
FR_HC3	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.095292427	0.095292427	9.192122118	0.003653271	1
FR_HC3	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.135736952	0.012339723	1.190317458	0.314449074	0
FR_HC3	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.317334079	0.028848553	2.782796355	0.005789124	0
FR_HC3	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	57	0.59090472	0.010366749			0
FR_HC3	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	5.00663E-05	5.00663E-05	0.392691799	0.533389712	0
FR_HC3	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.001178918	0.000107174	0.840615032	0.601112436	0
FR_HC3	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.000475673	4.3243E-05	0.339173929	0.972952429	0
FR_HC3	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	57	0.007267224	0.000127495			0
FR_HC3	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.244202719	0.244202719	10.60242833	0.001903776	1
FR_HC3	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.574927567	0.415902506	18.05703283	9.0813E-15	0
FR_HC3	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.142115773	0.012919616	0.560924549	0.851978652	0
FR_HC3	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	57	1.312864803	0.023032716			0
FR_HC3	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.342933963	1.342933963	10.93750863	0.001635356	1
FR_HC3	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.284220707	0.025838246	0.210439267	0.996224402	0
FR_HC3	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.318976613	0.028997874	0.236172816	0.993767777	0
FR_HC3	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	57	6.998598903	0.122782437			0
FR_HC3	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	7.259622222	7.259622222	79.54851223	2.09436E-12	1
FR_HC3	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	0.583779731	0.053070885	0.581533003	0.835870679	0
FR_HC3	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.016639914	0.09242181	1.012727286	0.447256255	0
FR_HC3	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	57	5.20183791	0.091260314			0
FR_HC3	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.137690362	0.137690362	5.232581967	0.026616357	1
FR_HC3	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	1.89572832	0.172338938	6.549315504	1.59737E-06	0
FR_HC3	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.423380511	0.038489137	1.462684561	0.177136177	0
FR_HC3	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	48	1.263073832	0.026314038			0
FR_HC3	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.037907758	0.037907758	0.633068292	0.430232324	0
FR_HC3	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.803990197	0.073090018	1.220620121	0.300329801	0
FR_HC3	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.763533937	0.069412176	1.159199316	0.340237276	0
FR_HC3	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	47	2.814332471	0.059879414			0
FR_HC3	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.106637572	0.106637572	0.813281799	0.371750178	0
FR_HC3	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	1.352632129	0.122966557	0.937816387	0.513768663	0
FR_HC3	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	1.074998346	0.097727122	0.745325387	0.690230361	0
FR_HC3	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	47	6.162643634	0.131120077			0
FR_HC3	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.000574421	0.000574421	0.461912986	0.499995944	0
FR_HC3	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.007440835	0.00067644	0.54395011	0.863072945	0
FR_HC3	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.007381178	0.000671016	0.539589004	0.866274273	0
FR_HC3	Field Measured	pH (-)_Field Measured	Residuals	48	0.059691315	0.001243569			0
FR_HC3	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	0	0	-	-	-
FR_HC3	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	0	0	-	-	0
FR_HC3	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0	0	-	-	0
FR_HC3	Major Ions	Bromide (mg/L)_Major Ions	Residuals	57	0	0			0
FR_HC3	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.002299896	0.002299896	0.390954715	0.534293365	0
FR_HC3	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	2.309374985	0.20994318	35.68782506	1.54486E-21	0
FR_HC3	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.044209526	0.004019048	0.683189979	0.748531509	0
FR_HC3	Major Ions	Calcium (mg/L)_Major Ions	Residuals	57	0.335317752	0.005882768			0
FR_HC3	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	1.376500896	1.376500896	3.185450793	0.079618209	0
FR_HC3	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	1.587267786	0.144297071	0.333927295	0.974515567	0
FR_HC3	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.669602215	0.060872929	0.140870027	0.999401289	0
FR_HC3	Major Ions	Chloride (mg/L)_Major Ions	Residuals	57	24.63090978	0.432121224			0
FR_HC3	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.018190631	0.018190631	0.704944817	0.404634949	0
FR_HC3	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	3.674662871	0.334060261	12.94589796	7.50409E-12	0
FR_HC3	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.153501077	0.013954643	0.54078683	0.867059223	0
FR_HC3	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	57	1.470846977	0.025804333			0
FR_HC3	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.101770637	0.101770637	6.919975757	0.010942649	1
FR_HC3	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	5.842551428	0.531141039	36.11535921	1.15585E-21	0
FR_HC3	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.081676322	0.00742512	0.504876979	0.892166992	0
FR_HC3	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	57	0.838287086	0.014706791			0
FR_HC3	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	10.41106909	10.41106909	8.817660273	0.004358761	1
FR_HC3	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	1.191937824	0.108357984	0.09177385	0.999926224	0
FR_HC3	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.745976533	0.067816048	0.057436837	0.999993248	0
FR_HC3	Major Ions	Potassium (mg/L)_Major Ions	Residuals	57	67.30027237	1.180706533			0
FR_HC3	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	5.760919545	5.760919545	7.700891207	0.007451235	1
FR_HC3	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	1.945421117	0.176856465	0.236412327	0.993740677	0
FR_HC3	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.776525099	0.070593191	0.094365227	0.999915208	0
FR_HC3	Major Ions	Sodium (mg/L)_Major Ions	Residuals	57	42.64083276	0.748084785			0
FR_HC3	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.291672122	0.291672122	3.67114939	0.060381969	0
FR_HC3	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	26.90954053	2.446321866	30.79078305	5.38451E-20	0
FR_HC3	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.112686581	0.010244235	0.1289397	0.999607857	0
FR_HC3	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	57	4.528639176	0.07944981			0
FR_HC3	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.459101129	0.459101129	6.628824605	0.0126557	1
FR_HC3	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	6.408688284	0.582608026	8.412103947	1.48785E-08	0
FR_HC3	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.143648123	0.01305892	0.188553864	0.997686308	0
FR_HC3	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	57	3.947723147	0.069258301			0
FR_HC3	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.063365284	0.063365284	4.603238599	0.036184415	1
FR_HC3	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	0.171882991	0.015625726	1.135147546	0.352351295	0
FR_HC3	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.432047309	0.039277028	2.853321558	0.004805419	0
FR_HC3	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	57	0.784626112	0.01376537			0
FR_HC3	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	2.509685457	2.509685457	29.14295895	1.35742E-06	1
FR_HC3	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	0.756940459	0.068812769	0.799067349	0.640275255	0
FR_HC3	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	2.062030381	0.187457307	2.176790959	0.028590101	0
FR_HC3	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	57	4.908632348	0.086116357			0
FR_HC3	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.525700308	0.525700308	7.448341712	0.008429763	1
FR_HC3	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.058248454	0.096204405	1.363064224	0.215635027	0
FR_HC3	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.384849163	0.125895378	1.783738349	0.078461122	0
FR_HC3	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	57	4.023032065	0.07057951			0
FR_HC3	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.102884047	0.102884047	2.195222931	0.144146088	0
FR_HC3	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	0.641405655	0.058309605	1.244144116	0.281436187	0
FR_HC3	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.078788786	0.098071708	2.0925427	0.036311136	0
FR_HC3	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	55	2.577698382	0.046867243			0
FR_HC3	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	14.49344009	14.49344009	4.940554284	0.03021585	1
FR_HC3	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	15.28941127	1.389946479	0.473807874	0.911871128	0
FR_HC3	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	5.207947008	0.473449728	0.161390537	0.998865496	0
FR_HC3	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	57	167.2132392	2.9335656			0
FR_HC3	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	3.135662713	3.135662713	5.608549022	0.021287121	1
FR_HC3	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	32.918194	2.992563091	5.352596352	9.28911E-06	0
FR_HC3	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	3.043838547	0.276712595	0.49493721	0.898683035	0
FR_HC3	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	57	31.86791698	0.559086263			0
FR_HC3	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.011312153	0.011312153	2.599951504	0.112390707	0
FR_HC3	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	0.081890055	0.00744455	1.711033213	0.094073716	0
FR_HC3	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.140779603	0.012798146	2.941487534	0.003808378	0
FR_HC3	Total Metals	Antimony (mg/L)_Total Metals	Residuals	57	0.248001836	0.004350909			0
FR_HC3	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.064247018	0.064247018	0.900212531	0.346730217	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_HC3	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	0.577943777	0.052540343	0.73618165	0.699567702	0
FR_HC3	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.542910943	0.04935554	0.691557017	0.740906947	0
FR_HC3	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	57	4.06801714	0.071368722			0
FR_HC3	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.011958618	0.011958618	1.114948864	0.295463686	0
FR_HC3	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	3.331183705	0.302834882	28.23448379	4.1613E-19	0
FR_HC3	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.044390423	0.004035493	0.376244838	0.960188635	0
FR_HC3	Total Metals	Barium (mg/L)_Total Metals	Residuals	57	0.611365464	0.01072571			0
FR_HC3	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	21.75354878	21.75354878	42.96002	1.75216E-08	1
FR_HC3	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	0.894419899	0.0813109	0.160576921	0.998891844	0
FR_HC3	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.307198422	0.027927129	0.055151922	0.999994531	0
FR_HC3	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	57	28.86293536	0.506367287			0
FR_HC3	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	20.29356044	20.29356044	16.0578082	0.000180262	1
FR_HC3	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	1.8663383	0.169667118	0.134253526	0.999524005	0
FR_HC3	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.55384943	0.050349948	0.039840708	0.999999006	0
FR_HC3	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	57	72.03554376	1.263781469			0
FR_HC3	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.013286602	0.013286602	3.152592593	0.081144899	0
FR_HC3	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.063769044	0.005797186	1.375533438	0.209618964	0
FR_HC3	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.157239342	0.014294486	3.391739289	0.001171208	0
FR_HC3	Total Metals	Boron (mg/L)_Total Metals	Residuals	57	0.240226507	0.0042145			0
FR_HC3	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	1.231354387	1.231354387	9.538051527	0.003107633	1
FR_HC3	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	0.7317394	0.066521764	0.515276525	0.88514319	0
FR_HC3	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.315972724	0.028724793	0.222501791	0.995181423	0
FR_HC3	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	57	7.358651801	0.129099154			0
FR_HC3	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.012926874	0.012926874	1.789371532	0.186315737	0
FR_HC3	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	1.929613091	0.175419372	24.28200642	1.35081E-17	0
FR_HC3	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.016107059	0.001464278	0.202689189	0.996801917	0
FR_HC3	Total Metals	Calcium (mg/L)_Total Metals	Residuals	57	0.411782454	0.007224254			0
FR_HC3	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.040275684	0.040275684	0.375823548	0.542285388	0
FR_HC3	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	0.570536739	0.051866976	0.483985107	0.905633368	0
FR_HC3	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.368669818	0.124424529	1.161039708	0.334175731	0
FR_HC3	Total Metals	Chromium (mg/L)_Total Metals	Residuals	57	6.108488886	0.107166472			0
FR_HC3	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.012464691	0.012464691	2.934311105	0.092150676	0
FR_HC3	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	0.063269854	0.005751805	1.354031609	0.220082684	0
FR_HC3	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.15817212	0.014379284	3.385025193	0.001191824	0
FR_HC3	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	57	0.242130891	0.00424791			0
FR_HC3	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.004591748	0.004591748	0.725109582	0.398036411	0
FR_HC3	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	0.115014464	0.01045586	1.651145436	0.109051496	0
FR_HC3	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.128393867	0.01167217	1.843219895	0.067533	0
FR_HC3	Total Metals	Copper (mg/L)_Total Metals	Residuals	57	0.360951875	0.006332489			0
FR_HC3	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	3.228851683	3.228851683	7.900323184	0.006763355	1
FR_HC3	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	2.780888609	0.252808055	0.618568314	0.805400891	0
FR_HC3	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.915464894	0.083224081	0.20363188	0.996735337	0
FR_HC3	Total Metals	Iron (mg/L)_Total Metals	Residuals	57	23.29582495	0.408698683			0
FR_HC3	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.004245758	0.004245758	0.188919406	0.665458626	0
FR_HC3	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	0.288629708	0.026239064	1.167534376	0.329724013	0
FR_HC3	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.306209973	0.02783727	1.238648204	0.283803644	0
FR_HC3	Total Metals	Lead (mg/L)_Total Metals	Residuals	57	1.281012963	0.022473912			0
FR_HC3	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.552757225	0.552757225	7.096917167	0.01002288	1
FR_HC3	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	0.403124154	0.03664765	0.470523635	0.913837886	0
FR_HC3	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.313715362	0.028519578	0.366166332	0.963960995	0
FR_HC3	Total Metals	Lithium (mg/L)_Total Metals	Residuals	57	4.439556088	0.077886949			0
FR_HC3	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.047944954	0.047944954	3.175362631	0.080083526	0
FR_HC3	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	5.510036954	0.50091245	33.17510094	9.04326E-21	0
FR_HC3	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.063816002	0.005801455	0.384226515	0.95703881	0
FR_HC3	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	57	0.860645751	0.015099048			0
FR_HC3	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	0.00231751	0.00231751	0.003932652	0.950216143	0
FR_HC3	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	37.96580583	3.451436894	5.856845938	2.93708E-06	0
FR_HC3	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	5.609584608	0.509962237	0.86537009	0.577978786	0
FR_HC3	Total Metals	Manganese (mg/L)_Total Metals	Residuals	57	33.59007647	0.589299587			0
FR_HC3	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	59.57685147	59.57685147	34.48791678	2.32314E-07	1
FR_HC3	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	2.236576603	0.203325146	0.117701096	0.999747823	0
FR_HC3	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.015160397	0.092287309	0.053423384	0.999995366	0
FR_HC3	Total Metals	Mercury (mg/L)_Total Metals	Residuals	57	98.46580632	1.727470286			0
FR_HC3	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.026923719	0.026923719	2.013499367	0.161350656	0
FR_HC3	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	1.915570408	0.174142764	13.02332493	6.69431E-12	0
FR_HC3	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.115383641	0.010489422	0.784454932	0.654089969	0
FR_HC3	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	57	0.762181518	0.013371606			0
FR_HC3	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.007040733	0.007040733	1.210478462	0.275862265	0
FR_HC3	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	0.069510355	0.006319123	1.086415627	0.388394643	0
FR_HC3	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.169660417	0.015423674	2.651716111	0.008185967	0
FR_HC3	Total Metals	Nickel (mg/L)_Total Metals	Residuals	57	0.331539803	0.005816488			0
FR_HC3	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	12.00008951	12.00008951	10.68317225	0.001835139	1
FR_HC3	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	1.355065395	0.123187763	0.109668856	0.999821525	0
FR_HC3	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.72625189	0.066022899	0.058777395	0.99999239	0
FR_HC3	Total Metals	Potassium (mg/L)_Total Metals	Residuals	57	64.02640397	1.123270245			0
FR_HC3	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.503100259	0.503100259	12.39734468	0.000853513	1
FR_HC3	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	11.55899599	1.050817818	25.89414426	3.10354E-18	0
FR_HC3	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.106387033	0.009671548	0.2383253	0.993521241	0
FR_HC3	Total Metals	Selenium (mg/L)_Total Metals	Residuals	57	2.313133618	0.040581292			0
FR_HC3	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.004954563	0.004954563	0.676978968	0.414057918	0
FR_HC3	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.539084312	0.049007665	6.696282846	4.69322E-07	0
FR_HC3	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.042512978	0.003864816	0.528078672	0.876215949	0
FR_HC3	Total Metals	Silicon (mg/L)_Total Metals	Residuals	57	0.41716232	0.007318637			0
FR_HC3	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.00150772	0.00150772	0.078965808	0.779721383	0
FR_HC3	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	0.184296118	0.016754193	0.8774896	0.566736413	0
FR_HC3	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.229804852	0.02089135	1.094170457	0.382500839	0
FR_HC3	Total Metals	Silver (mg/L)_Total Metals	Residuals	57	1.088319422	0.019093323			0
FR_HC3	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	6.748646995	6.748646995	9.274037929	0.003515573	1
FR_HC3	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	2.030220067	0.184565461	0.253631148	0.991567161	0
FR_HC3	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.606981552	0.055180141	0.075828936	0.999971846	0
FR_HC3	Total Metals	Sodium (mg/L)_Total Metals	Residuals	57	41.47846727	0.727692408			0
FR_HC3	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.126265153	0.126265153	6.40819264	0.014142078	1
FR_HC3	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	7.449912554	0.677264778	34.37245411	3.84338E-21	0
FR_HC3	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.035169718	0.003197247	0.162266267	0.998836617	0
FR_HC3	Total Metals	Strontium (mg/L)_Total Metals	Residuals	57	1.123111321	0.019703707			0
FR_HC3	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.013286602	0.013286602	3.152592593	0.081144899	0
FR_HC3	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	0.063769044	0.005797186	1.375533438	0.209618964	0
FR_HC3	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.157239342	0.014294486	3.391739289	0.001171208	0
FR_HC3	Total Metals	Thallium (mg/L)_Total Metals	Residuals	57	0.240226507	0.0042145			0
FR_HC3	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.013286602	0.013286602	3.152592593	0.081144899	0
FR_HC3	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.063769044	0.005797186	1.375533438	0.209618964	0
FR_HC3	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.157239342	0.014294486	3.391739289	0.001171208	0
FR_HC3	Total Metals	Tin (mg/L)_Total Metals	Residuals	57	0.240226507	0.0042145			0
FR_HC3	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.000149059	0.000149059	0.576648326	0.450758226	0
FR_HC3	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.003509916	0.000319083	1.234401258	0.286401159	0
FR_HC3	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.001416192	0.000128745	0.498060002	0.896656969	0
FR_HC3	Total Metals	Titanium (mg/L)_Total Metals	Residuals	57	0.014734066	0.000258492			0
FR_HC3	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.128302728	0.128302728	7.430582701	0.008503489	1
FR_HC3	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	4.734761936	0.430432903	24.92828737	7.42325E-18	0
FR_HC3	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.104904286	0.009536753	0.552315877	0.858508466	0
FR_HC3	Total Metals	Uranium (mg/L)_Total Metals	Residuals	57	0.984210232	0.017266846			0
FR_HC3	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	1.62141359	1.62141359	13.84831865	0.000455237	1
FR_HC3	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	0.269411671	0.02449197	0.209183276	0.996322732	0
FR_HC3	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.135334561	0.012303142	0.105079808	0.999855395	0
FR_HC3	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	57	6.673775854	0.117083787			0
FR_HC3	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.011278187	0.011278187	1.166943064	0.2845799	0
FR_HC3	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	0.107661838	0.00978744	1.012696933	0.447281522	0
FR_HC3	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.2207586	0.020068964	2.076516262	0.037116684	0
FR_HC3	Total Metals	Zinc (mg/L)_Total Metals	Residuals	57	0.550889462	0.009664727			0
FR_HC3	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	1	0	0	-	-	-
FR_HC3	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(Month)	3	0	0	-	-	0
FR_HC3	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	1	0	0	-	-	-
FR_HC3	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(Month)	3	0	0	-	-	0
FR_KC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.80278463	0.80278463	1.746296111	0.19070813	0
FR_KC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	9.915620626	0.901420057	1.960857596	0.046073207	0
FR_KC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	4.182876145	0.380261468	0.827182158	0.613536636	0
FR_KC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	69	31.71978631	0.459707048			0
FR_KC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.124324987	0.124324987	8.688223015	0.004385074	1
FR_KC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.229718915	0.111792629	7.812422191	1.46352E-08	0
FR_KC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.52007983	0.047279985	3.30407474	0.001123262	0
FR_KC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	0.973052731	0.014309599			0
FR_KC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.13037133	0.13037133	0.488809716	0.486843348	0
FR_KC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.469459	0.224496273	0.841718494	0.599727218	0
FR_KC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	4.426249858	0.402386351	1.508693347	0.148735007	0
FR_KC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	18.13640387	0.266711822			0
FR_KC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.185255895	0.185255895	10.62895422	0.001730756	1
FR_KC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	8.308116912	0.755283356	43.33396358	1.28822E-26	0
FR_KC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.117020768	0.010638252	0.610363785	0.813816944	0
FR_KC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	69	1.202626006	0.017429362			0
FR_KC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.17921078	0.17921078	1.945393584	0.167558198	0
FR_KC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	1.742351952	0.158395632	1.719438117	0.087138618	0
FR_KC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.555518249	0.14141075	1.535061481	0.139012123	0
FR_KC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	69	6.356319838	0.092120577			0
FR_KC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.502579416	0.502579416	26.70005263	2.19967E-06	1
FR_KC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	9.913844348	0.901258577	47.88029643	6.59158E-28	0
FR_KC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.132732665	0.012066606	0.64105095	0.787477739	0
FR_KC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	1.298798179	0.018823162			0
FR_KC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.00184317	0.00184317	0.326086957	0.569854848	0
FR_KC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.073769798	0.006706345	1.186462216	0.313002595	0
FR_KC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.015255319	0.001386847	0.245355966	0.992911365	0
FR_KC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	0.384362411	0.005652388			0
FR_KC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.12971459	0.12971459	4.524025708	0.036999684	1
FR_KC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.152902315	0.01390021	0.48479442	0.906594366	0
FR_KC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.225734457	0.020521314	0.715717123	0.719570566	0
FR_KC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	69	1.978394313	0.028672381			0
FR_KC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000961547	0.000961547	5.031320264	0.02810713	1
FR_KC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.004302281	0.000391116	2.046528284	0.036559845	0
FR_KC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.002800144	0.000254559	1.331984944	0.226086373	0
FR_KC1	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	69	0.013186741	0.000191112			0
FR_KC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.148623066	0.148623066	10.55221396	0.001794068	1
FR_KC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.199972192	0.109088381	7.745257657	1.54168E-08	0
FR_KC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.520592003	0.047326546	3.360177194	0.00094018	0
FR_KC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	0.97183317	0.014084539			0
FR_KC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.350925886	0.350925886	13.48358413	0.000470673	1
FR_KC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	11.44807575	1.040734159	39.98800641	1.369E-25	0
FR_KC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.171913178	0.015628471	0.600490897	0.82203892	0
FR_KC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	69	1.795804878	0.026026158			0
FR_KC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.068101431	0.068101431	0.280754615	0.597907953	0
FR_KC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	2.820188794	0.256380799	1.056954193	0.408290613	0
FR_KC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	2.422387705	0.220217064	0.90786576	0.537667353	0
FR_KC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	69	16.73703106	0.242565668			0
FR_KC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	2.735412293	2.735412293	6.434499837	0.013458411	1
FR_KC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	7.309915577	0.66453778	1.563189669	0.129629072	0
FR_KC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.471714336	0.133792212	0.314718907	0.980326786	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_KC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	69	29.3330411	0.425116538			0
FR_KC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.126899606	0.126899606	0.1621763	0.688405701	0
FR_KC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	40.67163428	3.697421299	4.725263704	2.30243E-05	0
FR_KC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	7.346203111	0.667836646	0.85348788	0.588539019	0
FR_KC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	69	53.99107555	0.782479356			0
FR_KC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.01127998	0.01127998	0.053691628	0.81744555	0
FR_KC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.356509885	0.03240999	0.154268459	0.999122897	0
FR_KC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.128927866	0.011720715	0.055789486	0.999994532	0
FR_KC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	69	14.49608882	0.210088244			0
FR_KC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.414265545	0.414265545	93.79371706	1.71821E-14	1
FR_KC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	1.593639149	0.144876286	32.80138925	4.08091E-23	0
FR_KC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.134968889	0.012269899	2.77802354	0.004802375	0
FR_KC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	69	0.304757328	0.004416773			0
FR_KC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.016621448	0.016621448	0.271628537	0.603910168	0
FR_KC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	2.270884621	0.206444056	3.373719084	0.000905353	0
FR_KC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.529339679	0.048121789	0.78640868	0.65249637	0
FR_KC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	69	4.222236511	0.061191833			0
FR_KC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.294199269	0.294199269	6.723095937	0.011610261	1
FR_KC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.859531879	0.078139262	1.785652816	0.073346972	0
FR_KC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.338812321	0.03080112	0.703872874	0.730617422	0
FR_KC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	69	3.019405011	0.043759493			0
FR_KC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	28.9074003	28.9074003	48.44533146	1.56989E-09	1
FR_KC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.67251597	0.424774179	0.711870514	0.723166903	0
FR_KC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.69974259	0.063612963	0.106607686	0.999852726	0
FR_KC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	69	41.17240114	0.596701466			0
FR_KC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	33.18596418	33.18596418	22.13266522	1.26599E-05	1
FR_KC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	5.042805586	0.458436871	0.305744614	0.982459462	0
FR_KC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.776824213	0.070620383	0.047098746	0.999997744	0
FR_KC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	69	103.4593668	1.499411113			0
FR_KC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.528644381	0.528644381	60.77773797	4.71914E-11	1
FR_KC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	1.070741549	0.097340141	11.19110272	1.47989E-11	0
FR_KC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.151457464	0.01376886	1.582992685	0.123366299	0
FR_KC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	69	0.600161564	0.008697994			0
FR_KC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.879569397	1.879569397	2.110636326	0.150811217	0
FR_KC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	39.14679087	3.55879917	3.996304057	0.000162494	0
FR_KC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	24.11875444	2.19261404	2.462165456	0.011626729	0
FR_KC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	69	61.44606097	0.890522623			0
FR_KC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.019883297	0.019883297	0.276775153	0.600509662	0
FR_KC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.746370006	0.15876091	2.209949121	0.023391013	0
FR_KC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.737015141	0.067001376	0.932658003	0.514987443	0
FR_KC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	69	4.956902701	0.07183917			0
FR_KC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.35850871	0.35850871	1.999382491	0.161859573	0
FR_KC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	5.191699638	0.471972694	2.632164619	0.007229049	0
FR_KC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.201324957	0.10921136	0.609065483	0.814905596	0
FR_KC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	69	12.37237051	0.179309718			0
FR_KC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.00382671	0.00382671	0.033593036	0.855112678	0
FR_KC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.261366889	0.023760626	0.208584308	0.996512505	0
FR_KC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.095084875	0.00864408	0.075882652	0.999973313	0
FR_KC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	69	7.860050593	0.113913777			0
FR_KC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.963546145	1.963546145	7.283362382	0.008743593	1
FR_KC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	1.13645516	0.103314105	0.383221994	0.958421013	0
FR_KC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.450254557	0.040932232	0.151829527	0.999186298	0
FR_KC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	69	18.60194192	0.269593361			0
FR_KC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.013121831	0.013121831	0.216415713	0.643249536	0
FR_KC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	2.219277796	0.201752527	3.327463779	0.001029996	0
FR_KC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.52185529	0.04744139	0.782441287	0.656289093	0
FR_KC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	69	4.183644144	0.060632524			0
FR_KC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.568291999	1.568291999	31.18301209	4.31161E-07	1
FR_KC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	6.603494008	0.600317637	11.93636908	3.85856E-12	0
FR_KC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.12198914	0.011089922	0.220505599	0.995543935	0
FR_KC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	69	3.47022756	0.050293153			0
FR_KC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.6379E-05	1.6379E-05	8.92296E-05	0.992490438	0
FR_KC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	69.57106658	6.324642417	34.4553486	1.00972E-23	0
FR_KC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.375599713	0.21596361	1.176525246	0.319415608	0
FR_KC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	69	12.6656773	0.183560541			0
FR_KC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.888871893	2.888871893	25.4529924	3.51367E-06	1
FR_KC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.1193942	0.010854018	0.095631531	0.999914174	0
FR_KC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.040285773	0.003662343	0.032267816	0.999999695	0
FR_KC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	69	7.831384127	0.113498321			0
FR_KC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.080377111	0.080377111	3.789199841	0.055656719	0
FR_KC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	1.826148727	0.166013521	7.826337608	1.28877E-08	0
FR_KC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.520703801	0.047336709	2.231583703	0.02203844	0
FR_KC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	69	1.463638997	0.021212159			0
FR_KC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	7.530681907	7.530681907	210.0753239	1.26921E-22	1
FR_KC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	4.74417389	0.431288535	12.03119185	3.26348E-12	0
FR_KC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.877939155	0.07981265	2.226447566	0.022352474	0
FR_KC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	69	2.473479712	0.035847532			0
FR_KC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.101741891	2.101741891	42.96959198	8.43174E-09	1
FR_KC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	15.08559547	1.37141777	28.03829636	3.21885E-21	0
FR_KC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.401332407	0.036484764	0.745921961	0.691091603	0
FR_KC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	69	3.374949209	0.048912307			0
FR_KC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.318962092	0.318962092	49.01850321	1.32288E-09	1
FR_KC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.301781448	0.027434677	4.216196345	8.94801E-05	0
FR_KC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.066607987	0.006055272	0.930581894	0.516871893	0
FR_KC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	69	0.448981159	0.006506973			0
FR_KC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.013121831	0.013121831	0.216415713	0.643249536	0
FR_KC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	2.219277796	0.201752527	3.327463779	0.001029996	0
FR_KC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.52185529	0.04744139	0.782441287	0.656289093	0
FR_KC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	69	4.183644144	0.060632524			0
FR_KC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.127110083	1.127110083	56.31456898	1.60941E-10	1
FR_KC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	9.112340418	0.828394583	41.38964297	4.98739E-26	0
FR_KC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.173015161	0.015728651	0.785861308	0.653019702	0
FR_KC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	69	1.381003124	0.020014538			0
FR_KC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.083456029	0.083456029	8.752794175	0.004231674	1
FR_KC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.766675984	0.069697817	7.309845089	4.09407E-08	0
FR_KC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.137276621	0.012479693	1.308859098	0.238405742	0
FR_KC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	69	0.657900311	0.009534787			0
FR_KC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.013121831	0.013121831	0.216415713	0.643249536	0
FR_KC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	2.219277796	0.201752527	3.327463779	0.001029996	0
FR_KC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.52185529	0.04744139	0.782441287	0.656289093	0
FR_KC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	69	4.183644144	0.060632524			0
FR_KC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.85819072	0.85819072	13.93936577	0.000384516	1
FR_KC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.035654093	0.094150372	1.529259691	0.141020811	0
FR_KC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.379751812	0.034522892	0.560746239	0.853703617	0
FR_KC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	69	4.248052646	0.06156598			0
FR_KC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.98928286	0.98928286	38.18305473	3.94066E-08	1
FR_KC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	11.60264217	1.054785651	40.71124636	8.10077E-26	0
FR_KC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.216831933	0.019711994	0.760817935	0.676928529	0
FR_KC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	69	1.787717558	0.02590895			0
FR_KC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.291389607	3.291389607	14.29714319	0.000328424	1
FR_KC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.792019608	0.253819964	1.102543548	0.372681579	0
FR_KC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.505067916	0.045915265	0.199446798	0.997144061	0
FR_KC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	69	15.88470367	0.230213097			0
FR_KC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.697907512	0.697907512	3.127103578	0.081420571	0
FR_KC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	15.5647029	1.414972991	6.340047965	3.94747E-07	0
FR_KC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	3.830839502	0.348258137	1.560434937	0.130522411	0
FR_KC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	69	15.39943182	0.223180171			0
FR_KC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.842841445	0.842841445	4.995061791	0.029154708	1
FR_KC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	8.05630983	0.732391803	4.340486968	9.18118E-05	0
FR_KC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.503114761	0.045737706	0.271062448	0.988988549	0
FR_KC1	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	60	10.12409633	0.168734939			0
FR_KC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.056137281	0.056137281	9.034705763	0.003863524	1
FR_KC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.088248073	0.008022552	1.291145508	0.251775278	0
FR_KC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.036113549	0.00328305	0.528372408	0.876454846	0
FR_KC1	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	60	0.372810906	0.006213515			0
FR_KC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.058720394	0.058720394	9.046599622	0.003841785	1
FR_KC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.200466209	0.018224201	2.807662494	0.005122111	0
FR_KC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.047305192	0.004300472	0.662540652	0.767489984	0
FR_KC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	60	0.389452811	0.00649088			0
FR_KC1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.000741117	0.000741117	1.796473563	0.185192847	0
FR_KC1	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.04640627	0.004218752	10.22628973	3.4567E-10	0
FR_KC1	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.007971885	0.000724717	1.756719537	0.082566161	0
FR_KC1	Field Measured	pH (-)_Field Measured	Residuals	60	0.02475239	0.00041254			0
FR_KC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	10.27844812	10.27844812	28.18026607	1.27267E-06	1
FR_KC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	11.67945914	1.061769012	2.911036075	0.003306106	0
FR_KC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	1.402368496	0.127488045	0.349532049	0.970473531	0
FR_KC1	Major Ions	Bromide (mg/L)_Major Ions	Residuals	69	25.16700582	0.364739215			0
FR_KC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.485630208	0.485630208	26.8780822	2.05855E-06	1
FR_KC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	9.279229706	0.843566337	46.68870463	1.4021E-27	0
FR_KC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.158763707	0.014433064	0.798824045	0.640623941	0
FR_KC1	Major Ions	Calcium (mg/L)_Major Ions	Residuals	69	1.246684347	0.018067889			0
FR_KC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	1.49754765	1.49754765	16.22911671	0.000142262	1
FR_KC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	7.842510502	0.7129555	7.726390558	1.60751E-08	0
FR_KC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	1.161329969	0.105575452	1.144134765	0.342034641	0
FR_KC1	Major Ions	Chloride (mg/L)_Major Ions	Residuals	69	6.367000107	0.092275364			0
FR_KC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	3.405370804	3.405370804	23.31483919	7.97314E-06	1
FR_KC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	1.009244542	0.091749504	0.628162115	0.798676916	0
FR_KC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	2.292624014	0.208420365	1.426948069	0.18086775	0
FR_KC1	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	69	10.07815596	0.146060231			0
FR_KC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.51270674	0.51270674	24.2483988	5.56054E-06	1
FR_KC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	10.80996617	0.982724197	46.47781349	1.60526E-27	0
FR_KC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.129670831	0.011788257	0.557524104	0.856161431	0
FR_KC1	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	69	1.458932004	0.021143942			0
FR_KC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.696156287	0.696156287	119.4736366	1.04861E-16	1
FR_KC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	1.153848546	0.104895322	18.00202893	3.23319E-16	0
FR_KC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.094748007	0.008613455	1.478232453	0.159817482	0
FR_KC1	Major Ions	Potassium (mg/L)_Major Ions	Residuals	69	0.402053417	0.005826861			0
FR_KC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	1.626543081	1.626543081	47.96210713	1.81487E-09	1
FR_KC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	4.210718886	0.382792626	11.2874606	1.24026E-11	0
FR_KC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.128401318	0.011672847	0.344198902	0.972150826	0
FR_KC1	Major Ions	Sodium (mg/L)_Major Ions	Residuals	69	2.340002958	0.033913086			0
FR_KC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.887091951	0.887091951	23.51190836	7.38654E-06	1
FR_KC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	20.72485414	1.884077649	49.93649301	1.86061E-28	0
FR_KC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.338834965	0.030803179	0.816422145	0.623803912	0
FR_KC1	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	69	2.603333753	0.037729475			0
FR_KC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.07026541	0.07026541	1.835249104	0.179928066	0
FR_KC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	20.15063872	1.831876248	47.84643323	6.73297E-28	0
FR_KC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.369064685	0.033551335	0.876321045	0.567018378	0
FR_KC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	2.641773954	0.038286579			0
FR_KC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	8.373581584	8.373581584	24.32502907	5.39944E-06	1
FR_KC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	8.969034551	0.815366777	2.368618537	0.015084046	0
FR_KC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	2.89449523	0.26313593	0.764402793	0.673512037	0
FR_KC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	23.75237158	0.344237269			0
FR_KC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	4.194275847	4.194275847	21.39833037	1.69308E-05	1

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_KC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.673351448	0.152122859	0.776099453	0.662349003	0
FR_KC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.646290681	0.149662789	0.763548685	0.674326267	0
FR_KC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	13.52465489	0.196009491			0
FR_KC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	2.693060192	2.693060192	5.486116298	0.022059814	1
FR_KC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	7.071989749	0.642908159	1.309688116	0.237954932	0
FR_KC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	12.01756517	1.092505925	2.225577644	0.022406093	0
FR_KC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	33.87116553	0.490886457			0
FR_KC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.072828352	0.072828352	0.937667231	0.336702268	0
FR_KC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.040414642	0.094583149	1.217760911	0.295062101	0
FR_KC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.019037261	0.092639751	1.1927396	0.311234006	0
FR_KC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	61	4.737852933	0.07766972			0
FR_KC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	9.981574859	9.981574859	3.532957179	0.064383291	0
FR_KC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	12.23800414	1.112545831	0.393783229	0.954116136	0
FR_KC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	10.81274156	0.982976506	0.347922442	0.970986294	0
FR_KC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	69	194.9439606	2.825274792			0
FR_KC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	0.816863314	0.816863314	0.813930593	0.370099315	0
FR_KC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	27.70780018	2.518890925	2.509847547	0.01017825	0
FR_KC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	3.660852985	0.332804817	0.331609974	0.975866431	0
FR_KC1	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	69	69.24861793	1.003603158			0
FR_KC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.485092363	0.485092363	44.12441026	5.87326E-09	1
FR_KC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	1.086058195	0.098732563	8.980797178	1.09678E-09	0
FR_KC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.241910165	0.021991833	2.000395687	0.041420281	0
FR_KC1	Total Metals	Antimony (mg/L)_Total Metals	Residuals	69	0.758568168	0.010993742			0
FR_KC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.108957015	0.108957015	0.867982367	0.354762931	0
FR_KC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	2.270892699	0.206444791	1.644597533	0.105585951	0
FR_KC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.000396187	0.090945108	0.724494425	0.711335764	0
FR_KC1	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	69	8.661505495	0.125529065			0
FR_KC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.44050924	0.44050924	8.598790714	0.004560941	1
FR_KC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	0.922353074	0.083850279	1.636767041	0.107709215	0
FR_KC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.3123084	0.028391673	0.554208697	0.858672143	0
FR_KC1	Total Metals	Barium (mg/L)_Total Metals	Residuals	69	3.534815364	0.051229208			0
FR_KC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	25.22540501	25.22540501	42.00234804	1.1449E-08	1
FR_KC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	5.392927004	0.490266091	0.816332859	0.62388918	0
FR_KC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.470318261	0.042756206	0.071192555	0.999980739	0
FR_KC1	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	69	41.4394201	0.600571306			0
FR_KC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	29.21513987	29.21513987	19.43927249	3.72741E-05	1
FR_KC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	5.592808954	0.508437178	0.338305717	0.973932508	0
FR_KC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.726304122	0.066027647	0.043933708	0.999998435	0
FR_KC1	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	69	103.6995933	1.502892656			0
FR_KC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.458618341	0.458618341	38.99834377	3.01506E-08	1
FR_KC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	1.256176543	0.114197868	9.710749209	2.50084E-10	0
FR_KC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.040995935	0.003726903	0.316915045	0.979780163	0
FR_KC1	Total Metals	Boron (mg/L)_Total Metals	Residuals	69	0.811436141	0.011759944			0
FR_KC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	1.022418768	1.022418768	45.32509185	4.04932E-09	1
FR_KC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	1.876059008	0.170550819	7.560729296	2.32517E-08	0
FR_KC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.209547323	0.019049757	0.844499336	0.59706019	0
FR_KC1	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	69	1.556464469	0.022557456			0
FR_KC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.329816919	0.329816919	17.2764236	9.12901E-05	1
FR_KC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	9.736995401	0.8851814	46.36744802	1.72342E-27	0
FR_KC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.140795431	0.012799585	0.670466048	0.761271883	0
FR_KC1	Total Metals	Calcium (mg/L)_Total Metals	Residuals	69	1.317249907	0.019090578			0
FR_KC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.005510649	0.005510649	0.030740568	0.861333933	0
FR_KC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	3.245513045	0.29504664	1.645886349	0.105240156	0
FR_KC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.760782801	0.160071164	0.892939987	0.551492896	0
FR_KC1	Total Metals	Chromium (mg/L)_Total Metals	Residuals	69	12.36915186	0.17926307			0
FR_KC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.19457749	0.19457749	0.78823451	0.377718913	0
FR_KC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	6.850290132	0.622753648	2.522778538	0.009817187	0
FR_KC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.953776601	0.177616055	0.719523638	0.71600403	0
FR_KC1	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	69	17.03280771	0.246852286			0
FR_KC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.000555081	0.000555081	0.004129514	0.948947981	0
FR_KC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	3.277537125	0.29795792	2.216652274	0.022963515	0
FR_KC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.17023253	0.106384775	0.791447511	0.647678221	0
FR_KC1	Total Metals	Copper (mg/L)_Total Metals	Residuals	69	9.274840604	0.13441798			0
FR_KC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	1.595229158	1.595229158	2.309012667	0.133194963	0
FR_KC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	6.013598409	0.546690764	0.791306938	0.647812649	0
FR_KC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.91514092	0.17410372	0.252006235	0.992078839	0
FR_KC1	Total Metals	Iron (mg/L)_Total Metals	Residuals	69	47.67007712	0.690870683			0
FR_KC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.110460963	0.110460963	0.338406299	0.562646367	0
FR_KC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	6.508827408	0.591711583	1.812757389	0.068311728	0
FR_KC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.372829468	0.124802679	0.382343332	0.958767749	0
FR_KC1	Total Metals	Lead (mg/L)_Total Metals	Residuals	69	22.52264944	0.326415209			0
FR_KC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	1.464231761	1.464231761	30.75910735	5.01257E-07	1
FR_KC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	6.67988505	0.607262277	12.75675482	9.28978E-13	0
FR_KC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.087247391	0.007931581	0.166618672	0.998743056	0
FR_KC1	Total Metals	Lithium (mg/L)_Total Metals	Residuals	69	3.284620401	0.047603194			0
FR_KC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.252348898	0.252348898	10.3946386	0.001931739	1
FR_KC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	10.9331642	0.993924018	40.94125657	6.8671E-26	0
FR_KC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.151709037	0.013791731	0.568102565	0.848027968	0
FR_KC1	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	69	1.675101426	0.024276832			0
FR_KC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	0.0037513	0.0037513	0.010425579	0.918968909	0
FR_KC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	68.3771188	6.216101709	17.27573436	8.79986E-16	0
FR_KC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	3.336126992	0.303284272	0.84288494	0.598593119	0
FR_KC1	Total Metals	Manganese (mg/L)_Total Metals	Residuals	69	24.8273682	0.35981693			0
FR_KC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	71.07901803	71.07901803	45.28396918	4.10094E-09	1
FR_KC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	2.798955124	0.254450466	0.162108698	0.998893705	0
FR_KC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.77568078	0.161425525	0.102843128	0.999876738	0
FR_KC1	Total Metals	Mercury (mg/L)_Total Metals	Residuals	69	108.3043808	1.569628708			0
FR_KC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.195725432	0.195725432	9.052081701	0.003660806	1
FR_KC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	1.891723036	0.171974821	7.9536426	9.74363E-09	0
FR_KC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.538621891	0.048965626	2.2646053	0.020119831	0
FR_KC1	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	69	1.491928073	0.021622146			0
FR_KC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	7.048587706	7.048587706	164.1699871	6.45927E-20	1
FR_KC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	5.298553598	0.481686691	11.21905567	1.40584E-11	0
FR_KC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.895483978	0.081407634	1.896080583	0.054790463	0
FR_KC1	Total Metals	Nickel (mg/L)_Total Metals	Residuals	69	2.962493694	0.042934691			0
FR_KC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.382679605	0.382679605	50.71051172	8.02086E-10	1
FR_KC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	1.193054903	0.108459537	14.37243722	6.57149E-14	0
FR_KC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.074262239	0.006751113	0.894618813	0.549931953	0
FR_KC1	Total Metals	Potassium (mg/L)_Total Metals	Residuals	69	0.520698606	0.007546357			0
FR_KC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.891621484	0.891621484	17.4612875	8.44724E-05	1
FR_KC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	14.76927269	1.342661154	26.29433323	1.84747E-20	0
FR_KC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.334175636	0.030379603	0.594946395	0.826597631	0
FR_KC1	Total Metals	Selenium (mg/L)_Total Metals	Residuals	69	3.523330246	0.051062757			0
FR_KC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.320045974	0.320045974	25.50880654	3.52577E-06	1
FR_KC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.210540324	0.019140029	1.525528666	0.142710949	0
FR_KC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.07267973	0.006607248	0.526621263	0.878703966	0
FR_KC1	Total Metals	Silicon (mg/L)_Total Metals	Residuals	68	0.853161288	0.01254649			0
FR_KC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.062406965	0.062406965	0.781682699	0.379697388	0
FR_KC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	3.162191601	0.287471964	3.600749688	0.00048186	0
FR_KC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.960481123	0.087316466	1.093688347	0.379435755	0
FR_KC1	Total Metals	Silver (mg/L)_Total Metals	Residuals	69	5.50873213	0.079836698			0
FR_KC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	1.285375458	1.285375458	37.08126585	5.67815E-08	1
FR_KC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	4.660854678	0.423714062	12.22355202	2.32886E-12	0
FR_KC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.099395038	0.009035913	0.260673309	0.990866202	0
FR_KC1	Total Metals	Sodium (mg/L)_Total Metals	Residuals	69	2.391798245	0.034663743			0
FR_KC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.889661042	0.889661042	42.60262163	9.46623E-09	1
FR_KC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	9.327630597	0.847966418	40.6060182	8.73911E-26	0
FR_KC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.122034507	0.011094046	0.531253396	0.875528962	0
FR_KC1	Total Metals	Strontium (mg/L)_Total Metals	Residuals	69	1.440911604	0.020882777			0
FR_KC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.041831384	0.041831384	1.913652333	0.171017754	0
FR_KC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	0.640724817	0.058247711	2.664646862	0.00660017	0
FR_KC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.044021573	0.004001961	0.183076951	0.998061038	0
FR_KC1	Total Metals	Thallium (mg/L)_Total Metals	Residuals	69	1.50830194	0.021859448			0
FR_KC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.039634012	0.039634012	0.557974498	0.457615388	0
FR_KC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	3.16117976	0.287379978	4.04578524	0.000142007	0
FR_KC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.518251813	0.047113801	0.663276276	0.767753274	0
FR_KC1	Total Metals	Tin (mg/L)_Total Metals	Residuals	69	4.901203923	0.071031941			0
FR_KC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	1.240253872	1.240253872	16.14881024	0.000147226	1
FR_KC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.979201024	0.089018275	1.159068528	0.331469259	0
FR_KC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.357433945	0.032493995	0.423090281	0.940839676	0
FR_KC1	Total Metals	Titanium (mg/L)_Total Metals	Residuals	69	5.299307866	0.076801563			0
FR_KC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	1.015147539	1.015147539	36.93937031	5.95339E-08	1
FR_KC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	11.70046882	1.063678984	38.70534122	3.54187E-25	0
FR_KC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.214867332	0.019533394	0.710784629	0.724180668	0
FR_KC1	Total Metals	Uranium (mg/L)_Total Metals	Residuals	69	1.896220201	0.027481452			0
FR_KC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	2.267944683	2.267944683	9.120774162	0.003541505	1
FR_KC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	3.334325854	0.303120532	1.219030578	0.291407231	0
FR_KC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.476347122	0.043304284	0.174152657	0.998457921	0
FR_KC1	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	69	17.15733559	0.248657037			0
FR_KC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.953210777	0.953210777	18.12453537	6.40462E-05	1
FR_KC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	2.355252719	0.214113884	4.071203082	0.000132524	0
FR_KC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.710085549	0.064553232	1.22742772	0.28609862	0
FR_KC1	Total Metals	Zinc (mg/L)_Total Metals	Residuals	69	3.628867847	0.052592288			0
FR_KC1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	as.factor(new_year)	1	0.018122874	0.018122874	-	-	-
FR_KC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	1	2.62954E-31	2.62954E-31	-	-	-
FR_KC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(Month)	4	5.75211E-31	1.43803E-31	-	-	0
FR_KC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year):as.factor(Month)	1	3.45127E-31	3.45127E-31	-	-	0
FR_KC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	1	3.9443E-31	3.9443E-31	-	-	-
FR_KC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(Month)	4	5.91646E-31	1.47911E-31	-	-	0
FR_KC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	1	0	0	-	-	-
FR_KC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(Month)	3	0	0	-	-	0
FR_KC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	1	1.97215E-31	1.97215E-31	-	-	-
FR_KC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(Month)	5	1.18329E-30	2.36658E-31	-	-	0
FR_KC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year):as.factor(Month)	1	0	0	-	-	0
FR_MULTIPLATE	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.055632963	0.055632963	2.43540308	0.258998856	0
FR_MULTIPLATE	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.53544593	0.139585994	6.110552803	0.148932515	0
FR_MULTIPLATE	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	5	0.335682361	0.067136472	2.93898369	0.273129245	0
FR_MULTIPLATE	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	2	0.045686863	0.022843431			0
FR_MULTIPLATE	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.04024315	0.04024315	3.199254198	0.215570625	0
FR_MULTIPLATE	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.329125478	0.029920498	2.378622937	0.333101943	0
FR_MULTIPLATE	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	5	0.052885043	0.010577009	0.840852163	0.621993725	0
FR_MULTIPLATE	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	2	0.025157832	0.012578916			0
FR_MULTIPLATE	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	6.168479374	6.168479374	2.449986176	0.258002425	0
FR_MULTIPLATE	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	9.452772743	0.859342977	0.341312386	0.904504978	0
FR_MULTIPLATE	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	5	2.989124629	0.597824926	0.23744309	0.915317183	0
FR_MULTIPLATE	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	2	5.03552178	2.51776089			0
FR_MULTIPLATE	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.41953499	0.41953499	192.5491702	0.005153367	1
FR_MULTIPLATE	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	1.588233233	0.144384839	66.26665639	0.014956899	0
FR_MULTIPLATE	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	5	0.019273596	0.003854719	1.769156357	0.399257443	0
FR_MULTIPLATE	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	2	0.004357692	0.002178846			0
FR_MULTIPLATE	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.070175655	0.070175655	2.761574157	0.238441835	0
FR_MULTIPLATE	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	3.057407192	0.277946108	10.93782151	0.086684889	0
FR_MULTIPLATE	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	5	0.508737617	0.101747523	4.004000113	0.211835447	0
FR_MULTIPLATE	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	2	0.050822937	0.025411469			0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_MULTIPLATE	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.392503437	0.392503437	126.8244682	0.007792865	1
FR_MULTIPLATE	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.054421535	0.186765594	60.34710768	0.016409758	0
FR_MULTIPLATE	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	5	0.031531052	0.00630621	2.037642746	0.361155788	0
FR_MULTIPLATE	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	2	0.006189712	0.003094856			0
FR_MULTIPLATE	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0	0	-	-	-
FR_MULTIPLATE	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0	0	-	-	0
FR_MULTIPLATE	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	5	0	0	-	-	0
FR_MULTIPLATE	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	2	0	0			0
FR_MULTIPLATE	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.049796008	0.049796008	13.32772961	0.067520761	0
FR_MULTIPLATE	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.560197594	0.050927054	13.63045009	0.070287745	0
FR_MULTIPLATE	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	5	0.189199572	0.037839914	10.12772236	0.092297754	0
FR_MULTIPLATE	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	2	0.007472542	0.003736271			0
FR_MULTIPLATE	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000513732	0.000513732	6.041788364	0.133224885	0
FR_MULTIPLATE	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.002191468	0.000199224	2.342996304	0.337048563	0
FR_MULTIPLATE	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	5	0.000816923	0.000163385	1.921498529	0.376725859	0
FR_MULTIPLATE	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	2	0.00017006	8.50298E-05			0
FR_MULTIPLATE	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.076483048	0.076483048	21.53602084	0.0434312	1
FR_MULTIPLATE	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.315620816	0.028692801	8.079290631	0.115206576	0
FR_MULTIPLATE	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	5	0.053743335	0.010748667	3.026599007	0.26678895	0
FR_MULTIPLATE	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	2	0.007102802	0.003551401			0
FR_MULTIPLATE	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.547715206	0.547715206	131.2645212	0.00753224	1
FR_MULTIPLATE	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	2.057387633	0.187035239	44.82455642	0.022018061	0
FR_MULTIPLATE	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	5	0.020463429	0.004092686	0.980846336	0.574755157	0
FR_MULTIPLATE	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	2	0.008345213	0.004172607			0
FR_MULTIPLATE	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.037858889	0.037858889	0.699634683	0.490923364	0
FR_MULTIPLATE	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	5.320220363	0.483656397	8.938000967	0.104845619	0
FR_MULTIPLATE	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	5	0.887194821	0.177438964	3.279083341	0.250050409	0
FR_MULTIPLATE	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	2	0.108224736	0.054112368			0
FR_MULTIPLATE	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	10.39015869	10.39015869	7.039982404	0.026333528	1
FR_MULTIPLATE	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(Month)	11	23.52365589	2.138514172	1.448977114	0.29371804	0
FR_MULTIPLATE	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	10.15066167	1.127851297	0.7641898	0.652399763	0
FR_MULTIPLATE	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	Residuals	9	13.28290652	1.475878502			0
FR_MULTIPLATE	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	4.210621222	4.210621222	1.327324987	0.278965054	0
FR_MULTIPLATE	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	50.49787619	4.590716018	1.44714325	0.294374079	0
FR_MULTIPLATE	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	17.36318427	1.929242697	0.608160151	0.764852751	0
FR_MULTIPLATE	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	9	28.55034852	3.172260947			0
FR_MULTIPLATE	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.174541328	0.174541328	1.00585E+30	9.94185E-31	1
FR_MULTIPLATE	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	2.392337107	0.217485192	1.25333E+30	7.97876E-31	0
FR_MULTIPLATE	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	1.212405874	0.242481175	1.39737E+30	7.15628E-31	0
FR_MULTIPLATE	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	2	3.47053E-31	1.73526E-31			0
FR_MULTIPLATE	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.415706386	0.415706386	8.307081758	0.102247999	0
FR_MULTIPLATE	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	1.5912033	0.144654845	2.890645099	0.285019165	0
FR_MULTIPLATE	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.107742183	0.021548437	0.430603499	0.80648729	0
FR_MULTIPLATE	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	2	0.100084819	0.050042409			0
FR_MULTIPLATE	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.312493532	0.312493532	4.95892E+29	2.01657E-30	1
FR_MULTIPLATE	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	1.164412002	0.105855637	1.67981E+29	5.95305E-30	0
FR_MULTIPLATE	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	1.027353435	0.205470687	3.26059E+29	3.06693E-30	0
FR_MULTIPLATE	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	2	1.26033E-30	6.30164E-31			0
FR_MULTIPLATE	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.206189772	0.206189772	18.9104674	0.049024647	1
FR_MULTIPLATE	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.304545965	0.118595088	10.87681758	0.087145418	0
FR_MULTIPLATE	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.033898125	0.006779625	0.621785829	0.711130053	0
FR_MULTIPLATE	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	2	0.021806946	0.010903473			0
FR_MULTIPLATE	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	12.43339389	12.43339389	9.04397E+61	1.10571E-62	1
FR_MULTIPLATE	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	7.02141E-30	6.3831E-31	4.64302E+30	2.15377E-31	0
FR_MULTIPLATE	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	6.80831E-30	1.36166E-30	9.90464E+30	1.00963E-31	0
FR_MULTIPLATE	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	2	2.74954E-61	1.37477E-61			0
FR_MULTIPLATE	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	17.84467765	17.84467765	13.46285974	0.066909533	0
FR_MULTIPLATE	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	1.277689605	0.1161536	0.087631711	0.997925048	0
FR_MULTIPLATE	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.731910982	0.146382196	0.110437578	0.978226132	0
FR_MULTIPLATE	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	2	2.650949055	1.325474528			0
FR_MULTIPLATE	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.247950318	0.247950318	32.73610937	0.029215252	1
FR_MULTIPLATE	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	1.242444869	0.112949534	14.91237566	0.064480124	0
FR_MULTIPLATE	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	1.019560899	0.20391218	26.92189097	0.036199787	0
FR_MULTIPLATE	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	2	0.015148429	0.007574215			0
FR_MULTIPLATE	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.070067034	1.070067034	23.74595188	0.039626174	1
FR_MULTIPLATE	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.505036	0.409548727	9.088331905	0.103220289	0
FR_MULTIPLATE	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.301345518	0.060269104	1.337436989	0.480110953	0
FR_MULTIPLATE	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	2	0.09012627	0.045063135			0
FR_MULTIPLATE	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.013046987	1.013046987	137.2110883	0.007209323	1
FR_MULTIPLATE	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.902825974	0.082075089	11.11657442	0.085363036	0
FR_MULTIPLATE	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.888545035	0.177709007	24.06961036	0.040367352	0
FR_MULTIPLATE	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	2	0.014766255	0.007383128			0
FR_MULTIPLATE	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.106590839	0.106590839	46.93548347	0.020648244	1
FR_MULTIPLATE	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	2.029928736	0.184538976	81.25863452	0.012217391	0
FR_MULTIPLATE	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.490033804	0.098006761	43.15562888	0.022801251	0
FR_MULTIPLATE	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	2	0.004542015	0.002271008			0
FR_MULTIPLATE	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.036033976	0.036033976	3.53017E+29	2.83272E-30	1
FR_MULTIPLATE	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.218100381	0.019827307	1.94244E+29	5.14817E-30	0
FR_MULTIPLATE	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.202296006	0.040459201	3.9637E+29	2.52289E-30	0
FR_MULTIPLATE	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	2	2.04149E-31	1.02074E-31			0
FR_MULTIPLATE	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	5.044367415	5.044367415	16.7177489	0.054934106	0
FR_MULTIPLATE	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.493477308	0.044861573	0.148677616	0.987642288	0
FR_MULTIPLATE	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.327753345	0.065550669	0.217244212	0.926510047	0
FR_MULTIPLATE	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	2	0.60347448	0.30173724			0
FR_MULTIPLATE	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.19427178	0.19427178	2.36566E+29	4.22715E-30	1
FR_MULTIPLATE	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	1.175855508	0.106895955	1.30168E+29	7.68239E-30	0
FR_MULTIPLATE	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	1.090648587	0.218129717	2.65618E+29	3.76481E-30	0
FR_MULTIPLATE	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	2	1.64243E-30	8.21217E-31			0
FR_MULTIPLATE	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.229216591	1.229216591	9.084297638	0.094701944	0
FR_MULTIPLATE	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	5.541350756	0.50375916	3.722938803	0.230682913	0
FR_MULTIPLATE	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.31777429	0.063554858	0.469690411	0.78565294	0
FR_MULTIPLATE	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	2	0.270624464	0.135312232			0
FR_MULTIPLATE	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.172555128	0.172555128	0.321268293	0.627975739	0
FR_MULTIPLATE	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	15.23778203	1.385252912	2.579105257	0.312487076	0
FR_MULTIPLATE	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	4.658873036	0.931774607	1.734805802	0.404706379	0
FR_MULTIPLATE	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	2	1.074212002	0.537106001			0
FR_MULTIPLATE	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.297223138	1.297223138	10.8	0.081441346	0
FR_MULTIPLATE	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.265513508	0.024137592	0.200956938	0.971101442	0
FR_MULTIPLATE	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.214939506	0.042987901	0.357894737	0.846762149	0
FR_MULTIPLATE	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	2	0.240226507	0.120113253			0
FR_MULTIPLATE	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.035812262	0.035812262	2.725653079	0.240540934	0
FR_MULTIPLATE	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.382015822	0.034728711	2.64318456	0.306418688	0
FR_MULTIPLATE	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.207270581	0.041454116	3.155051723	0.258004282	0
FR_MULTIPLATE	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	2	0.026277931	0.013138966			0
FR_MULTIPLATE	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.100076898	0.100076898	0.620433019	0.513412532	0
FR_MULTIPLATE	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	3.141332437	0.285575676	1.770444362	0.4158931	0
FR_MULTIPLATE	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.475829775	0.095165955	0.589987323	0.725821992	0
FR_MULTIPLATE	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	2	0.32260339	0.161301695			0
FR_MULTIPLATE	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.107792734	1.107792734	25.26435522	0.000295967	1
FR_MULTIPLATE	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	5.912533341	0.537503031	12.25831068	6.78918E-05	0
FR_MULTIPLATE	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.996628493	0.110736499	2.525460013	0.068493664	0
FR_MULTIPLATE	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	12	0.526176611	0.043848051			0
FR_MULTIPLATE	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.011457382	0.011457382	14.20207739	0.063752683	0
FR_MULTIPLATE	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.135629287	0.012329935	15.28365673	0.062973059	0
FR_MULTIPLATE	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.037286318	0.007457264	9.243702819	0.100491255	0
FR_MULTIPLATE	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	2	0.00161348	0.00080674			0
FR_MULTIPLATE	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.19427178	0.19427178	1.99746E+29	5.00636E-30	1
FR_MULTIPLATE	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	1.175855508	0.106895955	1.09908E+29	9.09852E-30	0
FR_MULTIPLATE	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	1.090648587	0.218129717	2.24276E+29	4.45879E-30	0
FR_MULTIPLATE	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	2	1.94519E-30	9.72595E-31			0
FR_MULTIPLATE	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.297757097	0.297757097	162.1922112	0.006109083	1
FR_MULTIPLATE	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.622675029	0.147515912	80.3538594	0.01235395	0
FR_MULTIPLATE	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.012560802	0.00251216	1.368406855	0.473276581	0
FR_MULTIPLATE	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	2	0.003671657	0.001835829			0
FR_MULTIPLATE	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.19427178	0.19427178	1.99746E+29	5.00636E-30	1
FR_MULTIPLATE	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.175855508	0.106895955	1.09908E+29	9.09852E-30	0
FR_MULTIPLATE	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	1.090648587	0.218129717	2.24276E+29	4.45879E-30	0
FR_MULTIPLATE	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	2	1.94519E-30	9.72595E-31			0
FR_MULTIPLATE	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.19427178	0.19427178	2.5576E+29	3.90992E-30	1
FR_MULTIPLATE	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	1.175855508	0.106895955	1.40729E+29	7.10585E-30	0
FR_MULTIPLATE	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	1.090648587	0.218129717	2.87169E+29	3.48227E-30	0
FR_MULTIPLATE	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	2	1.51917E-30	7.59587E-31			0
FR_MULTIPLATE	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.001971189	0.001971189	3.312254676	0.210372223	0
FR_MULTIPLATE	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.010435095	0.000948645	1.594039737	0.447922433	0
FR_MULTIPLATE	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.000313221	6.26442E-05	0.105263158	0.980189433	0
FR_MULTIPLATE	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	2	0.00119024	0.00059512			0
FR_MULTIPLATE	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.951699737	0.951699737	61.03543752	0.015991964	1
FR_MULTIPLATE	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	3.144875866	0.285897806	18.33550751	0.052823999	0
FR_MULTIPLATE	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.037300011	0.007460002	0.478432932	0.781082166	0
FR_MULTIPLATE	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	2	0.031185153	0.015592577			0
FR_MULTIPLATE	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.495514533	2.495514533	20.77634616	0.044913824	1
FR_MULTIPLATE	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.590007353	0.053637032	0.446553819	0.847203501	0
FR_MULTIPLATE	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.483583729	0.096716746	0.805212939	0.63514744	0
FR_MULTIPLATE	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	2	0.240226507	0.120113253			0
FR_MULTIPLATE	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.67031458	1.67031458	16.90820656	0.054364858	0
FR_MULTIPLATE	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	3.643735417	0.331248674	3.353153396	0.252052313	0
FR_MULTIPLATE	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	5	0.146511219	0.029302244	0.296619809	0.881692895	0
FR_MULTIPLATE	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	2	0.197574423	0.098787212			0
FR_MULTIPLATE	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.262077334	0.262077334	9.866446658	0.01190711	1
FR_MULTIPLATE	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	1.97803616	0.179821469	6.769753428	0.003889832	0
FR_MULTIPLATE	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	8	0.194092312	0.024261539	0.913376128	0.545470804	0
FR_MULTIPLATE	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	9	0.239062359	0.026562484			0
FR_MULTIPLATE	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.044378945	0.044378945	3.808012812	0.082778646	0
FR_MULTIPLATE	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.10451188	0.00950108	0.815256757	0.631427702	0
FR_MULTIPLATE	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	8	0.043448647	0.005431081	0.466023374	0.852084433	0
FR_MULTIPLATE	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	9	0.104886859	0.011654095			0
FR_MULTIPLATE	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.017865227	0.017865227	0.937342888	0.358257963	0
FR_MULTIPLATE	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.299003262	0.027182115	1.426176245	0.301987271	0
FR_MULTIPLATE	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	8	0.065286797	0.00816085	0.428178971	0.876771189	0
FR_MULTIPLATE	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	9	0.171534923	0.019059436			0
FR_MULTIPLATE	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.005840375	0.005840375	10.09614054	0.011230836	1
FR_MULTIPLATE	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.008235619	0.000748693	1.294250172	0.354916586	0
FR_MULTIPLATE	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	8	0.011194002	0.00139925	2.41885628	0.105069466	0
FR_MULTIPLATE	Field Measured	pH (-)_Field Measured	Residuals	9	0.005206284	0.000578476			0
FR_MULTIPLATE	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	0.037628313	0.037628313	0.05810671	0.831972952	0
FR_MULTIPLATE	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	9.480696098	0.861881463	1.330941836	0.505530265	0
FR_MULTIPLATE	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	5	1.469088385	0.293817677	0.453721602	0.794087379	0
FR_MULTIPLATE	Major Ions	Bromide (mg/L)_Major Ions	Residuals	2	1.295145197	0.647572598			0
FR_MULTIPLATE	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.337424524	0.337424524	465.5804803	0.002140961	1
FR_MULTIPLATE	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	1.673522163	0.152138378	209.9214916	0.004750305	0
FR_MULTIPLATE	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	5	0.033592242	0.006718448	9.270157312	0.100225021	0
FR_MULTIPLATE	Major Ions	Calcium (mg/L)_Major Ions	Residuals	2	0.001449479	0.000724739			0
FR_MULTIPLATE	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.134641411	0.134641411	0.266482054	0.657107614	0
FR_MULTIPLATE	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	3.061236674	0.278294243	0.550799498	0.791724218	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_MULTIPLATE	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	5	2.209403891	0.441880778	0.874569694	0.60998879	0
FR_MULTIPLATE	Major Ions	Chloride (mg/L)_Major Ions	Residuals	2	1.010510154	0.505255077			0
FR_MULTIPLATE	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.053095196	0.053095196	1.598853054	0.333466137	0
FR_MULTIPLATE	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.31128951	0.028299046	0.852167808	0.654810495	0
FR_MULTIPLATE	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	5	0.218939194	0.043787839	1.318581061	0.484365425	0
FR_MULTIPLATE	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	2	0.066416605	0.033208303			0
FR_MULTIPLATE	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.495232214	0.495232214	36.13421087	0.026576323	1
FR_MULTIPLATE	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	2.763792179	0.251253834	18.33252923	0.052832309	0
FR_MULTIPLATE	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	5	0.027088847	0.005417769	0.395303085	0.825821783	0
FR_MULTIPLATE	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	2	0.027410711	0.013705356			0
FR_MULTIPLATE	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.312954482	0.312954482	5.47946212	0.144078805	0
FR_MULTIPLATE	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	0.554557489	0.050414317	0.882694951	0.643033137	0
FR_MULTIPLATE	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	5	0.409558736	0.081911747	1.434177625	0.459365348	0
FR_MULTIPLATE	Major Ions	Potassium (mg/L)_Major Ions	Residuals	2	0.114228176	0.057114088			0
FR_MULTIPLATE	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.25490797	0.25490797	15.37657222	0.059307435	0
FR_MULTIPLATE	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	1.318917731	0.119901612	7.232711462	0.127638607	0
FR_MULTIPLATE	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	5	0.42062945	0.08412589	5.074646441	0.1727738	0
FR_MULTIPLATE	Major Ions	Sodium (mg/L)_Major Ions	Residuals	2	0.03315537	0.016577685			0
FR_MULTIPLATE	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.933378385	0.933378385	216.0469547	0.004596733	1
FR_MULTIPLATE	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	3.993921005	0.363083728	84.04215802	0.011815579	0
FR_MULTIPLATE	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	5	0.03365618	0.006731236	1.558063743	0.435198308	0
FR_MULTIPLATE	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	2	0.008640514	0.004320257			0
FR_MULTIPLATE	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.914748831	0.914748831	24.67367239	0.038220556	1
FR_MULTIPLATE	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	6.282912265	0.571173842	15.40636707	0.062490332	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	5	0.231419354	0.046283871	1.248422546	0.500848198	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	2	0.074147765	0.037073882			0
FR_MULTIPLATE	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	4.007968484	4.007968484	4.43795174	0.169733664	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	6.382814804	0.580255891	0.642506959	0.746027849	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	5	1.41735658	0.283471316	0.313882713	0.871810832	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	2	1.806224456	0.903112228			0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.012974503	0.012974503	0.004244751	0.953979563	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	8.871274074	0.806479461	0.263848601	0.944037782	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	5	8.982053738	1.796410748	0.587715479	0.726889641	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	2	6.113198688	3.056599344			0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	1.55089783	1.55089783	3.4223729	0.205545602	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	8.338743601	0.7580676	1.672831028	0.433047558	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	5	2.816891212	0.563378242	1.243209186	0.502115747	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	2	0.906328957	0.453164478			0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.444517608	0.444517608	24.9674684	0.037795984	1
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	4.849425677	0.44085688	24.76185425	0.039438389	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	5	0.378397092	0.075679418	4.250728106	0.201351021	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	2	0.035607744	0.017803872			0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	18.4545408	18.4545408	3.625492356	0.197207646	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	26.04217709	2.367470645	0.465102157	0.837131718	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	5	11.59744068	2.319488137	0.455675738	0.793049386	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	2	10.18043289	5.090216443			0
FR_MULTIPLATE	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	1.138283554	1.138283554	6.96412366	0.118587272	0
FR_MULTIPLATE	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	33.61683301	3.056075728	18.69735288	0.051833478	0
FR_MULTIPLATE	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	6.919561555	1.383912311	8.466903029	0.108992074	0
FR_MULTIPLATE	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	2	0.326899294	0.163449647			0
FR_MULTIPLATE	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.276911292	0.276911292	4.862501911	0.158239285	0
FR_MULTIPLATE	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	0.487887263	0.044353388	0.778835814	0.684620063	0
FR_MULTIPLATE	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.483646957	0.096729391	1.69854702	0.410617586	0
FR_MULTIPLATE	Total Metals	Antimony (mg/L)_Total Metals	Residuals	2	0.113896631	0.056948315			0
FR_MULTIPLATE	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.184633562	0.184633562	74.21365885	0.013208236	1
FR_MULTIPLATE	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	2.759227575	0.25083887	100.8249541	0.009860313	0
FR_MULTIPLATE	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	1.662824115	0.332564823	133.6747887	0.007441843	0
FR_MULTIPLATE	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	2	0.00497573	0.002487865			0
FR_MULTIPLATE	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.0306045	0.0306045	15.95566398	0.057336468	0
FR_MULTIPLATE	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	1.049992737	0.095453885	49.76490712	0.019858042	0
FR_MULTIPLATE	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.108108638	0.021621728	11.27249311	0.083482249	0
FR_MULTIPLATE	Total Metals	Barium (mg/L)_Total Metals	Residuals	2	0.003836193	0.001918096			0
FR_MULTIPLATE	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	8.754428152	8.754428152	1.57286E+31	6.35785E-32	1
FR_MULTIPLATE	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	1.616270771	0.146933706	2.63987E+29	3.78806E-30	0
FR_MULTIPLATE	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	1.090648587	0.218129717	3.91901E+29	2.55166E-30	0
FR_MULTIPLATE	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	2	1.11319E-30	5.56594E-31			0
FR_MULTIPLATE	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	13.37352178	13.37352178	10.08961055	0.086452684	0
FR_MULTIPLATE	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	3.370411587	0.306401053	0.231163291	0.95889112	0
FR_MULTIPLATE	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	2.371901786	0.474380357	0.357894737	0.846762149	0
FR_MULTIPLATE	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	2	2.650949055	1.325474528			0
FR_MULTIPLATE	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.025664948	0.025664948	316.200712	0.003147624	1
FR_MULTIPLATE	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.520472555	0.047315687	582.9450337	0.00171369	0
FR_MULTIPLATE	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.050501685	0.010100337	124.4395189	0.007991045	0
FR_MULTIPLATE	Total Metals	Boron (mg/L)_Total Metals	Residuals	2	0.000162333	8.11666E-05			0
FR_MULTIPLATE	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.141232727	0.141232727	17.05855731	0.053923754	0
FR_MULTIPLATE	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	5.120622581	0.465511144	56.2259801	0.017599957	0
FR_MULTIPLATE	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	2.300225707	0.460045141	55.5657782	0.017772396	0
FR_MULTIPLATE	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	2	0.016558578	0.008279289			0
FR_MULTIPLATE	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.161596855	0.161596855	1364.811786	0.000731897	1
FR_MULTIPLATE	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	1.444080094	0.131280009	1108.762318	0.000901426	0
FR_MULTIPLATE	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.103793959	0.020758792	175.3242283	0.005681023	0
FR_MULTIPLATE	Total Metals	Calcium (mg/L)_Total Metals	Residuals	2	0.000236805	0.000118402			0
FR_MULTIPLATE	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.190720778	0.190720778	67.75724066	0.014439682	1
FR_MULTIPLATE	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	5.259363174	0.478123925	169.8627609	0.00586668	0
FR_MULTIPLATE	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	3.513445014	0.702689003	249.643843	0.003994502	0
FR_MULTIPLATE	Total Metals	Chromium (mg/L)_Total Metals	Residuals	2	0.005629532	0.002814766			0
FR_MULTIPLATE	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.041776236	0.041776236	5.027050664	0.154195311	0
FR_MULTIPLATE	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	2.980228811	0.270929892	32.60174709	0.030124909	0
FR_MULTIPLATE	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	2.372999064	0.474599813	57.10991489	0.017297705	0
FR_MULTIPLATE	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	2	0.016620575	0.008310288			0
FR_MULTIPLATE	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.230985093	0.230985093	92.68050418	0.01061821	1
FR_MULTIPLATE	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	1.57358776	0.143053433	57.39878749	0.017244026	0
FR_MULTIPLATE	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.80966115	0.16193223	64.97371979	0.015226542	0
FR_MULTIPLATE	Total Metals	Copper (mg/L)_Total Metals	Residuals	2	0.004984545	0.002492273			0
FR_MULTIPLATE	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	3.763231318	3.763231318	14.55060649	0.062365473	0
FR_MULTIPLATE	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	19.71600219	1.792363835	6.930209346	0.132756433	0
FR_MULTIPLATE	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	6.70086076	1.340172152	5.181801479	0.169640879	0
FR_MULTIPLATE	Total Metals	Iron (mg/L)_Total Metals	Residuals	2	0.517261094	0.258630547			0
FR_MULTIPLATE	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.211435405	0.211435405	3.74437E+29	2.67067E-30	1
FR_MULTIPLATE	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	6.38377787	0.580343443	1.02775E+30	9.73002E-31	0
FR_MULTIPLATE	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	3.780269117	0.756053823	1.33892E+30	7.46872E-31	0
FR_MULTIPLATE	Total Metals	Lead (mg/L)_Total Metals	Residuals	2	1.12935E-30	5.64675E-31			0
FR_MULTIPLATE	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	1.16276912	1.16276912	8.137877134	0.104053551	0
FR_MULTIPLATE	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	4.547750178	0.413431834	2.89348712	0.284790555	0
FR_MULTIPLATE	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.408529684	0.081705937	0.571835684	0.734419595	0
FR_MULTIPLATE	Total Metals	Lithium (mg/L)_Total Metals	Residuals	2	0.285767185	0.142883592			0
FR_MULTIPLATE	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.364604111	0.364604111	51.01971153	0.019042213	1
FR_MULTIPLATE	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	1.97046018	0.179132744	25.06636825	0.038970432	0
FR_MULTIPLATE	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.03744345	0.00748869	1.047905901	0.55439006	0
FR_MULTIPLATE	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	2	0.014292676	0.007146338			0
FR_MULTIPLATE	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	0.115311149	0.115311149	1.770459099	0.314755068	0
FR_MULTIPLATE	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	8.824664574	0.802242234	12.31743055	0.077430347	0
FR_MULTIPLATE	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	5.369379939	1.073875988	16.48802859	0.058165834	0
FR_MULTIPLATE	Total Metals	Manganese (mg/L)_Total Metals	Residuals	2	0.130261296	0.065130648			0
FR_MULTIPLATE	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	29.57377716	29.57377716	246.2157697	0.004036901	1
FR_MULTIPLATE	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	4.832326056	0.439302369	3.657401294	0.234203798	0
FR_MULTIPLATE	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	2.090804756	0.418160951	3.481388931	0.238072844	0
FR_MULTIPLATE	Total Metals	Mercury (mg/L)_Total Metals	Residuals	2	0.240226507	0.120113253			0
FR_MULTIPLATE	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.079385414	0.079385414	4.812596104	0.159508382	0
FR_MULTIPLATE	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	0.252453791	0.022950345	1.391322831	0.491101208	0
FR_MULTIPLATE	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.177368634	0.035473727	2.150530057	0.347188679	0
FR_MULTIPLATE	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	2	0.032990682	0.016495341			0
FR_MULTIPLATE	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.003505315	0.003505315	0.029201261	0.880039507	0
FR_MULTIPLATE	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	2.299198577	0.209018052	1.741238652	0.420886102	0
FR_MULTIPLATE	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	1.159071255	0.231814251	1.931143887	0.375382881	0
FR_MULTIPLATE	Total Metals	Nickel (mg/L)_Total Metals	Residuals	2	0.24007973	0.120039865			0
FR_MULTIPLATE	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.408779248	0.408779248	10.17217082	0.085838761	0
FR_MULTIPLATE	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	0.404397809	0.036763437	0.914831084	0.631020378	0
FR_MULTIPLATE	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.411689642	0.082337928	2.048918767	0.359711204	0
FR_MULTIPLATE	Total Metals	Potassium (mg/L)_Total Metals	Residuals	2	0.080372077	0.040186039			0
FR_MULTIPLATE	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.848829365	0.848829365	22.71807473	0.000459123	1
FR_MULTIPLATE	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	5.577951107	0.507086464	13.57166548	3.98435E-05	0
FR_MULTIPLATE	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.854685391	0.094965043	2.541645051	0.067193414	0
FR_MULTIPLATE	Total Metals	Selenium (mg/L)_Total Metals	Residuals	12	0.448363363	0.037363614			0
FR_MULTIPLATE	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.005741621	0.005741621	7.254708681	0.114622232	0
FR_MULTIPLATE	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.355169159	0.032288105	40.79697869	0.024160508	0
FR_MULTIPLATE	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.468366536	0.093673307	118.3590017	0.008399155	0
FR_MULTIPLATE	Total Metals	Silicon (mg/L)_Total Metals	Residuals	2	0.001582867	0.000791434			0
FR_MULTIPLATE	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.049222148	0.049222148	2.860297398	0.232860803	0
FR_MULTIPLATE	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	1.004700728	0.09133643	5.307556923	0.169107886	0
FR_MULTIPLATE	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.516788129	0.103357626	6.006108226	0.148867439	0
FR_MULTIPLATE	Total Metals	Silver (mg/L)_Total Metals	Residuals	2	0.034417504	0.017208752			0
FR_MULTIPLATE	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.37316682	0.37316682	27.8197655	0.034116782	1
FR_MULTIPLATE	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	1.171860902	0.106532809	7.942072053	0.117054764	0
FR_MULTIPLATE	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.42912014	0.085824028	6.398222461	0.140670126	0
FR_MULTIPLATE	Total Metals	Sodium (mg/L)_Total Metals	Residuals	2	0.02682746	0.01341373			0
FR_MULTIPLATE	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.138465922	0.138465922	168.5204803	0.005881695	1
FR_MULTIPLATE	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	1.349515525	0.12268323	149.3120942	0.006670956	0
FR_MULTIPLATE	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.023894653	0.004778931	5.816215802	0.153189816	0
FR_MULTIPLATE	Total Metals	Strontium (mg/L)_Total Metals	Residuals	2	0.001643313	0.000821656			0
FR_MULTIPLATE	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.013671508	0.013671508	2.62999E+28	3.8023E-29	1
FR_MULTIPLATE	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	2.224123213	0.202193019	3.88959E+29	2.57097E-30	0
FR_MULTIPLATE	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.980567512	0.196113502	3.77264E+29	2.65067E-30	0
FR_MULTIPLATE	Total Metals	Thallium (mg/L)_Total Metals	Residuals	2	1.03966E-30	5.19832E-31			0
FR_MULTIPLATE	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.0160151	0.0160151	1.65453E+31	6.04403E-32	1
FR_MULTIPLATE	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.440415263	0.040037751	4.13632E+31	2.41761E-32	0
FR_MULTIPLATE	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	8.9348E-29	1.78696E-29	18461.1471	5.41658E-05	0
FR_MULTIPLATE	Total Metals	Tin (mg/L)_Total Metals	Residuals	2	1.93591E-33	9.67957E-34			0
FR_MULTIPLATE	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.104757687	0.104757687	46.12828552	0.020998266	1
FR_MULTIPLATE	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.384085497	0.034916863	15.37505355	0.062612811	0
FR_MULTIPLATE	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.376030901	0.07520618	33.11577661	0.029570158	0
FR_MULTIPLATE	Total Metals	Titanium (mg/L)_Total Metals	Residuals	2	0.004542015	0.002271008			0
FR_MULTIPLATE	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.823518281	0.823518281	301.9031442	0.003295954	1
FR_MULTIPLATE	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	2.849585368	0.259053215	94.96933099	0.01046451	0
FR_MULTIPLATE	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	0.09147812	0.018295624	6.707205551	0.134819246	0
FR_MULTIPLATE	Total Metals	Uranium (mg/L)_Total Metals	Residuals	2	0.005455513	0.002727757			0
FR_MULTIPLATE	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	1.327406974	1.327406974	11.0512948	0.079805184	0
FR_MULTIPLATE	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	4.086887861	0.37153526	3.093207863	0.2695863	0
FR_MULTIPLATE	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	1.505625859	0.301125172	2.507010367	0.309324782	0
FR_MULTIPLATE	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	2	0.240226507	0.120113253			0
FR_MULTIPLATE	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.013443094	0.013443094	0.379854002	0.600484902	0
FR_MULTIPLATE	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	2.73181175	0.248346523	7.017388844	0.131239959	0
FR_MULTIPLATE	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	5	1.066677377	0.213335475	6.028101255	0.148382507	0
FR_MULTIPLATE	Total Metals	Zinc (mg/L)_Total Metals	Residuals	2	0.070780322	0.035390161			0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_NGD1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.137611743	0.137611743	3.402754922	0.069508441	0
FR_NGD1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.531063819	0.048278529	1.193793486	0.308434665	0
FR_NGD1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.528487003	0.048044273	1.188000988	0.312286834	0
FR_NGD1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	67	2.709565333	0.040441274			0
FR_NGD1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.857135959	0.857135959	86.38290515	1.14072E-13	1
FR_NGD1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.270786634	0.206435149	20.80471326	1.60051E-17	0
FR_NGD1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.478033461	0.043457587	4.379693333	6.21733E-05	0
FR_NGD1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	67	0.664808728	0.009922518			0
FR_NGD1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.25300447	0.25300447	0.286177019	0.594451921	0
FR_NGD1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	25.03212513	2.275647739	2.574018101	0.008719006	0
FR_NGD1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	7.08688244	0.64426204	0.72873412	0.707226954	0
FR_NGD1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	67	59.2336155	0.884083813			0
FR_NGD1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	1.943521175	1.943521175	64.76302946	1.97536E-11	1
FR_NGD1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	3.762998457	0.342090769	11.39932758	1.39383E-11	0
FR_NGD1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.222800778	0.020254616	0.674934917	0.757045235	0
FR_NGD1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	67	2.010652062	0.030009732			0
FR_NGD1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.352887215	0.352887215	11.75305506	0.001043121	1
FR_NGD1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	3.88218487	0.352925897	11.75434338	7.44001E-12	0
FR_NGD1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.480615363	0.043692306	1.455190363	0.169780252	0
FR_NGD1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	67	2.011684903	0.030025148			0
FR_NGD1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.702305669	1.702305669	61.68118586	4.41693E-11	1
FR_NGD1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	4.482592232	0.407508385	14.76562105	5.46774E-14	0
FR_NGD1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.220696937	0.020063358	0.72697385	0.708882688	0
FR_NGD1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	67	1.849096742	0.027598459			0
FR_NGD1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.829560202	0.829560202	4.83201E+30	0	1
FR_NGD1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	4.181192454	0.380108405	2.21405E+30	0	0
FR_NGD1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	20.24203585	1.840185077	1.07187E+31	0	0
FR_NGD1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	67	1.15026E-29	1.7168E-31			0
FR_NGD1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.249850353	0.249850353	6.750472823	0.01151395	1
FR_NGD1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.217122587	0.019738417	0.533293814	0.873843086	0
FR_NGD1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.111635943	0.010148722	0.274198823	0.988672167	0
FR_NGD1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	67	2.479822388	0.037012274			0
FR_NGD1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	3.34544E-05	3.34544E-05	0.263543117	0.609385117	0
FR_NGD1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.004726977	0.000429725	3.38523644	0.000917614	0
FR_NGD1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.000863754	7.85231E-05	0.61857966	0.806663395	0
FR_NGD1	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	67	0.008505044	0.000126941			0
FR_NGD1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.124905638	1.124905638	111.2985974	7.01374E-16	1
FR_NGD1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.406567556	0.218778869	21.64606559	5.92563E-18	0
FR_NGD1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.060358031	0.005487094	0.542895168	0.866869908	0
FR_NGD1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	67	0.67717545	0.010107096			0
FR_NGD1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	2.309440268	2.309440268	73.64071184	2.15779E-12	1
FR_NGD1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	4.888663501	0.444423955	14.17126774	1.36662E-13	0
FR_NGD1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.256943702	0.023358518	0.744828927	0.692031025	0
FR_NGD1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	67	2.101181454	0.031360917			0
FR_NGD1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.197260734	0.197260734	2.137158633	0.148442689	0
FR_NGD1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	6.674180318	0.606743665	6.573571119	2.6276E-07	0
FR_NGD1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.665257621	0.060477966	0.655229268	0.774759692	0
FR_NGD1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	67	6.184131097	0.092300464			0
FR_NGD1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.137313465	0.137313465	0.194413959	0.660709005	0
FR_NGD1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(Month)	11	30.9848492	2.816804473	3.988145726	0.000182889	0
FR_NGD1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.961534806	0.178321346	0.252474576	0.991954191	0
FR_NGD1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	Residuals	66	46.6154218	0.70629427			0
FR_NGD1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	24.91116925	24.91116925	15.86934641	0.000169845	1
FR_NGD1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	64.96353902	5.905776274	3.762200344	0.000326515	0
FR_NGD1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	4.570077728	0.415461612	0.264664584	0.990218789	0
FR_NGD1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	67	105.1743592	1.569766555			0
FR_NGD1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.298578688	0.298578688	0.628672243	0.430641568	0
FR_NGD1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	19.28531096	1.753210088	3.691470837	0.000395954	0
FR_NGD1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.11237836	0.192034396	0.404337951	0.949403806	0
FR_NGD1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	67	31.82067015	0.474935375			0
FR_NGD1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	11.30393452	11.30393452	19.80615281	3.31903E-05	1
FR_NGD1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	2.68513446	0.244103133	0.427704525	0.938397091	0
FR_NGD1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	3.064020194	0.27854729	0.488055746	0.904344076	0
FR_NGD1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	67	38.23880488	0.570728431			0
FR_NGD1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.661370636	1.661370636	36.80330566	6.79315E-08	1
FR_NGD1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.788566163	0.071687833	1.588055775	0.122576454	0
FR_NGD1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.619714939	0.056337722	1.248014349	0.274078187	0
FR_NGD1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	67	3.024506375	0.045141886			0
FR_NGD1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.647552541	1.647552541	5.533914663	0.021597046	1
FR_NGD1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	3.42093243	0.310993857	1.044587911	0.418715381	0
FR_NGD1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.041843712	0.094713065	0.318128864	0.979388126	0
FR_NGD1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	67	19.94718513	0.297719181			0
FR_NGD1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	25.19439845	25.19439845	57.86813954	1.22928E-10	1
FR_NGD1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.431720505	0.13015641	0.298951741	0.98389658	0
FR_NGD1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.646398984	0.058763544	0.134971945	0.999531852	0
FR_NGD1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	67	29.17019122	0.435375988			0
FR_NGD1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	30.69235678	30.69235678	24.46253405	5.36637E-06	1
FR_NGD1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	1.756002851	0.159636623	0.127234163	0.999647695	0
FR_NGD1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.697432458	0.063402951	0.050533651	0.999996709	0
FR_NGD1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	67	84.0627508	1.254667922			0
FR_NGD1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.200461741	0.200461741	2.986626358	0.088561451	0
FR_NGD1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.979762357	0.089069305	1.327019973	0.229427558	0
FR_NGD1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.341859471	0.031078134	0.463024878	0.919430344	0
FR_NGD1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	67	4.497026098	0.067119793			0
FR_NGD1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	21.31572042	21.31572042	101.7588047	4.49942E-15	1
FR_NGD1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	7.500058995	0.681823545	3.25494741	0.001315184	0
FR_NGD1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	3.596950267	0.326995479	1.561038915	0.131100273	0
FR_NGD1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	67	14.03468989	0.209472983			0
FR_NGD1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.087527755	0.087527755	1.332258834	0.252504277	0
FR_NGD1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.524253907	0.047659446	0.725423815	0.71033954	0
FR_NGD1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.365724257	0.03324766	0.5060622	0.892685572	0
FR_NGD1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	67	4.401817008	0.065698761			0
FR_NGD1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	29.63819287	29.63819287	51.08420938	8.24914E-10	1
FR_NGD1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	2.709962803	0.246360255	0.42462504	0.93991853	0
FR_NGD1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	4.616467758	0.419678887	0.723355983	0.712281363	0
FR_NGD1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	67	38.87226495	0.580183059			0
FR_NGD1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.438580337	0.438580337	9.343038731	0.003213423	1
FR_NGD1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.935594415	0.085054038	1.811898762	0.069124151	0
FR_NGD1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.452016354	0.041092396	0.875387731	0.568006285	0
FR_NGD1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	67	3.145109787	0.046941937			0
FR_NGD1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.983191476	0.983191476	2.462865374	0.121277031	0
FR_NGD1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	2.929610905	0.266328264	0.667144372	0.764089788	0
FR_NGD1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	3.03355072	0.275777338	0.690814021	0.7425364	0
FR_NGD1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	67	26.74682491	0.399206342			0
FR_NGD1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.087322659	0.087322659	1.312761188	0.255971272	0
FR_NGD1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.801787713	0.072889792	1.095785346	0.378325741	0
FR_NGD1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.855325122	0.16866592	2.535631376	0.00969841	0
FR_NGD1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	67	4.456726935	0.066518312			0
FR_NGD1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.979010949	1.979010949	5.318681713	0.024199003	1
FR_NGD1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	7.505422346	0.682311122	1.833742097	0.065281983	0
FR_NGD1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.820307995	0.074573454	0.200419541	0.997063817	0
FR_NGD1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	67	24.9298117	0.372086742			0
FR_NGD1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	31.08032619	31.08032619	27.90370924	1.49142E-06	1
FR_NGD1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	55.67342431	5.061220392	4.543929858	4.03275E-05	0
FR_NGD1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	16.45828577	1.496207798	1.343285366	0.221007614	0
FR_NGD1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	67	74.62742094	1.113842104			0
FR_NGD1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.716174497	2.716174497	23.23774295	8.57595E-06	1
FR_NGD1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.119720181	0.010883653	0.093113136	0.999924313	0
FR_NGD1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.039959792	0.003632708	0.031078984	0.999999748	0
FR_NGD1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	67	7.831384127	0.11688633			0
FR_NGD1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.377076627	3.377076627	11.02946368	0.00145445	1
FR_NGD1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	1.857247715	0.168840701	0.551430302	0.860533863	0
FR_NGD1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.094638224	0.099512566	0.325006019	0.977589771	0
FR_NGD1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	67	20.51451826	0.30618684			0
FR_NGD1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	46.78556328	46.78556328	89.31226303	6.01116E-14	1
FR_NGD1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	2.221055551	0.201914141	0.385448151	0.957393654	0
FR_NGD1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.6291017	0.239009245	0.456261614	0.923275709	0
FR_NGD1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	67	35.0974506	0.523842546			0
FR_NGD1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	5.11486663	5.11486663	39.52883766	2.79136E-08	1
FR_NGD1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.454288371	0.404935306	3.129430961	0.001862234	0
FR_NGD1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.898797951	0.081708905	0.63146476	0.79561807	0
FR_NGD1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	67	8.669520393	0.129395827			0
FR_NGD1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.18485067	0.18485067	19.55081097	3.67976E-05	1
FR_NGD1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	1.254468467	0.114042588	12.06176357	4.3589E-12	0
FR_NGD1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.196005313	0.017818665	1.884598779	0.057101389	0
FR_NGD1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	67	0.633477297	0.009454885			0
FR_NGD1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.42529E-05	1.42529E-05	0.000436602	0.983391498	0
FR_NGD1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.346877732	0.031534339	0.965972742	0.48543464	0
FR_NGD1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.234186792	0.021289708	0.65215503	0.777490882	0
FR_NGD1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	67	2.187226036	0.032645165			0
FR_NGD1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.335120478	3.335120478	34.31670191	1.56321E-07	1
FR_NGD1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.978214442	0.270746767	2.78584722	0.004839603	0
FR_NGD1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.414186489	0.037653317	0.387433579	0.956592047	0
FR_NGD1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	67	6.51149614	0.09718651			0
FR_NGD1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.861436995	2.861436995	17.80764671	7.51582E-05	1
FR_NGD1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.635552928	0.14868663	0.925324926	0.521859146	0
FR_NGD1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.831008276	0.166455298	1.035905086	0.425815502	0
FR_NGD1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	67	10.7659525	0.160685858			0
FR_NGD1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.004655706	0.004655706	0.149190171	0.700534353	0
FR_NGD1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.339179002	0.030834455	0.988077424	0.466143579	0
FR_NGD1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.154014067	0.014001279	0.448665225	0.927475176	0
FR_NGD1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	67	2.090836624	0.031206517			0
FR_NGD1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.014381613	0.014381613	2.006316946	0.16127792	0
FR_NGD1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.084364308	0.007669483	1.069936493	0.39839731	0
FR_NGD1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.022462838	0.002042076	0.284881263	0.986749712	0
FR_NGD1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	67	0.48026713	0.007168166			0
FR_NGD1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	7.954708851	7.954708851	155.7165952	3.85582E-19	1
FR_NGD1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.891978636	0.444725331	8.705675542	2.43899E-09	0
FR_NGD1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.416148299	0.037831664	0.740569887	0.696061401	0
FR_NGD1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	67	3.422663411	0.051084529			0
FR_NGD1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.559843098	1.559843098	11.63439522	0.001101232	1
FR_NGD1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.658759108	0.059887192	0.446680347	0.928551464	0
FR_NGD1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.872131398	0.079284673	0.591360257	0.829299255	0
FR_NGD1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	67	8.982803629	0.134071696			0
FR_NGD1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.66422466	0.66422466	4.531491073	0.03695672	1
FR_NGD1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	0.709892988	0.064535726	0.440277341	0.93196377	0
FR_NGD1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.940742997	0.176431182	1.203653481	0.301958417	0
FR_NGD1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	67	9.820840757	0.146579713			0
FR_NGD1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	2.700186656	2.700186656	37.26840504	9.14993E-08	1
FR_NGD1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	3.044150785	0.27674098	3.81962296	0.000375304	0
FR_NGD1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.273891727	0.024899248	0.343663374	0.971641757	0
FR_NGD1	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	58	4.202241172	0.072452434			0
FR_NGD1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.045114173	0.045114173	1.162715773	0.285609553	0
FR_NGD1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.669875717	0.060897792	1.569502879	0.134109018	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_NGD1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.273043475	0.024822134	0.639734369	0.786939304	0
FR_NGD1	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	55	2.134037873	0.038800689			0
FR_NGD1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.052085041	0.052085041	1.43644298	0.235763325	0
FR_NGD1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.872679982	0.079334544	2.187951592	0.028072996	0
FR_NGD1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.256370174	0.023306379	0.642762	0.784447111	0
FR_NGD1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	56	2.030545133	0.036259735			0
FR_NGD1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.012436166	0.012436166	29.2869499	1.24175E-06	1
FR_NGD1	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.00877549	0.000797772	1.878738411	0.061282233	0
FR_NGD1	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.004120086	0.000374553	0.882066426	0.562421698	0
FR_NGD1	Field Measured	pH (-)_Field Measured	Residuals	58	0.024628635	0.000424632			0
FR_NGD1	Field Measured	Total Suspended Solids (mg/L)_Field Measured	as.factor(new_year)	1	0.392155709	0.392155709	-	-	-
FR_NGD1	Field Measured	Total Suspended Solids (mg/L)_Field Measured	as.factor(Month)	1	0.449016314	0.449016314	-	-	0
FR_NGD1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	0.105116184	0.105116184	0.96235124	0.330124345	0
FR_NGD1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	0.794466747	0.07222425	0.661221646	0.76940992	0
FR_NGD1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	2.037838319	0.185258029	1.696059417	0.093279612	0
FR_NGD1	Major Ions	Bromide (mg/L)_Major Ions	Residuals	67	7.318309619	0.109228502			0
FR_NGD1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	1.855297857	1.855297857	78.5774192	6.6961E-13	1
FR_NGD1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	4.234754597	0.384977691	16.30495787	5.67765E-15	0
FR_NGD1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.231480963	0.021043724	0.891264717	0.553192868	0
FR_NGD1	Major Ions	Calcium (mg/L)_Major Ions	Residuals	67	1.581942467	0.023611082			0
FR_NGD1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	1.242037536	1.242037536	3.367312308	0.070941475	0
FR_NGD1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	3.333302484	0.303027499	0.82154379	0.618933318	0
FR_NGD1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	1.330279575	0.120934507	0.327867912	0.976812413	0
FR_NGD1	Major Ions	Chloride (mg/L)_Major Ions	Residuals	67	24.71303738	0.368851304			0
FR_NGD1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.017642275	0.017642275	0.492266007	0.485348279	0
FR_NGD1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.300097558	0.027281596	0.761228482	0.676462604	0
FR_NGD1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.647589836	0.058871803	1.642678573	0.106850797	0
FR_NGD1	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	67	2.401206716	0.035838906			0
FR_NGD1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	1.518255659	1.518255659	42.88911373	9.63311E-09	1
FR_NGD1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	4.856490212	0.44149911	12.47188208	2.16296E-12	0
FR_NGD1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.229857471	0.020896134	0.590293638	0.830165475	0
FR_NGD1	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	67	2.37177037	0.035399558			0
FR_NGD1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	2.053724423	2.053724423	59.60940304	7.67253E-11	1
FR_NGD1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	0.516884333	0.046989485	1.36387098	0.210717325	0
FR_NGD1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.590113124	0.053646648	1.557095297	0.132387856	0
FR_NGD1	Major Ions	Potassium (mg/L)_Major Ions	Residuals	67	2.308352866	0.034453028			0
FR_NGD1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	2.263329594	2.263329594	16.33694083	0.000139222	1
FR_NGD1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	3.218444826	0.292585893	2.111914429	0.031058358	0
FR_NGD1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.437028931	0.039729903	0.286774438	0.986387425	0
FR_NGD1	Major Ions	Sodium (mg/L)_Major Ions	Residuals	67	9.282220236	0.138540601			0
FR_NGD1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	2.113370865	2.113370865	24.60051245	5.09257E-06	1
FR_NGD1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	13.06612641	1.187829673	13.82682952	2.35036E-13	0
FR_NGD1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.80024476	0.072749524	0.846834595	0.594905874	0
FR_NGD1	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	67	5.755808879	0.085907595			0
FR_NGD1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	42.93601729	42.93601729	140.3158151	4.31924E-18	1
FR_NGD1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	4.053508467	0.36850077	1.204268331	0.301557946	0
FR_NGD1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	6.615366795	0.601396981	1.96537809	0.046073162	0
FR_NGD1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	67	20.50170293	0.305995566			0
FR_NGD1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	34.00059808	34.00059808	43.52075118	7.91733E-09	1
FR_NGD1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	8.949843712	0.813622156	1.041436015	0.421284596	0
FR_NGD1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	13.83395686	1.257632441	1.609768994	0.116090615	0
FR_NGD1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	67	52.34376728	0.781250258			0
FR_NGD1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	32.4390276	32.4390276	33.72694271	1.911E-07	1
FR_NGD1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	19.79103421	1.799184929	1.870617324	0.059248242	0
FR_NGD1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	29.08040886	2.643673533	2.748634357	0.005367377	0
FR_NGD1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	67	64.4415021	0.961813464			0
FR_NGD1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	9.36706914	9.36706914	59.99770649	6.91328E-11	1
FR_NGD1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	6.905996394	0.627817854	4.021282513	0.000161891	0
FR_NGD1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	2.500595405	0.227326855	1.456068031	0.169422464	0
FR_NGD1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	67	10.46029372	0.156123787			0
FR_NGD1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.452751618	0.452751618	1.01192991	0.318619371	0
FR_NGD1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	27.78168	2.525607273	5.644899855	4.41139E-06	0
FR_NGD1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	5.031629313	0.457420847	1.022365947	0.439017	0
FR_NGD1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	58	25.9500125	0.447414009			0
FR_NGD1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	6.34022391	6.34022391	4.976091423	0.029052492	1
FR_NGD1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	30.2603397	2.750939973	2.159060784	0.02732584	0
FR_NGD1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.496793709	0.136072155	0.106795516	0.99985031	0
FR_NGD1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	67	85.36720206	1.274137344			0
FR_NGD1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	4.931050882	4.931050882	3.921378297	0.051784574	0
FR_NGD1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	109.5276893	9.957062664	7.918273481	1.28386E-08	0
FR_NGD1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	3.253962961	0.295814815	0.235244337	0.994065138	0
FR_NGD1	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	67	84.25109338	1.257479006			0
FR_NGD1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	10.77774515	10.77774515	19.49539383	3.76327E-05	1
FR_NGD1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	2.611035348	0.23736685	0.429362557	0.937569059	0
FR_NGD1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.97485854	0.270441685	0.489190187	0.903629103	0
FR_NGD1	Total Metals	Antimony (mg/L)_Total Metals	Residuals	67	37.0399763	0.552835467			0
FR_NGD1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	1.66004961	1.66004961	15.84016053	0.000171974	1
FR_NGD1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	3.799908456	0.345446223	3.296241027	0.001173233	0
FR_NGD1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.603907216	0.054900656	0.523860974	0.880529618	0
FR_NGD1	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	67	7.021603326	0.10480005			0
FR_NGD1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	1.524698698	1.524698698	5.311784233	0.024287708	1
FR_NGD1	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	3.030248795	0.275477163	0.959714371	0.490965617	0
FR_NGD1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.905184386	0.08228949	0.286682224	0.986405225	0
FR_NGD1	Total Metals	Barium (mg/L)_Total Metals	Residuals	67	19.23173237	0.287040782			0
FR_NGD1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	23.54824391	23.54824391	45.54905827	4.25054E-09	1
FR_NGD1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	7.305134768	0.664103161	1.284566004	0.252635824	0
FR_NGD1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.21150577	0.110136888	0.213036333	0.996148763	0
FR_NGD1	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	67	34.63808916	0.516986405			0
FR_NGD1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	30.59750076	30.59750076	24.32704239	5.65005E-06	1
FR_NGD1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	1.548973553	0.140815778	0.111957882	0.999811128	0
FR_NGD1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.559448374	0.050858943	0.040436233	0.999998981	0
FR_NGD1	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	67	84.26969946	1.257756708			0
FR_NGD1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.206572465	0.206572465	3.878972896	0.053031145	0
FR_NGD1	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.882903815	0.080263983	1.507179646	0.149684066	0
FR_NGD1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.375044909	0.034094992	0.640228351	0.787996121	0
FR_NGD1	Total Metals	Boron (mg/L)_Total Metals	Residuals	67	3.568046373	0.053254423			0
FR_NGD1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	11.24557282	11.24557282	45.47075441	4.35289E-09	1
FR_NGD1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	15.69293841	1.426630764	5.768490246	1.80288E-06	0
FR_NGD1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.070053762	0.188186706	0.760920908	0.676755199	0
FR_NGD1	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	67	16.5700655	0.24731441			0
FR_NGD1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	1.649555646	1.649555646	70.629352	4.49828E-12	1
FR_NGD1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	4.265286415	0.38775331	16.60251058	3.72654E-15	0
FR_NGD1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.188084605	0.0170986	0.732114174	0.704043932	0
FR_NGD1	Total Metals	Calcium (mg/L)_Total Metals	Residuals	67	1.564791764	0.023355101			0
FR_NGD1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.18827619	0.18827619	0.302150897	0.584364827	0
FR_NGD1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	36.0637721	3.278524736	5.261468215	6.35958E-06	0
FR_NGD1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.126103501	0.193282136	0.31018458	0.981344944	0
FR_NGD1	Total Metals	Chromium (mg/L)_Total Metals	Residuals	67	41.74902296	0.623119746			0
FR_NGD1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	29.94419738	29.94419738	51.57238664	7.16618E-10	1
FR_NGD1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	14.08683244	1.280621131	2.205592198	0.024070948	0
FR_NGD1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	4.734250487	0.430386408	0.741247259	0.695420804	0
FR_NGD1	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	67	38.90184952	0.58062462			0
FR_NGD1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.061375652	0.061375652	0.149798295	0.699954845	0
FR_NGD1	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	17.82624917	1.620568106	3.955287306	0.000193425	0
FR_NGD1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.393307931	0.126664357	0.309147097	0.98159109	0
FR_NGD1	Total Metals	Copper (mg/L)_Total Metals	Residuals	67	27.45137197	0.40972197			0
FR_NGD1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	0.881151371	0.881151371	1.306957422	0.25701478	0
FR_NGD1	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	45.43911763	4.130828876	6.127003413	7.56079E-07	0
FR_NGD1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	3.013089903	0.273917264	0.406284565	0.948534264	0
FR_NGD1	Total Metals	Iron (mg/L)_Total Metals	Residuals	67	45.17143471	0.674200518			0
FR_NGD1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.451784772	0.451784772	0.878807234	0.351895618	0
FR_NGD1	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	31.566093	2.869644818	5.582004492	2.85398E-06	0
FR_NGD1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.741461687	0.158314699	0.307952174	0.981871922	0
FR_NGD1	Total Metals	Lead (mg/L)_Total Metals	Residuals	67	34.44393552	0.51408859			0
FR_NGD1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	1.980874429	1.980874429	5.67538504	0.020049819	1
FR_NGD1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	7.630458316	0.693678029	1.987450516	0.04343297	0
FR_NGD1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.802108245	0.072918931	0.208919357	0.996467228	0
FR_NGD1	Total Metals	Lithium (mg/L)_Total Metals	Residuals	67	23.38494848	0.349029082			0
FR_NGD1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	1.091130394	1.091130394	32.17316957	3.26414E-07	1
FR_NGD1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	4.976048297	0.452368027	13.33856459	5.14537E-13	0
FR_NGD1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.215068024	0.019551639	0.576501385	0.841214813	0
FR_NGD1	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	67	2.272257828	0.033914296			0
FR_NGD1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	3.781060984	3.781060984	9.681531647	0.002734886	1
FR_NGD1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	12.33914373	1.121740339	2.872253221	0.003805555	0
FR_NGD1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	6.588893563	0.598990324	1.533734526	0.140248662	0
FR_NGD1	Total Metals	Manganese (mg/L)_Total Metals	Residuals	67	26.16642647	0.390543679			0
FR_NGD1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	37.06590591	37.06590591	31.67315359	3.88534E-07	1
FR_NGD1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	7.488700766	0.680790979	0.581742081	0.837050014	0
FR_NGD1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	5.511484077	0.501044007	0.428146659	0.938176893	0
FR_NGD1	Total Metals	Mercury (mg/L)_Total Metals	Residuals	67	78.40759173	1.170262563			0
FR_NGD1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	1	0.916426804	0.916426804	13.83826893	0.065268181	0
FR_NGD1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(Month)	4	0.008220484	0.002055121	0.031032831	0.996584926	0
FR_NGD1	Total Metals	Methyl mercury (µg/L)_Total Metals	Residuals	2	0.132448185	0.066224093			0
FR_NGD1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	3.20537675	3.20537675	11.6462972	0.001095254	1
FR_NGD1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	1.77993092	0.161811902	0.587921373	0.832086109	0
FR_NGD1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.026838604	0.093348964	0.33917067	0.973573118	0
FR_NGD1	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	67	18.44021654	0.275227112			0
FR_NGD1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	42.3467769	42.3467769	85.67648506	1.33377E-13	1
FR_NGD1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	6.476212756	0.588746614	1.191158907	0.310182369	0
FR_NGD1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.506639917	0.227876356	0.461042059	0.920568039	0
FR_NGD1	Total Metals	Nickel (mg/L)_Total Metals	Residuals	67	33.11566821	0.494263705			0
FR_NGD1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	1.602996132	1.602996132	60.69345704	5.74056E-11	1
FR_NGD1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	0.478732675	0.043521152	1.647820063	0.105469217	0
FR_NGD1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.63342902	0.057584457	2.180292083	0.025790811	0
FR_NGD1	Total Metals	Potassium (mg/L)_Total Metals	Residuals	67	1.769560445	0.02641135			0
FR_NGD1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	3.775322841	3.775322841	30.86144977	5.16587E-07	1
FR_NGD1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	4.041110663	0.367373697	3.003103408	0.002644792	0
FR_NGD1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.903117293	0.082101572	0.671140893	0.760482389	0
FR_NGD1	Total Metals	Selenium (mg/L)_Total Metals	Residuals	67	8.196200508	0.122331351			0
FR_NGD1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.514002242	0.514002242	10.45486742	0.001899883	1
FR_NGD1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	2.739136979	0.249012453	5.064943239	1.04705E-05	0
FR_NGD1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.265008133	0.024091648	0.490027027	0.903099986	0
FR_NGD1	Total Metals	Silicon (mg/L)_Total Metals	Residuals	67	3.293982487	0.049163918			0
FR_NGD1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.117785635	0.117785635	0.52989432	0.469187706	0
FR_NGD1	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	7.053820151	0.641256377	2.884885862	0.003674147	0
FR_NGD1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.135898897	0.103263536	0.464562265	0.918542353	0
FR_NGD1	Total Metals	Silver (mg/L)_Total Metals	Residuals	67	14.89285169	0.222281369			0
FR_NGD1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	2.878099559	2.878099559	21.62102682	1.61029E-05	1
FR_NGD1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	3.374623666	0.30678397	2.304640371	0.018351644	0
FR_NGD1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.520552238	0.047322931	0.355502071	0.968405969	0
FR_NGD1	Total Metals	Sodium (mg/L)_Total Metals	Residuals	67	8.91875636	0.133115767			0
FR_NGD1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	2.825762156	2.825762156	30.30548412	6.28817E-07	1
FR_NGD1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	3.018077204	0.274370655	2.94254614	0.003129739	0
FR_NGD1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.370991462	0.033726497	0.361706949	0.966289123	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_NGD1	Total Metals	Strontium (mg/L)_Total Metals	Residuals	67	6.247254249	0.093242601			0
FR_NGD1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	2.144118881	2.144118881	7.791114463	0.0068338	1
FR_NGD1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	11.44300581	1.040273256	3.780055332	0.000311029	0
FR_NGD1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.622288189	0.238389835	0.866240445	0.576591021	0
FR_NGD1	Total Metals	Thallium (mg/L)_Total Metals	Residuals	67	18.43843595	0.275200537			0
FR_NGD1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.000186841	0.000186841	0.011337028	0.915523276	0
FR_NGD1	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.189574497	0.017234045	1.045718055	0.417796439	0
FR_NGD1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.144240347	0.013112759	0.795648873	0.643637158	0
FR_NGD1	Total Metals	Tin (mg/L)_Total Metals	Residuals	67	1.104199188	0.016480585			0
FR_NGD1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.03623796	0.03623796	0.285836694	0.594670746	0
FR_NGD1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	5.858935359	0.532630487	4.201266767	9.99121E-05	0
FR_NGD1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.30201185	0.118364714	0.933633635	0.514321184	0
FR_NGD1	Total Metals	Titanium (mg/L)_Total Metals	Residuals	67	8.494162505	0.126778545			0
FR_NGD1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	7.584623614	7.584623614	156.9416545	3.20494E-19	1
FR_NGD1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	5.079452752	0.461768432	9.554950303	4.40968E-10	0
FR_NGD1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.407718646	0.037065331	0.766958881	0.671007868	0
FR_NGD1	Total Metals	Uranium (mg/L)_Total Metals	Residuals	67	3.237953517	0.048327664			0
FR_NGD1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	0.001863553	0.001863553	0.003892378	0.950438863	0
FR_NGD1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	18.17721458	1.652474053	3.451500295	0.000764484	0
FR_NGD1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.669772241	0.242706567	0.506937938	0.892101926	0
FR_NGD1	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	67	32.07757557	0.478769785			0
FR_NGD1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	3.008814523	3.008814523	16.00407511	0.000160366	1
FR_NGD1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	11.31222877	1.028384434	5.470041968	3.76934E-06	0
FR_NGD1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.670201629	0.151836512	0.807628027	0.63220223	0
FR_NGD1	Total Metals	Zinc (mg/L)_Total Metals	Residuals	67	12.59620264	0.188003024			0
FR_NGD1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	1	0	0	-	-	-
FR_NGD1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(Month)	3	0	0	-	-	0
FR_NGD1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	1	2.46519E-32	2.46519E-32	-	-	-
FR_NGD1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(Month)	1	7.39557E-32	7.39557E-32	-	-	0
FR_NGD1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	1	1.2326E-32	1.2326E-32	-	-	-
FR_NGD1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	1	3.9443E-32	3.9443E-32	-	-	-
FR_NGD1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(Month)	4	9.46633E-31	2.36658E-31	-	-	0
FR_UFR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.553904478	0.553904478	5.81634312	0.01854293	1
FR_UFR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.035743182	0.094158471	0.98872278	0.465267982	0
FR_UFR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	2.130176797	0.193652436	2.03347158	0.037876868	0
FR_UFR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	69	6.571037539	0.095232428			0
FR_UFR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	5.32142E-06	5.32142E-06	0.001581115	0.968398397	0
FR_UFR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.920464377	0.08367858	24.86282198	1.18599E-19	0
FR_UFR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.071921741	0.00653834	1.942690555	0.048656303	0
FR_UFR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	0.228861528	0.003365611			0
FR_UFR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.511197269	1.511197269	3.32267755	0.072726716	0
FR_UFR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	17.15700439	1.559727672	3.429381607	0.000793504	0
FR_UFR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	4.22022896	0.383657178	0.843549098	0.597990027	0
FR_UFR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	30.92729064	0.454813098			0
FR_UFR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.00171342	0.00171342	0.267691555	0.606539264	0
FR_UFR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	2.440759166	0.221887197	34.66595058	8.48578E-24	0
FR_UFR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.03265967	0.002969061	0.463863261	0.919145208	0
FR_UFR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	69	0.441649986	0.006400724			0
FR_UFR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.192858654	0.192858654	2.105012738	0.151348301	0
FR_UFR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	13.90546702	1.264133366	13.79775697	1.64856E-13	0
FR_UFR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.522375636	0.138397785	1.5105835	0.147662014	0
FR_UFR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	69	6.321694347	0.091618759			0
FR_UFR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.0041052	0.0041052	0.725631024	0.397249925	0
FR_UFR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.293711452	0.208519223	36.85764763	1.46075E-24	0
FR_UFR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.028665736	0.002605976	0.460629687	0.921000116	0
FR_UFR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	0.390362036	0.005657421			0
FR_UFR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0	0	-	-	-
FR_UFR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0	0	-	-	0
FR_UFR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0	0	-	-	0
FR_UFR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	0	0			0
FR_UFR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.010429148	0.010429148	0.386088139	0.536410315	0
FR_UFR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.233097741	0.021190704	0.784482035	0.654338321	0
FR_UFR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.214303016	0.019482092	0.721229064	0.714403745	0
FR_UFR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	69	1.863852191	0.027012351			0
FR_UFR1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000195413	0.000195413	1.240533093	0.269233207	0
FR_UFR1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.007804373	0.000709488	4.504010053	4.13597E-05	0
FR_UFR1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.00652217	0.000592925	3.76403331	0.00030703	0
FR_UFR1	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	69	0.010869137	0.000157524			0
FR_UFR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.003346794	0.003346794	0.942315424	0.335073704	0
FR_UFR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.053474196	0.095770381	26.96488109	9.33818E-21	0
FR_UFR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.060557311	0.00550521	1.550033882	0.133945074	0
FR_UFR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	0.245065287	0.003551671			0
FR_UFR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.011791863	0.011791863	1.525094315	0.221039016	0
FR_UFR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	2.827512649	0.257046604	33.24498443	2.79039E-23	0
FR_UFR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.095959117	0.008723556	1.128256438	0.353523671	0
FR_UFR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	69	0.533500497	0.007731891			0
FR_UFR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.004398208	0.004398208	0.046251614	0.830353465	0
FR_UFR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	17.44188883	1.585626257	16.67446637	2.06095E-15	0
FR_UFR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.826691244	0.16606284	1.746318992	0.081272625	0
FR_UFR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	69	6.561422079	0.095093074			0
FR_UFR1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.66252353	0.66252353	1.782210993	0.186330407	0
FR_UFR1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(Month)	11	20.60716305	1.873378459	5.039452234	1.06391E-05	0
FR_UFR1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.342553479	0.122050316	0.328319532	0.976735746	0
FR_UFR1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	Residuals	68	25.27848848	0.371742478			0
FR_UFR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.380522117	0.380522117	0.867899112	0.354785866	0
FR_UFR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	65.54624832	5.958749847	13.59078346	2.30956E-13	0
FR_UFR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	3.908023085	0.355274826	0.810314806	0.629638446	0
FR_UFR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	69	30.25239426	0.438440497			0
FR_UFR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.078542004	0.078542004	0.253895803	0.615950267	0
FR_UFR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	21.77168974	1.979244521	6.398129075	3.43398E-07	0
FR_UFR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	5.881943602	0.534722146	1.728549085	0.085107895	0
FR_UFR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	69	21.34496982	0.309347389			0
FR_UFR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.056207836	0.056207836	10.6604061	0.001705483	1
FR_UFR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	0.073604663	0.006691333	1.269081526	0.260851798	0
FR_UFR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.213330826	0.019393711	3.678220924	0.000388963	0
FR_UFR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	69	0.363807971	0.005272579			0
FR_UFR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.050420374	0.050420374	3.503735325	0.065469526	0
FR_UFR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.320044901	0.029094991	2.021824502	0.039090076	0
FR_UFR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.213163902	0.019378537	1.346623548	0.218559999	0
FR_UFR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	69	0.992941958	0.014390463			0
FR_UFR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000296968	0.000296968	0.018464866	0.892307473	0
FR_UFR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.740556912	0.430959719	26.79615683	1.10733E-20	0
FR_UFR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.129476096	0.011770554	0.731867974	0.704390055	0
FR_UFR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	69	1.109719607	0.016082893			0
FR_UFR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	24.86783635	24.86783635	55.012025	2.32204E-10	1
FR_UFR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.060359484	0.096396317	0.213245596	0.996154059	0
FR_UFR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.243779938	0.022161813	0.049025825	0.999997216	0
FR_UFR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	69	31.19101157	0.452043646			0
FR_UFR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	29.25829284	29.25829284	23.2624081	8.13716E-06	1
FR_UFR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	1.595588843	0.145053531	0.115327796	0.999783178	0
FR_UFR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.453448077	0.041222552	0.032774839	0.999999668	0
FR_UFR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	69	86.78474717	1.257749959			0
FR_UFR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.051993892	0.051993892	9.616653757	0.002792028	1
FR_UFR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.070465471	0.006405952	1.184828043	0.313795131	0
FR_UFR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.218378205	0.019852564	3.671878123	0.000395835	0
FR_UFR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	69	0.373058929	0.005406651			0
FR_UFR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.417767019	0.417767019	9.288202704	0.003267405	1
FR_UFR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.904381167	0.08221647	1.827916525	0.065638684	0
FR_UFR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.441998115	0.040181647	0.893357455	0.551104608	0
FR_UFR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	69	3.103498621	0.044978241			0
FR_UFR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.177923957	0.177923957	2.424526235	0.124024515	0
FR_UFR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.474688236	0.043153476	0.588041862	0.832213256	0
FR_UFR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.903911668	0.082173788	1.119762108	0.359777302	0
FR_UFR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	69	5.063567817	0.073385041			0
FR_UFR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.056207836	0.056207836	10.6604061	0.001705483	1
FR_UFR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	0.073604663	0.006691333	1.269081526	0.260851798	0
FR_UFR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.213330826	0.019393711	3.678220924	0.000388963	0
FR_UFR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	69	0.363807971	0.005272579			0
FR_UFR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.123637766	0.123637766	2.111727211	0.150707286	0
FR_UFR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.216194653	0.019654059	0.335690406	0.974699265	0
FR_UFR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.09505241	0.008641128	0.147590061	0.999288206	0
FR_UFR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	69	4.03982381	0.058548171			0
FR_UFR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.00918089	2.00918089	7.182662183	0.009198028	1
FR_UFR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.841007677	0.076455243	0.273321426	0.988874482	0
FR_UFR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.701559377	0.063778125	0.228001735	0.994844167	0
FR_UFR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	69	19.30112789	0.279726491			0
FR_UFR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.05508723	0.05508723	10.42161139	0.001907416	1
FR_UFR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.072644695	0.006604063	1.249381764	0.272567562	0
FR_UFR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.214453148	0.019495741	3.688278284	0.000378314	0
FR_UFR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	69	0.364724678	0.005285865			0
FR_UFR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.155546982	0.155546982	4.892278625	0.030291083	1
FR_UFR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.573069021	0.233915366	7.357128534	3.6777E-08	0
FR_UFR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.171076906	0.015552446	0.489157024	0.90386182	0
FR_UFR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	69	2.193812457	0.031794383			0
FR_UFR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	8.121336293	8.121336293	3.923521481	0.051602707	0
FR_UFR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	15.84778473	1.440707702	0.696024326	0.737890946	0
FR_UFR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	4.36686531	0.396987755	0.191789864	0.997605369	0
FR_UFR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	69	142.823789	2.069909986			0
FR_UFR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.29073288	3.29073288	21.25454611	1.79281E-05	1
FR_UFR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.487180467	0.044289133	0.286059508	0.986586973	0
FR_UFR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.185790345	0.016890031	0.109091185	0.999835	0
FR_UFR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	69	10.68291779	0.154824895			0
FR_UFR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.014756825	0.014756825	3.927459108	0.051488796	0
FR_UFR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.354920442	0.032265495	8.587308877	2.49498E-09	0
FR_UFR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.062683541	0.005698504	1.516629818	0.145482415	0
FR_UFR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	69	0.259256907	0.003757346			0
FR_UFR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.049095863	0.049095863	8.465355371	0.00486787	1
FR_UFR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	0.073322147	0.00666565	1.14932481	0.338836303	0
FR_UFR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.219992106	0.019999282	3.448376741	0.000735439	0
FR_UFR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	69	0.400173933	0.005799622			0
FR_UFR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.494634599	0.494634599	21.20116762	1.83137E-05	1
FR_UFR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	3.816908615	0.346991692	14.87285575	3.00656E-14	0
FR_UFR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.097676761	0.008879706	0.380604443	0.959448789	0
FR_UFR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	69	1.609806965	0.023330536			0
FR_UFR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.001548302	0.001548302	0.524797525	0.471251662	0
FR_UFR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.330183748	0.030016704	10.17417125	1.00789E-10	0
FR_UFR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.048217536	0.004383412	1.485758975	0.156914108	0
FR_UFR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	69	0.203569662	0.002950285			0
FR_UFR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.068112539	0.068112539	14.09784351	0.000358537	1
FR_UFR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.082423961	0.007493087	1.550909339	0.13365394	0
FR_UFR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.238203802	0.021654891	4.48210081	4.38454E-05	0
FR_UFR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	69	0.333367666	0.004831415			0
FR_UFR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.101530782	0.101530782	18.1183102	6.4212E-05	1
FR_UFR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.16421379	0.196746708	35.10972558	5.89943E-24	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_UFR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.04503783	0.004094348	0.73064217	0.705546367	0
FR_UFR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	69	0.386659897	0.005603767			0
FR_UFR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.056207836	0.056207836	10.6604061	0.001705483	1
FR_UFR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.073604663	0.006691333	1.269081526	0.260851798	0
FR_UFR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.213330826	0.019393711	3.678220924	0.000388963	0
FR_UFR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	69	0.363807971	0.005272579			0
FR_UFR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.054762676	0.054762676	10.32999006	0.001991361	1
FR_UFR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.07742444	0.007038585	1.327702055	0.228328017	0
FR_UFR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.209872788	0.019079344	3.598973806	0.000484235	0
FR_UFR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	69	0.365791705	0.005301329			0
FR_UFR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	5.23836E-05	5.23836E-05	0.475963123	0.492570488	0
FR_UFR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.001208899	0.0001099	0.998562166	0.456796787	0
FR_UFR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.000478398	4.34907E-05	0.395161128	0.953535774	0
FR_UFR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	69	0.007594011	0.000110058			0
FR_UFR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.176137026	0.176137026	31.91965692	3.32404E-07	1
FR_UFR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.478573477	0.225324862	40.83350586	7.41898E-26	0
FR_UFR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.043488324	0.003953484	0.716452724	0.718881924	0
FR_UFR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	69	0.380751423	0.005518137			0
FR_UFR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.132247859	2.132247859	18.01098239	6.71424E-05	1
FR_UFR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.258111153	0.02346465	0.198204632	0.997222968	0
FR_UFR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.190269648	0.017297241	0.146108857	0.99932143	0
FR_UFR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	69	8.168632841	0.118385983			0
FR_UFR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	7.797646047	7.797646047	48.3425524	1.61898E-09	1
FR_UFR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	0.960611546	0.087328322	0.541403646	0.868191091	0
FR_UFR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.121466209	0.101951474	0.632061833	0.795308343	0
FR_UFR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	69	11.12968907	0.161299842			0
FR_UFR1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.001202835	0.001202835	0.041527863	0.83922367	0
FR_UFR1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	2.270914854	0.206446805	7.127575662	1.5499E-07	0
FR_UFR1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.082584271	0.007507661	0.259201987	0.99082619	0
FR_UFR1	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	59	1.708906656	0.02896452			0
FR_UFR1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.000423431	0.000423431	0.005405343	0.941644477	0
FR_UFR1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	1.283606905	0.116691537	1.489636589	0.160363481	0
FR_UFR1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.56441404	0.051310367	0.655007231	0.77394853	0
FR_UFR1	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	58	4.543463277	0.078335574			0
FR_UFR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.003096979	0.003096979	0.039164434	0.843815238	0
FR_UFR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	1.143787682	0.103980698	1.314941115	0.239718301	0
FR_UFR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.54018908	0.049108098	0.621021577	0.803464695	0
FR_UFR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	58	4.586426294	0.079076315			0
FR_UFR1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.001631077	0.001631077	1.261964403	0.265829895	0
FR_UFR1	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.00987644	0.000897858	0.694672754	0.738263167	0
FR_UFR1	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.006956475	0.000632407	0.489293069	0.902581466	0
FR_UFR1	Field Measured	pH (-)_Field Measured	Residuals	59	0.076256957	0.001292491			0
FR_UFR1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	0.122480719	0.122480719	4.670296699	0.03416193	1
FR_UFR1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	0.27473646	0.024976042	0.952358272	0.497251484	0
FR_UFR1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.503880337	0.045807303	1.746672455	0.081197989	0
FR_UFR1	Major Ions	Bromide (mg/L)_Major Ions	Residuals	69	1.809557323	0.026225468			0
FR_UFR1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.016358136	0.016358136	2.377721565	0.127650976	0
FR_UFR1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	2.312699133	0.210245376	30.56001956	2.97689E-22	0
FR_UFR1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.034076605	0.003097873	0.45028845	0.926778543	0
FR_UFR1	Major Ions	Calcium (mg/L)_Major Ions	Residuals	69	0.474702933	0.006879753			0
FR_UFR1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	1.863125648	1.863125648	3.944808132	0.05099014	0
FR_UFR1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	1.904792938	0.173162994	0.366639142	0.964670739	0
FR_UFR1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	1.071780915	0.097434629	0.206298977	0.99667911	0
FR_UFR1	Major Ions	Chloride (mg/L)_Major Ions	Residuals	69	32.58857349	0.472298167			0
FR_UFR1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.09719433	0.09719433	8.859558804	0.00401805	1
FR_UFR1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.253943468	0.02308577	2.10433814	0.031240072	0
FR_UFR1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.227322138	0.020665649	1.883736758	0.056620154	0
FR_UFR1	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	69	0.756968705	0.010970561			0
FR_UFR1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.007754386	0.007754386	1.629637012	0.206033062	0
FR_UFR1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	2.267071101	0.206097373	43.31276541	1.30701E-26	0
FR_UFR1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.037797853	0.003436168	0.722134176	0.713553855	0
FR_UFR1	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	69	0.32832627	0.004758352			0
FR_UFR1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	5.736355617	5.736355617	10.99167133	0.001461466	1
FR_UFR1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	0.969077654	0.088097969	0.168808208	0.998664632	0
FR_UFR1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.233828036	0.021257094	0.040731609	0.99999895	0
FR_UFR1	Major Ions	Potassium (mg/L)_Major Ions	Residuals	69	36.00985926	0.521882018			0
FR_UFR1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	1.865499158	1.865499158	7.146325866	0.009368037	1
FR_UFR1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	0.531714753	0.048337705	0.185171346	0.997957907	0
FR_UFR1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.170477249	0.015497932	0.059369242	0.999992447	0
FR_UFR1	Major Ions	Sodium (mg/L)_Major Ions	Residuals	69	18.01197487	0.261043114			0
FR_UFR1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.040986515	0.040986515	0.915900803	0.341894852	0
FR_UFR1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	22.20037569	2.018215972	45.09984928	3.93807E-27	0
FR_UFR1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.151683349	0.013789395	0.308143263	0.981905202	0
FR_UFR1	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	69	3.087746507	0.044749949			0
FR_UFR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.617784324	0.617784324	1.210988658	0.274960773	0
FR_UFR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	103.8047345	9.436794043	18.49812324	1.65798E-16	0
FR_UFR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	3.340700414	0.303700038	0.595316661	0.826294546	0
FR_UFR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	35.20026224	0.510148728			0
FR_UFR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.048109764	0.048109764	1.291723624	0.259662421	0
FR_UFR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	0.339661729	0.030878339	0.829068297	0.611738877	0
FR_UFR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.646087718	0.058735247	1.57701265	0.125228325	0
FR_UFR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	2.569879225	0.037244626			0
FR_UFR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	10.77122148	10.77122148	60.22533675	5.47989E-11	1
FR_UFR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.533255826	0.139386893	0.779356603	0.659237139	0
FR_UFR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	3.674770036	0.334070003	1.867892002	0.059053566	0
FR_UFR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	12.34055834	0.178848672			0
FR_UFR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.683282239	0.683282239	8.679015228	0.004386204	1
FR_UFR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	3.952016772	0.359274252	4.563482741	3.53113E-05	0
FR_UFR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.226632344	0.111512031	1.416419984	0.185471357	0
FR_UFR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	5.432237787	0.078728084			0
FR_UFR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.07643569	0.07643569	0.331893253	0.566665968	0
FR_UFR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	7.207290296	0.655208209	2.844995366	0.004548269	0
FR_UFR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	2.889518405	0.262683491	1.140604324	0.347010146	0
FR_UFR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	61	14.04842384	0.23030203			0
FR_UFR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	8.823787467	8.823787467	4.991636966	0.02871278	1
FR_UFR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	30.53603954	2.776003594	1.57039165	0.127319262	0
FR_UFR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	3.754870661	0.341351878	0.193103547	0.997530409	0
FR_UFR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	69	121.9722787	1.767714184			0
FR_UFR1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	0.687765719	0.687765719	1.235347104	0.270227525	0
FR_UFR1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	111.9724527	10.17931388	18.28382193	2.20901E-16	0
FR_UFR1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	11.68095662	1.061905147	1.907366728	0.053166693	0
FR_UFR1	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	69	38.41498022	0.556738844			0
FR_UFR1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.004096161	0.004096161	0.521182978	0.472777004	0
FR_UFR1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	0.080138781	0.007285344	0.926964883	0.520161685	0
FR_UFR1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.190217933	0.017292539	2.200249883	0.024023337	0
FR_UFR1	Total Metals	Antimony (mg/L)_Total Metals	Residuals	69	0.54229532	0.007859352			0
FR_UFR1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.031682274	0.031682274	0.548732918	0.461349372	0
FR_UFR1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	1.604372859	0.145852078	2.526139254	0.009725441	0
FR_UFR1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.420643508	0.038240319	0.66231741	0.768614157	0
FR_UFR1	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	69	3.983863269	0.057737149			0
FR_UFR1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.024590926	0.024590926	1.582149801	0.212691533	0
FR_UFR1	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	4.505627515	0.409602501	26.35331865	1.73891E-20	0
FR_UFR1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.101957187	0.009268835	0.596345398	0.825451443	0
FR_UFR1	Total Metals	Barium (mg/L)_Total Metals	Residuals	69	1.072448331	0.015542729			0
FR_UFR1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	26.28267559	26.28267559	58.65353866	8.4148E-11	1
FR_UFR1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	0.860356854	0.078214259	0.174546274	0.998441811	0
FR_UFR1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.303073049	0.027552095	0.06148643	0.999990944	0
FR_UFR1	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	69	30.91892932	0.448100425			0
FR_UFR1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	30.55474307	30.55474307	24.32782036	5.39366E-06	1
FR_UFR1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	1.592183934	0.144743994	0.115245802	0.999783932	0
FR_UFR1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.390925884	0.035538717	0.028296082	0.999999849	0
FR_UFR1	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	69	86.66116571	1.255958923			0
FR_UFR1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.01818203	0.01818203	5.12549606	0.02672363	1
FR_UFR1	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.055580641	0.005052786	1.424375161	0.181983715	0
FR_UFR1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.164321281	0.014938298	4.211091238	9.0722E-05	0
FR_UFR1	Total Metals	Boron (mg/L)_Total Metals	Residuals	69	0.244768522	0.00354737			0
FR_UFR1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.112061326	0.112061326	1.421208635	0.237288531	0
FR_UFR1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	4.421365426	0.401942311	5.097600614	8.72414E-06	0
FR_UFR1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.185804857	0.107800442	1.367170316	0.20834498	0
FR_UFR1	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	69	5.440602665	0.078849314			0
FR_UFR1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.049742923	0.049742923	6.42548705	0.013520895	1
FR_UFR1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	2.43449205	0.221317459	28.5884379	1.88805E-21	0
FR_UFR1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.041952833	0.003813894	0.492655522	0.901642005	0
FR_UFR1	Total Metals	Calcium (mg/L)_Total Metals	Residuals	69	0.534163662	0.007741502			0
FR_UFR1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.143470249	0.143470249	1.145932798	0.288132498	0
FR_UFR1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	7.02029152	0.63820832	5.09752964	8.72574E-06	0
FR_UFR1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.736838628	0.157894421	1.26114227	0.26552519	0
FR_UFR1	Total Metals	Chromium (mg/L)_Total Metals	Residuals	69	8.638767636	0.125199531			0
FR_UFR1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.006473687	0.006473687	0.39683229	0.530810346	0
FR_UFR1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	0.33060954	0.030055413	1.842374905	0.063181001	0
FR_UFR1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.213992438	0.019453858	1.192507321	0.308661354	0
FR_UFR1	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	69	1.125625124	0.016313408			0
FR_UFR1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.00543714	0.00543714	0.080615311	0.777315552	0
FR_UFR1	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	1.137334548	0.10339405	1.533001444	0.139722428	0
FR_UFR1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.271211266	0.02465557	0.365562853	0.965054996	0
FR_UFR1	Total Metals	Copper (mg/L)_Total Metals	Residuals	69	4.653739543	0.067445501			0
FR_UFR1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	1.97846562	1.97846562	3.78250613	0.05586758	0
FR_UFR1	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	42.02091595	3.820083268	7.30338108	4.15464E-08	0
FR_UFR1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	5.180661391	0.470969217	0.900416936	0.544552175	0
FR_UFR1	Total Metals	Iron (mg/L)_Total Metals	Residuals	69	36.09092044	0.523056818			0
FR_UFR1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.000653593	0.000653593	0.006733819	0.934836699	0
FR_UFR1	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	4.104456269	0.373132388	3.844299907	0.000246259	0
FR_UFR1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.812399425	0.073854493	0.760906397	0.676844254	0
FR_UFR1	Total Metals	Lead (mg/L)_Total Metals	Residuals	69	6.697223265	0.097061207			0
FR_UFR1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.026668397	0.026668397	1.022683545	0.315416483	0
FR_UFR1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	1.779500277	0.161772752	6.203684894	5.4855E-07	0
FR_UFR1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.20548324	0.018680295	0.716354635	0.718973768	0
FR_UFR1	Total Metals	Lithium (mg/L)_Total Metals	Residuals	69	1.799304785	0.026076881			0
FR_UFR1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	8.28299E-05	8.28299E-05	0.014854016	0.903350649	0
FR_UFR1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	2.507487162	0.227953378	40.87924548	7.17933E-26	0
FR_UFR1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.069277764	0.006297979	1.129426606	0.352668031	0
FR_UFR1	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	69	0.38476207	0.005576262			0
FR_UFR1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	2.883638676	2.883638676	2.153269432	0.146810217	0
FR_UFR1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	51.18813626	4.653466933	3.474834828	0.000683283	0
FR_UFR1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	7.017139485	0.637921771	0.476348671	0.911771003	0
FR_UFR1	Total Metals	Manganese (mg/L)_Total Metals	Residuals	69	92.40416718	1.339190829			0
FR_UFR1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	61.55776737	61.55776737	45.17643468	4.23916E-09	1
FR_UFR1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	2.896314442	0.263301313	0.193233366	0.997522909	0
FR_UFR1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	3.911846994	0.355622454	0.260986635	0.990820095	0
FR_UFR1	Total Metals	Mercury (mg/L)_Total Metals	Residuals	69	94.01994598	1.362607913			0
FR_UFR1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	1	0.904644511	0.904644511	124.1524256	0.001549124	1
FR_UFR1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(Month)	6	1.494912335	0.249152056	34.1933563	0.007439202	0
FR_UFR1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year):as.factor(Month)	2	0.016844036	0.008422018	1.155828527	0.42446007	0
FR_UFR1	Total Metals	Methyl mercury (µg/L)_Total Metals	Residuals	3	0.02185969	0.007286563			0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
FR_UFR1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.000536405	0.000536405	0.13905329	0.71036707	0
FR_UFR1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	0.309247809	0.028113437	7.287900821	4.30345E-08	0
FR_UFR1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.009919698	0.000901791	0.23377296	0.994254537	0
FR_UFR1	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	69	0.266170906	0.003857549			0
FR_UFR1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.009428071	0.009428071	0.587030824	0.446182863	0
FR_UFR1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	0.40321615	0.036656014	2.282355433	0.019156978	0
FR_UFR1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.226148223	0.020558929	1.280084207	0.254482155	0
FR_UFR1	Total Metals	Nickel (mg/L)_Total Metals	Residuals	69	1.108181882	0.016060607			0
FR_UFR1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	6.355685333	6.355685333	12.95428062	0.000596356	1
FR_UFR1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	0.817104266	0.074282206	0.151403427	0.99919701	0
FR_UFR1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.240582694	0.021871154	0.044578209	0.99999831	0
FR_UFR1	Total Metals	Potassium (mg/L)_Total Metals	Residuals	69	33.85307921	0.490624336			0
FR_UFR1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.252370239	0.252370239	13.61474261	0.000444003	1
FR_UFR1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	3.281288402	0.298298946	16.09248134	4.79197E-15	0
FR_UFR1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.098749028	0.008977184	0.484296622	0.906903642	0
FR_UFR1	Total Metals	Selenium (mg/L)_Total Metals	Residuals	69	1.279021352	0.018536541			0
FR_UFR1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.003308746	0.003308746	0.433682705	0.512411068	0
FR_UFR1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.407416054	0.037037823	4.854607012	1.71558E-05	0
FR_UFR1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.101432501	0.009221136	1.20862918	0.29840288	0
FR_UFR1	Total Metals	Silicon (mg/L)_Total Metals	Residuals	68	0.518800381	0.007629417			0
FR_UFR1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.06653502	0.06653502	3.773426792	0.056154977	0
FR_UFR1	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	0.273616571	0.024874234	1.410702219	0.188013045	0
FR_UFR1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.404257051	0.036750641	2.084253581	0.032997541	0
FR_UFR1	Total Metals	Silver (mg/L)_Total Metals	Residuals	69	1.216643815	0.017632519			0
FR_UFR1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	2.018743206	2.018743206	8.052349063	0.005962374	1
FR_UFR1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	0.57770672	0.052518793	0.2094866	0.99644509	0
FR_UFR1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.231153453	0.02101395	0.083820301	0.999955767	0
FR_UFR1	Total Metals	Sodium (mg/L)_Total Metals	Residuals	69	17.29846534	0.250702396			0
FR_UFR1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.025620078	0.025620078	4.591097511	0.035668302	1
FR_UFR1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	2.225205809	0.202291437	36.25046448	2.35727E-24	0
FR_UFR1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.042533394	0.003866672	0.692904582	0.74077085	0
FR_UFR1	Total Metals	Strontium (mg/L)_Total Metals	Residuals	69	0.385046354	0.005580382			0
FR_UFR1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	2.66617E-06	2.66617E-06	0.000167657	0.989706438	0
FR_UFR1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	0.238581867	0.021689261	1.363893067	0.20994726	0
FR_UFR1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.264517127	0.024047012	1.512156311	0.147092294	0
FR_UFR1	Total Metals	Thallium (mg/L)_Total Metals	Residuals	69	1.097270026	0.015902464			0
FR_UFR1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.007255293	0.007255293	1.054226171	0.308121821	0
FR_UFR1	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.080149152	0.007286287	1.058729622	0.406865548	0
FR_UFR1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.183646276	0.016695116	2.425874096	0.012863864	0
FR_UFR1	Total Metals	Tin (mg/L)_Total Metals	Residuals	69	0.474865124	0.006882103			0
FR_UFR1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.005081665	0.005081665	0.566781656	0.454101591	0
FR_UFR1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.115442521	0.010494775	1.170530821	0.323518565	0
FR_UFR1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.053445086	0.004858644	0.541907087	0.867822295	0
FR_UFR1	Total Metals	Titanium (mg/L)_Total Metals	Residuals	69	0.618641934	0.008965825			0
FR_UFR1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.073688983	0.073688983	16.60077608	0.000121446	1
FR_UFR1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	2.143409519	0.194855411	43.89734941	8.78732E-27	0
FR_UFR1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.027641778	0.002512889	0.566107771	0.849575753	0
FR_UFR1	Total Metals	Uranium (mg/L)_Total Metals	Residuals	69	0.306283261	0.004438888			0
FR_UFR1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	2.1470086	2.1470086	16.19961713	0.000144065	1
FR_UFR1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	0.667657837	0.060696167	0.457964941	0.922511573	0
FR_UFR1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.266603562	0.024236687	0.182870743	0.99807098	0
FR_UFR1	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	69	9.144882389	0.132534527			0
FR_UFR1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.013404803	0.013404803	0.207073839	0.650499238	0
FR_UFR1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	0.397874333	0.036170394	0.558750655	0.855227878	0
FR_UFR1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.229872672	0.111806607	1.727158813	0.085414915	0
FR_UFR1	Total Metals	Zinc (mg/L)_Total Metals	Residuals	69	4.466674284	0.06473441			0
GH_CC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	3.110558005	3.110558005	11.35922731	0.001240869	1
GH_CC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	6.747894007	0.61344491	2.240196184	0.02170698	0
GH_CC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.250535982	0.113685089	0.415158557	0.944544606	0
GH_CC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	68	18.62080391	0.273835352			0
GH_CC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.004024125	0.004024125	0.434094115	0.512244841	0
GH_CC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.183894351	0.016717668	1.803383787	0.070678606	0
GH_CC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.405917488	0.03690159	3.980682464	0.000180611	0
GH_CC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	67	0.621101166	0.009270167			0
GH_CC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.033356734	0.033356734	1.324444561	0.253886678	0
GH_CC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.209376574	0.019034234	0.75576306	0.681658727	0
GH_CC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.065900223	0.005990929	0.237872619	0.993774622	0
GH_CC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	67	1.687425259	0.025185452			0
GH_CC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.091815738	0.091815738	25.80277012	3.41536E-06	1
GH_CC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	0.185587556	0.016871596	4.741386634	2.63741E-05	0
GH_CC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.039281899	0.003571082	1.003573047	0.453223037	0
GH_CC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	65	0.231293886	0.003558367			0
GH_CC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.015106353	0.015106353	0.488379357	0.487034508	0
GH_CC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	0.329696884	0.029972444	0.968991194	0.48263434	0
GH_CC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.432961774	0.039360161	1.272490482	0.259211987	0
GH_CC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	68	2.103348516	0.030931596			0
GH_CC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.247132598	0.247132598	53.79766405	3.52841E-10	1
GH_CC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.258269936	0.023479085	5.111102057	8.85189E-06	0
GH_CC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.035744697	0.003249518	0.707379251	0.727284911	0
GH_CC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	0.312374468	0.004593742			0
GH_CC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.016072038	0.016072038	1.090161425	0.300188057	0
GH_CC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.157383187	0.014307562	0.970477564	0.481471908	0
GH_CC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.046349434	0.004213585	0.285806168	0.986573543	0
GH_CC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	67	0.987768005	0.014742806			0
GH_CC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.139850694	0.139850694	4.919113121	0.029905077	1
GH_CC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.258619177	0.023510834	0.826970892	0.613751724	0
GH_CC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.241895552	0.021990505	0.77349477	0.66480843	0
GH_CC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	68	1.933244256	0.028430063			0
GH_CC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.003206103	0.003206103	14.75915353	0.000271016	1
GH_CC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.006250581	0.000568235	2.615842949	0.007663516	0
GH_CC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.001330667	0.00012097	0.556878794	0.856539125	0
GH_CC1	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	68	0.014771513	0.000217228			0
GH_CC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.003554725	0.003554725	0.344010903	0.559465256	0
GH_CC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.178210058	0.016200914	1.567854206	0.128509765	0
GH_CC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.32856366	0.029869424	2.890633234	0.003557321	0
GH_CC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	0.702656007	0.010333177			0
GH_CC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.145736676	0.145736676	18.6811394	5.16359E-05	1
GH_CC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	0.421099978	0.038281816	4.907124031	1.49707E-05	0
GH_CC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.028777968	0.002616179	0.335352809	0.974748172	0
GH_CC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	68	0.530486591	0.007801273			0
GH_CC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.010317401	0.010317401	0.187495095	0.666380025	0
GH_CC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	1.10385065	0.100350059	1.823632111	0.066704618	0
GH_CC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.71528645	0.065026041	1.181699117	0.316207081	0
GH_CC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	68	3.741875337	0.055027578			0
GH_CC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.002578707	0.002578707	0.006831514	0.934370301	0
GH_CC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	3.581685634	0.325607785	0.862600446	0.579970965	0
GH_CC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	3.002185723	0.272925975	0.723035746	0.71264521	0
GH_CC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	68	25.66811723	0.377472312			0
GH_CC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.033057628	0.033057628	0.042866729	0.836595166	0
GH_CC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	19.75467646	1.795879678	2.328766176	0.017008152	0
GH_CC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	15.15931693	1.378119721	1.787045442	0.073411826	0
GH_CC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	68	52.43970793	0.771172176			0
GH_CC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.525559897	0.525559897	2.262340919	0.137253126	0
GH_CC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	1.324058101	0.120368918	0.518143661	0.884501007	0
GH_CC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.499820319	0.045438211	0.195594687	0.997367828	0
GH_CC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	67	15.56463608	0.232308001			0
GH_CC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.254471359	0.254471359	31.68148952	3.87404E-07	1
GH_CC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	0.085769225	0.007797202	0.97074572	0.481236516	0
GH_CC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.050767969	0.00461527	0.574597569	0.842717315	0
GH_CC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	67	0.538155918	0.008032178			0
GH_CC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.179964545	0.179964545	2.569630796	0.113637493	0
GH_CC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.42466399	0.038605817	0.551234672	0.860680504	0
GH_CC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.532804563	0.048436778	0.691606436	0.741807483	0
GH_CC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	67	4.692356789	0.070035176			0
GH_CC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.217629118	0.217629118	16.03312965	0.000158394	1
GH_CC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.581893624	0.05289942	3.897195715	0.000226324	0
GH_CC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.064022898	0.005820263	0.428789307	0.937856046	0
GH_CC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	67	0.909438844	0.013573714			0
GH_CC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	35.1554765	35.1554765	55.38960471	2.43327E-10	1
GH_CC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.011453284	0.182859389	0.288106159	0.986128612	0
GH_CC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.510633233	0.137330294	0.216372283	0.995875933	0
GH_CC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	67	42.52453033	0.634694483			0
GH_CC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	39.09310233	39.09310233	25.51595843	3.60585E-06	1
GH_CC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	2.681916413	0.243810583	0.159134485	0.998978635	0
GH_CC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.834209347	0.166746304	0.108834846	0.99983567	0
GH_CC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	67	102.6509689	1.532104014			0
GH_CC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.550103196	0.550103196	6.379084298	0.013918543	1
GH_CC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.578221021	0.052565547	0.609558461	0.814274757	0
GH_CC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.712939951	0.064812723	0.751578659	0.685632056	0
GH_CC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	67	5.777775058	0.086235449			0
GH_CC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	38.0502264	38.0502264	50.47867237	9.83081E-10	1
GH_CC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	21.21310271	1.928463883	2.558363135	0.009105989	0
GH_CC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	12.02100604	1.092818731	1.449769	0.172004807	0
GH_CC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	67	50.50380783	0.753788177			0
GH_CC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.597531532	0.597531532	6.479037669	0.013223356	1
GH_CC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.519526497	0.047229682	0.512111695	0.88862296	0
GH_CC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.743070288	0.067551844	0.732465018	0.703713269	0
GH_CC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	67	6.179098611	0.092225352			0
GH_CC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.606471111	0.606471111	6.858517786	0.010899782	1
GH_CC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	0.594929379	0.054084489	0.611635778	0.812531326	0
GH_CC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.773902377	0.070354762	0.795634573	0.64365081	0
GH_CC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	67	5.924540214	0.088425973			0
GH_CC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.648228119	0.648228119	2.725038388	0.103466056	0
GH_CC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.78585152	0.071441047	0.30032575	0.983597748	0
GH_CC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.251838369	0.022894397	0.096244068	0.999910701	0
GH_CC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	67	15.93786134	0.237878528			0
GH_CC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.214090012	1.214090012	15.6889166	0.000183456	1
GH_CC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.275974208	0.025088564	0.324203634	0.977804646	0
GH_CC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.713152689	0.064832063	0.8377837	0.603487631	0
GH_CC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	67	5.184808672	0.077385204			0
GH_CC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.606471111	0.606471111	6.858517786	0.010899782	1
GH_CC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.594929379	0.054084489	0.611635778	0.812531326	0
GH_CC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.773902377	0.070354762	0.795634573	0.64365081	0
GH_CC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	67	5.924540214	0.088425973			0
GH_CC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.25709519	1.25709519	45.27970547	4.6134E-09	1
GH_CC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.500837712	0.045530701	1.639984586	0.107581265	0
GH_CC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.068907703	0.006264337	0.225637104	0.995045577	0
GH_CC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	67	1.860113198	0.027762884			0
GH_CC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.135882157	0.135882157	2.407080748	0.125498577	0
GH_CC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	4.416928964	0.401538997	7.113051573	7.60416E-08	0
GH_CC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.914467257	0.083133387	1.472664109	0.162778712	0
GH_CC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	67	3.782218152	0.056451017			0
GH_CC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.708288937	2.708288937	23.60236071	7.45324E-06	1
GH_CC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.160069272	0.014551752	0.126816491	0.999653253	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
GH_CC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.055763981	0.005069453	0.044179575	0.999998374	0
GH_CC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	67	7.688017355	0.114746528			0
GH_CC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.281020712	0.281020712	16.02972024	0.000158624	1
GH_CC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.679280814	0.061752801	3.522445452	0.000629005	0
GH_CC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.100866718	0.009169702	0.523049534	0.881097043	0
GH_CC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	67	1.174592408	0.01753123			0
GH_CC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.088060713	0.088060713	16.71963191	0.000118437	1
GH_CC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	1.164913413	0.105901219	20.10691653	3.73245E-17	0
GH_CC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.124472062	0.011315642	2.148442393	0.028126493	0
GH_CC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	67	0.352882635	0.005266905			0
GH_CC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.053558814	0.053558814	7.828971187	0.006707029	1
GH_CC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.244726687	0.022247881	3.252088767	0.001325629	0
GH_CC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.094820281	0.008620026	1.260034101	0.266875761	0
GH_CC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	67	0.458354032	0.006841105			0
GH_CC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.07196907	0.07196907	32.87140163	2.56331E-07	1
GH_CC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.097531119	0.008866465	4.049699977	0.000149973	0
GH_CC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.012857901	0.0011689	0.533887449	0.873416784	0
GH_CC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	67	0.146690664	0.002189413			0
GH_CC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.606471111	0.606471111	6.858517786	0.010899782	1
GH_CC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.594929379	0.054084489	0.611635778	0.812531326	0
GH_CC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.773902377	0.070354762	0.795634573	0.64365081	0
GH_CC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	67	5.924540214	0.088425973			0
GH_CC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.075018626	0.075018626	17.21770225	9.60914E-05	1
GH_CC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.195058344	0.017732577	4.069845616	0.000142068	0
GH_CC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.058646097	0.005331463	1.223636761	0.289145209	0
GH_CC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	67	0.291923271	0.004357064			0
GH_CC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.057696161	0.057696161	9.035085566	0.003724849	1
GH_CC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.419408209	0.038128019	5.970759717	1.10169E-06	0
GH_CC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.054770194	0.004979109	0.779716902	0.658845079	0
GH_CC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	67	0.427847945	0.00638579			0
GH_CC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.606471111	0.606471111	6.858517786	0.010899782	1
GH_CC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.594929379	0.054084489	0.611635778	0.812531326	0
GH_CC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.773902377	0.070354762	0.795634573	0.64365081	0
GH_CC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	67	5.924540214	0.088425973			0
GH_CC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.243369492	1.243369492	12.42339684	0.00076958	1
GH_CC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.421509425	0.038319039	0.382873012	0.95842003	0
GH_CC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.149605149	0.013600468	0.135892036	0.999516356	0
GH_CC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	67	6.705553809	0.100082893			0
GH_CC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.385201715	0.385201715	39.6756537	2.66262E-08	1
GH_CC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.4971256	0.045193236	4.654888927	3.01643E-05	0
GH_CC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.046752246	0.004250204	0.437769674	0.933275233	0
GH_CC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	67	0.650487452	0.009708768			0
GH_CC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	5.870649094	5.870649094	22.81540151	1.00976E-05	1
GH_CC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.872890593	0.07935369	0.308396274	0.981767882	0
GH_CC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.973212883	0.088473898	0.343840602	0.972154879	0
GH_CC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	67	17.23982325	0.257310795			0
GH_CC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	18.83300903	18.83300903	45.99890432	3.70872E-09	1
GH_CC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	13.09178165	1.190161968	2.906925092	0.003455673	0
GH_CC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	7.267978659	0.660725333	1.613796357	0.114922263	0
GH_CC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	67	27.43134046	0.409422992			0
GH_CC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.448299843	0.448299843	4.390558924	0.040229162	1
GH_CC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	1.112251789	0.101113799	0.990288306	0.465121907	0
GH_CC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.632445051	0.057495005	0.563094566	0.851044303	0
GH_CC1	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	62	6.330535762	0.102105416			0
GH_CC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.003524257	0.003524257	0.051083761	0.822234707	0
GH_CC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.900462511	0.081860228	1.186555925	0.323915046	0
GH_CC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.408773088	0.03716119	0.538647777	0.866026144	0
GH_CC1	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	44	3.035550172	0.068989777			0
GH_CC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.183271577	0.183271577	1.048493713	0.309592766	0
GH_CC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	2.309859423	0.20998722	1.201333476	0.303804038	0
GH_CC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.675066362	0.061369669	0.351094881	0.969799089	0
GH_CC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	66	11.53647744	0.174795113			0
GH_CC1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.005359774	0.005359774	9.648857601	0.002763335	1
GH_CC1	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.002675531	0.00024323	0.437871496	0.933314356	0
GH_CC1	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.004089318	0.000371756	0.669248827	0.76228336	0
GH_CC1	Field Measured	pH (-)_Field Measured	Residuals	68	0.037772826	0.000555483			0
GH_CC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	33.97361147	33.97361147	515.6050251	1.85111E-33	1
GH_CC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	0.548742067	0.049885642	0.757096076	0.680432831	0
GH_CC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.552987569	0.050271597	0.762953568	0.674857785	0
GH_CC1	Major Ions	Bromide (mg/L)_Major Ions	Residuals	68	4.480572275	0.065890769			0
GH_CC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.067183839	0.067183839	23.04821924	9.22714E-06	1
GH_CC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	0.203429193	0.018493563	6.344437874	4.50353E-07	0
GH_CC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.033364684	0.003033153	1.040559417	0.422000797	0
GH_CC1	Major Ions	Calcium (mg/L)_Major Ions	Residuals	67	0.195300001	0.002914925			0
GH_CC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.329624489	0.329624489	22.40720013	1.15939E-05	1
GH_CC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	1.056171655	0.096015605	6.5269449	2.71844E-07	0
GH_CC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.400496685	0.03640879	2.474995218	0.011342835	0
GH_CC1	Major Ions	Chloride (mg/L)_Major Ions	Residuals	68	1.000324231	0.01471065			0
GH_CC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	21.10292695	21.10292695	334.1713182	6.00319E-28	1
GH_CC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.434808961	0.039528087	0.625939383	0.800485247	0
GH_CC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.656609505	0.059691773	0.945237529	0.503749206	0
GH_CC1	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	68	4.294201669	0.063150025			0
GH_CC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.485927884	0.485927884	62.84960015	3.24804E-11	1
GH_CC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	0.361044785	0.032822253	4.245209132	8.88616E-05	0
GH_CC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.049958294	0.004541663	0.587415787	0.832494378	0
GH_CC1	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	67	0.51801711	0.007731599			0
GH_CC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.203918337	0.203918337	50.73997219	9.1131E-10	1
GH_CC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	0.151080422	0.013734584	3.417507268	0.000839509	0
GH_CC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.046025556	0.004184141	1.041118836	0.421543656	0
GH_CC1	Major Ions	Potassium (mg/L)_Major Ions	Residuals	67	0.269265591	0.004018889			0
GH_CC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.233078327	0.233078327	24.3765369	5.54467E-06	1
GH_CC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	0.133044686	0.012094971	1.264954667	0.26397019	0
GH_CC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.055802086	0.005072917	0.530551884	0.875803733	0
GH_CC1	Major Ions	Sodium (mg/L)_Major Ions	Residuals	67	0.640626189	0.009561585			0
GH_CC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.16535561	0.16535561	29.18784453	9.08554E-07	1
GH_CC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	0.243863715	0.022169429	3.913249976	0.000210121	0
GH_CC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.038719565	0.00351996	0.621327936	0.804431972	0
GH_CC1	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	68	0.385235075	0.005665222			0
GH_CC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.23287509	0.23287509	35.53734768	9.93406E-08	1
GH_CC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	0.491931933	0.044721085	6.824554491	1.35512E-07	0
GH_CC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.02487345	0.002261223	0.345068503	0.971828626	0
GH_CC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	68	0.4456018	0.006552968			0
GH_CC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	12.61531251	12.61531251	133.757913	1.02638E-17	1
GH_CC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.945635918	0.176875993	1.875384664	0.058194753	0
GH_CC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	3.073851968	0.279441088	2.962864114	0.002907214	0
GH_CC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	68	6.413386929	0.094314514			0
GH_CC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	10.55322388	10.55322388	75.2612602	1.30422E-12	1
GH_CC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.400550079	0.127322734	0.908013471	0.537615651	0
GH_CC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.810214603	0.164564964	1.173609762	0.321704007	0
GH_CC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	68	9.535041293	0.140221195			0
GH_CC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	13.33308621	13.33308621	16.14237672	0.000149384	1
GH_CC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	6.662527119	0.605684284	0.733302382	0.702980743	0
GH_CC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	22.00581061	2.000528237	2.422040924	0.013138854	0
GH_CC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	68	56.1658223	0.825967975			0
GH_CC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.006021655	0.006021655	0.104128758	0.748090526	0
GH_CC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	0.556063771	0.050551252	0.874151602	0.56975045	0
GH_CC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.536827032	0.048802457	0.843910779	0.597981147	0
GH_CC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	58	3.354077945	0.05782893			0
GH_CC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	10.58998555	10.58998555	3.151558018	0.080329412	0
GH_CC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	0.52406085	0.047641895	0.014178131	0.999999996	0
GH_CC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.867481279	0.078861934	0.02346915	0.999999944	0
GH_CC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	68	228.4961956	3.360238171			0
GH_CC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	1.381253245	1.381253245	15.04448868	0.000239433	1
GH_CC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	0.796485922	0.072407811	0.788659501	0.650327365	0
GH_CC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.921954607	0.083814055	0.912895306	0.533125207	0
GH_CC1	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	68	6.243164703	0.091811246			0
GH_CC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.240509694	0.240509694	22.73605567	1.01969E-05	1
GH_CC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	0.095519415	0.008683583	0.820883467	0.619553392	0
GH_CC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.283045032	0.025731367	2.432458223	0.012764668	0
GH_CC1	Total Metals	Antimony (mg/L)_Total Metals	Residuals	68	0.71932702	0.010578339			0
GH_CC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.089840373	0.089840373	1.009293376	0.31863382	0
GH_CC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	0.857456764	0.077950615	0.875720307	0.567637576	0
GH_CC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.239851889	0.021804717	0.244960655	0.992959922	0
GH_CC1	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	68	6.052893564	0.089013141			0
GH_CC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.218734032	0.218734032	34.72134163	1.30931E-07	1
GH_CC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	0.24313602	0.022103275	3.508623416	0.000637351	0
GH_CC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.095353711	0.008668519	1.37602097	0.204445408	0
GH_CC1	Total Metals	Barium (mg/L)_Total Metals	Residuals	68	0.428379592	0.0062997			0
GH_CC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	41.2197476	41.2197476	64.80013946	1.77895E-11	1
GH_CC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	2.05349117	0.186681015	0.293474767	0.985085727	0
GH_CC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.431198514	0.130108956	0.204539789	0.996794134	0
GH_CC1	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	68	43.2551976	0.636105847			0
GH_CC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	45.84794028	45.84794028	29.8646507	7.12348E-07	1
GH_CC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	2.279003525	0.207182139	0.134955293	0.999533797	0
GH_CC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.751263803	0.1592058	0.103704236	0.999871052	0
GH_CC1	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	68	104.3929819	1.53519091			0
GH_CC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	1.328226875	1.328226875	14.73718439	0.00027362	1
GH_CC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.704961421	0.064087402	0.711074197	0.723841819	0
GH_CC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.928379965	0.084398179	0.936430021	0.511681118	0
GH_CC1	Total Metals	Boron (mg/L)_Total Metals	Residuals	68	6.128675948	0.090127587			0
GH_CC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	17.54229974	17.54229974	68.52751833	6.84896E-12	1
GH_CC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	33.1620501	3.014731827	11.77679629	6.04676E-12	0
GH_CC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	6.886860245	0.626078204	2.44572184	0.012303418	0
GH_CC1	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	68	17.40726078	0.255989129			0
GH_CC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.113381342	0.113381342	27.37155782	1.76173E-06	1
GH_CC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	0.167086662	0.015189697	3.666967175	0.000412036	0
GH_CC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.151840983	0.013803726	3.332377898	0.001038357	0
GH_CC1	Total Metals	Calcium (mg/L)_Total Metals	Residuals	68	0.281676742	0.004142305			0
GH_CC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.014705431	0.014705431	0.138554863	0.710879479	0
GH_CC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	0.88380175	0.080345614	0.757017965	0.680507123	0
GH_CC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.431047623	0.221004329	2.082307175	0.033407678	0
GH_CC1	Total Metals	Chromium (mg/L)_Total Metals	Residuals	68	7.217136155	0.106134355			0
GH_CC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	1.500169803	1.500169803	16.03120263	0.000156638	1
GH_CC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	0.732762312	0.066614756	0.711862513	0.723106238	0
GH_CC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.037679531	0.094334503	1.008082902	0.448852314	0
GH_CC1	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	68	6.363312158	0.09357812			0
GH_CC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	1.218477715	1.218477715	14.23043659	0.00034146	1
GH_CC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	0.5961124	0.054192036	0.63290147	0.794478975	0
GH_CC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.986409303	0.089673573	1.047285542	0.416311283	0
GH_CC1	Total Metals	Copper (mg/L)_Total Metals	Residuals	68	5.822483669	0.08562476			0
GH_CC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	2.515111688	2.515111688	31.09210014	4.60353E-07	1
GH_CC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	0.407863073	0.037078461	0.458368205	0.922187632	0
GH_CC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.93671762	0.085156147	1.052710093	0.411920826	0
GH_CC1	Total Metals	Iron (mg/L)_Total Metals	Residuals	68	5.500676827	0.080892306			0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
GH_CC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	1.500169803	1.500169803	16.03120263	0.000156638	1
GH_CC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	0.732762312	0.066614756	0.711862513	0.723106238	0
GH_CC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.037679531	0.094334503	1.008082902	0.448852314	0
GH_CC1	Total Metals	Lead (mg/L)_Total Metals	Residuals	68	6.363312158	0.09357812			0
GH_CC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	1.196088315	1.196088315	53.22784155	4.14992E-10	1
GH_CC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	0.448166455	0.040742405	1.813102135	0.068573678	0
GH_CC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.239400579	0.021763689	0.968518943	0.483050004	0
GH_CC1	Total Metals	Lithium (mg/L)_Total Metals	Residuals	68	1.528035011	0.022471103			0
GH_CC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.532442228	0.532442228	57.02702441	1.4276E-10	1
GH_CC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	0.244683044	0.022243913	2.382425937	0.014663103	0
GH_CC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.166535701	0.015139609	1.621522142	0.112327312	0
GH_CC1	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	68	0.634893226	0.009336665			0
GH_CC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	0.013659286	0.013659286	0.237775066	0.627386179	0
GH_CC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	6.21497583	0.564997803	9.835242754	2.23101E-10	0
GH_CC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.560954028	0.050995821	0.887713675	0.556427543	0
GH_CC1	Total Metals	Manganese (mg/L)_Total Metals	Residuals	68	3.906344922	0.057446249			0
GH_CC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	77.77079558	77.77079558	48.60134671	1.59662E-09	1
GH_CC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	2.520663838	0.229151258	0.143203624	0.999381071	0
GH_CC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.089519321	0.099047211	0.061897629	0.999990588	0
GH_CC1	Total Metals	Mercury (mg/L)_Total Metals	Residuals	68	108.8120897	1.60017779			0
GH_CC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.385514359	0.385514359	18.10730733	6.54306E-05	1
GH_CC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	0.779266338	0.070842394	3.327411749	0.001052772	0
GH_CC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.13482802	0.012257093	0.575706042	0.841958121	0
GH_CC1	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	68	1.447756749	0.02129054			0
GH_CC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.073069128	0.073069128	12.42100395	0.000764375	1
GH_CC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	1.077284151	0.097934923	16.6479346	2.73151E-15	0
GH_CC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.183325582	0.016665962	2.833042979	0.004178472	0
GH_CC1	Total Metals	Nickel (mg/L)_Total Metals	Residuals	68	0.400024082	0.005882707			0
GH_CC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.202776779	0.202776779	36.16215294	8.05363E-08	1
GH_CC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	0.120612153	0.010964741	1.955394745	0.047031363	0
GH_CC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.139553406	0.012686673	2.262475138	0.020417538	0
GH_CC1	Total Metals	Potassium (mg/L)_Total Metals	Residuals	68	0.38130531	0.005607431			0
GH_CC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.026787152	0.026787152	3.393405711	0.069818141	0
GH_CC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	0.235185579	0.021380507	2.70849009	0.005917528	0
GH_CC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.169003692	0.015363972	1.94631332	0.048187556	0
GH_CC1	Total Metals	Selenium (mg/L)_Total Metals	Residuals	68	0.536784128	0.007893884			0
GH_CC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.108244574	0.108244574	25.41238798	3.65622E-06	1
GH_CC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.070823624	0.006438511	1.511557947	0.147694446	0
GH_CC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.108169817	0.00983362	2.30862158	0.017980439	0
GH_CC1	Total Metals	Silicon (mg/L)_Total Metals	Residuals	68	0.289647358	0.00425952			0
GH_CC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	1.35901114	1.35901114	14.93734055	0.00025082	1
GH_CC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	0.790481166	0.071861924	0.789858156	0.649182099	0
GH_CC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.962175054	0.087470459	0.961416726	0.489321816	0
GH_CC1	Total Metals	Silver (mg/L)_Total Metals	Residuals	68	6.186694159	0.090980796			0
GH_CC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.249697895	0.249697895	24.08827866	6.04757E-06	1
GH_CC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	0.097204029	0.00883673	0.852476599	0.589531783	0
GH_CC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.097925109	0.008902283	0.858800453	0.583555473	0
GH_CC1	Total Metals	Sodium (mg/L)_Total Metals	Residuals	68	0.704884609	0.01036595			0
GH_CC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.063987815	0.063987815	18.43288846	5.71922E-05	1
GH_CC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	0.191037934	0.017367085	5.002914028	1.16884E-05	0
GH_CC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.184814463	0.016801315	4.839933347	1.78227E-05	0
GH_CC1	Total Metals	Strontium (mg/L)_Total Metals	Residuals	68	0.236054781	0.003471394			0
GH_CC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.065692224	0.065692224	9.142252415	0.003521189	1
GH_CC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	0.46541526	0.042310478	5.888262722	1.26271E-06	0
GH_CC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.131725263	0.011975024	1.666539583	0.100201492	0
GH_CC1	Total Metals	Thallium (mg/L)_Total Metals	Residuals	68	0.488618231	0.007185562			0
GH_CC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	1.389502523	1.389502523	15.20078957	0.000223773	1
GH_CC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.687618178	0.062510743	0.683850977	0.749006868	0
GH_CC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.060043818	0.09636762	1.054236236	0.410690677	0
GH_CC1	Total Metals	Tin (mg/L)_Total Metals	Residuals	68	6.215872611	0.091409891			0
GH_CC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	1.336987943	1.336987943	13.16014746	0.000548383	1
GH_CC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.449134228	0.040830384	0.401898822	0.950559487	0
GH_CC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.156252191	0.014204745	0.139819163	0.999447729	0
GH_CC1	Total Metals	Titanium (mg/L)_Total Metals	Residuals	68	6.908370931	0.10159369			0
GH_CC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.384308224	0.384308224	44.54340099	5.4546E-09	1
GH_CC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	0.698829056	0.063529914	7.36346054	3.96078E-08	0
GH_CC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.14306102	0.013005547	1.507413249	0.14920208	0
GH_CC1	Total Metals	Uranium (mg/L)_Total Metals	Residuals	68	0.586685315	0.008627725			0
GH_CC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	8.310194077	8.310194077	32.05657763	3.28015E-07	1
GH_CC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	0.888150493	0.080740954	0.311458268	0.981080662	0
GH_CC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.13435235	0.103122941	0.397796794	0.952339116	0
GH_CC1	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	68	17.62799522	0.259235224			0
GH_CC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	6.150598035	6.150598035	53.05050647	4.36554E-10	1
GH_CC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	22.35875364	2.032613967	17.5318237	7.96703E-16	0
GH_CC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.587210055	0.144291823	1.244554473	0.275834812	0
GH_CC1	Total Metals	Zinc (mg/L)_Total Metals	Residuals	68	7.883820423	0.115938536			0
GH_CC1	Toxicity	Daphnia magna, 48-hour, LC50 toxicity, mortality or lethal dose (%v/v)_Toxicity	as.factor(new_year)	1	0.020516678	0.020516678	3.192370677	0.324834075	0
GH_CC1	Toxicity	Daphnia magna, 48-hour, LC50 toxicity, mortality or lethal dose (%v/v)_Toxicity	as.factor(Month)	5	0.100867024	0.020173405	3.138957833	0.40315688	0
GH_CC1	Toxicity	Daphnia magna, 48-hour, LC50 toxicity, mortality or lethal dose (%v/v)_Toxicity	Residuals	1	0.006426784	0.006426784			0
GH_FR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.017509998	0.017509998	0.240475005	0.625514575	0
GH_FR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.124709023	0.102246275	1.404207645	0.192526146	0
GH_FR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.232357844	0.02112344	0.29010051	0.985666054	0
GH_FR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	65	4.732923859	0.072814213			0
GH_FR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.031188115	0.031188115	7.797303834	0.006864579	1
GH_FR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.626238016	0.056930729	14.23318436	1.90075E-13	0
GH_FR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.035306393	0.003209672	0.802446342	0.637134986	0
GH_FR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	65	0.259990827	0.003999859			0
GH_FR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	2.890555801	2.890555801	4.37614541	0.04035603	1
GH_FR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	9.281860285	0.84380548	1.277475937	0.257435482	0
GH_FR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	6.595815933	0.59961963	0.907791744	0.538087583	0
GH_FR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	65	42.93415998	0.660525538			0
GH_FR1	Conventional Parameters	Colour (CU)_Conventional Parameters	as.factor(new_year)	1	1.153657943	1.153657943	210.9096118	4.76853E-08	1
GH_FR1	Conventional Parameters	Colour (CU)_Conventional Parameters	as.factor(Month)	10	0.143328178	0.014332818	2.620299254	0.072289611	0
GH_FR1	Conventional Parameters	Colour (CU)_Conventional Parameters	Residuals	10	0.054699164	0.005469916			0
GH_FR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.192926607	0.192926607	19.42030903	4.15965E-05	1
GH_FR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	2.03308596	0.184825996	18.6048883	7.77435E-16	0
GH_FR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.026519695	0.002410881	0.242683279	0.993139173	0
GH_FR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	63	0.625859053	0.009934271			0
GH_FR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.038451501	0.038451501	0.368093428	0.546158697	0
GH_FR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	7.475785663	0.679616878	6.505922965	3.58899E-07	0
GH_FR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.805287058	0.073207914	0.700814042	0.733148218	0
GH_FR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	65	6.789981581	0.104461255			0
GH_FR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.137493814	0.137493814	13.26233696	0.000543435	1
GH_FR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.360285347	0.214571395	20.69706315	4.65738E-17	0
GH_FR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.07911851	0.007192592	0.693780861	0.7395524	0
GH_FR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	64	0.663503281	0.010367239			0
GH_FR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.00114529	0.00114529	0.342345506	0.560504232	0
GH_FR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.029462029	0.002678366	0.800606703	0.638888019	0
GH_FR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.009951209	0.000904655	0.270416025	0.989249689	0
GH_FR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	65	0.217452348	0.003345421			0
GH_FR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.097560862	0.097560862	2.964602795	0.089861467	0
GH_FR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.091174553	0.008288596	0.251867333	0.992013816	0
GH_FR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.2238903	0.020353664	0.618491135	0.806512702	0
GH_FR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	65	2.139057554	0.032908578			0
GH_FR1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000242594	0.000242594	4.227051329	0.043804715	1
GH_FR1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.001020514	9.2774E-05	1.616526776	0.114938578	0
GH_FR1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.000385735	3.50668E-05	0.611016284	0.812822469	0
GH_FR1	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	65	0.003730411	5.73909E-05			0
GH_FR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.046815712	0.046815712	11.56817763	0.001151764	1
GH_FR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.597558632	0.054323512	13.42335757	6.68876E-13	0
GH_FR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.034453837	0.003132167	0.773959497	0.664277357	0
GH_FR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	65	0.263051048	0.004046939			0
GH_FR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.241114146	0.241114146	17.76247699	7.88657E-05	1
GH_FR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	2.97639053	0.270580957	19.93324783	8.42968E-17	0
GH_FR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.061166855	0.005560623	0.409641833	0.946844166	0
GH_FR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	65	0.882332993	0.013574354			0
GH_FR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.284149755	0.284149755	1.427202642	0.236562598	0
GH_FR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	17.14528292	1.558662083	7.828712178	1.90697E-08	0
GH_FR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.365326892	0.124120627	0.623422274	0.802312215	0
GH_FR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	65	12.94121346	0.199095592			0
GH_FR1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.223901496	0.223901496	0.461573295	0.499301886	0
GH_FR1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	67.04740629	6.095218754	12.56530327	2.67653E-12	0
GH_FR1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	3.903596628	0.354872421	0.731570066	0.704436056	0
GH_FR1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	65	31.5304144	0.485083298			0
GH_FR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.75267382	0.75267382	0.836555021	0.363764457	0
GH_FR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	121.4040433	11.03673121	12.2667119	4.39638E-12	0
GH_FR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	10.86841624	0.98803784	1.098149017	0.377052001	0
GH_FR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	65	58.48246331	0.899730205			0
GH_FR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.079428849	0.079428849	0.324707695	0.570787031	0
GH_FR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	5.476819893	0.497892718	2.035401494	0.039012397	0
GH_FR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.677946052	0.15254055	0.623590691	0.802051848	0
GH_FR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	64	15.65545374	0.244616465			0
GH_FR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.474790673	0.474790673	10.70330449	0.001725287	1
GH_FR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	2.787186206	0.253380564	5.712010542	2.5019E-06	0
GH_FR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.327915944	0.02981054	0.672025185	0.759396608	0
GH_FR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	64	2.838992679	0.044359261			0
GH_FR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.0006077	0.0006077	0.027421251	0.868998742	0
GH_FR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.614521261	0.055865569	2.52082197	0.010487768	0
GH_FR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.086257051	0.00784155	0.353834251	0.968775127	0
GH_FR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	64	1.418345473	0.022161648			0
GH_FR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.002627571	0.002627571	0.272912378	0.603188471	0
GH_FR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.736824509	0.248802228	25.84181576	1.939E-19	0
GH_FR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.050989032	0.004635367	0.481451834	0.908117755	0
GH_FR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	64	0.61618513	0.009627893			0
GH_FR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	25.96212766	25.96212766	57.77170379	1.63053E-10	1
GH_FR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.7552392	0.068658109	0.15278008	0.999147172	0
GH_FR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.242936032	0.022085094	0.049144412	0.999997115	0
GH_FR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	64	28.76107266	0.44939176			0
GH_FR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	27.66285225	27.66285225	22.47169863	1.23159E-05	1
GH_FR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	1.782469242	0.162042658	0.131634068	0.999580138	0
GH_FR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.816378436	0.074216221	0.060288959	0.999991638	0
GH_FR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	64	78.78454466	1.23100851			0
GH_FR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.05180559	0.05180559	4.323546381	0.041600389	1
GH_FR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.226188604	0.0205626	1.716095819	0.089759614	0
GH_FR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.081400627	0.007400057	0.61758759	0.807161139	0
GH_FR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	64	0.76686069	0.011982198			0
GH_FR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.212506392	0.212506392	1.731381116	0.192928561	0
GH_FR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	3.097652627	0.281604784	2.29435548	0.019440737	0
GH_FR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.391558723	0.035596248	0.290017962	0.985646572	0
GH_FR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	64	7.855237059	0.122738079			0
GH_FR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.16025766	0.16025766	1.884522246	0.174612409	0
GH_FR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.527173667	0.13883397	1.632594069	0.110820602	0
GH_FR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.621187657	0.056471605	0.66406808	0.766560527	0
GH_FR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	64	5.442488267	0.085038879			0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
GH_FR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.001993068	0.001993068	0.044721536	0.833188874	0
GH_FR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	0.837815958	0.076165087	1.709032951	0.091386864	0
GH_FR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.02376582	0.002160529	0.048479108	0.999997314	0
GH_FR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	64	2.852236154	0.04456619			0
GH_FR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.004624633	0.004624633	0.138136457	0.71136839	0
GH_FR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.30808966	0.028008151	0.836595492	0.604687586	0
GH_FR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.099238895	0.009021718	0.26947614	0.98937522	0
GH_FR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	64	2.142638435	0.033478726			0
GH_FR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.118170546	3.118170546	8.724907979	0.004386934	1
GH_FR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	1.70797149	0.155270135	0.434459124	0.934695992	0
GH_FR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.307482206	0.027952928	0.078214684	0.999968197	0
GH_FR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	64	22.87278163	0.357387213			0
GH_FR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.010942742	0.010942742	0.10877248	0.742623067	0
GH_FR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	1.203102771	0.109372979	1.087183631	0.385708016	0
GH_FR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.46733527	0.042485025	0.422307443	0.940774679	0
GH_FR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	64	6.438535742	0.100602121			0
GH_FR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.773286021	0.773286021	25.6931432	3.65576E-06	1
GH_FR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.466416191	0.042401472	1.408828118	0.19087232	0
GH_FR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.126625913	0.011511447	0.382478461	0.95835222	0
GH_FR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	64	1.926206731	0.03009698			0
GH_FR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.302385628	1.302385628	3.730571685	0.057855724	0
GH_FR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	6.115651297	0.5559683	1.592523407	0.122449636	0
GH_FR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	4.476730735	0.406975521	1.1657464	0.328367764	0
GH_FR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	64	22.34313859	0.34911154			0
GH_FR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.071260061	2.071260061	17.37403703	9.39839E-05	1
GH_FR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.375943696	0.0341767	0.286679233	0.986304847	0
GH_FR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.202911959	0.018446542	0.154732332	0.999094756	0
GH_FR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	64	7.629812443	0.119215819			0
GH_FR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.287856252	2.287856252	112.9710251	9.03353E-16	1
GH_FR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.986751815	0.08970471	4.42948856	6.15684E-05	0
GH_FR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.827941027	0.075267366	3.716593422	0.000403414	0
GH_FR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	64	1.296109335	0.020251708			0
GH_FR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.699236242	1.699236242	6.3668587	0.014121763	1
GH_FR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	4.278190624	0.38892642	1.457266213	0.170193802	0
GH_FR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.053962597	0.095814782	0.359007865	0.967028187	0
GH_FR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	64	17.08081247	0.266887695			0
GH_FR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.083718264	1.083718264	40.97317066	2.06514E-08	1
GH_FR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.147133779	0.377012162	14.2540586	2.28993E-13	0
GH_FR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.172923098	0.015720282	0.594351689	0.826502826	0
GH_FR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	64	1.692765481	0.026449461			0
GH_FR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	5.96137E-05	5.96137E-05	0.015142015	0.90245083	0
GH_FR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.577994564	0.05254496	13.34655007	9.25442E-13	0
GH_FR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.061893276	0.005626661	1.429185936	0.181933243	0
GH_FR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	64	0.251966047	0.003936969			0
GH_FR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000246276	0.000246276	0.037797967	0.846465201	0
GH_FR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.055331649	0.00503015	0.772016952	0.666093994	0
GH_FR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.032408544	0.002946231	0.452181461	0.925238791	0
GH_FR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	64	0.416998087	0.006515595			0
GH_FR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.100364308	0.100364308	11.76540283	0.001061158	1
GH_FR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.068735312	0.188066847	22.04650501	1.00846E-17	0
GH_FR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.05196972	0.00472452	0.553841126	0.858354579	0
GH_FR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	64	0.545949491	0.008530461			0
GH_FR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000246276	0.000246276	0.037797967	0.846465201	0
GH_FR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.055331649	0.00503015	0.772016952	0.666093994	0
GH_FR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.032408544	0.002946231	0.452181461	0.925238791	0
GH_FR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	64	0.416998087	0.006515595			0
GH_FR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000320234	0.000320234	0.049949046	0.823863812	0
GH_FR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.060447293	0.005495208	0.85712383	0.585308153	0
GH_FR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.034309558	0.003119051	0.486498867	0.904981764	0
GH_FR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	64	0.410318006	0.006411219			0
GH_FR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.090967303	0.090967303	5.331732992	0.024180063	1
GH_FR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.136160848	0.012378259	0.725508717	0.710064373	0
GH_FR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.051616766	0.004692433	0.275030703	0.988441476	0
GH_FR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	64	1.091935288	0.017061489			0
GH_FR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.689936686	0.689936686	42.32957888	1.35687E-08	1
GH_FR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.430760398	0.130069127	7.980111052	1.53818E-08	0
GH_FR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.188293321	0.017117575	1.050211913	0.414836416	0
GH_FR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	64	1.043146402	0.016299163			0
GH_FR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.579788413	2.579788413	23.40346347	8.62284E-06	1
GH_FR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.185102916	0.016827538	0.152656964	0.999150399	0
GH_FR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.089635563	0.008148688	0.073923703	0.999976142	0
GH_FR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	64	7.054787366	0.110231053			0
GH_FR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	8.486363245	8.486363245	94.88236757	2.93834E-14	1
GH_FR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	0.950988801	0.086453527	0.966599605	0.485330226	0
GH_FR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.786466258	0.071496933	0.799376369	0.640051344	0
GH_FR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	64	5.724216855	0.089440888			0
GH_FR1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.788178875	0.788178875	21.36256782	2.22233E-05	1
GH_FR1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	1.693281169	0.153934652	4.17219941	0.000159922	0
GH_FR1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.183409495	0.01667359	0.451916079	0.924546744	0
GH_FR1	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	57	2.103033505	0.036895325			0
GH_FR1	Field Measured	Conductivity (µS/cm at 25 C)_Field Measured	as.factor(new_year)	1	0.032325817	0.032325817	-	-	-
GH_FR1	Field Measured	Conductivity (µS/cm at 25 C)_Field Measured	as.factor(Month)	1	0.004689944	0.004689944	-	-	0
GH_FR1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.036900092	0.036900092	9.657228426	0.003337814	1
GH_FR1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.080608178	0.007328016	1.917836064	0.063642655	0
GH_FR1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.038389426	0.003489948	0.91336423	0.536167731	0
GH_FR1	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	43	0.164302206	0.003820982			0
GH_FR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.027949298	0.027949298	9.309738001	0.003333926	1
GH_FR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.537171183	0.048833744	16.26621732	1.62469E-14	0
GH_FR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.047483274	0.004316661	1.43785312	0.178680551	0
GH_FR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	63	0.189135913	0.003002157			0
GH_FR1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.001329635	0.001329635	2.450328423	0.122509914	0
GH_FR1	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.006383092	0.000580281	1.069375535	0.399830455	0
GH_FR1	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.004521648	0.000411059	0.757523091	0.67981347	0
GH_FR1	Field Measured	pH (-)_Field Measured	Residuals	63	0.034186036	0.000542635			0
GH_FR1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	3.104498275	3.104498275	11.39937767	0.00126286	1
GH_FR1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	39.14808465	3.558916786	13.06795268	1.7584E-12	0
GH_FR1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	4.029777802	0.366343437	1.345172978	0.221679441	0
GH_FR1	Major Ions	Bromide (mg/L)_Major Ions	Residuals	63	17.15737446	0.272339277			0
GH_FR1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.031591762	0.031591762	3.995282574	0.049878754	1
GH_FR1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	2.217427211	0.201584292	25.4935511	2.73265E-19	0
GH_FR1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.039869687	0.003624517	0.458378019	0.921768538	0
GH_FR1	Major Ions	Calcium (mg/L)_Major Ions	Residuals	64	0.506065029	0.007907266			0
GH_FR1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.59574232	0.59574232	8.61498813	0.004604326	1
GH_FR1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	8.271521628	0.751956512	10.87399066	4.92383E-11	0
GH_FR1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.275537558	0.025048869	0.362229946	0.96597772	0
GH_FR1	Major Ions	Chloride (mg/L)_Major Ions	Residuals	65	4.494869897	0.069151845			0
GH_FR1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.25603552	0.25603552	7.028074558	0.010068318	1
GH_FR1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.074378652	0.006761696	0.185605892	0.997909679	0
GH_FR1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.308167596	0.028015236	0.769007236	0.668989813	0
GH_FR1	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	65	2.367975561	0.036430393			0
GH_FR1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.392206895	0.392206895	24.48839815	5.72423E-06	1
GH_FR1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	2.567317995	0.233392545	14.57243523	1.4223E-13	0
GH_FR1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.171627984	0.015602544	0.97418305	0.478694109	0
GH_FR1	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	64	1.025025855	0.016016029			0
GH_FR1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.105560895	0.105560895	1.674401232	0.200320228	0
GH_FR1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	0.33885696	0.030805178	0.488630078	0.903641669	0
GH_FR1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.129663803	0.011787618	0.186974569	0.997831463	0
GH_FR1	Major Ions	Potassium (mg/L)_Major Ions	Residuals	64	4.034813839	0.063043966			0
GH_FR1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.063191978	0.063191978	4.539875086	0.036962227	1
GH_FR1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	2.029966662	0.184542424	13.25800497	1.06396E-12	0
GH_FR1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.10625737	0.009659761	0.693982208	0.739367148	0
GH_FR1	Major Ions	Sodium (mg/L)_Major Ions	Residuals	64	0.890836529	0.013919321			0
GH_FR1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.714065193	0.714065193	26.53050699	2.61122E-06	1
GH_FR1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	6.376318948	0.579665359	21.53699131	1.28302E-17	0
GH_FR1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.108552787	0.009868435	0.366653622	0.96440717	0
GH_FR1	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	65	1.749466664	0.026914872			0
GH_FR1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.000119608	0.000119608	0.083591022	0.778393832	0
GH_FR1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	as.factor(Month)	10	0.011677339	0.001167734	0.816099752	0.622910775	0
GH_FR1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	Residuals	10	0.014308715	0.001430872			0
GH_FR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.021736468	0.021736468	1.007520028	0.319219825	0
GH_FR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	4.308845059	0.391713187	18.1565323	7.75658E-16	0
GH_FR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.07366335	0.006696668	0.310401275	0.981208637	0
GH_FR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	65	1.40232489	0.021574229			0
GH_FR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.476428266	0.476428266	2.925546757	0.092108435	0
GH_FR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	6.962879865	0.632989079	3.886921239	0.000264586	0
GH_FR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.954909367	0.086809942	0.533063556	0.873516364	0
GH_FR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	63	10.2596141	0.162851017			0
GH_FR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	8.939902061	8.939902061	40.70389954	2.12791E-08	1
GH_FR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.528640142	0.229876377	1.046640654	0.417489206	0
GH_FR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	2.449633464	0.222693951	1.013938649	0.444470523	0
GH_FR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	65	14.27611704	0.21963257			0
GH_FR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	17.574233	17.574233	41.79604986	1.69415E-08	1
GH_FR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	5.348250498	0.486204591	1.156319671	0.335242096	0
GH_FR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.133324083	0.103029462	0.245030582	0.992852069	0
GH_FR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	63	26.48998368	0.420475931			0
GH_FR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.019935857	0.019935857	0.065118105	0.799500681	0
GH_FR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	4.420010365	0.401819124	1.312494334	0.241525642	0
GH_FR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.891120043	0.081010913	0.264612503	0.989935674	0
GH_FR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	57	17.45050586	0.306149226			0
GH_FR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	21.21019798	21.21019798	7.687077322	0.007248592	1
GH_FR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	28.35796433	2.577996757	0.934326989	0.513926424	0
GH_FR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	4.706211375	0.427837398	0.15505839	0.99908914	0
GH_FR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	65	179.3481203	2.759201851			0
GH_FR1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.13727229	0.13727229	1.142857143	0.396977311	0
GH_FR1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	as.factor(Month)	4	0.583407231	0.145851808	1.214285714	0.498263889	0
GH_FR1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	Residuals	2	0.240226507	0.120113253			0
GH_FR1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.951598667	0.951598667	91.10585934	0.010798769	1
GH_FR1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(Month)	4	1.680520053	0.420130013	40.22316049	0.024405301	0
GH_FR1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	Residuals	2	0.020889955	0.010444978			0
GH_FR1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.494180342	0.494180342	2.944646147	0.228299204	0
GH_FR1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(Month)	4	0.823478959	0.20586974	1.22670508	0.495287578	0
GH_FR1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	Residuals	2	0.335646674	0.167823337			0
GH_FR1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.567129949	0.567129949	5.094875556	0.152588411	0
GH_FR1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(Month)	4	1.10377824	0.27594456	2.478978931	0.307514302	0
GH_FR1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	Residuals	2	0.222627596	0.111313798			0
GH_FR1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.274864578	0.274864578	1.142857143	0.396977311	0
GH_FR1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(Month)	4	1.168174457	0.292043614	1.214285714	0.498263889	0
GH_FR1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	Residuals	2	0.481013012	0.240506506			0
GH_FR1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.13727229	0.13727229	1.142857143	0.396977311	0
GH_FR1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(Month)	4	0.583407231	0.145851808	1.214285714	0.498263889	0
GH_FR1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	Residuals	2	0.240226507	0.120113253			0
GH_FR1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.054042132	0.054042132	0.042119936	0.856383867	0
GH_FR1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(Month)	4	1.351138739	0.337784685	0.263266248	0.881029783	0
GH_FR1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	Residuals	2	2.566107026	1.283053513			0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
GH_FR1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.549089159	0.549089159	1.142857143	0.396977311	0
GH_FR1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(Month)	4	2.333628925	0.583407231	1.214285714	0.498263889	0
GH_FR1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	Residuals	2	0.960906028	0.480453014			0
GH_FR1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	3.047300304	3.047300304	3.373526415	0.070824649	0
GH_FR1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	119.7757847	10.8887077	12.05438893	6.2849E-12	0
GH_FR1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	4.42505443	0.402277675	0.445343166	0.929073832	0
GH_FR1	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	65	58.71438233	0.90329819			0
GH_FR1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.275332442	0.275332442	4.449924102	0.038758584	1
GH_FR1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	3.541991459	0.321999224	5.204152825	8.17991E-06	0
GH_FR1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.524313677	0.04766488	0.77035999	0.667702905	0
GH_FR1	Total Metals	Antimony (mg/L)_Total Metals	Residuals	65	4.02177842	0.061873514			0
GH_FR1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.000566713	0.000566713	0.006252472	0.937217828	0
GH_FR1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	5.559307684	0.505391608	5.575920347	3.26669E-06	0
GH_FR1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.244257906	0.022205264	0.244987813	0.992898935	0
GH_FR1	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	65	5.891485612	0.09063824			0
GH_FR1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.008686864	0.008686864	0.994895113	0.322247709	0
GH_FR1	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	2.879496808	0.261772437	29.98045148	2.75456E-21	0
GH_FR1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.046955563	0.004268688	0.488887146	0.90359636	0
GH_FR1	Total Metals	Barium (mg/L)_Total Metals	Residuals	65	0.567543435	0.008731437			0
GH_FR1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	24.52940979	24.52940979	56.34458061	2.19902E-10	1
GH_FR1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	0.633255811	0.05756871	0.132236562	0.999572498	0
GH_FR1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.492099564	0.044736324	0.102760296	0.999875283	0
GH_FR1	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	65	28.29751538	0.43534639			0
GH_FR1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	28.52585791	28.52585791	23.06909029	9.57046E-06	1
GH_FR1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	1.412539949	0.128412723	0.1038484	0.999868603	0
GH_FR1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.685290475	0.062299134	0.05038181	0.99999673	0
GH_FR1	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	65	80.37511409	1.236540217			0
GH_FR1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.096410063	0.096410063	7.662115369	0.007338647	1
GH_FR1	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.161198528	0.014654412	1.164648053	0.328799488	0
GH_FR1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.061628782	0.005602617	0.44526363	0.929116598	0
GH_FR1	Total Metals	Boron (mg/L)_Total Metals	Residuals	65	0.817875195	0.012582695			0
GH_FR1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.193365678	0.193365678	1.24584942	0.268456011	0
GH_FR1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	10.63484384	0.966803985	6.229089877	6.83687E-07	0
GH_FR1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.284027485	0.02582068	0.166361891	0.998735247	0
GH_FR1	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	65	10.08851378	0.155207904			0
GH_FR1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.030646647	0.030646647	4.117552498	0.046539503	1
GH_FR1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	2.425155447	0.220468677	29.62122946	3.78688E-21	0
GH_FR1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.0466105	0.004237318	0.569307971	0.846621599	0
GH_FR1	Total Metals	Calcium (mg/L)_Total Metals	Residuals	65	0.483790317	0.007442928			0
GH_FR1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.035464663	0.035464663	0.159983186	0.690483438	0
GH_FR1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	9.76772371	0.887974883	4.005707104	0.000180451	0
GH_FR1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.985884381	0.089625853	0.404307512	0.94925164	0
GH_FR1	Total Metals	Chromium (mg/L)_Total Metals	Residuals	65	14.40903338	0.221677437			0
GH_FR1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	8.35616E-05	8.35616E-05	0.000804216	0.977462958	0
GH_FR1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	5.977712504	0.543428409	5.230077761	7.6677E-06	0
GH_FR1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.03932087	0.003574625	0.034402994	0.999999563	0
GH_FR1	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	65	6.753789949	0.103904461			0
GH_FR1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.015347791	0.015347791	0.247251055	0.620695236	0
GH_FR1	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	2.620074688	0.238188608	3.837189709	0.000283124	0
GH_FR1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.075983564	0.006907597	0.111280549	0.99981522	0
GH_FR1	Total Metals	Copper (mg/L)_Total Metals	Residuals	65	4.034791265	0.062073712			0
GH_FR1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	2.557535353	2.557535353	3.916013684	0.052067774	0
GH_FR1	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	72.98380577	6.634891433	10.15912668	1.82461E-10	0
GH_FR1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.854592336	0.168599303	0.258153686	0.99114023	0
GH_FR1	Total Metals	Iron (mg/L)_Total Metals	Residuals	65	42.45128117	0.653096633			0
GH_FR1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.004105815	0.004105815	0.015718717	0.900614196	0
GH_FR1	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	18.65750039	1.696136399	6.493495049	3.69349E-07	0
GH_FR1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.571119036	0.051919912	0.19877039	0.997152622	0
GH_FR1	Total Metals	Lead (mg/L)_Total Metals	Residuals	65	16.97835528	0.261205466			0
GH_FR1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.885660959	0.885660959	26.26377842	2.88043E-06	1
GH_FR1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	0.654693977	0.059517634	1.764962024	0.078835848	0
GH_FR1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.071188461	0.006471678	0.191913984	0.997568244	0
GH_FR1	Total Metals	Lithium (mg/L)_Total Metals	Residuals	65	2.191914713	0.033721765			0
GH_FR1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.37736313	0.37736313	26.41030931	2.72917E-06	1
GH_FR1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	3.060291076	0.27820828	19.47081239	1.48083E-16	0
GH_FR1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.101860196	0.009260018	0.648075862	0.780892713	0
GH_FR1	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	65	0.928751087	0.014288478			0
GH_FR1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	0.969628817	0.969628817	3.264355495	0.075429638	0
GH_FR1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	29.77860016	2.707145469	9.113884644	1.36104E-09	0
GH_FR1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.583005407	0.143909582	0.484486463	0.906354361	0
GH_FR1	Total Metals	Manganese (mg/L)_Total Metals	Residuals	65	19.30729457	0.297035301			0
GH_FR1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	66.91989875	66.91989875	58.12273969	1.35995E-10	1
GH_FR1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	4.521020791	0.41100189	0.356972385	0.967787647	0
GH_FR1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.029657898	0.184514354	0.160258458	0.998937098	0
GH_FR1	Total Metals	Mercury (mg/L)_Total Metals	Residuals	65	74.83806583	1.151354859			0
GH_FR1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	1	1.084836066	1.084836066	53.65271735	0.005256349	1
GH_FR1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(Month)	7	1.717996924	0.245428132	12.13813461	0.03249542	0
GH_FR1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year):as.factor(Month)	2	0.000826566	0.000413283	0.020439723	0.979902977	0
GH_FR1	Total Metals	Methyl mercury (µg/L)_Total Metals	Residuals	3	0.060658777	0.020219592			0
GH_FR1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	2.303513703	2.303513703	109.1255368	1.52459E-15	1
GH_FR1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	0.86623786	0.078748896	3.730611882	0.000377086	0
GH_FR1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.785025852	0.071365987	3.380857506	0.000973878	0
GH_FR1	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	65	1.372074723	0.021108842			0
GH_FR1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	2.467882178	2.467882178	8.665256739	0.004493753	1
GH_FR1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	6.876802163	0.625163833	2.195082555	0.025202613	0
GH_FR1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.740736306	0.067339664	0.236443816	0.993899403	0
GH_FR1	Total Metals	Nickel (mg/L)_Total Metals	Residuals	65	18.51212796	0.284801969			0
GH_FR1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.148550256	0.148550256	2.363219122	0.129079587	0
GH_FR1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	0.20450124	0.018591022	0.295756194	0.984504406	0
GH_FR1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.069969747	0.006360886	0.101192472	0.999884442	0
GH_FR1	Total Metals	Potassium (mg/L)_Total Metals	Residuals	65	4.085853296	0.062859281			0
GH_FR1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.840986932	0.840986932	34.17025349	1.78192E-07	1
GH_FR1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	4.608816996	0.418983363	17.02376957	3.4658E-15	0
GH_FR1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.13442819	0.012220745	0.496542721	0.89870356	0
GH_FR1	Total Metals	Selenium (mg/L)_Total Metals	Residuals	65	1.599758414	0.024611668			0
GH_FR1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	2.33976E-05	2.33976E-05	0.001185689	0.972636723	0
GH_FR1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.870500432	0.079136403	4.01029084	0.000178262	0
GH_FR1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.067467865	0.006133442	0.310816345	0.98110904	0
GH_FR1	Total Metals	Silicon (mg/L)_Total Metals	Residuals	65	1.282666618	0.019733333			0
GH_FR1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.011218249	0.011218249	0.258032993	0.613194277	0
GH_FR1	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	1.006886407	0.091535128	2.105416215	0.032101725	0
GH_FR1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.048966821	0.004451529	0.102390437	0.999877493	0
GH_FR1	Total Metals	Silver (mg/L)_Total Metals	Residuals	65	2.825941622	0.043476025			0
GH_FR1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.048963199	0.048963199	2.934471342	0.091473512	0
GH_FR1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	2.292081387	0.208371035	12.48813076	3.04069E-12	0
GH_FR1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.081251564	0.007386506	0.442689412	0.930493156	0
GH_FR1	Total Metals	Sodium (mg/L)_Total Metals	Residuals	65	1.084559214	0.016685526			0
GH_FR1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.078788579	0.078788579	9.219359548	0.003443616	1
GH_FR1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	2.396956775	0.217905161	25.49793448	1.85963E-19	0
GH_FR1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.030634839	0.002784985	0.325882018	0.977256205	0
GH_FR1	Total Metals	Strontium (mg/L)_Total Metals	Residuals	65	0.555489524	0.008545993			0
GH_FR1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.012828393	0.012828393	0.236336866	0.62849942	0
GH_FR1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	1.596777273	0.14516157	2.674304609	0.006788525	0
GH_FR1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.029442326	0.002676575	0.049310414	0.999997078	0
GH_FR1	Total Metals	Thallium (mg/L)_Total Metals	Residuals	65	3.528207683	0.054280118			0
GH_FR1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.00021105	0.00021105	0.03404601	0.854183463	0
GH_FR1	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.074366623	0.006760602	1.090603393	0.382812337	0
GH_FR1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.040237121	0.00365792	0.590086512	0.830096793	0
GH_FR1	Total Metals	Tin (mg/L)_Total Metals	Residuals	65	0.402932117	0.006198956			0
GH_FR1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.47953972	0.47953972	7.055071637	0.009932605	1
GH_FR1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	1.276336577	0.116030598	1.707062306	0.09144803	0
GH_FR1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.544452303	0.049495664	0.728188803	0.707614989	0
GH_FR1	Total Metals	Titanium (mg/L)_Total Metals	Residuals	65	4.418109894	0.067970921			0
GH_FR1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.797223899	0.797223899	46.94370477	3.17069E-09	1
GH_FR1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	1.68549046	0.153226405	9.022578412	1.63137E-09	0
GH_FR1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.10543554	0.009585049	0.564405701	0.850422604	0
GH_FR1	Total Metals	Uranium (mg/L)_Total Metals	Residuals	65	1.103865868	0.016982552			0
GH_FR1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	2.33740759	2.33740759	13.57804124	0.0004683	1
GH_FR1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	3.748769427	0.340797221	1.979696967	0.044924277	0
GH_FR1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.31653408	0.028775825	0.167159269	0.998706906	0
GH_FR1	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	65	11.18950007	0.172146155			0
GH_FR1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.004971601	0.004971601	0.11069255	0.740427723	0
GH_FR1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	2.076791507	0.188799228	4.203609536	0.000106804	0
GH_FR1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.01373725	0.001248841	0.027805407	0.99999986	0
GH_FR1	Total Metals	Zinc (mg/L)_Total Metals	Residuals	65	2.919383856	0.044913598			0
GH_GH1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.000811904	0.000811904	0.008738649	0.92579256	0
GH_GH1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.580077729	0.14364343	1.546057292	0.135274602	0
GH_GH1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.390923583	0.035538508	0.38250666	0.95870343	0
GH_GH1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	69	6.410756393	0.092909513			0
GH_GH1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.014277728	0.014277728	2.02361568	0.159441269	0
GH_GH1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.646010598	0.149637327	21.20844769	7.24197E-18	0
GH_GH1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.162207218	0.014746111	2.090000694	0.032717438	0
GH_GH1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	0.479777605	0.007055553			0
GH_GH1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.686640843	0.686640843	0.65551214	0.420972945	0
GH_GH1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	15.56093857	1.414630779	1.350498821	0.216973859	0
GH_GH1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	9.003586303	0.818507846	0.781400983	0.657261055	0
GH_GH1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	71.22915731	1.047487607			0
GH_GH1	Conventional Parameters	Colour (CU)_Conventional Parameters	as.factor(new_year)	1	0.087930456	0.087930456	0.787611009	0.393814283	0
GH_GH1	Conventional Parameters	Colour (CU)_Conventional Parameters	as.factor(Month)	11	3.780940341	0.343721849	3.078786636	0.037607358	0
GH_GH1	Conventional Parameters	Colour (CU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	1	0.004272195	0.004272195	0.038266925	0.848474807	0
GH_GH1	Conventional Parameters	Colour (CU)_Conventional Parameters	Residuals	11	1.228061827	0.111641984			0
GH_GH1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.371270993	0.371270993	19.65408396	3.65348E-05	1
GH_GH1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	5.385502386	0.489591126	25.91763235	1.22405E-19	0
GH_GH1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.249011321	0.022637393	1.198362459	0.306088729	0
GH_GH1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	65	1.227867683	0.018890272			0
GH_GH1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.013576863	0.013576863	0.206289939	0.651116519	0
GH_GH1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	8.771999553	0.797454505	12.11670442	2.80782E-12	0
GH_GH1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.568635976	0.05169418	0.785453077	0.653409993	0
GH_GH1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	69	4.541198573	0.065814472			0
GH_GH1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.421531089	0.421531089	17.68213289	7.70122E-05	1
GH_GH1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	7.201896258	0.654717842	27.46371071	5.66944E-21	0
GH_GH1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.28331805	0.025756186	1.080405035	0.389715576	0
GH_GH1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	1.644917235	0.02383938			0
GH_GH1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0	0	-	-	-
GH_GH1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0	0	-	-	0
GH_GH1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0	0	-	-	0
GH_GH1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	0	0			0
GH_GH1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.177092613	0.177092613	5.052715189	0.027786261	1
GH_GH1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.289075305	0.026279573	0.749795243	0.687414749	0
GH_GH1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.212356029	0.019305094	0.550802983	0.861231721	0
GH_GH1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	69	2.418380975	0.035049			0
GH_GH1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000191578	0.000191578	2.167207897	0.145528736	0
GH_GH1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.003394765	0.000308615	3.491173463	0.000652958	0
GH_GH1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.001042088	9.47353E-05	1.071682616	0.396561413	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
GH_GH1	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	69	0.006099506	8.83986E-05			0
GH_GH1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.007995746	0.007995746	1.164554967	0.28428081	0
GH_GH1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.449536099	0.131776009	19.19275728	6.6451E-17	0
GH_GH1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.145638821	0.013239893	1.928348346	0.050268628	0
GH_GH1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	0.473748742	0.006865924			0
GH_GH1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.450488101	0.450488101	16.02300754	0.000155365	1
GH_GH1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	9.29054675	0.844595159	30.04064829	4.79726E-22	0
GH_GH1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.304358885	0.02766899	0.984133492	0.469246678	0
GH_GH1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	69	1.939940358	0.028115078			0
GH_GH1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.550653834	0.550653834	3.27194091	0.074830828	0
GH_GH1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	20.94965924	1.904514477	11.31647224	1.17622E-11	0
GH_GH1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	3.062072138	0.278370194	1.654053364	0.10307278	0
GH_GH1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	69	11.61240854	0.168295776			0
GH_GH1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	9.194918477	9.194918477	12.28035988	0.000808519	1
GH_GH1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	60.61035078	5.510031889	7.358974929	3.66235E-08	0
GH_GH1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	6.081644126	0.552876739	0.73839973	0.698218431	0
GH_GH1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	69	51.66374448	0.74874992			0
GH_GH1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	24.84819665	24.84819665	25.06748542	4.06676E-06	1
GH_GH1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	147.4962303	13.40874821	13.52708226	2.56375E-13	0
GH_GH1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	6.475185919	0.588653265	0.593848212	0.827495409	0
GH_GH1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	69	68.3963924	0.991252064			0
GH_GH1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.753892448	0.753892448	4.400929995	0.039638252	1
GH_GH1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	10.05580636	0.914164214	5.33653404	4.98691E-06	0
GH_GH1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.638963847	0.148996713	0.869784684	0.573208856	0
GH_GH1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	68	11.64860303	0.171302986			0
GH_GH1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	5.968315048	5.968315048	9.847916586	0.002514038	1
GH_GH1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	1.316000574	0.119636416	0.19740403	0.99726494	0
GH_GH1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.340768495	0.030978954	0.051116296	0.999996521	0
GH_GH1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	68	41.21129782	0.606048497			0
GH_GH1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.69695E-07	1.69695E-07	4.96031E-06	0.998229494	0
GH_GH1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.423940836	0.038540076	1.126553463	0.355038548	0
GH_GH1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.15826939	0.014388126	0.420575029	0.941972497	0
GH_GH1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	68	2.326321171	0.034210605			0
GH_GH1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.381817467	0.381817467	25.82078899	3.13563E-06	1
GH_GH1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.365331201	0.033211927	2.245989884	0.021364202	0
GH_GH1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.126910491	0.011537317	0.780222654	0.658386304	0
GH_GH1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	68	1.005530381	0.014787211			0
GH_GH1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	26.60666503	26.60666503	59.36855419	7.51943E-11	1
GH_GH1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.775176928	0.07047063	0.157244036	0.999037441	0
GH_GH1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.455124684	0.041374971	0.092321688	0.999927769	0
GH_GH1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	68	30.4749416	0.448160906			0
GH_GH1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	30.10616506	30.10616506	24.20583639	5.78142E-06	1
GH_GH1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	1.593590688	0.144871881	0.1164793	0.999771544	0
GH_GH1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.749078853	0.068098078	0.054751939	0.99999502	0
GH_GH1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	68	84.5754384	1.243756447			0
GH_GH1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.21593275	0.21593275	12.11957302	0.000876285	1
GH_GH1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.289619866	0.026329079	1.477761904	0.16038684	0
GH_GH1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.116535858	0.010594169	0.594614773	0.826759024	0
GH_GH1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	68	1.21154656	0.017816861			0
GH_GH1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.905965076	4.905965076	5.886087969	0.01791872	1
GH_GH1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	38.92097018	3.538270017	4.245152229	8.57299E-05	0
GH_GH1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	3.336815963	0.303346906	0.363950119	0.965565247	0
GH_GH1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	68	56.67696897	0.833484838			0
GH_GH1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.118646313	1.118646313	10.56136457	0.001796872	1
GH_GH1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.505354536	0.045941321	0.433741245	0.935443145	0
GH_GH1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.249588589	0.022689872	0.214219638	0.996064895	0
GH_GH1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	68	7.20247358	0.105918729			0
GH_GH1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.140615819	0.140615819	0.468223306	0.496131161	0
GH_GH1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	3.310759146	0.300978104	1.002198498	0.45385563	0
GH_GH1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.84834744	0.077122495	0.256802894	0.991401253	0
GH_GH1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	68	20.4216142	0.300317856			0
GH_GH1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.014148784	0.014148784	0.920952763	0.340624827	0
GH_GH1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.702316075	0.063846916	4.155833815	0.000108976	0
GH_GH1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.108132836	0.009830258	0.639857342	0.788422943	0
GH_GH1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	68	1.044697762	0.015363202			0
GH_GH1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.614307927	2.614307927	9.886892613	0.002468033	1
GH_GH1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.433998646	0.039454422	0.149210287	0.999247958	0
GH_GH1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.18878201	0.017162001	0.06490393	0.999987976	0
GH_GH1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	68	17.98066855	0.264421596			0
GH_GH1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.032782867	0.032782867	4.006764915	0.049309737	1
GH_GH1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.077565129	0.007051375	0.861828323	0.580698882	0
GH_GH1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.161392493	0.014672045	1.793236527	0.072234185	0
GH_GH1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	68	0.556367793	0.008181879			0
GH_GH1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.178822872	2.178822872	39.72752467	2.49373E-08	1
GH_GH1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	3.734003826	0.339454893	6.189444228	6.07656E-07	0
GH_GH1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.425038618	0.038639874	0.704539402	0.729925787	0
GH_GH1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	68	3.729403141	0.054844164			0
GH_GH1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	5.474526493	5.474526493	4.657970202	0.03444367	1
GH_GH1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	73.21644189	6.656040172	5.663254499	2.19932E-06	0
GH_GH1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	12.86121193	1.169201085	0.994808194	0.46018148	0
GH_GH1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	68	79.92060604	1.17530303			0
GH_GH1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.890450006	2.890450006	26.2698768	2.6506E-06	1
GH_GH1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.172860323	0.015714575	0.142822032	0.999388877	0
GH_GH1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.062449019	0.005677184	0.051597126	0.999996346	0
GH_GH1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	68	7.481976484	0.110029066			0
GH_GH1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.486151183	2.486151183	7.48691379	0.00792152	1
GH_GH1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.54809628	0.049826935	0.150051198	0.999227725	0
GH_GH1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.184332275	0.10766657	0.324232225	0.977842928	0
GH_GH1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	68	22.58050315	0.332066223			0
GH_GH1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	8.314152645	8.314152645	8.282592855	0.00534451	1
GH_GH1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	6.595431433	0.599584676	0.597308705	0.824551103	0
GH_GH1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.285704733	0.116882248	0.116438574	0.999771935	0
GH_GH1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	68	68.25910554	1.003810376			0
GH_GH1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.436297588	1.436297588	19.89743286	3.14524E-05	1
GH_GH1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	14.91806297	1.356187543	18.78764597	1.48707E-16	0
GH_GH1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.858536418	0.078048765	1.08123141	0.389304828	0
GH_GH1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	68	4.908584774	0.07218507			0
GH_GH1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.029629964	0.029629964	2.9802047	0.08882966	0
GH_GH1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	1.467432408	0.133402946	13.41777155	3.72184E-13	0
GH_GH1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.35414925	0.032195386	3.238236875	0.001348876	0
GH_GH1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	68	0.676073542	0.009942258			0
GH_GH1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000509058	0.000509058	0.109444984	0.741794144	0
GH_GH1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.046731225	0.004248293	0.913362414	0.532696274	0
GH_GH1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.076541443	0.006958313	1.496003512	0.153422397	0
GH_GH1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	68	0.316286212	0.004651268			0
GH_GH1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.158804196	0.158804196	10.76116396	0.001636921	1
GH_GH1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.978281461	0.27075286	18.34722248	2.65447E-16	0
GH_GH1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.176185083	0.016016826	1.08535978	0.386097568	0
GH_GH1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	68	1.003486741	0.014757158			0
GH_GH1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.011883006	0.011883006	1.066121892	0.305481447	0
GH_GH1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.265005823	0.024091438	2.161440476	0.026933384	0
GH_GH1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.104730252	0.009520932	0.854200869	0.587900958	0
GH_GH1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	68	0.757928722	0.011146011			0
GH_GH1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.003316854	0.003316854	2.073150198	0.154499663	0
GH_GH1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.021737545	0.00197614	1.235157095	0.281608113	0
GH_GH1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.060039447	0.005458132	3.411523568	0.000833735	0
GH_GH1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	68	0.108793897	0.00159991			0
GH_GH1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.311421076	0.311421076	7.575097026	0.007580681	1
GH_GH1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.321354183	0.029214017	0.710610256	0.724274563	0
GH_GH1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.117889857	0.01071726	0.26068975	0.990841336	0
GH_GH1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	68	2.795559331	0.041111167			0
GH_GH1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.883482415	0.883482415	25.47311108	3.57349E-06	1
GH_GH1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	10.25430936	0.932209942	26.87805327	1.49185E-20	0
GH_GH1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.559106233	0.050827839	1.465499683	0.165221693	0
GH_GH1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	68	2.358440004	0.034682941			0
GH_GH1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.559153994	2.559153994	22.53417162	1.10325E-05	1
GH_GH1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.138239736	0.012567249	0.110658655	0.999822336	0
GH_GH1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.136799736	0.01243634	0.109505959	0.999831262	0
GH_GH1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	68	7.722603455	0.113567698			0
GH_GH1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	7.96028262	7.96028262	53.02110495	4.40239E-10	1
GH_GH1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	1.54089089	0.14008099	0.933038339	0.514749645	0
GH_GH1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.077803553	0.097982141	0.65263027	0.777167317	0
GH_GH1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	68	10.20912745	0.150134227			0
GH_GH1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	1.222352468	1.222352468	17.14551059	0.000104855	1
GH_GH1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	4.138657209	0.376241564	5.277408847	7.63738E-06	0
GH_GH1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.51537757	0.046852506	0.657183722	0.772605802	0
GH_GH1	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	63	4.491450112	0.071292859			0
GH_GH1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.021155049	0.021155049	5.43445325	0.024082938	1
GH_GH1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.026545268	0.002413206	0.619920857	0.802510324	0
GH_GH1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.022593324	0.002053939	0.527629737	0.874667203	0
GH_GH1	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	47	0.182959956	0.003892765			0
GH_GH1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.00645289	0.00645289	0.822234906	0.367683381	0
GH_GH1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	2.104261504	0.1912965	24.37522826	1.40677E-19	0
GH_GH1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.046045219	0.004185929	0.533376066	0.874009977	0
GH_GH1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	69	0.541511176	0.007847988			0
GH_GH1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.000506716	0.000506716	1.808879448	0.183046859	0
GH_GH1	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.003474112	0.000315828	1.127447416	0.354116067	0
GH_GH1	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.002794457	0.000254042	0.906880065	0.538576647	0
GH_GH1	Field Measured	pH (-)_Field Measured	Residuals	69	0.019328757	0.000280127			0
GH_GH1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	2.70880865	2.70880865	10.20593117	0.002111198	1
GH_GH1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	16.42319374	1.493017612	5.625216456	2.28098E-06	0
GH_GH1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	1.37739717	0.125217925	0.471781394	0.914507392	0
GH_GH1	Major Ions	Bromide (mg/L)_Major Ions	Residuals	69	18.31364465	0.26541514			0
GH_GH1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.140435607	0.140435607	8.08587595	0.0058866	1
GH_GH1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	5.313940222	0.483085475	27.81466405	5.93083E-21	0
GH_GH1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.290569788	0.026415435	1.52092434	0.144336718	0
GH_GH1	Major Ions	Calcium (mg/L)_Major Ions	Residuals	68	1.181024952	0.017368014			0
GH_GH1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.370648452	0.370648452	2.22012128	0.140779543	0
GH_GH1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	3.492300717	0.317481883	1.901662563	0.053981579	0
GH_GH1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.524922579	0.047720234	0.2858361	0.986629621	0
GH_GH1	Major Ions	Chloride (mg/L)_Major Ions	Residuals	69	11.51952527	0.166949642			0
GH_GH1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	1.130658463	1.130658463	11.95740506	0.000936645	1
GH_GH1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	3.846209094	0.349655372	3.697819501	0.000368484	0
GH_GH1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.476155561	0.043286869	0.457785127	0.922613004	0
GH_GH1	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	69	6.524445196	0.094557177			0
GH_GH1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.740756964	0.740756964	25.30065248	3.81364E-06	1
GH_GH1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	9.996942976	0.908812998	31.04062863	2.95449E-22	0
GH_GH1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.375190816	0.034108256	1.164972014	0.327649442	0
GH_GH1	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	68	1.990915989	0.029278176			0
GH_GH1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.436423612	0.436423612	13.53459474	0.00046419	1
GH_GH1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	1.243365308	0.11303321	3.505444354	0.000642973	0
GH_GH1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.192474951	0.017497723	0.542648429	0.867166351	0
GH_GH1	Major Ions	Potassium (mg/L)_Major Ions	Residuals	68	2.192663039	0.032245045			0
GH_GH1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.013114848	0.013114848	0.29803407	0.58690412	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
GH_GH1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	1.857770005	0.168888182	3.837972848	0.000257964	0
GH_GH1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.309731869	0.028157443	0.639876034	0.788406598	0
GH_GH1	Major Ions	Sodium (mg/L)_Major Ions	Residuals	68	2.99230788	0.044004528			0
GH_GH1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.840804077	0.840804077	17.18458914	9.4886E-05	1
GH_GH1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	14.01708046	1.274280042	26.0440923	2.39147E-20	0
GH_GH1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.377486052	0.034316914	0.701378694	0.732933128	0
GH_GH1	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	69	3.376017943	0.048927796			0
GH_GH1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	as.factor(new_year)	1	1.07182E-32	1.07182E-32	0.186335404	0.673638173	0
GH_GH1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	as.factor(Month)	11	6.30231E-31	5.72938E-32	0.996047431	0.499166149	0
GH_GH1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	3	1.76238E-62	5.87459E-63	1.02129E-31	1	0
GH_GH1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	Residuals	12	6.90253E-31	5.75211E-32			0
GH_GH1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	2.05083141	2.05083141	16.35725862	0.000134697	1
GH_GH1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	9.97104533	0.906458666	7.229837991	4.91205E-08	0
GH_GH1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.487864404	0.044351309	0.35374231	0.969105438	0
GH_GH1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	8.651044195	0.125377452			0
GH_GH1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.132625035	0.132625035	0.33902548	0.562290079	0
GH_GH1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	24.21318598	2.201198726	5.626859599	2.27161E-06	0
GH_GH1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	5.092347337	0.462940667	1.183401619	0.314755568	0
GH_GH1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	26.99244746	0.391194891			0
GH_GH1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	8.332825911	8.332825911	17.12947812	9.7114E-05	1
GH_GH1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	5.308106473	0.482555134	0.991970515	0.462462873	0
GH_GH1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	2.965377185	0.269579744	0.554164983	0.858705122	0
GH_GH1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	33.5658205	0.486461167			0
GH_GH1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	3.432458371	3.432458371	8.275390717	0.005342571	1
GH_GH1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	15.54460535	1.413145941	3.40698518	0.000825225	0
GH_GH1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	5.058457198	0.459859745	1.108686153	0.36804323	0
GH_GH1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	28.6197517	0.41477901			0
GH_GH1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	5.982672842	5.982672842	5.596487395	0.021301475	1
GH_GH1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	42.20249184	3.836590167	3.588935762	0.000659345	0
GH_GH1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	6.438660035	0.58533273	0.54754912	0.862377288	0
GH_GH1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	59	63.07129325	1.06900497			0
GH_GH1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	29.91336897	29.91336897	13.10475242	0.000557435	1
GH_GH1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	28.45778646	2.587071496	1.133370551	0.349794638	0
GH_GH1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	2.125255412	0.193205037	0.084641225	0.999953533	0
GH_GH1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	69	157.5018278	2.282635185			0
GH_GH1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.960452454	0.960452454	-	-	-
GH_GH1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(Month)	1	0.799603325	0.799603325	-	-	0
GH_GH1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.0178953	0.0178953	-	-	-
GH_GH1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(Month)	1	0.000198686	0.000198686	-	-	0
GH_GH1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.875738375	0.875738375	-	-	-
GH_GH1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(Month)	1	0.0180506	0.0180506	-	-	0
GH_GH1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(new_year)	1	2.238903214	2.238903214	-	-	-
GH_GH1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(Month)	1	0	0	-	-	0
GH_GH1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(new_year)	1	4.889023928	4.889023928	-	-	-
GH_GH1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(Month)	1	1.97215E-31	1.97215E-31	-	-	0
GH_GH1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(new_year)	1	4.184411008	4.184411008	-	-	-
GH_GH1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(Month)	1	1.605200998	1.605200998	-	-	0
GH_GH1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(new_year)	1	1.726860263	1.726860263	-	-	-
GH_GH1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(Month)	1	1.2326E-32	1.2326E-32	-	-	0
GH_GH1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	28.47997741	28.47997741	23.36931424	7.80633E-06	1
GH_GH1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	141.1346123	12.8304193	10.52803154	5.11084E-11	0
GH_GH1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	10.61605638	0.965096035	0.791911882	0.647234147	0
GH_GH1	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	69	84.08969221	1.218691191			0
GH_GH1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	4.489546624	4.489546624	8.154553418	0.005669515	1
GH_GH1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	0.886471013	0.080588274	0.14637589	0.999315529	0
GH_GH1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.378870841	0.034442804	0.062559921	0.999990096	0
GH_GH1	Total Metals	Antimony (mg/L)_Total Metals	Residuals	69	37.98843433	0.550557019			0
GH_GH1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.366227187	0.366227187	3.668307916	0.059601896	0
GH_GH1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	2.376067988	0.216006181	2.163621957	0.02656465	0
GH_GH1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.5765235	0.052411227	0.524976099	0.879972024	0
GH_GH1	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	69	6.888646339	0.099835454			0
GH_GH1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.750134445	0.750134445	29.48353213	7.92071E-07	1
GH_GH1	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	0.369947029	0.033631548	1.321865482	0.231411941	0
GH_GH1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.135439003	0.012312637	0.483939941	0.907124925	0
GH_GH1	Total Metals	Barium (mg/L)_Total Metals	Residuals	69	1.755531747	0.025442489			0
GH_GH1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	27.62564647	27.62564647	61.01242381	4.42968E-11	1
GH_GH1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	0.87881164	0.079891967	0.176444833	0.998362345	0
GH_GH1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.33652974	0.030593613	0.067567304	0.999985271	0
GH_GH1	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	69	31.24231899	0.452787232			0
GH_GH1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	31.25728867	31.25728867	25.17305311	3.90692E-06	1
GH_GH1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	1.380950815	0.125540983	0.101104414	0.999886744	0
GH_GH1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.378691134	0.034426467	0.02772535	0.999999864	0
GH_GH1	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	69	85.67704951	1.24169637			0
GH_GH1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.447670281	0.447670281	19.34825524	3.86854E-05	1
GH_GH1	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.363819003	0.033074455	1.429473926	0.179777879	0
GH_GH1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.104718484	0.009519862	0.411447289	0.946348297	0
GH_GH1	Total Metals	Boron (mg/L)_Total Metals	Residuals	69	1.596487591	0.023137501			0
GH_GH1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	4.264062511	4.264062511	5.472616415	0.022217852	1
GH_GH1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	51.9773016	4.725209237	6.064464948	7.69628E-07	0
GH_GH1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.726903571	0.247900325	0.318162171	0.979465371	0
GH_GH1	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	69	53.76227583	0.779163418			0
GH_GH1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.076590828	0.076590828	3.574260247	0.06288136	0
GH_GH1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	5.417263713	0.492478519	22.98246984	6.63517E-19	0
GH_GH1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.219821376	0.019983761	0.932581171	0.515057132	0
GH_GH1	Total Metals	Calcium (mg/L)_Total Metals	Residuals	69	1.47856249	0.021428442			0
GH_GH1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	2.524306628	2.524306628	5.971109217	0.017103846	1
GH_GH1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	15.59423106	1.417657369	3.353390944	0.000958139	0
GH_GH1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	6.73956459	0.61268769	1.449279209	0.171425379	0
GH_GH1	Total Metals	Chromium (mg/L)_Total Metals	Residuals	69	29.1699835	0.422753384			0
GH_GH1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	1.427257863	1.427257863	2.942099351	0.090786376	0
GH_GH1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	15.88925369	1.444477609	2.977595532	0.002742793	0
GH_GH1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.842132116	0.167466556	0.345209691	0.971837686	0
GH_GH1	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	69	33.47296634	0.485115454			0
GH_GH1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	1.704540142	1.704540142	6.754504205	0.0114259	1
GH_GH1	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	8.064747715	0.733158883	2.90525558	0.003360185	0
GH_GH1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.976629139	0.179693558	0.712063543	0.722986625	0
GH_GH1	Total Metals	Copper (mg/L)_Total Metals	Residuals	69	17.41256889	0.252356071			0
GH_GH1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	12.35463235	12.35463235	14.57413498	0.000290858	1
GH_GH1	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	85.86351001	7.805773637	9.208076406	6.87804E-10	0
GH_GH1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	7.971235697	0.724657791	0.854842148	0.587257337	0
GH_GH1	Total Metals	Iron (mg/L)_Total Metals	Residuals	69	58.49195393	0.847709477			0
GH_GH1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	3.906591203	3.906591203	9.012785672	0.003730932	1
GH_GH1	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	28.21183857	2.564712597	5.916975632	1.10505E-06	0
GH_GH1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	6.091659232	0.553787203	1.277626736	0.25589408	0
GH_GH1	Total Metals	Lead (mg/L)_Total Metals	Residuals	69	29.90804428	0.433449917			0
GH_GH1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	1.925849003	1.925849003	34.62562128	1.30077E-07	1
GH_GH1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	3.556800482	0.323345498	5.813560021	1.42672E-06	0
GH_GH1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.407438695	0.037039881	0.665955069	0.765343785	0
GH_GH1	Total Metals	Lithium (mg/L)_Total Metals	Residuals	69	3.837724097	0.05561919			0
GH_GH1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.806741912	0.806741912	23.84741057	6.4882E-06	1
GH_GH1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	10.11444384	0.919494894	27.18040543	7.52044E-21	0
GH_GH1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.296650307	0.02696821	0.797184279	0.642192053	0
GH_GH1	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	69	2.334223743	0.03382933			0
GH_GH1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	5.370703007	5.370703007	7.178008381	0.00921962	1
GH_GH1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	18.75430418	1.704936744	2.278668216	0.019353209	0
GH_GH1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	4.843724405	0.440338582	0.588517747	0.831828433	0
GH_GH1	Total Metals	Manganese (mg/L)_Total Metals	Residuals	69	51.62692599	0.748216319			0
GH_GH1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	74.70983015	74.70983015	74.59045659	1.37131E-12	1
GH_GH1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	3.644801963	0.331345633	0.330816199	0.976089378	0
GH_GH1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.571788561	0.23379896	0.233425389	0.994291339	0
GH_GH1	Total Metals	Mercury (mg/L)_Total Metals	Residuals	69	69.11042667	1.001600386			0
GH_GH1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	1	1.212549786	1.212549786	16.5557045	0.009644652	1
GH_GH1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(Month)	6	0.298221336	0.049703556	0.678633897	0.677355467	0
GH_GH1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year):as.factor(Month)	1	7.43914E-29	7.43914E-29	1.01571E-27	1	0
GH_GH1	Total Metals	Methyl mercury (µg/L)_Total Metals	Residuals	5	0.366203017	0.073240603			0
GH_GH1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	2.592730252	2.592730252	7.815369148	0.006704021	1
GH_GH1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	0.682583141	0.062053013	0.187048846	0.997862071	0
GH_GH1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.995734347	0.090521304	0.272861941	0.988951616	0
GH_GH1	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	69	22.890587	0.331747638			0
GH_GH1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	6.924311548	6.924311548	7.619316801	0.007390485	1
GH_GH1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	3.130144812	0.284558619	0.313120265	0.980718533	0
GH_GH1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.233166902	0.112106082	0.123358365	0.999698921	0
GH_GH1	Total Metals	Nickel (mg/L)_Total Metals	Residuals	69	62.70608105	0.908783783			0
GH_GH1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.240471475	0.240471475	7.321539318	0.008577527	1
GH_GH1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	0.833118346	0.075738031	2.305965713	0.017945818	0
GH_GH1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.136639502	0.012421773	0.378200777	0.960378918	0
GH_GH1	Total Metals	Potassium (mg/L)_Total Metals	Residuals	69	2.266262739	0.032844388			0
GH_GH1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.961003586	0.961003586	12.50531919	0.000730128	1
GH_GH1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	15.8506269	1.440966082	18.75096102	1.18535E-16	0
GH_GH1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.726898757	0.066081705	0.859906068	0.582470279	0
GH_GH1	Total Metals	Selenium (mg/L)_Total Metals	Residuals	69	5.302483405	0.076847586			0
GH_GH1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.281507354	0.281507354	5.987920075	0.016954799	1
GH_GH1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	3.424669302	0.311333573	6.622351146	2.01406E-07	0
GH_GH1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.885244461	0.080476769	1.711814823	0.08887204	0
GH_GH1	Total Metals	Silicon (mg/L)_Total Metals	Residuals	69	3.243865518	0.047012544			0
GH_GH1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.156227963	0.156227963	1.482454506	0.227538455	0
GH_GH1	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	3.771173794	0.342833981	3.253167803	0.001267477	0
GH_GH1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.052810488	0.095710044	0.908197121	0.537361799	0
GH_GH1	Total Metals	Silver (mg/L)_Total Metals	Residuals	69	7.271541508	0.10538466			0
GH_GH1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.011141163	0.011141163	0.243742422	0.623084011	0
GH_GH1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	1.99714948	0.181559044	3.972084589	0.000173592	0
GH_GH1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.299840594	0.027258236	0.596346049	0.82545091	0
GH_GH1	Total Metals	Sodium (mg/L)_Total Metals	Residuals	69	3.153904135	0.045708756			0
GH_GH1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.033694321	0.033694321	2.663255743	0.107246367	0
GH_GH1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	3.049954349	0.277268577	21.91577406	2.28469E-18	0
GH_GH1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.128628835	0.01169353	0.924276292	0.522612471	0
GH_GH1	Total Metals	Strontium (mg/L)_Total Metals	Residuals	69	0.872957157	0.012651553			0
GH_GH1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.41024752	0.41024752	3.194143574	0.078294269	0
GH_GH1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	5.02242645	0.456584223	3.554916218	0.000547095	0
GH_GH1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.263082469	0.114825679	0.89402053	0.550488062	0
GH_GH1	Total Metals	Thallium (mg/L)_Total Metals	Residuals	69	8.862181115	0.128437407			0
GH_GH1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.00186679	0.00186679	2.631403255	0.109329916	0
GH_GH1	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.010065079	0.000915007	1.289782107	0.248970363	0
GH_GH1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.029385386	0.002671399	3.765568546	0.000305736	0
GH_GH1	Total Metals	Tin (mg/L)_Total Metals	Residuals	69	0.048950513	0.000709428			0
GH_GH1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	2.490971056	2.490971056	10.22166278	0.002095595	1
GH_GH1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	7.459611825	0.67814653	2.782764226	0.00473891	0
GH_GH1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.779506993	0.161773363	0.663834596	0.76725162	0
GH_GH1	Total Metals	Titanium (mg/L)_Total Metals	Residuals	69	16.81497487	0.243695288			0
GH_GH1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.666218954	0.666218954	19.53364678	3.58668E-05	1
GH_GH1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	9.988191915	0.908017447	26.62321743	1.31983E-20	0
GH_GH1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.512328986	0.046575362	1.365597107	0.209112865	0
GH_GH1	Total Metals	Uranium (mg/L)_Total Metals	Residuals	69	2.353329533	0.034106225			0
GH_GH1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	5.185492879	5.185492879	16.65731907	0.000118567	1

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
GH_GH1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	9.614521308	0.874047392	2.807695743	0.004418666	0
GH_GH1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.476324075	0.13421128	0.431125866	0.93685847	0
GH_GH1	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	69	21.4799877	0.31130417			0
GH_GH1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.339537379	0.339537379	2.401132896	0.125822231	0
GH_GH1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	8.334170158	0.757651833	5.357945396	4.47803E-06	0
GH_GH1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.145105245	0.104100477	0.736175439	0.700321945	0
GH_GH1	Total Metals	Zinc (mg/L)_Total Metals	Residuals	69	9.75709392	0.141407158			0
GH_GH1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	as.factor(new_year)	1	0.018088957	0.018088957	-	-	-
GH_GH1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	as.factor(Month)	4	0.006821651	0.001705413	-	-	0
GH_GH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	1	0.026938675	0.026938675	0.320855615	0.595572973	0
GH_GH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(Month)	8	0.25442082	0.031802602	0.378787879	0.892964728	0
GH_GH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year):as.factor(Month)	2	0.089047287	0.044523643	0.53030303	0.618208357	0
GH_GH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Residuals	5	0.419794353	0.083958871			0
GH_GH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	1	0.055357497	0.055357497	4.49113E+30	3.00402E-16	1
GH_GH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(Month)	8	0.43978456	0.05497307	4.45995E+30	3.66217E-16	0
GH_GH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year):as.factor(Month)	2	0.279862902	0.139931451	1.13526E+31	2.09864E-16	0
GH_GH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Residuals	1	1.2326E-32	1.2326E-32			0
GH_GH1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	1	0.069965725	0.069965725	2.27052E+31	1.33603E-16	1
GH_GH1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(Month)	7	0.419794353	0.059970622	1.94616E+31	1.74539E-16	0
GH_GH1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year):as.factor(Month)	2	0.279862902	0.139931451	4.54104E+31	1.04932E-16	0
GH_GH1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Residuals	1	3.08149E-33	3.08149E-33			0
GH_GH1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	1	0.015532311	0.015532311	0.357142857	0.592200467	0
GH_GH1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(Month)	6	0.093193864	0.015532311	0.357142857	0.869012021	0
GH_GH1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year):as.factor(Month)	1	1.50993E-31	1.50993E-31	3.47186E-30	1	0
GH_GH1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Residuals	3	0.130471409	0.04349047			0
GH_PC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.388169182	0.388169182	3.798351419	0.055369828	0
GH_PC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.406351988	0.218759272	2.140624832	0.028291668	0
GH_PC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.420698465	0.129154406	1.263814449	0.26394498	0
GH_PC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	69	7.051394303	0.10219412			0
GH_PC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.499929495	0.499929495	2.326974266	0.132000127	0
GH_PC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	3.755833989	0.341439454	1.589265744	0.123018145	0
GH_PC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	9.829851038	0.893622822	4.15946114	0.000120008	0
GH_PC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	65	13.96466548	0.214841007			0
GH_PC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.152378667	1.152378667	2.545921982	0.115430389	0
GH_PC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	19.01699096	1.72881736	3.819433876	0.000296943	0
GH_PC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	7.531598109	0.684690737	1.512670486	0.148515439	0
GH_PC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	65	29.42140956	0.45263707			0
GH_PC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.5042748	0.5042748	1.584873846	0.212562629	0
GH_PC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	5.434844711	0.494076792	1.552822759	0.134616461	0
GH_PC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	13.72830215	1.248027468	3.922397262	0.000225362	0
GH_PC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	65	20.68168521	0.318179772			0
GH_PC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.050307944	0.050307944	0.600362857	0.441086827	0
GH_PC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	7.057224618	0.641565874	7.65629219	1.87844E-08	0
GH_PC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.469082315	0.133552938	1.593788503	0.120067581	0
GH_PC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	69	5.781916917	0.083795897			0
GH_PC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.014559342	0.014559342	3.436040974	0.068063528	0
GH_PC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.094683568	0.008607597	2.031414318	0.038088498	0
GH_PC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.054739551	0.004976323	1.174424562	0.320849143	0
GH_PC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	0.292369802	0.004237244			0
GH_PC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.889729945	0.889729945	3.787841602	0.055951296	0
GH_PC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	3.947720784	0.358883708	1.527873312	0.14311006	0
GH_PC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	9.997168713	0.908833519	3.869171125	0.00025986	0
GH_PC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	65	15.26791575	0.234891012			0
GH_PC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.363531195	0.363531195	4.186513765	0.04455983	1
GH_PC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.58013136	0.052739215	0.607357638	0.816334266	0
GH_PC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.742038734	0.067458067	0.776863524	0.661619118	0
GH_PC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	69	5.991537077	0.086833871			0
GH_PC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	5.67204E-05	5.67204E-05	1.270566557	0.263565084	0
GH_PC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.002246994	0.000204272	4.575800929	3.41757E-05	0
GH_PC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.000995935	9.05395E-05	2.028131155	0.038428591	0
GH_PC1	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	69	0.003080287	4.46418E-05			0
GH_PC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.05247296	0.05247296	13.18357711	0.000538107	1
GH_PC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.147865521	0.01344232	3.377317819	0.000896319	0
GH_PC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.10571572	0.00961052	2.414596591	0.013274089	0
GH_PC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	0.27463216	0.003980176			0
GH_PC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.126686981	0.126686981	7.801144816	0.006751504	1
GH_PC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	0.486797457	0.044254314	2.725097018	0.00557115	0
GH_PC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.710796122	0.064617829	3.979043778	0.000170326	0
GH_PC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	69	1.120528064	0.016239537			0
GH_PC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.141370478	0.141370478	1.581249561	0.212820248	0
GH_PC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	8.487804613	0.771618601	8.630667421	2.27693E-09	0
GH_PC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.664467504	0.151315228	1.692483052	0.093411249	0
GH_PC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	69	6.168895275	0.089404279			0
GH_PC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	2.681356567	2.681356567	10.78902223	0.001606063	1
GH_PC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	3.736287813	0.339662528	1.366706172	0.208571285	0
GH_PC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.721051905	0.065550173	0.263755401	0.990405641	0
GH_PC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	69	17.14831976	0.248526373			0
GH_PC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.319373374	0.319373374	0.550391509	0.460675649	0
GH_PC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	45.29068535	4.117335032	7.095601655	6.68062E-08	0
GH_PC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	6.840643018	0.621876638	1.071709945	0.396539846	0
GH_PC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	69	40.03834079	0.580265809			0
GH_PC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000117552	0.000117552	0.003428837	0.953477284	0
GH_PC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.431119486	0.039192681	1.143197939	0.342983579	0
GH_PC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.152100575	0.013827325	0.403324529	0.949931976	0
GH_PC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	68	2.331269317	0.034283372			0
GH_PC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.015916478	0.015916478	0.494824428	0.484184753	0
GH_PC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	0.345615326	0.031419575	0.976797334	0.47578881	0
GH_PC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.136880026	0.012443639	0.386857973	0.956897487	0
GH_PC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	68	2.187281879	0.03216591			0
GH_PC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.024212178	0.024212178	1.814861831	0.182398327	0
GH_PC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.187826374	0.017075125	1.279892796	0.254941733	0
GH_PC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.171067148	0.015551559	1.165691514	0.327151215	0
GH_PC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	68	0.907191991	0.013341059			0
GH_PC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.050125045	0.050125045	9.915333297	0.002435018	1
GH_PC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.753298516	0.068481683	13.54649587	3.01794E-13	0
GH_PC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.045512778	0.004137525	0.818451971	0.621872386	0
GH_PC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	68	0.343760815	0.005055306			0
GH_PC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	28.71668365	28.71668365	70.96292829	3.72393E-12	1
GH_PC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.241539632	0.112867239	0.278910681	0.987878402	0
GH_PC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.464842223	0.042258384	0.104426357	0.999866543	0
GH_PC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	68	27.51767064	0.404671627			0
GH_PC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	32.01985874	32.01985874	26.51475967	2.41943E-06	1
GH_PC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	2.193939049	0.199449004	0.165158206	0.998789541	0
GH_PC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.808118808	0.073465346	0.060834622	0.999991394	0
GH_PC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	68	82.11842844	1.207623948			0
GH_PC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.013141668	0.013141668	0.428176172	0.515092334	0
GH_PC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.338542749	0.030776614	1.002750342	0.453385144	0
GH_PC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.134484801	0.012225891	0.398338706	0.95210621	0
GH_PC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	68	2.087069565	0.030692199			0
GH_PC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.213884885	0.213884885	4.375329276	0.0401999	1
GH_PC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	3.038152272	0.276195661	5.649987655	2.27298E-06	0
GH_PC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.332017488	0.030183408	0.617445915	0.807734243	0
GH_PC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	68	3.324132034	0.048884295			0
GH_PC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.307194026	0.307194026	4.893634746	0.030318369	1
GH_PC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.95298535	0.177544123	2.828297472	0.004234253	0
GH_PC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.520523733	0.047320339	0.753818229	0.683549129	0
GH_PC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	68	4.268645878	0.062774204			0
GH_PC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000249844	0.000249844	0.007346893	0.931945636	0
GH_PC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	0.372418092	0.03385619	0.995572727	0.459524916	0
GH_PC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.327987322	0.029817029	0.876797447	0.566628148	0
GH_PC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	68	2.312458822	0.034006747			0
GH_PC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.012285801	0.012285801	0.491568937	0.485620711	0
GH_PC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.227585373	0.020689579	0.827813728	0.612948965	0
GH_PC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.085345121	0.007758647	0.310432353	0.981326297	0
GH_PC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	68	1.699526536	0.024993037			0
GH_PC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.234152818	3.234152818	11.73054071	0.001046385	1
GH_PC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.70416502	0.064015002	0.232187725	0.994406129	0
GH_PC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.272205293	0.024745936	0.089755563	0.9999373	0
GH_PC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	68	18.74784778	0.275703644			0
GH_PC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.014673966	0.014673966	0.465489897	0.497386933	0
GH_PC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.342453451	0.031132132	0.987578473	0.466414396	0
GH_PC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.135880351	0.012352759	0.391856204	0.954848434	0
GH_PC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	68	2.143611901	0.031523704			0
GH_PC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.076625872	0.076625872	6.054064721	0.016419515	1
GH_PC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.822237714	0.074748883	5.905767425	1.20973E-06	0
GH_PC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.104253616	0.009477601	0.748807309	0.688307589	0
GH_PC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	68	0.86067122	0.01265693			0
GH_PC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	5.221090614	5.221090614	27.64187731	1.59499E-06	1
GH_PC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	2.19617852	0.199652593	1.057015264	0.408456375	0
GH_PC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.890441762	0.080949251	0.428567407	0.938055657	0
GH_PC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	68	12.84406836	0.188883358			0
GH_PC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.572007117	2.572007117	22.47892072	1.12732E-05	1
GH_PC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.196627764	0.017875251	0.156226767	0.999066291	0
GH_PC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.104261036	0.009478276	0.082838579	0.999958162	0
GH_PC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	68	7.78046625	0.114418621			0
GH_PC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.083398685	0.083398685	20.07313172	2.92985E-05	1
GH_PC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.432127133	0.039284285	9.455288398	4.72489E-10	0
GH_PC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.034771732	0.003161067	0.760833403	0.67687658	0
GH_PC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	68	0.28252463	0.004154742			0
GH_PC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.045573598	0.045573598	3.901277046	0.052310529	0
GH_PC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	0.566865222	0.051533202	4.411442294	5.4996E-05	0
GH_PC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.117306166	0.010664197	0.912896687	0.533123939	0
GH_PC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	68	0.794356472	0.011681713			0
GH_PC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.051637209	0.051637209	4.587215165	0.035796501	1
GH_PC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.655472918	0.059588447	5.293567061	5.56013E-06	0
GH_PC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.082534862	0.007503169	0.666547489	0.764719919	0
GH_PC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	68	0.765460106	0.011256766			0
GH_PC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.031553732	0.031553732	17.13418808	9.81904E-05	1
GH_PC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.099350999	0.009031909	4.904472968	1.50738E-05	0
GH_PC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.005871784	0.000533799	0.289861246	0.985815266	0
GH_PC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	68	0.125226465	0.001841566			0
GH_PC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.01050572	0.01050572	0.344743673	0.559048314	0
GH_PC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.3430698	0.031188164	1.023435023	0.435942323	0
GH_PC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.136327228	0.012393384	0.406687094	0.94843363	0
GH_PC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	68	2.072232315	0.030474005			0
GH_PC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.214243298	0.214243298	30.59679245	5.48643E-07	1
GH_PC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.111497013	0.010136092	1.447568771	0.172518698	0
GH_PC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.053535913	0.004866901	0.695058228	0.738706386	0
GH_PC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	68	0.476146127	0.007002149			0
GH_PC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.01421512	0.01421512	0.401957019	0.528207317	0
GH_PC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.352352356	0.032032032	0.905760935	0.539692178	0
GH_PC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.185029207	0.016820837	0.475638165	0.912098503	0
GH_PC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	68	2.40480475	0.035364776			0
GH_PC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.01050572	0.01050572	0.344743673	0.559048314	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
GH_PC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.3430698	0.031188164	1.023435023	0.435942323	0
GH_PC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.136327228	0.012393384	0.406687094	0.94843363	0
GH_PC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	68	2.072232315	0.030474005			0
GH_PC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.152879995	0.152879995	5.540016191	0.021483536	1
GH_PC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.086358944	0.007850813	0.284495244	0.986853666	0
GH_PC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.030727075	0.00279337	0.101225262	0.999885638	0
GH_PC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	68	1.876499868	0.027595586			0
GH_PC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.131250416	0.131250416	16.76355533	0.000114778	1
GH_PC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.479989381	0.043635398	5.573196933	2.75185E-06	0
GH_PC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.093904368	0.008536761	1.090331484	0.382257742	0
GH_PC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	68	0.532406646	0.007829509			0
GH_PC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.732846983	2.732846983	21.57301605	1.60963E-05	1
GH_PC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.649594074	0.059054007	0.466170643	0.917709199	0
GH_PC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.329902948	0.029991177	0.236749496	0.993916452	0
GH_PC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	68	8.614168478	0.126678948			0
GH_PC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.011955691	0.011955691	0.180620162	0.672182669	0
GH_PC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	1.183792793	0.107617527	1.625827846	0.111112392	0
GH_PC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.292710209	0.026610019	0.402009888	0.950510768	0
GH_PC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	68	4.501086525	0.066192449			0
GH_PC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.157056415	0.157056415	1.834752139	0.180405408	0
GH_PC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	0.811203932	0.073745812	0.861507545	0.581237313	0
GH_PC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.402318575	0.036574416	0.427266775	0.938234747	0
GH_PC1	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	63	5.392856021	0.085600889			0
GH_PC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.286836182	0.286836182	0.624382346	0.433392305	0
GH_PC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	4.779302963	0.434482088	0.945776587	0.506817023	0
GH_PC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	5.075394197	0.461399472	1.004370101	0.457091097	0
GH_PC1	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	47	21.59141852	0.459391883			0
GH_PC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.104438618	0.104438618	0.249223492	0.619233713	0
GH_PC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	4.358229278	0.396202662	0.945464547	0.503545467	0
GH_PC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	2.434560276	0.221323661	0.52814808	0.877625195	0
GH_PC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	68	28.49581308	0.419056075			0
GH_PC1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.000970399	0.000970399	2.307937102	0.133350903	0
GH_PC1	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.002006013	0.000182365	0.433725331	0.935451273	0
GH_PC1	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.004941997	0.000449272	1.068521968	0.399284606	0
GH_PC1	Field Measured	pH (-)_Field Measured	Residuals	68	0.028591387	0.000420462			0
GH_PC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	9.369414682	9.369414682	25.58173151	3.34676E-06	1
GH_PC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	2.125535729	0.193230521	0.527585924	0.878133738	0
GH_PC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	2.776083084	0.252371189	0.689060334	0.744310255	0
GH_PC1	Major Ions	Bromide (mg/L)_Major Ions	Residuals	69	25.27153461	0.366254125			0
GH_PC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.000131851	0.000131851	0.041370238	0.839432373	0
GH_PC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	0.049068126	0.004460739	1.399622571	0.193402978	0
GH_PC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.048430332	0.004402757	1.381430094	0.201869064	0
GH_PC1	Major Ions	Calcium (mg/L)_Major Ions	Residuals	68	0.216722878	0.003187101			0
GH_PC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.54240658	0.54240658	7.009915395	0.010036306	1
GH_PC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	0.546544876	0.049685898	0.642127056	0.786534359	0
GH_PC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.977970951	0.08890645	1.149002826	0.338564924	0
GH_PC1	Major Ions	Chloride (mg/L)_Major Ions	Residuals	69	5.339016509	0.077377051			0
GH_PC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.272447799	0.272447799	7.565580544	0.007591227	1
GH_PC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.454586998	0.041326091	1.147580819	0.3395759	0
GH_PC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.789317342	0.071756122	1.992589859	0.042301724	0
GH_PC1	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	69	2.48479254	0.036011486			0
GH_PC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.059746644	0.059746644	7.973648518	0.006221371	1
GH_PC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	0.212309956	0.019300905	2.575854021	0.008567186	0
GH_PC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.073348792	0.006668072	0.889905417	0.554386235	0
GH_PC1	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	68	0.509524816	0.007493012			0
GH_PC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.32324348	0.32324348	4.04064833	0.048385785	1
GH_PC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	0.154054841	0.014004986	0.175066861	0.998415367	0
GH_PC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.101588918	0.009235356	0.115444947	0.9997813	0
GH_PC1	Major Ions	Potassium (mg/L)_Major Ions	Residuals	68	5.439858858	0.079997924			0
GH_PC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.527110762	0.527110762	3.724617355	0.057788472	0
GH_PC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	0.179470371	0.016315488	0.115286872	0.999782762	0
GH_PC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.120081506	0.010916501	0.077137085	0.99997087	0
GH_PC1	Major Ions	Sodium (mg/L)_Major Ions	Residuals	68	9.623413198	0.141520782			0
GH_PC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.248009747	0.248009747	10.45762292	0.001875437	1
GH_PC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	0.597554215	0.05432311	2.290597899	0.018725333	0
GH_PC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.648307448	0.058937041	2.485149698	0.010904739	0
GH_PC1	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	69	1.636382634	0.02371569			0
GH_PC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.194391026	0.194391026	1.683844333	0.198735912	0
GH_PC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	0.859857754	0.078168887	0.677110664	0.755242343	0
GH_PC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	2.155771397	0.195979218	1.697601488	0.092189092	0
GH_PC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	7.965689317	0.115444773			0
GH_PC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	6.72992855	6.72992855	18.52119064	5.43404E-05	1
GH_PC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.068042169	0.188003834	0.517398486	0.8852363	0
GH_PC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	3.438394244	0.312581295	0.860243569	0.582151547	0
GH_PC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	25.07209601	0.36336371			0
GH_PC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	4.162239944	4.162239944	25.88266553	2.98773E-06	1
GH_PC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.562127666	0.142011606	0.883091544	0.560677801	0
GH_PC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	2.245632498	0.204148409	1.269485915	0.260615493	0
GH_PC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	11.09601929	0.160811874			0
GH_PC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	9.071716439	9.071716439	37.46481693	4.99786E-08	1
GH_PC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	8.129119156	0.739010832	3.052002973	0.002226124	0
GH_PC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	10.47142761	0.951947965	3.931401127	0.000193996	0
GH_PC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	16.7076336	0.242139617			0
GH_PC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.097250684	0.097250684	1.27267773	0.263831612	0
GH_PC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.196807396	0.199709763	2.613515493	0.008766328	0
GH_PC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.390325271	0.035484116	0.464365308	0.917733368	0
GH_PC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	59	4.508439328	0.076414226			0
GH_PC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	17.83090908	17.83090908	7.39361407	0.008272967	1
GH_PC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.305623352	0.209602123	0.086911845	0.99994689	0
GH_PC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.139848412	0.103622583	0.042967265	0.999998608	0
GH_PC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	69	166.4047805	2.411663486			0
GH_PC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	3.733655736	3.733655736	6.595175794	0.012394101	1
GH_PC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	27.27943742	2.479948857	4.380612415	5.75038E-05	0
GH_PC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.489886913	0.135444265	0.239250429	0.993652115	0
GH_PC1	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	69	39.06222576	0.566119214			0
GH_PC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	7.18086E-05	7.18086E-05	0.001236685	0.97204849	0
GH_PC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	0.831982762	0.075634797	1.302578883	0.241843205	0
GH_PC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.624903592	0.056809417	0.978369096	0.474268463	0
GH_PC1	Total Metals	Antimony (mg/L)_Total Metals	Residuals	69	4.006514333	0.058065425			0
GH_PC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.001751534	0.001751534	0.049287972	0.824962707	0
GH_PC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	0.398252968	0.036204815	1.018799268	0.439635419	0
GH_PC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.268446346	0.024404213	0.686731708	0.746449064	0
GH_PC1	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	69	2.452035776	0.03553675			0
GH_PC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.010709846	0.010709846	2.496563358	0.118668674	0
GH_PC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	0.629855254	0.057259569	13.34773016	3.44562E-13	0
GH_PC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.026170802	0.002379164	0.55460489	0.858373093	0
GH_PC1	Total Metals	Barium (mg/L)_Total Metals	Residuals	69	0.295998659	0.004289836			0
GH_PC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	27.12066719	27.12066719	66.58780405	1.01838E-11	1
GH_PC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	1.162855024	0.105714093	0.259553693	0.991029645	0
GH_PC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.582192393	0.052926581	0.129947571	0.999612686	0
GH_PC1	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	69	28.10313484	0.407291809			0
GH_PC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	30.72993507	30.72993507	25.23300671	3.81904E-06	1
GH_PC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	1.486932644	0.135175695	0.110995653	0.999820323	0
GH_PC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.138088892	0.103462627	0.084955375	0.999952655	0
GH_PC1	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	69	84.03142536	1.217846744			0
GH_PC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.00751524	0.00751524	0.216544969	0.643150576	0
GH_PC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.371578444	0.033779859	0.973336688	0.478674336	0
GH_PC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.382536655	0.03477606	1.002041338	0.453821027	0
GH_PC1	Total Metals	Boron (mg/L)_Total Metals	Residuals	69	2.394659799	0.034705214			0
GH_PC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.013408932	0.013408932	0.292371	0.59044643	0
GH_PC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	2.786990568	0.253362779	5.524371962	2.93859E-06	0
GH_PC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.118246519	0.010749684	0.234388218	0.994188978	0
GH_PC1	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	69	3.164528359	0.04586273			0
GH_PC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.000770183	0.000770183	0.239110706	0.626399898	0
GH_PC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	0.049696474	0.004517861	1.402614173	0.191658756	0
GH_PC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.075271358	0.006842851	2.124429843	0.029572666	0
GH_PC1	Total Metals	Calcium (mg/L)_Total Metals	Residuals	69	0.22225102	0.003221029			0
GH_PC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.004077669	0.004077669	0.064066459	0.800933083	0
GH_PC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	0.843852131	0.07671383	1.205292451	0.300251919	0
GH_PC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.924509817	0.084046347	1.320497589	0.232139576	0
GH_PC1	Total Metals	Chromium (mg/L)_Total Metals	Residuals	69	4.391676284	0.063647482			0
GH_PC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.000458518	0.000458518	0.009034618	0.924550132	0
GH_PC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	0.580049189	0.052731744	1.03902491	0.422850538	0
GH_PC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.335136503	0.030466955	0.600320079	0.822180009	0
GH_PC1	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	69	3.501831698	0.050751184			0
GH_PC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.100298695	0.100298695	0.907271096	0.344164371	0
GH_PC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	0.811331477	0.073757407	0.667186782	0.764233738	0
GH_PC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.668480615	0.060770965	0.549715428	0.86204487	0
GH_PC1	Total Metals	Copper (mg/L)_Total Metals	Residuals	69	7.627940517	0.110549863			0
GH_PC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	5.217308692	5.217308692	11.73971335	0.00103476	1
GH_PC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	6.012478315	0.546588938	1.229905652	0.284546199	0
GH_PC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.384561081	0.034960098	0.078665373	0.999967941	0
GH_PC1	Total Metals	Iron (mg/L)_Total Metals	Residuals	69	30.66465841	0.444415339			0
GH_PC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.002548369	0.002548369	0.030643023	0.861551842	0
GH_PC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	1.200018396	0.109092581	1.311790796	0.2368146	0
GH_PC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.345649943	0.031422722	0.377844553	0.960515651	0
GH_PC1	Total Metals	Lead (mg/L)_Total Metals	Residuals	69	5.738253497	0.083163094			0
GH_PC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.034653195	0.034653195	2.783620445	0.099764769	0
GH_PC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	0.723156028	0.065741457	5.280877069	5.4499E-06	0
GH_PC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.120757414	0.010977947	0.881836058	0.561852006	0
GH_PC1	Total Metals	Lithium (mg/L)_Total Metals	Residuals	69	0.858978627	0.012448966			0
GH_PC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.030253684	0.030253684	4.028679768	0.048651989	1
GH_PC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	0.157554524	0.014323139	1.907316119	0.053173872	0
GH_PC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.115306493	0.010482408	1.395871902	0.19474334	0
GH_PC1	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	69	0.518160858	0.007509578			0
GH_PC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	6.208791111	6.208791111	31.30306734	4.13205E-07	1
GH_PC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	4.872476616	0.44295242	2.233247853	0.021937617	0
GH_PC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.53476372	0.048614884	0.245103265	0.992960544	0
GH_PC1	Total Metals	Manganese (mg/L)_Total Metals	Residuals	69	13.68577022	0.198344496			0
GH_PC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	79.13623431	79.13623431	56.41272356	1.56581E-10	1
GH_PC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	1.180689844	0.10733544	0.076514691	0.99997216	0
GH_PC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.963550365	0.087595488	0.062442951	0.999990192	0
GH_PC1	Total Metals	Mercury (mg/L)_Total Metals	Residuals	69	96.79376962	1.402808255			0
GH_PC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.087850851	0.087850851	17.08269042	9.90479E-05	1
GH_PC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	0.491471269	0.044679206	8.687918625	2.01862E-09	0
GH_PC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.034444303	0.0031313	0.60888463	0.815057068	0
GH_PC1	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	69	0.354845086	0.005142682			0
GH_PC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.037771273	0.037771273	2.476980144	0.120098311	0
GH_PC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	1.217647995	0.110695272	7.2592203	4.59376E-08	0
GH_PC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.124865553	0.011351414	0.744407712	0.692527789	0
GH_PC1	Total Metals	Nickel (mg/L)_Total Metals	Residuals	69	1.052175505	0.01524892			0
GH_PC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.561804137	0.561804137	7.2776053	0.008768928	1
GH_PC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	0.237991245	0.021635568	0.280266933	0.987663291	0
GH_PC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.074111986	0.006737453	0.087276904	0.999945756	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
GH_PC1	Total Metals	Potassium (mg/L)_Total Metals	Residuals	69	5.326544085	0.077196291			0
GH_PC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.009287551	0.009287551	0.794794602	0.375752635	0
GH_PC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	0.534407118	0.048582465	4.15750956	0.000104865	0
GH_PC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.144486774	0.013135161	1.124059026	0.356604535	0
GH_PC1	Total Metals	Selenium (mg/L)_Total Metals	Residuals	69	0.806297629	0.011685473			0
GH_PC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.038968484	0.038968484	14.42975151	0.000312906	1
GH_PC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.072292315	0.006572029	2.433575326	0.012725171	0
GH_PC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.015279516	0.001389047	0.514354168	0.887211018	0
GH_PC1	Total Metals	Silicon (mg/L)_Total Metals	Residuals	68	0.183638428	0.002700565			0
GH_PC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.002158392	0.002158392	0.055047142	0.815197534	0
GH_PC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	0.44630463	0.040573148	1.034768303	0.426351738	0
GH_PC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.339740388	0.03088549	0.787696478	0.651265071	0
GH_PC1	Total Metals	Silver (mg/L)_Total Metals	Residuals	69	2.705482199	0.039209887			0
GH_PC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.798487197	0.798487197	5.774638214	0.018952255	1
GH_PC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	0.173988988	0.015817181	0.114389431	0.999791685	0
GH_PC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.062731992	0.005702908	0.041243282	0.999998878	0
GH_PC1	Total Metals	Sodium (mg/L)_Total Metals	Residuals	69	9.540964226	0.138274844			0
GH_PC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.122531824	0.122531824	17.00620759	0.000102295	1
GH_PC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	0.120147518	0.010922502	1.515935407	0.145731291	0
GH_PC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.082996605	0.007545146	1.047191768	0.416180579	0
GH_PC1	Total Metals	Strontium (mg/L)_Total Metals	Residuals	69	0.497153513	0.007205123			0
GH_PC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.020335162	0.020335162	0.374564319	0.542538298	0
GH_PC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	0.630679733	0.057334521	1.056075476	0.408997048	0
GH_PC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.318457224	0.028950657	0.533257765	0.874094852	0
GH_PC1	Total Metals	Thallium (mg/L)_Total Metals	Residuals	69	3.746021993	0.054290174			0
GH_PC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.00751524	0.00751524	0.216544969	0.643150576	0
GH_PC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.371578444	0.033779859	0.973336688	0.478674336	0
GH_PC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.382536655	0.03477606	1.002041338	0.453821027	0
GH_PC1	Total Metals	Tin (mg/L)_Total Metals	Residuals	69	2.394659799	0.034705214			0
GH_PC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.253023711	0.253023711	7.804139681	0.006741477	1
GH_PC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.085323029	0.007756639	0.239241983	0.993653077	0
GH_PC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.032379378	0.00294358	0.090790336	0.999933841	0
GH_PC1	Total Metals	Titanium (mg/L)_Total Metals	Residuals	69	2.237099383	0.03242173			0
GH_PC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.139110945	0.139110945	19.85496562	3.14733E-05	1
GH_PC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	0.372485776	0.033862343	4.833089595	1.73487E-05	0
GH_PC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.05268042	0.004789129	0.683540709	0.749373425	0
GH_PC1	Total Metals	Uranium (mg/L)_Total Metals	Residuals	69	0.483438521	0.007006355			0
GH_PC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	2.441350213	2.441350213	18.86857921	4.70907E-05	1
GH_PC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	0.523699893	0.047609081	0.367958564	0.96419614	0
GH_PC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.58763656	0.053421505	0.412881323	0.945686465	0
GH_PC1	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	69	8.927707953	0.129387072			0
GH_PC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.011142953	0.011142953	0.177454881	0.674879027	0
GH_PC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	1.165720934	0.10597463	1.687677821	0.094572152	0
GH_PC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.295265258	0.026842296	0.42747163	0.938687056	0
GH_PC1	Total Metals	Zinc (mg/L)_Total Metals	Residuals	69	4.332728324	0.062793164			0
GH_PC1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	as.factor(new_year)	1	0.009673124	0.009673124	-	-	-
GH_PC1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	as.factor(Month)	3	0.02013552	0.00671184	-	-	0
GH_PC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	1	0.037315054	0.037315054	0.444444444	0.534509229	0
GH_PC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(Month)	8	0.326506719	0.04081334	0.486111111	0.825985864	0
GH_PC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Residuals	5	0.419794353	0.083958871			0
GH_PC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	1	0.091591495	0.091591495	2.41627E+30	4.13861E-31	1
GH_PC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(Month)	7	0.671670964	0.095952995	2.53133E+30	3.95049E-31	0
GH_PC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Residuals	2	7.58123E-32	3.79062E-32			0
GH_PC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	1	0.091591495	0.091591495	5.15764E+30	1.93887E-31	1
GH_PC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(Month)	7	0.671670964	0.095952995	5.40325E+30	1.85074E-31	0
GH_PC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Residuals	2	3.55168E-32	1.77584E-32			0
GH_PC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	1	7.88861E-31	7.88861E-31	1.66724E+31	5.99794E-32	1
GH_PC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(Month)	8	7.88861E-30	9.86076E-31	2.08405E+31	4.79835E-32	0
GH_PC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Residuals	2	9.46308E-62	4.73154E-62			0
GH_PC2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.105660292	0.105660292	0.392146761	0.535123854	0
GH_PC2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	6.995646879	0.635967898	2.360326157	0.02583107	0
GH_PC2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	3.208749635	0.356527737	1.323214185	0.259526782	0
GH_PC2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	36	9.699864684	0.269440686			0
GH_PC2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.011446017	0.011446017	3.976247298	0.05376317	0
GH_PC2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.71770597	0.065245997	22.66589418	5.92645E-13	0
GH_PC2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.067972961	0.007552551	2.623690871	0.0191406	0
GH_PC2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	36	0.103629527	0.002878598			0
GH_PC2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	2.410823028	2.410823028	3.751101872	0.060651874	0
GH_PC2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	9.583087695	0.87118979	1.355521171	0.235848693	0
GH_PC2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	10.00976676	1.112196307	1.730513439	0.117645487	0
GH_PC2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	36	23.13710264	0.642697296			0
GH_PC2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.124765373	0.124765373	14.75020597	0.000527724	1
GH_PC2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	1.844066464	0.167642406	19.81928118	1.8153E-11	0
GH_PC2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.026075721	0.002897302	0.342529375	0.95357467	0
GH_PC2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	33	0.279132192	0.008458551			0
GH_PC2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.044558412	0.044558412	0.899176147	0.349325087	0
GH_PC2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	6.821238218	0.620112565	12.51369599	2.99637E-09	0
GH_PC2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.750176572	0.083352952	1.682038979	0.129594534	0
GH_PC2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	36	1.78396953	0.049554709			0
GH_PC2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.101896752	0.101896752	10.1160505	0.003074355	1
GH_PC2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.036677214	0.185152474	18.38146686	2.08684E-11	0
GH_PC2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.006002489	0.000666943	0.06621243	0.999907659	0
GH_PC2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	35	0.352547304	0.01007278			0
GH_PC2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.00584925	0.00584925	0.378696495	0.542172704	0
GH_PC2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.132750204	0.0120682	0.7813284	0.656207869	0
GH_PC2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.021757253	0.002417473	0.156513808	0.997052611	0
GH_PC2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	36	0.556046874	0.015445746			0
GH_PC2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.07920186	0.07920186	2.561347285	0.118245629	0
GH_PC2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.156612201	0.014237473	0.460432529	0.915301369	0
GH_PC2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.328692935	0.036521437	1.181084443	0.336199589	0
GH_PC2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	36	1.113190296	0.030921953			0
GH_PC2	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000119867	0.000119867	2.262485636	0.141264609	0
GH_PC2	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.00219146	0.000199224	3.760345743	0.001241572	0
GH_PC2	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.001784973	0.00019833	3.743484138	0.002112101	0
GH_PC2	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	36	0.001907285	5.29801E-05			0
GH_PC2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.025568536	0.025568536	10.95353981	0.0021299	1
GH_PC2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.679337972	0.061757997	26.45707532	5.49388E-14	0
GH_PC2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.04092268	0.004546964	1.947915849	0.075874061	0
GH_PC2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	36	0.084033775	0.002334272			0
GH_PC2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.112377511	0.112377511	10.13380563	0.00299848	1
GH_PC2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	2.729571671	0.248142879	22.37664536	7.20224E-13	0
GH_PC2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.017010125	0.001890014	0.170434751	0.995928311	0
GH_PC2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	36	0.399217287	0.011089369			0
GH_PC2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.034501807	0.034501807	0.2356458	0.630310114	0
GH_PC2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	10.76434911	0.978577192	6.683638534	6.01829E-06	0
GH_PC2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	0.532666584	0.059185176	0.40423211	0.924550193	0
GH_PC2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	36	5.270898289	0.146413841			0
GH_PC2	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	2.866597743	2.866597743	5.873859331	0.020520621	1
GH_PC2	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	39.57008133	3.597280121	7.371078642	2.05804E-06	0
GH_PC2	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	4.916758818	0.546306535	1.119420312	0.37458085	0
GH_PC2	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	36	17.56894623	0.488026284			0
GH_PC2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.883876158	0.883876158	1.25970121	0.26913777	0
GH_PC2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	98.25106951	8.93191541	12.72977503	2.38089E-09	0
GH_PC2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	9	12.04404437	1.338227153	1.907242715	0.08240045	0
GH_PC2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	36	25.25959445	0.701655401			0
GH_PC2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.002775661	0.002775661	0.180559218	0.673494149	0
GH_PC2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.299650467	0.027240952	1.772047838	0.097693125	0
GH_PC2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.083673575	0.009297064	0.60478218	0.784271879	0
GH_PC2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	35	0.538040387	0.015372582			0
GH_PC2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.046455944	0.046455944	0.932347301	0.340878548	0
GH_PC2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	3.593684934	0.32669863	6.556676231	8.58957E-06	0
GH_PC2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.36212782	0.040236424	0.807524684	0.612368573	0
GH_PC2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	35	1.743940323	0.049826866			0
GH_PC2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.15934773	0.15934773	23.14723347	2.83438E-05	1
GH_PC2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.165727429	0.01506613	2.188542169	0.038832968	0
GH_PC2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.49693983	0.055215537	8.020741293	2.51364E-06	0
GH_PC2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	35	0.240943289	0.006884094			0
GH_PC2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.284890219	0.284890219	19.48559465	9.274E-05	1
GH_PC2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.605766711	0.236887883	16.20238586	1.23956E-10	0
GH_PC2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.0625564	0.006950711	0.475406773	0.881146024	0
GH_PC2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	35	0.511719445	0.014620556			0
GH_PC2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	21.22917527	21.22917527	3093.002282	9.61905E-36	1
GH_PC2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.061718273	0.005610752	0.817463169	0.623349004	0
GH_PC2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.134830688	0.014981188	2.182696531	0.047836075	0
GH_PC2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	35	0.240226507	0.006863614			0
GH_PC2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	29.84529385	29.84529385	32.99539445	1.67847E-06	1
GH_PC2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	3.196773891	0.290615808	0.321289624	0.975804068	0
GH_PC2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.479529372	0.053281041	0.05890473	0.999943611	0
GH_PC2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	35	31.65851787	0.904529082			0
GH_PC2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.091667352	0.091667352	4.159589945	0.049004818	1
GH_PC2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.620565776	0.056415071	2.559946963	0.017031225	0
GH_PC2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.377517356	0.041946373	1.903400794	0.084060818	0
GH_PC2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	35	0.771315772	0.022037593			0
GH_PC2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000159972	0.000159972	0.00282176	0.957938149	0
GH_PC2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.815746417	0.165067856	2.911639486	0.00788889	0
GH_PC2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.703883772	0.078209308	1.37953757	0.23457343	0
GH_PC2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	35	1.984234309	0.056692409			0
GH_PC2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.22607617	0.22607617	2.628816785	0.113915493	0
GH_PC2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.971328689	0.088302608	1.026783932	0.44466188	0
GH_PC2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.738846896	0.0820941	0.95459131	0.492557693	0
GH_PC2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	35	3.009972387	0.085999211			0
GH_PC2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.330342638	0.330342638	39.65707944	3.13903E-07	1
GH_PC2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	0.417043093	0.037913008	4.551393059	0.000280233	0
GH_PC2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	1.29819002	0.143757667	17.25786673	2.02743E-10	0
GH_PC2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	35	0.291549264	0.008329979			0
GH_PC2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	9.24339E-30	9.24339E-30	0.195779303	0.660871886	0
GH_PC2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	3.48346E-28	3.16678E-29	0.670739011	0.755691466	0
GH_PC2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	1.54579E-28	1.71754E-29	0.363782755	0.944632271	0
GH_PC2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	35	1.65247E-27	4.72133E-29			0
GH_PC2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.310548544	2.310548544	5.9387346	0.020036319	1
GH_PC2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.617110447	0.05610095	0.144194612	0.999211608	0
GH_PC2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.056095893	0.006232877	0.016020179	0.999999804	0
GH_PC2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	35	13.61724416	0.389064119			0
GH_PC2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.035248546	0.035248546	5.135566188	0.029729992	1
GH_PC2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.061718273	0.005610752	0.817463169	0.623349004	0
GH_PC2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.134830688	0.014981188	2.182696531	0.047836075	0
GH_PC2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	35	0.240226507	0.006863614			0
GH_PC2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.374871056	0.374871056	10.53184779	0.002584852	1
GH_PC2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.301167856	0.118287987	3.323252232	0.003273623	0
GH_PC2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	1.946054102	0.216228234	6.074843088	4.15079E-05	0
GH_PC2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	35	1.245791548	0.035594044			0
GH_PC2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	5.446352567	5.446352567	21.68851643	4.49949E-05	1
GH_PC2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	14.25706327	1.296096661	5.161328317	9.09065E-05	0
GH_PC2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	2.908834385	0.323203821	1.287065295	0.278497897	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
GH_PC2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	35	8.789090782	0.251116879			0
GH_PC2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.910570432	2.910570432	35.83588487	8.0483E-07	1
GH_PC2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.268094681	0.024372244	0.30007895	0.981376796	0
GH_PC2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.064392731	0.007154748	0.088091571	0.999697552	0
GH_PC2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	35	2.842680332	0.081219438			0
GH_PC2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.035170941	0.035170941	1.248244631	0.271498958	0
GH_PC2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	2.609188882	0.237198989	8.418380522	5.48423E-07	0
GH_PC2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	1.512794334	0.168088259	5.965585827	4.92159E-05	0
GH_PC2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	35	0.986171224	0.028176321			0
GH_PC2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.196129871	0.196129871	0.781873385	0.382602918	0
GH_PC2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	16.31226301	1.482933001	5.911724931	2.46725E-05	0
GH_PC2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	2.045521421	0.227280158	0.906054268	0.530814596	0
GH_PC2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	35	8.779612659	0.250846076			0
GH_PC2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.408667579	0.408667579	17.9738282	0.000155273	1
GH_PC2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	3.614959533	0.328632685	14.45377055	5.96931E-10	0
GH_PC2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.181041963	0.020115774	0.88472264	0.548075987	0
GH_PC2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	35	0.795788471	0.022736813			0
GH_PC2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.04929418	0.04929418	22.37935737	3.60924E-05	1
GH_PC2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.554461516	0.050405592	22.88393399	8.55436E-13	0
GH_PC2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.035785185	0.003976132	1.805147632	0.10235122	0
GH_PC2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	35	0.077093201	0.002202663			0
GH_PC2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.035248546	0.035248546	5.135566188	0.029729992	1
GH_PC2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.061718273	0.005610752	0.817463169	0.623349004	0
GH_PC2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.134830688	0.014981188	2.182696531	0.047836075	0
GH_PC2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	35	0.240226507	0.006863614			0
GH_PC2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.052712753	0.052712753	6.404691241	0.016031867	1
GH_PC2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.206116537	0.200556049	24.36790922	3.34995E-13	0
GH_PC2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.054774887	0.006086099	0.739471572	0.670534041	0
GH_PC2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	35	0.288061714	0.008230335			0
GH_PC2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.02551814	0.02551814	2.701961808	0.109179356	0
GH_PC2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.082460664	0.007496424	0.793751088	0.644857872	0
GH_PC2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.154533402	0.017170378	1.818067671	0.099742577	0
GH_PC2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	35	0.330550528	0.009444301			0
GH_PC2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.035248546	0.035248546	5.135566188	0.029729992	1
GH_PC2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.061718273	0.005610752	0.817463169	0.623349004	0
GH_PC2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.134830688	0.014981188	2.182696531	0.047836075	0
GH_PC2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	35	0.240226507	0.006863614			0
GH_PC2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.156756692	0.156756692	3.877172953	0.056904487	0
GH_PC2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.281977622	0.025634329	0.634031802	0.787414087	0
GH_PC2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.084703	0.009411444	0.232779839	0.98723811	0
GH_PC2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	35	1.41507338	0.040430668			0
GH_PC2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.542355147	0.542355147	57.79111986	6.49534E-09	1
GH_PC2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.468056092	0.133459645	14.22090741	7.43998E-10	0
GH_PC2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.123276124	0.013697347	1.459532619	0.201571298	0
GH_PC2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	35	0.32846621	0.009384749			0
GH_PC2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.279026477	2.279026477	25.76185987	1.27651E-05	1
GH_PC2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.411832661	0.037439333	0.423210022	0.935385304	0
GH_PC2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	0.08908004	0.009897782	0.111883421	0.99920231	0
GH_PC2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	35	3.096279814	0.088465138			0
GH_PC2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.824207532	3.824207532	189.1093714	1.12117E-15	1
GH_PC2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	0.566836788	0.051530617	2.548220127	0.017477898	0
GH_PC2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	9	2.132202172	0.236911352	11.71540942	3.15536E-08	0
GH_PC2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	35	0.707777001	0.0202222			0
GH_PC2	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.799625994	0.799625994	1.599209845	0.215751574	0
GH_PC2	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	3.879847257	0.352713387	0.705408185	0.723668441	0
GH_PC2	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	9	1.156105723	0.128456191	0.256905613	0.981456199	0
GH_PC2	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	30	15.00039528	0.500013176			0
GH_PC2	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.002845277	0.002845277	0.456253972	0.509659652	0
GH_PC2	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.064839999	0.005894545	0.945219051	0.527580433	0
GH_PC2	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	9	0.06933614	0.007704016	1.235376416	0.344579533	0
GH_PC2	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	15	0.093542528	0.006236169			0
GH_PC2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.016339191	0.016339191	1.891828813	0.177266534	0
GH_PC2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.205675481	0.018697771	2.164916339	0.039289186	0
GH_PC2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	9	0.147739693	0.016415521	1.900666695	0.082540884	0
GH_PC2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	37	0.319558551	0.008636718			0
GH_PC2	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.012420206	0.012420206	24.91615413	1.44766E-05	1
GH_PC2	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.00785603	0.000714185	1.432724333	0.19974132	0
GH_PC2	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	9	0.005710477	0.000634497	1.272864138	0.283912169	0
GH_PC2	Field Measured	pH (-)_Field Measured	Residuals	37	0.018443763	0.00049848			0
GH_PC2	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	9.748535998	9.748535998	26.61691221	9.23002E-06	1
GH_PC2	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	19.41578865	1.765071695	4.819262951	0.000153842	0
GH_PC2	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	3.674011238	0.408223471	1.114592826	0.377717828	0
GH_PC2	Major Ions	Bromide (mg/L)_Major Ions	Residuals	36	13.1851243	0.366253453			0
GH_PC2	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.031252882	0.031252882	3.536426821	0.068376819	0
GH_PC2	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	2.057743834	0.187067621	21.16767816	2.70275E-12	0
GH_PC2	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	0.043385895	0.004820655	0.545482279	0.831017542	0
GH_PC2	Major Ions	Calcium (mg/L)_Major Ions	Residuals	35	0.309309632	0.008837418			0
GH_PC2	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.187843059	0.187843059	6.323763883	0.016520439	1
GH_PC2	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	3.815427547	0.34685705	11.67699301	7.50716E-09	0
GH_PC2	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	0.830563882	0.092284876	3.106783759	0.00726363	0
GH_PC2	Major Ions	Chloride (mg/L)_Major Ions	Residuals	36	1.069355251	0.029704313			0
GH_PC2	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.355941366	0.355941366	7.43223181	0.009833185	1
GH_PC2	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.859201488	0.078109226	1.630959284	0.13151534	0
GH_PC2	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	1.29315519	0.14368391	3.000191121	0.008976622	0
GH_PC2	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	36	1.724097083	0.047891586			0
GH_PC2	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.26823977	0.26823977	31.65220667	2.40312E-06	1
GH_PC2	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	2.515253204	0.228659382	26.98173361	7.19087E-14	0
GH_PC2	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	0.060581317	0.006731257	0.794286217	0.623613847	0
GH_PC2	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	35	0.296610977	0.008474599			0
GH_PC2	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.010624705	0.010624705	0.636414342	0.43039167	0
GH_PC2	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	0.311222384	0.028292944	1.694732744	0.115653725	0
GH_PC2	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	0.219118208	0.024346468	1.458340844	0.202030939	0
GH_PC2	Major Ions	Potassium (mg/L)_Major Ions	Residuals	35	0.584312213	0.016694635			0
GH_PC2	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.00469822	0.00469822	0.312378555	0.579783055	0
GH_PC2	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	1.191156495	0.108286954	7.199859643	3.16934E-06	0
GH_PC2	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	0.592954622	0.065883847	4.380531846	0.000695448	0
GH_PC2	Major Ions	Sodium (mg/L)_Major Ions	Residuals	35	0.526405177	0.015040148			0
GH_PC2	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.385816403	0.385816403	20.04225253	7.33839E-05	1
GH_PC2	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	4.953684993	0.450334999	23.39384148	3.66141E-13	0
GH_PC2	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	9	0.036826213	0.004091801	0.212559437	0.99081654	0
GH_PC2	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	36	0.693005464	0.019250152			0
GH_PC2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.552559578	0.552559578	15.47798381	0.000365142	1
GH_PC2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	3.487341951	0.317031086	8.880494014	2.36345E-07	0
GH_PC2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	9	3.435040933	0.381671215	10.69115643	7.627E-08	0
GH_PC2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	36	1.285189663	0.035699713			0
GH_PC2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	5.690573899	5.690573899	26.26063761	1.02639E-05	1
GH_PC2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	5.270648894	0.479149899	2.211162195	0.036124737	0
GH_PC2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	9	2.402686585	0.266965176	1.231980442	0.306876965	0
GH_PC2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	36	7.801054315	0.216695953			0
GH_PC2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	8.369741799	8.369741799	31.91065269	2.04759E-06	1
GH_PC2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.117288686	0.19248079	0.733856286	0.699447524	0
GH_PC2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	9	7.158467864	0.795385318	3.032502705	0.008417406	0
GH_PC2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	36	9.442323466	0.262286763			0
GH_PC2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	3.668955884	3.668955884	24.28402677	1.87245E-05	1
GH_PC2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	4.088351528	0.371668321	2.459992362	0.020654761	0
GH_PC2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	9	5.611104953	0.623456106	4.126521344	0.001031769	0
GH_PC2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	36	5.439065483	0.151085152			0
GH_PC2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.942181391	0.942181391	11.31114759	0.002396892	1
GH_PC2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.451254131	0.131932194	1.583882392	0.162299283	0
GH_PC2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	9	1.524321914	0.169369102	2.033322802	0.076200714	0
GH_PC2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	26	2.165714484	0.083296711			0
GH_PC2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	15.7967183	15.7967183	3.234267772	0.080502227	0
GH_PC2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	18.01406891	1.637642628	0.335295893	0.971783573	0
GH_PC2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	9	1.62594093	0.180660103	0.036988895	0.999992401	0
GH_PC2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	36	175.8301721	4.884171446			0
GH_PC2	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	0.02108193	0.02108193	0.027615655	0.868945441	0
GH_PC2	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	71.79033798	6.526394362	8.5490586	3.72331E-07	0
GH_PC2	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	11.75919718	1.306577465	1.711512773	0.12219901	0
GH_PC2	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	36	27.48258119	0.763405033			0
GH_PC2	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.220696818	0.220696818	2.55051264	0.119000452	0
GH_PC2	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	3.902406832	0.354764257	4.099881141	0.000622491	0
GH_PC2	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.490517357	0.054501929	0.629858912	0.76387073	0
GH_PC2	Total Metals	Antimony (mg/L)_Total Metals	Residuals	36	3.115093543	0.086530376			0
GH_PC2	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.169227609	0.169227609	2.459465673	0.125567527	0
GH_PC2	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	1.872611612	0.170237419	2.474141725	0.020010254	0
GH_PC2	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	1.268132396	0.1409036	2.047819312	0.061917916	0
GH_PC2	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	36	2.477039627	0.068806656			0
GH_PC2	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.452596321	0.452596321	30.84737955	2.7425E-06	1
GH_PC2	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	2.736170296	0.248742754	16.95343463	4.3765E-11	0
GH_PC2	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.065428319	0.007269813	0.495484998	0.867747891	0
GH_PC2	Total Metals	Barium (mg/L)_Total Metals	Residuals	36	0.528196165	0.014672116			0
GH_PC2	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	21.31670185	21.31670185	3194.490385	9.3259E-37	1
GH_PC2	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	0.061569037	0.005597185	0.838786147	0.604017406	0
GH_PC2	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.134979923	0.014997769	2.247544204	0.041186606	0
GH_PC2	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	36	0.240226507	0.006672959			0
GH_PC2	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	30.2513743	30.2513743	33.9264127	1.1921E-06	1
GH_PC2	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	2.981302232	0.271027476	0.303952802	0.980565693	0
GH_PC2	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.414497663	0.046055296	0.051650248	0.999968051	0
GH_PC2	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	36	32.10034271	0.891676187			0
GH_PC2	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.150692045	0.150692045	9.865811905	0.003358989	1
GH_PC2	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.7417582	0.067432564	4.414811594	0.000333955	0
GH_PC2	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.396710192	0.04407891	2.885847334	0.011281325	0
GH_PC2	Total Metals	Boron (mg/L)_Total Metals	Residuals	36	0.549869964	0.015274166			0
GH_PC2	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.011036917	0.011036917	0.035157707	0.852318413	0
GH_PC2	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	5.242139677	0.476558152	1.5180591	0.167754668	0
GH_PC2	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	1.71399077	0.190443419	0.606650759	0.78298494	0
GH_PC2	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	36	11.30133438	0.313925955			0
GH_PC2	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.002726166	0.002726166	0.276356335	0.602322835	0
GH_PC2	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	2.107660794	0.191605527	19.42339842	6.00474E-12	0
GH_PC2	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.068249346	0.007583261	0.768728837	0.645427238	0
GH_PC2	Total Metals	Calcium (mg/L)_Total Metals	Residuals	36	0.355128326	0.009864676			0
GH_PC2	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.027053871	0.027053871	0.148225238	0.702502502	0
GH_PC2	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	3.465350011	0.315031819	1.726025334	0.106812866	0
GH_PC2	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	2.04079581	0.22675509	1.242366663	0.301152441	0
GH_PC2	Total Metals	Chromium (mg/L)_Total Metals	Residuals	36	6.570671513	0.182518653			0
GH_PC2	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.400063381	0.400063381	5.650241891	0.022889384	1
GH_PC2	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	2.708498003	0.246227091	3.477555539	0.002239646	0
GH_PC2	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	1.805078295	0.200564255	2.832642552	0.012552741	0
GH_PC2	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	36	2.548967279	0.070804647			0
GH_PC2	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.770815996	0.770815996	9.032049943	0.004809417	1
GH_PC2	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	2.195618547	0.199601686	2.338836256	0.027108864	0
GH_PC2	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	9.175626864	1.019514096	11.94617429	1.91621E-08	0
GH_PC2	Total Metals	Copper (mg/L)_Total Metals	Residuals	36	3.072323119	0.085342309			0
GH_PC2	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	1.149377569	1.149377569	1.779502406	0.190588575	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
GH_PC2	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	28.73985499	2.61271409	4.045085912	0.000694931	0
GH_PC2	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	6.515808342	0.723978705	1.120886541	0.373631861	0
GH_PC2	Total Metals	Iron (mg/L)_Total Metals	Residuals	36	23.25233859	0.645898294			0
GH_PC2	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	1.116300619	1.116300619	4.980031732	0.031958024	1
GH_PC2	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	4.467426328	0.406129666	1.811822541	0.088364677	0
GH_PC2	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	7.284563661	0.809395962	3.610871038	0.002719664	0
GH_PC2	Total Metals	Lead (mg/L)_Total Metals	Residuals	36	8.069591613	0.224155323			0
GH_PC2	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.430432069	0.430432069	11.70115433	0.001569413	1
GH_PC2	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	1.647455194	0.149768654	4.071411634	0.00065909	0
GH_PC2	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	2.012327396	0.223591933	6.078273204	3.68411E-05	0
GH_PC2	Total Metals	Lithium (mg/L)_Total Metals	Residuals	36	1.324275713	0.036785436			0
GH_PC2	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.109088142	0.109088142	11.03292513	0.002061345	1
GH_PC2	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	2.440385132	0.221853194	22.43772447	6.91053E-13	0
GH_PC2	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.038810206	0.004312245	0.436130608	0.90632377	0
GH_PC2	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	36	0.35595031	0.009887509			0
GH_PC2	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	1.01607576	1.01607576	1.764646106	0.192406196	0
GH_PC2	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	45.23198945	4.111999041	7.141419353	2.92607E-06	0
GH_PC2	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	5.145227777	0.571691975	0.992872833	0.462994257	0
GH_PC2	Total Metals	Manganese (mg/L)_Total Metals	Residuals	36	20.72864765	0.575795768			0
GH_PC2	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	66.30294676	66.30294676	828.0053804	1.93049E-26	1
GH_PC2	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	0.491506979	0.044682453	0.558004025	0.849188013	0
GH_PC2	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	1.767640094	0.196404455	2.452740841	0.027094467	0
GH_PC2	Total Metals	Mercury (mg/L)_Total Metals	Residuals	36	2.882718084	0.080075502			0
GH_PC2	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.006713219	0.006713219	0.254472224	0.617017342	0
GH_PC2	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	2.493882944	0.226716631	8.593952172	3.49875E-07	0
GH_PC2	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	1.463487678	0.162609742	6.163907506	3.21984E-05	0
GH_PC2	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	36	0.949714236	0.026380951			0
GH_PC2	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.304748419	0.304748419	1.148134693	0.291071076	0
GH_PC2	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	20.53869004	1.86715364	7.034470854	3.45476E-06	0
GH_PC2	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	2.934231655	0.326025739	1.228296651	0.308928327	0
GH_PC2	Total Metals	Nickel (mg/L)_Total Metals	Residuals	36	9.555449505	0.265429153			0
GH_PC2	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.07250676	0.07250676	4.414711261	0.042695348	1
GH_PC2	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	0.256055532	0.023277776	1.417311403	0.20752785	0
GH_PC2	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.244606194	0.027178466	1.654812316	0.136799927	0
GH_PC2	Total Metals	Potassium (mg/L)_Total Metals	Residuals	36	0.591260271	0.016423896			0
GH_PC2	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.140435689	0.140435689	6.324228836	0.01651677	1
GH_PC2	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	4.000216004	0.363656	16.3764908	7.19384E-11	0
GH_PC2	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.109117624	0.01212418	0.54598722	0.830908106	0
GH_PC2	Total Metals	Selenium (mg/L)_Total Metals	Residuals	36	0.799415221	0.022205978			0
GH_PC2	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.031137798	0.031137798	5.828811639	0.02097553	1
GH_PC2	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.344772001	0.031342909	5.867207269	2.33516E-05	0
GH_PC2	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.038887591	0.004320843	0.808836344	0.611163654	0
GH_PC2	Total Metals	Silicon (mg/L)_Total Metals	Residuals	36	0.192313767	0.005342049			0
GH_PC2	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.026037314	0.026037314	2.645439966	0.112570493	0
GH_PC2	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	0.079870736	0.007260976	0.737728796	0.695932025	0
GH_PC2	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.150931663	0.016770185	1.703882264	0.124074344	0
GH_PC2	Total Metals	Silver (mg/L)_Total Metals	Residuals	36	0.354324161	0.009842338			0
GH_PC2	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.004166964	0.004166964	0.235467524	0.630439099	0
GH_PC2	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	1.268075906	0.115279628	6.514240816	7.9135E-06	0
GH_PC2	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.632456619	0.070272958	3.970996247	0.001376652	0
GH_PC2	Total Metals	Sodium (mg/L)_Total Metals	Residuals	36	0.637076018	0.017696556			0
GH_PC2	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.004086459	0.004086459	0.552595015	0.462083383	0
GH_PC2	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	2.47011999	0.224556363	30.36583412	6.31676E-15	0
GH_PC2	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.101645366	0.01129393	1.527231689	0.175824476	0
GH_PC2	Total Metals	Strontium (mg/L)_Total Metals	Residuals	36	0.266221208	0.007395034			0
GH_PC2	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.036646608	0.036646608	1.366017003	0.250178743	0
GH_PC2	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	0.433368782	0.039397162	1.468544997	0.186356337	0
GH_PC2	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.197039958	0.021893329	0.816082597	0.605017393	0
GH_PC2	Total Metals	Thallium (mg/L)_Total Metals	Residuals	36	0.965784388	0.026827344			0
GH_PC2	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.035393874	0.035393874	5.304075235	0.027162231	1
GH_PC2	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.061569037	0.005597185	0.838786147	0.604017406	0
GH_PC2	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.134979923	0.014997769	2.247544204	0.041186606	0
GH_PC2	Total Metals	Tin (mg/L)_Total Metals	Residuals	36	0.240226507	0.006672959			0
GH_PC2	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.224599641	0.224599641	4.34672024	0.044233435	1
GH_PC2	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.249461554	0.022678323	0.438897968	0.9274487	0
GH_PC2	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.067528292	0.007503144	0.145209787	0.997790486	0
GH_PC2	Total Metals	Titanium (mg/L)_Total Metals	Residuals	36	1.860158147	0.05167106			0
GH_PC2	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.453859986	0.453859986	46.57242615	5.58592E-08	1
GH_PC2	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	1.628327148	0.148029741	15.18993606	2.09054E-10	0
GH_PC2	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.105496719	0.011721858	1.202827672	0.323413288	0
GH_PC2	Total Metals	Uranium (mg/L)_Total Metals	Residuals	36	0.350829039	0.009745251			0
GH_PC2	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	1.480892371	1.480892371	17.16223553	0.000198352	1
GH_PC2	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	0.794152664	0.072195697	0.836684404	0.605913458	0
GH_PC2	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.753371989	0.083707999	0.970101824	0.480206537	0
GH_PC2	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	36	3.106362529	0.086287848			0
GH_PC2	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.283425361	0.283425361	1.299760011	0.261785603	0
GH_PC2	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	3.709160012	0.337196365	1.546348392	0.15789954	0
GH_PC2	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	9	0.880668338	0.097852038	0.448739538	0.898612832	0
GH_PC2	Total Metals	Zinc (mg/L)_Total Metals	Residuals	36	7.850151488	0.218059764			0
GH_SC1-2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	2.004992351	2.004992351	3.500877669	0.065576819	0
GH_SC1-2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	19.75520991	1.795928174	3.135834825	0.001760016	0
GH_SC1-2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	6.30617706	0.573288824	1.001008328	0.454703485	0
GH_SC1-2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	69	39.51708266	0.572711343			0
GH_SC1-2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.051446887	0.051446887	2.094932293	0.152382946	0
GH_SC1-2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.145100462	0.195009133	7.940828907	1.10608E-08	0
GH_SC1-2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.259857896	0.023623445	0.96195359	0.488846384	0
GH_SC1-2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	1.669929071	0.02455778			0
GH_SC1-2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.314221196	0.314221196	0.725618082	0.397297307	0
GH_SC1-2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	16.22491106	1.474991914	3.406138151	0.000846267	0
GH_SC1-2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.714813691	0.155892154	0.359995338	0.966942374	0
GH_SC1-2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	29.44667707	0.433039369			0
GH_SC1-2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.031713257	0.031713257	0.74780583	0.390304057	0
GH_SC1-2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	5.550011429	0.504546494	11.89732139	6.88807E-12	0
GH_SC1-2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.537035282	0.048821389	1.151219493	0.337867607	0
GH_SC1-2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	66	2.798955118	0.042408411			0
GH_SC1-2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.350788731	0.350788731	7.45086052	0.008039157	1
GH_SC1-2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	1.477861201	0.134351018	2.853656946	0.003883869	0
GH_SC1-2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.940650967	0.085513724	1.816337803	0.06767133	0
GH_SC1-2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	69	3.248540534	0.047080298			0
GH_SC1-2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.036781061	0.036781061	0.72338193	0.397978629	0
GH_SC1-2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	8.649920417	0.786356402	15.46545959	1.21723E-14	0
GH_SC1-2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.774666848	0.070424259	1.385050759	0.199781341	0
GH_SC1-2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	3.508372409	0.050845977			0
GH_SC1-2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.013807152	0.013807152	0.936832532	0.336523777	0
GH_SC1-2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.129699157	0.011790832	0.800022739	0.639469566	0
GH_SC1-2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.037030003	0.003366364	0.228412003	0.99478971	0
GH_SC1-2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	1.002192271	0.014738122			0
GH_SC1-2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.220986062	0.220986062	6.217371921	0.01505215	1
GH_SC1-2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.099531581	0.009048326	0.254571734	0.991732363	0
GH_SC1-2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.314961371	0.028632852	0.805576097	0.634167856	0
GH_SC1-2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	69	2.452489331	0.035543324			0
GH_SC1-2	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000586395	0.000586395	5.243074854	0.025097298	1
GH_SC1-2	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.003988186	0.000362562	3.241744455	0.0013086	0
GH_SC1-2	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.001558657	0.000141696	1.26693402	0.262109511	0
GH_SC1-2	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	69	0.007717081	0.000111842			0
GH_SC1-2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.04018439	0.04018439	1.749752692	0.190275191	0
GH_SC1-2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.94665624	0.176968749	7.705766981	1.68278E-08	0
GH_SC1-2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.249815719	0.02271052	0.988886318	0.465126523	0
GH_SC1-2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	69	1.584637028	0.022965754			0
GH_SC1-2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.129317147	0.129317147	1.912387185	0.171157367	0
GH_SC1-2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	8.836682054	0.803334732	11.8799949	4.26416E-12	0
GH_SC1-2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.883290655	0.08029915	1.187491913	0.312007237	0
GH_SC1-2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	69	4.665835045	0.067620798			0
GH_SC1-2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.118293871	0.118293871	1.920591876	0.170254318	0
GH_SC1-2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	2.9804303	0.270948209	4.399052332	5.47336E-05	0
GH_SC1-2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.460190983	0.132744635	2.155211128	0.027184073	0
GH_SC1-2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	69	4.249875886	0.061592404			0
GH_SC1-2	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.074179516	0.074179516	0.106395996	0.745272413	0
GH_SC1-2	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(Month)	11	13.09882644	1.190802404	1.707972952	0.089757625	0
GH_SC1-2	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	6.426241616	0.584203783	0.837925971	0.603306126	0
GH_SC1-2	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	Residuals	69	48.10694794	0.697202144			0
GH_SC1-2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	12.09638567	12.09638567	9.806308139	0.002550921	1
GH_SC1-2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	68.19853559	6.199866872	5.026113307	1.04951E-05	0
GH_SC1-2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	8.161450775	0.74195007	0.601484709	0.821217275	0
GH_SC1-2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	69	85.11364309	1.233531059			0
GH_SC1-2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.276523212	0.276523212	0.764857231	0.384891174	0
GH_SC1-2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	2.812795018	0.255708638	0.707284569	0.727373035	0
GH_SC1-2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.852906586	0.077536962	0.214465563	0.99604494	0
GH_SC1-2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	68	24.58442915	0.361535723			0
GH_SC1-2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.648297226	0.648297226	13.79231076	0.000414125	1
GH_SC1-2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	2.252370689	0.204760972	4.356222487	6.3706E-05	0
GH_SC1-2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.902144182	0.082013107	1.744801951	0.081937688	0
GH_SC1-2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	68	3.196289014	0.04700425			0
GH_SC1-2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.029855958	0.029855958	0.358234107	0.551477173	0
GH_SC1-2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	2.025217265	0.18411066	2.209097375	0.023640632	0
GH_SC1-2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.964926242	0.087720567	1.052536963	0.412060519	0
GH_SC1-2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	68	5.667258062	0.08334203			0
GH_SC1-2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.783964337	0.783964337	19.80640481	3.26321E-05	1
GH_SC1-2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.674613011	0.061328456	1.549427902	0.134529855	0
GH_SC1-2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.302217718	0.118383429	2.99088875	0.002688327	0
GH_SC1-2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	68	2.69153213	0.039581355			0
GH_SC1-2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	37.58828604	37.58828604	54.00008918	3.33144E-10	1
GH_SC1-2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	11.74846046	1.06804186	1.534370458	0.139634273	0
GH_SC1-2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.921024423	0.265547675	0.381491141	0.959034478	0
GH_SC1-2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	68	47.33331907	0.696078222			0
GH_SC1-2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	40.21295322	40.21295322	24.76566852	4.67021E-06	1
GH_SC1-2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	14.35047702	1.30458882	0.803447936	0.636197112	0
GH_SC1-2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	3.588715745	0.326246886	0.200923374	0.997039539	0
GH_SC1-2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	68	110.4141734	1.623737845			0
GH_SC1-2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.626197488	0.626197488	5.386218934	0.023302614	1
GH_SC1-2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	7.065022191	0.642274745	5.524506973	3.10786E-06	0
GH_SC1-2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.064565172	0.187687743	1.614390497	0.114366106	0
GH_SC1-2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	68	7.905625398	0.116259197			0
GH_SC1-2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	37.98111801	37.98111801	26.00767675	2.92353E-06	1
GH_SC1-2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	9.583117643	0.871192513	0.596551509	0.825172728	0
GH_SC1-2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	19.54148881	1.776498983	1.216462645	0.293366907	0
GH_SC1-2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	68	99.30591069	1.46038104			0
GH_SC1-2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.831415721	0.831415721	6.507005556	0.013000551	1
GH_SC1-2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	5.874274607	0.534024964	4.179501686	0.000102253	0
GH_SC1-2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.984184837	0.18038044	1.411732415	0.18793519	0
GH_SC1-2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	68	8.688523248	0.127772401			0
GH_SC1-2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.048733705	0.048733705	0.402791551	0.527780696	0
GH_SC1-2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	7.457695531	0.677972321	5.603545264	2.55133E-06	0
GH_SC1-2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.824487574	0.074953416	0.619501483	0.805987985	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
GH_SC1-2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	68	8.22731247	0.120989889			0
GH_SC1-2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.948107094	0.948107094	5.697343298	0.019777769	1
GH_SC1-2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.932984085	0.084816735	0.509678769	0.89037695	0
GH_SC1-2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.162557184	0.014777926	0.088803171	0.999940575	0
GH_SC1-2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	68	11.31602556	0.166412141			0
GH_SC1-2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.640195661	1.640195661	10.04596452	0.00228918	1
GH_SC1-2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	3.817072428	0.347006584	2.125365844	0.029717971	0
GH_SC1-2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.351605448	0.122873223	0.752580966	0.684724697	0
GH_SC1-2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	68	11.10229931	0.163269107			0
GH_SC1-2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.639959941	0.639959941	5.480223096	0.022172168	1
GH_SC1-2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	6.942873245	0.631170295	5.40495398	4.19588E-06	0
GH_SC1-2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.050466554	0.18640605	1.5962667	0.119698668	0
GH_SC1-2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	68	7.940785475	0.116776257			0
GH_SC1-2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.067285585	0.067285585	0.735298238	0.394183362	0
GH_SC1-2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	6.361117679	0.578283425	6.319492974	4.44862E-07	0
GH_SC1-2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.132940841	0.193903713	2.118983698	0.030238832	0
GH_SC1-2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	68	6.222536062	0.091507883			0
GH_SC1-2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	34.94781313	34.94781313	96.44264111	1.13894E-14	1
GH_SC1-2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	8.927931207	0.81163011	2.239789686	0.021731231	0
GH_SC1-2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	7.405746711	0.673249701	1.857912512	0.060946187	0
GH_SC1-2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	68	24.64108475	0.362368893			0
GH_SC1-2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.813814699	2.813814699	24.89049319	4.45404E-06	1
GH_SC1-2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.158349252	0.014395387	0.127338972	0.999647576	0
GH_SC1-2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.056778963	0.005161724	0.045659671	0.999998075	0
GH_SC1-2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	68	7.687248223	0.113047768			0
GH_SC1-2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.108838502	0.108838502	2.904324346	0.092908033	0
GH_SC1-2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	1.438925124	0.130811375	3.490664185	0.000669773	0
GH_SC1-2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.277449661	0.025222696	0.673060453	0.758834632	0
GH_SC1-2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	68	2.548275349	0.037474637			0
GH_SC1-2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.361714778	4.361714778	24.71231923	4.76588E-06	1
GH_SC1-2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	11.56425541	1.051295947	5.956364035	1.06903E-06	0
GH_SC1-2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	5.315765874	0.483251443	2.73797452	0.005449764	0
GH_SC1-2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	68	12.00197368	0.176499613			0
GH_SC1-2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.126090726	0.126090726	1.178036831	0.281588929	0
GH_SC1-2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	10.00408575	0.909462341	8.496898768	3.36789E-09	0
GH_SC1-2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.202587531	0.20023523	1.870751986	0.058912627	0
GH_SC1-2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	68	7.27835424	0.107034621			0
GH_SC1-2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.123467214	0.123467214	3.521071215	0.064885092	0
GH_SC1-2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.823740014	0.074885456	2.135603571	0.028900551	0
GH_SC1-2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.498782523	0.045343866	1.293128559	0.24744525	0
GH_SC1-2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	68	2.384436448	0.035065242			0
GH_SC1-2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.529734601	0.529734601	4.665187465	0.034308786	1
GH_SC1-2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	7.339524214	0.667229474	5.876056754	1.30106E-06	0
GH_SC1-2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.940771386	0.176433762	1.553790474	0.133082283	0
GH_SC1-2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	68	7.721437374	0.11355055			0
GH_SC1-2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.002137556	0.002137556	0.06475828	0.79989546	0
GH_SC1-2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	6.553521088	0.595774644	18.04927828	3.95036E-16	0
GH_SC1-2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.333730161	0.030339106	0.919137738	0.527403659	0
GH_SC1-2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	68	2.244559322	0.033008225			0
GH_SC1-2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.399984398	0.399984398	11.28877997	0.001281823	1
GH_SC1-2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.870016008	0.442728728	12.49515538	1.7366E-12	0
GH_SC1-2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.561149878	0.051013625	1.439760138	0.175782221	0
GH_SC1-2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	68	2.409378082	0.035432031			0
GH_SC1-2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.616627866	0.616627866	5.308989731	0.024277144	1
GH_SC1-2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	7.15623369	0.650566699	5.601193389	2.56632E-06	0
GH_SC1-2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.073568898	0.188506263	1.622985066	0.111913182	0
GH_SC1-2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	68	7.898055373	0.116147873			0
GH_SC1-2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.023226026	1.023226026	12.23395083	0.000831942	1
GH_SC1-2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.468053534	0.042550321	0.508742473	0.891005808	0
GH_SC1-2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.177913432	0.016173948	0.193379844	0.997507023	0
GH_SC1-2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	68	5.687399822	0.083638233			0
GH_SC1-2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.228558285	0.228558285	3.751173309	0.056926691	0
GH_SC1-2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	10.99807164	0.999824695	16.40944984	3.83792E-15	0
GH_SC1-2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.832746207	0.075704201	1.242482097	0.277100091	0
GH_SC1-2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	68	4.14322722	0.060929812			0
GH_SC1-2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	6.035341815	6.035341815	19.57216741	3.58825E-05	1
GH_SC1-2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	8.899274539	0.809024958	2.623608141	0.007499341	0
GH_SC1-2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.400630271	0.218239116	0.707733321	0.726955315	0
GH_SC1-2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	68	20.9687172	0.308363488			0
GH_SC1-2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	18.21289691	18.21289691	24.54828241	5.07291E-06	1
GH_SC1-2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	6.613416245	0.601219659	0.810354884	0.62960025	0
GH_SC1-2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	9.181243321	0.834658484	1.12499578	0.356181411	0
GH_SC1-2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	68	50.45065757	0.741921435			0
GH_SC1-2	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.128567346	0.128567346	1.980097125	0.164455212	0
GH_SC1-2	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	5.047895542	0.458899595	7.067624846	1.44846E-07	0
GH_SC1-2	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.271257925	0.024659811	0.379791784	0.959166909	0
GH_SC1-2	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	61	3.960718896	0.064929818			0
GH_SC1-2	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.079490189	0.079490189	0.501698307	0.482328854	0
GH_SC1-2	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	1.531764348	0.139251304	0.878877558	0.566577779	0
GH_SC1-2	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.573425334	0.052129576	0.329013179	0.975015369	0
GH_SC1-2	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	46	7.28834175	0.158442212			0
GH_SC1-2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.064100962	0.064100962	7.349716902	0.008457082	1
GH_SC1-2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.088024481	0.008002226	0.91752278	0.528788524	0
GH_SC1-2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.123890021	0.011262729	1.291367066	0.248078638	0
GH_SC1-2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	69	0.601787309	0.008721555			0
GH_SC1-2	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.004525782	0.004525782	11.88370946	0.00097565	1
GH_SC1-2	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.005452849	0.000495714	1.301634754	0.242720986	0
GH_SC1-2	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.001296615	0.000117874	0.309511391	0.981545006	0
GH_SC1-2	Field Measured	pH (-)_Field Measured	Residuals	68	0.025897064	0.000380839			0
GH_SC1-2	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	27.0637848	27.0637848	117.590872	1.48681E-16	1
GH_SC1-2	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	3.66474037	0.333158215	1.447556775	0.172138301	0
GH_SC1-2	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	2.276064541	0.206914958	0.899035761	0.545832091	0
GH_SC1-2	Major Ions	Bromide (mg/L)_Major Ions	Residuals	69	15.88049413	0.230152089			0
GH_SC1-2	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.171282127	0.171282127	3.510913766	0.065263293	0
GH_SC1-2	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	8.08336876	0.734851705	15.06287321	2.79421E-14	0
GH_SC1-2	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.830220351	0.075474577	1.547065865	0.135319449	0
GH_SC1-2	Major Ions	Calcium (mg/L)_Major Ions	Residuals	68	3.317422597	0.048785626			0
GH_SC1-2	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.451350047	0.451350047	5.255479018	0.02493197	1
GH_SC1-2	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	3.468792625	0.315344784	3.671846073	0.00039587	0
GH_SC1-2	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	1.874671962	0.170424724	1.984410032	0.043244655	0
GH_SC1-2	Major Ions	Chloride (mg/L)_Major Ions	Residuals	69	5.925844838	0.085881809			0
GH_SC1-2	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	11.09042678	11.09042678	66.8472931	9.52477E-12	1
GH_SC1-2	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	2.600425347	0.236402304	1.424909469	0.181751484	0
GH_SC1-2	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	2.087762472	0.189796588	1.143994584	0.342134921	0
GH_SC1-2	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	69	11.44757569	0.165906894			0
GH_SC1-2	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.003606743	0.003606743	0.06643642	0.797376269	0
GH_SC1-2	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	8.681806868	0.78925517	14.53812539	6.25162E-14	0
GH_SC1-2	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.779319109	0.070847192	1.305009326	0.240866924	0
GH_SC1-2	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	68	3.691628055	0.054288648			0
GH_SC1-2	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.057575941	0.057575941	1.233496779	0.270639893	0
GH_SC1-2	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	3.955146887	0.359558808	7.703124323	1.86048E-08	0
GH_SC1-2	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.987402713	0.089763883	1.923085556	0.051269259	0
GH_SC1-2	Major Ions	Potassium (mg/L)_Major Ions	Residuals	68	3.174036652	0.04667701			0
GH_SC1-2	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.00102621	0.00102621	0.019102034	0.890482835	0
GH_SC1-2	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	1.704232274	0.154930207	2.883895311	0.003624936	0
GH_SC1-2	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.327064886	0.029733171	0.553457944	0.859125664	0
GH_SC1-2	Major Ions	Sodium (mg/L)_Major Ions	Residuals	68	3.653133322	0.053722549			0
GH_SC1-2	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.064140337	0.064140337	0.959639432	0.330700052	0
GH_SC1-2	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	9.201324445	0.83648404	12.51510528	1.40485E-12	0
GH_SC1-2	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.993488212	0.09031711	1.351284769	0.216207108	0
GH_SC1-2	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	69	4.611818877	0.066837955			0
GH_SC1-2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	4.994704016	4.994704016	28.56937474	1.10385E-06	1
GH_SC1-2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	13.09925118	1.190841017	6.811531405	1.29094E-07	0
GH_SC1-2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	2.918032088	0.265275644	1.517359041	0.145221465	0
GH_SC1-2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	12.06307734	0.174827208			0
GH_SC1-2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.334120194	0.334120194	1.673894952	0.200051767	0
GH_SC1-2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	5.476167427	0.497833402	2.494074992	0.010636471	0
GH_SC1-2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	2.346072168	0.213279288	1.068499092	0.399078718	0
GH_SC1-2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	13.77284359	0.199606429			0
GH_SC1-2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	17.37614642	17.37614642	41.02689472	1.5631E-08	1
GH_SC1-2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	6.357171142	0.577924649	1.364540398	0.209629965	0
GH_SC1-2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	11.02974558	1.002704144	2.367489106	0.015131432	0
GH_SC1-2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	29.22361321	0.423530626			0
GH_SC1-2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	11.17031515	11.17031515	12.47012057	0.000741853	1
GH_SC1-2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	18.13255344	1.648413949	1.840227461	0.063540476	0
GH_SC1-2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	5.994229999	0.54493	0.608339398	0.815513463	0
GH_SC1-2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	69	61.80788239	0.895766411			0
GH_SC1-2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.80934299	0.80934299	0.985203099	0.324971031	0
GH_SC1-2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	18.21687854	1.656079868	2.01592531	0.042692661	0
GH_SC1-2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	4.122506465	0.374773315	0.456206869	0.922406088	0
GH_SC1-2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	59	48.4684188	0.821498624			0
GH_SC1-2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	12.76372374	12.76372374	4.809298444	0.031680198	1
GH_SC1-2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	13.77002742	1.251820674	0.471678904	0.914568285	0
GH_SC1-2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	2.705910872	0.245991897	0.092688347	0.999926604	0
GH_SC1-2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	69	183.1237858	2.65396791			0
GH_SC1-2	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	0.017783389	0.017783389	0.018802853	0.891332516	0
GH_SC1-2	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	23.5552429	2.141385718	2.264144479	0.020145448	0
GH_SC1-2	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	7.293169338	0.663015394	0.701023936	0.733262184	0
GH_SC1-2	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	69	65.25891608	0.945781392			0
GH_SC1-2	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.609483932	0.609483932	8.328181284	0.005205985	1
GH_SC1-2	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	1.863563758	0.169414887	2.314938618	0.017505468	0
GH_SC1-2	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.663856734	0.151259703	2.06686044	0.034596274	0
GH_SC1-2	Total Metals	Antimony (mg/L)_Total Metals	Residuals	69	5.049648884	0.073183317			0
GH_SC1-2	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.007622052	0.007622052	0.0737975	0.786696958	0
GH_SC1-2	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	1.099753393	0.099977581	0.967993351	0.483374235	0
GH_SC1-2	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.298970889	0.027179172	0.263151571	0.990497109	0
GH_SC1-2	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	69	7.126550083	0.103283335			0
GH_SC1-2	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.808044375	0.808044375	18.84085531	4.76307E-05	1
GH_SC1-2	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	0.793306434	0.072118767	1.681565136	0.096068063	0
GH_SC1-2	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.311140306	0.119194573	2.779213344	0.004786368	0
GH_SC1-2	Total Metals	Barium (mg/L)_Total Metals	Residuals	69	2.959263842	0.042887882			0
GH_SC1-2	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	36.76289479	36.76289479	51.65112195	6.09257E-10	1
GH_SC1-2	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	11.13428659	1.012207872	1.422131541	0.182961642	0
GH_SC1-2	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.836017086	0.166910644	0.234506072	0.99417636	0
GH_SC1-2	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	69	49.11102885	0.711754041			0
GH_SC1-2	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	41.94181339	41.94181339	25.38510488	3.60512E-06	1
GH_SC1-2	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	12.74878553	1.158980503	0.70146804	0.732850242	0
GH_SC1-2	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.809955668	0.255450515	0.154610342	0.999113721	0
GH_SC1-2	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	69	114.0032762	1.652221395			0
GH_SC1-2	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.72739463	0.72739463	6.045039694	0.016458545	1
GH_SC1-2	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	7.138584076	0.648962189	5.393224018	4.09414E-06	0
GH_SC1-2	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.498644571	0.136240416	1.132230959	0.350623237	0
GH_SC1-2	Total Metals	Boron (mg/L)_Total Metals	Residuals	69	8.302712973	0.120329174			0
GH_SC1-2	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	3.765733021	3.765733021	11.42050985	0.001198339	1

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
GH_SC1-2	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	8.600126785	0.781829708	2.371090523	0.014980841	0
GH_SC1-2	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	3.762455418	0.342041402	1.037324519	0.42424714	0
GH_SC1-2	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	69	22.75166187	0.32973423			0
GH_SC1-2	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.121448369	0.121448369	2.351608102	0.129726505	0
GH_SC1-2	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	7.039084365	0.63991676	12.39072583	1.7414E-12	0
GH_SC1-2	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.788173675	0.071652152	1.387402594	0.19867719	0
GH_SC1-2	Total Metals	Calcium (mg/L)_Total Metals	Residuals	69	3.563492332	0.051644816			0
GH_SC1-2	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.586406136	0.586406136	3.493371125	0.065859576	0
GH_SC1-2	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	4.520797307	0.410981573	2.448322202	0.012084136	0
GH_SC1-2	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.431149274	0.130104479	0.775065614	0.663336476	0
GH_SC1-2	Total Metals	Chromium (mg/L)_Total Metals	Residuals	69	11.58251497	0.167862536			0
GH_SC1-2	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.087634021	0.087634021	0.574861634	0.45091542	0
GH_SC1-2	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	5.102224623	0.463838602	3.042688359	0.002285035	0
GH_SC1-2	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.145033743	0.104093977	0.682835645	0.750018535	0
GH_SC1-2	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	69	10.51861373	0.152443677			0
GH_SC1-2	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.71258087	0.71258087	6.332846338	0.014181172	1
GH_SC1-2	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	1.572254072	0.142932188	1.270266469	0.260159851	0
GH_SC1-2	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.342576893	0.031143354	0.276777111	0.988282534	0
GH_SC1-2	Total Metals	Copper (mg/L)_Total Metals	Residuals	69	7.763978057	0.112521421			0
GH_SC1-2	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	0.674034915	0.674034915	1.435361492	0.234990553	0
GH_SC1-2	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	7.953712685	0.72306479	1.539770911	0.137400302	0
GH_SC1-2	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	5.410118547	0.491828959	1.047352789	0.416049705	0
GH_SC1-2	Total Metals	Iron (mg/L)_Total Metals	Residuals	69	32.40187883	0.469592447			0
GH_SC1-2	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	1.155368087	1.155368087	5.824019097	0.018468617	1
GH_SC1-2	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	7.329724176	0.666338561	3.358902285	0.000943528	0
GH_SC1-2	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.539342721	0.139940247	0.705415601	0.729183172	0
GH_SC1-2	Total Metals	Lead (mg/L)_Total Metals	Residuals	69	13.68821026	0.198379859			0
GH_SC1-2	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.059972467	0.059972467	0.705516828	0.403837184	0
GH_SC1-2	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	6.328407277	0.575309752	6.767950951	1.4296E-07	0
GH_SC1-2	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.98402457	0.18036587	2.121826296	0.029783775	0
GH_SC1-2	Total Metals	Lithium (mg/L)_Total Metals	Residuals	69	5.865345835	0.085005012			0
GH_SC1-2	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.010801569	0.010801569	0.196195684	0.659194854	0
GH_SC1-2	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	7.695304258	0.699573114	12.70678545	1.01153E-12	0
GH_SC1-2	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.75301118	0.068455562	1.243401324	0.276203753	0
GH_SC1-2	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	69	3.798800655	0.055055082			0
GH_SC1-2	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	36.82239679	36.82239679	129.3206284	1.7852E-17	1
GH_SC1-2	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	11.57975345	1.052704859	3.697110069	0.000369206	0
GH_SC1-2	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	7.932965979	0.721178725	2.532786948	0.009546455	0
GH_SC1-2	Total Metals	Manganese (mg/L)_Total Metals	Residuals	69	19.64686848	0.284737224			0
GH_SC1-2	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	56.65048239	56.65048239	46.68070498	2.67405E-09	1
GH_SC1-2	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	1.348073564	0.122552142	0.100984496	0.99988741	0
GH_SC1-2	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	4.852961327	0.441178302	0.363536431	0.965771442	0
GH_SC1-2	Total Metals	Mercury (mg/L)_Total Metals	Residuals	69	83.73659495	1.21357384			0
GH_SC1-2	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.12791326	0.12791326	3.046474549	0.085364238	0
GH_SC1-2	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	1.036935164	0.094266833	2.245126961	0.02123087	0
GH_SC1-2	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.231052231	0.021004748	0.500264251	0.896727634	0
GH_SC1-2	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	69	2.897124125	0.041987306			0
GH_SC1-2	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	4.255403125	4.255403125	22.85824585	9.52433E-06	1
GH_SC1-2	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	10.77295408	0.979359462	5.260709431	5.73814E-06	0
GH_SC1-2	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	5.485275614	0.498661419	2.678600591	0.006347008	0
GH_SC1-2	Total Metals	Nickel (mg/L)_Total Metals	Residuals	69	12.84537832	0.186164903			0
GH_SC1-2	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.10649108	0.10649108	2.431009622	0.123531448	0
GH_SC1-2	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	3.607388712	0.327944428	7.486411626	2.74705E-08	0
GH_SC1-2	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.955628742	0.08687534	1.983215753	0.043383997	0
GH_SC1-2	Total Metals	Potassium (mg/L)_Total Metals	Residuals	69	3.022564974	0.043805289			0
GH_SC1-2	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.251256173	0.251256173	2.490411136	0.119115725	0
GH_SC1-2	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	9.776152122	0.888741102	8.809060148	1.56657E-09	0
GH_SC1-2	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.649399365	0.240854488	2.387311293	0.014320641	0
GH_SC1-2	Total Metals	Selenium (mg/L)_Total Metals	Residuals	69	6.961371021	0.100889435			0
GH_SC1-2	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.133692054	0.133692054	3.677845552	0.059340968	0
GH_SC1-2	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.918315864	0.08348326	2.29661023	0.018585882	0
GH_SC1-2	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.46035958	0.041850871	1.15131031	0.337212595	0
GH_SC1-2	Total Metals	Silicon (mg/L)_Total Metals	Residuals	68	2.471843777	0.036350644			0
GH_SC1-2	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.47145562	0.47145562	3.670246498	0.059536286	0
GH_SC1-2	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	6.707538241	0.609776204	4.747061824	2.1741E-05	0
GH_SC1-2	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.261907577	0.114718871	0.893077768	0.551364736	0
GH_SC1-2	Total Metals	Silver (mg/L)_Total Metals	Residuals	69	8.863284199	0.128453394			0
GH_SC1-2	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.000166592	0.000166592	0.003061604	0.956034065	0
GH_SC1-2	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	1.404896827	0.127717893	2.347183702	0.016008731	0
GH_SC1-2	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.278124288	0.025284026	0.464666717	0.918680786	0
GH_SC1-2	Total Metals	Sodium (mg/L)_Total Metals	Residuals	69	3.754514244	0.05441325			0
GH_SC1-2	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.000770026	0.000770026	0.020417105	0.88679474	0
GH_SC1-2	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	6.220307631	0.565482512	14.99366396	2.49572E-14	0
GH_SC1-2	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.235285733	0.021389612	0.567141598	0.848774398	0
GH_SC1-2	Total Metals	Strontium (mg/L)_Total Metals	Residuals	69	2.602318782	0.037714765			0
GH_SC1-2	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.158499708	0.158499708	2.402865957	0.125688041	0
GH_SC1-2	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	4.761824895	0.432893172	6.56268887	2.31972E-07	0
GH_SC1-2	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.411969178	0.219269925	3.324146441	0.001039574	0
GH_SC1-2	Total Metals	Thallium (mg/L)_Total Metals	Residuals	69	4.551431506	0.065962775			0
GH_SC1-2	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.715886398	0.715886398	5.950944423	0.017284458	1
GH_SC1-2	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	7.224440019	0.656767274	5.45950525	3.46131E-06	0
GH_SC1-2	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.509541016	0.137231001	1.140759295	0.344455043	0
GH_SC1-2	Total Metals	Tin (mg/L)_Total Metals	Residuals	69	8.300558359	0.120297947			0
GH_SC1-2	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	1.296439685	1.296439685	14.45028071	0.000307073	1
GH_SC1-2	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.398388369	0.036217124	0.40368065	0.949851322	0
GH_SC1-2	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.140723935	0.012793085	0.142593343	0.999395582	0
GH_SC1-2	Total Metals	Titanium (mg/L)_Total Metals	Residuals	69	6.190491388	0.089717266			0
GH_SC1-2	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.196560482	0.196560482	3.027748485	0.086310047	0
GH_SC1-2	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	11.06929077	1.006299161	15.50067807	1.15437E-14	0
GH_SC1-2	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.640753979	0.058250362	0.897268069	0.547471661	0
GH_SC1-2	Total Metals	Uranium (mg/L)_Total Metals	Residuals	69	4.479458369	0.064919687			0
GH_SC1-2	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	5.691544127	5.691544127	18.30830842	5.93442E-05	1
GH_SC1-2	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	6.30719553	0.573381412	1.844428066	0.062839098	0
GH_SC1-2	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.248402576	0.204400234	0.657505669	0.77292128	0
GH_SC1-2	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	69	21.45018184	0.310872201			0
GH_SC1-2	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	1.766744416	1.766744416	8.192751206	0.005563961	1
GH_SC1-2	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	4.85660473	0.441509521	2.04736895	0.036476574	0
GH_SC1-2	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.469390164	0.133580924	0.619441764	0.806144065	0
GH_SC1-2	Total Metals	Zinc (mg/L)_Total Metals	Residuals	69	14.8796615	0.215647268			0
LC_DC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.09175574	0.09175574	0.572448611	0.452248269	0
LC_DC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.097428561	0.099766233	0.622424726	0.802545569	0
LC_DC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.608163037	0.055287549	0.344929707	0.971386078	0
LC_DC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	60	9.617185368	0.160286423			0
LC_DC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.200197798	0.200197798	22.23425104	1.4818E-05	1
LC_DC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.752693826	0.159335802	17.69605991	5.73565E-15	0
LC_DC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.065485084	0.005953189	0.661169654	0.768714243	0
LC_DC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	60	0.540241624	0.009004027			0
LC_DC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	2.060149393	2.060149393	3.723175526	0.058394693	0
LC_DC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	13.49358214	1.226689285	2.216916666	0.024930157	0
LC_DC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	3.434472004	0.312224728	0.564263673	0.849865242	0
LC_DC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	60	33.19987541	0.553331257			0
LC_DC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	1.847160553	1.847160553	157.3411391	2.03635E-18	1
LC_DC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	1.183435789	0.107585072	9.1640966	2.39516E-09	0
LC_DC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.080756752	0.007341523	0.625350938	0.800047013	0
LC_DC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	60	0.704390688	0.011739845			0
LC_DC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.000114944	0.000114944	0.001716484	0.967090285	0
LC_DC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	3.915362579	0.355942053	5.315348895	8.34781E-06	0
LC_DC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.193737608	0.01761251	0.263010887	0.990281837	0
LC_DC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	60	4.01789677	0.066964946			0
LC_DC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	1.363023018	1.363023018	130.0425763	1.17293E-16	1
LC_DC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.581636778	0.143785162	13.71817835	1.2347E-12	0
LC_DC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.093547891	0.008504354	0.811378863	0.628635304	0
LC_DC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	60	0.628881582	0.01048136			0
LC_DC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.000670725	0.000670725	0.726392252	0.397444371	0
LC_DC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.006538905	0.000594446	0.643781984	0.78408868	0
LC_DC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.002287841	0.000207986	0.225247292	0.994973369	0
LC_DC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	60	0.055401917	0.000923365			0
LC_DC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.014182664	0.014182664	0.478166177	0.491921216	0
LC_DC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.121929672	0.011084516	0.373712606	0.961422461	0
LC_DC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.334347424	0.03039522	1.024769812	0.436541161	0
LC_DC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	60	1.779632068	0.029660534			0
LC_DC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.00038106	0.00038106	1.645261452	0.20453826	0
LC_DC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.003480593	0.000316418	1.366161751	0.21262308	0
LC_DC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.001135605	0.000103237	0.445734348	0.928312933	0
LC_DC1	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	60	0.013896638	0.000231611			0
LC_DC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.224910297	0.224910297	21.17340232	2.22314E-05	1
LC_DC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.777373924	0.161579448	15.21133847	1.46988E-13	0
LC_DC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.062810554	0.00571005	0.537552952	0.869866705	0
LC_DC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	60	0.637338185	0.010622303			0
LC_DC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	2.496726176	2.496726176	198.5671212	1.08052E-20	1
LC_DC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	0.983148648	0.08937715	7.108253803	1.46238E-07	0
LC_DC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.141683459	0.012880314	1.024384247	0.436859384	0
LC_DC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	60	0.754422835	0.012573714			0
LC_DC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.090527543	0.090527543	1.13293592	0.291414865	0
LC_DC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	4.614163644	0.419469422	5.249584377	9.76976E-06	0
LC_DC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.187668346	0.017060759	0.213512327	0.996021181	0
LC_DC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	60	4.794315801	0.079905263			0
LC_DC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	2.273319835	2.273319835	3.291240776	0.074650988	0
LC_DC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	32.78689102	2.980626456	4.315257	9.78708E-05	0
LC_DC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.594367036	0.144942458	0.20984312	0.996313747	0
LC_DC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	60	41.44309073	0.690718179			0
LC_DC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	1.77916439	1.77916439	1.298233153	0.259064684	0
LC_DC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	65.57298252	5.961180229	4.349795808	8.96743E-05	0
LC_DC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	9.194109884	0.835828171	0.609892963	0.813128988	0
LC_DC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	60	82.22703536	1.370450589			0
LC_DC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.204166916	0.204166916	1.03697214	0.312615391	0
LC_DC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	6.675337315	0.606848847	3.08221018	0.002453003	0
LC_DC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.110650912	0.191877356	0.974552958	0.479067036	0
LC_DC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	60	11.8132537	0.196887562			0
LC_DC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.990646468	0.990646468	30.92115896	6.56381E-07	1
LC_DC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	1.155359269	0.105032661	3.278396187	0.00145342	0
LC_DC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.330598119	0.030054374	0.93809055	0.511199631	0
LC_DC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	60	1.922269089	0.032037818			0
LC_DC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.008503233	0.008503233	0.326319696	0.56996792	0
LC_DC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	1.333737236	0.12124884	4.653039921	4.1916E-05	0
LC_DC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.129002723	0.01172752	0.450054781	0.925956775	0
LC_DC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	60	1.563479038	0.026057984			0
LC_DC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.348383525	1.348383525	116.4857477	1.09896E-15	1
LC_DC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.60572652	0.055066047	4.757110697	3.23875E-05	0
LC_DC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.055009983	0.005000908	0.432024306	0.935516221	0
LC_DC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	60	0.694531418	0.011575524			0
LC_DC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	23.31818671	23.31818671	44.74531924	8.45864E-09	1
LC_DC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.913047561	0.083004324	0.159277177	0.998946925	0
LC_DC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.694715016	0.063155911	0.121190014	0.999713544	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
LC_DC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	60	31.26787843	0.521131307			0
LC_DC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	23.79644774	23.79644774	20.19894032	3.24441E-05	1
LC_DC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	2.17149765	0.197408877	0.167564931	0.998667269	0
LC_DC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.368583427	0.215325766	0.182773175	0.998015127	0
LC_DC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	60	70.68622618	1.17810377			0
LC_DC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000993614	0.000993614	0.044081766	0.834412885	0
LC_DC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.202067059	0.018369733	0.814974798	0.625229215	0
LC_DC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.27001495	0.024546814	1.089021536	0.385447321	0
LC_DC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	60	1.352414776	0.022540246			0
LC_DC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.39394221	0.39394221	13.36557047	0.000541173	1
LC_DC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.525984643	0.047816786	1.622315667	0.115507543	0
LC_DC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.375960587	0.034178235	1.159590415	0.334018976	0
LC_DC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	60	1.768464178	0.029474403			0
LC_DC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.012858717	0.012858717	0.484671149	0.489002236	0
LC_DC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.337331106	0.030666464	1.155881261	0.336595621	0
LC_DC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.406201136	0.036927376	1.391867732	0.200428712	0
LC_DC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	60	1.591848498	0.026530808			0
LC_DC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.051274781	0.051274781	1.951745071	0.167544573	0
LC_DC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	0.252013481	0.022910316	0.872068036	0.571544182	0
LC_DC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.447655388	0.040695944	1.549067747	0.138143936	0
LC_DC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	60	1.576274933	0.026271249			0
LC_DC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.063013656	0.063013656	1.281328687	0.262155881	0
LC_DC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.366692108	0.033335646	0.677851799	0.753709176	0
LC_DC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.319350199	0.029031836	0.590337511	0.829238534	0
LC_DC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	60	2.950702167	0.049178369			0
LC_DC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.552750885	1.552750885	5.789053247	0.019223969	1
LC_DC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	1.291637484	0.117421589	0.437777779	0.932544216	0
LC_DC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.402942124	0.127540193	0.475502527	0.91125681	0
LC_DC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	60	16.09331424	0.268221904			0
LC_DC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.025451284	0.025451284	1.014961856	0.317762792	0
LC_DC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.220673293	0.020061208	0.800013115	0.639409376	0
LC_DC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.355143536	0.032285776	1.287511881	0.253810915	0
LC_DC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	60	1.504565966	0.025076099			0
LC_DC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.568715607	0.568715607	52.90937491	8.52454E-10	1
LC_DC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.370988051	0.033726186	3.137651613	0.002115134	0
LC_DC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.102644954	0.009331359	0.868125281	0.575217722	0
LC_DC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	60	0.644931763	0.010748863			0
LC_DC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000365231	0.000365231	0.000838061	0.977001119	0
LC_DC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	5.338353573	0.48530487	1.113581966	0.366976424	0
LC_DC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	4.58379811	0.416708919	0.956181497	0.495135181	0
LC_DC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	60	26.14831518	0.435805253			0
LC_DC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.302439766	2.302439766	20.86779676	2.50154E-05	1
LC_DC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.196703245	0.017882113	0.16207169	0.998858087	0
LC_DC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.155492489	0.014135681	0.128116495	0.999625154	0
LC_DC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	60	6.620075304	0.110334588			0
LC_DC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.445905773	1.445905773	173.9067459	2.21967E-19	1
LC_DC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.134024859	0.012184078	1.465443608	0.168761553	0
LC_DC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.64953031	0.05904821	7.102040984	1.48187E-07	0
LC_DC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	60	0.498855556	0.008314259			0
LC_DC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.482275205	2.482275205	54.75233444	5.20059E-10	1
LC_DC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	1.888015636	0.171637785	3.785869268	0.000381743	0
LC_DC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.948751491	0.177159226	3.907657456	0.000278197	0
LC_DC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	60	2.720185611	0.045336427			0
LC_DC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	39.21776186	39.21776186	269.0918206	7.55509E-24	1
LC_DC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.532880716	0.048443701	0.332395404	0.975157193	0
LC_DC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.213787588	0.110344326	0.757125196	0.680047478	0
LC_DC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	60	8.744471336	0.145741189			0
LC_DC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.002749521	0.002749521	1.754164393	0.190376996	0
LC_DC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.274645795	0.0249678	15.92918324	5.55569E-14	0
LC_DC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.071655988	0.006514181	4.155976102	0.000146816	0
LC_DC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	60	0.094045498	0.001567425			0
LC_DC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.008940334	0.008940334	0.42970104	0.51464136	0
LC_DC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.21689088	0.019717353	0.947679012	0.502656472	0
LC_DC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.244434739	0.02222134	1.068028642	0.401708053	0
LC_DC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	60	1.248356403	0.02080594			0
LC_DC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.19930731	2.19930731	213.5024332	1.98879E-21	1
LC_DC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.920024442	0.083638586	8.119393531	1.81458E-08	0
LC_DC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.094267872	0.008569807	0.831932194	0.609194533	0
LC_DC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	60	0.618065268	0.010301088			0
LC_DC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.008940334	0.008940334	0.42970104	0.51464136	0
LC_DC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.21689088	0.019717353	0.947679012	0.502656472	0
LC_DC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.244434739	0.02222134	1.068028642	0.401708053	0
LC_DC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	60	1.248356403	0.02080594			0
LC_DC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.007460694	0.007460694	0.358927042	0.551358215	0
LC_DC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.219198878	0.019927171	0.958677584	0.492937121	0
LC_DC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.244860105	0.02226001	1.070908283	0.399452127	0
LC_DC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	60	1.247166163	0.020786103			0
LC_DC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.07569E-06	3.07569E-06	0.403551251	0.527676272	0
LC_DC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	9.5218E-05	8.65618E-06	1.135748457	0.350827859	0
LC_DC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	4.6879E-05	4.26173E-06	0.559166798	0.853773974	0
LC_DC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	60	0.000457294	7.62156E-06			0
LC_DC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.965951686	4.965951686	228.3064325	4.06264E-22	1
LC_DC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.34869895	0.213518086	9.816356591	7.19568E-10	0
LC_DC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.732090164	0.066553651	3.05976128	0.002604851	0
LC_DC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	60	1.305075367	0.021751256			0
LC_DC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.749439132	1.749439132	26.19842839	3.42303E-06	1
LC_DC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.874489413	0.079499038	1.190524325	0.313082633	0
LC_DC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.680124012	0.061829456	0.925916505	0.522135694	0
LC_DC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	60	4.006589493	0.066776492			0
LC_DC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	5.851875901	5.851875901	31.729647	4.99384E-07	1
LC_DC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	1.089945527	0.099085957	0.537257196	0.870081305	0
LC_DC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.975741364	0.270521942	1.466805837	0.168218591	0
LC_DC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	60	11.0657567	0.184429278			0
LC_DC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.103563722	0.103563722	3.354730584	0.083614293	0
LC_DC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	10	0.852689586	0.085268959	2.762109908	0.02921429	0
LC_DC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	2	0.273898759	0.13694938	4.436189261	0.027145483	0
LC_DC1	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	18	0.555677111	0.030870951			0
LC_DC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.016253944	0.016253944	1.413649506	0.239468824	0
LC_DC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.184105097	0.016736827	1.455647117	0.174814346	0
LC_DC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.095963531	0.008723957	0.758746174	0.678311751	0
LC_DC1	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	56	0.643880169	0.01149786			0
LC_DC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.011354954	0.011354954	1.650944248	0.203852037	0
LC_DC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.416766435	0.037887858	5.508673873	5.64222E-06	0
LC_DC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.098838509	0.008985319	1.306413059	0.243829736	0
LC_DC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	59	0.40579342	0.006877855			0
LC_DC1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.002136096	0.002136096	2.719360708	0.104544323	0
LC_DC1	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.020902843	0.001900258	2.4191274	0.014925564	0
LC_DC1	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.004999696	0.000454518	0.578624768	0.838337071	0
LC_DC1	Field Measured	pH (-)_Field Measured	Residuals	58	0.045559811	0.000785514			0
LC_DC1	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	as.factor(new_year)	1	2.246811476	2.246811476	37.8108948	2.36443E-06	1
LC_DC1	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	as.factor(Month)	11	0.640764878	0.058251353	0.98029398	0.489516014	0
LC_DC1	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.47574799	0.043249817	0.727837787	0.702171596	0
LC_DC1	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	Residuals	24	1.426135925	0.05942233			0
LC_DC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	0.002768277	0.002768277	5.724568435	0.019876967	1
LC_DC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	0.00658785	0.000598895	1.238466299	0.282584617	0
LC_DC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.018485573	0.001680507	3.475148881	0.000862723	0
LC_DC1	Major Ions	Bromide (mg/L)_Major Ions	Residuals	60	0.029014699	0.000483578			0
LC_DC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	1.172276136	1.172276136	117.5206922	9.20836E-16	1
LC_DC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	1.533945159	0.13944956	13.97981951	8.41232E-13	0
LC_DC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.078692008	0.007153819	0.717170406	0.717556011	0
LC_DC1	Major Ions	Calcium (mg/L)_Major Ions	Residuals	60	0.598503692	0.009975062			0
LC_DC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	17.03197613	17.03197613	64.00370476	4.89581E-11	1
LC_DC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	0.808618151	0.073510741	0.27624274	0.988097003	0
LC_DC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.678891277	0.061717389	0.231925028	0.994296388	0
LC_DC1	Major Ions	Chloride (mg/L)_Major Ions	Residuals	60	15.96655337	0.266109223			0
LC_DC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.169197379	0.169197379	9.952022718	0.002511119	1
LC_DC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.329627328	0.029966121	1.762577625	0.081351326	0
LC_DC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.209418087	0.019038008	1.119796824	0.362398513	0
LC_DC1	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	60	1.020078332	0.017001306			0
LC_DC1	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(new_year)	1	0.000112723	0.000112723	0.000285059	0.986785783	0
LC_DC1	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(Month)	11	3.147587865	0.286144351	0.723611934	0.700906399	0
LC_DC1	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	7	2.420482115	0.345783159	0.874428656	0.551179238	0
LC_DC1	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	Residuals	13	5.140706493	0.395438961			0
LC_DC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	1.706075095	1.706075095	139.1160509	2.86614E-17	1
LC_DC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	1.668103366	0.151645761	12.36543421	9.72273E-12	0
LC_DC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.124997161	0.011363378	0.926587764	0.521530186	0
LC_DC1	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	60	0.735820957	0.012263683			0
LC_DC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.014221622	0.014221622	0.187051839	0.666932313	0
LC_DC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	0.304401402	0.027672855	0.363971036	0.965000881	0
LC_DC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.147831535	0.01343923	0.17676133	0.998295993	0
LC_DC1	Major Ions	Potassium (mg/L)_Major Ions	Residuals	60	4.561822557	0.076030376			0
LC_DC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.094243842	0.094243842	1.066989454	0.305772147	0
LC_DC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	0.514536951	0.046776086	0.529579334	0.875597448	0
LC_DC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.287846906	0.026167901	0.296262052	0.984192343	0
LC_DC1	Major Ions	Sodium (mg/L)_Major Ions	Residuals	60	5.299612367	0.088326873			0
LC_DC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	23.7584778	23.7584778	318.6864504	1.10496E-25	1
LC_DC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	0.47692093	0.043356448	0.581565565	0.836291801	0
LC_DC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.674626618	0.061329693	0.822651274	0.617964103	0
LC_DC1	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	60	4.473075861	0.074551264			0
LC_DC1	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(new_year)	1	1.942675002	1.942675002	2.716138064	0.107172191	0
LC_DC1	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(Month)	11	1.532418004	0.139310728	0.194776362	0.997046619	0
LC_DC1	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	3.88204209	0.352912917	0.493422836	0.896140205	0
LC_DC1	Major Ions	Sulphide (mg/L)_Major Ions	Residuals	40	28.60937045	0.715234261			0
LC_DC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	276.1653656	276.1653656	202.515859	6.84262E-21	1
LC_DC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	32.33886971	2.939897247	2.155867066	0.029307305	0
LC_DC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	15.12868792	1.375335265	1.008552257	0.450040086	0
LC_DC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	60	81.82036712	1.363672785			0
LC_DC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	21.98463878	21.98463878	52.14222704	1.04973E-09	1
LC_DC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	10.70062251	0.972783865	2.307207211	0.019606041	0
LC_DC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	7.854770092	0.714070008	1.693600739	0.096771394	0
LC_DC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	60	25.29769827	0.421628305			0
LC_DC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	17.36532957	17.36532957	124.5601206	2.84134E-16	1
LC_DC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.300757945	0.118250722	0.848202977	0.593869381	0
LC_DC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.973147865	0.179377079	1.286657444	0.254291496	0
LC_DC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	60	8.364794197	0.139413237			0
LC_DC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	15.49271001	15.49271001	82.16753791	7.68514E-13	1
LC_DC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	6.659063975	0.605369452	3.2106531	0.001740754	0
LC_DC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.863801736	0.078527431	0.416480114	0.943174477	0
LC_DC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	60	11.31301514	0.188550252			0
LC_DC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	3.343217099	3.343217099	25.34170073	5.48522E-06	1
LC_DC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	5.363886953	0.487626087	3.696222527	0.000573158	0
LC_DC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	3.899531867	0.354502897	2.687144166	0.007731101	0
LC_DC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	55	7.255903714	0.131925522			0
LC_DC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	12.40169658	12.40169658	10.3896094	0.002050677	1

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
LC_DC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	7.637207755	0.694291614	0.581647731	0.836226255	0
LC_DC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	1.104717371	0.100428852	0.084134984	0.999953083	0
LC_DC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	60	71.61980461	1.19366341			0
LC_DC1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.440415263	0.440415263	-	-	-
LC_DC1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	as.factor(Month)	10	6.93335E-32	6.93335E-33	-	-	0
LC_DC1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.053513311	0.053513311	-	-	-
LC_DC1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(Month)	10	0.313175536	0.031317554	-	-	0
LC_DC1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.943777437	0.943777437	-	-	-
LC_DC1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(Month)	10	0.681243488	0.068124349	-	-	0
LC_DC1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.529249619	0.529249619	-	-	-
LC_DC1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(Month)	10	4.158830559	0.415883056	-	-	0
LC_DC1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.881857188	0.881857188	-	-	-
LC_DC1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(Month)	10	0	0	-	-	0
LC_DC1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(new_year)	1	0.440415263	0.440415263	-	-	-
LC_DC1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(Month)	10	6.93335E-32	6.93335E-33	-	-	0
LC_DC1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(new_year)	1	1.761661051	1.761661051	-	-	-
LC_DC1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(Month)	10	1.2326E-31	1.2326E-32	-	-	0
LC_DC1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(new_year)	1	1.761661051	1.761661051	-	-	-
LC_DC1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(Month)	10	1.2326E-31	1.2326E-32	-	-	0
LC_DC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	8.456000279	8.456000279	10.2162682	0.002221512	1
LC_DC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	63.68519544	5.789563222	6.994764508	1.86383E-07	0
LC_DC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.748610411	0.249873674	0.301889355	0.982958027	0
LC_DC1	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	60	49.66197117	0.827699519			0
LC_DC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.568662191	0.568662191	20.32922166	3.08357E-05	1
LC_DC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	1.400997863	0.127363442	4.553141897	5.37705E-05	0
LC_DC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.180826252	0.01643875	0.587672263	0.831393346	0
LC_DC1	Total Metals	Antimony (mg/L)_Total Metals	Residuals	60	1.678358966	0.027972649			0
LC_DC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.054023151	0.054023151	1.263585588	0.265450737	0
LC_DC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	2.695461359	0.245041942	5.731458854	3.13222E-06	0
LC_DC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.536636394	0.048785127	1.141069746	0.347025743	0
LC_DC1	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	60	2.565231101	0.042753852			0
LC_DC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	1.153964213	1.153964213	129.7480835	1.22921E-16	1
LC_DC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	0.559983268	0.05090757	5.723886015	3.18787E-06	0
LC_DC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.052345164	0.004758651	0.535047684	0.871679587	0
LC_DC1	Total Metals	Barium (mg/L)_Total Metals	Residuals	60	0.533632952	0.008893883			0
LC_DC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	24.08628404	24.08628404	45.99514984	5.88281E-09	1
LC_DC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	0.941871422	0.085624675	0.163508814	0.998810277	0
LC_DC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.557201193	0.050654654	0.096730089	0.999905546	0
LC_DC1	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	60	31.42020511	0.523670085			0
LC_DC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	25.2626198	25.2626198	21.1062862	2.2814E-05	1
LC_DC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	2.986440418	0.271494583	0.226826926	0.994818689	0
LC_DC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.233010651	0.203000968	0.169602225	0.998590792	0
LC_DC1	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	60	71.815438	1.196923967			0
LC_DC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.070377636	0.070377636	2.621073569	0.110698204	0
LC_DC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.438241446	0.039840131	1.483765597	0.161585247	0
LC_DC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.35066577	0.031878706	1.187258325	0.315246449	0
LC_DC1	Total Metals	Boron (mg/L)_Total Metals	Residuals	60	1.611041455	0.026850691			0
LC_DC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.053301931	0.053301931	0.50695189	0.479220811	0
LC_DC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	4.816291179	0.437844653	4.164317694	0.000143718	0
LC_DC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.255484322	0.023225847	0.220899826	0.99538206	0
LC_DC1	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	60	6.308519447	0.105141991			0
LC_DC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	1.102591574	1.102591574	110.0483371	3.382E-15	1
LC_DC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	1.496898512	0.136081683	13.58214888	1.51017E-12	0
LC_DC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.101208974	0.009200816	0.918322345	0.529005655	0
LC_DC1	Total Metals	Calcium (mg/L)_Total Metals	Residuals	60	0.601149424	0.010019157			0
LC_DC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.960926749	0.960926749	4.83891376	0.031687661	1
LC_DC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	4.608633976	0.418966725	2.109779808	0.033099482	0
LC_DC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.433676302	0.130334209	0.656320577	0.773030715	0
LC_DC1	Total Metals	Chromium (mg/L)_Total Metals	Residuals	60	11.91498914	0.198583152			0
LC_DC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.031696473	0.031696473	0.569403562	0.453447658	0
LC_DC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	1.069862422	0.09726022	1.747207505	0.084574873	0
LC_DC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.412795655	0.037526878	0.674142443	0.757065361	0
LC_DC1	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	60	3.339965741	0.055666096			0
LC_DC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.124171728	0.124171728	1.862959559	0.177380252	0
LC_DC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	0.682801256	0.062072841	0.931284398	0.517301695	0
LC_DC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.290637607	0.026421601	0.39640564	0.952256401	0
LC_DC1	Total Metals	Copper (mg/L)_Total Metals	Residuals	60	3.999176295	0.066652938			0
LC_DC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	5.403559955	5.403559955	12.74489799	0.000710149	1
LC_DC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	23.31089966	2.119172696	4.998304834	1.79263E-05	0
LC_DC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.185077215	0.107734292	0.254103328	0.991586205	0
LC_DC1	Total Metals	Iron (mg/L)_Total Metals	Residuals	60	25.43869692	0.423978282			0
LC_DC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.392677838	0.392677838	2.369698212	0.128968593	0
LC_DC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	5.159439612	0.469039965	2.830521759	0.004817037	0
LC_DC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.794084979	0.072189544	0.435643206	0.933655464	0
LC_DC1	Total Metals	Lead (mg/L)_Total Metals	Residuals	60	9.942477138	0.165707952			0
LC_DC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.581411486	0.581411486	54.46061641	5.62063E-10	1
LC_DC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	0.405319712	0.036847247	3.451469067	0.000918433	0
LC_DC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.128357116	0.011668829	1.093015226	0.382402888	0
LC_DC1	Total Metals	Lithium (mg/L)_Total Metals	Residuals	60	0.640548923	0.010675815			0
LC_DC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	1.559135981	1.559135981	133.1401865	7.19601E-17	1
LC_DC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	1.765828363	0.160529851	13.70821697	1.25299E-12	0
LC_DC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.115342042	0.01048564	0.895406242	0.549942221	0
LC_DC1	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	60	0.702629021	0.011710484			0
LC_DC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	0.550125417	0.550125417	1.285085667	0.261464863	0
LC_DC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	11.19316972	1.017560883	2.377008707	0.016272143	0
LC_DC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.458431398	0.041675582	0.097353605	0.999902474	0
LC_DC1	Total Metals	Manganese (mg/L)_Total Metals	Residuals	60	25.68507756	0.428084626			0
LC_DC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	54.83855669	54.83855669	49.30272541	2.2982E-09	1
LC_DC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	9.879489951	0.89813545	0.807470658	0.632338827	0
LC_DC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	6.233751353	0.566704668	0.509497083	0.889510054	0
LC_DC1	Total Metals	Mercury (mg/L)_Total Metals	Residuals	60	66.73694759	1.11228246			0
LC_DC1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	1	0.4679014	0.4679014	1.606952795	0.294371861	0
LC_DC1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(Month)	4	3.90501555	0.976253887	3.352830131	0.173961258	0
LC_DC1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year):as.factor(Month)	2	0.233879561	0.116939781	0.40161604	0.700571782	0
LC_DC1	Total Metals	Methyl mercury (µg/L)_Total Metals	Residuals	3	0.87351925	0.291173083			0
LC_DC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	1.177312032	1.177312032	121.8723882	4.42726E-16	1
LC_DC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	0.149100162	0.01355456	1.403134064	0.195273329	0
LC_DC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.605492147	0.055044741	5.698093471	3.38513E-06	0
LC_DC1	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	60	0.57961219	0.009660203			0
LC_DC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	2.195910018	2.195910018	21.24261715	2.16467E-05	1
LC_DC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	5.064900979	0.460445544	4.454220947	6.89089E-05	0
LC_DC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.807116262	0.164283297	1.589230499	0.125280732	0
LC_DC1	Total Metals	Nickel (mg/L)_Total Metals	Residuals	60	6.2023714	0.103372857			0
LC_DC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.003020008	0.003020008	0.041672987	0.838935244	0
LC_DC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	0.303278128	0.027570739	0.380447659	0.958823664	0
LC_DC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.162322854	0.014756623	0.203626124	0.996773553	0
LC_DC1	Total Metals	Potassium (mg/L)_Total Metals	Residuals	60	4.348152219	0.072469204			0
LC_DC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	37.02873274	37.02873274	299.3032425	5.37081E-25	1
LC_DC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	0.428887458	0.038989769	0.315154297	0.979800306	0
LC_DC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.23629295	0.112390268	0.908450525	0.537988233	0
LC_DC1	Total Metals	Selenium (mg/L)_Total Metals	Residuals	60	7.422986622	0.123716444			0
LC_DC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.00789433	0.00789433	2.64598306	0.109053052	0
LC_DC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.203779691	0.018525426	6.209262523	1.04885E-06	0
LC_DC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.104885467	0.009535042	3.195909248	0.001810547	0
LC_DC1	Total Metals	Silicon (mg/L)_Total Metals	Residuals	60	0.179010886	0.002983515			0
LC_DC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.013404161	0.013404161	0.319554079	0.573983554	0
LC_DC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	0.390238855	0.03547626	0.845751081	0.596174099	0
LC_DC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.461464461	0.041951315	1.000115856	0.45715279	0
LC_DC1	Total Metals	Silver (mg/L)_Total Metals	Residuals	60	2.516787295	0.041946455			0
LC_DC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.08023106	0.08023106	0.901968669	0.346064286	0
LC_DC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	0.475707358	0.043246123	0.486178902	0.904680458	0
LC_DC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.305983754	0.027816705	0.312719244	0.980406517	0
LC_DC1	Total Metals	Sodium (mg/L)_Total Metals	Residuals	60	5.337062954	0.088951049			0
LC_DC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	1.926756239	1.926756239	193.8426778	1.88394E-20	1
LC_DC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	0.904606996	0.082237	8.273511671	1.33517E-08	0
LC_DC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.094318227	0.008574384	0.862632008	0.580346267	0
LC_DC1	Total Metals	Strontium (mg/L)_Total Metals	Residuals	60	0.596387626	0.009939794			0
LC_DC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.028144462	0.028144462	0.613582369	0.436523287	0
LC_DC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	0.496217683	0.045110698	0.983466274	0.471365559	0
LC_DC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.306454814	0.027859529	0.607370483	0.81523554	0
LC_DC1	Total Metals	Thallium (mg/L)_Total Metals	Residuals	60	2.75214512	0.045869085			0
LC_DC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.000241407	0.000241407	0.011225653	0.915974525	0
LC_DC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.212193127	0.019290284	0.897016471	0.548461618	0
LC_DC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.233071993	0.021188363	0.98527893	0.469807141	0
LC_DC1	Total Metals	Tin (mg/L)_Total Metals	Residuals	60	1.290296325	0.021504939			0
LC_DC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.000593974	0.000593974	0.73082729	0.396015913	0
LC_DC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.006376446	0.000579677	0.713236018	0.721214664	0
LC_DC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.002350081	0.000213644	0.262867859	0.990303816	0
LC_DC1	Total Metals	Titanium (mg/L)_Total Metals	Residuals	60	0.04876452	0.000812742			0
LC_DC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	3.773865149	3.773865149	208.8544714	3.33366E-21	1
LC_DC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	1.957833153	0.177984832	9.850094414	6.76997E-10	0
LC_DC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.484567609	0.044051601	2.437918005	0.013824616	0
LC_DC1	Total Metals	Uranium (mg/L)_Total Metals	Residuals	60	1.084161174	0.018069353			0
LC_DC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	2.285582449	2.285582449	27.3426409	2.27383E-06	1
LC_DC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	4.070965715	0.370087792	4.427395569	7.37219E-05	0
LC_DC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.490413826	0.044583075	0.533351581	0.872900557	0
LC_DC1	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	60	5.015424348	0.083590406			0
LC_DC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.000320832	0.000320832	0.003158912	0.955365884	0
LC_DC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	1.460671989	0.132788363	1.307436244	0.242809439	0
LC_DC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.263414198	0.114855836	1.130872315	0.354337315	0
LC_DC1	Total Metals	Zinc (mg/L)_Total Metals	Residuals	60	6.093835774	0.10156393			0
LC_FRB	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.012014675	0.012014675	0.418728606	0.520125032	0
LC_FRB	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.372700816	0.033881892	1.180832433	0.320328567	0
LC_FRB	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.60335556	0.054850505	1.911618604	0.056335872	0
LC_FRB	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	58	1.664207132	0.028693226			0
LC_FRB	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.028126112	0.028126112	6.069541837	0.016794734	1
LC_FRB	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.606789973	0.055162725	11.90397271	3.64818E-11	0
LC_FRB	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.082870618	0.007533693	1.625751278	0.116040745	0
LC_FRB	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	57	0.264136637	0.004633976			0
LC_FRB	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	2.102148895	2.102148895	2.17083672	0.146150941	0
LC_FRB	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	7.254779443	0.659525404	0.681075431	0.750450634	0
LC_FRB	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	4.78000665	0.434546059	0.448744874	0.926297164	0
LC_FRB	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	57	55.19645302	0.968358825			0
LC_FRB	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.129016175	0.129016175	16.3590781	0.000156719	1
LC_FRB	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	2.312845785	0.210258708	26.66052239	1.03205E-18	0
LC_FRB	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.097615117	0.008874102	1.125224184	0.359131677	0
LC_FRB	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	58	0.457418083	0.007886519			0
LC_FRB	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.099653824	0.099653824	1.339041109	0.251946689	0
LC_FRB	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	5.584485775	0.507680525	6.821665924	3.2674E-07	0
LC_FRB	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.654625096	0.059511372	0.799649939	0.639734444	0
LC_FRB	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	58	4.316463277	0.074421781			0
LC_FRB	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.097531034	0.097531034	13.92588898	0.000434886	1
LC_FRB	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	2.747767318	0.249797029	35.66706449	9.21437E-22	0
LC_FRB	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.122022687	0.011092972	1.58390087	0.127927918	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
LC_FRB	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	58	0.40620746	0.007003577			0
LC_FRB	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0	0	-	-	-
LC_FRB	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0	0	-	-	0
LC_FRB	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0	0	-	-	0
LC_FRB	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	57	0	0			0
LC_FRB	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.041528822	0.041528822	1.039386313	0.312198093	0
LC_FRB	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.249307903	0.022664355	0.567245091	0.847263436	0
LC_FRB	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.229722421	0.020883856	0.522682651	0.880168878	0
LC_FRB	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	58	2.317397892	0.039955136			0
LC_FRB	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000373836	0.000373836	2.092990488	0.153359245	0
LC_FRB	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.001575948	0.000143268	0.802112341	0.637404447	0
LC_FRB	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.000681174	6.19249E-05	0.346698285	0.970682605	0
LC_FRB	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	58	0.010359574	0.000178613			0
LC_FRB	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.034623366	0.034623366	7.080339076	0.010063491	1
LC_FRB	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.607142331	0.055194757	11.28710578	8.04767E-11	0
LC_FRB	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.118753568	0.010795779	2.207693346	0.026086935	0
LC_FRB	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	58	0.283624163	0.004890072			0
LC_FRB	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.130280614	0.130280614	11.22020202	0.001427019	1
LC_FRB	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	3.34405611	0.304005101	26.18193567	1.57847E-18	0
LC_FRB	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.131583104	0.0119621	1.030216076	0.432567403	0
LC_FRB	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	58	0.673452722	0.011611254			0
LC_FRB	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.092124314	0.092124314	0.603606974	0.440417497	0
LC_FRB	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	11.09832099	1.008938272	6.610656292	5.63262E-07	0
LC_FRB	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	1.067742324	0.097067484	0.635995077	0.790473022	0
LC_FRB	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	57	8.699511658	0.152623012			0
LC_FRB	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.015759021	0.015759021	0.026180827	0.872021842	0
LC_FRB	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	38.36447262	3.487679329	5.794162597	3.13578E-06	0
LC_FRB	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	8.607408952	0.782491723	1.299971656	0.24782376	0
LC_FRB	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	58	34.91193036	0.601929834			0
LC_FRB	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.040591234	0.040591234	0.059621709	0.807956555	0
LC_FRB	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	69.13258784	6.284780712	9.231287763	2.80729E-09	0
LC_FRB	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	9.716547974	0.883322543	1.297452522	0.249209325	0
LC_FRB	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	58	39.48715398	0.680813			0
LC_FRB	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.197925112	0.197925112	1.363808843	0.247656792	0
LC_FRB	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	1.849402251	0.168127477	1.158487358	0.335540623	0
LC_FRB	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.972113227	0.270192112	1.86176674	0.06399441	0
LC_FRB	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	58	8.417350109	0.145126726			0
LC_FRB	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.013493909	0.013493909	0.652770529	0.42242527	0
LC_FRB	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	0.790144474	0.071831316	3.474854084	0.000915709	0
LC_FRB	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.077394387	0.007035853	0.340360796	0.972662757	0
LC_FRB	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	58	1.198961516	0.02067175			0
LC_FRB	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.015191609	0.015191609	2.15529096	0.147482091	0
LC_FRB	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.156703371	0.014245761	2.021099959	0.042474445	0
LC_FRB	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.138984398	0.012634945	1.792567441	0.076274697	0
LC_FRB	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	58	0.408814088	0.007048519			0
LC_FRB	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.015548338	0.015548338	1.453444303	0.232871544	0
LC_FRB	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	4.327348611	0.393395328	36.77423239	4.322E-22	0
LC_FRB	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.110905877	0.010082352	0.942489003	0.507578371	0
LC_FRB	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	58	0.620459696	0.010697581			0
LC_FRB	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	24.3399896	24.3399896	51.73742968	1.38987E-09	1
LC_FRB	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.833667985	0.075787999	0.161096053	0.998880141	0
LC_FRB	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.513155931	0.046650539	0.099161053	0.999892046	0
LC_FRB	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	58	27.28622982	0.470452238			0
LC_FRB	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	23.84946679	23.84946679	19.37381639	4.67413E-05	1
LC_FRB	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	2.301347271	0.209213388	0.169951882	0.998565367	0
LC_FRB	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.82855231	0.166232028	0.135036511	0.999512937	0
LC_FRB	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	58	71.39889455	1.231015423			0
LC_FRB	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.003115008	0.003115008	1.012733699	0.318428899	0
LC_FRB	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.038233527	0.003475775	1.130024116	0.355657935	0
LC_FRB	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.015471425	0.001406493	0.457270998	0.921675188	0
LC_FRB	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	58	0.178398812	0.003075842			0
LC_FRB	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000252008	0.000252008	0.002656135	0.95907415	0
LC_FRB	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.313833186	0.210348471	2.217047577	0.025453181	0
LC_FRB	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.625608996	0.056873545	0.599440322	0.821516787	0
LC_FRB	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	58	5.502909126	0.094877744			0
LC_FRB	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.15852877	0.15852877	4.941752454	0.030126788	1
LC_FRB	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.380947276	0.034631571	1.079555769	0.393337207	0
LC_FRB	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.064517609	0.096774328	3.016706512	0.003053918	0
LC_FRB	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	58	1.860608915	0.032079464			0
LC_FRB	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.072798119	0.072798119	12.26771922	0.000894344	1
LC_FRB	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	0.098738166	0.008976197	1.512641603	0.151837621	0
LC_FRB	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.241862228	0.021987475	3.705262959	0.000503712	0
LC_FRB	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	58	0.344178963	0.00593412			0
LC_FRB	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.064314778	0.064314778	1.289893293	0.260738966	0
LC_FRB	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.212616651	0.019328786	0.387656971	0.955739835	0
LC_FRB	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.217984106	0.019816737	0.397443276	0.951610575	0
LC_FRB	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	58	2.891911399	0.049860541			0
LC_FRB	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.738194029	0.738194029	2.671702341	0.107563437	0
LC_FRB	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	1.846853538	0.167895776	0.607655333	0.814714864	0
LC_FRB	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.669662428	0.242696584	0.87837751	0.565833961	0
LC_FRB	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	58	16.025458	0.276301			0
LC_FRB	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.037364812	0.037364812	3.075323526	0.084771773	0
LC_FRB	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.164545883	0.014958717	1.231182249	0.287929821	0
LC_FRB	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.48167499	0.043788635	3.604038506	0.000654467	0
LC_FRB	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	58	0.704693042	0.01214988			0
LC_FRB	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.685500011	0.685500011	22.09886108	1.64026E-05	1
LC_FRB	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.282276618	0.116570602	3.757954034	0.000439754	0
LC_FRB	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.150418065	0.01367437	0.440828576	0.930697184	0
LC_FRB	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	58	1.79914252	0.031019699			0
LC_FRB	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.729733965	0.729733965	1.802004207	0.184701245	0
LC_FRB	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	6.636764904	0.603342264	1.489892688	0.160266293	0
LC_FRB	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.974633534	0.27042123	0.667777873	0.762563946	0
LC_FRB	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	58	23.48749786	0.40495686			0
LC_FRB	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.161216221	2.161216221	19.37381639	4.67413E-05	1
LC_FRB	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.208545923	0.01895872	0.169951882	0.998565367	0
LC_FRB	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.165701688	0.01506379	0.135036511	0.999512937	0
LC_FRB	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	58	6.470100587	0.111553458			0
LC_FRB	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.003789149	0.003789149	0.520833655	0.473385757	0
LC_FRB	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	1.028939766	0.093539979	12.85744258	6.89155E-12	0
LC_FRB	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.069355877	0.00630508	0.866658312	0.576713803	0
LC_FRB	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	58	0.421959401	0.007275162			0
LC_FRB	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.135627852	0.135627852	2.047496697	0.157822771	0
LC_FRB	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	5.907816726	0.537074248	8.107905051	2.36034E-08	0
LC_FRB	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.401356492	0.036486954	0.55082283	0.859784053	0
LC_FRB	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	58	3.841967336	0.066240816			0
LC_FRB	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.781177473	0.781177473	37.29667823	9.06959E-08	1
LC_FRB	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	5.617050455	0.51064095	24.38013368	8.28118E-18	0
LC_FRB	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.296928035	0.026993458	1.288780517	0.254026825	0
LC_FRB	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	58	1.214807741	0.020944961			0
LC_FRB	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.013957088	0.013957088	6.928290893	0.010853788	1
LC_FRB	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.550818837	0.05007444	24.85692417	5.29172E-18	0
LC_FRB	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.013941602	0.001267418	0.629145793	0.796522235	0
LC_FRB	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	58	0.116841387	0.002014507			0
LC_FRB	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.00025258	0.00025258	3.225365854	0.07771474	0
LC_FRB	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.001072234	9.74758E-05	1.244733019	0.27965275	0
LC_FRB	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.00310642	0.000282402	3.606176072	0.000650851	0
LC_FRB	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	58	0.004542015	7.83106E-05			0
LC_FRB	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.152719281	0.152719281	20.99123632	2.49802E-05	1
LC_FRB	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.401456318	0.218314211	30.00724701	6.21299E-20	0
LC_FRB	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.12910054	0.011736413	1.613167708	0.119132017	0
LC_FRB	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	58	0.421972206	0.007275383			0
LC_FRB	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.98228E-29	4.98228E-29	0.372272144	0.544151647	0
LC_FRB	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.03513E-27	9.41028E-29	0.703128932	0.730386214	0
LC_FRB	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	3.53929E-28	3.21753E-29	0.240411738	0.993299999	0
LC_FRB	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	58	7.76239E-27	1.33834E-28			0
LC_FRB	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.45992E-29	3.45992E-29	0.372272144	0.544151647	0
LC_FRB	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	7.18841E-28	6.53492E-29	0.703128932	0.730386214	0
LC_FRB	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.45784E-28	2.2344E-29	0.240411738	0.993299999	0
LC_FRB	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	58	5.39055E-27	9.29405E-29			0
LC_FRB	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.021994237	0.021994237	4.507071101	0.038033913	1
LC_FRB	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.084735672	0.007703243	1.578552768	0.129597314	0
LC_FRB	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.051680838	0.004698258	0.962769611	0.489696941	0
LC_FRB	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	58	0.283036523	0.00487994			0
LC_FRB	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.573864379	0.573864379	53.33741462	9.06617E-10	1
LC_FRB	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.352705582	0.122973235	11.42965943	6.38409E-11	0
LC_FRB	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.130282016	0.01184382	1.100815356	0.377155654	0
LC_FRB	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	58	0.624029758	0.010759134			0
LC_FRB	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.021881667	2.021881667	18.00859887	8.02739E-05	1
LC_FRB	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.217864059	0.019805824	0.176407521	0.998297582	0
LC_FRB	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.194784946	0.017707722	0.157720046	0.998985369	0
LC_FRB	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	58	6.511841233	0.112273125			0
LC_FRB	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	6.625967266	6.625967266	43.91822648	1.23642E-08	1
LC_FRB	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	1.450599564	0.131872688	0.874078354	0.569818404	0
LC_FRB	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.001286151	0.091026014	0.60333849	0.818300199	0
LC_FRB	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	58	8.750492273	0.150870556			0
LC_FRB	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.034937798	0.034937798	1.448838422	0.251922089	0
LC_FRB	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	9	1.343298793	0.149255421	6.189485393	0.002363357	0
LC_FRB	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	1	0.185311292	0.185311292	7.684689244	0.016895159	0
LC_FRB	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	12	0.289372209	0.024114351			0
LC_FRB	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.001893337	0.001893337	0.1493674	0.700605262	0
LC_FRB	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.237580709	0.021598246	1.703908588	0.096264205	0
LC_FRB	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.050036012	0.004548728	0.358854015	0.966470119	0
LC_FRB	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	56	0.709839601	0.012675707			0
LC_FRB	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.027843764	0.027843764	4.07384822	0.048266369	1
LC_FRB	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.469230755	0.042657341	6.241237249	1.25238E-06	0
LC_FRB	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.065277825	0.005934348	0.868260205	0.575292301	0
LC_FRB	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	57	0.389581161	0.006834757			0
LC_FRB	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.006769498	0.006769498	17.37649152	0.000107361	1
LC_FRB	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.009014084	0.000819462	2.103461485	0.034950498	0
LC_FRB	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.006601625	0.000600148	1.540507379	0.143133165	0
LC_FRB	Field Measured	pH (-)_Field Measured	Residuals	56	0.021816365	0.000389578			0
LC_FRB	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	as.factor(new_year)	1	0.676031349	0.676031349	22.85361367	8.04525E-05	1
LC_FRB	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	as.factor(Month)	11	1.149878453	0.104534405	3.533843375	0.005146194	0
LC_FRB	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.231269701	0.021024518	0.710745468	0.716664343	0
LC_FRB	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	Residuals	23	0.680361594	0.029580939			0
LC_FRB	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	9.464822064	9.464822064	21.96032904	1.72824E-05	1
LC_FRB	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	17.22692106	1.566083733	3.633635565	0.000606158	0
LC_FRB	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	4.874231919	0.443111993	1.028110734	0.434291699	0
LC_FRB	Major Ions	Bromide (mg/L)_Major Ions	Residuals	58	24.99778936	0.430996368			0
LC_FRB	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.034374713	0.034374713	5.377453942	0.023942849	1
LC_FRB	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	2.544436265	0.231312388	36.18566125	6.44763E-22	0
LC_FRB	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.099393985	0.009035817	1.413530032	0.191624695	0
LC_FRB	Major Ions	Calcium (mg/L)_Major Ions	Residuals	58	0.370757865	0.006392377			0
LC_FRB	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.954599319	0.954599319	14.45054824	0.000347721	1

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
LC_FRB	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	6.838394149	0.621672195	9.410758918	2.02422E-09	0
LC_FRB	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.274334247	0.024939477	0.377529199	0.959784816	0
LC_FRB	Major Ions	Chloride (mg/L)_Major Ions	Residuals	58	3.831464353	0.06605973			0
LC_FRB	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.299577865	0.299577865	12.76859452	0.000717643	1
LC_FRB	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.361616686	0.032874244	1.401164582	0.197169955	0
LC_FRB	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.418955191	0.038086836	1.623335424	0.116207183	0
LC_FRB	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	58	1.360800997	0.023462086			0
LC_FRB	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(new_year)	1	0.1865394	0.1865394	0.311514901	0.586236417	0
LC_FRB	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(Month)	11	4.319663317	0.392696665	0.655791016	0.755002199	0
LC_FRB	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	4	0.007286966	0.001821742	0.003042251	0.999978755	0
LC_FRB	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	Residuals	13	7.784578506	0.598813731			0
LC_FRB	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.250602216	0.250602216	26.77205462	2.98001E-06	1
LC_FRB	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	3.096159602	0.281469055	30.06958609	5.91082E-20	0
LC_FRB	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.166416682	0.015128789	1.616221829	0.118246509	0
LC_FRB	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	58	0.542914197	0.00936059			0
LC_FRB	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.162289772	0.162289772	2.388017743	0.127707886	0
LC_FRB	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	0.444773515	0.040433956	0.594966663	0.825183081	0
LC_FRB	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.235146859	0.021376987	0.314552322	0.9798412	0
LC_FRB	Major Ions	Potassium (mg/L)_Major Ions	Residuals	58	3.941682096	0.067960036			0
LC_FRB	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.044051705	0.044051705	2.457165072	0.122429898	0
LC_FRB	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	1.692674346	0.153879486	8.583261382	9.41835E-09	0
LC_FRB	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.193071256	0.017551932	0.979031234	0.475580877	0
LC_FRB	Major Ions	Sodium (mg/L)_Major Ions	Residuals	58	1.039815729	0.017927857			0
LC_FRB	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.457411194	0.457411194	24.02554674	8.01391E-06	1
LC_FRB	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	7.186616215	0.653328747	34.31612642	2.38547E-21	0
LC_FRB	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.288288581	0.026208053	1.376579337	0.208600716	0
LC_FRB	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	58	1.104234984	0.019038534			0
LC_FRB	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(new_year)	1	2.070330375	2.070330375	2.647916738	0.111165892	0
LC_FRB	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(Month)	11	2.356571646	0.214233786	0.274001307	0.987591699	0
LC_FRB	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	5.479409427	0.49812813	0.637097262	0.786766925	0
LC_FRB	Major Ions	Sulphide (mg/L)_Major Ions	Residuals	42	32.83859893	0.781871403			0
LC_FRB	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.002819537	0.002819537	0.131216524	0.718490581	0
LC_FRB	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	5.708929022	0.518993547	24.15309242	1.02746E-17	0
LC_FRB	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.177510488	0.016137317	0.751003772	0.685714012	0
LC_FRB	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	58	1.246284543	0.021487665			0
LC_FRB	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.989304508	0.989304508	6.982118726	0.010566763	1
LC_FRB	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	4.865749012	0.442340819	3.121866011	0.002312685	0
LC_FRB	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	2.06804405	0.188004005	1.326857677	0.233421304	0
LC_FRB	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	58	8.218087331	0.141691161			0
LC_FRB	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	6.929844057	6.929844057	70.53711426	1.3197E-11	1
LC_FRB	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.540866368	0.140078761	1.42582596	0.186243357	0
LC_FRB	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	3.222735262	0.292975933	2.982127258	0.003346782	0
LC_FRB	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	58	5.69814855	0.098243941			0
LC_FRB	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	13.79614499	13.79614499	23.48706684	9.77127E-06	1
LC_FRB	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	6.903531971	0.627593816	1.068438894	0.401974659	0
LC_FRB	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	5.08598495	0.462362268	0.787142604	0.651572206	0
LC_FRB	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	58	34.06880966	0.58739327			0
LC_FRB	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.692865057	0.692865057	3.332572768	0.073557129	0
LC_FRB	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	4.777549769	0.434322706	2.089024418	0.037407153	0
LC_FRB	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	5.165253683	0.469568517	2.258551264	0.024250037	0
LC_FRB	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	53	11.01906863	0.207906955			0
LC_FRB	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	10.8850284	10.8850284	4.591534896	0.036338221	1
LC_FRB	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	28.80172088	2.618338262	1.104470384	0.37441871	0
LC_FRB	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	9.618693592	0.87442669	0.368851648	0.963066549	0
LC_FRB	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	58	137.4990415	2.37067313			0
LC_FRB	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	1.860675776	1.860675776	2.8282032	0.09799936	0
LC_FRB	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	92.68859927	8.426236297	12.80777058	7.42633E-12	0
LC_FRB	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	6.845583092	0.622325736	0.945927098	0.504526315	0
LC_FRB	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	58	38.15821826	0.657900315			0
LC_FRB	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.008224586	0.008224586	0.313258745	0.57784254	0
LC_FRB	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	1.487903651	0.135263968	5.151946043	1.39456E-05	0
LC_FRB	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.286684094	0.02606219	0.992659023	0.463912441	0
LC_FRB	Total Metals	Antimony (mg/L)_Total Metals	Residuals	58	1.522785778	0.026254927			0
LC_FRB	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.022820588	0.022820588	0.263476542	0.609691507	0
LC_FRB	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	3.642271141	0.331115558	3.822915624	0.000372147	0
LC_FRB	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.065110413	0.096828219	1.117936332	0.364450478	0
LC_FRB	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	58	5.023574745	0.086613358			0
LC_FRB	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.003911259	0.003911259	0.355133487	0.553540071	0
LC_FRB	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	3.81803188	0.347093807	31.51533036	1.90368E-20	0
LC_FRB	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.15575436	0.014159487	1.285649329	0.25578452	0
LC_FRB	Total Metals	Barium (mg/L)_Total Metals	Residuals	58	0.638782478	0.011013491			0
LC_FRB	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	22.79879595	22.79879595	47.77923623	4.11471E-09	1
LC_FRB	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	0.693203193	0.063018472	0.132067258	0.999562142	0
LC_FRB	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.871597795	0.079236163	0.166054531	0.998711064	0
LC_FRB	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	58	27.67583305	0.477169535			0
LC_FRB	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	22.27878064	22.27878064	18.02678901	7.96916E-05	1
LC_FRB	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	1.515523249	0.137774841	0.111479978	0.999807578	0
LC_FRB	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.857502285	0.259772935	0.210194263	0.996258478	0
LC_FRB	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	58	71.68050155	1.235870716			0
LC_FRB	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.017757965	0.017757965	1.430388801	0.236567613	0
LC_FRB	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.258152916	0.023468447	1.890363244	0.059487963	0
LC_FRB	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.240233512	0.02183941	1.759145735	0.082970494	0
LC_FRB	Total Metals	Boron (mg/L)_Total Metals	Residuals	58	0.720057337	0.012414782			0
LC_FRB	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.208457015	0.208457015	1.32070664	0.255182384	0
LC_FRB	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	9.327558509	0.847959864	5.372360455	8.29786E-06	0
LC_FRB	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.195213422	0.108655766	0.688402792	0.743896511	0
LC_FRB	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	58	9.154574148	0.157837485			0
LC_FRB	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.004877277	0.004877277	0.697291318	0.407121902	0
LC_FRB	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	2.504599764	0.227690888	32.55236374	8.67092E-21	0
LC_FRB	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.130952338	0.011904758	1.701991756	0.095708105	0
LC_FRB	Total Metals	Calcium (mg/L)_Total Metals	Residuals	58	0.405687021	0.006994604			0
LC_FRB	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.093468193	0.093468193	0.533163117	0.468219157	0
LC_FRB	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	5.701130787	0.518284617	2.956409373	0.00358282	0
LC_FRB	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.263030772	0.20573007	1.173529539	0.325243836	0
LC_FRB	Total Metals	Chromium (mg/L)_Total Metals	Residuals	58	10.16791113	0.175308813			0
LC_FRB	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.074450424	0.074450424	0.724137086	0.39828984	0
LC_FRB	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	1.458774352	0.13261585	1.289879217	0.253412367	0
LC_FRB	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.195524428	0.108684039	1.057108052	0.410900595	0
LC_FRB	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	58	5.963131438	0.102812611			0
LC_FRB	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.025557724	0.025557724	0.249610903	0.619239268	0
LC_FRB	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	0.825819829	0.07507453	0.733219496	0.702414684	0
LC_FRB	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.523204201	0.047564018	0.464536581	0.917501311	0
LC_FRB	Total Metals	Copper (mg/L)_Total Metals	Residuals	58	5.938634691	0.102390253			0
LC_FRB	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	2.143365554	2.143365554	3.988336655	0.050515499	0
LC_FRB	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	54.12666008	4.920605461	9.156175479	3.2224E-09	0
LC_FRB	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	6.150629672	0.559148152	1.040452976	0.424240707	0
LC_FRB	Total Metals	Iron (mg/L)_Total Metals	Residuals	58	31.16968623	0.537408383			0
LC_FRB	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.002583176	0.002583176	0.010439137	0.918972499	0
LC_FRB	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	7.704044351	0.700367668	2.830327949	0.005006346	0
LC_FRB	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.467724621	0.224338602	0.90659784	0.539901163	0
LC_FRB	Total Metals	Lead (mg/L)_Total Metals	Residuals	58	14.35216183	0.247451066			0
LC_FRB	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.517341674	0.517341674	17.72057576	9.01075E-05	1
LC_FRB	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	1.149539697	0.104503609	3.579576534	0.000697342	0
LC_FRB	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.20252349	0.018411226	0.630642277	0.795235229	0
LC_FRB	Total Metals	Lithium (mg/L)_Total Metals	Residuals	58	1.693275519	0.029194405			0
LC_FRB	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.119237074	0.119237074	13.43873121	0.000536277	1
LC_FRB	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	3.017527955	0.274320723	30.91758569	3.02496E-20	0
LC_FRB	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.145166573	0.013196961	1.487376435	0.161223436	0
LC_FRB	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	58	0.514613337	0.008872644			0
LC_FRB	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	0.569627651	0.569627651	1.690934339	0.198621361	0
LC_FRB	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	31.57904601	2.870822364	8.522009268	1.05861E-08	0
LC_FRB	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.564783968	0.233162179	0.692139742	0.740481226	0
LC_FRB	Total Metals	Manganese (mg/L)_Total Metals	Residuals	58	19.53854917	0.336871537			0
LC_FRB	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	55.18999347	55.18999347	34.97786152	1.88695E-07	1
LC_FRB	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	3.067879632	0.278898148	0.176757782	0.998282067	0
LC_FRB	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.999412268	0.272673843	0.172812992	0.998450869	0
LC_FRB	Total Metals	Mercury (mg/L)_Total Metals	Residuals	58	91.51558965	1.577854994			0
LC_FRB	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.01997676	0.01997676	3.081449784	0.084470115	0
LC_FRB	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	1.100063698	0.100005791	15.42606632	1.8281E-13	0
LC_FRB	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.086299433	0.007845403	1.210166997	0.30113666	0
LC_FRB	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	58	0.376008747	0.006482909			0
LC_FRB	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.113091124	0.113091124	0.740537045	0.393032297	0
LC_FRB	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	10.65095343	0.968268493	6.34036218	9.24855E-07	0
LC_FRB	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.866364599	0.078760418	0.515734612	0.884980917	0
LC_FRB	Total Metals	Nickel (mg/L)_Total Metals	Residuals	58	8.857470758	0.152715013			0
LC_FRB	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.334613177	0.334613177	4.961907633	0.029805848	1
LC_FRB	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	0.430240717	0.039112792	0.57999528	0.837248785	0
LC_FRB	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.145145154	0.013195014	0.195666056	0.997278534	0
LC_FRB	Total Metals	Potassium (mg/L)_Total Metals	Residuals	58	3.91131107	0.067436398			0
LC_FRB	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.426593413	0.426593413	22.78925927	1.26616E-05	1
LC_FRB	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	5.605978843	0.50963444	27.22543536	6.29916E-19	0
LC_FRB	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.260073781	0.023643071	1.263048274	0.268760971	0
LC_FRB	Total Metals	Selenium (mg/L)_Total Metals	Residuals	58	1.085705229	0.018719056			0
LC_FRB	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.000131662	0.000131662	0.01073411	0.917846057	0
LC_FRB	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.216709981	0.019700907	1.606167331	0.12170752	0
LC_FRB	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.083915276	0.007628661	0.621946319	0.802534437	0
LC_FRB	Total Metals	Silicon (mg/L)_Total Metals	Residuals	57	0.699149894	0.012265788			0
LC_FRB	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.023508336	0.023508336	0.189109189	0.665272874	0
LC_FRB	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	1.628331742	0.148030158	1.190805831	0.313704403	0
LC_FRB	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.215501527	0.110500139	0.888901363	0.556116255	0
LC_FRB	Total Metals	Silver (mg/L)_Total Metals	Residuals	58	7.210032871	0.124310912			0
LC_FRB	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.013904848	0.013904848	0.76179554	0.386366372	0
LC_FRB	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	1.762974885	0.160270444	8.780629002	6.48171E-09	0
LC_FRB	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.221673259	0.020152114	1.104060339	0.374725095	0
LC_FRB	Total Metals	Sodium (mg/L)_Total Metals	Residuals	58	1.058658298	0.018252729			0
LC_FRB	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.052487747	0.052487747	6.633978334	0.01257588	1
LC_FRB	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	2.38046336	0.21640576	27.35173856	5.64722E-19	0
LC_FRB	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.110515863	0.010046897	1.269837227	0.264809463	0
LC_FRB	Total Metals	Strontium (mg/L)_Total Metals	Residuals	58	0.458893465	0.007911956			0
LC_FRB	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	2.43878E-05	2.43878E-05	0.000454585	0.983062766	0
LC_FRB	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	0.56017575	0.050925068	0.949237022	0.501595863	0
LC_FRB	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.366867471	0.033351588	0.621669513	0.802913822	0
LC_FRB	Total Metals	Thallium (mg/L)_Total Metals	Residuals	58	3.111608468	0.053648422			0
LC_FRB	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.112384644	0.112384644	6.595135476	0.0128239	1
LC_FRB	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.186721441	0.016974676	0.996135122	0.460960491	0
LC_FRB	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.286581447	0.026052859	1.528875545	0.14606506	0
LC_FRB	Total Metals	Tin (mg/L)_Total Metals	Residuals	58	0.988351091	0.017040536			0
LC_FRB	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.068217467	0.068217467	5.046471206	0.028498692	1
LC_FRB	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.150410496	0.013673681	1.011527448	0.448011774	0
LC_FRB	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.080490591	0.007317326	0.541308245	0.86683256	0
LC_FRB	Total Metals	Titanium (mg/L)_Total Metals	Residuals	58	0.784035597	0.013517855			0
LC_FRB	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.349981286	0.349981286	34.77206863	2.0156E-07	1
LC_FRB	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	1.192003827	0.108363984	10.76640394	1.90418E-10	0
LC_FRB	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.131982683	0.011998426	1.192092546	0.312857231	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
LC_FRB	Total Metals	Uranium (mg/L)_Total Metals	Residuals	58	0.583770693	0.010065012			0
LC_FRB	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	1.560407342	1.560407342	9.11426356	0.003765578	1
LC_FRB	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	1.3383919	0.121671991	0.710680194	0.723408363	0
LC_FRB	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.409338201	0.128121655	0.748352367	0.688209768	0
LC_FRB	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	58	9.92988904	0.171204983			0
LC_FRB	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.026774628	0.026774628	0.317477863	0.575299339	0
LC_FRB	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	0.929825785	0.084529617	1.002302693	0.455747824	0
LC_FRB	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.714888601	0.064989873	0.770611851	0.667210614	0
LC_FRB	Total Metals	Zinc (mg/L)_Total Metals	Residuals	58	4.891454258	0.084335418			0
LC_FRUS	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.000779722	0.000779722	0.161760725	0.69407529	0
LC_FRUS	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.051684454	0.004698587	0.974766917	0.510734799	0
LC_FRUS	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	13	0.062662803	0.004820216			0
LC_FRUS	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.004408155	0.004408155	0.73770259	0.405956837	0
LC_FRUS	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.166691853	0.015153805	2.53598194	0.056814181	0
LC_FRUS	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	13	0.077681729	0.005975518			0
LC_FRUS	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.865782337	0.865782337	1.023141615	0.330231952	0
LC_FRUS	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	6.660580976	0.605507361	0.715560659	0.707340621	0
LC_FRUS	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	13	11.00059876	0.846199905			0
LC_FRUS	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.003766015	0.003766015	0.904293692	0.358978941	0
LC_FRUS	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	0.624769392	0.056797217	13.6381203	2.14598E-05	0
LC_FRUS	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	13	0.054139706	0.004164593			0
LC_FRUS	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.008344306	0.008344306	0.079829135	0.781977537	0
LC_FRUS	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	1.218282044	0.110752913	1.05956191	0.454562397	0
LC_FRUS	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	13	1.358852046	0.10452708			0
LC_FRUS	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	4.67919E-05	4.67919E-05	0.006261106	0.938136544	0
LC_FRUS	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.678952531	0.061722957	8.258986421	0.000331654	0
LC_FRUS	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	13	0.097154591	0.00747343			0
LC_FRUS	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.002410299	0.002410299	0.130434783	0.723783166	0
LC_FRUS	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.219337245	0.01993975	1.079051383	0.442355028	0
LC_FRUS	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	13	0.240226507	0.018478962			0
LC_FRUS	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.3165378	0.3165378	11.94873501	0.004253117	1
LC_FRUS	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.234968912	0.02136081	0.806332327	0.635398219	0
LC_FRUS	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	13	0.3443872	0.026491323			0
LC_FRUS	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	3.8084E-05	3.8084E-05	0.586310726	0.457527128	0
LC_FRUS	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.000596081	5.41892E-05	0.834253747	0.613743623	0
LC_FRUS	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	13	0.000844418	6.49553E-05			0
LC_FRUS	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.009510313	0.009510313	2.124947479	0.1686489	0
LC_FRUS	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.154230601	0.014020964	3.132789829	0.026992033	0
LC_FRUS	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	13	0.058182176	0.004475552			0
LC_FRUS	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.010364048	0.010364048	1.402092457	0.257572399	0
LC_FRUS	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	0.839074035	0.076279458	10.31940874	0.00010121	0
LC_FRUS	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	13	0.09609397	0.007391844			0
LC_FRUS	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.002352301	0.002352301	0.021182459	0.886515449	0
LC_FRUS	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	2.061352409	0.187395674	1.687497281	0.183473369	0
LC_FRUS	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	13	1.443643071	0.111049467			0
LC_FRUS	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.08195519	0.08195519	0.55230103	0.470596965	0
LC_FRUS	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	11.51242128	1.046583752	7.052991805	0.000744205	0
LC_FRUS	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	13	1.929052118	0.148388624			0
LC_FRUS	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.826074177	0.826074177	3.994179711	0.067014787	0
LC_FRUS	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	16.37950721	1.48904611	7.199738138	0.000670864	0
LC_FRUS	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	13	2.688653262	0.206819482			0
LC_FRUS	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.00299911	0.00299911	0.130434783	0.723783166	0
LC_FRUS	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.272919015	0.02481082	1.079051383	0.442355028	0
LC_FRUS	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	13	0.298911302	0.022993177			0
LC_FRUS	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.009752348	0.009752348	0.703600395	0.416734337	0
LC_FRUS	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	0.267051486	0.024277408	1.751536553	0.167276778	0
LC_FRUS	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	13	0.180188247	0.013860634			0
LC_FRUS	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.55721E-05	4.55721E-05	0.130434783	0.723783166	0
LC_FRUS	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.004147057	0.000377005	1.079051383	0.442355028	0
LC_FRUS	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	13	0.004542015	0.000349386			0
LC_FRUS	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000471964	0.000471964	0.038419747	0.847633418	0
LC_FRUS	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.446439586	0.131494508	10.70417007	8.28826E-05	0
LC_FRUS	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	13	0.159697444	0.012284419			0
LC_FRUS	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	6.874232199	6.874232199	7.24577E+30	9.6985E-195	1
LC_FRUS	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.14803E-29	1.04367E-30	1.100075179	0.429486644	0
LC_FRUS	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	13	1.23334E-29	9.48723E-31			0
LC_FRUS	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	7.686865655	7.686865655	6.282608696	0.026264135	1
LC_FRUS	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	7.607071202	0.691551927	0.565217391	0.825001849	0
LC_FRUS	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	13	15.90569433	1.223514949			0
LC_FRUS	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.00610957	0.00610957	1.228260733	0.287829016	0
LC_FRUS	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.063123732	0.005738521	1.153665576	0.39809583	0
LC_FRUS	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	13	0.064664124	0.004974163			0
LC_FRUS	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.144912492	0.144912492	0.745859129	0.403443564	0
LC_FRUS	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.54837816	0.140761651	0.724494904	0.700200977	0
LC_FRUS	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	13	2.525761674	0.19428936			0
LC_FRUS	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.04343664	0.04343664	1.146582476	0.303743683	0
LC_FRUS	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.483647042	0.043967913	1.160606321	0.3941781	0
LC_FRUS	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	13	0.492486434	0.037883572			0
LC_FRUS	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.1158E-31	4.1158E-31	0.130434783	0.723783166	0
LC_FRUS	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	3.74537E-29	3.40489E-30	1.079051383	0.442355028	0
LC_FRUS	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	13	4.10208E-29	3.15544E-30			0
LC_FRUS	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.005318308	0.005318308	0.130434783	0.723783166	0
LC_FRUS	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.483966066	0.043996915	1.079051383	0.442355028	0
LC_FRUS	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	13	0.530058072	0.040773698			0
LC_FRUS	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.089006784	0.089006784	0.518822956	0.484094992	0
LC_FRUS	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	1.458825668	0.132620515	0.77304858	0.661566974	0
LC_FRUS	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	13	2.230217794	0.171555215			0
LC_FRUS	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.70422E-30	3.70422E-30	0.130434783	0.723783166	0
LC_FRUS	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	3.37084E-28	3.0644E-29	1.079051383	0.442355028	0
LC_FRUS	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	13	3.69187E-28	2.8399E-29			0
LC_FRUS	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.258317486	0.258317486	24.64952251	0.000258552	1
LC_FRUS	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.270060865	0.024550988	2.342737744	0.073367039	0
LC_FRUS	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	13	0.136234985	0.010479614			0
LC_FRUS	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.03296006	0.03296006	0.314599255	0.584410086	0
LC_FRUS	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	2.782694803	0.252972255	2.414585515	0.066657617	0
LC_FRUS	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	13	1.361989166	0.104768397			0
LC_FRUS	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.696576527	0.696576527	6.282608696	0.026264135	1
LC_FRUS	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.689345629	0.062667784	0.565217391	0.825001849	0
LC_FRUS	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	13	1.441359042	0.110873772			0
LC_FRUS	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.003577321	0.003577321	0.952693634	0.346848732	0
LC_FRUS	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.505413103	0.045946646	12.23627314	3.95369E-05	0
LC_FRUS	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	13	0.048814405	0.003754954			0
LC_FRUS	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.073380924	0.073380924	1.928318349	0.188276209	0
LC_FRUS	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	1.387666987	0.126151544	3.315035096	0.02179213	0
LC_FRUS	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	13	0.494706701	0.038054362			0
LC_FRUS	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.106550347	0.106550347	6.922134009	0.020748141	1
LC_FRUS	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.460991093	0.132817372	8.628593689	0.000263718	0
LC_FRUS	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	13	0.200105127	0.015392702			0
LC_FRUS	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.005824893	0.005824893	2.627542544	0.129015548	0
LC_FRUS	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.131320437	0.011938222	5.385195352	0.002751934	0
LC_FRUS	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	13	0.028819174	0.00221686			0
LC_FRUS	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.70422E-30	3.70422E-30	0.130434783	0.723783166	0
LC_FRUS	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	3.37084E-28	3.0644E-29	1.079051383	0.442355028	0
LC_FRUS	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	13	3.69187E-28	2.8399E-29			0
LC_FRUS	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.000245577	0.000245577	0.039339913	0.845844874	0
LC_FRUS	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.6032065	0.054836955	8.784546986	0.000239966	0
LC_FRUS	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	13	0.081151642	0.006242434			0
LC_FRUS	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.70422E-30	3.70422E-30	0.130434783	0.723783166	0
LC_FRUS	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	3.37084E-28	3.0644E-29	1.079051383	0.442355028	0
LC_FRUS	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	13	3.69187E-28	2.8399E-29			0
LC_FRUS	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.1158E-31	4.1158E-31	0.130434783	0.723783166	0
LC_FRUS	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	3.74537E-29	3.40489E-30	1.079051383	0.442355028	0
LC_FRUS	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	13	4.10208E-29	3.15544E-30			0
LC_FRUS	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.037762235	0.037762235	2.791082098	0.118675992	0
LC_FRUS	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.308321173	0.028029198	2.071693886	0.106270659	0
LC_FRUS	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	13	0.17588485	0.013529604			0
LC_FRUS	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.07356103	0.07356103	10.60270653	0.006253411	1
LC_FRUS	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.294704066	0.026791279	3.861556413	0.011873171	0
LC_FRUS	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	13	0.090193328	0.006937948			0
LC_FRUS	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.696576527	0.696576527	6.282608696	0.026264135	1
LC_FRUS	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.689345629	0.062667784	0.565217391	0.825001849	0
LC_FRUS	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	13	1.441359042	0.110873772			0
LC_FRUS	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.423580826	1.423580826	23	0.000349444	1
LC_FRUS	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	1.00036E-28	9.09421E-30	1.4693E-28	1	0
LC_FRUS	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	13	0.804632641	0.061894819			0
LC_FRUS	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.015038406	0.015038406	2.893079529	0.187518048	0
LC_FRUS	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	9	1.548659703	0.1720733	33.10335754	0.007564458	0
LC_FRUS	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	3	0.015594186	0.005198062			0
LC_FRUS	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.114158733	0.114158733	0.554664944	0.470752583	0
LC_FRUS	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	2.713602615	0.246691147	1.198602401	0.378613968	0
LC_FRUS	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	1	0.010178565	0.010178565	0.049454763	0.827754726	0
LC_FRUS	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	12	2.469787945	0.205815662			0
LC_FRUS	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.034203552	0.034203552	0.143247441	0.711684558	0
LC_FRUS	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	2.66329212	0.242117465	1.014008926	0.487349107	0
LC_FRUS	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	1	0.003278242	0.003278242	0.013729563	0.908661086	0
LC_FRUS	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	12	2.865270228	0.238772519			0
LC_FRUS	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.003880222	0.003880222	1.548560833	0.237105278	0
LC_FRUS	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.028557566	0.002596142	1.036096481	0.47311339	0
LC_FRUS	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	1	0.000356857	0.000356857	0.142418479	0.71247814	0
LC_FRUS	Field Measured	pH (-)_Field Measured	Residuals	12	0.030068346	0.002505696			0
LC_FRUS	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	4.289319954	4.289319954	7.175663847	0.018946195	1
LC_FRUS	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	10.11231676	0.919301523	1.537912484	0.228006849	0
LC_FRUS	Major Ions	Bromide (mg/L)_Major Ions	Residuals	13	7.770871182	0.597759322			0
LC_FRUS	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.003930039	0.003930039	0.496854642	0.493321547	0
LC_FRUS	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	0.625584636	0.056871331	7.189949926	0.000675489	0
LC_FRUS	Major Ions	Calcium (mg/L)_Major Ions	Residuals	13	0.102827878	0.007909837			0
LC_FRUS	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	0.549020898	0.549020898	31.72397207	8.16749E-05	1
LC_FRUS	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	1.237675012	0.11251591	6.501485832	0.001115764	0
LC_FRUS	Major Ions	Chloride (mg/L)_Major Ions	Residuals	13	0.224980392	0.017306184			0
LC_FRUS	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.113512092	0.113512092	3.355742924	0.089973499	0
LC_FRUS	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.30031219	0.027301108	0.807099042	0.634799615	0
LC_FRUS	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	13	0.439740835	0.033826218			0
LC_FRUS	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.012604922	0.012604922	1.61157372	0.226526597	0
LC_FRUS	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	0.779362145	0.070851104	9.058506988	0.000203953	0
LC_FRUS	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	13	0.101679488	0.007821499			0
LC_FRUS	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	0.038908112	0.038908112	5.862321096	0.030834348	1
LC_FRUS	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	0.186821296	0.016983754	2.55895792	0.055139492	0
LC_FRUS	Major Ions	Potassium (mg/L)_Major Ions	Residuals	13	0.086280749	0.006636981			0
LC_FRUS	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.023769608	0.023769608	2.190671121	0.162671968	0
LC_FRUS	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	0.894777754	0.081343432	7.496829876	0.000546391	0
LC_FRUS	Major Ions	Sodium (mg/L)_Major Ions	Residuals	13	0.141054904	0.010850377			0
LC_FRUS	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.014919894	0.014919894	1.169578599	0.299141789	0
LC_FRUS	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	1.695803143	0.154163922	12.08499389	4.23817E-05	0
LC_FRUS	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	13	0.165836326	0.01275664			0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
LC_FRUS	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.039119516	0.039119516	1.406961337	0.256788353	0
LC_FRUS	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.573660539	0.143060049	5.145256824	0.00339758	0
LC_FRUS	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	13	0.361455356	0.027804258			0
LC_FRUS	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.141463291	0.141463291	0.517732047	0.484546045	0
LC_FRUS	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.363538504	0.214867137	0.786377877	0.651046955	0
LC_FRUS	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	13	3.552074467	0.273236497			0
LC_FRUS	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	2.952341098	2.952341098	9.873400252	0.007787756	1
LC_FRUS	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	0.025373995	0.002306727	0.007714297	1	0
LC_FRUS	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	13	3.88725599	0.299019692			0
LC_FRUS	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	1.074247294	1.074247294	2.912738426	0.111640552	0
LC_FRUS	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.015275796	0.0922978	0.250258343	0.986262861	0
LC_FRUS	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	13	4.794531047	0.368810081			0
LC_FRUS	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.001206693	0.001206693	0.010588847	0.920926569	0
LC_FRUS	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	0.583297472	0.053027043	0.465317401	0.876384243	0
LC_FRUS	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	7	0.797712057	0.113958865			0
LC_FRUS	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	1.852025779	1.852025779	2.945885741	0.109813018	0
LC_FRUS	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	10.5210878	0.956462527	1.521376945	0.233569735	0
LC_FRUS	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	13	8.172867939	0.628682149			0
LC_FRUS	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	1.691980621	1.691980621	6.884038841	0.021035934	1
LC_FRUS	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	25.07110276	2.27919116	9.273179775	0.000180046	0
LC_FRUS	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	13	3.195180704	0.245783131			0
LC_FRUS	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	0.058691258	0.058691258	6.893474066	0.020964221	1
LC_FRUS	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	0.726045852	0.066004168	7.752398577	0.000460224	0
LC_FRUS	Total Metals	Antimony (mg/L)_Total Metals	Residuals	13	0.110682414	0.008514032			0
LC_FRUS	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.088779637	0.088779637	2.622474906	0.129353354	0
LC_FRUS	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	1.541685622	0.140153238	4.14000734	0.008876026	0
LC_FRUS	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	13	0.44009393	0.033853379			0
LC_FRUS	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.019397928	0.019397928	1.93986582	0.187045464	0
LC_FRUS	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	1.416918761	0.128810796	12.88156477	2.96322E-05	0
LC_FRUS	Total Metals	Barium (mg/L)_Total Metals	Residuals	13	0.129995104	0.009999623			0
LC_FRUS	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	6.874232199	6.874232199	7.24577E+30	9.6985E-195	1
LC_FRUS	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	1.14803E-29	1.04367E-30	1.100075179	0.429486644	0
LC_FRUS	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	13	1.23334E-29	9.48723E-31			0
LC_FRUS	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	7.686865655	7.686865655	6.282608696	0.026264135	1
LC_FRUS	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	7.607071202	0.691551927	0.565217391	0.825001849	0
LC_FRUS	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	13	15.90569433	1.223514949			0
LC_FRUS	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	0.018735368	0.018735368	2.748240374	0.121282644	0
LC_FRUS	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	0.231513012	0.021046637	3.087274271	0.028500727	0
LC_FRUS	Total Metals	Boron (mg/L)_Total Metals	Residuals	13	0.0886239	0.006817223			0
LC_FRUS	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.055606851	0.055606851	0.612331763	0.447931269	0
LC_FRUS	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	2.021020553	0.183729141	2.023189372	0.113713838	0
LC_FRUS	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	13	1.180551296	0.090811638			0
LC_FRUS	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.00094609	0.00094609	0.12071852	0.733817187	0
LC_FRUS	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	0.690519462	0.062774497	8.009858828	0.000388848	0
LC_FRUS	Total Metals	Calcium (mg/L)_Total Metals	Residuals	13	0.101883001	0.007837154			0
LC_FRUS	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.028840025	0.028840025	0.377979616	0.549296882	0
LC_FRUS	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	1.827280321	0.166116393	2.177134362	0.091858743	0
LC_FRUS	Total Metals	Chromium (mg/L)_Total Metals	Residuals	13	0.991906216	0.076300478			0
LC_FRUS	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.003118721	0.003118721	0.165639641	0.690637982	0
LC_FRUS	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	0.217739609	0.01979451	1.051314222	0.459808649	0
LC_FRUS	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	13	0.244768522	0.018828348			0
LC_FRUS	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.001623897	0.001623897	0.256387638	0.621090737	0
LC_FRUS	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	0.068265066	0.006205915	0.979815801	0.507254105	0
LC_FRUS	Total Metals	Copper (mg/L)_Total Metals	Residuals	13	0.082338839	0.006333757			0
LC_FRUS	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	1.472069378	1.472069378	8.391391229	0.012484607	1
LC_FRUS	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	15.47348413	1.406680375	8.018647452	0.000386646	0
LC_FRUS	Total Metals	Iron (mg/L)_Total Metals	Residuals	13	2.280539828	0.175426141			0
LC_FRUS	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.047754975	0.047754975	2.036534453	0.177135022	0
LC_FRUS	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	3.064134222	0.278557657	11.87922848	4.66382E-05	0
LC_FRUS	Total Metals	Lead (mg/L)_Total Metals	Residuals	13	0.304838781	0.023449137			0
LC_FRUS	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.248669306	0.248669306	19.18137426	0.00074508	1
LC_FRUS	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	0.272213511	0.024746683	1.908861988	0.133591342	0
LC_FRUS	Total Metals	Lithium (mg/L)_Total Metals	Residuals	13	0.168533335	0.012964103			0
LC_FRUS	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.013519086	0.013519086	1.820054225	0.200336779	0
LC_FRUS	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	0.835731248	0.075975568	10.22847636	0.000106198	0
LC_FRUS	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	13	0.096562024	0.007427848			0
LC_FRUS	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	0.067334624	0.067334624	0.58634018	0.457516074	0
LC_FRUS	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	6.350128349	0.577284395	5.026909108	0.00377898	0
LC_FRUS	Total Metals	Manganese (mg/L)_Total Metals	Residuals	13	1.49290488	0.114838837			0
LC_FRUS	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	21.02834833	21.02834833	189.6602584	3.94177E-09	1
LC_FRUS	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	0.689345629	0.062667784	0.565217391	0.825001849	0
LC_FRUS	Total Metals	Mercury (mg/L)_Total Metals	Residuals	13	1.441359042	0.110873772			0
LC_FRUS	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.003782567	0.003782567	0.67497091	0.426134971	0
LC_FRUS	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	0.43410932	0.039464484	7.042144017	0.000749983	0
LC_FRUS	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	13	0.07285257	0.005604044			0
LC_FRUS	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.06685714	0.06685714	1.672150202	0.218478622	0
LC_FRUS	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	2.832291475	0.257481043	6.439805535	0.001169283	0
LC_FRUS	Total Metals	Nickel (mg/L)_Total Metals	Residuals	13	0.519775565	0.039982736			0
LC_FRUS	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	0.02160378	0.02160378	3.0728941	0.103140806	0
LC_FRUS	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	0.147286487	0.013389681	1.904531088	0.134414548	0
LC_FRUS	Total Metals	Potassium (mg/L)_Total Metals	Residuals	13	0.091395646	0.007030434			0
LC_FRUS	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.012652495	0.012652495	0.720473425	0.411346546	0
LC_FRUS	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	1.590147519	0.144558865	8.231642619	0.000337434	0
LC_FRUS	Total Metals	Selenium (mg/L)_Total Metals	Residuals	13	0.228297721	0.017561363			0
LC_FRUS	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	2.71735E-05	2.71735E-05	0.006906069	0.935035828	0
LC_FRUS	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.07591552	0.006901411	1.753976934	0.166690206	0
LC_FRUS	Total Metals	Silicon (mg/L)_Total Metals	Residuals	13	0.051151381	0.003934722			0
LC_FRUS	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	0.008338399	0.008338399	0.151127985	0.703752179	0
LC_FRUS	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	0.645001323	0.058636484	1.062747648	0.452548744	0
LC_FRUS	Total Metals	Silver (mg/L)_Total Metals	Residuals	13	0.717267446	0.055174419			0
LC_FRUS	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.016641647	0.016641647	1.735789204	0.210421527	0
LC_FRUS	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	0.955321363	0.086847397	9.058524723	0.000203951	0
LC_FRUS	Total Metals	Sodium (mg/L)_Total Metals	Residuals	13	0.124635765	0.009587367			0
LC_FRUS	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.000147506	0.000147506	0.026531261	0.873114369	0
LC_FRUS	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	0.673355064	0.061214097	11.01028165	7.10025E-05	0
LC_FRUS	Total Metals	Strontium (mg/L)_Total Metals	Residuals	13	0.072276376	0.005559721			0
LC_FRUS	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.000935298	0.000935298	0.418124259	0.529126152	0
LC_FRUS	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	0.085112112	0.007737465	3.459027959	0.018479261	0
LC_FRUS	Total Metals	Thallium (mg/L)_Total Metals	Residuals	13	0.029079569	0.00223689			0
LC_FRUS	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	4.1158E-31	4.1158E-31	0.130434783	0.723783166	0
LC_FRUS	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	3.74537E-29	3.40489E-30	1.079051383	0.442355028	0
LC_FRUS	Total Metals	Tin (mg/L)_Total Metals	Residuals	13	4.10208E-29	3.15544E-30			0
LC_FRUS	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	0.049183346	0.049183346	2.738731629	0.121870724	0
LC_FRUS	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.33776274	0.030705704	1.709820255	0.177647839	0
LC_FRUS	Total Metals	Titanium (mg/L)_Total Metals	Residuals	13	0.233459714	0.01795844			0
LC_FRUS	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.069500898	0.069500898	8.19310998	0.013337095	1
LC_FRUS	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	0.345793582	0.03143578	3.705805426	0.014045306	0
LC_FRUS	Total Metals	Uranium (mg/L)_Total Metals	Residuals	13	0.11027701	0.008482847			0
LC_FRUS	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	0.754171778	0.754171778	6.64590742	0.022944898	1
LC_FRUS	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	0.635139174	0.057739925	0.508815374	0.865509472	0
LC_FRUS	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	13	1.475228663	0.113479128			0
LC_FRUS	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.015650393	0.015650393	0.210089802	0.65426525	0
LC_FRUS	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	0.832783014	0.075707547	1.016292883	0.48261213	0
LC_FRUS	Total Metals	Zinc (mg/L)_Total Metals	Residuals	13	0.968419757	0.074493827			0
RG_CH1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.049596306	0.049596306	2.912503298	0.092458597	0
RG_CH1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.374251412	0.034022856	1.997964927	0.041955812	0
RG_CH1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.242678919	0.02206172	1.295556817	0.246089185	0
RG_CH1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Residuals	68	1.157955354	0.017028755			0
RG_CH1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.420594876	0.420594876	2.316268874	0.132732736	0
RG_CH1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	3.169803527	0.288163957	1.58695515	0.12291374	0
RG_CH1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	8.210873712	0.746443065	4.110755828	0.000127293	0
RG_CH1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	67	12.16605594	0.181582924			0
RG_CH1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.123343257	0.123343257	0.17234327	0.679364044	0
RG_CH1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	1.837365901	0.167033264	0.233389807	0.994264261	0
RG_CH1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	2.806169369	0.255106306	0.356451226	0.968087684	0
RG_CH1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	67	47.95080295	0.715683626			0
RG_CH1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	1	0.001007814	0.001007814	0.211595595	0.646987122	0
RG_CH1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(Month)	11	0.878605718	0.079873247	16.76978444	2.29877E-15	0
RG_CH1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.038254331	0.003477666	0.730153328	0.705949934	0
RG_CH1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Residuals	68	0.323878987	0.004762926			0
RG_CH1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.012638681	0.012638681	0.148014548	0.701640642	0
RG_CH1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	4.98406691	0.453096992	5.306324638	5.38323E-06	0
RG_CH1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.833692865	0.07579026	0.887597432	0.556535872	0
RG_CH1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Residuals	68	5.806390966	0.085388102			0
RG_CH1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	3.52248E-05	3.52248E-05	0.009147305	0.924086568	0
RG_CH1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.944861403	0.085896491	22.30594067	1.99873E-18	0
RG_CH1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.038121402	0.003465582	0.899956033	0.545056434	0
RG_CH1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	0.261856762	0.003850835			0
RG_CH1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.788225237	0.788225237	4.110805861	0.046590539	1
RG_CH1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	3.349311787	0.30448289	1.587959874	0.12260581	0
RG_CH1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	8.427008543	0.766091686	3.995373459	0.000173596	0
RG_CH1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	67	12.84689491	0.1917447			0
RG_CH1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	1	0.158198647	0.158198647	4.136941531	0.045860573	1
RG_CH1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(Month)	11	0.386934965	0.035175906	0.919860367	0.526742845	0
RG_CH1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.263204829	0.023927712	0.625716756	0.800676371	0
RG_CH1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Residuals	68	2.600352928	0.038240484			0
RG_CH1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	1	0.000301356	0.000301356	3.84011699	0.054140452	0
RG_CH1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(Month)	11	0.002369617	0.00021542	2.745051364	0.005343091	0
RG_CH1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.001031954	9.3814E-05	1.195453442	0.307018524	0
RG_CH1	Conventional Parameters	pH (-)_Conventional Parameters	Residuals	68	0.005336345	7.84757E-05			0
RG_CH1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.049701112	0.049701112	12.61331228	0.000700825	1
RG_CH1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(Month)	11	0.421051204	0.038277382	9.714160369	2.82896E-10	0
RG_CH1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.039035867	0.003548715	0.900604659	0.544456137	0
RG_CH1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Residuals	68	0.267945133	0.00394037			0
RG_CH1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.030141492	0.030141492	3.412982189	0.06903578	0
RG_CH1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(Month)	11	0.928020341	0.084365486	9.552874836	3.89087E-10	0
RG_CH1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.049641729	0.004512884	0.511003053	0.889484559	0
RG_CH1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Residuals	68	0.600536814	0.008831424			0
RG_CH1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	1	0.254111691	0.254111691	2.257567595	0.137592748	0
RG_CH1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(Month)	11	5.298375803	0.481670528	4.279235516	7.82507E-05	0
RG_CH1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	0.320272121	0.029115647	0.258667918	0.991135647	0
RG_CH1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Residuals	68	7.65407647	0.112559948			0
RG_CH1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	1	2.330971387	2.330971387	7.570749258	0.00759712	1
RG_CH1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(Month)	11	7.304472081	0.664042916	2.156741367	0.027281223	0
RG_CH1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	2.450287264	0.222753388	0.723479513	0.712228446	0
RG_CH1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Residuals	68	20.93664034	0.30789177			0
RG_CH1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	1	0.231418626	0.231418626	0.854721264	0.358489366	0
RG_CH1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(Month)	11	19.34554139	1.758685581	6.495527136	2.92784E-07	0
RG_CH1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year):as.factor(Month)	11	5.054880228	0.459534566	1.697244395	0.092630381	0
RG_CH1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Residuals	68	18.41122622	0.270753327			0
RG_CH1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.279196975	0.279196975	2.539661609	0.115656575	0
RG_CH1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.663427954	0.060311632	0.548613168	0.862754613	0
RG_CH1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.40237962	0.036579965	0.332742624	0.975498036	0
RG_CH1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Residuals	68	7.475560611	0.109934715			0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
RG_CH1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.117398926	0.117398926	5.794645892	0.018795132	1
RG_CH1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(Month)	11	0.34426971	0.031297246	1.544788068	0.136084782	0
RG_CH1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.870742601	0.079158418	3.907148211	0.000213639	0
RG_CH1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Residuals	68	1.377672961	0.020259896			0
RG_CH1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.183511663	0.183511663	8.135898816	0.005743512	1
RG_CH1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(Month)	11	0.318576832	0.02896153	1.283995118	0.252599241	0
RG_CH1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.830125224	0.075465929	3.345744659	0.00100054	0
RG_CH1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Residuals	68	1.533794036	0.022555795			0
RG_CH1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.03885042	0.03885042	4.945948409	0.02947627	1
RG_CH1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.809181333	0.16447103	20.93838974	1.00161E-17	0
RG_CH1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.073531807	0.00668471	0.851013443	0.590916387	0
RG_CH1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Residuals	68	0.534139931	0.007854999			0
RG_CH1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	1	23.01032172	23.01032172	48.13406536	1.95644E-09	1
RG_CH1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.217675453	0.110697768	0.231562761	0.994455755	0
RG_CH1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.886158637	0.080559876	0.16851891	0.998666622	0
RG_CH1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Residuals	67	32.02911584	0.478046505			0
RG_CH1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	1	27.33667175	27.33667175	21.34417879	1.76231E-05	1
RG_CH1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(Month)	11	1.5191852	0.138107745	0.10783304	0.999843594	0
RG_CH1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	1.18610215	0.107827468	0.084190525	0.999954592	0
RG_CH1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Residuals	68	87.09136563	1.280755377			0
RG_CH1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.118264735	0.118264735	5.838765971	0.018366737	1
RG_CH1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.345020883	0.031365535	1.548526003	0.134830861	0
RG_CH1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.869931924	0.07908472	3.904436725	0.000215221	0
RG_CH1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Residuals	68	1.377346174	0.020255091			0
RG_CH1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.469377535	0.469377535	5.462773794	0.022377519	1
RG_CH1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.536007618	0.048727965	0.567112467	0.848684721	0
RG_CH1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.990848716	0.090077156	1.048348272	0.415448939	0
RG_CH1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Residuals	68	5.842759296	0.085922931			0
RG_CH1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.33618757	0.33618757	5.155967055	0.026338441	1
RG_CH1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.85574958	0.077795416	1.193115509	0.308566351	0
RG_CH1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.832448455	0.075677132	1.16062828	0.330668848	0
RG_CH1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Residuals	68	4.433844226	0.065203592			0
RG_CH1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.118264735	0.118264735	5.838765971	0.018366737	1
RG_CH1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(Month)	11	0.345020883	0.031365535	1.548526003	0.134830861	0
RG_CH1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.869931924	0.07908472	3.904436725	0.000215221	0
RG_CH1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Residuals	68	1.377346174	0.020255091			0
RG_CH1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.342385685	0.342385685	4.027013474	0.048755319	1
RG_CH1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(Month)	11	0.433598613	0.039418056	0.463620556	0.919187451	0
RG_CH1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.160838779	0.014621707	0.171975099	0.998540227	0
RG_CH1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Residuals	68	5.781511962	0.085022235			0
RG_CH1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.775964932	1.775964932	6.11500352	0.015908926	1
RG_CH1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(Month)	11	0.490447446	0.044586131	0.153518995	0.99913992	0
RG_CH1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.79717686	0.072470624	0.249530895	0.99238411	0
RG_CH1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Residuals	68	19.74906719	0.290427459			0
RG_CH1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.118733822	0.118733822	5.861891058	0.018146339	1
RG_CH1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(Month)	11	0.344860462	0.031350951	1.547797048	0.135074586	0
RG_CH1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.869456192	0.079041472	3.902278967	0.000216489	0
RG_CH1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Residuals	68	1.377354142	0.020255208			0
RG_CH1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.172653703	0.172653703	5.000529405	0.028624216	1
RG_CH1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(Month)	11	6.722281058	0.61111646	17.69962517	6.33611E-16	0
RG_CH1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.262053015	0.023823001	0.689980098	0.743384762	0
RG_CH1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Residuals	68	2.347841768	0.034527085			0
RG_CH1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.015174959	0.015174959	0.08018358	0.777909056	0
RG_CH1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(Month)	11	6.093548428	0.553958948	2.927086155	0.003212821	0
RG_CH1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	2.434912431	0.221355676	1.169630233	0.324433422	0
RG_CH1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Residuals	68	12.86918337	0.189252697			0
RG_CH1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	1	2.871803522	2.871803522	25.61594065	3.38644E-06	1
RG_CH1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(Month)	11	0.087680639	0.007970967	0.071099509	0.999980789	0
RG_CH1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.029806938	0.002709722	0.024170201	0.999999935	0
RG_CH1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Residuals	68	7.623481105	0.112110016			0
RG_CH1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.038827943	0.038827943	5.976365401	0.01709579	1
RG_CH1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(Month)	11	0.331730115	0.030157283	4.641784468	2.99163E-05	0
RG_CH1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.046935308	0.004266846	0.656749493	0.773502206	0
RG_CH1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Residuals	68	0.44179028	0.006496916			0
RG_CH1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.118264735	0.118264735	5.838765971	0.018366737	1
RG_CH1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(Month)	11	0.345020883	0.031365535	1.548526003	0.134830861	0
RG_CH1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.869931924	0.07908472	3.904436725	0.000215221	0
RG_CH1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Residuals	68	1.377346174	0.020255091			0
RG_CH1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.423562708	0.423562708	13.23318561	0.000530798	1
RG_CH1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(Month)	11	2.878788683	0.261708062	8.176431246	6.65237E-09	0
RG_CH1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.119986023	0.01090782	0.340788288	0.973139894	0
RG_CH1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Residuals	68	2.176517809	0.032007615			0
RG_CH1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.008785497	0.008785497	2.720500055	0.103679472	0
RG_CH1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(Month)	11	0.133506138	0.012136922	3.758295682	0.000320739	0
RG_CH1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.024622693	0.002238427	0.693146866	0.740469376	0
RG_CH1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Residuals	68	0.219597057	0.003229368			0
RG_CH1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.118264735	0.118264735	5.838765971	0.018366737	1
RG_CH1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(Month)	11	0.345020883	0.031365535	1.548526003	0.134830861	0
RG_CH1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.869931924	0.07908472	3.904436725	0.000215221	0
RG_CH1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Residuals	68	1.377346174	0.020255091			0
RG_CH1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.060967924	0.060967924	8.080302526	0.005902772	1
RG_CH1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.979160051	0.08901455	11.79742469	5.83035E-12	0
RG_CH1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.062986462	0.005726042	0.758893346	0.678723035	0
RG_CH1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Residuals	68	0.513077181	0.007545253			0
RG_CH1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.118264735	0.118264735	5.838765971	0.018366737	1
RG_CH1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.345020883	0.031365535	1.548526003	0.134830861	0
RG_CH1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.869931924	0.07908472	3.904436725	0.000215221	0
RG_CH1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Residuals	68	1.377346174	0.020255091			0
RG_CH1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.118264735	0.118264735	5.838765971	0.018366737	1
RG_CH1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(Month)	11	0.345020883	0.031365535	1.548526003	0.134830861	0
RG_CH1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.869931924	0.07908472	3.904436725	0.000215221	0
RG_CH1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Residuals	68	1.377346174	0.020255091			0
RG_CH1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	1	3.68431E-05	3.68431E-05	0.344743673	0.559048314	0
RG_CH1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.00120313	0.000109375	1.023435023	0.435942323	0
RG_CH1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.000478093	4.3463E-05	0.406687094	0.94843363	0
RG_CH1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Residuals	68	0.007267224	0.000106871			0
RG_CH1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	1	0.129809431	0.129809431	14.61736251	0.000288286	1
RG_CH1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(Month)	11	1.073476564	0.097588779	10.98911336	2.50235E-11	0
RG_CH1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.051767625	0.004706148	0.529941979	0.876352166	0
RG_CH1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Residuals	68	0.603873736	0.008880496			0
RG_CH1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	1	1.778346277	1.778346277	13.22382854	0.000533017	1
RG_CH1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(Month)	11	0.464784179	0.042253107	0.314195189	0.980414984	0
RG_CH1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	0.88522134	0.080474667	0.598411691	0.823644162	0
RG_CH1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Residuals	68	9.144669899	0.13448044			0
RG_CH1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	1	4.724421719	4.724421719	22.77211876	1.00547E-05	1
RG_CH1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(Month)	11	1.995008728	0.18136443	0.874192141	0.569070532	0
RG_CH1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year):as.factor(Month)	11	5.309456277	0.482677843	2.326548692	0.017112601	0
RG_CH1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Residuals	68	14.10763224	0.20746518			0
RG_CH1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	1	0.000136586	0.000136586	0.017250309	0.895960542	0
RG_CH1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(Month)	11	0.765647527	0.069604321	8.790771078	6.3592E-09	0
RG_CH1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.075379348	0.006852668	0.865466902	0.57782306	0
RG_CH1	Field Measured	Conductivity (µS/cm)_Field Measured	Residuals	58	0.459237371	0.007917886			0
RG_CH1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	1	0.008264671	0.008264671	0.506447268	0.47953351	0
RG_CH1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(Month)	11	0.378057569	0.03436887	2.106075358	0.03404619	0
RG_CH1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.117616926	0.010692448	0.655217962	0.773761859	0
RG_CH1	Field Measured	Dissolved Oxygen (%)_Field Measured	Residuals	58	0.946497212	0.016318917			0
RG_CH1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	1	0.001214467	0.001214467	0.06531533	0.799188109	0
RG_CH1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(Month)	11	0.353554216	0.032141292	1.72859313	0.089568767	0
RG_CH1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.157934862	0.014357715	0.772173276	0.665734485	0
RG_CH1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Residuals	58	1.078446353	0.018593903			0
RG_CH1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	1	0.001132353	0.001132353	2.833704643	0.097680942	0
RG_CH1	Field Measured	pH (-)_Field Measured	as.factor(Month)	11	0.002533226	0.000230293	0.576307156	0.840171036	0
RG_CH1	Field Measured	pH (-)_Field Measured	as.factor(new_year):as.factor(Month)	11	0.005362191	0.000487472	1.21989461	0.294967311	0
RG_CH1	Field Measured	pH (-)_Field Measured	Residuals	58	0.023176894	0.000399602			0
RG_CH1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	1	8.75193E-30	8.75193E-30	0.338213926	0.562784951	0
RG_CH1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(Month)	11	2.91769E-28	2.65244E-29	1.025024343	0.434617883	0
RG_CH1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	1.15923E-28	1.05385E-29	0.407253403	0.94817875	0
RG_CH1	Major Ions	Bromide (mg/L)_Major Ions	Residuals	68	1.75963E-27	2.58769E-29			0
RG_CH1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	1	0.00411303	0.00411303	0.868023172	0.354799295	0
RG_CH1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(Month)	11	0.974838182	0.088621653	18.70291474	1.66119E-16	0
RG_CH1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.049606036	0.00450964	0.951724582	0.497941729	0
RG_CH1	Major Ions	Calcium (mg/L)_Major Ions	Residuals	68	0.322210334	0.004738387			0
RG_CH1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	1	2.972387716	2.972387716	7.667186631	0.007241115	1
RG_CH1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(Month)	11	1.593521266	0.14486557	0.373676473	0.962029552	0
RG_CH1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.570741534	0.051885594	0.133837363	0.999552044	0
RG_CH1	Major Ions	Chloride (mg/L)_Major Ions	Residuals	68	26.36199879	0.387676453			0
RG_CH1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	1	0.025125323	0.025125323	3.313860277	0.073098527	0
RG_CH1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(Month)	11	0.234998197	0.021363472	2.817697652	0.004361552	0
RG_CH1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.141066168	0.012824197	1.691424941	0.094023677	0
RG_CH1	Major Ions	Fluoride (mg/L)_Major Ions	Residuals	68	0.51556849	0.00758189			0
RG_CH1	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(new_year)	1	0.066617198	0.066617198	0.60222845	0.451617188	0
RG_CH1	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(Month)	11	0.515524152	0.046865832	0.423673437	0.919025538	0
RG_CH1	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	7	0.050709191	0.00724417	0.065488275	0.999317802	0
RG_CH1	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	Residuals	13	1.438031659	0.11061782			0
RG_CH1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	1	0.028984129	0.028984129	8.074882622	0.005918543	1
RG_CH1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(Month)	11	0.88448567	0.080407788	22.40134414	1.79113E-18	0
RG_CH1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.035466354	0.003224214	0.898255367	0.546631451	0
RG_CH1	Major Ions	Magnesium (mg/L)_Major Ions	Residuals	68	0.244080425	0.003589418			0
RG_CH1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	1	6.09188185	6.09188185	8.619946117	0.004533015	1
RG_CH1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(Month)	11	0.887409951	0.080673632	0.114152306	0.999793037	0
RG_CH1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.377534993	0.034321363	0.048564353	0.999997339	0
RG_CH1	Major Ions	Potassium (mg/L)_Major Ions	Residuals	68	48.05690896	0.706719249			0
RG_CH1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	1	0.364910795	0.364910795	2.284843835	0.135276874	0
RG_CH1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(Month)	11	3.213921436	0.292174676	1.829415615	0.065698508	0
RG_CH1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.531017646	0.048274331	0.302263759	0.983207347	0
RG_CH1	Major Ions	Sodium (mg/L)_Major Ions	Residuals	68	10.86023198	0.159709294			0
RG_CH1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	1	0.12188365	0.12188365	2.513608228	0.117507064	0
RG_CH1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(Month)	11	14.01112077	1.273738252	26.26832178	2.75702E-20	0
RG_CH1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	0.071656584	0.006514235	0.134343157	0.999543857	0
RG_CH1	Major Ions	Sulphate (mg/L)_Major Ions	Residuals	68	3.297287198	0.048489518			0
RG_CH1	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(new_year)	1	2.513457248	2.513457248	4.526971115	0.039278297	1
RG_CH1	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(Month)	11	1.747276612	0.158843328	0.286091661	0.985240308	0
RG_CH1	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(new_year):as.factor(Month)	11	2.131584785	0.193780435	0.349016651	0.968272151	0
RG_CH1	Major Ions	Sulphide (mg/L)_Major Ions	Residuals	42	23.31916899	0.555218309			0
RG_CH1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.116840276	0.116840276	0.454524004	0.502479879	0
RG_CH1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	44.9959688	4.090542619	15.91274753	7.87811E-15	0
RG_CH1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.972335383	0.088394126	0.343864748	0.972201415	0
RG_CH1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Residuals	68	17.48013016	0.257060738			0
RG_CH1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.020113955	0.020113955	1.052288196	0.308616029	0
RG_CH1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	0.180080283	0.016370935	0.856467123	0.585759006	0
RG_CH1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	0.203901903	0.018536537	0.969763451	0.481954991	0
RG_CH1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Residuals	68	1.299785522	0.019114493			0
RG_CH1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	9.628694089	9.628694089	46.17635	3.30879E-09	1
RG_CH1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	2.107352331	0.191577485	0.918748576	0.527759663	0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
RG_CH1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	6.419255086	0.583568644	2.798621466	0.004600358	0
RG_CH1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Residuals	68	14.17936234	0.208520034			0
RG_CH1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.004053932	0.004053932	0.02228234	0.881780287	0
RG_CH1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(Month)	11	1.808599733	0.164418158	0.903720348	0.541575763	0
RG_CH1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	4.185070158	0.380460923	2.091194083	0.032611612	0
RG_CH1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Residuals	68	12.37156465	0.181934774			0
RG_CH1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	0.616705204	0.616705204	3.394803533	0.070263318	0
RG_CH1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	4.336604307	0.394236755	2.170171942	0.027949264	0
RG_CH1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	3.31664698	0.301513362	1.659753509	0.104825947	0
RG_CH1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Residuals	61	11.08135332	0.18166153			0
RG_CH1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	1	8.573878743	8.573878743	4.352097231	0.040716988	1
RG_CH1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(Month)	11	23.82608878	2.166008071	1.099464783	0.375268541	0
RG_CH1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year):as.factor(Month)	11	5.981048823	0.543731711	0.275997987	0.988390651	0
RG_CH1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Residuals	68	133.9638624	1.9700568			0
RG_CH1	Parent PAHs	Acenaphthene (%)_Parent PAHs	as.factor(new_year)	1	0.028070751	0.028070751	1.77828427	0.409622007	0
RG_CH1	Parent PAHs	Acenaphthene (%)_Parent PAHs	as.factor(Month)	10	0.084843757	0.008484376	0.537485859	0.797523269	0
RG_CH1	Parent PAHs	Acenaphthene (%)_Parent PAHs	Residuals	1	0.0157853	0.0157853			0
RG_CH1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.280931854	0.280931854	0.216911474	0.722520401	0
RG_CH1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	as.factor(Month)	10	4.511013855	0.451101385	0.348301786	0.878952273	0
RG_CH1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	Residuals	1	1.295145197	1.295145197			0
RG_CH1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.280931854	0.280931854	0.216911474	0.722520401	0
RG_CH1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	as.factor(Month)	10	4.511013855	0.451101385	0.348301786	0.878952273	0
RG_CH1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	Residuals	1	1.295145197	1.295145197			0
RG_CH1	Parent PAHs	Acridine (µg/L)_Parent PAHs	as.factor(new_year)	1	0.316398645	0.316398645	0.244295887	0.707761308	0
RG_CH1	Parent PAHs	Acridine (µg/L)_Parent PAHs	as.factor(Month)	10	4.214347529	0.421434753	0.325395758	0.889863732	0
RG_CH1	Parent PAHs	Acridine (µg/L)_Parent PAHs	Residuals	1	1.295145197	1.295145197			0
RG_CH1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.280931854	0.280931854	0.216911474	0.722520401	0
RG_CH1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	as.factor(Month)	10	4.511013855	0.451101385	0.348301786	0.878952273	0
RG_CH1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	Residuals	1	1.295145197	1.295145197			0
RG_CH1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.280931854	0.280931854	0.216911474	0.722520401	0
RG_CH1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	as.factor(Month)	10	4.511013855	0.451101385	0.348301786	0.878952273	0
RG_CH1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	Residuals	1	1.295145197	1.295145197			0
RG_CH1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.44349509	0.44349509	4.25832E+29	9.75575E-16	1
RG_CH1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	as.factor(Month)	10	9.14978E-31	9.14978E-32	0.087853821	0.992924	0
RG_CH1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	Residuals	1	1.04148E-30	1.04148E-30			0
RG_CH1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.280931854	0.280931854	0.216911474	0.722520401	0
RG_CH1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	as.factor(Month)	10	4.511013855	0.451101385	0.348301786	0.878952273	0
RG_CH1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	Residuals	1	1.295145197	1.295145197			0
RG_CH1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.280931854	0.280931854	0.216911474	0.722520401	0
RG_CH1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	as.factor(Month)	10	4.511013855	0.451101385	0.348301786	0.878952273	0
RG_CH1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	Residuals	1	1.295145197	1.295145197			0
RG_CH1	Parent PAHs	Chrysene (%)_Parent PAHs	as.factor(new_year)	1	0.009056031	0.009056031	0.340829269	0.663592971	0
RG_CH1	Parent PAHs	Chrysene (%)_Parent PAHs	as.factor(Month)	10	0.066100525	0.006610052	0.248773373	0.927211882	0
RG_CH1	Parent PAHs	Chrysene (%)_Parent PAHs	Residuals	1	0.026570579	0.026570579			0
RG_CH1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.280931854	0.280931854	0.216911474	0.722520401	0
RG_CH1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	as.factor(Month)	10	4.511013855	0.451101385	0.348301786	0.878952273	0
RG_CH1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	Residuals	1	1.295145197	1.295145197			0
RG_CH1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	as.factor(new_year)	1	1.430378494	1.430378494	1.10441555	0.484199815	0
RG_CH1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	as.factor(Month)	10	4.511013855	0.451101385	0.348301786	0.878952273	0
RG_CH1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	Residuals	1	1.295145197	1.295145197			0
RG_CH1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.280931854	0.280931854	0.216911474	0.722520401	0
RG_CH1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	as.factor(Month)	10	4.511013855	0.451101385	0.348301786	0.878952273	0
RG_CH1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	Residuals	1	1.295145197	1.295145197			0
RG_CH1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.280931854	0.280931854	0.216911474	0.722520401	0
RG_CH1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	as.factor(Month)	10	4.511013855	0.451101385	0.348301786	0.878952273	0
RG_CH1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	Residuals	1	1.295145197	1.295145197			0
RG_CH1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.280931854	0.280931854	0.216911474	0.722520401	0
RG_CH1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	as.factor(Month)	10	4.511013855	0.451101385	0.348301786	0.878952273	0
RG_CH1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	Residuals	1	1.295145197	1.295145197			0
RG_CH1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.775004959	0.775004959	5.06684E+30	2.82821E-16	1
RG_CH1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	as.factor(Month)	10	1.36704E-31	1.36704E-32	0.089374355	0.992572102	0
RG_CH1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	Residuals	1	1.52956E-31	1.52956E-31			0
RG_CH1	Parent PAHs	Phenanthrene (%)_Parent PAHs	as.factor(new_year)	1	0.010531938	0.010531938	1.268396701	0.462249139	0
RG_CH1	Parent PAHs	Phenanthrene (%)_Parent PAHs	as.factor(Month)	10	0.048469004	0.0048469	0.583728509	0.780140868	0
RG_CH1	Parent PAHs	Phenanthrene (%)_Parent PAHs	Residuals	1	0.008303347	0.008303347			0
RG_CH1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.08432504	0.08432504	0.200872259	0.73176291	0
RG_CH1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	as.factor(Month)	10	1.417328855	0.141732886	0.337624565	0.88401618	0
RG_CH1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	Residuals	1	0.419794353	0.419794353			0
RG_CH1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	as.factor(new_year)	1	0.280931854	0.280931854	0.216911474	0.722520401	0
RG_CH1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	as.factor(Month)	10	4.511013855	0.451101385	0.348301786	0.878952273	0
RG_CH1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	Residuals	1	1.295145197	1.295145197			0
RG_CH1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	as.factor(new_year)	1	0.9600141	0.9600141	0.741240521	0.547478744	0
RG_CH1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	as.factor(Month)	10	4.252594763	0.425259476	0.328348881	0.888447206	0
RG_CH1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	Residuals	1	1.295145197	1.295145197			0
RG_CH1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	1	3.586405091	3.586405091	7.391876755	0.008306914	1
RG_CH1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(Month)	11	38.11629715	3.465117922	7.141893894	6.53688E-08	0
RG_CH1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	5.400705699	0.490973245	1.011936362	0.445592195	0
RG_CH1	Total Metals	Aluminum (mg/L)_Total Metals	Residuals	68	32.9923718	0.485181938			0
RG_CH1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	1	3.68431E-05	3.68431E-05	0.330953926	0.566996714	0
RG_CH1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(Month)	11	0.001031307	9.37552E-05	0.842184036	0.599285346	0
RG_CH1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.000347115	3.15559E-05	0.283460468	0.987047812	0
RG_CH1	Total Metals	Antimony (mg/L)_Total Metals	Residuals	68	0.007570025	0.000111324			0
RG_CH1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	1	0.094719702	0.094719702	1.764929631	0.188452143	0
RG_CH1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(Month)	11	1.284015554	0.116728687	2.175027102	0.025951729	0
RG_CH1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.924478086	0.084043462	1.5659973	0.129105347	0
RG_CH1	Total Metals	Arsenic (mg/L)_Total Metals	Residuals	68	3.649403124	0.053667693			0
RG_CH1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	1	0.011192444	0.011192444	1.512132929	0.223051623	0
RG_CH1	Total Metals	Barium (mg/L)_Total Metals	as.factor(Month)	11	1.813872541	0.164897504	22.27815033	2.06375E-18	0
RG_CH1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.061820936	0.005620085	0.759290452	0.678345156	0
RG_CH1	Total Metals	Barium (mg/L)_Total Metals	Residuals	68	0.503319624	0.007401759			0
RG_CH1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	1	26.52063106	26.52063106	57.96997369	1.19563E-10	1
RG_CH1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(Month)	11	0.668956869	0.060814261	0.132930513	0.999564882	0
RG_CH1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.226690805	0.020608255	0.045046439	0.999998199	0
RG_CH1	Total Metals	Beryllium (mg/L)_Total Metals	Residuals	67	30.65176966	0.457489099			0
RG_CH1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	1	31.0510256	31.0510256	24.63389016	4.91021E-06	1
RG_CH1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(Month)	11	1.110661764	0.100969251	0.080102522	0.999964712	0
RG_CH1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.379672779	0.034515707	0.027382546	0.999999872	0
RG_CH1	Total Metals	Bismuth (mg/L)_Total Metals	Residuals	68	85.71401945	1.260500286			0
RG_CH1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	1	2.94351E-31	2.94351E-31	0.344743673	0.559048314	0
RG_CH1	Total Metals	Boron (mg/L)_Total Metals	as.factor(Month)	11	9.61219E-30	8.73835E-31	1.023435023	0.435942323	0
RG_CH1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	3.81964E-30	3.4724E-31	0.406687094	0.94843363	0
RG_CH1	Total Metals	Boron (mg/L)_Total Metals	Residuals	68	5.80602E-29	8.53826E-31			0
RG_CH1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	1	0.362496151	0.362496151	2.126689631	0.14935659	0
RG_CH1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(Month)	11	1.227360609	0.111578237	0.654606344	0.775411154	0
RG_CH1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.753155524	0.068468684	0.401691549	0.95065033	0
RG_CH1	Total Metals	Cadmium (mg/L)_Total Metals	Residuals	68	11.59066086	0.170450895			0
RG_CH1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	1	0.032348273	0.032348273	7.514923569	0.00781155	1
RG_CH1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(Month)	11	0.843775249	0.076706841	17.81999456	5.38109E-16	0
RG_CH1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.026211605	0.002382873	0.55357237	0.859039467	0
RG_CH1	Total Metals	Calcium (mg/L)_Total Metals	Residuals	68	0.292708573	0.004304538			0
RG_CH1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	1	0.169766892	0.169766892	1.255345642	0.26647551	0
RG_CH1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(Month)	11	0.685070536	0.06227914	0.460524696	0.920963104	0
RG_CH1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.392660193	0.035696381	0.263957806	0.990351424	0
RG_CH1	Total Metals	Chromium (mg/L)_Total Metals	Residuals	68	9.195992164	0.135235179			0
RG_CH1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	1	0.001808874	0.001808874	0.640410752	0.426349091	0
RG_CH1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(Month)	11	0.024703755	0.002245796	0.795097684	0.644175574	0
RG_CH1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.009806914	0.000891538	0.315638451	0.980057843	0
RG_CH1	Total Metals	Cobalt (mg/L)_Total Metals	Residuals	68	0.192069634	0.002824553			0
RG_CH1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	1	0.013390725	0.013390725	1.217304351	0.27377961	0
RG_CH1	Total Metals	Copper (mg/L)_Total Metals	as.factor(Month)	11	0.101299853	0.009209078	0.837165287	0.604051843	0
RG_CH1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.034550808	0.003140983	0.285535829	0.986656454	0
RG_CH1	Total Metals	Copper (mg/L)_Total Metals	Residuals	68	0.748021067	0.01100031			0
RG_CH1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	1	6.044582763	6.044582763	11.89387899	0.000971133	1
RG_CH1	Total Metals	Iron (mg/L)_Total Metals	as.factor(Month)	11	13.17175861	1.197432601	2.356178916	0.015767491	0
RG_CH1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	1.936228774	0.176020798	0.346354769	0.971426804	0
RG_CH1	Total Metals	Iron (mg/L)_Total Metals	Residuals	68	34.55824867	0.508209539			0
RG_CH1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	1	0.071675414	0.071675414	0.818631208	0.368775187	0
RG_CH1	Total Metals	Lead (mg/L)_Total Metals	as.factor(Month)	11	0.920528181	0.08368438	0.955790022	0.494317619	0
RG_CH1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.411925617	0.037447783	0.427704879	0.938485315	0
RG_CH1	Total Metals	Lead (mg/L)_Total Metals	Residuals	68	5.953753143	0.087555193			0
RG_CH1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	1	0.119578511	0.119578511	3.482612826	0.066329803	0
RG_CH1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(Month)	11	6.339320494	0.576301863	16.78425537	2.25229E-15	0
RG_CH1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.183519766	0.016683615	0.485894762	0.905805239	0
RG_CH1	Total Metals	Lithium (mg/L)_Total Metals	Residuals	68	2.334838564	0.034335861			0
RG_CH1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	1	0.006156769	0.006156769	1.71108176	0.195249756	0
RG_CH1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(Month)	11	0.845346976	0.076849725	21.35798093	6.05951E-18	0
RG_CH1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.019240092	0.001749099	0.486107525	0.905672354	0
RG_CH1	Total Metals	Magnesium (mg/L)_Total Metals	Residuals	68	0.244675811	0.003598174			0
RG_CH1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	1	1.062119506	1.062119506	2.723751444	0.10347725	0
RG_CH1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(Month)	11	32.99916066	2.999923696	7.693151715	1.90181E-08	0
RG_CH1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.719893579	0.247263053	0.634093521	0.793444975	0
RG_CH1	Total Metals	Manganese (mg/L)_Total Metals	Residuals	68	26.51641602	0.389947294			0
RG_CH1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	1	67.45330903	67.45330903	41.71747217	1.31946E-08	1
RG_CH1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(Month)	11	0.985236365	0.089566942	0.055393968	0.999994709	0
RG_CH1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	2.338519226	0.212592657	0.131480996	0.999588718	0
RG_CH1	Total Metals	Mercury (mg/L)_Total Metals	Residuals	68	109.9497351	1.616907869			0
RG_CH1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	1	0.005318934	0.005318934	0.88095516	0.351262174	0
RG_CH1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(Month)	11	0.376721608	0.034247419	5.672272055	2.15065E-06	0
RG_CH1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.044261398	0.004023763	0.666440913	0.764815917	0
RG_CH1	Total Metals	Molybdenum (mg/L)_Total Metals	Residuals	68	0.410562903	0.00603769			0
RG_CH1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	1	0.041460445	0.041460445	0.652553426	0.422018136	0
RG_CH1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(Month)	11	0.56633007	0.051484552	0.810324649	0.62962912	0
RG_CH1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.190933381	0.01735758	0.273194085	0.988869616	0
RG_CH1	Total Metals	Nickel (mg/L)_Total Metals	Residuals	68	4.320428275	0.06353571			0
RG_CH1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	1	6.82641953	6.82641953	9.761200669	0.002619626	1
RG_CH1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(Month)	11	0.771992546	0.070181141	0.100353076	0.999890452	0
RG_CH1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.31994057	0.029085506	0.041589806	0.999998823	0
RG_CH1	Total Metals	Potassium (mg/L)_Total Metals	Residuals	68	47.55526946	0.699342198			0
RG_CH1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	1	0.178573897	0.178573897	6.252788743	0.014815299	1
RG_CH1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(Month)	11	2.612395267	0.237490479	8.315760679	4.94069E-09	0
RG_CH1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.061421865	0.005583806	0.195517705	0.997380459	0
RG_CH1	Total Metals	Selenium (mg/L)_Total Metals	Residuals	68	1.942017476	0.028559081			0
RG_CH1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	1	0.008393772	0.008393772	1.490452025	0.226362699	0
RG_CH1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(Month)	11	0.097810791	0.00889189	1.578901114	0.125017129	0
RG_CH1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.034138436	0.003103494	0.551076355	0.86091463	0
RG_CH1	Total Metals	Silicon (mg/L)_Total Metals	Residuals	68	0.382955286	0.005631695			0
RG_CH1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	1	5.09621E-06	5.09621E-06	0.039558451	0.842939885	0
RG_CH1	Total Metals	Silver (mg/L)_Total Metals	as.factor(Month)	11	0.00237382	0.000215802	1.675123069	0.098029811	0
RG_CH1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	9.96235E-05	9.05669E-06	0.070300908	0.99998187	0
RG_CH1	Total Metals	Silver (mg/L)_Total Metals	Residuals	68	0.008760265	0.000128827			0
RG_CH1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	1	0.438795276	0.438795276	2.7439749	0.1022293	0
RG_CH1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(Month)	11	3.225865507	0.293260501	1.833883581	0.064931035	0
RG_CH1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.512185079	0.04656228	0.29117389	0.985553096	0
RG_CH1	Total Metals	Sodium (mg/L)_Total Metals	Residuals	68	10.87403489	0.159912278			0

Table F27-2. Raw Output of Two-Factor ANOVA (Year, Month) for Log-Transformed Monthly Average Concentrations

Station	Group	Constituent	term	df	sumsq	meansq	statistic	p.value	a_check
RG_CH1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	1	0.023082366	0.023082366	3.790711644	0.055669365	0
RG_CH1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(Month)	11	0.89465687	0.081332443	13.35685574	4.11182E-13	0
RG_CH1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.023049943	0.002095449	0.344126076	0.972120752	0
RG_CH1	Total Metals	Strontium (mg/L)_Total Metals	Residuals	68	0.414064973	0.006089191			0
RG_CH1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	1	0.000459172	0.000459172	0.330953926	0.566996714	0
RG_CH1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(Month)	11	0.012853103	0.001168464	0.842184036	0.599285346	0
RG_CH1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.00432607	0.000393279	0.283460468	0.987047812	0
RG_CH1	Total Metals	Thallium (mg/L)_Total Metals	Residuals	68	0.094344638	0.001387421			0
RG_CH1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	1	0.000968329	0.000968329	2.971304348	0.089297594	0
RG_CH1	Total Metals	Tin (mg/L)_Total Metals	as.factor(Month)	11	0.003543316	0.00032212	0.988419636	0.465686976	0
RG_CH1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.006207421	0.000564311	1.731580364	0.084789646	0
RG_CH1	Total Metals	Tin (mg/L)_Total Metals	Residuals	68	0.022160767	0.000325894			0
RG_CH1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	1	3.68431E-05	3.68431E-05	0.344743673	0.559048314	0
RG_CH1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(Month)	11	0.00120313	0.000109375	1.023435023	0.435942323	0
RG_CH1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.000478093	4.3463E-05	0.406687094	0.94843363	0
RG_CH1	Total Metals	Titanium (mg/L)_Total Metals	Residuals	68	0.007267224	0.000106871			0
RG_CH1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	1	0.065218856	0.065218856	8.918091644	0.003923002	1
RG_CH1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(Month)	11	1.034560719	0.094050974	12.86062445	9.35859E-13	0
RG_CH1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.030094905	0.0027359	0.374109765	0.961867097	0
RG_CH1	Total Metals	Uranium (mg/L)_Total Metals	Residuals	68	0.497290493	0.007313095			0
RG_CH1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	1	2.437013485	2.437013485	21.89602991	1.41699E-05	1
RG_CH1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(Month)	11	0.354899687	0.032263608	0.289881418	0.985811262	0
RG_CH1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.23215819	0.02110529	0.189626386	0.997718317	0
RG_CH1	Total Metals	Vanadium (mg/L)_Total Metals	Residuals	68	7.568354521	0.111299331			0
RG_CH1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	1	0.005394742	0.005394742	1.061158022	0.30660137	0
RG_CH1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(Month)	11	0.044869915	0.004079083	0.80236489	0.637231807	0
RG_CH1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year):as.factor(Month)	11	0.017346852	0.001576987	0.31019683	0.981382391	0
RG_CH1	Total Metals	Zinc (mg/L)_Total Metals	Residuals	68	0.345700139	0.005083826			0
RG_CH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	1	0	0	-	-	-
RG_CH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(Month)	6	0	0	-	-	0
RG_CH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year):as.factor(Month)	1	0	0	-	-	0
RG_CH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Residuals	1	0	0			0
RG_CH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	1	0	0	-	-	-
RG_CH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(Month)	6	0	0	-	-	0
RG_CH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year):as.factor(Month)	1	0	0	-	-	0
RG_CH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Residuals	1	0	0			0
RG_CH1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	1	0	0	-	-	-
RG_CH1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(Month)	6	0	0	-	-	0
RG_CH1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year):as.factor(Month)	1	0	0	-	-	0
RG_CH1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Residuals	1	0	0			0
RG_CH1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	1	9.86076E-32	9.86076E-32	Inf	0	1
RG_CH1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(Month)	6	2.95823E-31	4.93038E-32	Inf	0	0
RG_CH1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Residuals	1	0	0			0

Notes: "-" = data was not available; Inf = infinite

Model outputs are provided for the aov() function in the stats package for R version 3.6.2.

The aov() function was used to run a 2-way ANOVA including the factors Year and Month for the log-transformed average monthly concentrations for all constituents at all stations

Parameters with measured values of 0 or negative values were excluded at the log-transformation step

The "a_check" column contains a value of 1 if the calculated p-value for the new_year term was <0.05

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
FR_CC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.28477162	-0.03252894	0.602072172	0.077771874	0
FR_CC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.231925	-0.434946699	-0.028903288	0.025767803	0
FR_CC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.2590692	-0.512018838	-0.006119642	0.044852781	0
FR_CC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.3229807	0.220432727	0.425528674	2.57304E-08	1
FR_CC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.2346292	0.070922426	0.398335973	0.005612491	1
FR_CC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.36132607	0.253603674	0.469048471	4.74949E-09	1
FR_CC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0101933	-0.045018567	0.024631885	0.561178008	0
FR_CC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1189815	-0.203770456	-0.034192617	0.006632892	0
FR_CC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0034123	-0.010118438	0.003293934	0.31361807	0
FR_CC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.2360704	-0.438725607	-0.033415243	0.023083337	0
FR_CC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.38958931	0.271404606	0.507774022	7.68058E-09	1
FR_CC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0097682	-0.285900825	0.266364436	0.943943163	0
FR_CC1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.3204602	-0.610422391	-0.030498039	0.03080654	0
FR_CC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.3930777	-0.798291285	0.012135926	0.057065522	0
FR_CC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02434162	-0.191239165	0.239922398	0.822448343	0
FR_CC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.7213289	-0.995343849	-0.447313933	1.58756E-06	0
FR_CC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4236551	-0.665261179	-0.182049023	0.000824646	0
FR_CC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.9299892	-1.186048394	-0.673930058	4.29132E-10	0
FR_CC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.0758986	-1.39376451	-0.758032687	3.67923E-09	0
FR_CC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.1657522	-1.691810514	-0.639693953	3.57201E-05	0
FR_CC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2190634	-0.377062681	-0.061064042	0.007276471	0
FR_CC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06481042	-0.60281018	0.732431029	0.847008926	0
FR_CC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.10983844	0.027772366	0.191904515	0.0094491	1
FR_CC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.0284788	-1.382027201	-0.674930385	1.80036E-07	0
FR_CC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06883214	-0.032529041	0.170193322	0.179924984	0
FR_CC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2490535	-0.501217039	0.003109966	0.052813323	0
FR_CC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.15484804	0.09121345	0.218482631	7.23324E-06	1
FR_CC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.21208454	-0.033032633	0.457201708	0.088804708	0
FR_CC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2663154	-0.603268119	0.070637293	0.1194309	0
FR_CC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3975403	-0.55473675	-0.240343839	3.51363E-06	0
FR_CC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4625175	-0.683524099	-0.24151082	8.55733E-05	0
FR_CC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.17385634	0.055379429	0.292333246	0.00462564	1
FR_CC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.51703834	0.361986982	0.672089692	5.59288E-09	1
FR_CC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1061596	-0.172281786	-0.040037505	0.002059451	0
FR_CC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.15247645	0.088306781	0.216646119	1.10862E-05	1
FR_CC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.09079295	-0.015874096	0.197459992	0.094002393	0
FR_CC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0321405	-0.172678355	0.108397352	0.649652504	0
FR_CC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.15484804	0.09121345	0.218482631	7.23324E-06	1
FR_CC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1496686	-0.251016796	-0.048320484	0.004385287	0
FR_CC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.65773949	0.457748353	0.857730617	8.1799E-09	1
FR_CC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2426923	-0.412280245	-0.073104263	0.005680868	0
FR_CC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2415785	-0.616716399	0.133559366	0.203196797	0
FR_CC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.4064254	0.08485249	0.727998307	0.014132496	1
FR_CC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.0296167	-0.084883944	0.025650601	0.287954074	0
FR_CC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.0227629	-0.075422018	0.029896294	0.390560798	0
FR_CC1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0079004	-0.017274047	0.001473313	0.097009234	0
FR_CC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.4654841	-0.704152596	-0.226815514	0.000227459	0
FR_CC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.3215231	0.220753007	0.422293188	1.83754E-08	1
FR_CC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.12003806	0.026690934	0.213385195	0.012483735	1
FR_CC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.2293026	-0.367489051	-0.091116224	0.001484204	0
FR_CC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.41000292	0.290874956	0.529130875	2.27707E-09	1
FR_CC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.01487753	-0.100386418	0.130141487	0.797563196	0
FR_CC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1874198	-0.380796607	0.005956967	0.057279233	0
FR_CC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.53087397	0.411219082	0.650528851	0	1
FR_CC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.51743771	0.290049579	0.744825844	2.32182E-05	1
FR_CC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-1.1970877	-1.619910616	-0.774264792	3.34608E-07	0
FR_CC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-2.4674355	-3.549475748	-1.385395274	2.24233E-05	0
FR_CC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.2326283	-0.793745796	0.328489262	0.411051321	0
FR_CC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.11225529	-0.048083611	0.272594195	0.166590356	0
FR_CC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-1.0604819	-1.796397916	-0.324565874	0.00537144	0
FR_CC1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-1.6094379	-	-	-	0
FR_CC1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-1.6094379	-	-	-	0
FR_CC1	Parent PAHs	Acridine (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-1.6094379	-	-	-	0
FR_CC1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-1.6094379	-	-	-	0
FR_CC1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-1.6094379	-	-	-	0
FR_CC1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.6931472	-	-	-	0
FR_CC1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-1.6094379	-	-	-	0
FR_CC1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-1.6094379	-	-	-	0
FR_CC1	Parent PAHs	Chrysene (%)_Parent PAHs	as.factor(new_year)	2019-2017	0.2237968	-	-	-	-
FR_CC1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-1.6094379	-	-	-	0
FR_CC1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-2.3025851	-	-	-	0
FR_CC1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-1.6094379	-	-	-	0
FR_CC1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-1.6094379	-	-	-	0
FR_CC1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-1.6094379	-	-	-	0
FR_CC1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.4581454	-	-	-	0
FR_CC1	Parent PAHs	Phenanthrene (%)_Parent PAHs	as.factor(new_year)	2019-2017	0.13527867	-	-	-	-
FR_CC1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.8464098	-	-	-	0
FR_CC1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-1.6094379	-	-	-	0
FR_CC1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	0	-	-	-	0
FR_CC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.6961544	-1.215079039	-0.177229728	0.009291965	0
FR_CC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.7226326	-0.995764623	-0.449500643	1.43244E-06	0
FR_CC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4292595	-0.672903691	-0.185615307	0.00078212	0
FR_CC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1447952	-1.528542727	-0.761047688	9.92686E-08	0
FR_CC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1036245	-1.42029583	-0.786953142	1.57376E-09	0
FR_CC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1934781	-1.718815457	-0.668140785	2.38584E-05	0
FR_CC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2270169	-0.379715849	-0.074318021	0.004142957	0
FR_CC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.42263456	0.034324232	0.810944896	0.033351201	1
FR_CC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.307345	0.206575106	0.408114893	5.7879E-08	1
FR_CC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0640769	-0.278970682	0.150816831	0.553888221	0
FR_CC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.2907105	-1.690898583	-0.890522408	1.38275E-08	0
FR_CC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0732418	-0.260470235	0.113986719	0.437823867	0
FR_CC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4712979	-0.845684647	-0.096911175	0.014372541	0
FR_CC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00245195	-0.181485957	0.186389859	0.978860914	0
FR_CC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.20590716	-0.041335504	0.453149828	0.101166833	0
FR_CC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.39455819	0.276305086	0.512811293	5.5037E-09	1
FR_CC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4682609	-0.863267344	-0.073254459	0.020852057	0
FR_CC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-2.0108438	-2.602275505	-1.419412079	3.2384E-09	0
FR_CC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4808274	-0.698426744	-0.263228082	3.73795E-05	0
FR_CC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.1375674	0.021311852	0.253822939	0.021074142	1
FR_CC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.015927	-0.130797751	0.098943781	0.782912731	0
FR_CC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.44675676	0.296732298	0.596781215	1.03602E-07	1
FR_CC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.114922	-0.189749273	-0.040094715	0.003123063	0
FR_CC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.10475142	0.03355682	0.175946022	0.004523638	1
FR_CC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2162342	-0.410477506	-0.021990813	0.029650138	0
FR_CC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04953918	-0.058824871	0.157903221	0.364944422	0
FR_CC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0824082	-0.2296185	0.064802153	0.267967243	0
FR_CC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.08653377	-0.06353432	0.236601863	0.253972822	0
FR_CC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1917329	-0.30897055	-0.074495228	0.001718301	0
FR_CC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.6317975	0.431560914	0.832034095	2.4559E-08	1
FR_CC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.296823	-0.481862178	-0.111783807	0.002076872	0
FR_CC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.12176842	-0.146524389	0.390061222	0.368386496	0
FR_CC1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	as.factor(new_year)	2019-2017	-0.0406496	-	-	-	0
FR_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	0	-	-	1	0
FR_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	-4.441E-16	-	-	-	0
FR_CC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	4.4409E-16	-	-	-	-
FR_CC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	0	-	-	-	0
FR_FC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.26457747	-0.305004104	0.834159034	0.339418579	0
FR_FC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.05176253	-0.016210545	0.119735613	0.125999155	0
FR_FC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.82102975	-0.108793926	1.750853423	0.079621692	0
FR_FC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.34126709	0.209208922	0.473325248	5.05578E-05	1
FR_FC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.313016	-0.699374634	0.073342544	0.105180516	0
FR_FC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.33729522	0.200877809	0.473712635	8.06785E-05	1
FR_FC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0	0	0	-	0
FR_FC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.2407246	-0.556746437	0.075297294	0.125898204	0
FR_FC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0089086	-0.025392737	0.007575621	0.268782308	0
FR_FC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.07066905	0.008799725	0.132538368	0.027710874	1
FR_FC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.41279201	0.219483952	0.606100065	0.000343905	1
FR_FC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1182147	-0.483839144	0.247409698	0.502893383	0
FR_FC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.25765249	-0.772828693	1.288133683	0.60336106	0
FR_FC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	1.01560358	0.313972327	1.717234824	0.007348242	1
FR_FC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.11430452	-0.463658749	0.692267798	0.680603584	0
FR_FC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0198308	-0.090578323	0.050916647	0.56067456	0
FR_FC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0034039	-0.033590711	0.026782841	0.814105159	0
FR_FC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.36414785	0.218863776	0.509431931	6.99486E-05	1
FR_FC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.1495985	-2.52684952	0.227652502	0.095863967	0
FR_FC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.6447036	-3.615104374	0.325697099	0.095863967	0
FR_FC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0034039	-0.02954645	0.02273858	0.786061381	0
FR_FC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.051007	-0.329559764	0.227545741	0.702995296	0
FR_FC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2930254	-0.774332827	0.188282042	0.215173798	0
FR_FC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	1.7764E-15	-1.17263E-14	1.5279E-14	0.78390426	0
FR_FC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.13089868	-0.445880117	0.707677469	0.636953139	0
FR_FC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5885423	-1.620740815	0.44365622	0.244325478	0
FR_FC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0	-6.75132E-15	6.75132E-15	1	0
FR_FC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.10486979	-0.071783883	0.28152346	0.226274863	0
FR_FC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.0962268	-2.437821794	0.245368159	0.102469453	0
FR_FC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4951051	-1.088254854	0.098044596	0.095863967	0
FR_FC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0574303	-0.14021292	0.025352396	0.160770212	0
FR_FC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0	0	0	-	0
FR_FC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.65749359	0.278562702	1.036424483	0.002033427	1
FR_FC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0227528	-0.075106007	0.029600403	0.37056993	0
FR_FC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0	-6.75132E-15	6.75132E-15	1	0
FR_FC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.39210421	0.233786443	0.550421984	7.92739E-05	1
FR_FC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0	-6.75132E-15	6.75132E-15	1	0
FR_FC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	1.7764E-15	-1.17263E-14	1.5279E-14	0.78390426	0
FR_FC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0178848	-0.149804527	0.114034864	0.777492589	0
FR_FC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.33623579	0.181110617	0.491360953	0.000298872	1
FR_FC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4951051	-1.088254854	0.098044596	0.095863967	0
FR_FC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.15026817	-0.557418664	0.857954997	0.658652543	0
FR_FC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.25041912	-0.019207089	0.520045336	0.065866013	0
FR_FC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.086521	-0.224727792	0.051685774	0.195626042	0
FR_FC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.0179368	-0.156066062	0.120192536	0.780335102	0
FR_FC1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.006976	-0.0465839	0.032631901	0.707878879	0
FR_FC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-4.441E-16	-4.66367E-15	3.77549E-15	0.826273871	0
FR_FC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.3084911	0.159029546	0.45795266	0.000470573	1
FR_FC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.4132638	-1.529588549	0.703060888	0.444042269	0

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
FR_FC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.2945623	-0.428254448	-0.160870107	0.000255731	0
FR_FC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.39068313	0.258815014	0.522551246	1.0957E-05	1
FR_FC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.5655115	-1.627103085	0.49608007	0.275428227	0
FR_FC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.3841265	-1.483733907	0.71548096	0.46969672	0
FR_FC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.70000778	0.439161205	0.960854363	3.35584E-05	1
FR_FC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.41920308	-0.022730645	0.861136809	0.061502556	0
FR_FC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.1726079	-0.622638225	0.277422453	0.428103915	0
FR_FC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.48999751	0.344565877	0.635429144	2.33665E-06	1
FR_FC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	1.16241793	0.114773788	2.210062078	0.031800184	1
FR_FC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.06100135	-0.561310147	0.683312841	0.836509252	0
FR_FC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.1618136	-2.560440181	2.23681291	0.888067161	0
FR_FC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.86520151	-0.646258189	2.376661205	0.242552072	0
FR_FC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1052739	-0.303769566	0.093221835	0.277467073	0
FR_FC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0621023	-0.186334718	0.062130114	0.305010387	0
FR_FC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.29555893	0.14626731	0.444850541	0.000682956	1
FR_FC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1495985	-2.52684952	0.227652502	0.095863967	0
FR_FC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.6447036	-3.615104374	0.325697099	0.095863967	0
FR_FC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0181694	-0.102033402	0.065694584	0.652208242	0
FR_FC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2063687	-1.535367306	1.122629948	0.746288043	0
FR_FC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.36603544	0.213462041	0.51860884	0.000110115	1
FR_FC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2309186	-2.000857539	1.539020329	0.785645395	0
FR_FC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	1.7764E-15	-1.17263E-14	1.5279E-14	0.78390426	0
FR_FC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0763205	-0.601388687	0.448747731	0.761954477	0
FR_FC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3751889	-1.801826626	1.051448894	0.584895232	0
FR_FC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0782724	-0.419134107	0.262589342	0.633004328	0
FR_FC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.13860398	-0.032216759	0.309424711	0.104695175	0
FR_FC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.32886487	0.18363369	0.474096057	0.000196182	1
FR_FC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5367244	-2.08030873	1.006860022	0.471722027	0
FR_FC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.6557678	-2.269750021	-1.041785635	3.17984E-05	0
FR_FC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0339543	-0.145102209	0.077193582	0.526424489	0
FR_FC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0221634	-0.218713315	0.174386423	0.814105159	0
FR_FC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.6160112	-1.679790619	0.447768245	0.237356013	0
FR_FC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.65196462	0.27693597	1.026993261	0.0020035	1
FR_FC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0411637	-0.09165346	0.009326043	0.103174244	0
FR_FC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0034039	-0.033590711	0.026782841	0.814105159	0
FR_FC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4644274	-1.568227136	0.639372308	0.385633957	0
FR_FC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.34872566	0.196591196	0.500860124	0.000174006	1
FR_FC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0	-6.75132E-15	6.75132E-15	1	0
FR_FC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1287581	-1.189956889	0.932440741	0.800292332	0
FR_FC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0235937	-0.163193992	0.116006564	0.724814659	0
FR_FC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.33135018	0.189085758	0.473614603	0.000148481	1
FR_FC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5328476	-1.046726196	-0.018969047	0.042999678	0
FR_FC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-8.882E-16	-1.2703E-14	1.09266E-14	0.875376604	0
FR_FR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.005816	-0.10195898	0.0903269	0.903777961	0
FR_FR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0219482	-0.121649862	0.077753538	0.660279583	0
FR_FR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.0868014	-0.352826896	0.526429706	0.693368186	0
FR_FR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0147765	-0.139981077	0.110428028	0.813587905	0
FR_FR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.1304916	-0.010516203	0.271499401	0.068951544	0
FR_FR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0291561	-0.166022317	0.10771017	0.670579219	0
FR_FR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0135911	-0.060053256	0.032871013	0.559482291	0
FR_FR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0316296	-0.134916805	0.071657521	0.541290439	0
FR_FR1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0035673	-0.010408199	0.003273636	0.299957467	0
FR_FR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0182992	-0.116141021	0.079542681	0.708761081	0
FR_FR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0244244	-0.149817277	0.100968537	0.697287613	0
FR_FR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.13408389	-0.032926899	0.301094687	0.113134366	0
FR_FR1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.3267933	-0.738542599	0.084956028	0.117208552	0
FR_FR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	0.1264867	-0.368133146	0.621106548	0.60976691	0
FR_FR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.15200776	-0.094712071	0.398727595	0.221680441	0
FR_FR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0035749	-0.016048081	0.008898216	0.56741783	0
FR_FR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.03012505	-0.018334387	0.078584491	0.217615028	0
FR_FR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00132471	-0.076499619	0.079149038	0.972862353	0
FR_FR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.1676314	-1.545538442	-0.789724412	1.0465E-07	0
FR_FR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.2641644	-1.870590446	-0.657738283	0.000114399	0
FR_FR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0065632	-0.017201778	0.004075475	0.221088288	0
FR_FR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.17823168	0.049051284	0.307412081	0.007821449	1
FR_FR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.107221	-0.235989238	0.021547174	0.100680488	0
FR_FR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0	-4.09598E-15	4.09598E-15	1	0
FR_FR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.0884964	-0.041905854	0.218898653	0.178960727	0
FR_FR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.38298	-0.659383415	-0.106576594	0.007580005	0
FR_FR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0051444	-0.023093501	0.012804706	0.56741783	0
FR_FR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.12524673	-0.047000158	0.297493627	0.1504101	0
FR_FR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.738568	-1.212513723	-0.264622239	0.002916569	0
FR_FR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3805514	-0.563103834	-0.197998953	0.000114399	0
FR_FR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0030212	-0.104618992	0.098576564	0.952609934	0
FR_FR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.0285969	-0.090139427	0.14733322	0.630676101	0
FR_FR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.09717753	-0.143994961	0.338350013	0.422163264	0
FR_FR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0286402	-0.094765636	0.037485198	0.388487009	0
FR_FR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	1.7764E-15	-4.36761E-15	7.92032E-15	0.564038215	0
FR_FR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0332769	-0.161712071	0.095158223	0.605076164	0
FR_FR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0035749	-0.016048081	0.008898216	0.56741783	0
FR_FR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0	-4.09598E-15	4.09598E-15	1	0
FR_FR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0258854	-0.071969581	0.020198814	0.264618814	0
FR_FR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0046919	-0.179523481	0.170139618	0.957226899	0
FR_FR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3805514	-0.563103834	-0.197998953	0.000114399	0
FR_FR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.759927	-0.937430174	-0.582423769	1.55014E-11	0
FR_FR1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	-0.0551814	-0.20375172	0.093388833	0.457915622	0
FR_FR1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.0937	-0.135042746	-0.05235731	4.19294E-05	0
FR_FR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.0790936	-0.121766977	-0.036420301	0.000550475	0
FR_FR1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0037644	-0.013882063	0.0063533	0.457142262	0
FR_FR1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0631152	-0.214886322	0.088655897	0.407536439	0
FR_FR1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0659783	-0.190621938	0.058665244	0.292798108	0
FR_FR1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.4002517	-0.755000464	-0.045502849	0.027800212	0
FR_FR1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1435392	-0.257072616	-0.030005872	0.014260431	0
FR_FR1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.03669329	-0.127257779	0.200644366	0.654993296	0
FR_FR1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.3205299	-0.631719574	-0.009340145	0.043750338	0
FR_FR1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.3494299	-0.668146789	-0.030713105	0.032297562	0
FR_FR1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.02987743	-0.179770152	0.239525003	0.775873163	0
FR_FR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.3164099	-0.523217983	-0.109601853	0.003426169	0
FR_FR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.04209354	-0.262576945	0.346764033	0.782537094	0
FR_FR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.97883273	0.684520024	1.273145435	1.89977E-08	1
FR_FR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.7545828	0.395878777	1.113286829	0.000100996	1
FR_FR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.10845126	-0.10019593	0.317098444	0.300564736	0
FR_FR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.6375287	-1.379677314	0.104619901	0.09062915	0
FR_FR1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.211815	-0.718135833	0.294505764	0.404760721	0
FR_FR1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0513482	-0.173985252	0.071288947	0.404361109	0
FR_FR1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0321113	-0.161452485	0.097229848	0.620204505	0
FR_FR1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0455215	-0.124341133	0.033298192	0.251549027	0
FR_FR1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1676314	-1.545538442	-0.789724412	1.0465E-07	0
FR_FR1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.2851758	-1.88206981	-0.688281806	7.2892E-05	0
FR_FR1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0073126	-0.021167145	0.006541971	0.294175613	0
FR_FR1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06982413	-0.102946316	0.24259458	0.420784566	0
FR_FR1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1057587	-0.235288358	0.023771032	0.107292382	0
FR_FR1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.0177619	-0.21932503	0.254848831	0.880994718	0
FR_FR1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02507835	-0.042758464	0.092915158	0.461236391	0
FR_FR1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03668766	-0.146148829	0.21952414	0.688641425	0
FR_FR1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3947529	-0.812858952	0.023353097	0.06369612	0
FR_FR1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0167153	-0.177945435	0.144514874	0.835892049	0
FR_FR1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.08189027	-0.085268914	0.249049457	0.329862542	0
FR_FR1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0348291	-0.198967481	0.129309354	0.671789457	0
FR_FR1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3099969	-0.600305462	-0.019688276	0.03685406	0
FR_FR1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.7751972	-2.419029068	-1.131365354	1.13234E-06	0
FR_FR1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.9162907	-	-	-	0
FR_FR1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0315255	-0.103545307	0.040494369	0.383491878	0
FR_FR1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03019108	-0.12378915	0.184171305	0.695388113	0
FR_FR1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3549894	-0.655453048	-0.054525709	0.021526988	0
FR_FR1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05756108	-0.174754827	0.289876985	0.620903918	0
FR_FR1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0306845	-0.108454004	0.047084987	0.431663121	0
FR_FR1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00020536	-0.034533509	0.034944221	0.990573858	0
FR_FR1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3895985	-0.70793923	-0.071257789	0.017473432	0
FR_FR1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0695461	-0.188237509	0.049145386	0.244809768	0
FR_FR1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0097588	-0.061872129	0.042354605	0.708416501	0
FR_FR1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03209269	-0.001920693	0.066106081	0.063862956	0
FR_FR1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0516037	-0.111733053	0.008525577	0.090928186	0
FR_FR1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0064163	-0.15803167	0.145199168	0.932600267	0
FR_FR1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2897824	-0.481961961	-0.097602742	0.003879708	0
FR_FR1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00769695	-0.060554042	0.075947947	0.821725431	0
FR_FR2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.15781295	0.006946409	0.308679501	0.040606871	1
FR_FR2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.04995129	0.005529903	0.094372683	0.028108163	1
FR_FR2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.2498565	-0.647580364	0.147867374	0.21422699	0
FR_FR2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.10061128	0.037742156	0.163480404	0.002130986	1
FR_FR2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.05173465	-0.098905222	0.20237452	0.495478471	0
FR_FR2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.11018395	0.044834178	0.175533715	0.001263623	1
FR_FR2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0059627	-0.027294436	0.015368992	0.578750493	0
FR_FR2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0607742	-0.156649117	0.035100678	0.210221551	0
FR_FR2	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0039167	-0.007537925	-0.000295509	0.034437488	0
FR_FR2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.0504042	0.007466563	0.093341829	0.022091162	1
FR_FR2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.12569454	0.053103594	0.198285486	0.000951473	1
FR_FR2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.083372	-0.308912349	0.142168299	0.463274549	0
FR_FR2	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.5066642	-0.986630698	-0.026697745	0.038857004	0
FR_FR2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	0.01211247	-0.57075661	0.594981551	0.967044808	0
FR_FR2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05714936	-0.096868491	0.211167217	0.461586803	0
FR_FR2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.056726	-0.187869353	0.074417382	0.391095239	0
FR_FR2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.0861737	0.029745401	0.142601995	0.003285764	1
FR_FR2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.03630104	-0.025645911	0.098247986	0.246345738	0
FR_FR2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.1644042	-1.486673486	-0.842134971	5.59453E-10	0
FR_FR2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.2535404	-1.789719876	-0.717360845	1.49246E-05	0
FR_FR2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0007526	-0.064660351	0.063155118	0.981320364	0
FR_FR2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1037055	-0.282980303	0.075569216	0.252407987	0
FR_FR2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08112102	-0.032635485	0.19487752	0.159310531	0
FR_FR2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.15026156	0.057266011	0.243257111	0.001941638	1
FR_FR2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06757967	-0.02041901	0.155578358	0.13005218	0
FR_FR2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2538896	-0.510849055	0.003069815	0.052722038	0
FR_FR2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07155964	0.02395855	0.11916072	0.003772783	1
FR_FR2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.13142	-0.010566052	0.273406062	0.069102134	0
FR_FR2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.15771025	-0.036382209	0.351802712	0.109555154	0

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
FR_FR2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.431519	-0.608393367	-0.254644671	7.01828E-06	0
FR_FR2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0077737	-0.096636529	0.081089138	0.861941672	0
FR_FR2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.18489116	0.039078646	0.330703684	0.013718197	1
FR_FR2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.28740163	0.174224683	0.400578584	3.30895E-06	1
FR_FR2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02468253	-0.003321101	0.052686168	0.083107697	0
FR_FR2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06705991	0.020040068	0.114079758	0.005847515	1
FR_FR2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.10853175	0.051742591	0.165320912	0.000297714	1
FR_FR2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.04035538	-0.02061161	0.101322366	0.190981179	0
FR_FR2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06592813	0.018735346	0.11312092	0.006877155	1
FR_FR2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0716094	-0.127245377	-0.0159735	0.012418214	0
FR_FR2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.2448864	0.151166502	0.338606308	1.88604E-06	1
FR_FR2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3304804	-0.4979989	-0.162961864	0.000196912	0
FR_FR2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5944569	-0.731617714	-0.45729615	0	0
FR_FR2	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.15058737	0.04423656	0.256938182	0.006295712	1
FR_FR2	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.028631	-0.065929278	0.008667226	0.129881308	0
FR_FR2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.0250157	-0.06681078	0.016779464	0.235840096	0
FR_FR2	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0022997	-0.009809056	0.005209653	0.542367061	0
FR_FR2	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.7204721	-1.062789309	-0.378154912	7.94999E-05	0
FR_FR2	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.08147663	0.021768463	0.141184794	0.008212951	1
FR_FR2	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.2692228	-0.437150322	-0.10129528	0.002094468	0
FR_FR2	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0893061	-0.163351525	-0.015260749	0.018817486	0
FR_FR2	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.15161265	0.074920051	0.228305258	0.000191541	1
FR_FR2	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0115703	-0.113498459	0.090357778	0.821480372	0
FR_FR2	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0685214	-0.186890564	0.049847797	0.252078459	0
FR_FR2	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.15817005	0.058898899	0.257441208	0.002222477	1
FR_FR2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.12908599	-0.006896656	0.265068638	0.062443618	0
FR_FR2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.4960579	-0.802818885	-0.189296856	0.001926584	0
FR_FR2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.11966964	-0.322042717	0.561381994	0.590538333	0
FR_FR2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.89288632	0.569892389	1.215880246	5.8225E-07	1
FR_FR2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.0493673	-0.131635455	0.230370063	0.587289775	0
FR_FR2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.7748381	-1.501518197	-0.048157971	0.036989564	0
FR_FR2	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3776739	-0.923888018	0.168540299	0.172185216	0
FR_FR2	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0315906	-0.156264804	0.093083513	0.614756278	0
FR_FR2	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03268333	-0.124293932	0.189660597	0.67910957	0
FR_FR2	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0367285	-0.101309117	0.027852101	0.260414351	0
FR_FR2	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1409304	-1.455973708	-0.825887002	5.1967E-10	0
FR_FR2	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.2290492	-1.76601669	-0.69208181	2.13595E-05	0
FR_FR2	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01032715	-0.0632567	0.083911003	0.780285654	0
FR_FR2	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1601582	-0.331602068	0.011285725	0.066623205	0
FR_FR2	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05544825	-0.004836358	0.115732861	0.070822413	0
FR_FR2	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00186186	-0.320189087	0.323912805	0.990829333	0
FR_FR2	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.10396074	-0.083120633	0.29104212	0.271389239	0
FR_FR2	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.08272118	-0.058239293	0.223681644	0.24567793	0
FR_FR2	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.025924	-0.417900031	0.366052101	0.895394946	0
FR_FR2	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0628272	-0.355287809	0.229633498	0.669516998	0
FR_FR2	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.12981232	-0.010053693	0.269678329	0.068362458	0
FR_FR2	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.10249789	0.024615882	0.1803799	0.010659181	1
FR_FR2	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0026332	-0.206538837	0.201272356	0.979516646	0
FR_FR2	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.7535238	-2.329953701	-1.177093964	6.40201E-08	0
FR_FR2	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.8588441	-1.00033764	-0.717350622	1.99792E-05	0
FR_FR2	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0156329	-0.106147844	0.074882102	0.731430099	0
FR_FR2	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.14546706	-0.020284667	0.311218794	0.084409759	0
FR_FR2	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0617854	-0.160451693	0.036880844	0.21573877	0
FR_FR2	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.23932226	0.126518143	0.352126381	7.06345E-05	1
FR_FR2	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01076657	-0.053878763	0.07541191	0.740653328	0
FR_FR2	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06896901	-0.029841117	0.167779133	0.168209019	0
FR_FR2	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.104036	-0.222745194	0.014673243	0.084835442	0
FR_FR2	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.07330841	0.017120113	0.129496699	0.011321176	1
FR_FR2	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03685346	-0.100257565	0.173964483	0.593464845	0
FR_FR2	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.07540645	-0.005571232	0.156384131	0.067472435	0
FR_FR2	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1176827	-0.227584639	-0.007780709	0.036219756	0
FR_FR2	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.22660114	0.131962343	0.321239937	9.83667E-06	1
FR_FR2	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2685923	-0.488591314	-0.048593231	0.017465959	0
FR_FR2	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06420027	-0.102877424	0.231277973	0.445874034	0
FR_FR2	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	-2.22E-16	-	-	-	0
FR_FR2	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	-2.22E-16	-	-	-	0
FR_FR2	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	-1.11E-16	-	-	-	0
FR_FR2	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	-2.22E-16	-	-	-	0
FR_FR3	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1080118	-	-	-	0
FR_FR3	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.10342519	-	-	-	-
FR_FR3	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.76691692	-	-	-	-
FR_FR3	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.36871161	-	-	-	-
FR_FR3	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.3428997	-	-	-	0
FR_FR3	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.31743855	-	-	-	-
FR_FR3	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0	-	-	-	0
FR_FR3	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1706754	-	-	-	0
FR_FR3	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	0.00537478	-	-	-	-
FR_FR3	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.12358046	-	-	-	-
FR_FR3	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.3226054	-	-	-	-
FR_FR3	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-1.2962893	-	-	-	0
FR_FR3	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-1.481985	-	-	-	0
FR_FR3	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.5511179	-	-	-	0
FR_FR3	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.6813165	-	-	-	0
FR_FR3	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0106282	-	-	-	0
FR_FR3	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2911207	-	-	-	0
FR_FR3	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.17149366	-	-	-	-
FR_FR3	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.6094379	-	-	-	0
FR_FR3	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-2.3025851	-	-	-	0
FR_FR3	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00628651	-	-	-	-
FR_FR3	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4396405	-	-	-	0
FR_FR3	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1388159	-	-	-	0
FR_FR3	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.054628	-	-	-	0
FR_FR3	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0862589	-	-	-	0
FR_FR3	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.0546879	-	-	-	0
FR_FR3	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-5.329E-15	-	-	-	0
FR_FR3	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.65907112	-	-	-	-
FR_FR3	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.16744097	-	-	-	-
FR_FR3	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.6931472	-	-	-	0
FR_FR3	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00494899	-	-	-	-
FR_FR3	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.03539581	-	-	-	-
FR_FR3	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.42846373	0.243224043	0.613703413	0.001307219	1
FR_FR3	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.03360085	-	-	-	-
FR_FR3	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-5.329E-15	-	-	-	0
FR_FR3	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.35884944	-	-	-	-
FR_FR3	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0397126	-	-	-	0
FR_FR3	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	1.7764E-15	-	-	-	-
FR_FR3	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1311821	-	-	-	0
FR_FR3	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.53123526	-	-	-	-
FR_FR3	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.6931472	-	-	-	0
FR_FR3	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.6104873	-	-	-	0
FR_FR3	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	-0.1737843	-1.317846834	0.970278172	0.730044137	0
FR_FR3	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.0444972	-0.142720846	0.053726502	0.319608848	0
FR_FR3	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.0559037	-0.168551296	0.056743805	0.278974953	0
FR_FR3	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.015963	-0.029225139	-0.002700839	0.024823849	0
FR_FR3	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.7489331	-	-	-	0
FR_FR3	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.27759661	-	-	-	-
FR_FR3	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.5570108	-	-	-	0
FR_FR3	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.02793365	-	-	-	-
FR_FR3	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.38141501	-	-	-	-
FR_FR3	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1419186	-	-	-	0
FR_FR3	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.119665	-	-	-	0
FR_FR3	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.44640578	-	-	-	-
FR_FR3	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.52137717	-	-	-	-
FR_FR3	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.850018	-	-	-	0
FR_FR3	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.4330806	-	-	-	0
FR_FR3	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.98250025	-	-	-	-
FR_FR3	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.2395224	-	-	-	0
FR_FR3	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-1.8445474	-	-	-	0
FR_FR3	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.9542648	-	-	-	0
FR_FR3	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2942273	-	-	-	0
FR_FR3	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1176411	-	-	-	0
FR_FR3	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.239473	-	-	-	0
FR_FR3	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.7190999	-	-	-	0
FR_FR3	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-2.2448228	-	-	-	0
FR_FR3	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1668501	-	-	-	0
FR_FR3	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.054691	-	-	-	0
FR_FR3	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.08711899	-	-	-	-
FR_FR3	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.9321696	-	-	-	0
FR_FR3	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.3451513	-	-	-	0
FR_FR3	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.8945296	-	-	-	0
FR_FR3	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.8569598	-	-	-	0
FR_FR3	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.5017303	-	-	-	0
FR_FR3	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.47292038	-	-	-	-
FR_FR3	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.21433294	-	-	-	-
FR_FR3	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.3784557	-	-	-	0
FR_FR3	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-2.6420812	-	-	-	0
FR_FR3	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1186501	-	-	-	0
FR_FR3	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.6731683	-	-	-	0
FR_FR3	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2039863	-	-	-	0
FR_FR3	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.37206857	0.207061256	0.537075878	0.001490426	1
FR_FR3	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.469382	-	-	-	0
FR_FR3	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.7999709	-	-	-	0
FR_FR3	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1966436	-	-	-	0
FR_FR3	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.14953665	-	-	-	-
FR_FR3	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.9209518	-	-	-	0
FR_FR3	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05776227	-	-	-	-
FR_FR3	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.8975436	-	-	-	0
FR_FR3	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.33450803	-	-	-	-
FR_FR3	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.4351077	-	-	-	0
FR_FR3	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.8091479	-	-	-	0
FR_FR4	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.04125423	-0.140267747	0.222776199	0.650254716	0
FR_FR4	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.03353476	-0.018335553	0.085405082	0.200247226	0
FR_FR4	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.3428929	-0.849055692	0.163269878	0.179894018	0
FR_FR4	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.07601045	-0.008450931	0.160471824	0.07672849	0
FR_FR4	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.08547843	-0.126015748	0.296972611	0.421053475	0

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
FR_FR4	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.10831281	0.016985049	0.19964057	0.021022468	1
FR_FR4	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0	0	0	-	0
FR_FR4	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0805861	-0.190106758	0.028934612	0.145839158	0
FR_FR4	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0043095	-0.008792617	0.000173532	0.059200331	0
FR_FR4	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.02932268	-0.019234626	0.077879976	0.231078342	0
FR_FR4	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.09680533	-0.007789377	0.201400035	0.068949196	0
FR_FR4	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0391807	-0.288637473	0.210275995	0.753892018	0
FR_FR4	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.6450126	-1.11170778	-0.178317338	0.007703846	0
FR_FR4	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0150606	-0.604848385	0.574727164	0.959329799	0
FR_FR4	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08570743	-0.077868306	0.249283158	0.297933725	0
FR_FR4	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0883691	-0.244991774	0.068253489	0.262750955	0
FR_FR4	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.04508098	0.016802374	0.073359592	0.002350441	1
FR_FR4	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08788132	0.005237105	0.170525538	0.037595175	1
FR_FR4	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.2400587	-1.661161427	-0.818956012	2.6781E-07	0
FR_FR4	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.3211554	-2.044624676	-0.597686087	0.000582027	0
FR_FR4	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0667399	-0.154078447	0.020598568	0.131243374	0
FR_FR4	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1447722	-0.548638053	0.259093724	0.475167553	0
FR_FR4	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0790267	-0.188165136	0.030111784	0.152230976	0
FR_FR4	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0420886	-0.166094231	0.081916977	0.498846448	0
FR_FR4	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02238644	-0.15099815	0.19577103	0.796591096	0
FR_FR4	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4030672	-0.728960933	-0.077173474	0.016339376	0
FR_FR4	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	1.7764E-15	-4.01408E-15	7.56679E-15	0.540851736	0
FR_FR4	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.15410191	-0.01780785	0.326011669	0.077858075	0
FR_FR4	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0956293	-0.479465461	0.288206821	0.619227824	0
FR_FR4	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4013655	-0.617377204	-0.185353775	0.000476794	0
FR_FR4	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0513888	-0.173522428	0.070744807	0.402361384	0
FR_FR4	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0188804	-0.229092916	0.191332196	0.857674023	0
FR_FR4	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.16822024	0.003716921	0.332723554	0.045221481	1
FR_FR4	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00252698	-0.043788027	0.048841995	0.91323983	0
FR_FR4	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-3.553E-15	-1.97659E-14	1.26605E-14	0.661972488	0
FR_FR4	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.12916633	0.04765491	0.210677759	0.002483897	1
FR_FR4	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0359337	-0.089185654	0.017318253	0.181573398	0
FR_FR4	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0003246	-0.001815378	0.001166111	0.663935772	0
FR_FR4	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1188497	-0.218179286	-0.019520111	0.019962485	0
FR_FR4	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.19598046	0.068768577	0.323192342	0.003198743	1
FR_FR4	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3977074	-0.615493357	-0.17992144	0.000582027	0
FR_FR4	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.6081161	-0.752904813	-0.463327381	2.33208E-11	0
FR_FR4	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.21332108	0.048705278	0.377936873	0.012277849	1
FR_FR4	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.059838	-0.118899884	-0.000776168	0.047192023	0
FR_FR4	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.0724403	-0.133596674	-0.011283943	0.021363584	0
FR_FR4	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0284204	-0.036204576	-0.020636261	3.42486E-09	0
FR_FR4	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.8126074	-1.278797767	-0.346417024	0.000970016	0
FR_FR4	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.08580091	0.006062982	0.165538831	0.035467234	1
FR_FR4	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.2921132	-0.511434753	-0.072791736	0.010028548	0
FR_FR4	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0976283	-0.21001939	0.014762721	0.087232005	0
FR_FR4	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.13910322	0.026038879	0.252167565	0.016880851	1
FR_FR4	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.05035052	-0.074830084	0.175531116	0.423274136	0
FR_FR4	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0671325	-0.221865157	0.087600209	0.387970946	0
FR_FR4	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.11922159	-0.016721115	0.255164288	0.084318768	0
FR_FR4	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.10727969	-0.069364807	0.283924186	0.228467131	0
FR_FR4	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.3747932	-0.773499334	0.023912856	0.064845158	0
FR_FR4	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.1562842	-0.385186528	0.697754918	0.564970684	0
FR_FR4	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.36890344	-0.207237742	0.945044615	0.204536327	0
FR_FR4	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.17554183	-0.011929072	0.363012727	0.065735039	0
FR_FR4	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.6921129	-1.574925961	0.190700165	0.12174189	0
FR_FR4	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5449229	-1.211703589	0.121857706	0.107057922	0
FR_FR4	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.083196	-0.237362371	0.0709704	0.283853974	0
FR_FR4	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0714999	-0.268570557	0.125570833	0.469856069	0
FR_FR4	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02660987	-0.056814158	0.11003389	0.524942177	0
FR_FR4	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1574315	-1.584980543	-0.729882535	1.49264E-06	0
FR_FR4	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.3211554	-2.044624676	-0.597686087	0.000582027	0
FR_FR4	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0791347	-0.173211649	0.014942184	0.097414041	0
FR_FR4	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2385592	-0.501701653	0.024583344	0.074643581	0
FR_FR4	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05664249	-0.025596994	0.138881979	0.172855808	0
FR_FR4	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.07449993	-0.32017063	0.469170486	0.706390201	0
FR_FR4	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0716691	-0.363043449	0.219705223	0.623685847	0
FR_FR4	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0821183	-0.338031809	0.173795188	0.522470944	0
FR_FR4	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2664945	-0.743591535	0.210602594	0.267496189	0
FR_FR4	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1212189	-0.526759213	0.284321493	0.551243821	0
FR_FR4	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.16678364	-0.006310462	0.339877732	0.058628074	0
FR_FR4	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.07946373	-0.029756145	0.188683607	0.150319116	0
FR_FR4	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0956543	-0.381468198	0.190159519	0.504829139	0
FR_FR4	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.9577007	-2.63929593	-1.276105432	4.53734E-07	0
FR_FR4	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0584804	-0.172821866	0.055861122	0.309497627	0
FR_FR4	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0551658	-0.285776466	0.175444851	0.633224534	0
FR_FR4	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01290744	-0.113148875	0.138963757	0.838007908	0
FR_FR4	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.09503924	-0.059403757	0.249482236	0.222446113	0
FR_FR4	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05399452	-0.042467225	0.150456273	0.266382511	0
FR_FR4	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.09268086	-0.014142343	0.199504057	0.087600202	0
FR_FR4	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0978008	-0.252927606	0.057325941	0.211473528	0
FR_FR4	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.10433335	0.023862964	0.184803739	0.012054063	1
FR_FR4	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01603698	-0.184311094	0.216385056	0.873012529	0
FR_FR4	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0307708	-0.122145336	0.060603719	0.502195009	0
FR_FR4	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0500578	-0.214012998	0.113897306	0.542772739	0
FR_FR4	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.18577954	0.05724319	0.314315891	0.005451585	1
FR_FR4	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2067803	-0.500125538	0.086564887	0.163177001	0
FR_FR4	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0121158	-0.229326923	0.20509528	0.911310822	0
FR_FR5	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.03545108	-0.226522168	0.297424329	0.78725716	0
FR_FR5	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0036049	-0.037294553	0.030084796	0.830944161	0
FR_FR5	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0830253	-0.67279583	0.50674518	0.77883983	0
FR_FR5	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.06319481	0.008076	0.118313611	0.025408797	1
FR_FR5	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.019778	-0.142850915	0.182406925	0.808354078	0
FR_FR5	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.08199081	0.029785961	0.134195654	0.002659363	1
FR_FR5	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0	0	0	-	0
FR_FR5	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0861788	-0.201510364	0.029152778	0.139987101	0
FR_FR5	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0118419	-0.016977385	-0.006706393	2.34756E-05	0
FR_FR5	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.00165713	-0.031849092	0.035163358	0.921407353	0
FR_FR5	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.07683602	0.014321902	0.139350133	0.01692948	1
FR_FR5	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1256639	-0.327174238	0.07584643	0.216685479	0
FR_FR5	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.6031126	-1.04311997	-0.163105207	0.008116354	0
FR_FR5	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.2922187	-0.705008211	0.120570723	0.161632082	0
FR_FR5	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02697801	-0.190110232	0.244066244	0.804252276	0
FR_FR5	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00656084	-0.155232731	0.168354418	0.935525873	0
FR_FR5	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07611015	-0.061066596	0.213286893	0.271013785	0
FR_FR5	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.031097	-0.098471311	0.036277371	0.359018601	0
FR_FR5	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.1454266	-1.545275568	-0.74557759	4.20205E-07	0
FR_FR5	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.2252152	-1.882970833	-0.567459627	0.000450414	0
FR_FR5	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.01840605	-0.130055124	0.166867232	0.804704468	0
FR_FR5	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0731828	-0.231320308	0.084954773	0.357755327	0
FR_FR5	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.093414	-0.283640214	0.096812227	0.329365027	0
FR_FR5	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.1503775	0.005064242	0.295690766	0.042784862	1
FR_FR5	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.12445466	-0.056883856	0.305793186	0.174584275	0
FR_FR5	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.384306	-0.709874346	-0.05873761	0.021553046	0
FR_FR5	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07309393	-0.063412736	0.209600601	0.287917908	0
FR_FR5	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.26285535	0.137746293	0.387964414	9.51206E-05	1
FR_FR5	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2020403	-0.473362279	0.069281748	0.141331012	0
FR_FR5	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4051368	-0.601741494	-0.208532206	0.000126179	0
FR_FR5	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0576628	-0.130275098	0.014949506	0.11724034	0
FR_FR5	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0794756	-0.303745562	0.144794446	0.480591591	0
FR_FR5	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.25094384	0.167050311	0.334837367	1.64193E-07	1
FR_FR5	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.01274955	-0.018773275	0.044272384	0.421120369	0
FR_FR5	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07463119	-0.06171618	0.210978567	0.277449247	0
FR_FR5	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07279753	0.019891975	0.125703076	0.00788865	1
FR_FR5	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07463119	-0.06171618	0.210978567	0.277449247	0
FR_FR5	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07463119	-0.06171618	0.210978567	0.277449247	0
FR_FR5	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0977271	-0.190527629	-0.00492666	0.039382772	0
FR_FR5	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.17672682	0.118085153	0.235368485	1.38879E-07	1
FR_FR5	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3166616	-0.538913672	-0.094409468	0.006053073	0
FR_FR5	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.6049849	-0.830357179	-0.3796127	1.57883E-06	0
FR_FR5	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.19897234	0.041442457	0.356502232	0.014463763	1
FR_FR5	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.0516529	-0.1078318	0.004526053	0.07061684	0
FR_FR5	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.0423535	-0.103815099	0.01910812	0.171992921	0
FR_FR5	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0203918	-0.043242921	0.002459222	0.078993063	0
FR_FR5	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.4172343	-0.87136154	0.036892958	0.070982356	0
FR_FR5	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.04967709	-0.00228227	0.101636457	0.060566048	0
FR_FR5	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0113367	-0.152664384	0.129991027	0.872874959	0
FR_FR5	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.236486	-0.371915966	-0.101055953	0.000932001	0
FR_FR5	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.30031204	-0.812250843	1.412874923	0.495259809	0
FR_FR5	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.12788363	0.071602554	0.184164707	2.96445E-05	1
FR_FR5	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0949234	-0.217906986	0.028060252	0.127647458	0
FR_FR5	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.1111529	0.04212425	0.180181559	0.00210951	1
FR_FR5	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.16142559	0.079146324	0.243704861	0.000238236	1
FR_FR5	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.1972331	-0.496672333	0.891138538	0.512764234	0
FR_FR5	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.0525419	-0.143165247	0.038081393	0.250288419	0
FR_FR5	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.1133597	-0.354443114	0.127723621	0.350148987	0
FR_FR5	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.91323061	0.625997028	1.200464187	4.01449E-08	1
FR_FR5	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.51078085	0.053556698	0.968004997	0.029235547	1
FR_FR5	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.08419384	-0.028964796	0.19735248	0.141052181	0
FR_FR5	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-1.0892673	-2.024225249	-0.154309327	0.02323165	0
FR_FR5	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.7123743	-1.171870716	-0.252877949	0.002988833	0
FR_FR5	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1420791	-0.291940287	0.007782029	0.062683574	0
FR_FR5	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1810745	-0.366958041	0.004809084	0.056012816	0
FR_FR5	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0729711	-0.140815722	-0.005126402	0.035517274	0
FR_FR5	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.2460164	-1.636455908	-0.855576989	3.6706E-08	0
FR_FR5	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.3258051	-1.977883462	-0.673726737	0.000149344	0
FR_FR5	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1053845	-0.226226397	0.015457415	0.086097221	0
FR_FR5	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1212836	-0.290619962	0.048052724	0.156848713	0
FR_FR5	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03356832	-0.018909231	0.086045878	0.205245618	0
FR_FR5	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.14485086	-0.122325413	0.412027141	0.281995809	0
FR_FR5	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01053404	-0.159994712	0.181062788	0.901928546	0
FR_FR5	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.025473	-0.155807137	0.10486111	0.696809343	0
FR_FR5	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.7011383	-1.10656366	-0.295713002	0.001032927	0
FR_FR5	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1659587	-0.431844641	0.099927307	0.216277271	0
FR_FR5	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.24478436	0.117846021	0.371722703	0.000296018	1
FR_FR5	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.10112228	0.044596975	0.157647594	0.000715587	1

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
FR_FR5	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3067748	-0.568797068	-0.044752446	0.0225903	0
FR_FR5	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-2.1113009	-2.798536564	-1.424065285	8.971E-08	0
FR_FR5	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0802697	-0.15193306	-0.00860638	0.028828212	0
FR_FR5	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1011351	-0.42235973	0.220089441	0.530681085	0
FR_FR5	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1377632	-0.256213746	-0.019312633	0.023458454	0
FR_FR5	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.17627459	0.09333785	0.259211329	8.07436E-05	1
FR_FR5	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00949386	-0.027920763	0.046908479	0.613121896	0
FR_FR5	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0706879	-0.280143146	0.138767259	0.501662616	0
FR_FR5	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.07461243	0.003400148	0.145824717	0.040353961	1
FR_FR5	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04152503	-0.010991008	0.094041076	0.118786072	0
FR_FR5	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0658964	-0.193131608	0.061338826	0.303851376	0
FR_FR5	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0259587	-0.131572897	0.079655545	0.624277449	0
FR_FR5	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1256377	-0.229437961	-0.021837417	0.018589649	0
FR_FR5	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.15794118	0.098694961	0.217187397	1.80693E-06	1
FR_FR5	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4313569	-0.629950088	-0.232763695	5.88973E-05	0
FR_FR5	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.08398303	-0.088369867	0.256335928	0.333083408	0
FR_FRABCH	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0653308	-0.314567478	0.1839058	0.595553043	0
FR_FRABCH	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.03170103	-0.007338614	0.070740674	0.107249064	0
FR_FRABCH	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.25467141	-0.20574851	0.715091328	0.266381613	0
FR_FRABCH	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.06887506	0.018410412	0.119339707	0.009250381	1
FR_FRABCH	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0078622	-0.181924042	0.166199556	0.926939742	0
FR_FRABCH	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.09187098	0.033500206	0.150241758	0.003203989	1
FR_FRABCH	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0	0	0	-	0
FR_FRABCH	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	0.0219514	-0.100839288	0.144742088	0.716971642	0
FR_FRABCH	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	0.00384917	-0.001720707	0.009419043	0.167922925	0
FR_FRABCH	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.03676627	0.000754646	0.072777887	0.045691981	1
FR_FRABCH	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.09052994	0.033217619	0.147842266	0.003110934	1
FR_FRABCH	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.2323514	-0.502554548	0.037851823	0.089079494	0
FR_FRABCH	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.3604649	-0.848299039	0.127369252	0.141338032	0
FR_FRABCH	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.2385909	-0.824068997	0.346887132	0.410921067	0
FR_FRABCH	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.1840709	-0.151239004	0.519380802	0.270353757	0
FR_FRABCH	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.03057965	-0.114222046	0.175381356	0.668627303	0
FR_FRABCH	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.01695226	-0.116976064	0.150880583	0.797314913	0
FR_FRABCH	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0526226	-0.109827317	0.004582163	0.069941751	0
FR_FRABCH	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.7497128	-1.197062846	-0.302362795	0.001876037	0
FR_FRABCH	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1453601	-0.457332979	0.166612721	0.348033134	0
FR_FRABCH	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.0088685	-0.111060862	0.128797853	0.880687205	0
FR_FRABCH	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08115791	-0.055467683	0.217783511	0.233842052	0
FR_FRABCH	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.09766168	-0.063134377	0.258457731	0.223767143	0
FR_FRABCH	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.19694793	0.033209848	0.360686021	0.02014971	1
FR_FRABCH	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.18796527	0.005666351	0.370264181	0.043730689	1
FR_FRABCH	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06497643	-0.145575174	0.275528042	0.53242328	0
FR_FRABCH	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.09147107	-0.035288025	0.218230175	0.150527329	0
FR_FRABCH	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.09662344	0.023599373	0.169647512	0.011344884	1
FR_FRABCH	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0621303	-0.231688849	0.10742815	0.459163454	0
FR_FRABCH	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0619991	-0.150729908	0.026731654	0.163414977	0
FR_FRABCH	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0077426	-0.068330827	0.052845639	0.795417355	0
FR_FRABCH	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1063295	-0.326959109	0.114300135	0.331997997	0
FR_FRABCH	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.22778606	0.149963862	0.305608268	1.85136E-06	1
FR_FRABCH	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.01363004	-0.019206966	0.046467046	0.402394959	0
FR_FRABCH	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02520173	-0.100165337	0.150568797	0.683637424	0
FR_FRABCH	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.09721842	0.045865999	0.14857085	0.00058231	1
FR_FRABCH	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02599383	-0.09938226	0.15136993	0.674308502	0
FR_FRABCH	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02520173	-0.100165337	0.150568797	0.683637424	0
FR_FRABCH	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0429808	-0.09882081	0.012859285	0.12610088	0
FR_FRABCH	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.19453949	0.137623067	0.251455912	1.29549E-07	1
FR_FRABCH	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0229162	-0.175067067	0.129234688	0.759969968	0
FR_FRABCH	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3908254	-0.693744617	-0.087906105	0.013309835	0
FR_FRABCH	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.28181703	-0.052803062	0.616437113	0.095520185	0
FR_FRABCH	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.0147774	-0.082204845	0.052650061	0.656938531	0
FR_FRABCH	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.0037466	-0.069971673	0.062478475	0.908570026	0
FR_FRABCH	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0120031	-0.021497909	-0.00250836	0.015078858	0
FR_FRABCH	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1794489	-0.527414645	0.168516768	0.299823776	0
FR_FRABCH	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.06806572	0.011495611	0.124635823	0.020113309	1
FR_FRABCH	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.01332643	-0.125574422	0.152227284	0.845616145	0
FR_FRABCH	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0362378	-0.13251142	0.060035728	0.447146835	0
FR_FRABCH	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.12333366	0.058958266	0.187709053	0.000514387	1
FR_FRABCH	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.02907902	-0.032200423	0.090358471	0.339356712	0
FR_FRABCH	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.05757958	-0.008713339	0.123872504	0.086070859	0
FR_FRABCH	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.13023593	0.049449087	0.211022769	0.002625486	1
FR_FRABCH	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.047822	-0.120202507	0.024558471	0.186757316	0
FR_FRABCH	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.0174137	-0.230520618	0.195693281	0.868272473	0
FR_FRABCH	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.81612035	0.497818134	1.134422568	1.39261E-05	1
FR_FRABCH	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.43703951	0.005029054	0.869049962	0.047564462	1
FR_FRABCH	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.02203106	-0.272433954	0.316496072	0.87929543	0
FR_FRABCH	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.4838161	-0.94504558	-0.022586614	0.040448868	0
FR_FRABCH	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.46209812	-0.622265604	1.546461845	0.32326019	0
FR_FRABCH	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.5345787	-0.036557655	1.105715048	0.061162354	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	3.07248503	2.618401965	3.526568089	1.22119E-05	1
FR_FRABCH	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	-2.7144691	-3.156282977	-2.272655126	1.8877E-05	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.39847336	-0.73947951	1.536426224	0.409307116	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.46209812	-0.342087541	1.266283782	0.199688787	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.43378161	-1.174589709	2.042152937	0.519006026	0
FR_FRABCH	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.57762265	-1.030748672	2.185993973	0.398272428	0
FR_FRABCH	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.6918008	-1.280937211	-0.102664432	0.023009214	0
FR_FRABCH	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.099583	-0.230529731	0.031363764	0.130517239	0
FR_FRABCH	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2131904	-0.483368651	0.056987933	0.117233218	0
FR_FRABCH	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0829341	-0.150341421	-0.015526833	0.017707017	0
FR_FRABCH	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.8314354	-1.265721359	-0.397149506	0.000518236	0
FR_FRABCH	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2008119	-0.489609061	0.087985255	0.165399386	0
FR_FRABCH	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0542758	-0.133848268	0.025296754	0.173327879	0
FR_FRABCH	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0363586	-0.311866381	0.239149164	0.788891194	0
FR_FRABCH	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06420016	0.017131761	0.111268553	0.009288874	1
FR_FRABCH	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0693056	-0.385253929	0.246642777	0.656650351	0
FR_FRABCH	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03969271	-0.267745575	0.347130987	0.793358257	0
FR_FRABCH	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0984898	-0.324388754	0.12740909	0.379422833	0
FR_FRABCH	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5584298	-1.046644201	-0.070215338	0.026462155	0
FR_FRABCH	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1503182	-0.533685439	0.233049091	0.4286366	0
FR_FRABCH	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.08766887	0.023741533	0.151596198	0.008955393	1
FR_FRABCH	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.09858013	0.04434193	0.152818323	0.000878396	1
FR_FRABCH	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2477099	-0.585571965	0.090152208	0.144336164	0
FR_FRABCH	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.0800699	-1.688116915	-0.47202291	0.001097397	0
FR_FRABCH	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0219574	-0.095019895	0.051105	0.543125579	0
FR_FRABCH	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1477722	-0.443326534	0.147782227	0.314523037	0
FR_FRABCH	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.004205	-0.074202494	0.065792517	0.902942755	0
FR_FRABCH	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.1935772	0.120471782	0.266682617	8.71254E-06	1
FR_FRABCH	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0047088	-0.124101785	0.114684178	0.936185073	0
FR_FRABCH	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0940917	-0.270141755	0.081958417	0.282936704	0
FR_FRABCH	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.0521501	-0.013054104	0.117354302	0.11254767	0
FR_FRABCH	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.07527577	0.035513185	0.115038362	0.000582408	1
FR_FRABCH	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1295488	-0.352838252	0.093740679	0.244638324	0
FR_FRABCH	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01143163	-0.085522863	0.108386128	0.810910651	0
FR_FRABCH	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1055363	-0.264383297	0.053310698	0.184386485	0
FR_FRABCH	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.16904688	0.116219955	0.221873796	4.16732E-07	1
FR_FRABCH	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1795993	-0.484671708	0.12547319	0.237940754	0
FR_FRABCH	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1332393	-0.372880713	0.106402048	0.264393984	0
FR_FRCP1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.57525743	0.229559261	0.920955598	0.001902043	1
FR_FRCP1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.12988146	0.053610343	0.206152575	0.001540166	1
FR_FRCP1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.5870819	-0.931780326	-0.242383392	0.001537789	0
FR_FRCP1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.27407986	0.118441834	0.42971789	0.001119951	1
FR_FRCP1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.0846689	-0.081732921	0.251070713	0.307414038	0
FR_FRCP1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.35641898	0.15945084	0.553387113	0.000856288	1
FR_FRCP1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0	0	0	-	0
FR_FRCP1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	0.00090936	-0.099007912	0.100826631	0.985309581	0
FR_FRCP1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0132701	-0.01946094	-0.007079295	0.000128758	0
FR_FRCP1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.12054178	0.046037282	0.195046269	0.00243853	1
FR_FRCP1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.34242911	0.146952241	0.537905971	0.001178439	1
FR_FRCP1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0240894	-0.202883571	0.154704787	0.785301601	0
FR_FRCP1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.09842975	-0.359852933	0.556712426	0.664390383	0
FR_FRCP1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	0.28525151	-0.307664661	0.87816768	0.334086187	0
FR_FRCP1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02561711	-0.121385233	0.172619447	0.724687772	0
FR_FRCP1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.17061159	0.026002073	0.315221114	0.022268494	1
FR_FRCP1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.12196845	0.007717487	0.236219418	0.037193421	1
FR_FRCP1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3040042	-0.555484111	-0.052524231	0.019421046	0
FR_FRCP1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.7186801	-1.15214012	-0.285220047	0.001965178	0
FR_FRCP1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0747597	-0.371548119	0.222028794	0.611073548	0
FR_FRCP1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05806037	-0.046948109	0.163068859	0.268111998	0
FR_FRCP1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4131743	-0.736345746	-0.090002781	0.013901825	0
FR_FRCP1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08509984	-0.045251831	0.215451501	0.192735778	0
FR_FRCP1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.14693762	0.035495599	0.258379639	0.011427434	1
FR_FRCP1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.15528836	-0.015801307	0.326378022	0.073696043	0
FR_FRCP1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08002056	-0.017905637	0.177946757	0.105669618	0
FR_FRCP1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07525667	-0.030647665	0.181161	0.157295856	0
FR_FRCP1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.15605395	0.043115161	0.268992735	0.008337375	1
FR_FRCP1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5866651	-1.146557752	-0.026772367	0.040592823	0
FR_FRCP1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0632706	-0.147465717	0.020924418	0.135505841	0
FR_FRCP1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.14746396	0.039993825	0.254934098	0.008750493	1
FR_FRCP1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.47635136	0.19320243	0.759500292	0.001722485	1
FR_FRCP1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.5334565	0.262201407	0.804711592	0.000354346	1
FR_FRCP1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.09409551	0.03804176	0.150149264	0.001757145	1
FR_FRCP1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07874601	-0.026919099	0.18441112	0.138663446	0
FR_FRCP1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.14564349	0.088192818	0.203094154	1.31773E-05	1
FR_FRCP1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.27082951	0.078847049	0.462811974	0.007201907	1
FR_FRCP1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06813089	-0.039346307	0.175608079	0.205609562	0
FR_FRCP1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0723941	-0.118688305	-0.026099913	0.003253541	0
FR_FRCP1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.46576696	0.249066773	0.682467153	0.000124489	1
FR_FRCP1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.0325362	-0.107761779	0.172834176	0.639541536	0
FR_FRCP1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.406415	-0.603995051	-0.208834889	0.000211733	0
FR_FRCP1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.42793234	0.078418361	0.777446325	0.018041823	1
FR_FRCP1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.102216	-0.218618623	0.014186692	0.083071775	0
FR_FRCP1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.0684088	-0.182461152	0.045643563	0.230432916	0
FR_FRCP1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0108042	-0.018239243	-0.003369235	0.005796594	0
FR_FRCP1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.4275173	-0.703037394	-0.151997277	0.003468618	0
FR_FRCP1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.27875512	0.120996914	0.43651332	0.001083697	1
FR_FRCP1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.20202739	-0.031664273	0.43571905	0.087728601	0

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
FR_FRCP1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.2281854	-0.336399587	-0.119971294	0.000157391	0
FR_FRCP1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.43131835	0.198079951	0.664556747	0.000686252	1
FR_FRCP1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.25916359	0.130658855	0.387668333	0.000266416	1
FR_FRCP1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.07652537	0.004739461	0.148311285	0.037447025	1
FR_FRCP1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.41313969	0.173705503	0.65257388	0.001361296	1
FR_FRCP1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.11306741	7.95599E-05	0.226055254	0.049848599	1
FR_FRCP1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.1886965	-0.400056273	0.02266335	0.078299042	0
FR_FRCP1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.74466963	0.439496273	1.049842992	2.29591E-05	1
FR_FRCP1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.58987943	0.196612694	0.983146162	0.004549583	1
FR_FRCP1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.07452904	-0.169701418	0.318759489	0.538246577	0
FR_FRCP1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.3383721	-0.67169828	-0.00504583	0.046832788	0
FR_FRCP1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.58852401	-0.133656679	1.310704698	0.090343615	0
FR_FRCP1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.8999743	-0.211070044	2.01101865	0.091800639	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	1.71481685	-0.316596243	3.746229938	0.082147616	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	1.19659731	-0.238168937	2.631363547	0.084900744	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.65388617	-0.880529165	2.188301502	0.32326019	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.46209812	-0.622265604	1.546461845	0.32326019	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.63651417	-1.532213281	2.805241618	0.4845711	0
FR_FRCP1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.74187468	-1.426852765	2.910602133	0.419464253	0
FR_FRCP1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4204391	-0.862456136	0.021577918	0.061530271	0
FR_FRCP1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.12152117	-0.005337722	0.248380064	0.059811646	0
FR_FRCP1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.10770927	-0.035426246	0.250844781	0.134994088	0
FR_FRCP1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.28868	-0.52247402	-0.054885914	0.017167833	0
FR_FRCP1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.6892104	-1.109878518	-0.26854231	0.002184762	0
FR_FRCP1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0421998	-0.332320295	0.247920632	0.768704719	0
FR_FRCP1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06750634	-0.023478486	0.158491173	0.140353129	0
FR_FRCP1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1886806	-0.50412249	0.126761261	0.231691735	0
FR_FRCP1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.28387152	0.130070361	0.437672678	0.000700016	1
FR_FRCP1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0506238	-0.307527165	0.206279524	0.69051941	0
FR_FRCP1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.19079875	0.059424498	0.322172993	0.005821348	1
FR_FRCP1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06345938	-0.068717126	0.195635878	0.335065186	0
FR_FRCP1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1986585	-0.521059055	0.123742036	0.21824294	0
FR_FRCP1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.11877152	-0.107875916	0.34541896	0.293421202	0
FR_FRCP1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.1466176	0.031590895	0.261644305	0.014165019	1
FR_FRCP1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.42239817	0.197031625	0.647764725	0.000596594	1
FR_FRCP1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5142611	-1.069521551	0.040999385	0.068289557	0
FR_FRCP1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.9175447	-1.519415731	-0.315673594	0.004001944	0
FR_FRCP1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4539352	-1.03072011	0.122849613	0.087350618	0
FR_FRCP1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.14104072	0.040412525	0.241668922	0.007542104	1
FR_FRCP1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.46766575	0.196049253	0.739282251	0.001389121	1
FR_FRCP1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.2310748	0.099458903	0.362690692	0.001153335	1
FR_FRCP1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.49082939	0.224064748	0.757594034	0.000722933	1
FR_FRCP1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.09794111	0.034833758	0.16104846	0.00346309	1
FR_FRCP1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.11891637	0.000895177	0.236937561	0.048390235	1
FR_FRCP1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04086648	-0.030173212	0.111906173	0.249629429	0
FR_FRCP1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.13316605	0.077234411	0.189097681	3.24561E-05	1
FR_FRCP1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.27506293	0.060076482	0.490049383	0.013838092	1
FR_FRCP1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.11813196	0.03230685	0.203957062	0.008564013	1
FR_FRCP1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0856941	-0.139219566	-0.032168651	0.002669487	0
FR_FRCP1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.45307029	0.232703803	0.67343677	0.000212922	1
FR_FRCP1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01829503	-0.179710697	0.216300756	0.851756958	0
FR_FRCP1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.15724083	-0.020758701	0.335240358	0.081332422	0
FR_FRRD	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.2541723	-0.49174793	-0.016596634	0.036743064	0
FR_FRRD	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.06540854	0.016463682	0.114353397	0.010361205	1
FR_FRRD	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.14252734	-0.284440534	0.569495211	0.501780536	0
FR_FRRD	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.07747404	0.020227495	0.134720587	0.009470347	1
FR_FRRD	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.105011	-0.259861628	0.049839644	0.177158363	0
FR_FRRD	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.11869143	0.051906139	0.185476722	0.00096988	1
FR_FRRD	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0	0	0	-	0
FR_FRRD	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	0.0200322	-0.063966853	0.10403126	0.631030804	0
FR_FRRD	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	0.00362039	-0.003298506	0.010539294	0.295097351	0
FR_FRRD	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.07686066	0.030469086	0.123252243	0.001899439	1
FR_FRRD	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.09549367	0.020933566	0.170053779	0.013602461	1
FR_FRRD	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1328744	-0.297606531	0.031857726	0.110387996	0
FR_FRRD	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.209305	-0.509815375	0.091205463	0.166030442	0
FR_FRRD	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1375665	-0.56815377	0.2930207	0.520523959	0
FR_FRRD	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00978443	-0.27230919	0.291878046	0.944217851	0
FR_FRRD	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05356732	-0.07695688	0.184091525	0.410082297	0
FR_FRRD	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06533549	-0.039909697	0.170580681	0.215678565	0
FR_FRRD	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0403188	-0.111112624	0.03047495	0.255169849	0
FR_FRRD	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.7647269	-1.185398027	-0.344055698	0.00077016	0
FR_FRRD	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2147237	-0.57776523	0.148317817	0.237673894	0
FR_FRRD	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08978514	-0.020793982	0.200364266	0.108134392	0
FR_FRRD	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08968976	-0.065986778	0.2453663	0.249806023	0
FR_FRRD	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.09218546	-0.075006083	0.259376995	0.270340091	0
FR_FRRD	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.44814053	0.187205377	0.709075674	0.001356759	1
FR_FRRD	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.13194908	-0.005638601	0.269536758	0.059590004	0
FR_FRRD	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02774235	-0.097444652	0.152929361	0.655309465	0
FR_FRRD	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06397615	-0.041196394	0.169148686	0.22485354	0
FR_FRRD	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.11676211	0.029536596	0.203987622	0.010199648	1
FR_FRRD	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1121795	-0.459424503	0.235065465	0.515903427	0
FR_FRRD	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0907798	-0.19672657	0.015167038	0.090671328	0
FR_FRRD	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0117326	-0.085410883	0.06194559	0.748209478	0
FR_FRRD	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00304798	-0.296538942	0.302634901	0.983625034	0
FR_FRRD	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.23485123	0.118415228	0.351287222	0.000243571	1
FR_FRRD	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05452802	0.022985821	0.086070222	0.001273775	1
FR_FRRD	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06437752	-0.040790275	0.169545308	0.222000686	0
FR_FRRD	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.10715302	0.055730418	0.158575621	0.000164421	1
FR_FRRD	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05175585	-0.055889117	0.15940082	0.335418138	0
FR_FRRD	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06437752	-0.040790275	0.169545308	0.222000686	0
FR_FRRD	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0799624	-0.145286025	-0.014638781	0.01792318	0
FR_FRRD	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.19840513	0.130371872	0.266438383	1.07239E-06	1
FR_FRRD	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0268036	-0.176201216	0.122593976	0.71766234	0
FR_FRRD	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5867803	-0.827703258	-0.345857302	1.99618E-05	0
FR_FRRD	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.09401349	0.023931717	0.164095263	0.010053982	1
FR_FRRD	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.0106708	-0.071313038	0.049971448	0.722853088	0
FR_FRRD	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	0.00917042	-0.057318865	0.075659713	0.780950437	0
FR_FRRD	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0205762	-0.049811704	0.008659384	0.161755486	0
FR_FRRD	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1113421	-0.350167485	0.12748321	0.35009656	0
FR_FRRD	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.10171474	0.039780063	0.163649408	0.002057025	1
FR_FRRD	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.09016764	-0.075202099	0.255537373	0.275605183	0
FR_FRRD	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0470089	-0.136907526	0.04288971	0.295416388	0
FR_FRRD	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.14123533	0.062937253	0.219533408	0.000834221	1
FR_FRRD	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.08936074	0.027456986	0.151264497	0.005961591	1
FR_FRRD	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.14345914	0.066291247	0.220627024	0.000608754	1
FR_FRRD	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.13975234	0.038803612	0.240701061	0.008088172	1
FR_FRRD	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.0038049	-0.103816682	0.096206864	0.938825405	0
FR_FRRD	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.02277918	-0.151670575	0.197228933	0.792330666	0
FR_FRRD	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.5787367	0.185043488	0.972429905	0.005191155	1
FR_FRRD	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.43767413	-0.020664988	0.89601325	0.060633216	0
FR_FRRD	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.00541097	-0.267514251	0.27833619	0.968096845	0
FR_FRRD	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.3752213	-0.687582291	-0.062860347	0.019996757	0
FR_FRRD	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5204847	-0.970784714	-0.070184742	0.024774646	0
FR_FRRD	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.0623829	-0.069201077	0.193966877	0.342114286	0
FR_FRRD	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0476876	-0.196626099	0.101250875	0.519619571	0
FR_FRRD	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0874822	-0.152663639	-0.022300753	0.010021105	0
FR_FRRD	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.7756766	-1.179913166	-0.371439951	0.000431374	0
FR_FRRD	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2236494	-0.576979111	0.129680213	0.207007041	0
FR_FRRD	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05696023	-0.038234913	0.152155373	0.232361027	0
FR_FRRD	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06636022	-0.069579966	0.2023004	0.328178651	0
FR_FRRD	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.07663178	0.013898861	0.1393647	0.018143535	1
FR_FRRD	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.0633881	-0.180502854	0.307279051	0.6008001	0
FR_FRRD	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.46035288	0.237403468	0.683302297	0.000183866	1
FR_FRRD	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05993057	-0.042145205	0.162006342	0.24106333	0
FR_FRRD	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.302183	-0.691402997	0.087036987	0.123872495	0
FR_FRRD	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0029465	-0.19802275	0.19212973	0.975691596	0
FR_FRRD	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.1096931	0.020209196	0.199177013	0.017773192	1
FR_FRRD	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.11216668	0.038477682	0.185855669	0.003940296	1
FR_FRRD	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2324942	-0.631974549	0.166986167	0.245113637	0
FR_FRRD	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.137465	-1.746495724	-0.528434339	0.000579417	0
FR_FRRD	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4859017	-	-	-	0
FR_FRRD	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.017607	-0.087781635	0.052567553	0.613417851	0
FR_FRRD	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02233025	-0.284448016	0.329108511	0.883274864	0
FR_FRRD	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03864834	-0.016943856	0.094240534	0.166792139	0
FR_FRRD	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.17158207	0.063711504	0.27945263	0.002727034	1
FR_FRRD	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04419038	0.002371435	0.086009318	0.038969968	1
FR_FRRD	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04930986	-0.036874694	0.135494407	0.253033869	0
FR_FRRD	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.11362055	0.034693495	0.192547596	0.006086286	1
FR_FRRD	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05612212	0.001793364	0.11045088	0.043286416	1
FR_FRRD	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04183537	-0.098352684	0.182023432	0.548231701	0
FR_FRRD	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.15244388	-0.018461132	0.323348898	0.078712598	0
FR_FRRD	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0983525	-0.171372421	-0.025332634	0.00978193	0
FR_FRRD	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.20337968	0.125468163	0.281291205	6.90201E-06	1
FR_FRRD	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0991596	-0.291706712	0.093387557	0.302675678	0
FR_FRRD	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06260153	-0.142888627	0.268091681	0.539968509	0
FR_HC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.0236312	-0.151281955	0.198544357	0.788332339	0
FR_HC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.0626523	0.025629345	0.099675249	0.001216069	1
FR_HC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.5089932	0.267116084	0.750870319	7.9692E-05	1
FR_HC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.08229569	0.023991853	0.140599531	0.006336836	1
FR_HC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0060916	-0.116290967	0.104107742	0.912509966	0
FR_HC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.07336425	0.012164645	0.134563848	0.019511443	1
FR_HC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0101933	-0.045813414	0.025426732	0.569854848	0
FR_HC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0698056	-0.151364267	0.01175301	0.092232148	0
FR_HC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	0.00343009	-0.002449044	0.009309233	0.248465058	0
FR_HC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.0759985	0.042227081	0.109769914	2.78769E-05	1
FR_HC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.08309496	0.015125237	0.151064691	0.017309833	1
FR_HC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1871024	-0.352511711	-0.021693143	0.027205035	0
FR_HC1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.487636	-0.813477	-0.161795052	0.003914666	0
FR_HC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0084838	-0.369394869	0.352427217	0.962732717	0
FR_HC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0456334	-0.196143478	0.104876693	0.547262245	0
FR_HC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.03260502	1.09952E-05	0.065199036	0.049924888	1
FR_HC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.01679009	-0.035021008	0.068601192	0.520107244	0
FR_HC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.01519416	-0.048510446	0.078898766	0.635710203	0
FR_HC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.194095	-1.506866382	-0.881323637	5.30149E-11	0
FR_HC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.2802002	-1.802177948	-0.75822251	6.26202E-06	0

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
FR_HC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02076091	-0.014507525	0.05602935	0.244298834	0
FR_HC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.19474189	0.05993238	0.329551394	0.005265502	1
FR_HC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0964652	-0.206416666	0.013486183	0.084519809	0
FR_HC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02450102	-0.010309203	0.059311245	0.164764346	0
FR_HC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.09268439	-0.030173697	0.215542475	0.136890536	0
FR_HC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3676131	-0.61321064	-0.122015508	0.003908696	0
FR_HC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.03665163	0.007728371	0.065574887	0.013764349	1
FR_HC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.22282684	0.108102912	0.337550766	0.000240115	1
FR_HC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5069951	-0.859332563	-0.154657662	0.005434978	0
FR_HC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4132498	-0.602073601	-0.224426019	4.34905E-05	0
FR_HC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05873961	-0.016049417	0.13352864	0.121727472	0
FR_HC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0686774	-0.202644877	0.065290071	0.310025032	0
FR_HC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.18217808	0.041773756	0.322582406	0.011746114	1
FR_HC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.0269438	-0.001206599	0.055094197	0.06036432	0
FR_HC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.03665163	0.007728371	0.065574887	0.013764349	1
FR_HC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06112818	0.011788703	0.11046766	0.015922676	1
FR_HC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.03665163	0.007728371	0.065574887	0.013764349	1
FR_HC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.03665163	0.007728371	0.065574887	0.013764349	1
FR_HC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.022534	-0.050910254	0.005842328	0.117718716	0
FR_HC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.14348992	0.072174288	0.21480556	0.000149594	1
FR_HC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.358925	-0.518297067	-0.19955287	2.75279E-05	0
FR_HC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5522847	-0.682740886	-0.421828473	0	0
FR_HC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.12113854	-0.049976354	0.292253425	0.161864738	0
FR_HC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.0883841	-0.131364465	-0.045403683	0.000123378	0
FR_HC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.0867026	-0.128646657	-0.044758582	0.000114806	0
FR_HC1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.018491	-0.029953238	-0.007028809	0.002036954	0
FR_HC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.2334005	-0.435999038	-0.030802008	0.024583193	0
FR_HC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.0411079	-0.014107422	0.096323221	0.142034832	0
FR_HC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.4804397	-0.728889918	-0.231989461	0.000254281	0
FR_HC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0354946	-0.107678531	0.036689361	0.330038236	0
FR_HC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.13262054	0.056335756	0.208905323	0.000906778	1
FR_HC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.2280071	-0.464514825	0.008500597	0.058576869	0
FR_HC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.2613076	-0.527550643	0.004935495	0.054279015	0
FR_HC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.14450361	0.044491466	0.244515755	0.005256903	1
FR_HC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.249063	-0.379298167	-0.118827823	0.000293254	0
FR_HC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.1156666	-0.342947189	0.111614083	0.313529766	0
FR_HC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.59377794	0.390703855	0.796852016	1.59764E-07	1
FR_HC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	1.0548072	0.766634435	1.342979973	3.28412E-10	1
FR_HC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.03409293	-0.124623832	0.192809696	0.668974011	0
FR_HC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.8402952	-1.565735822	-0.114854542	0.02383881	0
FR_HC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3202157	-0.708957358	0.06852586	0.104873739	0
FR_HC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01471677	-0.03177953	0.061213073	0.529845805	0
FR_HC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0221782	-0.142316733	0.097960241	0.713793235	0
FR_HC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0324061	-0.097826621	0.033014504	0.326509514	0
FR_HC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1868021	-1.49986244	-0.873741854	7.83691E-11	0
FR_HC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.2729074	-1.795058259	-0.750756474	6.99735E-06	0
FR_HC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04158551	0.009292173	0.073878849	0.012365829	1
FR_HC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.12617061	-0.01848888	0.270830109	0.086322523	0
FR_HC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.0018295	-0.054582912	0.058241918	0.948601713	0
FR_HC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0889134	-0.26438326	0.08655645	0.315609941	0
FR_HC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0517193	-0.154932674	0.051494124	0.320973453	0
FR_HC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03334535	-0.084714036	0.151404744	0.574945938	0
FR_HC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4788786	-0.815054397	-0.142702897	0.005894094	0
FR_HC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0965053	-0.255641057	0.06263041	0.230483144	0
FR_HC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.15985211	0.058627235	0.261076989	0.002411318	1
FR_HC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.09596394	0.02048697	0.171440902	0.013465126	1
FR_HC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3145726	-0.512314592	-0.11683067	0.002249266	0
FR_HC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-2.0292923	-2.608852504	-1.449732163	1.36755E-09	0
FR_HC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01091668	-0.03847873	0.060312095	0.660667439	0
FR_HC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0667432	-0.214718568	0.081232224	0.371353748	0
FR_HC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2583639	-0.487861316	-0.028866571	0.027917306	0
FR_HC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.13536209	-0.006008117	0.276732289	0.060269319	0
FR_HC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00295738	-0.039234113	0.04514887	0.889198462	0
FR_HC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02897871	-0.018418955	0.076376369	0.226731282	0
FR_HC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2780173	-0.541916259	-0.014118268	0.039235162	0
FR_HC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02202445	-0.024532564	0.068581459	0.348596969	0
FR_HC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02790329	-0.031077441	0.086884014	0.34856906	0
FR_HC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03614113	-0.005429547	0.077711817	0.087315263	0
FR_HC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0445278	-0.090890308	0.001834761	0.059509301	0
FR_HC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.1105598	0.04897485	0.172144752	0.000631625	1
FR_HC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3619614	-0.527377212	-0.196545625	4.36012E-05	0
FR_HC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.0028687	-0.086527987	0.092265392	0.949141819	0
FR_HC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	-2.22E-16	-	-	-	0
FR_HC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	-4.441E-16	-	-	-	0
FR_HC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	-4.441E-16	-	-	-	0
FR_HC3	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.0455261	-0.07985348	0.170905686	0.470135937	0
FR_HC3	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.02796736	-0.003961961	0.059896675	0.084807584	0
FR_HC3	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.16239239	0.007727211	0.317057565	0.039936893	1
FR_HC3	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.05562219	0.009747917	0.101496457	0.018363446	1
FR_HC3	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0032522	-0.102946291	0.096441847	0.948144239	0
FR_HC3	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.02961327	-0.010582206	0.069808741	0.145640226	0
FR_HC3	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0	0	0	-	0
FR_HC3	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0661037	-0.158203045	0.025995691	0.156112445	0
FR_HC3	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0039453	-0.008918396	0.001027732	0.117674548	0
FR_HC3	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.03387693	0.002797882	0.064955968	0.033189477	1
FR_HC3	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.07714874	0.024929992	0.129367483	0.004495358	1
FR_HC3	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0494579	-0.212524165	0.113608418	0.546033225	0
FR_HC3	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.5099825	-0.839836842	-0.180128202	0.003040318	0
FR_HC3	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0526591	-0.439963281	0.33464508	0.786404768	0
FR_HC3	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0346185	-0.147573287	0.078336289	0.541843514	0
FR_HC3	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05545177	0.011230469	0.09967308	0.0148984	1
FR_HC3	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.03023844	-0.049471169	0.109948052	0.450594066	0
FR_HC3	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06377367	0.010793516	0.116753828	0.019182598	1
FR_HC3	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.0941467	-1.438319249	-0.74997422	3.59477E-08	0
FR_HC3	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.0547232	-1.597603358	-0.511843004	0.000264225	0
FR_HC3	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05545177	0.011230469	0.09967308	0.0148984	1
FR_HC3	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2602766	-0.427541423	-0.093011782	0.002869725	0
FR_HC3	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1111151	-0.233529086	0.011298804	0.074376511	0
FR_HC3	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05545177	0.011230469	0.09967308	0.0148984	1
FR_HC3	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.04197805	-0.009221236	0.093177333	0.106135639	0
FR_HC3	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3637683	-0.61756236	-0.109974205	0.005747033	0
FR_HC3	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05545177	0.011230469	0.09967308	0.0148984	1
FR_HC3	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.24504919	0.110824681	0.379273702	0.000560184	1
FR_HC3	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.29260182	0.106407158	0.47879648	0.002624116	1
FR_HC3	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.334196	-0.497076103	-0.171315821	0.000128773	0
FR_HC3	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07773348	0.000927687	0.154539266	0.04738554	1
FR_HC3	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05545177	0.011230469	0.09967308	0.0148984	1
FR_HC3	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.18099839	0.078728381	0.283268393	0.000794835	1
FR_HC3	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.03188127	0.001020183	0.062742361	0.043124471	1
FR_HC3	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05545177	0.011230469	0.09967308	0.0148984	1
FR_HC3	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.12230476	0.051283022	0.193326496	0.001066983	1
FR_HC3	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05545177	0.011230469	0.09967308	0.0148984	1
FR_HC3	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07425192	0.025210297	0.123293542	0.003653271	1
FR_HC3	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.001702	-0.007140608	0.003736673	0.533389712	0
FR_HC3	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.11886493	0.045765145	0.191964715	0.001903776	1
FR_HC3	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2787442	-0.447520561	-0.109967815	0.001635356	0
FR_HC3	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.6480903	-0.793597479	-0.502583064	1.33219E-11	0
FR_HC3	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.09185421	0.011116909	0.172591519	0.026616357	1
FR_HC3	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.0483776	-0.170695772	0.073940575	0.430232324	0
FR_HC3	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.0811401	-0.262143504	0.099863364	0.371750178	0
FR_HC3	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0059328	-0.023484385	0.011618713	0.499995944	0
FR_HC3	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0	0	0	-	0
FR_HC3	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.0115354	-0.025407791	0.048478586	0.534293365	0
FR_HC3	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.2822063	-0.598832141	0.034419494	0.079618209	0
FR_HC3	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.03244161	-0.044931465	0.10981468	0.404634949	0
FR_HC3	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.07673434	0.018322281	0.135146391	0.010942649	1
FR_HC3	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.7761151	-1.29949199	-0.252738291	0.004358761	0
FR_HC3	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.5773304	-0.993930045	-0.160730676	0.007451235	0
FR_HC3	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.12990503	-0.005860641	0.265670692	0.060381969	0
FR_HC3	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.16297938	0.036220198	0.28973857	0.0126557	1
FR_HC3	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.06054861	0.004037028	0.117060195	0.036184415	1
FR_HC3	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.38105542	0.239708496	0.522402336	1.35743E-06	1
FR_HC3	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.17440045	0.046437915	0.30236299	0.008429763	1
FR_HC3	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.07759267	-0.027358866	0.182544201	0.144146088	0
FR_HC3	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.9157232	-1.740699445	-0.090747015	0.03021585	0
FR_HC3	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4259348	-0.786084437	-0.065785238	0.021287121	0
FR_HC3	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02558298	-0.006188214	0.057354175	0.112390707	0
FR_HC3	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0609684	-0.189644405	0.067707555	0.346730217	0
FR_HC3	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02630383	-0.023579628	0.076187288	0.295463686	0
FR_HC3	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1218726	-1.46462174	-0.779123504	1.75329E-08	0
FR_HC3	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.0835716	-1.625047986	-0.542095226	0.000180262	0
FR_HC3	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02772589	-0.003543298	0.058995072	0.081144899	0
FR_HC3	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2669132	-0.439976579	-0.093849785	0.003107633	0
FR_HC3	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.027348	-0.068287242	0.013591283	0.186315737	0
FR_HC3	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0482725	-0.205951204	0.109406168	0.542285388	0
FR_HC3	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02685463	-0.004538248	0.058247517	0.092150676	0
FR_HC3	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01629925	-0.022030041	0.054628535	0.398036411	0
FR_HC3	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4322177	-0.74014283	-0.124292554	0.006763355	0
FR_HC3	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0156731	-0.087880735	0.056534448	0.665458626	0
FR_HC3	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.17883219	0.044408486	0.313255902	0.01002288	1
FR_HC3	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05266838	-0.00651753	0.111854286	0.080083526	0
FR_HC3	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0115795	-0.381332391	0.358173417	0.950216143	0
FR_HC3	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.8565954	-2.489661131	-1.22352963	2.32326E-07	0
FR_HC3	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03946808	-0.016229367	0.095165531	0.161350656	0
FR_HC3	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02018308	-0.016551404	0.056917563	0.275862265	0
FR_HC3	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.8332412	-1.343729333	-0.322753062	0.001835139	0
FR_HC3	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.1706105	0.073580407	0.267640598	0.000853513	1
FR_HC3	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01693094	-0.024274882	0.058136772	0.414057918	0
FR_HC3	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00933983	-0.057215725	0.075895378	0.779721383	0
FR_HC3	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.6248659	-1.035748246	-0.213983619	0.003515573	0
FR_HC3	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.08547129	0.017860266	0.153082309	0.014142078	1
FR_HC3	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02772589	-0.003543298	0.058995072	0.081144899	0
FR_HC3	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02772589	-0.003543298	0.058995072	0.081144899	0
FR_HC3	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0029367	-0.010680725	0.004807348	0.450758226	0
FR_HC3	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.08615816	0.022865987	0.149450342	0.008503489	1

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
FR_HC3	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3062848	-0.471097933	-0.141471598	0.000455237	0
FR_HC3	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02554454	-0.021807458	0.072896543	0.2845799	0
FR_HC3	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	-4.441E-16	-	-	-	0
FR_HC3	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	-4.441E-16	-	-	-	0
FR_KC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.20956393	-0.1068012	0.525929064	0.19070813	0
FR_KC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.08371688	0.027041751	0.140392014	0.004385074	1
FR_KC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.08572843	-0.158952394	0.33040926	0.486843348	0
FR_KC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.10067069	0.039069542	0.162271831	0.001730756	1
FR_KC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.09901456	-0.042606012	0.24063514	0.167558198	0
FR_KC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.1658133	0.101796447	0.229830153	2.19962E-06	1
FR_KC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0101933	-0.045813414	0.025426732	0.569854848	0
FR_KC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0842387	-0.163248265	-0.005229047	0.036999684	0
FR_KC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0072527	-0.013703224	-0.000802258	0.02810713	0
FR_KC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.0901696	0.034793881	0.14554531	0.001794068	1
FR_KC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.1385558	0.063280404	0.2138312	0.000470673	1
FR_KC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0610373	-0.29084398	0.168769431	0.597907953	0
FR_KC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.3868374	-0.691067355	-0.082607365	0.013458411	0
FR_KC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0833196	-0.496067117	0.329427927	0.688405701	0
FR_KC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02484112	-0.189028405	0.238710646	0.81744555	0
FR_KC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.15054156	0.119531649	0.181551477	0	1
FR_KC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0301545	-0.145578092	0.085269187	0.603910168	0
FR_KC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1268638	-0.224471548	-0.029256106	0.011610261	0
FR_KC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.2575392	-1.61797389	-0.89710451	1.52238E-09	0
FR_KC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.3473928	-1.918750941	-0.776034729	1.26599E-05	0
FR_KC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.17005869	0.126541825	0.21357555	0	1
FR_KC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.320661	-0.760983166	0.119661086	0.150811217	0
FR_KC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0329808	-0.158043756	0.092082152	0.600509662	0
FR_KC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1400448	-0.33762793	0.057538406	0.161859573	0
FR_KC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0144687	-0.171952607	0.14301519	0.855112678	0
FR_KC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3277461	-0.570017795	-0.085474461	0.008743593	0
FR_KC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0267926	-0.141687488	0.088102366	0.643249536	0
FR_KC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.29290749	0.18826635	0.39754863	4.31113E-07	1
FR_KC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0009466	-0.20085805	0.198964873	0.992490438	0
FR_KC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3975403	-0.55473675	-0.240343839	3.51363E-06	0
FR_KC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0663106	-0.13426862	0.001647343	0.055656719	0
FR_KC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.64185092	0.553506794	0.730195039	0	1
FR_KC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.33908354	0.235888904	0.442278168	8.38423E-09	1
FR_KC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.13209505	0.094456098	0.169734006	1.27537E-09	1
FR_KC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0267926	-0.141687488	0.088102366	0.643249536	0
FR_KC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.24831341	0.182301729	0.314325099	1.13432E-10	1
FR_KC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06756875	0.022006669	0.113130827	0.004231674	1
FR_KC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0267926	-0.141687488	0.088102366	0.643249536	0
FR_KC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2166751	-0.332451028	-0.100899087	0.000384516	0
FR_KC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.23263618	0.157530472	0.307741886	3.93591E-08	1
FR_KC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4243329	-0.648211694	-0.200454018	0.000328424	0
FR_KC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1953961	-0.415828732	0.025036479	0.081420571	0
FR_KC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.21908698	0.023003594	0.415170372	0.029154708	1
FR_KC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.0565418	-0.094169399	-0.01891412	0.003863524	0
FR_KC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.057828	-0.096286293	-0.019369692	0.003841785	0
FR_KC1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0064966	-0.016192136	0.00319891	0.185192847	0
FR_KC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.749861	-1.031659915	-0.468062158	1.27262E-06	0
FR_KC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.16299334	0.100273963	0.225712718	2.0585E-06	1
FR_KC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.28622485	0.144485346	0.427964357	0.000142262	1
FR_KC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.4316177	-0.609943407	-0.253291937	7.97309E-06	0
FR_KC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.16747559	0.099626975	0.235324213	5.56049E-06	1
FR_KC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.19515082	0.159533165	0.230768482	0	1
FR_KC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.29829763	0.212370224	0.384225031	1.76736E-09	1
FR_KC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.22029332	0.129659894	0.310926751	7.38649E-06	1
FR_KC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.0619994	-0.153299558	0.029300667	0.179928066	0
FR_KC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.6768192	-0.950583557	-0.403054754	5.39939E-06	0
FR_KC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.47901102	0.272431829	0.685590219	1.69307E-05	1
FR_KC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.383831	0.056913206	0.710748788	0.022059814	1
FR_KC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.06424126	-0.068418114	0.196900641	0.336702268	0
FR_KC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.7389525	-1.523245613	0.045340528	0.064383291	0
FR_KC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2113935	-0.678836948	0.25604987	0.370099315	0
FR_KC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.16290306	0.113979187	0.211826925	5.82575E-09	1
FR_KC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.07720486	-0.088113158	0.242522869	0.354762931	0
FR_KC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1552367	-0.260847184	-0.049626304	0.004560941	0
FR_KC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1747247	-1.536326246	-0.813123085	1.14015E-08	0
FR_KC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.2642152	-1.836236225	-0.692194122	3.72741E-05	0
FR_KC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.15839546	0.107795441	0.208995474	3.01031E-08	1
FR_KC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.23650015	0.166420312	0.306579988	4.00181E-09	1
FR_KC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.13432396	0.069853972	0.198793943	9.12901E-05	1
FR_KC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01736274	-0.180194721	0.21492021	0.861333933	0
FR_KC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1031723	-0.335000731	0.128656036	0.377718913	0
FR_KC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0055106	-0.176581678	0.165560573	0.948947981	0
FR_KC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2954123	-0.683246762	0.09242219	0.133194963	0
FR_KC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0777359	-0.344319338	0.188847611	0.562646367	0
FR_KC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.28302313	0.181218837	0.384827417	5.01209E-07	1
FR_KC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.11749455	0.044792937	0.190196161	0.001931739	1
FR_KC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0143254	-0.29421637	0.265565494	0.918968909	0
FR_KC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.9719129	-2.556496303	-1.387329453	4.05343E-09	0
FR_KC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1034762	-0.172087822	-0.03486466	0.003660806	0
FR_KC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.62096635	0.524282887	0.717649816	0	1
FR_KC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.14468872	0.104154978	0.185222461	7.54577E-10	1
FR_KC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.22085502	0.115416292	0.326293749	8.44723E-05	1
FR_KC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.13258448	0.080201212	0.184967749	3.52573E-06	1
FR_KC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05842969	-0.073410958	0.190270328	0.379697388	0
FR_KC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.26517466	0.178301469	0.352047844	5.6734E-08	1
FR_KC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.22061209	0.153183794	0.288040377	9.41872E-09	1
FR_KC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04783746	-0.021149597	0.116824521	0.171017754	0
FR_KC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04656408	-0.077794247	0.170922408	0.457615388	0
FR_KC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2604788	-0.389789039	-0.131168474	0.000147226	0
FR_KC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.23565768	0.158306334	0.313009024	5.94864E-08	1
FR_KC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3522356	-0.584909892	-0.1195613	0.003541505	0
FR_KC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.2283555	0.121349275	0.335361735	6.40461E-05	1
FR_KC1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	as.factor(new_year)	2019-2017	-0.1903832	-	-	-	0
FR_KC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	-2.22E-16	-	-	-	0
FR_KC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	4.4409E-16	-	-	-	-
FR_KC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	-2.22E-16	-	-	-	0
FR_KC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	-4.441E-16	-	-	-	0
FR_MULTIPLATE	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.10765779	-0.188909144	0.404224732	0.258970141	0
FR_MULTIPLATE	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.09156413	-0.128507305	0.311635561	0.215537702	0
FR_MULTIPLATE	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	1.13362245	-1.979880659	4.247125568	0.257973624	0
FR_MULTIPLATE	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.29564019	0.204048658	0.387231725	0.004865902	1
FR_MULTIPLATE	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.12091289	-0.191880048	0.433705837	0.238411253	0
FR_MULTIPLATE	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.28595725	0.176797567	0.395116935	0.00757059	1
FR_MULTIPLATE	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0	0	0	-	0
FR_MULTIPLATE	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1018537	-0.221792888	0.018085564	0.067453221	0
FR_MULTIPLATE	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	0.01034541	-0.007748298	0.028439113	0.133179577	0
FR_MULTIPLATE	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.12622982	0.009295522	0.243164124	0.043344985	1
FR_MULTIPLATE	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.33779777	0.21104841	0.464547134	0.007305445	1
FR_MULTIPLATE	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0888103	-0.54525727	0.367636678	0.490907987	0
FR_MULTIPLATE	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-1.1633314	-2.155168742	-0.171494102	0.026333528	0
FR_MULTIPLATE	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.7405689	-2.194686689	0.713548937	0.278965054	0
FR_MULTIPLATE	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1906903	-0.190690264	-0.190690264	1.85851E-13	0
FR_MULTIPLATE	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2942881	-0.733234193	0.144657954	0.102194811	0
FR_MULTIPLATE	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2551525	-0.255152541	-0.255152541	1.85851E-13	0
FR_MULTIPLATE	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.20725878	0.002367023	0.41215054	0.048943966	1
FR_MULTIPLATE	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.6094379	-1.609437912	-1.609437912	1.85851E-13	0
FR_MULTIPLATE	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.9281186	-4.187178507	0.330941389	0.066841647	0
FR_MULTIPLATE	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2272803	-0.398049979	-0.056510539	0.029108336	0
FR_MULTIPLATE	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.47215531	0.055619093	0.888691517	0.03953554	1
FR_MULTIPLATE	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4594034	-0.628005187	-0.290801551	0.006976521	0
FR_MULTIPLATE	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1490182	-0.24252676	-0.055509646	0.020519255	0
FR_MULTIPLATE	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0866434	-0.086643398	-0.086643398	1.85851E-13	0
FR_MULTIPLATE	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.025139	-2.102984472	0.052706561	0.054858332	0
FR_MULTIPLATE	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2011797	-0.201179739	-0.201179739	1.85851E-13	0
FR_MULTIPLATE	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.50605019	-0.215739368	1.227839738	0.094646302	0
FR_MULTIPLATE	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.18960218	-1.248441463	1.627645814	0.62796532	0
FR_MULTIPLATE	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5198604	-1.199905192	0.160184421	0.081380625	0
FR_MULTIPLATE	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0863764	-0.311293623	0.13854076	0.240510552	0
FR_MULTIPLATE	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.14439305	-0.643671019	0.932457124	0.513398052	0
FR_MULTIPLATE	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.37771719	0.213985569	0.541448812	0.000295967	1
FR_MULTIPLATE	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.04885647	-0.006876069	0.104589008	0.063682931	0
FR_MULTIPLATE	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2011797	-0.201179739	-0.201179739	1.85851E-13	0
FR_MULTIPLATE	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.2490637	0.164990398	0.33313701	0.005851461	1
FR_MULTIPLATE	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2011797	-0.201179739	-0.201179739	1.85851E-13	0
FR_MULTIPLATE	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2011797	-0.201179739	-0.201179739	1.85851E-13	0
FR_MULTIPLATE	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0202649	-0.068132753	0.027603041	0.210338722	0
FR_MULTIPLATE	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.44527607	0.200256369	0.690295772	0.015843732	1
FR_MULTIPLATE	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.7210401	-1.401084931	-0.040995318	0.044829176	0
FR_MULTIPLATE	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5899002	-1.206626404	0.026826075	0.054288646	0
FR_MULTIPLATE	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.1886163	0.052778197	0.324454404	0.01190711	1
FR_MULTIPLATE	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.0776163	-0.16759228	0.012359665	0.082778646	0
FR_MULTIPLATE	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.0492458	-0.164310497	0.065818997	0.358257963	0
FR_MULTIPLATE	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0281569	-0.048203002	-0.008110799	0.011230836	0
FR_MULTIPLATE	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.08853944	-1.490475705	1.667554579	0.831968522	0
FR_MULTIPLATE	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.26513539	0.212311182	0.3179596	0.001579603	1
FR_MULTIPLATE	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1674822	-1.562235547	1.227271107	0.657098126	0
FR_MULTIPLATE	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1051737	-0.462747224	0.252399901	0.333442881	0
FR_MULTIPLATE	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.32120613	0.09149226	0.55092	0.026463795	1
FR_MULTIPLATE	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.2553407	-0.724276776	0.213595465	0.144035669	0
FR_MULTIPLATE	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.230447	-0.483088116	0.022194084	0.059234814	0
FR_MULTIPLATE	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.44096919	0.311996771	0.569941617	0.004285978	1
FR_MULTIPLATE	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.4365463	0.058733997	0.814358605	0.038128124	1
FR_MULTIPLATE	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.9137798	-2.778496725	0.950937223	0.169694864	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.0519906	-3.482521373	3.378540191	0.953978366	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.56842213	-0.752478033	1.889322287	0.205511546	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.30431535	0.04249748	0.566133229	0.037702989	1
FR_MULTIPLATE	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-1.9607896	-6.387796422	2.466217148	0.197172591	0
FR_MULTIPLATE	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4869727	-1.280266489	0.306321097	0.118538606	0
FR_MULTIPLATE	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2401871	-0.708442206	0.228067966	0.158198662	0
FR_MULTIPLATE	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1961258	-0.293997114	-0.098254465	0.013043567	0
FR_MULTIPLATE	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.07984947	-0.006086954	0.16578589	0.05726247	0

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
FR_MULTIPLATE	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.3504959	-1.350495908	-1.350495908	1.85851E-13	0
FR_MULTIPLATE	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.6691766	-3.928236503	0.589883393	0.086394014	0
FR_MULTIPLATE	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0731223	-0.090800161	-0.055444348	0.002733317	0
FR_MULTIPLATE	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.17153275	-0.007008505	0.350074008	0.053847198	0
FR_MULTIPLATE	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.183483	0.162131808	0.204834193	9.66663E-05	1
FR_MULTIPLATE	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1993326	-0.303435617	-0.095229633	0.014282913	0
FR_MULTIPLATE	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0932919	-0.272167103	0.08558326	0.154154003	0
FR_MULTIPLATE	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.219367	-0.317325017	-0.121409046	0.010432199	0
FR_MULTIPLATE	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.8854414	-1.883329825	0.112446966	0.062294858	0
FR_MULTIPLATE	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2098786	-0.209878638	-0.209878638	1.85851E-13	0
FR_MULTIPLATE	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.49218245	-0.249526026	1.233890931	0.104000912	0
FR_MULTIPLATE	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.27560695	0.109730837	0.441483059	0.01890743	1
FR_MULTIPLATE	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1549941	-0.655759969	0.345771866	0.314730594	0
FR_MULTIPLATE	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-2.4821772	-3.162221991	-1.802132378	0.003695669	0
FR_MULTIPLATE	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1286026	-0.380615463	0.123410269	0.159467969	0
FR_MULTIPLATE	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02702358	-0.652813439	0.706860606	0.880036367	0
FR_MULTIPLATE	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2918259	-0.685176337	0.10152458	0.085779849	0
FR_MULTIPLATE	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.33063414	0.179493291	0.481774985	0.000459123	1
FR_MULTIPLATE	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0345857	-0.089787011	0.020615598	0.114572554	0
FR_MULTIPLATE	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1012651	-0.358669932	0.156139795	0.232829678	0
FR_MULTIPLATE	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2788245	-0.50608125	-0.051567698	0.034018474	0
FR_MULTIPLATE	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.16984424	0.113598823	0.226089664	0.005617847	1
FR_MULTIPLATE	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0533688	-0.053368819	-0.053368819	1.85851E-13	0
FR_MULTIPLATE	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05776227	0.057762265	0.057762265	1.85851E-13	1
FR_MULTIPLATE	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1477312	-0.241239793	-0.054222679	0.020870446	0
FR_MULTIPLATE	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.41420564	0.311724279	0.516686992	0.002896732	1
FR_MULTIPLATE	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5258737	-1.205918479	0.154171134	0.079743752	0
FR_MULTIPLATE	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0529211	-0.422054509	0.316212275	0.600473574	0
FR_NGD1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.08948084	-0.007341834	0.186303521	0.069508441	0
FR_NGD1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.22331977	0.175360165	0.271279383	0	1
FR_NGD1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1213295	-0.574030443	0.331371437	0.594451921	0
FR_NGD1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.33627684	0.252871141	0.419682543	0	1
FR_NGD1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.14329145	0.059864332	0.226718573	0.001043121	1
FR_NGD1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.31471765	0.234732915	0.394702378	2.35796E-11	1
FR_NGD1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.21969809	0.219698087	0.219698087	0	1
FR_NGD1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1205708	-0.213197838	-0.027943853	0.01151395	0
FR_NGD1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0013952	-0.006819749	0.004029397	0.609385117	0
FR_NGD1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.25583524	0.207431618	0.304238865	0	1
FR_NGD1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.36656896	0.281306266	0.451831656	0	1
FR_NGD1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.10713285	-0.039140979	0.253406672	0.148442689	0
FR_NGD1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.08955225	-0.315952648	0.495057147	0.660709005	0
FR_NGD1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	1.20392485	0.600695847	1.807153849	0.000169845	1
FR_NGD1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.13180495	-0.199999292	0.463609195	0.430641568	0
FR_NGD1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.81099306	0.447262803	1.174723319	3.31903E-05	1
FR_NGD1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.31091064	0.208615613	0.41320567	6.79108E-08	1
FR_NGD1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.30961498	0.046910129	0.572319822	0.021597046	1
FR_NGD1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.2107496	-1.528434705	-0.893064407	1.02338E-10	0
FR_NGD1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.3363415	-1.875639782	-0.797043126	5.36635E-06	0
FR_NGD1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.10799859	-0.016736887	0.23273406	0.088561451	0
FR_NGD1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	1.11365925	0.893301321	1.334017183	0	1
FR_NGD1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0713633	-0.194771335	0.052044639	0.252504277	0
FR_NGD1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	1.31319186	0.946461218	1.679922501	8.04324E-10	1
FR_NGD1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.15974486	0.055430243	0.264059482	0.003213423	1
FR_NGD1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2391781	-0.543381009	0.06502485	0.121277031	0
FR_NGD1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07127969	-0.052895631	0.195455009	0.255971272	0
FR_NGD1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.33933325	0.045644866	0.63302164	0.024199003	1
FR_NGD1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	1.344761	0.836629065	1.852892938	1.4914E-06	1
FR_NGD1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3975403	-0.562146627	-0.232933962	8.57593E-06	0
FR_NGD1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.44327453	0.176859983	0.709689079	0.00145445	1
FR_NGD1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	1.6499024	1.301432664	1.998372127	0	1
FR_NGD1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.54553106	0.372340258	0.718721853	2.7893E-08	1
FR_NGD1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.10370814	0.0568923	0.150523976	3.67976E-05	1
FR_NGD1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00091066	-0.0860803	0.087901614	0.983391498	0
FR_NGD1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.44051235	0.290416848	0.590607846	1.56301E-07	1
FR_NGD1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.40803218	0.215033871	0.601030489	7.51582E-05	1
FR_NGD1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0164587	-0.10151123	0.068593864	0.700534353	0
FR_NGD1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0289272	-0.069690423	0.011836059	0.16127792	0
FR_NGD1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.68032192	0.57150176	0.789142086	0	1
FR_NGD1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3012609	-0.47755316	-0.124968654	0.001101232	0
FR_NGD1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.19658927	0.012256903	0.380921645	0.03695672	1
FR_NGD1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.40393724	0.271488976	0.536385507	9.15142E-08	1
FR_NGD1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.0526032	-0.150368047	0.04516166	0.285609553	0
FR_NGD1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.0563768	-0.150606745	0.037853214	0.235763325	0
FR_NGD1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0274132	-0.037552953	-0.017273513	1.24176E-06	0
FR_NGD1	Field Measured	Total Suspended Solids (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.7669639	-	-	-	0
FR_NGD1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.07820547	-0.080917425	0.23732836	0.330124345	0
FR_NGD1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.3285558	0.254574392	0.402537216	0	1
FR_NGD1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.268825	-0.56123375	0.023583715	0.070941475	0
FR_NGD1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.03203905	-0.059107882	0.12318598	0.485348279	0
FR_NGD1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.29721777	0.206631249	0.387804297	9.61252E-09	1
FR_NGD1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.34567933	0.256312079	0.435046571	5.61343E-11	1
FR_NGD1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.362891	-0.542097295	-0.183684748	0.000139222	0
FR_NGD1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.35066319	0.209545826	0.491780555	5.09255E-06	1
FR_NGD1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	1.58056806	1.314236735	1.846899377	0	1
FR_NGD1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	1.40651899	0.980960006	1.832077974	7.89674E-09	1
FR_NGD1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	1.37384025	0.901657514	1.846022982	1.91079E-07	1
FR_NGD1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.73825124	0.548012388	0.928490091	4.85429E-11	1
FR_NGD1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.1654044	-0.494539765	0.163731003	0.318619371	0
FR_NGD1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.6073718	-1.150838319	-0.063905269	0.029052492	0
FR_NGD1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.53563884	-0.004263295	1.075540982	0.051784574	0
FR_NGD1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.79189259	0.433909403	1.149875769	3.76327E-05	1
FR_NGD1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.31078701	0.15492315	0.466650865	0.000171974	1
FR_NGD1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.29784776	0.039897197	0.555798321	0.024287708	1
FR_NGD1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1705274	-1.516709206	-0.824345596	4.22995E-09	0
FR_NGD1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.3342748	-1.874236598	-0.794313095	5.65003E-06	0
FR_NGD1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.1096323	-0.001474978	0.220739584	0.053031145	0
FR_NGD1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.80889679	0.569460825	1.048332758	4.3323E-09	1
FR_NGD1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.30980313	0.236223851	0.383382417	0	1
FR_NGD1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.10466465	-0.275393836	0.484723135	0.584364827	0
FR_NGD1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	1.31995359	0.953083417	1.686823755	6.96029E-10	1
FR_NGD1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.0597586	-0.248424847	0.367942038	0.699954845	0
FR_NGD1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.22642667	-0.168902823	0.621756166	0.25701478	0
FR_NGD1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.16213177	-0.183078464	0.507341998	0.351895618	0
FR_NGD1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.33949298	0.055049824	0.62393613	0.020049819	1
FR_NGD1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.25196525	0.163299462	0.340631038	3.26393E-07	1
FR_NGD1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.46903922	0.168154955	0.769923493	0.002734886	1
FR_NGD1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.468553	-1.989395423	-0.947710621	3.88514E-07	0
FR_NGD1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.6991144	-1.507037565	0.10880874	0.065199341	0
FR_NGD1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.43185889	0.179272303	0.684445475	0.001095254	1
FR_NGD1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	1.56968498	1.231196387	1.908173571	0	1
FR_NGD1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.30539967	0.227154058	0.383645276	3.68154E-11	1
FR_NGD1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.46868318	0.300286487	0.637079876	5.16566E-07	1
FR_NGD1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.17293577	0.066180844	0.279690693	0.001899883	1
FR_NGD1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.0827844	-0.14421056	0.309779352	0.469187706	0
FR_NGD1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4092185	-0.584881119	-0.233555823	1.61028E-05	0
FR_NGD1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.40548064	0.258462182	0.552499099	6.28797E-07	1
FR_NGD1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.35320493	0.100630535	0.605779317	0.0068338	1
FR_NGD1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00329715	-0.05851175	0.065106043	0.915523276	0
FR_NGD1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04591813	-0.125512159	0.217348419	0.594670746	0
FR_NGD1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.66430778	0.558464673	0.770150887	0	1
FR_NGD1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0104129	-0.343553904	0.322728032	0.950438863	0
FR_NGD1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.41840805	0.209648142	0.627167955	0.000160366	1
FR_NGD1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	0	-	-	-	0
FR_NGD1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	0	-	-	-	0
FR_NGD1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	-2.22E-16	-	-	-	0
FR_NGD1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	2.2204E-16	-	-	-	-
FR_UFR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.17407422	0.030081523	0.318066912	0.01854293	1
FR_UFR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.00054771	-0.026938244	0.028033656	0.968398397	0
FR_UFR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.29187333	-0.027644638	0.611391302	0.072726715	0
FR_UFR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.00968164	-0.027648756	0.047012036	0.606539264	0
FR_UFR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.10271564	-0.038518676	0.243949957	0.151348301	0
FR_UFR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0149859	-0.050081918	0.020110025	0.397249925	0
FR_UFR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0	0	0	-	0
FR_UFR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0238859	-0.10057421	0.052802429	0.536410315	0
FR_UFR1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0032696	-0.009125865	0.002586672	0.269233207	0
FR_UFR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.01353105	-0.014276606	0.041338707	0.335073704	0
FR_UFR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.02539851	-0.015630487	0.066427507	0.221039016	0
FR_UFR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0155115	-0.159398843	0.128375764	0.830353465	0
FR_UFR1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1907599	-0.475896275	0.094376408	0.186330407	0
FR_UFR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	0.14428028	-0.164680509	0.453241062	0.354785866	0
FR_UFR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06554929	-0.193970963	0.325069546	0.615950267	0
FR_UFR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05545177	0.021570511	0.089333037	0.001705483	1
FR_UFR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05251944	-0.003454446	0.108493316	0.065469526	0
FR_UFR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0040306	-0.063204512	0.055143266	0.892307473	0
FR_UFR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.1663691	-1.480086239	-0.852652005	1.84696E-10	0
FR_UFR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.2651485	-1.788441814	-0.741855185	8.13711E-06	0
FR_UFR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05333265	0.019023324	0.087641979	0.002792028	1
FR_UFR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1511764	-0.250134056	-0.052218806	0.003267405	0
FR_UFR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0986584	-0.225059812	0.027742939	0.124024515	0
FR_UFR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05545177	0.021570511	0.089333037	0.001705483	1
FR_UFR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.0822418	-0.030661	0.195144593	0.150707286	0
FR_UFR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3315328	-0.578315591	-0.084750057	0.009198028	0
FR_UFR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05489622	0.020972303	0.088820147	0.001907416	1
FR_UFR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.09224606	0.009046074	0.175446039	0.030291083	1
FR_UFR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.666547	-1.337857969	0.004764022	0.051602707	0
FR_UFR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4242905	-0.607888724	-0.240692317	1.79281E-05	0
FR_UFR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02841276	-0.000188726	0.057014253	0.051488796	0
FR_UFR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05182502	0.016290708	0.087359328	0.00486787	1
FR_UFR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.16449748	0.093226888	0.235768079	1.83136E-05	1
FR_UFR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0092033	-0.034547611	0.016140956	0.471251662	0
FR_UFR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06104225	0.028609394	0.09347511	0.000358537	1
FR_UFR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07452738	0.039598232	0.109456537	6.4212E-05	1
FR_UFR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05545177	0.021570511	0.089333037	0.001705483	1
FR_UFR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05473427	0.020760763	0.088707781	0.00199136	1
FR_UFR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0016928	-0.006587908	0.003202237	0.492570488	0

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
FR_UFR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.09816176	0.063500509	0.132823014	3.32356E-07	1
FR_UFR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3415355	-0.502081017	-0.180989991	6.71424E-05	0
FR_UFR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.6531287	-0.840526728	-0.465730685	1.57147E-09	0
FR_UFR1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	-0.0082977	-0.089774567	0.073179157	0.83922367	0
FR_UFR1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	0.00493618	-0.129458415	0.139330767	0.941644477	0
FR_UFR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	0.01334961	-0.121678903	0.148378126	0.843815238	0
FR_UFR1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0096626	-0.02687391	0.007548784	0.265829895	0
FR_UFR1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.08185607	0.006292986	0.157419149	0.03416193	1
FR_UFR1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0299146	-0.068616742	0.008787442	0.127650976	0
FR_UFR1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.3192553	-0.639923675	0.001413119	0.05099014	0
FR_UFR1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0729185	-0.121790721	-0.024046196	0.00401805	0
FR_UFR1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.02059637	-0.011590317	0.052783061	0.206033062	0
FR_UFR1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.5601896	-0.897270547	-0.223108666	0.001461466	0
FR_UFR1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.3194586	-0.557857417	-0.081059722	0.009368037	0
FR_UFR1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.04735191	-0.05135426	0.146058082	0.341894852	0
FR_UFR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.18383807	-0.149432092	0.517108235	0.274960773	0
FR_UFR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.05130192	-0.038747276	0.141351117	0.259662421	0
FR_UFR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.76762567	0.570296685	0.964954662	7.29061E-12	1
FR_UFR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.19333794	0.062415864	0.324260009	0.004386204	1
FR_UFR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.06581304	-0.162621081	0.294247154	0.566665968	0
FR_UFR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.6947756	-1.315150226	-0.074400895	0.02871278	0
FR_UFR1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1939712	-0.542127137	0.154184716	0.270227525	0
FR_UFR1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01496944	-0.02639636	0.056335237	0.472777004	0
FR_UFR1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0416318	-0.153749892	0.070486292	0.461349372	0
FR_UFR1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0366779	-0.094849589	0.021493789	0.212691533	0
FR_UFR1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1990901	-1.511435882	-0.886744227	3.66392E-11	0
FR_UFR1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.2928744	-1.815794984	-0.769953789	5.39362E-06	0
FR_UFR1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03153829	0.00374748	0.059329108	0.02672363	1
FR_UFR1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.078297	-0.209319793	0.052725876	0.237288531	0
FR_UFR1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0521654	-0.093219904	-0.011110925	0.013520894	0
FR_UFR1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0885927	-0.253693578	0.076508177	0.288132498	0
FR_UFR1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01881884	-0.040777607	0.078415288	0.530810346	0
FR_UFR1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0172466	-0.138424758	0.103931655	0.777315552	0
FR_UFR1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3289889	-0.666449043	0.008471209	0.05586758	0
FR_UFR1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0059796	-0.151348268	0.13938911	0.934836699	0
FR_UFR1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03819579	-0.037152928	0.113544503	0.315416483	0
FR_UFR1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0021287	-0.036972007	0.032714646	0.903350649	0
FR_UFR1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3971801	-0.9371496	0.142789485	0.146810217	0
FR_UFR1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.8350945	-2.379764578	-1.290424507	4.19165E-09	0
FR_UFR1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5715568	-0.734802933	-0.408310682	0.00154912	0
FR_UFR1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0054171	-0.034397417	0.023563303	0.71036707	0
FR_UFR1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02271059	-0.036422285	0.081843468	0.446182862	0
FR_UFR1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5896553	-0.916485798	-0.262824804	0.000596356	0
FR_UFR1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.11749952	0.053971927	0.181027108	0.000444003	1
FR_UFR1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0134809	-0.054329479	0.027367719	0.512411068	0
FR_UFR1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06033123	-0.001627889	0.122290343	0.056154977	0
FR_UFR1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3323208	-0.565950103	-0.09869154	0.005962374	0
FR_UFR1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03743753	0.002581338	0.07229373	0.035668302	1
FR_UFR1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00038191	-0.058459117	0.059222937	0.989706438	0
FR_UFR1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01992253	-0.018786173	0.058631234	0.308121821	0
FR_UFR1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0166732	-0.060855017	0.027508534	0.454101591	0
FR_UFR1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.0634919	0.032404445	0.094579347	0.000121446	1
FR_UFR1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3427156	-0.512584006	-0.172847244	0.000144065	0
FR_UFR1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02707991	-0.091637831	0.145797653	0.650499238	0
GH_CC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.41874823	0.170821383	0.666675085	0.001240869	1
GH_CC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0153016	-0.061657908	0.031054624	0.512244841	0
GH_CC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0440549	-0.120463012	0.03235324	0.253886678	0
GH_CC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.07237545	0.043919953	0.100830945	3.41536E-06	1
GH_CC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.02918191	-0.054143986	0.112507797	0.487034508	0
GH_CC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.11803175	0.08592014	0.150143365	3.19099E-10	1
GH_CC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.03058	-0.089039476	0.027879431	0.300188057	0
GH_CC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0887904	-0.168675883	-0.008904973	0.029905077	0
GH_CC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0134438	-0.020426733	-0.006460901	0.000271016	0
GH_CC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0141559	-0.062316906	0.034005146	0.559465256	0
GH_CC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.09063966	0.048792927	0.132486392	5.16359E-05	1
GH_CC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.02411676	-0.087022884	0.135256407	0.666380025	0
GH_CC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0120569	-0.303142904	0.279029149	0.934370301	0
GH_CC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0431688	-0.459227351	0.372889809	0.836595166	0
GH_CC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1724602	-0.401321329	0.05640101	0.137253126	0
GH_CC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1200044	-0.162559986	-0.077448792	3.87384E-07	0
GH_CC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1009186	-0.226578898	0.02474173	0.113637493	0
GH_CC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1109778	-0.166298734	-0.055656898	0.000158394	0
GH_CC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.4105035	-1.788791348	-1.032215653	2.22737E-10	0
GH_CC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.4873999	-2.075138398	-0.899661362	3.60583E-06	0
GH_CC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1764411	-0.315879678	-0.037002524	0.013918543	0
GH_CC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.4674263	-1.879680114	-1.055172473	9.62492E-10	0
GH_CC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.18389	-0.328089966	-0.039690013	0.013223356	0
GH_CC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1852605	-0.326458916	-0.044062	0.010899782	0
GH_CC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1915321	-0.423120968	0.040056736	0.103466056	0
GH_CC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2621218	-0.394211498	-0.130032073	0.000183456	0
GH_CC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1852605	-0.326458916	-0.044062	0.010899782	0
GH_CC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.26672379	0.187606336	0.345841248	4.59281E-09	1
GH_CC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0876918	-0.200509136	0.025125574	0.125498577	0
GH_CC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3914941	-0.552339885	-0.230648226	7.45322E-06	0
GH_CC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1261092	-0.18897962	-0.06323882	0.000158624	0
GH_CC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0705942	-0.105054358	-0.036133961	0.000118437	0
GH_CC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05505454	0.01578072	0.094328362	0.006707029	1
GH_CC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06381909	0.041601148	0.086037036	2.56311E-07	1
GH_CC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1852605	-0.326458916	-0.044062	0.010899782	0
GH_CC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06515717	0.03381443	0.096499914	9.60913E-05	1
GH_CC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05714143	0.019197063	0.095085804	0.003724849	1
GH_CC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1852605	-0.326458916	-0.044062	0.010899782	0
GH_CC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2652637	-0.415480973	-0.115046372	0.00076958	0
GH_CC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.14764603	0.100859367	0.194432697	2.66056E-08	1
GH_CC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5763957	-0.817258116	-0.335533291	1.00976E-05	0
GH_CC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.0323751	-1.336201968	-0.72854828	3.68813E-09	0
GH_CC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.16096522	0.007404992	0.314525452	0.040229162	1
GH_CC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	0.01506455	-0.119264245	0.149393354	0.822234707	0
GH_CC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.1020449	-0.30101673	0.096926968	0.309592766	0
GH_CC1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0173823	-0.028548717	-0.00621587	0.002763335	0
GH_CC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-1.3839	-1.505516058	-1.262283846	0	0
GH_CC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.06166093	0.036024726	0.087297138	9.22712E-06	1
GH_CC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.136315	-0.193778829	-0.078851123	1.15938E-05	0
GH_CC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-1.0906997	-1.209759591	-0.971639761	0	0
GH_CC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.16583018	0.124078435	0.207581934	1.189E-11	1
GH_CC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.10742511	0.077323271	0.137526953	8.9072E-10	1
GH_CC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.11484937	0.068418699	0.161280043	5.54465E-06	1
GH_CC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.096548	0.060887518	0.132208491	9.0852E-07	1
GH_CC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.1145764	-0.152929313	-0.076223582	9.93068E-08	0
GH_CC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.8433014	-0.988803144	-0.697799741	0	0
GH_CC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.77130547	0.59389239	0.948718553	0	1
GH_CC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.86696024	0.436373737	1.297546741	0.000149384	1
GH_CC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.0188341	-0.135666347	0.097998115	0.748090526	0
GH_CC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.7726477	-1.641135737	0.095840323	0.080329412	0
GH_CC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2790426	-0.422600373	-0.135484804	0.000239433	0
GH_CC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1164394	-0.16516845	-0.067710441	1.01969E-05	0
GH_CC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0711655	-0.21251879	0.070187756	0.31863382	0
GH_CC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1110432	-0.148647618	-0.073438806	1.30897E-07	0
GH_CC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.5243563	-1.902227283	-1.146485391	0	0
GH_CC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.6076583	-2.194687918	-1.020628714	7.12314E-07	0
GH_CC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2736339	-0.415869337	-0.131398549	0.00027362	0
GH_CC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.9944366	-1.234148486	-0.754724715	0	0
GH_CC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.07994745	0.049454475	0.110440431	1.7617E-06	1
GH_CC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0287921	-0.183142117	0.125558	0.710879479	0
GH_CC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2908065	-0.435739018	-0.145873897	0.000156638	0
GH_CC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2620853	-0.40072207	-0.123448493	0.00034146	0
GH_CC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3765412	-0.511292305	-0.241790046	4.60319E-07	0
GH_CC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2908065	-0.435739018	-0.145873897	0.000156638	0
GH_CC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.25966622	0.188644533	0.330687913	3.8125E-10	1
GH_CC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.17324874	0.127468854	0.219028624	1.09017E-10	1
GH_CC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.027749	-0.141304916	0.085806853	0.627386179	0
GH_CC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-2.0938333	-2.693159057	-1.494507589	1.56288E-09	0
GH_CC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1474192	-0.216550112	-0.078288332	6.54306E-05	0
GH_CC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0641802	-0.100518696	-0.027841625	0.000764375	0
GH_CC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.10691606	0.071437925	0.142394195	8.05026E-08	1
GH_CC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03885949	-0.003234896	0.080953877	0.06981814	0
GH_CC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.07811544	0.047194045	0.109036843	3.65618E-06	1
GH_CC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2767868	-0.419693837	-0.133879725	0.00025082	0
GH_CC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.11864277	0.070405428	0.166880111	6.04753E-06	1
GH_CC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06005961	0.032145048	0.087974164	5.71922E-05	1
GH_CC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06085424	0.020692805	0.101015668	0.003521189	1
GH_CC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2798746	-0.423118271	-0.136630955	0.000223773	0
GH_CC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2745349	-0.425547162	-0.123522664	0.000548383	0
GH_CC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.14718843	0.103180904	0.191195957	5.42085E-09	1
GH_CC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.6844464	-0.925673305	-0.44321942	3.27981E-07	0
GH_CC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5888335	-0.75015517	-0.427511828	4.02813E-10	0
GH_CC1	Toxicity	Daphnia magna, 48-hour, LC50 toxicity, mortality or lethal dose (%v/v)_Toxicity	as.factor(new_year)	2019-2017	0.11695206	-	-	-	-
GH_FR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.03120887	-0.095892767	0.15831051	0.625514575	0
GH_FR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.0416514	0.011861747	0.071441047	0.006864579	1
GH_FR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.40098275	0.018168696	0.783796805	0.04035603	1
GH_FR1	Conventional Parameters	Colour (CU)_Conventional Parameters	as.factor(new_year)	2019-2017	1.09936074	0.930692121	1.268029358	4.83498E-08	1
GH_FR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.10406144	0.056873475	0.15124941	4.15965E-05	1
GH_FR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.04624786	-0.105989302	0.198485027	0.546158697	0
GH_FR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.08764813	0.039567588	0.135728665	0.000543435	1
GH_FR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0079817	-0.035225498	0.019262197	0.560504232	0
GH_FR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.073667	-0.159114131	0.011780185	0.089861467	0
GH_FR1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	0.00367346	0.000105133	0.007241789	0.043804715	1
GH_FR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.05103062	0.021066161	0.080995075	0.001151764	1
GH_FR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.11581008	0.060931526	0.170688631	7.88657E-05	1
GH_FR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1257212	-0.335892771	0.084450292	0.236562598	0
GH_FR1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1115998	-0.439658274	0.216458626	0.499301886	0
GH_FR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.2046154	-0.651401099	0.242170204	0.363764457	0
GH_FR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0666178	-0.300168186	0.166932615	0.570787031	0
GH_FR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.16287414	0.063418388	0.2623299	0.001725287	1
GH_FR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00582701	-0.064470316	0.076124334	0.868998742	0

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
GH_FR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0121165	-0.058450915	0.034217853	0.603188471	0
GH_FR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.2044012	-1.520957087	-0.887845413	1.72611E-10	0
GH_FR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.2432244	-1.767148439	-0.71930042	1.23159E-05	0
GH_FR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0538009	-0.105490818	-0.002110939	0.041600389	0
GH_FR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.108965	-0.274400023	0.056470006	0.192928561	0
GH_FR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.094626	-0.232329988	0.043078	0.174612409	0
GH_FR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0105527	-0.110240124	0.089134794	0.833188874	0
GH_FR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.01607458	-0.070327108	0.10247627	0.71136839	0
GH_FR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4173986	-0.699696261	-0.135100941	0.004386934	0
GH_FR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0247266	-0.174502279	0.125049109	0.742623067	0
GH_FR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.2078601	0.12593835	0.289781855	3.65577E-06	1
GH_FR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2697558	-0.548765908	0.009254229	0.057855724	0
GH_FR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3401875	-0.503231477	-0.177143555	9.39839E-05	0
GH_FR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.35753242	0.29033252	0.424732313	9.55447E-12	1
GH_FR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.30812571	0.064175022	0.552076399	0.014121763	1
GH_FR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.24607033	0.16927299	0.322867672	2.06609E-08	1
GH_FR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00182505	-0.027804077	0.031454169	0.90245083	0
GH_FR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0037095	-0.041826132	0.034407184	0.846465201	0
GH_FR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07488429	0.031270479	0.118498097	0.001061158	1
GH_FR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0037095	-0.041826132	0.034407184	0.846465201	0
GH_FR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0042299	-0.042040069	0.033580174	0.823863812	0
GH_FR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0712925	-0.132972745	-0.009612213	0.024180063	0
GH_FR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.19633859	0.136052046	0.256625142	1.35782E-08	1
GH_FR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3796585	-0.536438148	-0.222878805	8.62284E-06	0
GH_FR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.6885918	-0.829814958	-0.547368702	9.58778E-12	0
GH_FR1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.21354573	0.121027098	0.306064358	2.22233E-05	1
GH_FR1	Field Measured	Conductivity (µS/cm at 25 C)_Field Measured	as.factor(new_year)	2019-2017	0.22020156	-	-	-	-
GH_FR1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	0.04894533	0.017182103	0.08070856	0.003337814	1
GH_FR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	0.03960766	0.013667065	0.065548263	0.003333926	1
GH_FR1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0086389	-0.019667455	0.002389592	0.122509914	0
GH_FR1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.4174356	-0.664504695	-0.170366514	0.00126286	0
GH_FR1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.04201342	2.29243E-05	0.084003906	0.049878754	1
GH_FR1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1820389	-0.305902872	-0.058174957	0.004604326	0
GH_FR1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1193397	-0.209242918	-0.029436581	0.010068318	0
GH_FR1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.14803304	0.08827241	0.207793678	5.72424E-06	1
GH_FR1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0767985	-0.195364301	0.041767354	0.200320228	0
GH_FR1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.05941992	0.003708166	0.115131665	0.036962227	1
GH_FR1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.19929846	0.122023423	0.276573498	2.61122E-06	1
GH_FR1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.0111939	-0.097460826	0.075073004	0.778393832	0
GH_FR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.034772	-0.103956789	0.034412817	0.319219825	0
GH_FR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.1635282	-0.354583202	0.027526892	0.092108435	0
GH_FR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.70518228	0.484436997	0.925927569	2.12806E-08	1
GH_FR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.99318915	0.686192352	1.300185951	1.69569E-08	1
GH_FR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.0339622	-0.300470123	0.232545702	0.799500681	0
GH_FR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-1.0861939	-1.868604675	-0.303783194	0.007248592	0
GH_FR1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.3960841	-1.19668976	1.988857966	0.396957653	0
GH_FR1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	1.0428525	0.57316131	1.512543687	0.010614518	1
GH_FR1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.75151682	-1.131199254	2.634232897	0.228267622	0
GH_FR1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.80507671	-0.728244541	2.338397966	0.152546824	0
GH_FR1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.56047386	-1.693360885	2.814308603	0.396957653	0
GH_FR1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.3960841	-1.19668976	1.988857966	0.396957653	0
GH_FR1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.2485205	-4.957202321	5.454243312	0.856380095	0
GH_FR1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.79216821	-2.393379519	3.977715932	0.396957653	0
GH_FR1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4117112	-0.859381826	0.035959505	0.070824649	0
GH_FR1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.12375527	0.006590929	0.240919613	0.038758584	1
GH_FR1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00561457	-0.136192797	0.147421941	0.937217828	0
GH_FR1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.021982	-0.06599547	0.022031537	0.322247709	0
GH_FR1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1680961	-1.478881418	-0.857310714	2.21377E-10	0
GH_FR1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.259663	-1.783440913	-0.735885065	9.57047E-06	0
GH_FR1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0732312	-0.126067205	-0.02039521	0.007338647	0
GH_FR1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.103711	-0.289277647	0.081855702	0.268456011	0
GH_FR1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04128825	0.000651875	0.081924628	0.046539503	1
GH_FR1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04441533	-0.177355185	0.266185852	0.690483438	0
GH_FR1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00215595	-0.149674951	0.153986847	0.977462958	0
GH_FR1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0292185	-0.146572239	0.088135235	0.620695236	0
GH_FR1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3771775	-0.75783277	0.00347767	0.052067774	0
GH_FR1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0151124	-0.25584465	0.225619764	0.900614196	0
GH_FR1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.22195696	0.135460521	0.308453394	2.88043E-06	1
GH_FR1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.1448821	0.088578518	0.20118569	2.72917E-06	1
GH_FR1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2322404	-0.488952949	0.024472151	0.075429638	0
GH_FR1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.9293572	-2.434771706	-1.423942778	1.3747E-10	0
GH_FR1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.6784051	-0.973155452	-0.383654752	0.005256349	0
GH_FR1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.35795663	0.289522104	0.426391158	1.47404E-12	1
GH_FR1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.37050769	0.119137041	0.621878333	0.004493753	1
GH_FR1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0909016	-0.208995623	0.027192345	0.129079587	0
GH_FR1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.21628661	0.14239186	0.290181362	1.78193E-07	1
GH_FR1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00114083	-0.065026451	0.06730811	0.972636723	0
GH_FR1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0249803	-0.123193069	0.073232481	0.613194277	0
GH_FR1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05218791	-0.008655427	0.113031247	0.091473512	0
GH_FR1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06620132	0.02265772	0.109744919	0.003443616	1
GH_FR1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0267129	-0.136452528	0.083026716	0.62849942	0
GH_FR1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0034263	-0.040511661	0.03365903	0.854183463	0
GH_FR1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.163323	-0.286124759	-0.040521208	0.009932605	0
GH_FR1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.2105839	0.149201405	0.271966397	3.17216E-09	1
GH_FR1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3605805	-0.556010725	-0.165150276	0.0004683	0
GH_FR1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0166297	-0.116452966	0.083193665	0.740427723	0
GH_GH1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0066645	-0.14889024	0.135561188	0.92579256	0
GH_GH1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0283703	-0.068166715	0.011426186	0.159441269	0
GH_GH1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.19674271	-0.288158482	0.681643906	0.420972945	0
GH_GH1	Conventional Parameters	Colour (CU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.182502	-0.635117009	0.270112949	0.393814283	0
GH_GH1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.14370786	0.078969428	0.208446291	3.65348E-05	1
GH_GH1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0272532	-0.146957171	0.092450867	0.651116519	0
GH_GH1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.15185595	0.079812335	0.223899569	7.70122E-05	1
GH_GH1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0	0	0	-	0
GH_GH1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0984277	-0.18578229	-0.011073064	0.027786261	0
GH_GH1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	0.00323735	-0.001149679	0.007624385	0.145528736	0
GH_GH1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0209145	-0.059577628	0.017748723	0.284280809	0
GH_GH1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.15698519	0.078747199	0.235223176	0.000155365	1
GH_GH1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1735627	-0.364981502	0.017856142	0.074830828	0
GH_GH1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.7092363	-1.112989916	-0.305482683	0.000808519	0
GH_GH1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-1.1659085	-1.630466603	-0.701350305	4.06671E-06	0
GH_GH1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2034891	-0.397048381	-0.009929869	0.039638252	0
GH_GH1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.57254863	0.208478398	0.936618857	0.002514038	1
GH_GH1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	9.6543E-05	-0.086402611	0.086595697	0.998229494	0
GH_GH1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1448153	-0.201684158	-0.087946413	3.13559E-06	0
GH_GH1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.2088759	-1.521950979	-0.895800873	4.14517E-11	0
GH_GH1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.2859208	-1.807474662	-0.764366974	5.78139E-06	0
GH_GH1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1089045	-0.171327836	-0.046481134	0.000876285	0
GH_GH1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5190973	-0.946050514	-0.092144001	0.01791872	0
GH_GH1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2478751	-0.400076226	-0.095673978	0.001796872	0
GH_GH1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0878827	-0.344167074	0.16840159	0.496131161	0
GH_GH1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.027877	-0.085842871	0.030088868	0.340624827	0
GH_GH1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3789351	-0.619415678	-0.138454597	0.002468033	0
GH_GH1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.04243361	0.000131891	0.084735328	0.049309737	1
GH_GH1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.34593736	0.236416543	0.455458183	2.49035E-08	1
GH_GH1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5483525	-1.055350638	-0.041354264	0.03444367	0
GH_GH1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3984458	-0.553572	-0.243319574	2.65057E-06	0
GH_GH1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.36953049	0.100039759	0.639021217	0.00792152	1
GH_GH1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.6757647	0.20721322	1.14431619	0.00534451	1
GH_GH1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.28087218	0.155224298	0.40652006	3.14524E-05	1
GH_GH1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0403415	-0.086972423	0.006289418	0.08882966	0
GH_GH1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00528774	-0.026606859	0.03718234	0.741794144	0
GH_GH1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.09339368	0.036582628	0.150204735	0.001636921	1
GH_GH1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02554757	-0.023825618	0.074920766	0.305481447	0
GH_GH1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.01349739	-0.005208542	0.032203316	0.154499663	0
GH_GH1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1307858	-0.22560827	-0.035963279	0.007580681	0
GH_GH1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.22028527	0.133191032	0.307379513	3.57346E-06	1
GH_GH1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3749166	-0.532517613	-0.21731567	1.10324E-05	0
GH_GH1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.6612273	-0.842432746	-0.48002178	4.06498E-10	0
GH_GH1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.26193408	0.135522663	0.388345493	0.000104855	1
GH_GH1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	0.03613993	0.004952374	0.067327481	0.024082938	1
GH_GH1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	0.01878859	-0.022547293	0.060124469	0.367683381	0
GH_GH1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.005265	-0.013074551	0.002544529	0.183046859	0
GH_GH1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.3849516	-0.625338587	-0.144564699	0.002111198	0
GH_GH1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.08782641	0.026194367	0.149458451	0.0058866	1
GH_GH1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1423961	-0.333047846	0.048255637	0.140779543	0
GH_GH1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.248704	-0.392185271	-0.105222686	0.000936645	0
GH_GH1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.20170858	0.121687673	0.281729494	3.8136E-06	1
GH_GH1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.15482484	0.07084733	0.238802341	0.00046419	1
GH_GH1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.02683911	-0.071263407	0.124941631	0.58690412	0
GH_GH1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.21446895	0.111257977	0.317679916	9.4886E-05	1
GH_GH1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0	-2.57848E-16	2.57848E-16	1	0
GH_GH1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.33495155	0.169733403	0.5001697	0.000134697	1
GH_GH1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.08517846	-0.206661409	0.377018324	0.562290079	0
GH_GH1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.67517005	0.349729158	1.000610938	9.7114E-05	1
GH_GH1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.43333089	0.132822633	0.733839156	0.005342571	1
GH_GH1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.5851978	-1.080181592	-0.090213975	0.021301475	0
GH_GH1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-1.2792331	-1.984196005	-0.574270132	0.000557435	0
GH_GH1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	-1.2002828	-	-	-	0
GH_GH1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.16383818	-	-	-	-
GH_GH1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	-1.1461272	-	-	-	0
GH_GH1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	-1.8325815	-	-	-	0
GH_GH1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	-2.7080502	-	-	-	0
GH_GH1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	-2.5053176	-	-	-	0
GH_GH1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	-1.6094379	-	-	-	0
GH_GH1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.2482076	-1.763311567	-0.733103698	7.80629E-06	0
GH_GH1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.49558512	0.149367485	0.841802751	0.005669515	1
GH_GH1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1415443	-0.288975823	0.005887276	0.059601895	0
GH_GH1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2025753	-0.277001876	-0.128148796	7.92023E-07	0
GH_GH1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.2293435	-1.543318504	-0.915368435	0	0
GH_GH1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.3076535	-1.827596455	-0.787710453	3.90687E-06	0
GH_GH1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1564934	-0.227468583	-0.085518303	3.86854E-05	0
GH_GH1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4829796	-0.894851645	-0.071107571	0.022217852	0
GH_GH1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06472997	-0.00357359	0.133033527	0.062881359	0
GH_GH1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3716106	-0.674993812	-0.068227343	0.017103846	0

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
GH_GH1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2794269	-0.604417355	0.045563525	0.090786376	0
GH_GH1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.305366	-0.539764509	-0.070967421	0.0114259	0
GH_GH1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.8221138	-1.251720977	-0.392506579	0.000290858	0
GH_GH1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4622916	-0.769488965	-0.155094225	0.003730932	0
GH_GH1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.32458476	0.214542286	0.434627241	1.30029E-07	1
GH_GH1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.21007981	0.124258585	0.295901042	6.48815E-06	1
GH_GH1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5420416	-0.945651276	-0.138431833	0.00921962	0
GH_GH1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-2.0216496	-2.488626383	-1.554672853	0	0
GH_GH1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.8410236	-1.372355342	-0.309691873	0.009644652	0
GH_GH1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.37661332	0.107861173	0.645365476	0.006704021	1
GH_GH1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.61546777	0.170653903	1.060281632	0.007390485	1
GH_GH1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.11469614	0.030133483	0.199258794	0.008577527	1
GH_GH1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.22928705	0.099938025	0.358636066	0.000730128	1
GH_GH1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1240972	-0.225267908	-0.022926437	0.016954799	0
GH_GH1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0924478	-0.243921285	0.059025763	0.227538455	0
GH_GH1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02468779	-0.075070206	0.124445792	0.623084011	0
GH_GH1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04293341	-0.009549748	0.095416565	0.107246367	0
GH_GH1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1498097	-0.317031868	0.017412426	0.078294269	0
GH_GH1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01010566	-0.002322362	0.022533687	0.109329916	0
GH_GH1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3691487	-0.599489894	-0.138807524	0.002095595	0
GH_GH1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.19090861	0.104736867	0.277080345	3.58668E-05	1
GH_GH1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5326133	-0.792953093	-0.272273574	0.000118567	0
GH_GH1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.136289	-0.311751265	0.039173262	0.125822231	0
GH_GH1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	as.factor(new_year)	2019-2017	-0.1098149	-	-	-	0
GH_GH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	0.08329916	-0.294722941	0.461321256	0.595572973	0
GH_GH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	0.13089868	-	-	-	-
GH_GH1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	0.15271512	-	-	-	-
GH_GH1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	0.07297509	-0.315635593	0.461585771	0.592200467	0
GH_PC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.14572281	-0.003440147	0.294885768	0.055369828	0
GH_PC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1688834	-0.389988847	0.052221953	0.132000127	0
GH_PC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.2564073	-0.577341321	0.064526812	0.115430389	0
GH_PC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1674822	-0.433174729	0.098210339	0.212562629	0
GH_PC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0524608	-0.187531005	0.082609311	0.441086827	0
GH_PC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.02822201	-0.002151137	0.05859515	0.068063528	0
GH_PC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.22530032	-0.005892296	0.456492935	0.055951296	0
GH_PC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1410223	-0.278519127	-0.003525514	0.04455983	0
GH_PC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0017615	-0.004879107	0.001356074	0.263565084	0
GH_PC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.05357779	0.024140408	0.083015172	0.000538107	1
GH_PC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.08324976	0.023788401	0.142711125	0.006751504	1
GH_PC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.087942	-0.227459025	0.05157501	0.212820247	0
GH_PC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.3829961	-0.615609208	-0.150382898	0.001606063	0
GH_PC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1321802	-0.487616277	0.2232559	0.460675649	0
GH_PC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00254098	-0.084050115	0.08913208	0.953477284	0
GH_PC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0295672	-0.113441581	0.054307209	0.484184753	0
GH_PC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.03646729	-0.017549237	0.090483809	0.182398327	0
GH_PC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05247034	0.019219304	0.08572138	0.002435018	1
GH_PC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.2558959	-1.553393103	-0.958398739	0	0
GH_PC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.3261609	-1.840083034	-0.812238733	2.4194E-06	0
GH_PC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0268665	-0.108797019	0.055063936	0.515092334	0
GH_PC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.10838684	0.004987884	0.211785796	0.040199899	1
GH_PC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1298951	-0.247066663	-0.012723611	0.030318369	0
GH_PC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00370443	-0.082536622	0.089945474	0.931945636	0
GH_PC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02597696	-0.047956499	0.099910409	0.485620711	0
GH_PC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4214701	-0.667027339	-0.175912873	0.001046385	0
GH_PC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0283897	-0.111422545	0.054643215	0.497386933	0
GH_PC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06487453	0.012261215	0.117487844	0.016419515	1
GH_PC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5355094	-0.738758388	-0.332260473	1.59495E-06	0
GH_PC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.375857	-0.534047249	-0.217666661	1.12732E-05	0
GH_PC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.0676809	0.037536715	0.09782508	2.92984E-05	1
GH_PC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0500315	-0.10057722	0.000514302	0.052310529	0
GH_PC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05325592	0.003638028	0.102873811	0.035796501	1
GH_PC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.04163052	0.021561554	0.061699494	9.81903E-05	1
GH_PC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0240215	-0.105660192	0.057617269	0.559048314	0
GH_PC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.10847762	0.069344254	0.147610977	5.4861E-07	1
GH_PC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0279423	-0.115888446	0.060003895	0.528207317	0
GH_PC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0240215	-0.105660192	0.057617269	0.559048314	0
GH_PC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0916351	-0.169322622	-0.01394757	0.021483536	0
GH_PC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.0849057	0.043524913	0.126286489	0.000114778	1
GH_PC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3874308	-0.553880783	-0.220980857	1.60962E-05	0
GH_PC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02562559	-0.094693824	0.145945001	0.672182669	0
GH_PC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.09389049	-0.044626296	0.232407281	0.180405408	0
GH_PC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	0.13307523	-0.205725141	0.471875598	0.433392305	0
GH_PC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	0.07573856	-0.226999862	0.37847699	0.619233713	0
GH_PC1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0073007	-0.016890123	0.002288819	0.133350902	0
GH_PC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.7159344	-0.998317907	-0.433550938	3.34671E-06	0
GH_PC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0026911	-0.02909264	0.023710457	0.839432373	0
GH_PC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.17225803	0.042464184	0.302051886	0.010036306	1
GH_PC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.122084	-0.210629896	-0.033538056	0.007591226	0
GH_PC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.05728531	0.016803521	0.097767098	0.006221371	1
GH_PC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1332451	-0.265518034	-0.000972257	0.048385785	0
GH_PC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1701522	-0.346082836	0.00577853	0.057788472	0
GH_PC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.11648001	0.044623531	0.188336483	0.001875437	1
GH_PC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.1031229	-0.055415754	0.261661555	0.198735912	0
GH_PC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.6067674	-0.888034418	-0.325500385	5.43403E-05	0
GH_PC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.47717817	0.290063827	0.664292519	2.98769E-06	1
GH_PC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.70446877	0.474863976	0.93407357	4.99311E-08	1
GH_PC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.0746107	-0.206949864	0.057728374	0.263831612	0
GH_PC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.9876516	-1.712265005	-0.263038126	0.008272967	0
GH_PC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4519435	-0.803020181	-0.100866828	0.0123941	0
GH_PC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00198201	-0.110454367	0.114418383	0.97204849	0
GH_PC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0097887	-0.097749067	0.078171608	0.824962707	0
GH_PC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.0242052	-0.006355858	0.054766254	0.118668674	0
GH_PC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.2180558	-1.515839503	-0.920272176	0	0
GH_PC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.2965756	-1.811501014	-0.78165013	3.81899E-06	0
GH_PC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02027629	-0.066648853	0.107201427	0.643150576	0
GH_PC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02708408	-0.072841799	0.127009961	0.59044643	0
GH_PC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.006491	-0.032972703	0.019990636	0.626399898	0
GH_PC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0149356	-0.132652464	0.102781243	0.800933083	0
GH_PC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00500835	-0.100108201	0.110124909	0.924550132	0
GH_PC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0740738	-0.229215001	0.081067391	0.344164371	0
GH_PC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5342448	-0.845303613	-0.223185929	0.00103476	0
GH_PC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0118072	-0.146366419	0.122751953	0.861551842	0
GH_PC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04354002	-0.008521236	0.095601282	0.099764769	0
GH_PC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04068236	0.000247515	0.081117206	0.048651989	1
GH_PC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5828013	-0.790607347	-0.374995323	4.13158E-07	0
GH_PC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-2.0806772	-2.633323378	-1.52803098	1.09072E-10	0
GH_PC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06932502	0.035863714	0.102786325	9.90479E-05	1
GH_PC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0454567	-0.103075939	0.012162555	0.120098311	0
GH_PC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1753111	-0.304953283	-0.045668969	0.008768928	0
GH_PC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02254071	-0.027898836	0.072980258	0.375752635	0
GH_PC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04626401	0.021961069	0.070566948	0.000312906	1
GH_PC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01086631	-0.081528125	0.10326075	0.815197534	0
GH_PC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2090023	-0.382510311	-0.035494219	0.018952255	0
GH_PC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.08187314	0.042266435	0.121479851	0.000102295	1
GH_PC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0333535	-0.142073256	0.075366345	0.542538298	0
GH_PC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02027629	-0.066648853	0.107201427	0.643150576	0
GH_PC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1176515	-0.20166834	-0.033634744	0.006741477	0
GH_PC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.08723639	0.048179815	0.126292957	3.14733E-05	1
GH_PC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3654534	-0.533292669	-0.197614213	4.70906E-05	0
GH_PC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0246898	-0.141613925	0.092234371	0.674879027	0
GH_PC1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	as.factor(new_year)	2019-2017	-0.0897827	-	-	-	0
GH_PC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	0.10181008	-0.290756608	0.49437677	0.534509229	0
GH_PC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	0.18325815	0.183258146	0.183258146	1.85851E-13	1
GH_PC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	0.18325815	0.183258146	0.183258146	1.85851E-13	1
GH_PC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	4.4409E-16	4.44089E-16	4.44089E-16	1.85851E-13	1
GH_PC2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1088741	-0.461479053	0.243730828	0.535123854	0
GH_PC2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.03583405	-0.000611733	0.072279838	0.05376317	0
GH_PC2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.52005753	-0.024520404	1.064635469	0.060651874	0
GH_PC2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.11907092	0.055994413	0.182147421	0.000527724	1
GH_PC2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.07070231	-0.080514225	0.221918837	0.349325087	0
GH_PC2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.10713771	0.038753473	0.175521937	0.003074355	1
GH_PC2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0256164	-0.110039535	0.05880665	0.542172704	0
GH_PC2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0942619	-0.213713078	0.025189181	0.118245629	0
GH_PC2	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	0.00366706	-0.001277336	0.008611458	0.141264609	0
GH_PC2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.05355767	0.020738128	0.086377208	0.0021299	1
GH_PC2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.11228156	0.040747934	0.183815181	0.00299848	1
GH_PC2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0622142	-0.32213911	0.197710675	0.630310114	0
GH_PC2	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.5670901	-1.041636252	-0.092544044	0.020520621	0
GH_PC2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.314894	-0.88390252	0.254114449	0.26913777	0
GH_PC2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.01768257	-0.066797586	0.102162728	0.673494149	0
GH_PC2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0723407	-0.224435069	0.079753633	0.340878548	0
GH_PC2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.1339785	0.077445154	0.190511846	2.83438E-05	1
GH_PC2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1791435	-0.261531315	-0.09675559	9.274E-05	0
GH_PC2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.5464245	-1.602873725	-1.489975339	0	0
GH_PC2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.833581	-2.481607194	-1.185554797	1.67847E-06	0
GH_PC2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1016177	-0.202767152	-0.000468319	0.049004818	0
GH_PC2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00424507	-0.157989633	0.166479769	0.957938149	0
GH_PC2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1595841	-0.359399283	0.040231124	0.113915493	0
GH_PC2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.19290544	0.130717923	0.255092966	3.13902E-07	1
GH_PC2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-8.882E-16	-5.56999E-15	3.79363E-15	0.702472775	0
GH_PC2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5101756	-0.935178534	-0.085172747	0.020036319	0
GH_PC2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06301338	0.006564187	0.119462573	0.029729992	1
GH_PC2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.20549588	0.076946509	0.334045256	0.002584852	1
GH_PC2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.7832764	-1.124720221	-0.441832592	4.49949E-05	0
GH_PC2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5725998	-0.766782881	-0.378416809	8.0483E-07	0
GH_PC2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06294397	-0.051429005	0.177316955	0.271498958	0
GH_PC2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1486394	-0.489899092	0.192620226	0.382602918	0
GH_PC2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.21455926	0.111817714	0.317300806	0.000155273	1
GH_PC2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07451779	0.042539499	0.10649609	3.60924E-05	1
GH_PC2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06301338	0.006564187	0.119462573	0.029729992	1
GH_PC2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.07705841	0.01524395	0.13887286	0.016031867	1
GH_PC2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05361505	-0.012601452	0.119831542	0.109179356	0
GH_PC2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06301338	0.006564187	0.119462573	0.029729992	1
GH_PC2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1328848	-0.269889878	0.004120335	0.056904487	0
GH_PC2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.24717472	0.181167321	0.313182121	6.49523E-09	1

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
GH_PC2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5066836	-0.709343299	-0.304023918	1.27651E-05	0
GH_PC2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.6563461	-0.75323977	-0.559452389	0	0
GH_PC2	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.29432321	-0.180996104	0.769642515	0.215751574	0
GH_PC2	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	0.01873279	-0.040379012	0.077844594	0.509659652	0
GH_PC2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	0.04134298	-0.01956042	0.102246371	0.177266534	0
GH_PC2	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0360455	-0.050677058	-0.02141391	1.44766E-05	0
GH_PC2	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-1.0457754	-1.456875591	-0.634675226	9.23002E-06	0
GH_PC2	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.05933449	-0.004719178	0.123388156	0.068376819	0
GH_PC2	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1451665	-0.26224211	-0.02809082	0.016520439	0
GH_PC2	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1998287	-0.348486102	-0.051171384	0.009833185	0
GH_PC2	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.17382961	0.111104578	0.23655464	2.40312E-06	1
GH_PC2	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0345956	-0.122633496	0.053442337	0.43039167	0
GH_PC2	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.02300535	-0.060556367	0.106567065	0.579783055	0
GH_PC2	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.20804586	0.113797478	0.302294234	7.33839E-05	1
GH_PC2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.2489765	-0.377324474	-0.120628438	0.000365142	0
GH_PC2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.799	-1.115214772	-0.482785153	1.02639E-05	0
GH_PC2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.96900218	0.621109742	1.316894624	2.04759E-06	1
GH_PC2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.64156398	0.377525207	0.905602745	1.87245E-05	1
GH_PC2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.33334249	0.129609649	0.537075331	0.002396892	1
GH_PC2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-1.3312271	-2.832474494	0.17002022	0.080502227	0
GH_PC2	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0486322	-0.642150774	0.544886375	0.868945441	0
GH_PC2	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.15735	-0.357170993	0.042470983	0.119000452	0
GH_PC2	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.13778576	-0.040399606	0.315971125	0.125567527	0
GH_PC2	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2253327	-0.307614393	-0.143051023	2.7425E-06	0
GH_PC2	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.5464245	-1.601914698	-1.490934367	0	0
GH_PC2	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.8422191	-2.483665522	-1.20077267	1.1921E-06	0
GH_PC2	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1300211	-0.213973987	-0.046068245	0.003358989	0
GH_PC2	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0351878	-0.415789272	0.345413592	0.852318413	0
GH_PC2	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01748819	-0.049979869	0.084956248	0.602322835	0
GH_PC2	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05509135	-0.235117352	0.345300056	0.702502502	0
GH_PC2	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.21185227	0.031098368	0.392606176	0.022889384	1
GH_PC2	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.29406551	0.095621037	0.492509975	0.004809417	1
GH_PC2	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3590873	-0.905019738	0.186845074	0.190588575	0
GH_PC2	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.35388268	0.032271355	0.675494006	0.031958024	1
GH_PC2	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.21974603	0.089460925	0.350031132	0.001569413	1
GH_PC2	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.11062607	0.043079979	0.178172168	0.002061345	1
GH_PC2	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3376228	-0.853078139	0.177832534	0.192406196	0
GH_PC2	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-2.727314	-2.919537563	-2.53509042	0	0
GH_PC2	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02744316	-0.082888975	0.137775298	0.617017342	0
GH_PC2	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1849011	-0.534871324	0.165069157	0.291071076	0
GH_PC2	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0901899	-0.177245152	-0.003134677	0.042695348	0
GH_PC2	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.12551842	0.024292495	0.226744348	0.01651677	1
GH_PC2	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05910343	0.009454401	0.108752455	0.02097553	1
GH_PC2	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05404641	-0.013345221	0.121438032	0.112570493	0
GH_PC2	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0216211	-0.111986335	0.068744053	0.630439099	0
GH_PC2	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02141126	-0.037004073	0.079826599	0.462083383	0
GH_PC2	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06411883	-0.047142854	0.175380523	0.250178743	0
GH_PC2	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06301338	0.007523215	0.118503545	0.027162231	1
GH_PC2	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1587352	-0.313147005	-0.004323402	0.044233435	0
GH_PC2	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.22564706	0.158588636	0.292705477	5.58589E-08	1
GH_PC2	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4075965	-0.607137287	-0.208055764	0.000198352	0
GH_PC2	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.17831508	-0.13889324	0.495523406	0.261785603	0
GH_SC1-2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.33118707	-0.021927732	0.684301873	0.065576819	0
GH_SC1-2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0538534	-0.128099484	0.020392619	0.152382946	0
GH_SC1-2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1330919	-0.444867753	0.178683983	0.397297307	0
GH_SC1-2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0419097	-0.138671534	0.054852048	0.390304057	0
GH_SC1-2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.13852872	0.037285111	0.239772335	0.008039157	1
GH_SC1-2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0448569	-0.150071566	0.06035779	0.397978629	0
GH_SC1-2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0278988	-0.085416307	0.02961866	0.336523777	0
GH_SC1-2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1099511	-0.197919541	-0.021982597	0.01505215	0
GH_SC1-2	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0056639	-0.010598432	-0.000729276	0.025097298	0
GH_SC1-2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0468863	-0.117597501	0.023824957	0.190275191	0
GH_SC1-2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0841095	-0.205445085	0.037226078	0.171157367	0
GH_SC1-2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.08044483	-0.035355984	0.196245643	0.170254318	0
GH_SC1-2	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.06370287	-0.325904699	0.453310443	0.745272413	0
GH_SC1-2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	0.81347615	0.295245526	1.331706779	0.002550921	1
GH_SC1-2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1232402	-0.404434845	0.157954497	0.384891174	0
GH_SC1-2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1887007	-0.290091883	-0.087309585	0.000414125	0
GH_SC1-2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0404951	-0.175504304	0.094514191	0.551477173	0
GH_SC1-2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.20750791	0.11446639	0.300549434	3.26321E-05	1
GH_SC1-2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.4368544	-1.827030379	-1.04667847	2.99401E-10	0
GH_SC1-2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.4861734	-2.082095451	-0.890251407	4.67018E-06	0
GH_SC1-2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1854565	-0.344914115	-0.025998978	0.023302614	0
GH_SC1-2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.4443431	-2.009494223	-0.879192038	2.92349E-06	0
GH_SC1-2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2136956	-0.380862413	-0.046528831	0.013000551	0
GH_SC1-2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.051737	-0.11093246	0.214406455	0.527780696	0
GH_SC1-2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2281998	-0.418975879	-0.037423665	0.019777769	0
GH_SC1-2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3001472	-0.489113149	-0.111181308	0.00228918	0
GH_SC1-2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1874834	-0.347295202	-0.027671668	0.022172168	0
GH_SC1-2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06079215	-0.080676668	0.202260974	0.394183362	0
GH_SC1-2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	1.38546804	1.103949539	1.666986531	0	1
GH_SC1-2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3931283	-0.550368049	-0.235888455	4.454E-06	0
GH_SC1-2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0773175	-0.167849098	0.013214104	0.092908033	0
GH_SC1-2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.4894577	-0.685930888	-0.292984454	4.76585E-06	0
GH_SC1-2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0832201	-0.236220841	0.069780699	0.281588929	0
GH_SC1-2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08234976	-0.005223175	0.169922692	0.064885092	0
GH_SC1-2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1705751	-0.328164189	-0.012986045	0.034308786	0
GH_SC1-2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.01083541	-0.074130082	0.095800897	0.79989546	0
GH_SC1-2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1482204	-0.236250174	-0.060190662	0.001281823	0
GH_SC1-2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.184034	-0.343415213	-0.024652801	0.024277143	0
GH_SC1-2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2370677	-0.372316601	-0.101818701	0.000831942	0
GH_SC1-2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1120431	-0.227480431	0.003394295	0.056926691	0
GH_SC1-2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5757546	-0.835449257	-0.316060016	3.58825E-05	0
GH_SC1-2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.0001751	-1.402994519	-0.597355609	5.07287E-06	0
GH_SC1-2	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.08535504	-0.035937523	0.206647604	0.164455212	0
GH_SC1-2	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	0.07099394	-0.130759613	0.272747484	0.482328854	0
GH_SC1-2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.0592174	-0.102793156	-0.015641631	0.008457082	0
GH_SC1-2	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0157664	-0.024892887	-0.00663997	0.00097565	0
GH_SC1-2	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-1.2167778	-1.440626977	-0.992928634	0	0
GH_SC1-2	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0969935	-0.200288031	0.006301075	0.065263293	0
GH_SC1-2	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.1571353	0.020394341	0.29387626	0.02493197	1
GH_SC1-2	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.7789169	-0.968972344	-0.588861514	0	0
GH_SC1-2	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0140749	-0.123039603	0.094889879	0.797376269	0
GH_SC1-2	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.056235	-0.157272636	0.04480255	0.270639893	0
GH_SC1-2	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.00750766	-0.100887473	0.115902793	0.890482835	0
GH_SC1-2	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0592356	-0.179866767	0.06139561	0.330700052	0
GH_SC1-2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.5227233	-0.717821216	-0.327625464	1.1038E-06	0
GH_SC1-2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.1351974	-0.34366344	0.073268617	0.200051767	0
GH_SC1-2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.9749756	0.671313606	1.278637596	1.55834E-08	1
GH_SC1-2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.78171731	0.340100678	1.223333934	0.000741853	1
GH_SC1-2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.2152392	-0.649154078	0.218675697	0.324971031	0
GH_SC1-2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.835614	-1.595757994	-0.07547002	0.031680198	0
GH_SC1-2	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0311906	-0.484968615	0.422587337	0.891332516	0
GH_SC1-2	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1825989	-0.308826422	-0.056371367	0.005205985	0
GH_SC1-2	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02041987	-0.129535892	0.170375631	0.786696958	0
GH_SC1-2	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.21024933	0.113618584	0.306880075	4.76307E-05	1
GH_SC1-2	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.418149	-1.811801493	-1.024496515	5.61749E-10	0
GH_SC1-2	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.5147488	-2.114515221	-0.914982367	3.60508E-06	0
GH_SC1-2	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1994812	-0.361338989	-0.03762349	0.016458545	0
GH_SC1-2	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4538808	-0.721816133	-0.185945394	0.001198339	0
GH_SC1-2	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0815104	-0.187548337	0.0245276	0.129726505	0
GH_SC1-2	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1791085	-0.370280809	0.012063752	0.065859576	0
GH_SC1-2	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06923941	-0.112941442	0.25142027	0.45091542	0
GH_SC1-2	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1974395	-0.353958008	-0.040921038	0.014181172	0
GH_SC1-2	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1920252	-0.511773742	0.127723356	0.234990553	0
GH_SC1-2	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2514069	-0.459231438	-0.043582367	0.018468617	0
GH_SC1-2	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05727868	-0.078762475	0.193319827	0.403837184	0
GH_SC1-2	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0243086	-0.13379164	0.085174384	0.659194854	0
GH_SC1-2	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	1.4192962	1.170312938	1.668279464	0	1
GH_SC1-2	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.7604302	-2.27445156	-1.246408917	2.62655E-09	0
GH_SC1-2	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0836517	-0.179262524	0.011959114	0.085364238	0
GH_SC1-2	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4824889	-0.683813587	-0.281164304	9.52429E-06	0
GH_SC1-2	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0763262	-0.173984981	0.021332585	0.123531448	0
GH_SC1-2	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1172399	-0.265447622	0.030967852	0.119115725	0
GH_SC1-2	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.08569181	-0.003471779	0.174855395	0.059340968	0
GH_SC1-2	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.160597	-0.327829552	0.006635556	0.059536286	0
GH_SC1-2	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00301887	-0.105824099	0.111861831	0.956034065	0
GH_SC1-2	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00649038	-0.084125384	0.097106134	0.88679474	0
GH_SC1-2	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0931175	-0.212956298	0.026721324	0.125688041	0
GH_SC1-2	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1978969	-0.359733682	-0.036060189	0.017284458	0
GH_SC1-2	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2663135	-0.406074509	-0.126552478	0.000307073	0
GH_SC1-2	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1036967	-0.222584255	0.015190768	0.086310047	0
GH_SC1-2	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5579973	-0.818156333	-0.297838189	5.93441E-05	0
GH_SC1-2	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3108879	-0.527568532	-0.094207351	0.005563961	0
LC_DC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.072287	-0.263398439	0.118824422	0.452248269	0
LC_DC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.10677591	0.06148024	0.15207158	1.4818E-05	1
LC_DC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.34252556	-0.012558267	0.697609395	0.058394693	0
LC_DC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.3243366	0.272615292	0.376057902	1.98906E-11	1
LC_DC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.00255851	-0.120968536	0.126085557	0.967090285	0
LC_DC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.27860906	0.229738519	0.327479592	1.98964E-11	1
LC_DC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0061804	-0.020685637	0.008324853	0.397444371	0
LC_DC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0284199	-0.110630493	0.053790693	0.491921216	0
LC_DC1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	0.00465844	-0.002606259	0.011923136	0.20453826	0
LC_DC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.11317443	0.063976405	0.162372448	2.22314E-05	1
LC_DC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.37707617	0.32354952	0.430602825	1.98886E-11	1
LC_DC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0718016	-0.206737007	0.063133847	0.291414865	0
LC_DC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.3598106	-0.7565348	0.036913683	0.074650988	0
LC_DC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.318311	-0.877128503	0.240506466	0.259064684	0
LC_DC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1078292	-0.319639659	0.103981292	0.312615391	0
LC_DC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.23752153	0.152079853	0.322963206	6.56401E-07	1
LC_DC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0220057	-0.099062123	0.055050672	0.56996792	0
LC_DC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.27710882	0.225750761	0.328466883	1.99029E-11	1
LC_DC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.1523676	-1.496964856	-0.807770245	8.47855E-09	0
LC_DC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.1641252	-1.682244877	-0.646005567	3.24441E-05	0
LC_DC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00752233	-0.064144404	0.079189067	0.834412885	0

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
LC_DC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.14978209	0.067829857	0.231734327	0.000541173	1
LC_DC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02706091	-0.050691438	0.104813266	0.489002236	0
LC_DC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05403754	-0.023333543	0.131408615	0.167544573	0
LC_DC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05990471	-0.045953698	0.165763118	0.262155881	0
LC_DC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2973682	-0.544589233	-0.050147169	0.019223969	0
LC_DC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.03807137	-0.037519318	0.113662054	0.317762792	0
LC_DC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.17996631	0.130476068	0.229456547	8.72358E-10	1
LC_DC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0045607	-0.319686869	0.31056555	0.977001119	0
LC_DC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3621077	-0.520667891	-0.203547528	2.50154E-05	0
LC_DC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.28695489	0.243428757	0.330481021	1.98891E-11	1
LC_DC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.37598334	0.274343972	0.477622701	5.39964E-10	1
LC_DC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	1.49446255	1.312228529	1.676696564	1.98884E-11	1
LC_DC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0125133	-0.031411998	0.00638538	0.190376996	0
LC_DC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02256423	-0.046290213	0.091418672	0.51464136	0
LC_DC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.35390491	0.305456468	0.402353358	1.98884E-11	1
LC_DC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02256423	-0.046290213	0.091418672	0.51464136	0
LC_DC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02061262	-0.048208987	0.089434233	0.551358215	0
LC_DC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0004185	-0.001736352	0.000899314	0.527676272	0
LC_DC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.53179577	0.461394504	0.602197035	1.98884E-11	1
LC_DC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3156407	-0.438993846	-0.192287632	3.42305E-06	0
LC_DC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5772862	-0.782285916	-0.372286513	4.99404E-07	0
LC_DC1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.17201638	-0.02529444	0.369327199	0.083614293	0
LC_DC1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.030752	-0.082564565	0.021060613	0.239468824	0
LC_DC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	0.02549457	-0.01420882	0.065197966	0.203852037	0
LC_DC1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0110869	-0.024544853	0.002371067	0.104544323	0
LC_DC1	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	as.factor(new_year)	2019-2017	0.43308188	0.287720228	0.578443531	2.36443E-06	1
LC_DC1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.01255592	0.002058759	0.023053074	0.019876967	1
LC_DC1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.25837982	0.210704231	0.306055413	1.99017E-11	1
LC_DC1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.98486375	0.738618276	1.231109225	6.88644E-11	1
LC_DC1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0981613	-0.160402744	-0.035919922	0.002511119	0
LC_DC1	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0043127	-0.556148105	0.547522712	0.986785783	0
LC_DC1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.31170424	0.258841609	0.364566864	1.98938E-11	1
LC_DC1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.02845891	-0.103164118	0.160081929	0.666932313	0
LC_DC1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.07326054	-0.068607549	0.215128632	0.305772147	0
LC_DC1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	1.1631961	1.03285968	1.293532528	1.98884E-11	1
LC_DC1	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.3570983	-0.795017842	0.080821287	0.107172191	0
LC_DC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	3.96577654	3.408342629	4.523210442	1.98884E-11	1
LC_DC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	1.11893098	0.808972753	1.428889216	1.06964E-09	1
LC_DC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.99445503	0.816221132	1.172688924	1.98984E-11	1
LC_DC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.9393065	0.732029149	1.146583856	2.06754E-11	1
LC_DC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.4423122	-0.618395665	-0.266228801	5.48522E-06	0
LC_DC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.8403964	-1.361926329	-0.318866472	0.002050677	0
LC_DC1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.69314718	-	-	-	-
LC_DC1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.24161572	-	-	-	-
LC_DC1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	1.01467994	-	-	-	-
LC_DC1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.75984421	-	-	-	-
LC_DC1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.98082925	-	-	-	-
LC_DC1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	0.69314718	-	-	-	-
LC_DC1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	1.38629436	-	-	-	-
LC_DC1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	as.factor(new_year)	2019-2017	1.38629436	-	-	-	-
LC_DC1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.6939467	-1.128231537	-0.259661902	0.002221512	0
LC_DC1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.17995786	0.100120693	0.259795019	3.08358E-05	1
LC_DC1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0554669	-0.154168853	0.043235131	0.265450737	0
LC_DC1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.25635383	0.211336055	0.301371597	1.98966E-11	1
LC_DC1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1711932	-1.516628847	-0.825757512	5.90272E-09	0
LC_DC1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1994519	-1.721693606	-0.677210134	2.2814E-05	0
LC_DC1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0633083	-0.141528025	0.014911332	0.110698204	0
LC_DC1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05509537	-0.099688747	0.209879487	0.479220811	0
LC_DC1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.25058263	0.202801781	0.298363484	1.99057E-11	1
LC_DC1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2339315	-0.446652111	-0.021210963	0.031687661	0
LC_DC1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.04248632	-0.070138389	0.155111026	0.453447658	0
LC_DC1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0840921	-0.207330998	0.039146876	0.177380252	0
LC_DC1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5547325	-0.865553331	-0.243911693	0.000710149	0
LC_DC1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1495415	-0.343858163	0.044775097	0.128968593	0
LC_DC1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.18196398	0.132642195	0.231285773	5.81967E-10	1
LC_DC1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.29797898	0.246322393	0.349635568	1.98951E-11	1
LC_DC1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.1770005	-0.135321886	0.489322882	0.261464863	0
LC_DC1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.7672038	-2.270641638	-1.263765995	2.31811E-09	0
LC_DC1	Total Metals	Methyl mercury (µg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4630927	-1.625684895	0.699499582	0.294371861	0
LC_DC1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.2589342	0.212017076	0.305851334	1.98989E-11	1
LC_DC1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.35363147	0.200155085	0.50710785	2.16467E-05	1
LC_DC1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01311438	-0.115389147	0.141617902	0.838935244	0
LC_DC1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	1.45215528	1.28425477	1.620055785	1.98884E-11	1
LC_DC1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0212032	-0.047276876	0.004870491	0.109053052	0
LC_DC1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0276289	-0.125394458	0.070136677	0.573983554	0
LC_DC1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06759505	-0.074773424	0.209963525	0.346064286	0
LC_DC1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.33125086	0.283659628	0.3788421	1.98886E-11	1
LC_DC1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.040035	-0.142269727	0.062199676	0.436523287	0
LC_DC1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00370782	-0.06629369	0.073709328	0.915974525	0
LC_DC1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.005816	-0.019424677	0.007792598	0.396015913	0
LC_DC1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.46359295	0.399426265	0.527759632	1.98884E-11	1
LC_DC1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3607797	-0.498791581	-0.222767796	2.27385E-06	0
LC_DC1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00427447	-0.147853141	0.156402079	0.955365884	0
LC_FRB	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.02629393	-0.055043785	0.107631645	0.520125032	0
LC_FRB	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.04080885	0.007639157	0.073978534	0.016794734	1
LC_FRB	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.35280213	-0.126691291	0.832295549	0.146150941	0
LC_FRB	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.08616315	0.043520427	0.128805876	0.000156719	1
LC_FRB	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.07572625	-0.055268017	0.206720526	0.251946689	0
LC_FRB	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.07491537	0.034730528	0.115100205	0.000434886	1
LC_FRB	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0	0	0	-	0
LC_FRB	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0488849	-0.144866583	0.047096881	0.312198093	0
LC_FRB	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	0.0046381	-0.001779302	0.011055502	0.153359245	0
LC_FRB	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.04463588	0.011057492	0.078214276	0.010063491	1
LC_FRB	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.08658435	0.034842512	0.138326184	0.001427019	1
LC_FRB	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0730072	-0.261178553	0.115164176	0.440417497	0
LC_FRB	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0301137	-0.402655673	0.342428274	0.872021842	0
LC_FRB	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0483299	-0.444531443	0.347871704	0.807956555	0
LC_FRB	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.10672101	-0.076205212	0.289647241	0.247656792	0
LC_FRB	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0278656	-0.096904029	0.04117283	0.42242527	0
LC_FRB	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.0295666	-0.010746966	0.069880165	0.147482091	0
LC_FRB	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02991173	-0.019752659	0.079576112	0.232871544	0
LC_FRB	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.1834766	-1.512828439	-0.854124831	1.40479E-09	0
LC_FRB	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.1714907	-1.704253622	-0.638727701	4.67414E-05	0
LC_FRB	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0133884	-0.040019216	0.01324239	0.318428899	0
LC_FRB	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00380809	-0.144097457	0.151713629	0.95907415	0
LC_FRB	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.09551103	0.009507591	0.181514474	0.030126788	1
LC_FRB	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06472314	0.02773347	0.101712808	0.000894344	1
LC_FRB	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.06083519	-0.046386035	0.168056418	0.260738966	0
LC_FRB	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2061032	-0.458505625	0.046299203	0.107563437	0
LC_FRB	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.04636934	-0.006559002	0.099297678	0.084771773	0
LC_FRB	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.19861097	0.114040046	0.283181889	1.64027E-05	1
LC_FRB	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2049188	-0.510485931	0.100648359	0.184701245	0
LC_FRB	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3526538	-0.51303146	-0.192276197	4.67414E-05	0
LC_FRB	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.01476625	-0.026190319	0.055722828	0.473385757	0
LC_FRB	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0883434	-0.21192818	0.035241451	0.157822771	0
LC_FRB	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.21201879	0.14252563	0.281511948	9.07109E-08	1
LC_FRB	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02833981	0.006787855	0.049891761	0.010853788	1
LC_FRB	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00381241	-0.000436846	0.00806166	0.07771474	0
LC_FRB	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.09374464	0.052787442	0.134701831	2.49802E-05	1
LC_FRB	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.776E-15	-7.33138E-15	3.77867E-15	0.524629096	0
LC_FRB	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	1.7764E-15	-2.85283E-15	6.40554E-15	0.445532997	0
LC_FRB	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0355757	-0.069119328	-0.002032152	0.038033913	0
LC_FRB	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.18172059	0.131913523	0.231527648	9.21535E-10	1
LC_FRB	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3410966	-0.5019907	-0.180202454	8.02739E-05	0
LC_FRB	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.6174818	-0.803992796	-0.430970734	1.23792E-08	0
LC_FRB	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.13804702	-0.111836137	0.387930184	0.251922089	0
LC_FRB	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.0104956	-0.064897361	0.043906142	0.700605262	0
LC_FRB	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	0.04013677	0.000316424	0.079957124	0.048266369	1
LC_FRB	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0198459	-0.029383217	-0.010308682	0.000107361	0
LC_FRB	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	as.factor(new_year)	2019-2017	0.24035381	0.136346907	0.344360703	8.04525E-05	1
LC_FRB	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.7379989	-1.053237287	-0.422760535	1.72824E-05	0
LC_FRB	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.04447532	0.006083958	0.082866672	0.023942849	1
LC_FRB	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.2343743	-0.357790111	-0.110958561	0.000347721	0
LC_FRB	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1312969	-0.204847358	-0.057746371	0.000717643	0
LC_FRB	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.21158794	-0.607403495	1.030579373	0.586236417	0
LC_FRB	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.12008588	0.07362859	0.166543171	2.98003E-06	1
LC_FRB	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0966374	-0.221815671	0.028540945	0.127707886	0
LC_FRB	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.05034784	-0.01394557	0.114641253	0.122429898	0
LC_FRB	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.16223811	0.095983057	0.228493171	8.01393E-06	1
LC_FRB	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.3651152	-0.817925611	0.087695297	0.111165892	0
LC_FRB	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.0127376	-0.08312534	0.057650096	0.718490582	0
LC_FRB	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.2385967	-0.419344795	-0.057848666	0.010566763	0
LC_FRB	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.63148236	0.480975894	0.78198883	2.81202E-11	1
LC_FRB	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.89100136	0.522985314	1.259017414	9.77128E-06	1
LC_FRB	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.20258068	-0.019998294	0.425159647	0.073557129	0
LC_FRB	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.7914332	-1.530762859	-0.052103587	0.036338221	0
LC_FRB	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3272162	-0.716693692	0.062261218	0.09799936	0
LC_FRB	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0217549	-0.099559903	0.056050161	0.57784254	0
LC_FRB	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0362379	-0.17755499	0.105079209	0.609691507	0
LC_FRB	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0150023	-0.065394668	0.035390071	0.553540071	0
LC_FRB	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1453954	-1.477090216	-0.813700665	4.12963E-09	0
LC_FRB	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.1322575	-1.666070063	-0.59844492	7.96916E-05	0
LC_FRB	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0319666	-0.085468796	0.021535649	0.236567613	0
LC_FRB	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1095236	-0.300292413	0.081245192	0.255182384	0
LC_FRB	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01675283	-0.023406257	0.056911918	0.407121902	0
LC_FRB	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0733384	-0.274388432	0.127711636	0.468219157	0
LC_FRB	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06545353	-0.088512697	0.21941976	0.39828984	0
LC_FRB	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0383496	-0.191999231	0.115300077	0.619239268	0
LC_FRB	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3511944	-0.703204018	0.000815161	0.050515499	0
LC_FRB	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.012192	-0.251053975	0.22666989	0.918972499	0
LC_FRB	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.17253938	0.090494382	0.254584373	9.01075E-05	1
LC_FRB	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.08283334	0.037603105	0.128063566	0.000536277	1
LC_FRB	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1810485	-0.459746914	0.097649835	0.198621361	0
LC_FRB	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.7820901	-2.385254699	-1.178925565	1.8871E-07	0
LC_FRB	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0339049	-0.072567126	0.004757397	0.084470115	0

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
LC_FRB	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0806703	-0.268317971	0.10697734	0.393032297	0
LC_FRB	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1387621	-0.263457268	-0.014067028	0.029805848	0
LC_FRB	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.15667748	0.090980672	0.22237428	1.26616E-05	1
LC_FRB	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00276	-0.050584695	0.056104697	0.917846057	0
LC_FRB	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0367799	-0.206079869	0.132520087	0.665272874	0
LC_FRB	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02828672	-0.036586607	0.09316005	0.386366372	0
LC_FRB	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05495769	0.012246248	0.097669129	0.01257588	1
LC_FRB	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00118464	-0.110034814	0.112404091	0.983062766	0
LC_FRB	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.08041795	0.017735794	0.143100099	0.0128239	1
LC_FRB	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0626538	-0.118482309	-0.006825254	0.028498692	0
LC_FRB	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.14191291	0.093739274	0.190086546	2.01575E-07	1
LC_FRB	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2996529	-0.498335795	-0.100970007	0.003765578	0
LC_FRB	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03925195	-0.100194442	0.178698339	0.575299339	0
LC_FRUS	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.01714083	-0.074930245	0.10921191	0.69407529	0
LC_FRUS	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.04075591	-0.061756815	0.143268626	0.405956837	0
LC_FRUS	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.57117145	-0.648734863	1.791077758	0.330231952	0
LC_FRUS	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	0.03767065	-0.047910131	0.123251438	0.358978941	0
LC_FRUS	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.05607345	-0.372676819	0.484823712	0.781977537	0
LC_FRUS	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.00419902	-0.110444626	0.11884266	0.938136544	0
LC_FRUS	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0301368	-0.210409042	0.150135374	0.723783166	0
LC_FRUS	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.3453623	-0.561207205	-0.12951738	0.004253117	0
LC_FRUS	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	0.0037882	-0.006899815	0.014476221	0.457527128	0
LC_FRUS	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.05986315	-0.028855172	0.148581462	0.1686489	0
LC_FRUS	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.06249235	-0.051523804	0.176508501	0.257572399	0
LC_FRUS	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.02977204	-0.412152617	0.471696692	0.886515449	0
LC_FRUS	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.1757318	-0.335114551	0.686578153	0.470596965	0
LC_FRUS	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.5579196	-1.161014624	0.045175339	0.067014787	0
LC_FRUS	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.033617	-0.234706493	0.16747259	0.723783166	0
LC_FRUS	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0606201	-0.21674838	0.09550816	0.416734337	0
LC_FRUS	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0041439	-0.028931985	0.020644143	0.723783166	0
LC_FRUS	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0133357	-0.160318791	0.133647338	0.847633418	0
LC_FRUS	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.6094379	-1.609437912	-1.609437912	4.12637E-12	0
LC_FRUS	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.7019107	-3.168790871	-0.235030571	0.026264135	0
LC_FRUS	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0479808	-0.141510597	0.045549008	0.287829016	0
LC_FRUS	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.2336765	-0.818216858	0.350863855	0.403443564	0
LC_FRUS	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1279353	-0.386051567	0.130181057	0.303743683	0
LC_FRUS	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0	-2.3557E-15	2.3557E-15	1	0
LC_FRUS	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0447661	-0.312547236	0.223015113	0.723783166	0
LC_FRUS	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.183136	-0.732413665	0.3661417	0.484094992	0
LC_FRUS	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	1.7764E-15	-5.29075E-15	8.84346E-15	0.596303515	0
LC_FRUS	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.31198882	0.176231693	0.447745947	0.000258552	1
LC_FRUS	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1114439	-0.540688753	0.317801044	0.584410086	0
LC_FRUS	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5123262	-0.953901102	-0.070751252	0.026264135	0
LC_FRUS	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.03671479	-0.044548107	0.117977693	0.346848732	0
LC_FRUS	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1662852	-0.424982734	0.092412243	0.188276209	0
LC_FRUS	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.20037317	0.035842286	0.364904048	0.020748141	1
LC_FRUS	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.04684962	-0.015589829	0.109289074	0.129015548	0
LC_FRUS	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	1.7764E-15	-5.29075E-15	8.84346E-15	0.596303515	0
LC_FRUS	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.00961957	-0.095157671	0.114396817	0.845844874	0
LC_FRUS	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	1.7764E-15	-5.29075E-15	8.84346E-15	0.596303515	0
LC_FRUS	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0	-2.3557E-15	2.3557E-15	1	0
LC_FRUS	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1192864	-0.273539025	0.034966202	0.118675992	0
LC_FRUS	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.16648919	0.056029063	0.276949308	0.006253411	1
LC_FRUS	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5123262	-0.953901102	-0.070751252	0.026264135	0
LC_FRUS	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.7324082	-1.062334646	-0.402481739	0.000349444	0
LC_FRUS	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	0.07987446	-0.069573105	0.229322033	0.187518048	0
LC_FRUS	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	0.20740379	-0.399362237	0.814169826	0.470752583	0
LC_FRUS	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	0.11352663	-0.540016452	0.767069707	0.711684558	0
LC_FRUS	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	0.03823758	-0.028711743	0.105186906	0.237105278	0
LC_FRUS	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-1.2713243	-2.296629531	-0.246019081	0.018946195	0
LC_FRUS	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0384823	-0.15642569	0.07946117	0.493321547	0
LC_FRUS	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.4548378	-0.629295721	-0.280379913	8.16749E-05	0
LC_FRUS	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.2068156	-0.450718311	0.037087208	0.089973499	0
LC_FRUS	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.06891793	-0.048365051	0.186200908	0.226526597	0
LC_FRUS	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.12108273	0.013045046	0.229120415	0.030834348	1
LC_FRUS	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.09463965	-0.043498107	0.232777413	0.162671968	0
LC_FRUS	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.07497992	-0.074801568	0.224761415	0.299141789	0
LC_FRUS	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.1214112	-0.342540205	0.09971774	0.256788353	0
LC_FRUS	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.23087877	-0.462322491	0.924080039	0.484546045	0
LC_FRUS	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	1.05473995	0.329569851	1.779910042	0.007787756	1
LC_FRUS	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.63623017	-0.169132287	1.441592637	0.111640552	0
LC_FRUS	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.02175346	-0.47812694	0.521633856	0.920926569	0
LC_FRUS	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.83538302	-0.216107974	1.88687401	0.109813018	0
LC_FRUS	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.7984722	-1.455927231	-0.141017245	0.021035934	0
LC_FRUS	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.148713	-0.271078083	-0.02634785	0.020964221	0
LC_FRUS	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1829022	-0.426902813	0.061098511	0.129353354	0
LC_FRUS	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0854948	-0.21810651	0.047116873	0.187045464	0
LC_FRUS	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.6094379	-1.609437912	-1.609437912	4.12637E-12	0
LC_FRUS	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.7019107	-3.168790871	-0.235030571	0.026264135	0
LC_FRUS	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.084022	-0.193516907	0.02547282	0.121282644	0
LC_FRUS	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1447526	-0.544385019	0.254879883	0.447931269	0
LC_FRUS	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0188811	-0.136281435	0.09851915	0.733817187	0
LC_FRUS	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1042461	-0.47056022	0.262067957	0.549296882	0
LC_FRUS	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0342808	-0.216249206	0.147687696	0.690637982	0
LC_FRUS	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0247367	-0.130277551	0.080804197	0.621090737	0
LC_FRUS	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.744777	-1.300217012	-0.189337027	0.012484607	0
LC_FRUS	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1341441	-0.337217638	0.068929521	0.177135022	0
LC_FRUS	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.30610697	0.155112438	0.457101504	0.00074508	1
LC_FRUS	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.0713733	-0.042920187	0.185666794	0.200336779	0
LC_FRUS	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1592874	-0.608688735	0.29011399	0.457516074	0
LC_FRUS	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-2.8149113	-3.256486195	-2.373336345	3.90881E-09	0
LC_FRUS	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03775334	-0.061521853	0.137028539	0.426134971	0
LC_FRUS	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1587216	-0.423892731	0.106449537	0.218478622	0
LC_FRUS	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.09022502	-0.020968904	0.20141895	0.103140806	0
LC_FRUS	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.06904786	-0.106691526	0.244787246	0.411346546	0
LC_FRUS	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0031999	-0.086385265	0.079985492	0.935035828	0
LC_FRUS	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0560536	-0.367554185	0.255446998	0.703752179	0
LC_FRUS	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.07918817	-0.050661147	0.209037479	0.210421527	0
LC_FRUS	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00745534	-0.091426489	0.106337173	0.873114369	0
LC_FRUS	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0187731	-0.081494051	0.043947754	0.529126152	0
LC_FRUS	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0	-2.3557E-15	2.3557E-15	1	0
LC_FRUS	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1361354	-0.313850513	0.041579654	0.121870724	0
LC_FRUS	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.16182937	0.039688554	0.28397018	0.013337095	1
LC_FRUS	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.533086	-0.979818938	-0.086353037	0.022944898	0
LC_FRUS	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0767936	-0.438744849	0.285157744	0.65426525	0
RG_CH1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.05219287	-0.008834258	0.113219997	0.092458597	0
RG_CH1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.15428	-0.356618048	0.048058025	0.132732736	0
RG_CH1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0835479	-0.485246702	0.318150963	0.679364044	0
RG_CH1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0074401	-0.039715226	0.024835095	0.646987122	0
RG_CH1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0263474	-0.163003835	0.110309081	0.701640642	0
RG_CH1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.00139095	-0.027629822	0.030411716	0.924086568	0
RG_CH1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.21120434	0.003281734	0.419126949	0.046590539	1
RG_CH1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0932154	-0.18466744	-0.001763456	0.045860573	0
RG_CH1	Conventional Parameters	pH (-)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.0040684	-0.008211272	7.44235E-05	0.054140452	0
RG_CH1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.05224799	0.022891779	0.081604195	0.000700825	1
RG_CH1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	0.04068824	-0.003260544	0.084637019	0.06903578	0
RG_CH1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.1181405	-0.27504068	0.038759665	0.137592748	0
RG_CH1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	as.factor(new_year)	2019-2017	-0.3578121	-0.617307975	-0.098316153	0.00759712	0
RG_CH1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	as.factor(new_year)	2019-2017	0.11274198	-0.13060075	0.356084713	0.358489366	0
RG_CH1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.12383456	-0.031225129	0.278894247	0.115656575	0
RG_CH1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08030056	0.013734923	0.146866196	0.018795132	1
RG_CH1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.10039645	0.030160322	0.170632572	0.005743512	1
RG_CH1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.04619387	0.00474578	0.087641964	0.02947627	1
RG_CH1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.1411402	-1.469443428	-0.812837048	1.93585E-09	0
RG_CH1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-1.2253477	-1.754602179	-0.696093148	1.76231E-05	0
RG_CH1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08059612	0.01403838	0.147153862	0.018366737	1
RG_CH1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1605638	-0.297647571	-0.023480044	0.022377519	0
RG_CH1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.1358868	-0.255304117	-0.016469522	0.026338441	0
RG_CH1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08059612	0.01403838	0.147153862	0.018366737	1
RG_CH1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.13713374	0.000770362	0.273497109	0.048755318	1
RG_CH1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3123228	-0.564351692	-0.060293925	0.015908926	0
RG_CH1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.0807558	0.014197868	0.147313736	0.018146339	1
RG_CH1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.09738105	0.01048272	0.184279382	0.028624216	1
RG_CH1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02887023	-0.174577343	0.232317806	0.777909056	0
RG_CH1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3971585	-0.55374478	-0.240572235	3.38641E-06	0
RG_CH1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.04618051	0.00848539	0.083875625	0.01709579	1
RG_CH1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08059612	0.01403838	0.147153862	0.018366737	1
RG_CH1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.15252652	0.068858763	0.23619428	0.000530798	1
RG_CH1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.02196695	-0.004609095	0.048542987	0.103679472	0
RG_CH1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08059612	0.01403838	0.147153862	0.018366737	1
RG_CH1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.05786783	0.017245171	0.098490493	0.005902772	1
RG_CH1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08059612	0.01403838	0.147153862	0.018366737	1
RG_CH1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08059612	0.01403838	0.147153862	0.018366737	1
RG_CH1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.0014225	-0.006257148	0.003412068	0.559048314	0
RG_CH1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	0.08443833	0.040367615	0.128509044	0.000288286	1
RG_CH1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.3125321	-0.484030912	-0.141033349	0.000533017	0
RG_CH1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	as.factor(new_year)	2019-2017	-0.5094022	-0.722414232	-0.296390216	1.00546E-05	0
RG_CH1	Field Measured	Conductivity (µS/cm)_Field Measured	as.factor(new_year)	2019-2017	-0.0028035	-0.045530955	0.039923929	0.895960542	0
RG_CH1	Field Measured	Dissolved Oxygen (%)_Field Measured	as.factor(new_year)	2019-2017	-0.0218078	-0.083148412	0.039532769	0.47953351	0
RG_CH1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	as.factor(new_year)	2019-2017	-0.0083597	-0.073836548	0.057117084	0.799188109	0
RG_CH1	Field Measured	pH (-)_Field Measured	as.factor(new_year)	2019-2017	-0.0080722	-0.017670949	0.001526605	0.097680942	0
RG_CH1	Major Ions	Bromide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-4.441E-16	-2.82305E-15	1.93487E-15	0.710678245	0
RG_CH1	Major Ions	Calcium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0150303	-0.047222204	0.017161618	0.354799295	0
RG_CH1	Major Ions	Chloride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.4040538	-0.695236955	-0.112870722	0.007241115	0
RG_CH1	Major Ions	Fluoride (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.0371486	-0.077869756	0.003572576	0.073098527	0
RG_CH1	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.10484197	-0.18702328	0.39670721	0.451617188	0
RG_CH1	Major Ions	Magnesium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.03989942	0.011881014	0.067917836	0.005918543	1
RG_CH1	Major Ions	Potassium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.5784452	-0.971592205	-0.185298254	0.004533015	0
RG_CH1	Major Ions	Sodium (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.1415728	-0.328467336	0.045321709	0.135276874	0
RG_CH1	Major Ions	Sulphate (mg/L)_Major Ions	as.factor(new_year)	2019-2017	0.08181995	-0.021160644	0.184800553	0.117507064	0
RG_CH1	Major Ions	Sulphide (mg/L)_Major Ions	as.factor(new_year)	2019-2017	-0.4022961	-0.783871731	-0.020720402	0.039278297	0
RG_CH1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.08010927	-0.157000444	0.317218991	0.502479879	0
RG_CH1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.03323803	-0.031418573	0.097894629	0.308616029	0
RG_CH1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.72722735	0.513674498	0.940780198	3.27505E-09	1
RG_CH1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.01492192	-0.184553474	0.214397318	0.881780287	0

Table F27-3. Raw Output for the Tukey's HSD Pairwise Comparison Test for the Period of Interest

Station	Group	Constituent	term	comparison	estimate	conf.low	conf.high	adj.p.value	t_check
RG_CH1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	0.18694017	-0.015941851	0.389822196	0.070263318	0
RG_CH1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	as.factor(new_year)	2019-2017	-0.6862387	-1.342642099	-0.029835208	0.040716988	0
RG_CH1	Parent PAHs	Acenaphthene (%)_Parent PAHs	as.factor(new_year)	2019-2017	0.17438458	-	-	-	-
RG_CH1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.5516728	-	-	-	0
RG_CH1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.5516728	-	-	-	0
RG_CH1	Parent PAHs	Acridine (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.5854615	-	-	-	0
RG_CH1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.5516728	-	-	-	0
RG_CH1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.5516728	-	-	-	0
RG_CH1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.6931472	-	-	-	0
RG_CH1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.5516728	-	-	-	0
RG_CH1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.5516728	-	-	-	0
RG_CH1	Parent PAHs	Chrysene (%)_Parent PAHs	as.factor(new_year)	2019-2017	0.09904898	-	-	-	-
RG_CH1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.5516728	-	-	-	0
RG_CH1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-1.2448199	-	-	-	0
RG_CH1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.5516728	-	-	-	0
RG_CH1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.5516728	-	-	-	0
RG_CH1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.5516728	-	-	-	0
RG_CH1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.9162907	-	-	-	0
RG_CH1	Parent PAHs	Phenanthrene (%)_Parent PAHs	as.factor(new_year)	2019-2017	0.10681573	-	-	-	-
RG_CH1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.3022451	-	-	-	0
RG_CH1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	-0.5516728	-	-	-	0
RG_CH1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	as.factor(new_year)	2019-2017	1.01981139	-	-	-	-
RG_CH1	Total Metals	Aluminum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.4438295	-0.769579039	-0.11807999	0.008306914	0
RG_CH1	Total Metals	Antimony (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0014225	-0.006356842	0.003511762	0.566996714	0
RG_CH1	Total Metals	Arsenic (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.07212846	-0.036211317	0.18046824	0.188452142	0
RG_CH1	Total Metals	Barium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02479414	-0.015440397	0.065028667	0.223051623	0
RG_CH1	Total Metals	Beryllium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.2250945	-1.546261152	-0.903927908	9.89737E-11	0
RG_CH1	Total Metals	Bismuth (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.3059438	-1.830996552	-0.780891016	4.91018E-06	0
RG_CH1	Total Metals	Boron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0	-4.32132E-16	4.32132E-16	1	0
RG_CH1	Total Metals	Cadmium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1411036	-0.334180894	0.051973621	0.14935659	0
RG_CH1	Total Metals	Calcium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0421514	-0.072834188	-0.011468623	0.00781155	0
RG_CH1	Total Metals	Chromium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0965635	-0.268542858	0.075415854	0.26647551	0
RG_CH1	Total Metals	Cobalt (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0099676	-0.03482218	0.014886974	0.426349091	0
RG_CH1	Total Metals	Copper (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0271199	-0.076169356	0.021929497	0.27377961	0
RG_CH1	Total Metals	Iron (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.5761952	-0.90958549	-0.242805006	0.000971133	0
RG_CH1	Total Metals	Lead (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0627439	-0.20112363	0.075635801	0.368775187	0
RG_CH1	Total Metals	Lithium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.08104255	-0.005614813	0.167699906	0.066329803	0
RG_CH1	Total Metals	Magnesium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.0183892	-0.009663358	0.046441767	0.195249756	0
RG_CH1	Total Metals	Manganese (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.2415312	-0.533565862	0.050503505	0.10347725	0
RG_CH1	Total Metals	Mercury (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-1.9248112	-2.519478582	-1.330143824	1.31609E-08	0
RG_CH1	Total Metals	Molybdenum (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.01709223	-0.019246257	0.053430723	0.351262174	0
RG_CH1	Total Metals	Nickel (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0477203	-0.165600416	0.070159744	0.422018136	0
RG_CH1	Total Metals	Potassium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.6123264	-1.003416087	-0.221236746	0.002619626	0
RG_CH1	Total Metals	Selenium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.09903655	0.020004436	0.178068661	0.014815299	1
RG_CH1	Total Metals	Silicon (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.02147163	-0.013623836	0.056567103	0.226362699	0
RG_CH1	Total Metals	Silver (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00052907	-0.004778991	0.005837124	0.842939885	0
RG_CH1	Total Metals	Sodium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.1552449	-0.342258202	0.031768303	0.1022293	0
RG_CH1	Total Metals	Strontium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.03560629	-0.000886857	0.072099429	0.055669365	0
RG_CH1	Total Metals	Thallium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.005022	-0.022441472	0.012397524	0.566996714	0
RG_CH1	Total Metals	Tin (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.00729286	-0.001149606	0.01573533	0.089297594	0
RG_CH1	Total Metals	Titanium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0014225	-0.006257148	0.003412068	0.559048314	0
RG_CH1	Total Metals	Uranium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	0.05985123	0.019858406	0.099844059	0.003923002	1
RG_CH1	Total Metals	Vanadium (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.3658605	-0.521879554	-0.209841363	1.41699E-05	0
RG_CH1	Total Metals	Zinc (mg/L)_Total Metals	as.factor(new_year)	2019-2017	-0.0172136	-0.050558305	0.016131093	0.30660137	0
RG_CH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	0	-	-	-	0
RG_CH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	0	-	-	-	0
RG_CH1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	0	-	-	-	0
RG_CH1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	as.factor(new_year)	2019-2017	2.2204E-16	-	-	-	-

Notes: "-" = insufficient data was available for the model

Model outputs are provided for the TukeyHSD() function in the stats package for R version 3.6.2.

The TukeyHSD() function was run for the Year term of a 2-way ANOVA including the factors Year and Month for the log-transformed average monthly concentrations for all constituents at all stations

Cases where data was only available for 1 unique month or 1 of the Year periods were excluded

Parameters with measured values of 0 or negative values were also excluded at the log-transformation step

The "t_check" column

contains a value of 1 if

the estimate was >1

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_CC1	Alkylated PAHs	1-Methylnaphthalene (µg/L)_Alkylated PAHs	(Intercept)	-2.995732274	-	-	-	0
FR_CC1	Alkylated PAHs	1-Methylnaphthalene (µg/L)_Alkylated PAHs	Date	-1.06447E-17	-	-	-	0
FR_CC1	Alkylated PAHs	2-Methylnaphthalene (µg/L)_Alkylated PAHs	(Intercept)	-173.9593424	-	-	-	0
FR_CC1	Alkylated PAHs	2-Methylnaphthalene (µg/L)_Alkylated PAHs	Date	0.009485013	-	-	-	0
FR_CC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-3.926030511	1.370096788	-2.865513258	0.005136708	0
FR_CC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	0.000292286	8.15212E-05	3.585398125	0.000536142	1
FR_CC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	6.344431479	1.147245167	5.530144439	2.86277E-07	0
FR_CC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-5.9125E-05	6.82615E-05	-0.866154779	0.388610708	0
FR_CC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	1.821576908	1.150390539	1.583442185	0.116679541	0
FR_CC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-9.59421E-05	6.84486E-05	-1.401665717	0.164308419	0
FR_CC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	3.008101176	0.296491528	10.14565643	9.01494E-17	0
FR_CC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	0.000247904	1.76413E-05	14.05247364	7.89942E-25	1
FR_CC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-1.275985264	0.747868046	-1.706163634	0.091279622	0
FR_CC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	5.95162E-05	4.44984E-05	1.337491083	0.184289642	0
FR_CC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	2.081813592	0.319333221	6.519251544	3.49762E-09	0
FR_CC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000269794	1.90004E-05	14.1993591	4.05165E-25	1
FR_CC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.139357529	0.144006226	0.967718774	0.33566813	0
FR_CC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-7.87213E-06	8.56842E-06	-0.918737516	0.360584374	0
FR_CC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	7.078076458	0.370150427	19.12216205	3.67586E-34	0
FR_CC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-6.70539E-05	2.20241E-05	-3.044571987	0.00302249	0
FR_CC1	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.178618661	0.030509665	71.40749299	1.07234E-83	0
FR_CC1	Conventional Parameters	pH (-)_Conventional Parameters	Date	-4.67232E-06	1.81533E-06	-2.573808206	0.011621509	0
FR_CC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	6.370580169	1.146976216	5.554239122	2.58082E-07	0
FR_CC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-6.04731E-05	6.82455E-05	-0.88611191	0.377818554	0
FR_CC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	2.056420679	0.348269317	5.904685184	5.58797E-08	0
FR_CC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	0.000291416	2.07221E-05	14.06302492	7.52886E-25	1
FR_CC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	1.772574289	1.118764157	1.584403896	0.116460527	0
FR_CC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-0.000107783	6.65668E-05	-1.619165059	0.108762206	0
FR_CC1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	(Intercept)	7.205507309	1.069895717	6.734775356	1.29409E-09	0
FR_CC1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	Date	-0.000393425	6.36591E-05	-6.180173695	1.63414E-08	0
FR_CC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	6.250352901	1.737176394	3.597995529	0.000513848	0
FR_CC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-0.000377601	0.000103363	-3.653167945	0.000426153	0
FR_CC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-4.096289805	0.831642836	-4.925539697	3.5941E-06	0
FR_CC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-0.000103071	4.9483E-05	-2.082958474	0.039970231	0
FR_CC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	1.267270522	0.987399759	1.283442203	0.202492217	0
FR_CC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	-0.000472957	5.87506E-05	-8.050253307	2.50438E-12	0
FR_CC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-3.533602394	0.89073699	-3.967054733	0.000142056	0
FR_CC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	-0.000310589	5.29991E-05	-5.860267385	6.79875E-08	0
FR_CC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	7.387330994	0.897063492	8.235014643	1.02346E-12	0
FR_CC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	-0.000596338	5.33756E-05	-11.17248749	6.09926E-19	0
FR_CC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	3.08621797	0.851604547	3.62400363	0.00047057	0
FR_CC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000774116	5.06707E-05	-15.2773759	3.26836E-27	0
FR_CC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	9.437349331	1.262270642	7.476486432	3.94221E-11	0
FR_CC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001094107	7.51055E-05	-14.56759878	7.68483E-26	0
FR_CC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-1.894225464	0.671255756	-2.821913179	0.005825397	0
FR_CC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-0.000107087	3.99399E-05	-2.681198428	0.008664673	0
FR_CC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-9.827757344	3.61372069	-2.719567501	0.007786348	0
FR_CC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	2.53249E-05	0.000215018	0.117780417	0.906492954	0
FR_CC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-9.101738862	0.375911993	-24.21241951	3.52892E-42	0
FR_CC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-2.16823E-06	2.23669E-05	-0.096939201	0.922981066	0
FR_CC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	2.928944749	1.398541503	2.094285184	0.038925274	0
FR_CC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	-0.000655286	8.32137E-05	-7.874744179	5.84235E-12	0
FR_CC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-6.541636123	0.420795495	-15.54587963	1.00618E-27	0
FR_CC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-6.60256E-05	2.50375E-05	-2.637069984	0.009785421	0
FR_CC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	2.232600832	0.733845892	3.042329264	0.003043041	0
FR_CC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000387916	4.36641E-05	-8.884102916	4.33241E-14	0
FR_CC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.64587612	0.315519402	-33.74079714	2.52389E-54	0
FR_CC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	4.66305E-05	1.87735E-05	2.483843741	0.014768028	1
FR_CC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-7.687079535	0.807004358	-9.525449845	1.8764E-15	0
FR_CC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000350848	4.8017E-05	7.306749864	8.83689E-11	1
FR_CC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-0.535222938	1.752036143	-0.305486243	0.760671305	0
FR_CC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	-0.000343954	0.000104247	-3.299425033	0.001369448	0
FR_CC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-6.160419374	0.367802082	-16.74927816	5.73001E-30	0
FR_CC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000343396	2.18843E-05	-15.69140923	5.33342E-28	0
FR_CC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	0.054824032	0.84642637	0.064771176	0.948493739	0
FR_CC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	-0.000321851	5.03626E-05	-6.390674367	6.29711E-09	0
FR_CC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-5.846563651	0.500104185	-11.6906913	5.02396E-20	0
FR_CC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	0.000150044	2.97564E-05	5.042423539	2.22897E-06	1
FR_CC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-8.112663155	0.52108474	-15.56879819	9.10303E-28	0
FR_CC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.000358993	3.10047E-05	11.57867395	8.60332E-20	1
FR_CC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	1.799190497	0.344063273	5.229243103	1.02659E-06	0
FR_CC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	-8.22352E-05	2.04719E-05	-4.016982754	0.000118666	0
FR_CC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-12.20235483	0.317711863	-38.40698524	2.94322E-59	0
FR_CC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	4.35755E-05	1.8904E-05	2.305097671	0.023361323	1
FR_CC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-3.081048231	0.425788357	-7.236102589	1.23493E-10	0
FR_CC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	0.000107361	2.53345E-05	4.237723863	5.27042E-05	1
FR_CC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-10.95749403	0.639086221	-17.1455645	1.0877E-30	0
FR_CC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	3.59115E-05	3.80258E-05	0.944396223	0.347388339	0
FR_CC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.952728943	0.315519402	-31.54395226	8.50557E-52	0
FR_CC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	4.66305E-05	1.87735E-05	2.483843741	0.014768028	1
FR_CC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-3.258517386	0.406995939	-8.00626511	3.09763E-12	0
FR_CC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-7.39114E-05	2.42164E-05	-3.052124912	0.00295422	0
FR_CC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-13.65387434	0.467338857	-29.21621891	5.91987E-49	0
FR_CC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	0.000516083	2.78068E-05	18.55957585	3.40244E-33	1
FR_CC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-2.297637759	0.48488847	-4.738487102	7.62587E-06	0
FR_CC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000296766	2.8851E-05	-10.2861429	4.53813E-17	0
FR_CC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	-3.625179113	2.059885038	-1.7598939	0.081678952	0
FR_CC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-7.15556E-05	0.000122564	-0.583823133	0.560737668	0
FR_CC1	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	0.667641086	1.337578394	0.49914165	0.618984351	0
FR_CC1	Field Measured	Conductivity (µS/cm)_Field Measured	Date	0.000374479	7.89444E-05	4.743579535	8.50513E-06	1
FR_CC1	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	3.998144706	0.361152938	11.07050305	4.33113E-18	0
FR_CC1	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	2.11905E-05	2.13137E-05	0.994219532	0.322971398	0
FR_CC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	1.851567317	0.302911512	6.112568342	2.96246E-08	0
FR_CC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	2.41569E-05	1.78765E-05	1.351318232	0.180221775	0
FR_CC1	Field Measured	pH (-)_Field Measured	(Intercept)	2.09570201	0.05125896	40.88459892	1.11866E-57	0
FR_CC1	Field Measured	pH (-)_Field Measured	Date	-9.52378E-07	3.02701E-06	-0.314626622	0.753816166	0
FR_CC1	Field Measured	Total Suspended Solids (mg/L)_Field Measured	(Intercept)	136.5080667	-	-	-	0
FR_CC1	Field Measured	Total Suspended Solids (mg/L)_Field Measured	Date	-0.008468356	-	-	-	0
FR_CC1	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	3.068733618	0.98506766	3.115251613	0.002437081	0
FR_CC1	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.000253198	5.86118E-05	-4.319908865	3.87043E-05	0
FR_CC1	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	1.062891281	0.325553474	3.264874638	0.00152839	0
FR_CC1	Major Ions	Calcium (mg/L)_Major Ions	Date	0.00024033	1.93705E-05	12.40698407	1.65301E-21	1
FR_CC1	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	0.334512597	0.421859298	0.79294826	0.429804843	0
FR_CC1	Major Ions	Chloride (mg/L)_Major Ions	Date	2.74188E-05	2.51008E-05	1.092350104	0.27747098	0
FR_CC1	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	1.398695413	0.529327155	2.642402527	0.009643343	0
FR_CC1	Major Ions	Fluoride (mg/L)_Major Ions	Date	-0.000170693	3.14951E-05	-5.419666944	4.59307E-07	0
FR_CC1	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	-0.749600415	0.343391888	-2.182929886	0.031531739	0
FR_CC1	Major Ions	Magnesium (mg/L)_Major Ions	Date	0.000306436	2.04319E-05	14.99789132	1.12478E-26	1
FR_CC1	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	0.628682606	0.508510959	1.236320663	0.219419702	0
FR_CC1	Major Ions	Potassium (mg/L)_Major Ions	Date	5.38886E-05	3.02566E-05	1.78105518	0.07813361	0
FR_CC1	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	1.44377451	0.799025538	1.806919105	0.07397423	0
FR_CC1	Major Ions	Sodium (mg/L)_Major Ions	Date	5.96351E-06	4.75423E-05	0.125435866	0.900446379	0
FR_CC1	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	0.0826094	0.388667689	0.212545066	0.832142057	0
FR_CC1	Major Ions	Sulphate (mg/L)_Major Ions	Date	0.000345473	2.31259E-05	14.93881904	1.46236E-26	1
FR_CC1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-6.907755279	6.39726E-14	-1.0798E+14	4.25839E-83	0
FR_CC1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	6.91715E-18	3.98449E-18	1.736019958	0.13324153	0
FR_CC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	0	-Inf	0	0
FR_CC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	0	0	-	-	0
FR_CC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-3.714968757	0.66412333	-5.593793488	2.17593E-07	0
FR_CC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	0.000448128	3.95156E-05	11.34055921	2.70818E-19	1
FR_CC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	11.1749851	1.981476356	5.639726695	1.78356E-07	0
FR_CC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000830628	0.000117898	-7.045281608	3.03669E-10	0
FR_CC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	28.36527107	3.541964074	8.008345222	3.06666E-12	0
FR_CC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	-0.001838549	0.000210748	-8.723919824	9.47418E-14	0
FR_CC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-2.616156245	2.326020964	-1.124734594	0.263565346	0
FR_CC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	3.21646E-05	0.000138399	0.232404902	0.816728791	0
FR_CC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-8.11926649	0.695354366	-11.67644425	1.98745E-19	0
FR_CC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	7.71565E-05	4.12104E-05	1.872256224	0.064569711	0
FR_CC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-29.32426834	15.18364969	-1.931305644	0.094740055	0
FR_CC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.001514414	0.000982013	1.542152332	0.166941059	0
FR_CC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	11.30432744	2.504724231	4.513202409	1.84737E-05	0
FR_CC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000994448	0.000149032	-6.672717678	1.72488E-09	0
FR_CC1	Parent PAHs	Acenaphthene (%)_Parent PAHs	(Intercept)	-2.623953658	-	-	-	0
FR_CC1	Parent PAHs	Acenaphthene (%)_Parent PAHs	Date	0.000398822	-	-	-	0
FR_CC1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	(Intercept)	15.98998892	0.731816022	21.84973879	0.029115947	0
FR_CC1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	Date	-0.001146844	4.18113E-05	-27.42903059	0.023199432	0
FR_CC1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	(Intercept)	15.98998892	0.731816022	21.84973879	0.029115947	0
FR_CC1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	Date	-0.001146844	4.18113E-05	-27.42903059	0.023199432	0
FR_CC1	Parent PAHs	Acridine (%)_Parent PAHs	(Intercept)	4.434974809	-	-	-	0
FR_CC1	Parent PAHs	Acridine (µg/L)_Parent PAHs	(Intercept)	15.98998892	0.731816022	21.84973879	0.029115947	0
FR_CC1	Parent PAHs	Acridine (µg/L)_Parent PAHs	Date	-0.001146844	4.18113E-05	-27.42903059	0.023199432	0
FR_CC1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	(Intercept)	15.98998892	0.731816022	21.84973879	0.029115947	0
FR_CC1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	Date	-0.001146844	4.18113E-05	-27.42903059	0.023199432	0
FR_CC1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	(Intercept)	15.98998892	0.731816022	21.84973879	0.029115947	0
FR_CC1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	Date	-0.001146844	4.18113E-05	-27.42903059	0.023199432	0
FR_CC1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	(Intercept)	3.571534872	0.315176005	11.33187428	0.056034411	0
FR_CC1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	Date	-0.000493919	1.80072E-05	-27.42903059	0.023199432	0
FR_CC1	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	(Intercept)	-2.995732274	-	-	-	0
FR_CC1	Parent PAHs	Benzo(b,j)fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_CC1	Parent PAHs	Benzo(b,j)fluoranthene (µg/L)_Parent PAHs	Date	0	-	-	-	0
FR_CC1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	(Intercept)	15.98998892	0.731816022	21.84973879	0.029115947	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_CC1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	Date	-0.001146844	4.18113E-05	-27.42903059	0.023199432	0
FR_CC1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	(Intercept)	15.98998892	0.731816022	21.84973879	0.029115947	0
FR_CC1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	Date	-0.001146844	4.18113E-05	-27.42903059	0.023199432	0
FR_CC1	Parent PAHs	Chrysene (%)_Parent PAHs	(Intercept)	1.592724157	1.426062551	1.11686837	0.464889048	0
FR_CC1	Parent PAHs	Chrysene (%)_Parent PAHs	Date	0.000162654	8.14761E-05	1.996341476	0.295633736	0
FR_CC1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	(Intercept)	15.98998892	0.731816022	21.84973879	0.029115947	0
FR_CC1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	Date	-0.001146844	4.18113E-05	-27.42903059	0.023199432	0
FR_CC1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	(Intercept)	24.16669398	1.046992027	23.08202293	0.027563525	0
FR_CC1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	Date	-0.001640762	5.98185E-05	-27.42903059	0.023199432	0
FR_CC1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	(Intercept)	15.98998892	0.731816022	21.84973879	0.029115947	0
FR_CC1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	Date	-0.001146844	4.18113E-05	-27.42903059	0.023199432	0
FR_CC1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	(Intercept)	15.98998892	0.731816022	21.84973879	0.029115947	0
FR_CC1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	Date	-0.001146844	4.18113E-05	-27.42903059	0.023199432	0
FR_CC1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	(Intercept)	15.98998892	0.731816022	21.84973879	0.029115947	0
FR_CC1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	Date	-0.001146844	4.18113E-05	-27.42903059	0.023199432	0
FR_CC1	Parent PAHs	Naphthalene (%)_Parent PAHs	(Intercept)	4.548070594	-	-	-	0
FR_CC1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	(Intercept)	2.76933915	9.688645807	0.28583346	0.822758794	0
FR_CC1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	Date	-0.000347078	0.000553548	-0.627005759	0.643467234	0
FR_CC1	Parent PAHs	Phenanthrene (%)_Parent PAHs	(Intercept)	2.932385382	0.614399905	4.772763405	0.131483981	0
FR_CC1	Parent PAHs	Phenanthrene (%)_Parent PAHs	Date	9.7804E-05	3.51029E-05	2.786207608	0.219373451	0
FR_CC1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	(Intercept)	6.933936785	1.894450399	3.66013108	0.169789845	0
FR_CC1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	Date	-0.000599985	0.000108237	-5.543262648	0.113623615	0
FR_CC1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	(Intercept)	15.98998892	0.731816022	21.84973879	0.029115947	0
FR_CC1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	Date	-0.001146844	4.18113E-05	-27.42903059	0.023199432	0
FR_CC1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	(Intercept)	-2.995732274	6.99501E-16	-4.28267E+15	1.4865E-16	0
FR_CC1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	Date	1.0962E-18	3.99651E-20	27.42903059	0.023199432	1
FR_CC1	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	6.276833125	1.891555504	3.318344669	0.001289112	0
FR_CC1	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000643245	0.000112548	-5.71528295	1.284E-07	0
FR_CC1	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	1.216099063	0.98926512	1.229295401	0.222029345	0
FR_CC1	Total Metals	Antimony (mg/L)_Total Metals	Date	-0.000468627	5.88616E-05	-7.961499886	3.84508E-12	0
FR_CC1	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-3.012134406	0.889538217	-3.386177623	0.001035966	0
FR_CC1	Total Metals	Arsenic (mg/L)_Total Metals	Date	-0.000329473	5.29278E-05	-6.224959725	1.33537E-08	0
FR_CC1	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	10.82502537	1.266821346	8.545029182	2.26693E-13	0
FR_CC1	Total Metals	Barium (mg/L)_Total Metals	Date	-0.00079177	7.53763E-05	-10.50423538	1.56589E-17	0
FR_CC1	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	3.211489931	0.85006087	3.777952903	0.000277241	0
FR_CC1	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000782009	5.05789E-05	-15.46117768	1.45766E-27	0
FR_CC1	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	9.562621291	1.256743349	7.609048654	2.09274E-11	0
FR_CC1	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001102	7.47766E-05	-14.7372267	3.59298E-26	0
FR_CC1	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-1.871054829	0.650654359	-2.875650953	0.00498768	0
FR_CC1	Total Metals	Boron (mg/L)_Total Metals	Date	-0.000105935	3.87141E-05	-2.736331834	0.007428674	0
FR_CC1	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-12.09810041	1.928212035	-6.274258321	1.06858E-08	0
FR_CC1	Total Metals	Cadmium (mg/L)_Total Metals	Date	0.000223868	0.000114729	1.951268876	0.054002336	0
FR_CC1	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	1.257392133	0.317987398	3.954220015	0.000148747	0
FR_CC1	Total Metals	Calcium (mg/L)_Total Metals	Date	0.000230113	1.89204E-05	12.16217133	5.28183E-21	1
FR_CC1	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-5.733013479	0.824185353	-6.955975932	4.61645E-10	0
FR_CC1	Total Metals	Chromium (mg/L)_Total Metals	Date	-0.000190627	4.90393E-05	-3.887232577	0.00018885	0
FR_CC1	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	6.252502827	1.397398924	4.474386462	2.14635E-05	0
FR_CC1	Total Metals	Cobalt (mg/L)_Total Metals	Date	-0.000833072	8.31457E-05	-10.01942689	1.67118E-16	0
FR_CC1	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-6.122528619	0.746605447	-8.200487473	1.21002E-12	0
FR_CC1	Total Metals	Copper (mg/L)_Total Metals	Date	-7.75127E-05	4.44233E-05	-1.744867978	0.084276062	0
FR_CC1	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	5.411207821	1.196409876	4.522871241	1.77941E-05	0
FR_CC1	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000561449	7.11868E-05	-7.886990379	5.5076E-12	0
FR_CC1	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-8.488639776	0.720631789	-11.77944119	3.28297E-20	0
FR_CC1	Total Metals	Lead (mg/L)_Total Metals	Date	-7.62151E-05	4.28778E-05	-1.777494131	0.07872116	0
FR_CC1	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-7.61098232	0.812318315	-9.369457983	4.0286E-15	0
FR_CC1	Total Metals	Lithium (mg/L)_Total Metals	Date	0.00034715	4.83332E-05	7.18242987	1.59157E-10	1
FR_CC1	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	-0.526119212	0.342105614	-1.537885352	0.127436118	0
FR_CC1	Total Metals	Magnesium (mg/L)_Total Metals	Date	0.000293921	2.03554E-05	14.43946676	1.36789E-25	1
FR_CC1	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	3.279023193	1.433672625	2.287149196	0.024430622	0
FR_CC1	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.00052765	8.5304E-05	-6.185526711	1.59522E-08	0
FR_CC1	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	12.23261424	1.315771803	9.296911676	5.7472E-15	0
FR_CC1	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001505	7.82888E-05	-19.22368542	2.47033E-34	0
FR_CC1	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	-10.44821473	-	-	-	0
FR_CC1	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	0.277809963	0.826326079	0.336198954	0.737470171	0
FR_CC1	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-0.000333805	4.91667E-05	-6.789252118	1.00489E-09	0
FR_CC1	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-5.388978168	0.487778518	-11.04800227	1.11423E-18	0
FR_CC1	Total Metals	Nickel (mg/L)_Total Metals	Date	0.000125182	2.9023E-05	4.313203059	3.96969E-05	1
FR_CC1	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	1.046149467	0.509654795	2.052662854	0.042884758	0
FR_CC1	Total Metals	Potassium (mg/L)_Total Metals	Date	2.96656E-05	3.03246E-05	0.978266837	0.330453381	0
FR_CC1	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-7.4023984	0.522595932	-14.164669	4.74255E-25	0
FR_CC1	Total Metals	Selenium (mg/L)_Total Metals	Date	0.000315101	3.10946E-05	10.13361472	9.5615E-17	1
FR_CC1	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	2.038649789	0.360427596	5.656197834	1.69579E-07	0
FR_CC1	Total Metals	Silicon (mg/L)_Total Metals	Date	-9.33183E-05	2.14525E-05	-4.349988316	3.48467E-05	0
FR_CC1	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.73461298	0.333250594	-35.21257938	6.10335E-56	0
FR_CC1	Total Metals	Silver (mg/L)_Total Metals	Date	1.61234E-05	1.98285E-05	0.813140517	0.41819231	0
FR_CC1	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	1.74717329	0.804906779	2.17065297	0.03247659	0
FR_CC1	Total Metals	Sodium (mg/L)_Total Metals	Date	-1.09231E-05	4.78922E-05	-0.228076056	0.820082509	0
FR_CC1	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-2.670810782	0.432841399	-6.170414352	1.70752E-08	0
FR_CC1	Total Metals	Strontium (mg/L)_Total Metals	Date	8.39958E-05	2.57542E-05	3.261439805	0.001545101	1
FR_CC1	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-10.56669709	0.648938558	-16.28304708	4.15215E-29	0
FR_CC1	Total Metals	Thallium (mg/L)_Total Metals	Date	1.45701E-05	3.86121E-05	0.37734661	0.706766652	0
FR_CC1	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.520209544	0.639859016	-14.87860498	1.91177E-26	0
FR_CC1	Total Metals	Tin (mg/L)_Total Metals	Date	2.21456E-05	3.80718E-05	0.581679531	0.56217493	0
FR_CC1	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-2.675533184	0.463725005	-5.769654758	1.0124E-07	0
FR_CC1	Total Metals	Titanium (mg/L)_Total Metals	Date	-0.000106868	2.75918E-05	-3.873176786	0.000198486	0
FR_CC1	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-13.43495471	0.472802379	-28.41558184	6.20108E-48	0
FR_CC1	Total Metals	Uranium (mg/L)_Total Metals	Date	0.000504338	2.81319E-05	17.92761083	4.3425E-32	1
FR_CC1	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-1.699994814	0.534034482	-3.183305335	0.001974658	0
FR_CC1	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000331686	3.17752E-05	-10.43852307	2.15729E-17	0
FR_CC1	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-5.761778341	1.258150726	-4.579561274	1.42708E-05	0
FR_CC1	Total Metals	Zinc (mg/L)_Total Metals	Date	9.36894E-05	7.48604E-05	1.251521428	0.213849866	0
FR_CC1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	(Intercept)	5.061616769	-	-	-	0
FR_CC1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	Date	-2.9628E-05	-	-	-	0
FR_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	1.33262E-15	-1.04028E+15	2.0032E-103	0
FR_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	1.08789E-19	7.82656E-20	1.39000023	0.207127355	0
FR_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	1.9923E-15	-6.95825E+14	1.1636E-73	0
FR_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	-4.24543E-19	1.15113E-19	-3.688059715	0.014174209	0
FR_CC1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	5.67682E-14	-2.44203E+13	2.60693E-14	0
FR_CC1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	6.33868E-18	3.58008E-18	1.770540826	0.327308061	0
FR_CC1	Volatile Organics	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_CC1	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_CC1	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	Date	-3.13079E-19	-	-	-	0
FR_CC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-0.693147181	6.78511E-16	-1.02157E+15	5.50905E-60	0
FR_CC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Date	4.30224E-19	3.85895E-20	11.14872533	0.00036839	1
FR_CC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	1.17938E-15	-1.17545E+15	8.5183E-104	0
FR_CC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	9.90912E-20	6.9697E-20	1.421743743	0.198088275	0
FR_FC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.459797855	1.871338066	0.245705393	0.807702433	0
FR_FC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	-9.62796E-06	0.000114343	-0.084202227	0.933494798	0
FR_FC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.858442423	0.292955312	16.58424416	5.16826E-16	0
FR_FC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	3.21573E-06	1.79003E-05	0.179646972	0.858723494	0
FR_FC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-6.146360345	2.417014621	-2.542955385	0.01680257	0
FR_FC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000388531	0.000147686	2.630797845	0.013692091	1
FR_FC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	5.420709114	0.974411988	5.563056672	5.96768E-06	0
FR_FC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	4.07386E-05	5.9539E-05	0.684234386	0.499451702	0
FR_FC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-1.635293358	1.372807464	-1.19120372	0.243573763	0
FR_FC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	7.54856E-05	8.38819E-05	0.899902839	0.375846766	0
FR_FC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.44639517	1.003937318	5.425035081	8.68837E-06	0
FR_FC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	2.21674E-06	6.1343E-05	0.036136787	0.971429693	0
FR_FC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0	0	-	-	0
FR_FC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0	0	-	-	0
FR_FC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	7.609511307	0.811617751	9.375732973	3.91599E-10	0
FR_FC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-9.90562E-05	4.95918E-05	-1.997430173	0.055579067	0
FR_FC1	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.150554418	0.061061973	35.21920946	9.8552E-25	0
FR_FC1	Conventional Parameters	pH (-)_Conventional Parameters	Date	-2.79622E-06	3.73104E-06	-0.749448041	0.459837928	0
FR_FC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.651598173	0.265579716	17.51488495	1.27608E-16	0
FR_FC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	1.62579E-05	1.62276E-05	1.001869383	0.324986783	0
FR_FC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	5.177979586	1.122941589	4.611085419	8.02688E-05	0
FR_FC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	3.0177E-05	6.86145E-05	0.439804875	0.66345456	0
FR_FC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	-1.151059677	1.411969628	-0.815215607	0.421829393	0
FR_FC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	5.27257E-05	8.62748E-05	0.611137156	0.546038679	0
FR_FC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	8.4683787	2.314089876	3.659485652	0.001038688	0
FR_FC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-0.00047399	0.000141397	-3.352200376	0.002309912	0
FR_FC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	-1.718744861	2.406048531	-0.714343389	0.480928217	0
FR_FC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	1.81294E-05	0.000147015	0.123316357	0.902737529	0
FR_FC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-2.527576449	1.338247384	-1.888721382	0.069328802	0
FR_FC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-0.000207215	8.17702E-05	-2.53411084	0.017149596	0
FR_FC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-9.135259581	0.222886496	-40.98615098	1.5265E-26	0
FR_FC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	-3.45977E-06	1.36189E-05	-0.254041286	0.80131998	0
FR_FC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-9.289470536	0.075077747	-123.7313441	6.83163E-40	0
FR_FC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	5.03365E-06	4.58743E-06	1.09726848	0.281871235	0
FR_FC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-3.449127374	0.891621492	-3.868376217	0.000597381	0
FR_FC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	4.50553E-05	5.44803E-05	0.827003224	0.415227758	0
FR_FC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	7.111693512	1.180225699	6.025706367	1.70783E-06	0
FR_FC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.001031013	7.21147E-05	-14.29686011	2.15427E-14	0
FR_FC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	15.7506488	1.688521241	9.328072642	4.36794E-10	0
FR_FC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001475047	0.000103173	-14.29686011	2.15427E-14	0
FR_FC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.521562081	0.075150458	-60.16679318	3.69333E-31	0
FR_FC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-4.91891E-06	4.59188E-06	-1.071220398	0.29321741	0
FR_FC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-10.56142123	0.796116845	-13.26616979	1.34871E-13	0
FR_FC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-5.64133E-05	4.86447E-05	-1.159702133	0.255964072	0
FR_FC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-5.445913893	1.126706876	-4.833478882	4.3726E-05	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_FC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-0.000213495	6.88445E-05	-3.101111782	0.004367568	0
FR_FC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-9.210340372	3.04601E-14	-3.02374E+14	0	0
FR_FC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	2.34085E-18	1.86119E-18	1.25771714	0.218882759	0
FR_FC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-3.795602715	1.181845063	-3.211590787	0.003306645	0
FR_FC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-0.000240192	7.22136E-05	-3.326128318	0.00246968	0
FR_FC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	7.059595526	1.280593996	5.512750759	6.84258E-06	0
FR_FC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000679786	7.82474E-05	-8.687652211	1.95108E-09	0
FR_FC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-9.903487553	1.523E-14	-6.5026E+14	0	0
FR_FC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	1.17042E-18	9.30593E-19	1.25771714	0.218882759	0
FR_FC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-5.859718547	0.542173151	-10.80783609	1.68576E-11	0
FR_FC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	3.70955E-05	3.31281E-05	1.11975871	0.272330287	0
FR_FC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-10.36036024	3.563850979	-2.90706887	0.007059962	0
FR_FC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	0.000185088	0.00021776	0.849963021	0.402555241	0
FR_FC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-4.483408091	0.508295542	-8.820474942	1.42407E-09	0
FR_FC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000444033	3.10581E-05	-14.29686011	2.15427E-14	0
FR_FC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-6.967327405	0.467151297	-14.91449868	7.52888E-15	0
FR_FC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	-1.39816E-05	2.85441E-05	-0.489824926	0.628073766	0
FR_FC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-7.60090246	0	-Inf	0	0
FR_FC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	0	0	-	-	0
FR_FC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-3.906532735	2.363338128	-1.652972416	0.10950734	0
FR_FC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	-1.75286E-05	0.000144406	-0.121384046	0.904253792	0
FR_FC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	-0.001707471	0.339675787	-0.005026768	0.996024881	0
FR_FC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	2.70921E-05	2.0755E-05	1.305327361	0.202406397	0
FR_FC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.51292546	1.523E-14	-7.55935E+14	0	0
FR_FC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	1.17042E-18	9.30593E-19	1.25771714	0.218882759	0
FR_FC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-2.093031665	1.021690676	-2.048596227	0.049980262	0
FR_FC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	-5.0658E-06	6.24278E-05	-0.081146515	0.935902699	0
FR_FC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.51292546	1.523E-14	-7.55935E+14	0	0
FR_FC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	1.17042E-18	9.30593E-19	1.25771714	0.218882759	0
FR_FC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.210340372	3.04601E-14	-3.02374E+14	0	0
FR_FC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	2.34085E-18	1.86119E-18	1.25771714	0.218882759	0
FR_FC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-4.412566389	0.330825421	-13.33805117	1.18274E-13	0
FR_FC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-1.07582E-05	2.02142E-05	-0.532207877	0.598780197	0
FR_FC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-7.386716153	0.959828753	-7.695868797	2.20334E-08	0
FR_FC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	1.66526E-05	5.86479E-05	0.283941819	0.778544127	0
FR_FC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	0.121762095	0.508295542	0.239549799	0.812424226	0
FR_FC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000444033	3.10581E-05	-14.29686011	2.15427E-14	0
FR_FC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	-1.20547963	1.431292137	-0.842231714	0.406794952	0
FR_FC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000290123	8.74554E-05	-3.317377958	0.00252565	0
FR_FC1	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	5.943981298	1.321423449	4.498165447	0.00017867	0
FR_FC1	Field Measured	Conductivity (µS/cm)_Field Measured	Date	3.62675E-06	8.05846E-05	0.045005568	0.96450889	0
FR_FC1	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	4.47398109	0.330575914	13.53389916	7.68347E-12	0
FR_FC1	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-5.47865E-06	2.01375E-05	-0.272062039	0.788231256	0
FR_FC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	2.721237957	0.588182324	4.626521138	0.000145404	0
FR_FC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-2.33303E-05	3.58299E-05	-0.651140672	0.522017775	0
FR_FC1	Field Measured	pH (-)_Field Measured	(Intercept)	2.174482726	0.094042624	23.12231013	6.29695E-17	0
FR_FC1	Field Measured	pH (-)_Field Measured	Date	-6.31497E-06	5.73502E-06	-1.101125449	0.282744153	0
FR_FC1	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	-7.995732274	9.51878E-15	-3.14718E+14	0	0
FR_FC1	Major Ions	Bromide (mg/L)_Major Ions	Date	-7.31514E-19	5.81621E-19	-1.25771714	0.218882759	0
FR_FC1	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	4.396621101	0.987898033	4.450480671	0.000124334	0
FR_FC1	Major Ions	Calcium (mg/L)_Major Ions	Date	-1.44228E-05	6.0363E-05	-0.238934338	0.812896728	0
FR_FC1	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	11.04026072	1.59106778	6.938900319	1.52377E-07	0
FR_FC1	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000693989	9.72181E-05	-7.138474922	9.09107E-08	0
FR_FC1	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-0.39538893	0.525216973	-0.752810648	0.457846741	0
FR_FC1	Major Ions	Fluoride (mg/L)_Major Ions	Date	-7.29016E-05	3.2092E-05	-2.271641105	0.030988545	0
FR_FC1	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	2.409982959	1.048871516	2.297691302	0.02926084	0
FR_FC1	Major Ions	Magnesium (mg/L)_Major Ions	Date	3.43309E-05	6.40886E-05	0.535678296	0.59641073	0
FR_FC1	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	11.03485852	1.491088513	7.400538886	4.6469E-08	0
FR_FC1	Major Ions	Potassium (mg/L)_Major Ions	Date	-0.000669492	9.11092E-05	-7.348235442	5.3094E-08	0
FR_FC1	Major Ions	Silica (mg/L)_Major Ions	(Intercept)	1.068153081	-	-	-	0
FR_FC1	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	10.62359386	1.657527357	6.409302275	6.12784E-07	0
FR_FC1	Major Ions	Sodium (mg/L)_Major Ions	Date	-0.00064453	0.000101279	-6.363908115	6.91331E-07	0
FR_FC1	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	3.387579001	2.097079219	1.615379606	0.117442246	0
FR_FC1	Major Ions	Sulphate (mg/L)_Major Ions	Date	6.51729E-05	0.000128137	0.508620261	0.615002863	0
FR_FC1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-6.907755279	-	-	-	0
FR_FC1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-2.05914E-17	-	-	-	0
FR_FC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	3.63622E-15	-3.31106E+14	4.0419E-224	0
FR_FC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	3.86734E-19	2.29558E-19	1.68469299	0.111450412	0
FR_FC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	4.231953622	2.244648574	1.88535242	0.069798354	0
FR_FC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000182062	0.000137154	-1.327428786	0.19508908	0
FR_FC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-4.389814733	1.498601341	-2.929274527	0.006686365	0
FR_FC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000138562	9.15682E-05	-1.513208393	0.14143349	0
FR_FC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-6.786707257	0.924829807	-7.338331019	5.44531E-08	0
FR_FC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	9.64456E-05	5.65094E-05	1.706718885	0.09894312	0
FR_FC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-12.40172376	2.069869546	-5.991548496	1.87215E-06	0
FR_FC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000604771	0.000126474	4.781780759	5.03626E-05	1
FR_FC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-9.925073636	1.437131522	-6.906169325	2.48086E-07	0
FR_FC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.00019512	8.76663E-05	2.225718985	0.03491513	1
FR_FC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	211.633287	-	-	-	0
FR_FC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.014006809	-	-	-	0
FR_FC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.998158853	5.838534282	-0.342236383	0.734728685	0
FR_FC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000218256	0.000356749	-0.611793012	0.545610782	0
FR_FC1	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	-0.497631423	4.038858496	-0.123210908	0.902820264	0
FR_FC1	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000269182	0.000246784	-1.09075882	0.284676913	0
FR_FC1	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-8.4750906	0.617989816	-13.71396483	6.00206E-14	0
FR_FC1	Total Metals	Antimony (mg/L)_Total Metals	Date	-3.89566E-05	3.77607E-05	-1.031669521	0.311056369	0
FR_FC1	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-9.369056479	0.363799338	-25.75336318	4.87866E-21	0
FR_FC1	Total Metals	Arsenic (mg/L)_Total Metals	Date	1.32514E-05	2.2229E-05	0.596128508	0.555878397	0
FR_FC1	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-2.979046592	0.849655861	-3.506180242	0.001551332	0
FR_FC1	Total Metals	Barium (mg/L)_Total Metals	Date	1.5862E-05	5.19161E-05	0.305532633	0.762220474	0
FR_FC1	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	7.111693512	1.180225699	6.025706367	1.70783E-06	0
FR_FC1	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.001031013	7.21147E-05	-14.29686011	2.15427E-14	0
FR_FC1	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	15.7506488	1.688521241	9.328072642	4.36794E-10	0
FR_FC1	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001475047	0.000103173	-14.29686011	2.15427E-14	0
FR_FC1	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-4.23902512	0.205053718	-20.67275421	1.70031E-18	0
FR_FC1	Total Metals	Boron (mg/L)_Total Metals	Date	-2.13552E-05	1.25293E-05	-1.704420786	0.099376629	0
FR_FC1	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-13.93534453	3.798107587	-3.669023116	0.001012941	0
FR_FC1	Total Metals	Cadmium (mg/L)_Total Metals	Date	0.000169408	0.000232074	0.729974945	0.471469055	0
FR_FC1	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.483350277	0.998625932	4.489519182	0.000111801	0
FR_FC1	Total Metals	Calcium (mg/L)_Total Metals	Date	-1.93626E-05	6.10185E-05	-0.317323429	0.753352405	0
FR_FC1	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-10.03902668	4.585803029	-2.189153486	0.037084256	0
FR_FC1	Total Metals	Chromium (mg/L)_Total Metals	Date	9.30786E-05	0.000280204	0.332181956	0.74222585	0
FR_FC1	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-9.210340372	3.04601E-14	-3.02374E+14	0	0
FR_FC1	Total Metals	Cobalt (mg/L)_Total Metals	Date	2.34085E-18	1.86119E-18	1.25771714	0.218882759	0
FR_FC1	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-8.833114271	1.436793849	-6.147795158	1.23075E-06	0
FR_FC1	Total Metals	Copper (mg/L)_Total Metals	Date	7.97145E-05	8.77916E-05	0.907997113	0.37162885	0
FR_FC1	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	3.932190173	3.441093464	1.142715307	0.26283408	0
FR_FC1	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000469218	0.000210259	-2.231617623	0.033823203	0
FR_FC1	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-9.560461973	0.876255916	-10.91058194	1.3586E-11	0
FR_FC1	Total Metals	Lead (mg/L)_Total Metals	Date	-1.65106E-05	5.35414E-05	-0.308370759	0.760082806	0
FR_FC1	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-5.183894567	0.573754329	-9.035042187	8.60544E-10	0
FR_FC1	Total Metals	Lithium (mg/L)_Total Metals	Date	-2.75634E-06	3.50578E-05	-0.078622789	0.937891861	0
FR_FC1	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	2.923600208	1.012788112	2.886684959	0.007420218	0
FR_FC1	Total Metals	Magnesium (mg/L)_Total Metals	Date	3.06321E-06	6.18838E-05	0.049499306	0.960872804	0
FR_FC1	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-9.469082114	4.122902362	-2.296702974	0.029324761	0
FR_FC1	Total Metals	Manganese (mg/L)_Total Metals	Date	0.000172463	0.000251919	0.684596849	0.499226356	0
FR_FC1	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	-1.39225473	1.807956806	-0.770070792	0.447706678	0
FR_FC1	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.000637238	0.000110471	-5.768391941	3.41905E-06	0
FR_FC1	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-7.089156111	0.470689027	-15.06123089	5.89438E-15	0
FR_FC1	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-4.60481E-06	2.87603E-05	-0.160110121	0.873943817	0
FR_FC1	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-8.116128844	0.488840589	-16.6028129	5.02286E-16	0
FR_FC1	Total Metals	Nickel (mg/L)_Total Metals	Date	3.27747E-05	2.98694E-05	1.09726848	0.281871235	0
FR_FC1	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	11.38339888	1.409805784	8.074444727	8.60313E-09	0
FR_FC1	Total Metals	Potassium (mg/L)_Total Metals	Date	-0.000690925	8.61426E-05	-8.020712267	9.8206E-09	0
FR_FC1	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-3.303537295	2.265317871	-1.458310702	0.155881716	0
FR_FC1	Total Metals	Selenium (mg/L)_Total Metals	Date	-5.47583E-05	0.000138416	-0.395605608	0.695394214	0
FR_FC1	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	0.366951234	0.389602639	0.941860238	0.354320056	0
FR_FC1	Total Metals	Silicon (mg/L)_Total Metals	Date	5.10599E-06	2.38057E-05	0.214486441	0.831722178	0
FR_FC1	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.492253	0.07660348	-150.0225971	3.1261E-42	0
FR_FC1	Total Metals	Silver (mg/L)_Total Metals	Date	-1.06997E-06	4.68066E-06	-0.228593143	0.820846491	0
FR_FC1	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	11.0699329	1.581194943	7.000991843	1.29695E-07	0
FR_FC1	Total Metals	Sodium (mg/L)_Total Metals	Date	-0.000672138	9.66149E-05	-6.956874646	1.45425E-07	0
FR_FC1	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-1.683846729	1.016735852	-1.656129983	0.108861678	0
FR_FC1	Total Metals	Strontium (mg/L)_Total Metals	Date	-2.89273E-05	6.2125E-05	-0.465630911	0.645081364	0
FR_FC1	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-11.51292546	1.523E-14	-7.55935E+14	0	0
FR_FC1	Total Metals	Thallium (mg/L)_Total Metals	Date	1.17042E-18	9.30593E-19	1.25771714	0.218882759	0
FR_FC1	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-11.75556088	2.642600067	-4.448482775	0.000125012	0
FR_FC1	Total Metals	Tin (mg/L)_Total Metals	Date	0.000163007	0.000161469	1.009523782	0.321368401	0
FR_FC1	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-4.304972993	0.384123081	-11.20727496	7.33883E-12	0
FR_FC1	Total Metals	Titanium (mg/L)_Total Metals	Date	-1.70124E-05	2.34709E-05	-0.724830288	0.474570261	0
FR_FC1	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-7.310536882	0.932928872	-7.836113877	1.55185E-08	0
FR_FC1	Total Metals	Uranium (mg/L)_Total Metals	Date	1.35723E-05	5.70042E-05	0.238093406	0.813542446	0
FR_FC1	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-0.872054683	0.643788722	-1.354566574	0.186386076	0
FR_FC1	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.0003811	3.93371E-05	-9.688071292	1.92829E-10	0
FR_FC1	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-5.80914299	2.66526E-14	-2.17958E+14	0	0
FR_FC1	Total Metals	Zinc (mg/L)_Total Metals	Date	-2.04824E-18	1.62854E-18	-1.25771714	0.218882759	0
FR_FC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FC1	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.490861358	0.423654223	1.158636764	0.250432826	0
FR_FR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	-2.45718E-05	2.51115E-05	-0.978508189	0.33109949	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_FR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.674910948	0.528380186	8.847627276	4.0144E-13	0
FR_FR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	1.04738E-05	3.13189E-05	0.334422657	0.739032862	0
FR_FR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.552412775	1.823649925	-0.302916019	0.762827335	0
FR_FR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	7.15226E-05	0.000108094	0.661669868	0.510294914	0
FR_FR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	5.639425411	0.793226632	7.109475635	6.94141E-10	0
FR_FR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	2.25875E-05	4.70173E-05	0.480408741	0.632393241	0
FR_FR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-0.768263221	1.029525097	-0.746230688	0.457957702	0
FR_FR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	3.79981E-05	6.10235E-05	0.622678805	0.535462858	0
FR_FR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.309141109	0.859681767	6.175705141	3.51259E-08	0
FR_FR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	6.1658E-06	5.09563E-05	0.121001556	0.904026854	0
FR_FR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.195782997	0.187412904	1.044661241	0.299674275	0
FR_FR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-1.10634E-05	1.11086E-05	-0.995926289	0.32262133	0
FR_FR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	6.798034379	0.432292207	15.72555384	5.47913E-25	0
FR_FR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-5.20554E-05	2.56235E-05	-2.031553736	0.04589044	0
FR_FR1	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.116242791	0.035787712	59.13322462	8.90249E-63	0
FR_FR1	Conventional Parameters	pH (-)_Conventional Parameters	Date	-1.76729E-07	2.12126E-06	-0.083312988	0.933833872	0
FR_FR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.652197019	0.529255629	8.790075646	5.13901E-13	0
FR_FR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	1.28074E-05	3.13708E-05	0.408257653	0.684296132	0
FR_FR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	5.31554028	0.866501735	6.134483136	4.16486E-08	0
FR_FR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	1.76956E-05	5.13606E-05	0.344535717	0.731447778	0
FR_FR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	0.382670556	1.212911126	0.315497605	0.753296535	0
FR_FR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-1.89881E-05	7.18935E-05	-0.264113761	0.792446777	0
FR_FR1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	6.258224026	1.922866839	3.254632041	0.001731217	0
FR_FR1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-0.000323256	0.000113975	-2.836197317	0.005924064	0
FR_FR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	0.491159259	2.744250495	0.17897756	0.85845801	0
FR_FR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-4.17674E-05	0.000162661	-0.256775291	0.798084578	0
FR_FR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-5.93880703	1.329466228	-4.46706122	2.88229E-05	0
FR_FR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	2.10128E-05	7.88021E-05	0.266653249	0.790498368	0
FR_FR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-9.208412902	0.055690974	-165.3483891	1.17591E-94	0
FR_FR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	1.08269E-07	3.301E-06	0.032798725	0.973925849	0
FR_FR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-9.304237171	0.221532745	-41.99937654	2.21418E-52	0
FR_FR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	6.80909E-06	1.3131E-05	0.518550482	0.605664309	0
FR_FR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-3.276200073	0.541407823	-6.051261056	5.86859E-08	0
FR_FR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	4.59945E-06	3.20911E-05	0.143324786	0.886434051	0
FR_FR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	4.008279021	0.92843476	4.317243596	4.96112E-05	0
FR_FR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000832252	5.50316E-05	-15.12318236	4.78609E-24	0
FR_FR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	9.781000392	1.415900725	6.907970467	1.63307E-09	0
FR_FR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001116522	8.39254E-05	-13.30374614	4.41539E-21	0
FR_FR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.476052912	0.043546863	-102.7870337	7.43746E-80	0
FR_FR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-7.39436E-06	2.58117E-06	-2.864728655	0.005466008	0
FR_FR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-12.11615884	0.844871694	-14.34082705	8.55943E-23	0
FR_FR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	5.4158E-05	5.00785E-05	1.081461926	0.283100632	0
FR_FR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-7.118041931	0.508415675	-14.0004376	3.07591E-22	0
FR_FR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-0.000114478	3.01356E-05	-3.798754496	0.000301192	0
FR_FR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-9.210340372	4.48636E-14	-2.05296E+14	0	0
FR_FR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	4.53244E-18	2.65922E-18	1.704422022	0.092614343	0
FR_FR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-6.675361283	0.67843659	-9.839329686	5.82978E-15	0
FR_FR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-5.90438E-05	4.02133E-05	-1.468265785	0.146387429	0
FR_FR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	2.68614786	0.73842794	3.6376574	0.000513837	0
FR_FR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000416787	4.37692E-05	-9.522376553	2.24127E-14	0
FR_FR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-9.908606918	0.071417592	-138.7418232	3.46116E-89	0
FR_FR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	5.14237E-07	4.23317E-06	0.121478084	0.903650771	0
FR_FR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-6.915873795	1.054127213	-6.560758235	7.06061E-09	0
FR_FR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	9.22329E-05	6.24818E-05	1.476156454	0.1442622	0
FR_FR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-0.506397529	2.304517338	-0.219741254	0.826694487	0
FR_FR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	-0.00036559	0.000136597	-2.676417366	0.009208179	0
FR_FR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-6.280451325	0.426228589	-14.73493681	1.98278E-23	0
FR_FR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000336107	2.52641E-05	-13.30374614	4.41539E-21	0
FR_FR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-7.515540825	0.528442049	-14.2220719	1.33514E-22	0
FR_FR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	1.81202E-05	3.13226E-05	0.578503412	0.564729543	0
FR_FR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-6.885866726	0.721711284	-9.541026828	2.07016E-14	0
FR_FR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	-2.47876E-05	4.27783E-05	-0.579442515	0.564099289	0
FR_FR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-5.478027481	1.671634503	-3.277048583	0.001616049	0
FR_FR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	6.59114E-05	9.90836E-05	0.665209654	0.508041719	0
FR_FR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.487639596	0.330658201	1.474754276	0.144638081	0
FR_FR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	-5.53822E-06	1.95993E-05	-0.282572684	0.778315173	0
FR_FR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.51292546	1.6314E-14	-7.05706E+14	0	0
FR_FR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	1.64816E-18	9.6699E-19	1.704422022	0.092614343	0
FR_FR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-2.656912464	0.786032672	-3.380155254	0.001173123	0
FR_FR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	2.06882E-05	4.65909E-05	0.444039014	0.658346085	0
FR_FR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.47199513	0.049426452	-232.1023374	3.0635E-105	0
FR_FR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	-2.2829E-06	2.92968E-06	-0.779231931	0.438396871	0
FR_FR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.55118373	0.222908708	-42.8479614	5.53943E-53	0
FR_FR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	2.08962E-05	1.32126E-05	1.581542202	0.118137383	0
FR_FR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-4.219932375	0.181568048	-23.24160232	3.42516E-35	0
FR_FR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-2.18042E-05	1.07622E-05	-2.026004448	0.046470464	0
FR_FR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-7.900323784	1.010851321	-7.815515124	3.3872E-11	0
FR_FR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	4.76368E-05	5.99167E-05	0.795050974	0.429196972	0
FR_FR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-1.675281139	0.426228589	-3.930475764	0.000192749	0
FR_FR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000336107	2.52641E-05	-13.30374614	4.41539E-21	0
FR_FR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	1.395683023	0.734549114	1.900054056	0.061430624	0
FR_FR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000447461	4.35393E-05	-10.27717495	9.18243E-16	0
FR_FR1	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	5.798397509	0.996110503	5.821038421	1.96211E-07	0
FR_FR1	Field Measured	Conductivity (µS/cm)_Field Measured	Date	5.79742E-06	5.85925E-05	0.098944771	0.921486635	0
FR_FR1	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	5.360117763	0.208834752	25.66679016	2.11901E-35	0
FR_FR1	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-5.33425E-05	1.22731E-05	-4.346293983	5.05708E-05	0
FR_FR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	3.149528152	0.315615658	9.97899843	1.14593E-14	0
FR_FR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-4.42241E-05	1.85485E-05	-2.384236561	0.020089882	0
FR_FR1	Field Measured	pH (-)_Field Measured	(Intercept)	2.138781965	0.049942372	42.82499803	2.33838E-49	0
FR_FR1	Field Measured	pH (-)_Field Measured	Date	-1.19254E-06	2.93767E-06	-0.405946892	0.686114926	0
FR_FR1	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	-2.179826965	0.608586878	-3.581784369	0.000616492	0
FR_FR1	Major Ions	Bromide (mg/L)_Major Ions	Date	-4.58405E-05	3.60731E-05	-1.270769485	0.207901296	0
FR_FR1	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	4.341488248	0.777606337	5.583144119	3.93396E-07	0
FR_FR1	Major Ions	Calcium (mg/L)_Major Ions	Date	-1.58964E-05	4.60914E-05	-0.344888567	0.731183609	0
FR_FR1	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	6.940302691	1.107201862	6.268326427	2.39305E-08	0
FR_FR1	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000436656	6.56277E-05	-6.653537039	4.78142E-09	0
FR_FR1	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-0.761999522	0.690633768	-1.103333717	0.273556336	0
FR_FR1	Major Ions	Fluoride (mg/L)_Major Ions	Date	-4.87296E-05	4.09363E-05	-1.190376113	0.237808655	0
FR_FR1	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	2.147771033	1.029448149	2.086332406	0.040491285	0
FR_FR1	Major Ions	Magnesium (mg/L)_Major Ions	Date	4.64692E-05	6.1019E-05	0.761552556	0.4488144	0
FR_FR1	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	6.611969595	0.961720822	6.875144476	1.8766E-09	0
FR_FR1	Major Ions	Potassium (mg/L)_Major Ions	Date	-0.000407096	5.70045E-05	-7.141468724	6.05775E-10	0
FR_FR1	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	5.907590543	1.06717371	5.535734707	4.7567E-07	0
FR_FR1	Major Ions	Sodium (mg/L)_Major Ions	Date	-0.000365967	6.32551E-05	-5.785565648	1.73808E-07	0
FR_FR1	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	3.067909674	1.494794415	2.05239573	0.043767258	0
FR_FR1	Major Ions	Sulphate (mg/L)_Major Ions	Date	7.71419E-05	8.86017E-05	0.870660203	0.386833407	0
FR_FR1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-36.30001166	12.10084054	-2.99979258	0.039950139	0
FR_FR1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.001837814	0.0007537	2.438390384	0.071332132	0
FR_FR1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	4.9996E-15	-2.40814E+14	3.9397E-303	0
FR_FR1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-5.02716E-19	3.15167E-19	-1.595080462	0.124960595	0
FR_FR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	3.961996775	1.55932449	2.540841757	0.013214375	0
FR_FR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	-0.00017547	9.24266E-05	-1.898475018	0.061641441	0
FR_FR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-3.741264434	1.732181227	-2.159857396	0.034114245	0
FR_FR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000130217	0.000102672	-1.26827947	0.20878379	0
FR_FR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-12.41184759	1.628148745	-7.623288492	7.72735E-11	0
FR_FR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.00045778	9.6506E-05	4.743540812	1.03392E-05	1
FR_FR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-11.12121896	1.474435994	-7.542693617	1.09149E-10	0
FR_FR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000536954	8.73949E-05	6.143990145	4.00453E-08	1
FR_FR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-6.354257586	1.10902225	-5.729603337	2.70189E-07	0
FR_FR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-1.87765E-05	6.54636E-05	-0.286822699	0.775146604	0
FR_FR1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	185.199106	41.94283237	4.415512628	0.011551052	0
FR_FR1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.01228658	0.002704723	-4.542638346	0.010476063	0
FR_FR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	7.165543847	2.980928547	2.40379591	0.018801737	0
FR_FR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.00073293	0.00017669	-4.148110645	9.05528E-05	0
FR_FR1	Speciation of Selenium	Total Selenium 4+ (µg/L)_Speciation of Selenium	(Intercept)	-165.513629	-	-	-	0
FR_FR1	Speciation of Selenium	Total Selenium 4+ (µg/L)_Speciation of Selenium	Date	0.01029076	-	-	-	0
FR_FR1	Speciation of Selenium	Total Selenium 6+ (µg/L)_Speciation of Selenium	(Intercept)	-337.5480702	-	-	-	0
FR_FR1	Speciation of Selenium	Total Selenium 6+ (µg/L)_Speciation of Selenium	Date	0.021356289	-	-	-	0
FR_FR1	Speciation of Selenium	Total Selenocyanate (µg/L)_Speciation of Selenium	(Intercept)	30.19288279	-	-	-	0
FR_FR1	Speciation of Selenium	Total Selenocyanate (µg/L)_Speciation of Selenium	Date	-0.002062571	-	-	-	0
FR_FR1	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	1.36753145	2.982353862	0.458540976	0.647944963	0
FR_FR1	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000322748	0.000176774	-1.825762465	0.0720327	0
FR_FR1	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-9.378581915	0.605496831	-15.48906855	1.27604E-24	0
FR_FR1	Total Metals	Antimony (mg/L)_Total Metals	Date	1.31033E-05	3.58899E-05	0.365097126	0.7161092	0
FR_FR1	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-8.299117129	0.602881099	-13.76576101	7.49399E-22	0
FR_FR1	Total Metals	Arsenic (mg/L)_Total Metals	Date	-4.17206E-05	3.57349E-05	-1.167504938	0.246858387	0
FR_FR1	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-2.898004124	0.529782219	-5.470180046	6.17933E-07	0
FR_FR1	Total Metals	Barium (mg/L)_Total Metals	Date	-1.75269E-05	3.1402E-05	-0.558143785	0.578477718	0
FR_FR1	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	4.008279021	0.92843476	4.317243596	4.96112E-05	0
FR_FR1	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000832252	5.50316E-05	-15.12318236	4.78609E-24	0
FR_FR1	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	9.854112275	1.385219245	7.113756405	6.81612E-10	0
FR_FR1	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001120001	8.21068E-05	-13.64079243	1.20753E-21	0
FR_FR1	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-4.516687493	0.060200446	-75.02747591	4.2058E-70	0
FR_FR1	Total Metals	Boron (mg/L)_Total Metals	Date	-4.95214E-06	3.56829E-06	-1.387819693	0.169471947	0
FR_FR1	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-10.49878352	0.909583412	-11.54240873	4.85269E-18	0
FR_FR1	Total Metals	Cadmium (mg/L)_Total Metals	Date	-2.21729E-05	5.39142E-05	-0.411262519	0.68210164	0
FR_FR1	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.644312966	0.794235623	5.847525386	1.35107E-07	0
FR_FR1	Total Metals	Calcium (mg/L)_Total Metals	Date	-3.35986E-05	4.70771E-05	-0.713692015	0.477724793	0
FR_FR1	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-6.504038546	1.105259598	-5.884625259	1.16146E-07	0
FR_FR1	Total Metals	Chromium (mg/L)_Total Metals	Date	-0.000118464	6.55126E-05	-1.808265616	0.074741017	0
FR_FR1	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-8.739384845	0.403772239	-21.64434301	3.06116E-33	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_FR1	Total Metals	Cobalt (mg/L)_Total Metals	Date	-2.45397E-05	2.3933E-05	-1.025350074	0.308630639	0
FR_FR1	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-6.948499878	0.852942955	-8.146500107	8.16819E-12	0
FR_FR1	Total Metals	Copper (mg/L)_Total Metals	Date	-3.31138E-05	5.05569E-05	-0.65498111	0.51456706	0
FR_FR1	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	3.377121349	2.005567393	1.683873282	0.096537202	0
FR_FR1	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000420196	0.000118877	-3.534714236	0.000717812	0
FR_FR1	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-8.316287597	0.818436015	-10.16119457	1.49603E-15	0
FR_FR1	Total Metals	Lead (mg/L)_Total Metals	Date	-8.45714E-05	4.85115E-05	-1.743324442	0.085545706	0
FR_FR1	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-6.638262201	1.017470487	-6.524279854	8.22744E-09	0
FR_FR1	Total Metals	Lithium (mg/L)_Total Metals	Date	7.7587E-05	6.0309E-05	1.286490829	0.202393132	0
FR_FR1	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	2.72850036	1.031698282	2.6446689	0.010031856	0
FR_FR1	Total Metals	Magnesium (mg/L)_Total Metals	Date	1.20658E-05	6.11523E-05	0.197306882	0.844143341	0
FR_FR1	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-0.245658212	1.282099185	-0.191606246	0.848589981	0
FR_FR1	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.000319768	7.59945E-05	-4.20777301	7.33389E-05	0
FR_FR1	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	10.5711842	1.509183058	7.004573864	1.08413E-09	0
FR_FR1	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001398334	8.94545E-05	-15.63178025	7.65476E-25	0
FR_FR1	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	3.393098282	2.797507421	1.212900547	0.311962738	0
FR_FR1	Total Metals	Methyl mercury (µg/L)_Total Metals	Date	-0.000791775	0.000157832	-5.016571272	0.015253422	0
FR_FR1	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-7.066035679	0.415066659	-17.02385755	5.98546E-27	0
FR_FR1	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-6.63123E-06	2.46024E-05	-0.269535314	0.788288738	0
FR_FR1	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-7.041461628	0.869411386	-8.099113656	1.0014E-11	0
FR_FR1	Total Metals	Nickel (mg/L)_Total Metals	Date	-7.38689E-06	5.1533E-05	-0.143342894	0.886419802	0
FR_FR1	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	6.77957923	0.91139769	7.438661853	1.7038E-10	0
FR_FR1	Total Metals	Potassium (mg/L)_Total Metals	Date	-0.000416231	5.40217E-05	-7.704875597	5.44596E-11	0
FR_FR1	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-4.825852196	1.639850769	-2.942860587	0.004373496	0
FR_FR1	Total Metals	Selenium (mg/L)_Total Metals	Date	2.62668E-05	9.71997E-05	0.270235342	0.7877523	0
FR_FR1	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	0.847111964	0.337297824	2.511465844	0.014299804	0
FR_FR1	Total Metals	Silicon (mg/L)_Total Metals	Date	-2.32942E-05	2.00002E-05	-1.164700488	0.248038735	0
FR_FR1	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.5207405	0.150156338	-76.72497002	8.56631E-71	0
FR_FR1	Total Metals	Silver (mg/L)_Total Metals	Date	1.20238E-06	8.90029E-06	0.135094199	0.89291436	0
FR_FR1	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	6.288225874	1.067775101	5.889092066	1.14048E-07	0
FR_FR1	Total Metals	Sodium (mg/L)_Total Metals	Date	-0.000388895	6.32907E-05	-6.144572863	3.9949E-08	0
FR_FR1	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-2.369262942	0.743024616	-3.188673554	0.002116354	0
FR_FR1	Total Metals	Strontium (mg/L)_Total Metals	Date	3.94992E-06	4.40417E-05	0.089686108	0.928785675	0
FR_FR1	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-11.2058609	0.211989574	-52.86043419	2.38746E-59	0
FR_FR1	Total Metals	Thallium (mg/L)_Total Metals	Date	-1.68061E-05	1.25654E-05	-1.337493204	0.185271516	0
FR_FR1	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.39486014	0.174799571	-53.74647145	7.42721E-60	0
FR_FR1	Total Metals	Tin (mg/L)_Total Metals	Date	1.1542E-05	1.0361E-05	1.113989195	0.268988818	0
FR_FR1	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-3.912695087	0.23404619	-16.71761926	1.70468E-26	0
FR_FR1	Total Metals	Titanium (mg/L)_Total Metals	Date	-3.89861E-05	1.38727E-05	-2.810267786	0.006370715	0
FR_FR1	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-7.811737703	0.928203114	-8.41597877	2.56391E-12	0
FR_FR1	Total Metals	Uranium (mg/L)_Total Metals	Date	4.36758E-05	5.50178E-05	0.793847593	0.429892773	0
FR_FR1	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-2.156618571	0.577840375	-3.732204717	0.000376158	0
FR_FR1	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000304404	3.42506E-05	-8.887552556	3.3825E-13	0
FR_FR1	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-5.480460207	0.283991714	-19.29795813	3.57051E-30	0
FR_FR1	Total Metals	Zinc (mg/L)_Total Metals	Date	-1.70575E-05	1.68332E-05	-1.013325278	0.314298048	0
FR_FR1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FR1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	-1.04673E-17	-	-	-	0
FR_FR1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FR1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	-1.04673E-17	-	-	-	0
FR_FR1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FR1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	-1.04673E-17	-	-	-	0
FR_FR2	Alkylated PAHs	1-Methylnaphthalene (µg/L)_Alkylated PAHs	(Intercept)	-2.995732274	-	-	-	0
FR_FR2	Alkylated PAHs	2-Methylnaphthalene (µg/L)_Alkylated PAHs	(Intercept)	-3.912023005	-	-	-	0
FR_FR2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.277474683	0.759092796	-0.365534602	0.715542463	0
FR_FR2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	2.80202E-05	4.52046E-05	0.619853248	0.536870199	0
FR_FR2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.819378198	0.368079059	13.09332352	9.83916E-23	0
FR_FR2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	2.2054E-05	2.1929E-05	1.005699661	0.317197903	0
FR_FR2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	2.913803202	1.784479624	1.632858769	0.105916776	0
FR_FR2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-0.000114732	0.000106314	-1.079185168	0.283326419	0
FR_FR2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	5.785966071	0.614077401	9.422209746	3.41401E-15	0
FR_FR2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	4.42751E-05	3.65688E-05	1.210735498	0.229064734	0
FR_FR2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-0.244803807	0.860037766	-0.28464309	0.776550459	0
FR_FR2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	1.09764E-05	5.12159E-05	0.21431687	0.830769178	0
FR_FR2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.31236062	0.662567909	8.017835682	3.1106E-12	0
FR_FR2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	3.84746E-05	3.94565E-05	0.975115887	0.332032377	0
FR_FR2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.081957941	0.086484548	0.947659935	0.345785184	0
FR_FR2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-4.6316E-06	5.15248E-06	-0.898905506	0.371049682	0
FR_FR2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	6.711078846	0.373473447	17.96936008	5.26937E-32	0
FR_FR2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-5.09406E-05	2.22406E-05	-2.290429883	0.024256389	0
FR_FR2	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.138931823	0.019729368	108.4136029	1.0733E-99	0
FR_FR2	Conventional Parameters	pH (-)_Conventional Parameters	Date	-1.37101E-06	1.1749E-06	-1.166915581	0.246227892	0
FR_FR2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.854587311	0.354997807	13.67497831	5.5359E-24	0
FR_FR2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	2.11932E-05	2.11404E-05	1.002497962	0.318704442	0
FR_FR2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	5.26127291	0.725981083	7.247121215	1.22608E-10	0
FR_FR2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	5.46009E-05	4.32328E-05	1.262951204	0.209764046	0
FR_FR2	Conventional Parameters	Total Inorganic Carbon (mg/L)_Conventional Parameters	(Intercept)	-63.23780696	30.62655558	-2.064803102	0.287125148	0
FR_FR2	Conventional Parameters	Total Inorganic Carbon (mg/L)_Conventional Parameters	Date	0.003682576	0.001682715	2.188473242	0.27286151	0
FR_FR2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	2.467054819	1.111079905	2.220411699	0.028819889	0
FR_FR2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-0.000135038	6.61657E-05	-2.040912014	0.044093713	0
FR_FR2	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	(Intercept)	7.747340417	2.109963391	3.671789022	0.000401909	0
FR_FR2	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	Date	-0.000396772	0.00012565	-3.157757117	0.002144108	0
FR_FR2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	1.814430467	2.824702889	0.642343828	0.522230304	0
FR_FR2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-0.000111375	0.000168213	-0.662106831	0.509540141	0
FR_FR2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-5.420928875	0.749786176	-7.22996642	1.32934E-10	0
FR_FR2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-1.62565E-05	4.46504E-05	-0.36408522	0.716620828	0
FR_FR2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-6.901332129	0.576005833	-11.98135806	1.47524E-20	0
FR_FR2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	-9.25383E-05	3.43016E-05	-2.697784418	0.008288943	0
FR_FR2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-9.46960691	0.288144953	-32.86403884	5.56415E-53	0
FR_FR2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	1.79791E-05	1.71593E-05	1.047777132	0.297456742	0
FR_FR2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-2.904608562	0.548613314	-5.294455107	7.94019E-07	0
FR_FR2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	2.03524E-05	3.26704E-05	0.622962773	0.534833675	0
FR_FR2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	3.622212572	0.857894751	4.222210903	5.62949E-05	0
FR_FR2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000807534	5.10883E-05	-15.80662948	4.32214E-28	0
FR_FR2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	10.08327378	1.255540897	8.031019787	2.9194E-12	0
FR_FR2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001134336	7.47685E-05	-15.17131697	6.82935E-27	0
FR_FR2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-3.63313498	0.337040016	-10.77953599	4.66786E-18	0
FR_FR2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-4.89967E-05	2.0071E-05	-2.441166309	0.016532498	0
FR_FR2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-8.372209259	1.127922123	-7.422683787	5.34558E-11	0
FR_FR2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-9.15982E-05	6.71687E-05	-1.363704538	0.175952376	0
FR_FR2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-8.794514259	0.519627341	-16.92465651	3.80367E-30	0
FR_FR2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-1.69586E-05	3.09442E-05	-0.548036311	0.584980026	0
FR_FR2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-8.512476399	0.580634548	-14.660644	6.51322E-26	0
FR_FR2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	-2.81315E-05	3.45773E-05	-0.813583087	0.417961967	0
FR_FR2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-6.286795369	0.450234988	-13.96336477	1.49103E-24	0
FR_FR2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-8.19413E-05	2.68119E-05	-3.056160136	0.002926128	0
FR_FR2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	1.62763753	0.826158575	1.970127261	0.051798296	0
FR_FR2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000348752	4.91984E-05	-7.088690352	2.58252E-10	0
FR_FR2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.20500561	0.244099842	-41.80668664	4.35719E-62	0
FR_FR2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	1.91531E-05	1.45363E-05	1.317604466	0.190872824	0
FR_FR2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-6.124770857	0.996624692	-6.145513861	1.96265E-08	0
FR_FR2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000153737	5.93498E-05	2.590360932	0.011130152	1
FR_FR2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-4.572513705	1.547529277	-2.954718706	0.0039642	0
FR_FR2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	8.37317E-08	9.21566E-05	0.000908581	0.999277004	0
FR_FR2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-5.817746052	0.465756991	-12.49094734	1.33239E-21	0
FR_FR2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000362486	2.77362E-05	-13.06907022	8.98675E-23	0
FR_FR2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-6.177922512	0.412217059	-14.98706175	1.53511E-26	0
FR_FR2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	-2.8957E-05	2.45479E-05	-1.179615077	0.241162116	0
FR_FR2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-7.058849704	0.708314773	-9.965696008	2.41926E-16	0
FR_FR2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	6.01526E-05	4.21807E-05	1.426069406	0.157196499	0
FR_FR2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-5.521231221	0.990766822	-5.572684809	2.4318E-07	0
FR_FR2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.000119976	5.9001E-05	2.033461561	0.044855472	1
FR_FR2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.369838164	0.184539502	2.004113804	0.047966745	0
FR_FR2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	1.22421E-05	1.09895E-05	1.11398692	0.268155576	0
FR_FR2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.79706562	0.242582151	-48.63121867	6.26851E-68	0
FR_FR2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	1.7952E-05	1.4446E-05	1.242696801	0.217103758	0
FR_FR2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-2.825955019	0.558113812	-5.063402763	2.07482E-06	0
FR_FR2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	5.21935E-05	3.32361E-05	1.570385722	0.119721638	0
FR_FR2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.35862069	0.284614503	-39.90879089	2.61591E-60	0
FR_FR2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	-7.00291E-06	1.6949E-05	-0.413174712	0.680429727	0
FR_FR2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.504275855	0.242743378	-39.15359479	1.4007E-59	0
FR_FR2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	1.85843E-05	1.44556E-05	1.285615693	0.201769287	0
FR_FR2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-3.799309605	0.232237376	-16.35959581	4.07796E-29	0
FR_FR2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-4.49931E-05	1.38299E-05	-3.253316974	0.001590548	0
FR_FR2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-8.014750724	0.852859528	-9.397503882	3.85075E-15	0
FR_FR2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	0.000111396	5.07885E-05	2.193327505	0.030777144	1
FR_FR2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-1.782893227	0.439967592	-4.052328537	0.000105121	0
FR_FR2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000328921	2.62004E-05	-12.55404626	9.91043E-22	0
FR_FR2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	-0.880559572	0.600671375	-1.465958939	0.146032533	0
FR_FR2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000305365	3.57705E-05	-8.536799462	2.53444E-13	0
FR_FR2	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	4.225464159	0.832280608	5.076970576	2.27237E-06	0
FR_FR2	Field Measured	Conductivity (µS/cm)_Field Measured	Date	0.000129851	4.919E-05	2.639777991	0.009887936	1
FR_FR2	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	4.688660081	0.173746795	26.98559172	3.75854E-43	0
FR_FR2	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-1.36245E-05	1.02689E-05	-1.326772114	0.18817963	0
FR_FR2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	2.65183887	0.275073467	9.64047496	3.05515E-15	0
FR_FR2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-1.45954E-05	1.62576E-05	-0.897760956	0.371879018	0
FR_FR2	Field Measured	pH (-)_Field Measured	(Intercept)	2.162658746	0.037589289	57.53390889	2.9706E-69	0
FR_FR2	Field Measured	pH (-)_Field Measured	Date	-2.99953E-06	2.22163E-06	-1.350152177	0.180593961	0
FR_FR2	Field Measured	Total Suspended Solids (mg/L)_Field Measured	(Intercept)	3.317815773	-	-	-	0
FR_FR2	Field Measured	Total Suspended Solids (ppm)_Field Measured	(Intercept)	0.832909123	-	-	-	0
FR_FR2	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	5.997709274	1.71618885	3.494783965	0.000728697	0
FR_FR2	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.000486385	0.0001022	-4.759126712	7.10846E-06	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_FR2	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	4.034424655	0.605084594	6.667538214	1.82973E-09	0
FR_FR2	Major Ions	Calcium (mg/L)_Major Ions	Date	2.95141E-05	3.60333E-05	0.819079289	0.414835207	0
FR_FR2	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	5.695795481	0.96043837	5.930412254	5.10979E-08	0
FR_FR2	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000316182	5.71949E-05	-5.528159189	2.94425E-07	0
FR_FR2	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-0.790597779	0.311016996	-2.541976124	0.01267624	0
FR_FR2	Major Ions	Fluoride (mg/L)_Major Ions	Date	-4.96799E-05	1.85213E-05	-2.682309774	0.008652798	0
FR_FR2	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	2.753703492	0.755749609	3.64367174	0.000442306	0
FR_FR2	Major Ions	Magnesium (mg/L)_Major Ions	Date	5.2089E-05	4.50055E-05	1.157392895	0.25007586	0
FR_FR2	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	1.88059663	0.530510687	3.544879821	0.000616942	0
FR_FR2	Major Ions	Potassium (mg/L)_Major Ions	Date	-8.27932E-05	3.15923E-05	-2.620672303	0.01025045	0
FR_FR2	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	2.769053729	0.75163815	3.684024994	0.000385445	0
FR_FR2	Major Ions	Sodium (mg/L)_Major Ions	Date	-0.000127847	4.47607E-05	-2.856232346	0.005287898	0
FR_FR2	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	4.167251338	1.001527515	4.160895509	7.06523E-05	0
FR_FR2	Major Ions	Sulphate (mg/L)_Major Ions	Date	5.56707E-05	5.96418E-05	0.933417857	0.353021397	0
FR_FR2	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-48.50605181	12.05674964	-4.023144981	0.005039443	0
FR_FR2	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.002598689	0.00075024	3.46381053	0.010493333	1
FR_FR2	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	0	-Inf	0	0
FR_FR2	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	0	0	-	-	0
FR_FR2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-0.025057606	1.112444115	-0.022524822	0.98207757	0
FR_FR2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	0.000134146	6.62469E-05	2.024935144	0.045741054	1
FR_FR2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	3.469874979	1.076728854	3.222607963	0.001751892	0
FR_FR2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.00049778	6.41201E-05	-7.763250986	1.05529E-11	0
FR_FR2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	1.461046067	1.665788079	0.87709	0.382697858	0
FR_FR2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000347063	9.9199E-05	-3.498649621	0.000719435	0
FR_FR2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-10.68343247	1.490486036	-7.167750797	1.78165E-10	0
FR_FR2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000509866	8.87596E-05	5.744348918	1.15619E-07	1
FR_FR2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-7.864581163	0.785087327	-10.01746035	5.36051E-16	0
FR_FR2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	6.80492E-05	4.65481E-05	1.46191049	0.147496899	0
FR_FR2	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-20.52223604	59.18148599	-0.34676784	0.738956476	0
FR_FR2	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.000975789	0.003827605	0.254934568	0.806101352	0
FR_FR2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	9.095590154	2.786733802	3.263889126	0.001538296	0
FR_FR2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000838902	0.000165952	-5.055078504	2.14702E-06	0
FR_FR2	Parent PAHs	Acenaphthene (%)_Parent PAHs	(Intercept)	4.75660289	-	-	-	0
FR_FR2	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR2	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR2	Parent PAHs	Acridine (µg/L)_Parent PAHs	(Intercept)	-4.199705078	-	-	-	0
FR_FR2	Parent PAHs	Anthracene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR2	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR2	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	(Intercept)	-5.298317367	-	-	-	0
FR_FR2	Parent PAHs	Benzo(b,j)fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR2	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR2	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR2	Parent PAHs	Chrysene (%)_Parent PAHs	(Intercept)	4.718052343	-	-	-	0
FR_FR2	Parent PAHs	Chrysene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR2	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	(Intercept)	-5.298317367	-	-	-	0
FR_FR2	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR2	Parent PAHs	Fluorene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR2	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR2	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	(Intercept)	-2.995732274	-	-	-	0
FR_FR2	Parent PAHs	Phenanthrene (%)_Parent PAHs	(Intercept)	4.711779921	-	-	-	0
FR_FR2	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	(Intercept)	-3.912023005	-	-	-	0
FR_FR2	Parent PAHs	Pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR2	Parent PAHs	Quinoline (µg/L)_Parent PAHs	(Intercept)	-2.995732274	-	-	-	0
FR_FR2	Speciation of Selenium	Total Selenium 4+ (µg/L)_Speciation of Selenium	(Intercept)	-74.09763885	37.26444626	-1.988427208	0.18508743	0
FR_FR2	Speciation of Selenium	Total Selenium 4+ (µg/L)_Speciation of Selenium	Date	0.004568004	0.002343222	1.949454167	0.190559142	0
FR_FR2	Speciation of Selenium	Total Selenium 6+ (µg/L)_Speciation of Selenium	(Intercept)	-10.52499656	72.98187931	-0.144213833	0.898551528	0
FR_FR2	Speciation of Selenium	Total Selenium 6+ (µg/L)_Speciation of Selenium	Date	0.000861491	0.004589166	0.187722773	0.868414158	0
FR_FR2	Speciation of Selenium	Total Selenocyanate (µg/L)_Speciation of Selenium	(Intercept)	-43.95223852	22.56675697	-1.947654179	0.190817077	0
FR_FR2	Speciation of Selenium	Total Selenocyanate (µg/L)_Speciation of Selenium	Date	0.002591594	0.001419018	1.826329398	0.209335209	0
FR_FR2	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	-1.771468065	2.933533275	-0.603868407	0.547401322	0
FR_FR2	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000134667	0.000174694	-0.770872675	0.442736462	0
FR_FR2	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-7.211188758	0.546256521	-13.2011033	4.87895E-23	0
FR_FR2	Total Metals	Antimony (mg/L)_Total Metals	Date	-6.8358E-05	3.253E-05	-2.101381301	0.038311676	0
FR_FR2	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-8.671658514	0.70961869	-12.22016646	4.76622E-21	0
FR_FR2	Total Metals	Arsenic (mg/L)_Total Metals	Date	-1.29118E-05	4.22584E-05	-0.305543392	0.760635176	0
FR_FR2	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-2.211330522	0.518165965	-4.267610517	4.75197E-05	0
FR_FR2	Total Metals	Barium (mg/L)_Total Metals	Date	-1.9675E-05	3.08572E-05	-0.63761493	0.525291108	0
FR_FR2	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	3.347730966	0.858586846	3.899117466	0.000182165	0
FR_FR2	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000789824	5.11295E-05	-15.4475035	2.04442E-27	0
FR_FR2	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	9.971467039	1.263427654	7.892392575	5.6835E-12	0
FR_FR2	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001127301	7.52381E-05	-14.9831042	1.56212E-26	0
FR_FR2	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-3.570767808	0.367217703	-9.723844417	7.85311E-16	0
FR_FR2	Total Metals	Boron (mg/L)_Total Metals	Date	-5.09865E-05	2.18681E-05	-2.331545176	0.021884248	0
FR_FR2	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-6.246763967	0.844082572	-7.400655072	5.93391E-11	0
FR_FR2	Total Metals	Cadmium (mg/L)_Total Metals	Date	-0.000192069	5.02658E-05	-3.821067017	0.000239836	0
FR_FR2	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.228535805	0.590133666	7.165386501	1.80157E-10	0
FR_FR2	Total Metals	Calcium (mg/L)_Total Metals	Date	1.81476E-05	3.51429E-05	0.516394399	0.606804705	0
FR_FR2	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-8.346219263	1.389364782	-6.007219539	3.63648E-08	0
FR_FR2	Total Metals	Chromium (mg/L)_Total Metals	Date	-6.34759E-06	8.27378E-05	-0.076719304	0.939011656	0
FR_FR2	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-7.563037039	0.867570016	-8.717494729	1.0544E-13	0
FR_FR2	Total Metals	Cobalt (mg/L)_Total Metals	Date	-7.25868E-05	5.16645E-05	-1.404964348	0.163363359	0
FR_FR2	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-7.456072966	0.643908298	-11.5794019	9.99385E-20	0
FR_FR2	Total Metals	Copper (mg/L)_Total Metals	Date	-8.23457E-07	3.83453E-05	-0.021474796	0.982912916	0
FR_FR2	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	-0.581746909	1.779164514	-0.326977581	0.744419644	0
FR_FR2	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000132507	0.000105951	-1.250649198	0.214199919	0
FR_FR2	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-8.109665223	1.308698825	-6.196739132	1.55973E-08	0
FR_FR2	Total Metals	Lead (mg/L)_Total Metals	Date	-8.58731E-05	7.79341E-05	-1.101868793	0.273362197	0
FR_FR2	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-6.037066467	0.98561956	-6.125148803	2.14996E-08	0
FR_FR2	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000149215	5.86944E-05	2.54223481	0.012667484	1
FR_FR2	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	3.103366537	0.755863456	4.105723743	8.65289E-05	0
FR_FR2	Total Metals	Magnesium (mg/L)_Total Metals	Date	3.16309E-05	4.50123E-05	0.702716327	0.483987844	0
FR_FR2	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-2.464794355	1.100328029	-2.240054138	0.027469385	0
FR_FR2	Total Metals	Manganese (mg/L)_Total Metals	Date	-9.52669E-05	6.55254E-05	-1.453892975	0.149342449	0
FR_FR2	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	10.06682498	1.425080483	7.064039615	2.89878E-10	0
FR_FR2	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001367671	8.48647E-05	-16.11590814	1.14865E-28	0
FR_FR2	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	7.465913821	2.648268259	2.819168261	0.018186633	0
FR_FR2	Total Metals	Methyl mercury (µg/L)_Total Metals	Date	-0.001019234	0.000151008	-6.749554643	5.04496E-05	0
FR_FR2	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-5.997804396	0.422111623	-14.20904819	4.91476E-25	0
FR_FR2	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-3.82313E-05	2.51371E-05	-1.520912195	0.131674692	0
FR_FR2	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-6.648601077	0.743302275	-8.944680111	3.49378E-14	0
FR_FR2	Total Metals	Nickel (mg/L)_Total Metals	Date	4.20818E-05	4.42642E-05	0.950695537	0.344223132	0
FR_FR2	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	2.132044756	0.504624162	4.225015205	5.57105E-05	0
FR_FR2	Total Metals	Potassium (mg/L)_Total Metals	Date	-9.76705E-05	3.00508E-05	-3.250183501	0.001606351	0
FR_FR2	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-4.897209307	0.981647006	-4.988768141	2.81669E-06	0
FR_FR2	Total Metals	Selenium (mg/L)_Total Metals	Date	8.16285E-05	5.84579E-05	1.396364253	0.165928804	0
FR_FR2	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	0.674579867	0.27551726	2.44841237	0.016223847	0
FR_FR2	Total Metals	Silicon (mg/L)_Total Metals	Date	-1.81706E-06	1.64073E-05	-0.110747266	0.912055415	0
FR_FR2	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.59977327	0.433298073	-26.7708859	1.73904E-45	0
FR_FR2	Total Metals	Silver (mg/L)_Total Metals	Date	9.0968E-06	2.58032E-05	0.352544928	0.725227347	0
FR_FR2	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	2.98719939	0.763381561	3.913114416	0.000173335	0
FR_FR2	Total Metals	Sodium (mg/L)_Total Metals	Date	-0.000140415	4.546E-05	-3.088763165	0.002650201	0
FR_FR2	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-2.534158531	0.546498082	-4.637085866	1.1516E-05	0
FR_FR2	Total Metals	Strontium (mg/L)_Total Metals	Date	3.5309E-05	3.25444E-05	1.084948681	0.280748873	0
FR_FR2	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-11.15448026	0.58981003	-18.91198808	1.24701E-33	0
FR_FR2	Total Metals	Thallium (mg/L)_Total Metals	Date	-1.35405E-05	3.51237E-05	-0.385508739	0.70074091	0
FR_FR2	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.763926478	0.39290501	-24.85060315	7.61276E-43	0
FR_FR2	Total Metals	Tin (mg/L)_Total Metals	Date	3.5605E-05	2.33978E-05	1.521723745	0.1314713	0
FR_FR2	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-3.20178772	0.43341915	-7.387277926	6.32212E-11	0
FR_FR2	Total Metals	Titanium (mg/L)_Total Metals	Date	-7.81755E-05	2.58105E-05	-3.028830823	0.003177702	0
FR_FR2	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-7.87448673	0.847375654	-9.292793213	6.4138E-15	0
FR_FR2	Total Metals	Uranium (mg/L)_Total Metals	Date	0.000103803	5.04619E-05	2.057062421	0.042480464	1
FR_FR2	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-2.505383775	0.807068878	-3.104299824	0.002527395	0
FR_FR2	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000277694	4.80616E-05	-5.777877794	9.98788E-08	0
FR_FR2	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-5.118675696	0.712728262	-7.181805425	1.66769E-10	0
FR_FR2	Total Metals	Zinc (mg/L)_Total Metals	Date	-2.97388E-05	4.24435E-05	-0.700667507	0.485259866	0
FR_FR2	Unknown	2-Bromobenzotrifluoride (%)_Unknown	(Intercept)	4.391976966	-	-	-	0
FR_FR2	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	3.06979E-15	-4.51593E+14	7.95829E-87	0
FR_FR2	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	-1.70849E-19	1.85411E-19	-0.921458454	0.392355026	0
FR_FR2	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	0	-Inf	0	0
FR_FR2	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
FR_FR2	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	0	-Inf	0	0
FR_FR2	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
FR_FR2	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-0.693147181	0	-Inf	0	0
FR_FR2	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
FR_FR2	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	3.06979E-15	-4.51593E+14	7.95829E-87	0
FR_FR2	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	-1.70849E-19	1.85411E-19	-0.921458454	0.392355026	0
FR_FR3	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.656063256	1.896879941	0.345864407	0.734977669	0
FR_FR3	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	-2.98199E-05	0.000108032	-0.276027963	0.786865863	0
FR_FR3	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.029598146	0.868397105	4.640271279	0.000462606	0
FR_FR3	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	6.77446E-05	4.94574E-05	1.369758176	0.193957897	0
FR_FR3	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.828689545	6.850459177	-0.120968467	0.905565756	0
FR_FR3	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000105498	0.000390151	0.270402625	0.791095843	0
FR_FR3	Conventional Parameters	Conductivity (µmhos/cm)_Conventional Parameters	(Intercept)	6.126869184	-	-	-	0
FR_FR3	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	3.743223923	1.281357398	2.921295751	0.01280945	0
FR_FR3	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	0.000165773	7.30136E-05	2.270445835	0.042403843	1
FR_FR3	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	3.81268687	3.39055157	1.12450343	0.281134586	0
FR_FR3	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	-0.000219694	0.0001931	-1.137717566	0.275773313	0
FR_FR3	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	3.293674759	1.72852859	1.905478902	0.079073309	0
FR_FR3	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000157417	9.8444E-05	1.599049411	0.133820836	0
FR_FR3	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0	0	-	-	0
FR_FR3	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0	0	-	-	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_FR3	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	6.277473292	1.83880018	3.413896387	0.004617392	0
FR_FR3	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-2.19344E-05	0.000104724	-0.209449383	0.837344001	0
FR_FR3	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.121123434	0.07313433	29.00311563	3.35017E-13	0
FR_FR3	Conventional Parameters	pH (-)_Conventional Parameters	Date	-2.03136E-07	4.16518E-06	-0.048769918	0.961843978	0
FR_FR3	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	3.988786334	0.786508845	5.071508553	0.000214192	0
FR_FR3	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	7.13621E-05	4.47936E-05	1.593131587	0.135144379	0
FR_FR3	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	3.398969389	1.840567269	1.846696639	0.087674483	0
FR_FR3	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	0.000163687	0.000104825	1.561524813	0.142406197	0
FR_FR3	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	11.35374559	4.747685619	2.391427425	0.032603835	0
FR_FR3	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-0.00063724	0.000270392	-2.356721267	0.034787384	0
FR_FR3	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	12.91627871	7.455169993	1.732526384	0.102408104	0
FR_FR3	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-0.000669331	0.00042919	-1.559520618	0.138432084	0
FR_FR3	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	3.260249259	9.02814976	0.361120423	0.722733446	0
FR_FR3	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-0.000171162	0.000519746	-0.329319495	0.746185849	0
FR_FR3	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	0.842287092	3.754294453	0.224352965	0.825970319	0
FR_FR3	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-0.000358833	0.000213816	-1.678230774	0.117164487	0
FR_FR3	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-8.638665395	1.046175835	-8.257374247	1.57837E-06	0
FR_FR3	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	1.18205E-05	5.95823E-05	0.198389738	0.845808995	0
FR_FR3	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-6.844087677	0.918779131	-7.449110939	4.84004E-06	0
FR_FR3	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	-0.000131083	5.23267E-05	-2.505078856	0.026335301	0
FR_FR3	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-4.198785483	1.728059494	-2.429769055	0.030344045	0
FR_FR3	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	9.35565E-05	9.84173E-05	0.950610198	0.359141934	0
FR_FR3	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	2.123062727	0.890148209	2.385066561	0.032993976	0
FR_FR3	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000725535	5.06961E-05	-14.31143802	2.46149E-09	0
FR_FR3	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	8.613531677	1.273514175	6.76359309	1.3344E-05	0
FR_FR3	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001038006	7.25298E-05	-14.31143802	2.46149E-09	0
FR_FR3	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.498524646	0.669573446	-6.7184932	1.42955E-05	0
FR_FR3	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-9.42409E-07	3.81339E-05	-0.024713189	0.980659059	0
FR_FR3	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-7.138638718	5.970815784	-1.195588505	0.253211118	0
FR_FR3	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-0.000163457	0.000340053	-0.480680451	0.638732098	0
FR_FR3	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-8.070880862	0.114605533	-70.42313433	3.54862E-18	0
FR_FR3	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-6.38964E-05	6.52707E-06	-9.789440269	2.30185E-07	0
FR_FR3	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-8.528143694	1.27376612	-6.695219445	1.48144E-05	0
FR_FR3	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	-3.02297E-05	7.25441E-05	-0.416707957	0.683690493	0
FR_FR3	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-5.07429971	1.943836387	-2.610456181	0.021573584	0
FR_FR3	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-0.00015091	0.000110706	-1.363156596	0.195977393	0
FR_FR3	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	3.312925803	1.225348497	2.703660069	0.018067424	0
FR_FR3	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000439453	6.97866E-05	-6.297096521	2.75725E-05	0
FR_FR3	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-9.903487553	1.6208E-14	-6.11025E+14	2.2829E-186	0
FR_FR3	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	-3.30986E-18	9.23086E-19	-3.585648227	0.003321817	0
FR_FR3	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-9.091033196	2.491276072	-3.649147237	0.002942117	0
FR_FR3	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000319195	0.000141884	2.24968463	0.04243213	1
FR_FR3	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-8.141550856	7.232063683	-1.125757628	0.280622353	0
FR_FR3	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	0.000170674	0.000411884	0.414373881	0.685356195	0
FR_FR3	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-6.631894427	0.383365967	-17.29912147	2.34903E-10	0
FR_FR3	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000312471	2.18336E-05	-14.31143802	2.46149E-09	0
FR_FR3	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-7.112246095	0.959386035	-7.413330854	5.09554E-06	0
FR_FR3	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	2.58504E-05	5.46394E-05	0.473109376	0.643980519	0
FR_FR3	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-6.170250043	1.774975199	-3.476245779	0.004096502	0
FR_FR3	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	2.17154E-05	0.000101089	0.214814599	0.833245001	0
FR_FR3	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-7.319666718	1.432683704	-5.109059799	2.52066E-05	0
FR_FR3	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.000230689	8.39314E-05	2.748548499	0.0107368	1
FR_FR3	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.345017873	0.737503076	0.467818893	0.647659836	0
FR_FR3	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	1.33722E-05	4.20026E-05	0.318365295	0.755264651	0
FR_FR3	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.51292546	1.6208E-14	-7.10324E+14	3.2235E-187	0
FR_FR3	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	-3.30986E-18	9.23086E-19	-3.585648227	0.003321817	0
FR_FR3	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-4.946629104	1.621169122	-3.051272712	0.009277231	0
FR_FR3	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	0.000173382	9.23296E-05	1.877855915	0.083015157	0
FR_FR3	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.1206753	0.188305109	-59.05668385	3.47501E-17	0
FR_FR3	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	-2.16346E-05	1.07244E-05	-2.017320116	0.064796649	0
FR_FR3	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.210340372	2.4312E-14	-3.78839E+14	1.1411E-183	0
FR_FR3	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	-4.96479E-18	1.38463E-18	-3.585648227	0.003321817	0
FR_FR3	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-3.480497233	0.309049653	-11.26193541	4.45753E-08	0
FR_FR3	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-6.31115E-05	1.76011E-05	-3.585648227	0.003321817	0
FR_FR3	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-10.59504617	2.041720295	-5.189274063	0.000174315	0
FR_FR3	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	0.000263957	0.000116281	2.269993312	0.040868991	1
FR_FR3	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-2.026724241	0.383365967	-5.28665666	0.000147221	0
FR_FR3	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000312471	2.18336E-05	-14.31143802	2.46149E-09	0
FR_FR3	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	-0.875012444	2.505222552	-0.349275334	0.732475315	0
FR_FR3	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000311728	0.000142679	-2.184827261	0.047810312	0
FR_FR3	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	8.705773416	3.673346583	2.369984214	0.02549173	0
FR_FR3	Field Measured	Conductivity (µS/cm)_Field Measured	Date	-0.000140105	0.000215648	-0.649693701	0.521589226	0
FR_FR3	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	4.950356561	0.356317834	13.8930923	8.10626E-14	0
FR_FR3	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-2.94787E-05	2.08658E-05	-1.41278011	0.169144729	0
FR_FR3	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	3.125900062	0.561116828	5.570854246	6.60066E-06	0
FR_FR3	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-4.3131E-05	3.28587E-05	-1.312620322	0.20035972	0
FR_FR3	Field Measured	pH (-)_Field Measured	(Intercept)	2.262164878	0.083265428	27.16811695	3.82523E-21	0
FR_FR3	Field Measured	pH (-)_Field Measured	Date	-8.83933E-06	4.87597E-06	-1.812832441	0.080991244	0
FR_FR3	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	(Intercept)	6.472655366	-	-	-	0
FR_FR3	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	3.460726863	5.086737315	0.680343145	0.508223229	0
FR_FR3	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.000340932	0.000289702	-1.176836688	0.260359547	0
FR_FR3	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	2.221453365	1.54015942	1.442352873	0.172860364	0
FR_FR3	Major Ions	Calcium (mg/L)_Major Ions	Date	0.000135848	8.77159E-05	1.548725126	0.145440965	0
FR_FR3	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	4.10882493	3.325768485	1.235451279	0.238524142	0
FR_FR3	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000221223	0.000189411	-1.167954125	0.263799777	0
FR_FR3	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-1.659437332	0.763789685	-2.172636478	0.048890217	0
FR_FR3	Major Ions	Fluoride (mg/L)_Major Ions	Date	1.85759E-06	4.34997E-05	0.042703404	0.966586898	0
FR_FR3	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	0.402509733	2.016887608	0.199569739	0.844904859	0
FR_FR3	Major Ions	Magnesium (mg/L)_Major Ions	Date	0.000191184	0.000114867	1.664394943	0.119937188	0
FR_FR3	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	1.228985731	1.293958099	0.949787889	0.359544189	0
FR_FR3	Major Ions	Potassium (mg/L)_Major Ions	Date	-3.69403E-05	7.36941E-05	-0.501265031	0.624565088	0
FR_FR3	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	1.013116974	2.110288781	0.480084519	0.639144482	0
FR_FR3	Major Ions	Sodium (mg/L)_Major Ions	Date	-2.23227E-05	0.000120186	-0.185734268	0.855519855	0
FR_FR3	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	1.316952397	2.545138069	0.517438489	0.613541493	0
FR_FR3	Major Ions	Sulphate (mg/L)_Major Ions	Date	0.000222446	0.000144952	1.534622591	0.148848563	0
FR_FR3	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	-	-	-	0
FR_FR3	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-1.29226E-18	-	-	-	0
FR_FR3	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-2.147772481	2.573150822	-0.834685811	0.418969698	0
FR_FR3	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	0.000260519	0.000146547	1.777711362	0.098837406	0
FR_FR3	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-0.965009302	4.15712768	-0.232133669	0.820048487	0
FR_FR3	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000223057	0.000236759	-0.942130047	0.363305436	0
FR_FR3	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-2.360742078	5.568514963	-0.423944641	0.678537043	0
FR_FR3	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	-7.90371E-05	0.000317141	-0.249217828	0.807086574	0
FR_FR3	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-9.499580207	6.276453881	-1.513526648	0.154073026	0
FR_FR3	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000449513	0.00035746	1.257522456	0.230686033	0
FR_FR3	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-4.563844461	2.805786074	-1.626583189	0.127809309	0
FR_FR3	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000111205	0.000159796	-0.695919044	0.498732873	0
FR_FR3	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	10.23186406	8.838140752	1.157694174	0.267816993	0
FR_FR3	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000886508	0.000503354	-1.761201102	0.101690646	0
FR_FR3	Speciation of Selenium	Total Selenium 4+ (µg/L)_Speciation of Selenium	(Intercept)	-66.58994853	52.5902015	-1.266204476	0.332954876	0
FR_FR3	Speciation of Selenium	Total Selenium 4+ (µg/L)_Speciation of Selenium	Date	0.004092089	0.003306919	1.237432491	0.341496711	0
FR_FR3	Speciation of Selenium	Total Selenium 6+ (µg/L)_Speciation of Selenium	(Intercept)	-6.581354459	66.39378844	-0.099126057	0.930078843	0
FR_FR3	Speciation of Selenium	Total Selenium 6+ (µg/L)_Speciation of Selenium	Date	0.000616946	0.004174901	0.147774877	0.896073215	0
FR_FR3	Speciation of Selenium	Total Selenocyanate (µg/L)_Speciation of Selenium	(Intercept)	-43.95223852	22.56675697	-1.947654179	0.190817077	0
FR_FR3	Speciation of Selenium	Total Selenocyanate (µg/L)_Speciation of Selenium	Date	0.002591594	0.001419018	1.826329398	0.209335209	0
FR_FR3	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	14.34940769	12.35282044	1.161630071	0.26627039	0
FR_FR3	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.001051562	0.000703524	-1.494707041	0.158864457	0
FR_FR3	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-6.221395714	0.965719899	-6.442236222	2.19298E-05	0
FR_FR3	Total Metals	Antimony (mg/L)_Total Metals	Date	-0.000119435	5.50001E-05	-2.171540144	0.048988448	0
FR_FR3	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	0.460316312	4.029861815	0.114226327	0.910803703	0
FR_FR3	Total Metals	Arsenic (mg/L)_Total Metals	Date	-0.000522151	0.000229511	-2.275064087	0.040487283	0
FR_FR3	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-1.140967295	1.708351876	-0.667876045	0.515895224	0
FR_FR3	Total Metals	Barium (mg/L)_Total Metals	Date	-7.93513E-05	9.72949E-05	-0.815575613	0.429433131	0
FR_FR3	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	3.776241431	1.687507789	2.237762371	0.043375911	0
FR_FR3	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000812267	9.61077E-05	-8.451632318	1.21954E-06	0
FR_FR3	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	8.587369701	1.375500367	6.243087901	3.0047E-05	0
FR_FR3	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.00103388	7.83382E-05	-13.19765883	6.62353E-09	0
FR_FR3	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-2.855245936	1.148494444	-2.486077274	0.027295774	0
FR_FR3	Total Metals	Boron (mg/L)_Total Metals	Date	-9.10659E-05	6.54096E-05	-1.392240472	0.187208183	0
FR_FR3	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-0.087586511	3.376560125	-0.025939568	0.979699501	0
FR_FR3	Total Metals	Cadmium (mg/L)_Total Metals	Date	-0.000521377	0.000192303	-2.711220426	0.017808753	0
FR_FR3	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	3.53329152	1.423407862	2.482276242	0.027491914	0
FR_FR3	Total Metals	Calcium (mg/L)_Total Metals	Date	6.08594E-05	8.10666E-05	0.750733942	0.46618516	0
FR_FR3	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	1.392063397	6.505571711	0.213980179	0.833882165	0
FR_FR3	Total Metals	Chromium (mg/L)_Total Metals	Date	-0.00054053	0.000370508	-1.458886182	0.16833283	0
FR_FR3	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	2.375926216	4.193749839	0.566539805	0.580676749	0
FR_FR3	Total Metals	Cobalt (mg/L)_Total Metals	Date	-0.000628016	0.000238844	-2.62939335	0.020811386	0
FR_FR3	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	0.332925713	3.402559974	0.097845656	0.92354738	0
FR_FR3	Total Metals	Copper (mg/L)_Total Metals	Date	-0.000435246	0.000193784	-2.246032235	0.042719179	0
FR_FR3	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	12.86420243	8.309957676	1.548046685	0.145603355	0
FR_FR3	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000877043	0.000473273	-1.853145885	0.086691176	0
FR_FR3	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	3.49664218	6.7058397	0.521432414	0.610834134	0
FR_FR3	Total Metals	Lead (mg/L)_Total Metals	Date	-0.000726701	0.000381914	-1.902786388	0.079449922	0
FR_FR3	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-7.693200073	2.456905609	-3.131255855	0.007953529	0
FR_FR3	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000242003	0.000139927	1.729499594	0.107375217	0
FR_FR3	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	1.559728381	1.794160055	0.869336254	0.400429498	0
FR_FR3	Total Metals	Magnesium (mg/L)_Total Metals	Date	0.000124282	0.000102182	1.216287181	0.245499056	0
FR_FR3	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	6.250016227	5.221946663	1.196874773	0.252726429	0
FR_FR3	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.000592082	0.000297403	-1.990841429	0.067944849	0
FR_FR3	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	8.787593367	4.0584818	2.165241536	0.049556389	0
FR_FR3	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001289036	0.000231141	-5.576847583	8.96847E-05	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_FR3	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-6.025996583	0.792268389	-7.606004058	3.86995E-06	0
FR_FR3	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-3.44238E-05	4.51216E-05	-0.762909922	0.459137882	0
FR_FR3	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-0.586270476	2.519269982	-0.232714429	0.81960693	0
FR_FR3	Total Metals	Nickel (mg/L)_Total Metals	Date	-0.00028681	0.000143479	-1.998973808	0.066963286	0
FR_FR3	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	1.486766959	1.137816619	1.306684166	0.213964121	0
FR_FR3	Total Metals	Potassium (mg/L)_Total Metals	Date	-5.41951E-05	6.48015E-05	-0.836324644	0.418080253	0
FR_FR3	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-6.992411482	1.446956217	-4.832496933	5.22914E-05	0
FR_FR3	Total Metals	Selenium (mg/L)_Total Metals	Date	0.000210043	8.47675E-05	2.477869055	0.020034334	1
FR_FR3	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	4.1122313	1.706585608	2.409624973	0.031511914	0
FR_FR3	Total Metals	Silicon (mg/L)_Total Metals	Date	-0.000193057	9.71943E-05	-1.986295873	0.068499232	0
FR_FR3	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-4.561528343	3.007688663	-1.516622514	0.153296697	0
FR_FR3	Total Metals	Silver (mg/L)_Total Metals	Date	-0.000382525	0.000171295	-2.23313278	0.043747707	0
FR_FR3	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	1.351446401	2.038755607	0.66287808	0.518989659	0
FR_FR3	Total Metals	Sodium (mg/L)_Total Metals	Date	-4.34417E-05	0.000116112	-0.374135451	0.714334884	0
FR_FR3	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-3.566883109	1.658034807	-2.15127155	0.050838136	0
FR_FR3	Total Metals	Strontium (mg/L)_Total Metals	Date	9.41175E-05	9.44292E-05	0.996699725	0.337101452	0
FR_FR3	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-3.106023721	3.559983227	-0.872482684	0.398773636	0
FR_FR3	Total Metals	Thallium (mg/L)_Total Metals	Date	-0.000459929	0.00020275	-2.268455318	0.040985436	0
FR_FR3	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.236502347	1.151328516	-8.022473359	2.1685E-06	0
FR_FR3	Total Metals	Tin (mg/L)_Total Metals	Date	4.12533E-06	6.5571E-05	0.062913951	0.950792085	0
FR_FR3	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	2.314504757	1.558047221	1.485516437	0.161249832	0
FR_FR3	Total Metals	Titanium (mg/L)_Total Metals	Date	-0.000387613	8.87346E-05	-4.368228795	0.00076095	0
FR_FR3	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-9.034916587	1.850605023	-4.882142043	0.000299473	0
FR_FR3	Total Metals	Uranium (mg/L)_Total Metals	Date	0.000175301	0.000105397	1.663251205	0.120168944	0
FR_FR3	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	5.565400319	4.463595395	1.246842473	0.234452902	0
FR_FR3	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000721525	0.000254213	-2.838270562	0.013967475	0
FR_FR3	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	1.784348931	4.159555541	0.428975864	0.674964033	0
FR_FR3	Total Metals	Zinc (mg/L)_Total Metals	Date	-0.000405429	0.000236897	-1.711415276	0.110742557	0
FR_FR3	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FR3	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FR3	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FR4	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.228245013	0.782361623	-0.291738509	0.771314005	0
FR_FR4	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	1.9579E-05	4.70151E-05	0.416440694	0.678309459	0
FR_FR4	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.066147508	0.400497141	12.64964712	4.46344E-20	0
FR_FR4	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	7.23135E-06	2.40674E-05	0.300462094	0.764678731	0
FR_FR4	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	2.615676674	2.389314289	1.094739476	0.277229723	0
FR_FR4	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-8.63668E-05	0.000143583	-0.601510751	0.549363334	0
FR_FR4	Conventional Parameters	Colour (CU)_Conventional Parameters	(Intercept)	1.609437912	-	-	-	0
FR_FR4	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	6.17154296	0.722285194	8.54446832	1.33421E-12	0
FR_FR4	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	2.72399E-05	4.34049E-05	0.627576158	0.532239854	0
FR_FR4	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-0.251166012	1.126316923	-0.222997637	0.82416015	0
FR_FR4	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	1.80656E-05	6.76848E-05	0.26690759	0.790292867	0
FR_FR4	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.680253777	0.81169308	6.99803154	1.05058E-09	0
FR_FR4	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	2.31368E-05	4.87778E-05	0.474330269	0.636680215	0
FR_FR4	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0	0	-	-	0
FR_FR4	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0	0	-	-	0
FR_FR4	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	7.3389247	0.440195456	16.67196834	1.34137E-26	0
FR_FR4	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-8.661E-05	2.64531E-05	-3.274101894	0.001621977	0
FR_FR4	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.120310208	0.024416486	86.83928419	2.00962E-75	0
FR_FR4	Conventional Parameters	pH (-)_Conventional Parameters	Date	-1.00459E-07	1.46728E-06	-0.068465983	0.94560189	0
FR_FR4	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.081158366	0.380858693	13.34132174	2.9164E-21	0
FR_FR4	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	7.85765E-06	2.28873E-05	0.34331979	0.732344681	0
FR_FR4	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	5.813956575	0.85632432	6.789432974	2.55358E-09	0
FR_FR4	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	2.92988E-05	5.14598E-05	0.569352583	0.5708647	0
FR_FR4	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	1.322630508	1.264071287	1.046325885	0.29886282	0
FR_FR4	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-6.33895E-05	7.59629E-05	-0.834479582	0.406733334	0
FR_FR4	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	8.349285601	2.425444891	3.442372834	0.000964161	0
FR_FR4	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-0.000433405	0.000145685	-2.974952847	0.003986346	0
FR_FR4	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	0.305760184	3.220751986	0.094934408	0.924627037	0
FR_FR4	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-1.73759E-05	0.000193547	-0.089775662	0.92871135	0
FR_FR4	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-5.423087576	0.803860024	-6.746308333	3.06639E-09	0
FR_FR4	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-1.77437E-05	4.83071E-05	-0.367310467	0.714450162	0
FR_FR4	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-5.889968562	0.599059867	-9.832019949	5.21804E-15	0
FR_FR4	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	-0.000145738	3.59998E-05	-4.048294176	0.000126998	0
FR_FR4	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-9.296981627	0.143994846	-64.5646835	3.79242E-66	0
FR_FR4	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	6.51945E-06	8.65321E-06	0.753413778	0.453624417	0
FR_FR4	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-3.360097444	0.662530277	-5.071613423	2.89069E-06	0
FR_FR4	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	4.57306E-05	3.9814E-05	1.148606456	0.25446808	0
FR_FR4	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	4.708652239	1.090688057	4.317139266	4.89634E-05	0
FR_FR4	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000873442	6.55437E-05	-13.3261118	3.09474E-21	0
FR_FR4	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	12.81779134	1.568370046	8.172683083	6.67029E-12	0
FR_FR4	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001302161	9.42494E-05	-13.81611192	4.64062E-22	0
FR_FR4	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-3.082374922	0.376898229	-8.178268516	6.51096E-12	0
FR_FR4	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-8.29192E-05	2.26493E-05	-3.661009013	0.000472223	0
FR_FR4	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-6.107860569	1.851259721	-3.29929966	0.001500537	0
FR_FR4	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-0.00023801	0.000111249	-2.139424825	0.03574506	0
FR_FR4	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-7.714720845	0.411798242	-18.7342248	1.32475E-29	0
FR_FR4	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-8.53192E-05	2.47466E-05	-3.447720917	0.000941874	0
FR_FR4	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-7.135832626	0.512858536	-13.91384197	3.19006E-22	0
FR_FR4	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	-0.000116651	3.08197E-05	-3.784952426	0.000312704	0
FR_FR4	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-5.794048814	0.640743654	-9.042694028	1.54879E-13	0
FR_FR4	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-0.000113724	3.85048E-05	-2.953498165	0.004225279	0
FR_FR4	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	4.197988003	0.842492844	4.982817401	4.07573E-06	0
FR_FR4	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000509424	5.06287E-05	-10.06197684	1.95742E-15	0
FR_FR4	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-9.903487553	2.2486E-14	-4.40429E+14	0	0
FR_FR4	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	2.22937E-18	1.35127E-18	1.649833052	0.103273826	0
FR_FR4	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-6.300449996	1.106028627	-5.696461956	2.41351E-07	0
FR_FR4	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000167152	6.64656E-05	2.514868123	0.014109925	1
FR_FR4	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-3.99625531	2.178736458	-1.834207756	0.07069842	0
FR_FR4	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	-7.44898E-05	0.000130929	-0.568933643	0.571147487	0
FR_FR4	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-5.354726502	0.461314121	-11.60754953	3.0331E-18	0
FR_FR4	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000392506	2.77222E-05	-14.15856231	1.25463E-22	0
FR_FR4	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-5.443689469	0.551527407	-9.870206635	4.43283E-15	0
FR_FR4	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	-6.68944E-05	3.31434E-05	-2.018330974	0.047231516	0
FR_FR4	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-3.138308556	0.964491919	-3.253846397	0.001726228	0
FR_FR4	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	-0.000146352	5.79601E-05	-2.525040682	0.013740466	0
FR_FR4	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-3.106728584	1.189542847	-2.611699605	0.010929867	0
FR_FR4	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	2.07575E-06	7.14842E-05	0.029037848	0.976913645	0
FR_FR4	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.553280908	0.267430767	2.0688753	0.04209936	0
FR_FR4	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	1.74009E-07	1.6071E-05	0.010827575	0.99139055	0
FR_FR4	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.51292546	6.29608E-14	-1.82859E+14	0	0
FR_FR4	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	-6.24224E-18	3.78356E-18	-1.649833052	0.103273826	0
FR_FR4	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-3.001213382	0.717202842	-4.184608882	7.86436E-05	0
FR_FR4	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	6.26424E-05	4.30995E-05	1.453437806	0.150387846	0
FR_FR4	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-10.65385532	0.189177155	-56.31681745	6.72326E-62	0
FR_FR4	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	-4.95098E-05	1.13684E-05	-4.355039967	4.2699E-05	0
FR_FR4	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.201252478	0.005804602	-1585.165042	2.3669E-167	0
FR_FR4	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	-5.308E-07	3.48821E-07	-1.521696391	0.132405289	0
FR_FR4	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-3.070190172	0.437104865	-7.0239213	9.40628E-10	0
FR_FR4	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-8.6522E-05	2.62673E-05	-3.293900268	0.001525817	0
FR_FR4	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-6.988779494	0.988522305	-7.06992595	7.7275E-10	0
FR_FR4	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	5.89282E-05	5.94041E-05	0.991988144	0.324480089	0
FR_FR4	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-0.761115973	0.472126428	-1.61210203	0.111255117	0
FR_FR4	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000391989	2.83719E-05	-13.81611192	4.64062E-22	0
FR_FR4	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	-1.070877615	0.730773933	-1.465402044	0.147105297	0
FR_FR4	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000291045	4.3915E-05	-6.627447692	5.07188E-09	0
FR_FR4	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	3.440981952	1.003251561	3.429829651	0.00105371	0
FR_FR4	Field Measured	Conductivity (µS/cm)_Field Measured	Date	0.000181547	5.99344E-05	3.02909999	0.003516616	1
FR_FR4	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	5.035374384	0.265060056	18.99710754	5.30094E-28	0
FR_FR4	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-3.34349E-05	1.58533E-05	-2.109015277	0.038861445	0
FR_FR4	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	3.348894207	0.360361734	9.293146002	1.74622E-13	0
FR_FR4	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-5.68342E-05	2.15533E-05	-2.636912546	0.0104886	0
FR_FR4	Field Measured	pH (-)_Field Measured	(Intercept)	2.369641796	0.088872323	26.66343951	1.02922E-36	0
FR_FR4	Field Measured	pH (-)_Field Measured	Date	-1.49441E-05	5.30925E-06	-2.814732066	0.00645348	0
FR_FR4	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	7.517830155	2.268258804	3.314361722	0.001432084	0
FR_FR4	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.00057194	0.000136308	-4.195923899	7.55481E-05	0
FR_FR4	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	4.304246632	0.735170373	5.854760736	1.2664E-07	0
FR_FR4	Major Ions	Calcium (mg/L)_Major Ions	Date	1.82871E-05	4.41792E-05	0.413929275	0.680139548	0
FR_FR4	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	5.882204484	1.221854332	4.814161828	7.77064E-06	0
FR_FR4	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000329582	7.3426E-05	-4.488636616	2.62293E-05	0
FR_FR4	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-0.51303176	0.488742943	-1.049696509	0.297320417	0
FR_FR4	Major Ions	Fluoride (mg/L)_Major Ions	Date	-6.71956E-05	2.93705E-05	-2.287861824	0.025043686	0
FR_FR4	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	3.284346435	0.932437426	3.522323691	0.000741863	0
FR_FR4	Major Ions	Magnesium (mg/L)_Major Ions	Date	2.94873E-05	5.60338E-05	0.526241423	0.600315697	0
FR_FR4	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	1.748386694	0.587217542	2.977408831	0.003942543	0
FR_FR4	Major Ions	Potassium (mg/L)_Major Ions	Date	-7.19965E-05	3.52882E-05	-2.04024274	0.044944141	0
FR_FR4	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	2.893956599	0.873792828	3.311948215	0.001442851	0
FR_FR4	Major Ions	Sodium (mg/L)_Major Ions	Date	-0.000136034	5.25096E-05	-2.590652881	0.011559868	0
FR_FR4	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	4.93340378	1.224555162	4.028731358	0.000135945	0
FR_FR4	Major Ions	Sulphate (mg/L)_Major Ions	Date	2.1699E-05	7.35883E-05	0.294870198	0.768930007	0
FR_FR4	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	(Intercept)	0.693147181	-	-	-	0
FR_FR4	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-16.19233591	16.97039219	-0.954152133	0.371786119	0
FR_FR4	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.000584353	0.001055995	0.553367271	0.597234151	0
FR_FR4	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	2.25624E-15	-5.33619E+14	0	0
FR_FR4	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	2.45921E-19	1.42228E-19	1.729070015	0.094809268	0
FR_FR4	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	1.133725716	1.130884163	1.002512683	0.319407605	0
FR_FR4	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	7.4633E-05	6.79592E-05	1.098202304	0.275725202	0
FR_FR4	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	4.147390443	1.42710971	2.906146888	0.00484135	0
FR_FR4	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000533911	8.57606E-05	-6.225595275	2.73873E-08	0
FR_FR4	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	2.297416336	2.055287381	1.117807834	0.267314307	0
FR_FR4	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000409528	0.00012351	-3.315742739	0.001425957	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_FR4	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-8.017122318	2.322959281	-3.451253917	0.000931351	0
FR_FR4	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000357917	0.000139596	2.563953902	0.012406311	1
FR_FR4	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-7.642789184	0.983636986	-7.769928636	8.20413E-11	0
FR_FR4	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	5.50342E-05	5.8841E-05	0.935303976	0.353147446	0
FR_FR4	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	104.5038233	100.5447241	1.039376498	0.346256074	0
FR_FR4	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.007070943	0.006490115	-1.089494265	0.325637287	0
FR_FR4	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	9.714557747	3.53453883	2.748465419	0.007540068	0
FR_FR4	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000882755	0.000212404	-4.156016405	8.70207E-05	0
FR_FR4	Parent PAHs	Acenaphthene (%)_Parent PAHs	(Intercept)	4.406719247	-	-	-	0
FR_FR4	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Parent PAHs	Acridine (%)_Parent PAHs	(Intercept)	4.469350463	-	-	-	0
FR_FR4	Parent PAHs	Acridine (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Parent PAHs	Anthracene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Parent PAHs	Chrysene (%)_Parent PAHs	(Intercept)	4.434381865	-	-	-	0
FR_FR4	Parent PAHs	Chrysene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Parent PAHs	Fluorene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Parent PAHs	Naphthalene (%)_Parent PAHs	(Intercept)	4.454347296	-	-	-	0
FR_FR4	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	(Intercept)	-2.995732274	-	-	-	0
FR_FR4	Parent PAHs	Phenanthrene (%)_Parent PAHs	(Intercept)	4.469350463	-	-	-	0
FR_FR4	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	(Intercept)	-3.912023005	-	-	-	0
FR_FR4	Parent PAHs	Pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Parent PAHs	Quinoline (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_FR4	Speciation of Selenium	Total Selenium 4+ (µg/L)_Speciation of Selenium	(Intercept)	-51.04933793	51.85308875	-0.984499461	0.428662289	0
FR_FR4	Speciation of Selenium	Total Selenium 4+ (µg/L)_Speciation of Selenium	Date	0.003126848	0.003260569	0.958988385	0.438761698	0
FR_FR4	Speciation of Selenium	Total Selenium 6+ (µg/L)_Speciation of Selenium	(Intercept)	-11.60267325	57.41767074	-0.202074955	0.858548154	0
FR_FR4	Speciation of Selenium	Total Selenium 6+ (µg/L)_Speciation of Selenium	Date	0.000961021	0.003610475	0.266175863	0.81503294	0
FR_FR4	Speciation of Selenium	Total Selenocyanate (µg/L)_Speciation of Selenium	(Intercept)	-43.95223852	22.56675697	-1.947654179	0.190817077	0
FR_FR4	Speciation of Selenium	Total Selenocyanate (µg/L)_Speciation of Selenium	Date	0.002591594	0.001419018	1.826329398	0.209335209	0
FR_FR4	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	0.266350187	3.860388752	0.06899569	0.945181696	0
FR_FR4	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000251117	0.000231986	-1.082466351	0.28260804	0
FR_FR4	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-6.107958209	0.592459891	-10.30948812	6.8441E-16	0
FR_FR4	Total Metals	Antimony (mg/L)_Total Metals	Date	-0.000128505	3.56032E-05	-3.609362165	0.000559399	0
FR_FR4	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-7.831826241	0.903099744	-8.672160846	7.67868E-13	0
FR_FR4	Total Metals	Arsenic (mg/L)_Total Metals	Date	-6.24795E-05	5.42708E-05	-1.151255897	0.253383814	0
FR_FR4	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-2.696383331	0.632458709	-4.263334968	5.94042E-05	0
FR_FR4	Total Metals	Barium (mg/L)_Total Metals	Date	7.95397E-06	3.80069E-05	0.209276973	0.83481494	0
FR_FR4	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	4.291127044	1.13162696	3.791997888	0.000305391	0
FR_FR4	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000847304	6.80039E-05	-12.45965123	9.5408E-20	0
FR_FR4	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	12.81779134	1.568370046	8.172683083	6.67029E-12	0
FR_FR4	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001302161	9.42494E-05	-13.81611192	4.64062E-22	0
FR_FR4	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-2.872403878	0.37175947	-7.726511665	4.59239E-11	0
FR_FR4	Total Metals	Boron (mg/L)_Total Metals	Date	-9.46505E-05	2.23405E-05	-4.236729404	6.53322E-05	0
FR_FR4	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-3.99329373	1.009299785	-3.95649914	0.000174524	0
FR_FR4	Total Metals	Cadmium (mg/L)_Total Metals	Date	-0.000324583	6.06527E-05	-5.351490456	9.63403E-07	0
FR_FR4	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.519032813	0.718125679	6.29281607	2.06924E-08	0
FR_FR4	Total Metals	Calcium (mg/L)_Total Metals	Date	6.09689E-06	4.3155E-05	0.141279094	0.888038615	0
FR_FR4	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-6.296166333	1.753945807	-3.589715434	0.000596416	0
FR_FR4	Total Metals	Chromium (mg/L)_Total Metals	Date	-0.000131611	0.000105401	-1.248663714	0.215777747	0
FR_FR4	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-5.378750402	1.175702315	-4.574925415	1.9074E-05	0
FR_FR4	Total Metals	Cobalt (mg/L)_Total Metals	Date	-0.000208507	7.06525E-05	-2.951157569	0.004253942	0
FR_FR4	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-5.882118035	1.063583832	-5.530469587	4.71601E-07	0
FR_FR4	Total Metals	Copper (mg/L)_Total Metals	Date	-9.28983E-05	6.39149E-05	-1.453468619	0.15037932	0
FR_FR4	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	2.041354213	2.527131759	0.807775141	0.421844444	0
FR_FR4	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000299512	0.000151865	-1.972222339	0.052372793	0
FR_FR4	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-6.686556123	1.76028868	-3.798556567	0.00029873	0
FR_FR4	Total Metals	Lead (mg/L)_Total Metals	Date	-0.000171552	0.000105783	-1.621740641	0.109170427	0
FR_FR4	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-6.271703171	1.100427484	-5.699333451	2.38557E-07	0
FR_FR4	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000166249	6.6129E-05	2.514016872	0.014141244	1
FR_FR4	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	3.763009884	0.910056865	4.134917307	9.37474E-05	0
FR_FR4	Total Metals	Magnesium (mg/L)_Total Metals	Date	1.01216E-06	5.46888E-05	0.018507584	0.98528442	0
FR_FR4	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-1.023307543	1.308874195	-0.781822689	0.436847266	0
FR_FR4	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.000205057	7.86553E-05	-2.607030739	0.011066872	0
FR_FR4	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	11.79191918	1.630651398	7.231416346	3.86983E-10	0
FR_FR4	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.00146779	9.79922E-05	-14.97865014	5.81526E-24	0
FR_FR4	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-5.024576132	0.505966027	-9.930659097	3.4249E-15	0
FR_FR4	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-8.99089E-05	3.04055E-05	-2.956997435	0.004182761	0
FR_FR4	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-2.750198161	0.98827294	-2.782832606	0.006855307	0
FR_FR4	Total Metals	Nickel (mg/L)_Total Metals	Date	-0.000164078	5.93892E-05	-2.762765721	0.007247868	0
FR_FR4	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	2.013302917	0.556775239	3.616006559	0.000547382	0
FR_FR4	Total Metals	Potassium (mg/L)_Total Metals	Date	-8.77078E-05	3.34588E-05	-2.621368388	0.010651023	0
FR_FR4	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-2.419927892	1.152174976	-2.100312837	0.039156298	0
FR_FR4	Total Metals	Selenium (mg/L)_Total Metals	Date	-4.00885E-05	6.92387E-05	-0.578989972	0.564378262	0
FR_FR4	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	0.498089481	0.426944314	1.166638048	0.247206181	0
FR_FR4	Total Metals	Silicon (mg/L)_Total Metals	Date	8.70205E-06	2.56712E-05	0.338981777	0.73561013	0
FR_FR4	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.79930472	0.457315052	-25.80126034	2.00837E-38	0
FR_FR4	Total Metals	Silver (mg/L)_Total Metals	Date	1.97766E-05	2.74818E-05	0.719623894	0.474054236	0
FR_FR4	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	3.077259507	0.864287266	3.560459151	0.000655878	0
FR_FR4	Total Metals	Sodium (mg/L)_Total Metals	Date	-0.000146858	5.19384E-05	-2.827537057	0.006049907	0
FR_FR4	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-2.741638666	0.704916775	-3.889308304	0.000219687	0
FR_FR4	Total Metals	Strontium (mg/L)_Total Metals	Date	4.7879E-05	4.23612E-05	1.130255974	0.262068348	0
FR_FR4	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-10.49980539	0.848334488	-12.37696397	1.3297E-19	0
FR_FR4	Total Metals	Thallium (mg/L)_Total Metals	Date	-5.14257E-05	5.09797E-05	-1.008747795	0.316427597	0
FR_FR4	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.074477278	0.381281072	-23.79996789	3.92646E-36	0
FR_FR4	Total Metals	Tin (mg/L)_Total Metals	Date	-6.66736E-06	2.29127E-05	-0.290990065	0.771884085	0
FR_FR4	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-3.102501052	0.718687651	-4.316897677	4.9006E-05	0
FR_FR4	Total Metals	Titanium (mg/L)_Total Metals	Date	-8.09435E-05	4.31887E-05	-1.87418126	0.064906987	0
FR_FR4	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-6.820808771	0.972161039	-7.016130558	9.72451E-10	0
FR_FR4	Total Metals	Uranium (mg/L)_Total Metals	Date	4.93448E-05	5.84209E-05	0.844642789	0.401070007	0
FR_FR4	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-2.28627466	1.137536457	-2.009847374	0.048143585	0
FR_FR4	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000292062	6.8359E-05	-4.272473047	5.74907E-05	0
FR_FR4	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-3.272891695	0.938679835	-3.486696501	0.000831757	0
FR_FR4	Total Metals	Zinc (mg/L)_Total Metals	Date	-0.000137203	5.64089E-05	-2.432291475	0.017455811	0
FR_FR4	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	24.86438722	32.47575627	0.765629198	0.584014187	0
FR_FR4	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	-0.001638778	0.002038884	-0.803762139	0.568988855	0
FR_FR4	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FR4	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	-6.44802E-19	-	-	-	0
FR_FR4	Volatile Organics	Extracted Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FR4	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	20.95355526	27.63751139	0.758156368	0.587024257	0
FR_FR4	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	-0.001394632	0.001735131	-0.803762139	0.568988855	0
FR_FR4	Volatile Organics	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FR4	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FR4	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	Date	-6.44802E-19	-	-	-	0
FR_FR4	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-0.693147181	-	-	-	0
FR_FR4	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-3.673672285	23.74166404	-0.154735249	0.891234761	0
FR_FR4	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	0.000158148	0.001499293	0.105481602	0.925619852	0
FR_FR5	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.194630165	1.060340806	-0.183554348	0.854851915	0
FR_FR5	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	2.14775E-05	6.37198E-05	0.337061945	0.73699927	0
FR_FR5	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.004157054	0.316101597	15.83085027	1.27785E-25	0
FR_FR5	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	1.48805E-05	1.90083E-05	0.78284029	0.436185817	0
FR_FR5	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	1.962162279	2.424243039	0.809391735	0.420850278	0
FR_FR5	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-5.91692E-05	0.000145778	-0.405884128	0.68598342	0
FR_FR5	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	5.985407734	0.462586543	12.93900097	6.73626E-21	0
FR_FR5	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	4.29884E-05	2.77985E-05	1.54642761	0.126155525	0
FR_FR5	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-1.079229796	0.897510157	-1.202470843	0.232914197	0
FR_FR5	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	5.1067E-05	5.39347E-05	0.946830309	0.346726064	0
FR_FR5	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.637753087	0.51016225	11.05090211	1.77505E-17	0
FR_FR5	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	3.00849E-05	3.06575E-05	0.98132146	0.32954789	0
FR_FR5	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0	0	-	-	0
FR_FR5	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0	0	-	-	0
FR_FR5	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	6.865405951	0.458158441	14.98478547	2.14765E-24	0
FR_FR5	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-5.61731E-05	2.75324E-05	-2.040251774	0.044799425	0
FR_FR5	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.204049942	0.05775088	38.16478508	2.48892E-51	0
FR_FR5	Conventional Parameters	pH (-)_Conventional Parameters	Date	-5.52018E-06	3.47046E-06	-1.59061753	0.115847073	0
FR_FR5	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.010657372	0.304984354	16.42922764	1.00527E-26	0
FR_FR5	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	1.57342E-05	1.83276E-05	0.858494099	0.393319207	0
FR_FR5	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	5.673480507	0.533803888	10.62839861	1.08834E-16	0
FR_FR5	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	4.25986E-05	3.20782E-05	1.327961481	0.188165407	0
FR_FR5	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	1.63063168	1.111503022	1.467051055	0.146488233	0
FR_FR5	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-0.000104169	6.67943E-05	-1.559542875	0.123022677	0
FR_FR5	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	8.805705961	2.072908346	4.247995807	6.04934E-05	0
FR_FR5	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-0.000486838	0.000124569	-3.908192251	0.000200309	0
FR_FR5	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	0.717769957	2.744074782	0.261570844	0.794359907	0
FR_FR5	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-8.7479E-05	0.000164901	-0.530492715	0.597317067	0
FR_FR5	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-4.792942683	0.845098637	-5.671459491	2.43613E-07	0
FR_FR5	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-6.03804E-05	5.07851E-05	-1.188939937	0.238164919	0
FR_FR5	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-8.818679417	0.769392421	-11.46187455	3.09221E-18	0
FR_FR5	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	-1.369E-05	4.62356E-05	-0.296091411	0.767967836	0
FR_FR5	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-9.865627909	0.618846631	-15.94195948	5.96142E-26	0
FR_FR5	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	4.21922E-05	3.71888E-05	1.13454171	0.260133142	0
FR_FR5	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-1.612182896	0.649869711	-2.480778637	0.01532062	0
FR_FR5	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	-3.4309E-05	3.9053E-05	-0.878521783	0.382429705	0
FR_FR5	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	3.710655443	1.103253124	3.363376329	0.001208528	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_FR5	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000813322	6.62985E-05	-12.2675706	1.05906E-19	0
FR_FR5	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	11.63439621	1.489378107	7.811579984	2.5241E-11	0
FR_FR5	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001231072	8.95022E-05	-13.75466437	2.55223E-22	0
FR_FR5	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.077708774	0.654030042	-6.23474231	2.3328E-08	0
FR_FR5	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-2.52158E-05	3.93031E-05	-0.641573013	0.523080742	0
FR_FR5	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-9.15001096	0.824225712	-11.10134133	1.43111E-17	0
FR_FR5	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-8.77058E-05	4.95307E-05	-1.770735473	0.080614429	0
FR_FR5	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-6.639300251	0.751619289	-8.833328713	2.78403E-13	0
FR_FR5	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-0.00014108	4.51675E-05	-3.123488012	0.002529262	0
FR_FR5	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-10.49531445	0.650191215	-16.14188904	2.86145E-26	0
FR_FR5	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	8.0721E-05	3.90724E-05	2.065937101	0.042242753	1
FR_FR5	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-6.411936054	0.715288989	-8.964119609	1.56371E-13	0
FR_FR5	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-7.4873E-05	4.29843E-05	-1.741866745	0.085577556	0
FR_FR5	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	3.711657112	0.96539826	3.844690078	0.000248989	0
FR_FR5	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000475909	5.80143E-05	-8.203306772	4.49131E-12	0
FR_FR5	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.59200901	0.617289809	-17.15889176	7.3915E-28	0
FR_FR5	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	4.39774E-05	3.70952E-05	1.185528194	0.239502213	0
FR_FR5	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-8.023559319	0.426794918	-18.7995662	2.6452E-30	0
FR_FR5	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000246508	2.56477E-05	9.611337078	9.08003E-15	1
FR_FR5	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-5.644719836	1.352945855	-4.1721698	7.93926E-05	0
FR_FR5	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	-6.24686E-05	8.13035E-05	-0.76833835	0.444667126	0
FR_FR5	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-5.508927253	0.401476273	-13.72167578	3.823E-22	0
FR_FR5	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000383753	2.41362E-05	-15.89945224	9.94378E-26	0
FR_FR5	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-6.73614617	0.572221576	-11.77191921	8.36989E-19	0
FR_FR5	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	-2.81908E-05	3.43869E-05	-0.819812395	0.414886748	0
FR_FR5	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-5.825651306	1.335479064	-4.362218371	3.99705E-05	0
FR_FR5	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	-7.19967E-05	8.02538E-05	-0.897112605	0.372491905	0
FR_FR5	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-4.738094348	0.678299535	-6.985253712	9.36091E-10	0
FR_FR5	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.000111898	4.07615E-05	2.745186113	0.007543915	1
FR_FR5	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.541833494	0.312315139	1.734893469	0.086813452	0
FR_FR5	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	9.1838E-06	1.87682E-05	0.489328572	0.626018428	0
FR_FR5	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-12.24045125	0.616615617	-19.85102373	8.43943E-32	0
FR_FR5	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	4.62504E-05	3.70547E-05	1.248165599	0.21580213	0
FR_FR5	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-2.331185568	0.52071392	-4.476902721	2.62168E-05	0
FR_FR5	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	2.38127E-05	3.12916E-05	0.760994376	0.449015178	0
FR_FR5	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-12.24045125	0.616615617	-19.85102373	8.43943E-32	0
FR_FR5	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	4.62504E-05	3.70547E-05	1.248165599	0.21580213	0
FR_FR5	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.937866162	0.616615617	-16.11679283	3.13674E-26	0
FR_FR5	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	4.62504E-05	3.70547E-05	1.248165599	0.21580213	0
FR_FR5	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-3.397380815	0.394692808	-8.607658268	7.53724E-13	0
FR_FR5	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-6.7987E-05	2.37185E-05	-2.866408731	0.005368067	0
FR_FR5	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-7.666210163	0.391773943	-19.56794296	2.10763E-31	0
FR_FR5	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	9.00915E-05	2.35431E-05	3.826656641	0.000264758	1
FR_FR5	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-1.625872108	0.727857711	-2.233777403	0.028438703	0
FR_FR5	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000338262	4.37396E-05	-7.733537662	3.55774E-11	0
FR_FR5	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	-0.010082667	0.867853911	-0.011617931	0.990760885	0
FR_FR5	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.00036169	5.21525E-05	-6.935241996	1.16261E-09	0
FR_FR5	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	3.180924066	0.772434021	4.118052781	0.000107123	0
FR_FR5	Field Measured	Conductivity (µS/cm)_Field Measured	Date	0.000202707	4.59652E-05	4.410000135	3.83608E-05	1
FR_FR5	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	5.012022905	0.270927532	18.4994964	4.9823E-28	0
FR_FR5	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-3.37276E-05	1.61221E-05	-2.092011956	0.040230023	0
FR_FR5	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	2.989516876	0.29617825	10.09364083	4.39012E-15	0
FR_FR5	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-3.38124E-05	1.76247E-05	-1.918469506	0.059313724	0
FR_FR5	Field Measured	pH (-)_Field Measured	(Intercept)	2.267190113	0.109037934	20.79267314	6.23683E-31	0
FR_FR5	Field Measured	pH (-)_Field Measured	Date	-9.45647E-06	6.48852E-06	-1.457414916	0.149673169	0
FR_FR5	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	6.879823791	2.017226557	3.410535999	0.00104108	0
FR_FR5	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.000515565	0.000121223	-4.253045004	5.94026E-05	0
FR_FR5	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	4.477754984	0.508903301	8.798832652	3.24169E-13	0
FR_FR5	Major Ions	Calcium (mg/L)_Major Ions	Date	1.32254E-05	3.05819E-05	0.432459355	0.666632242	0
FR_FR5	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	3.327461399	0.823545153	4.04041161	0.000126532	0
FR_FR5	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000156914	4.94898E-05	-3.170630647	0.002193502	0
FR_FR5	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	1.743175886	0.447000499	3.899717987	0.000206233	0
FR_FR5	Major Ions	Fluoride (mg/L)_Major Ions	Date	-0.000212872	2.68619E-05	-7.924668035	1.53423E-11	0
FR_FR5	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	(Intercept)	-6.912191999	8.413961105	-0.821514613	0.420582528	0
FR_FR5	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	Date	3.82054E-05	0.000479523	0.079673844	0.937251044	0
FR_FR5	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	2.928538709	0.519852121	5.633407256	2.84687E-07	0
FR_FR5	Major Ions	Magnesium (mg/L)_Major Ions	Date	5.39873E-05	3.12398E-05	1.728157926	0.088021129	0
FR_FR5	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	2.90685589	0.425374313	6.833642284	1.80398E-09	0
FR_FR5	Major Ions	Potassium (mg/L)_Major Ions	Date	-0.000150729	2.55623E-05	-5.896537119	9.62239E-08	0
FR_FR5	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	0.314593164	0.47237116	0.665987237	0.507435739	0
FR_FR5	Major Ions	Sodium (mg/L)_Major Ions	Date	2.5317E-05	2.83865E-05	0.891867903	0.375278822	0
FR_FR5	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	4.020969344	0.717916173	5.600889763	3.25134E-07	0
FR_FR5	Major Ions	Sulphate (mg/L)_Major Ions	Date	7.98457E-05	4.31422E-05	1.850757206	0.068090223	0
FR_FR5	Major Ions	Sulphide (mg/L)_Major Ions	(Intercept)	-5.511378725	5.818211805	-0.947263336	0.35190616	0
FR_FR5	Major Ions	Sulphide (mg/L)_Major Ions	Date	-4.48452E-05	0.000333322	-0.134540226	0.893973327	0
FR_FR5	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-14.97141541	3.646900779	-4.105243415	0.004542988	0
FR_FR5	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.000503693	0.000226931	2.219584328	0.061915226	0
FR_FR5	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	4.48424E-15	-2.6849E+14	0	0
FR_FR5	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	4.91686E-19	2.83836E-19	1.732289824	0.093847024	0
FR_FR5	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	2.919538907	0.682794652	4.27586669	5.47048E-05	0
FR_FR5	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	-1.21829E-05	4.10316E-05	-0.296915466	0.767341024	0
FR_FR5	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-0.754602545	1.00294014	-0.752390412	0.454140379	0
FR_FR5	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000256104	6.02703E-05	-4.249247841	6.02211E-05	0
FR_FR5	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-10.08570548	1.461250399	-6.902106231	1.3419E-09	0
FR_FR5	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000306833	8.78119E-05	3.494203377	0.000796563	1
FR_FR5	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-10.71351275	1.740529291	-6.15531885	3.26069E-08	0
FR_FR5	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000503974	0.000104595	4.818352147	7.23709E-06	1
FR_FR5	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-7.312919234	0.622552066	-11.74667892	6.32522E-18	0
FR_FR5	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	2.96779E-05	3.72482E-05	0.796760541	0.42840451	0
FR_FR5	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-62.31202055	45.97099741	-1.35546375	0.217375896	0
FR_FR5	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.003663981	0.002973207	1.232332987	0.257607052	0
FR_FR5	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	13.63111614	3.32562028	4.098819165	0.000103016	0
FR_FR5	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.001128795	0.000199849	-5.648250722	2.67911E-07	0
FR_FR5	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	0.632793604	3.107966193	0.20360376	0.839207335	0
FR_FR5	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000318992	0.000186769	-1.707946665	0.091728144	0
FR_FR5	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-8.436969145	0.767341421	-10.99506545	2.25362E-17	0
FR_FR5	Total Metals	Antimony (mg/L)_Total Metals	Date	-3.30391E-05	4.61123E-05	-0.716490442	0.475884574	0
FR_FR5	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-8.429841852	0.801874711	-10.51266704	1.79345E-16	0
FR_FR5	Total Metals	Arsenic (mg/L)_Total Metals	Date	-3.27838E-05	4.81876E-05	-0.680337464	0.498358164	0
FR_FR5	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-1.202453243	0.633665766	-1.897614338	0.061544949	0
FR_FR5	Total Metals	Barium (mg/L)_Total Metals	Date	-5.88706E-05	3.80793E-05	-1.545999999	0.126258726	0
FR_FR5	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	4.168954575	1.044929472	3.989699484	0.000151062	0
FR_FR5	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000842134	6.27936E-05	-13.41113951	1.00283E-21	0
FR_FR5	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	12.09269534	1.421597007	8.50641587	1.17848E-12	0
FR_FR5	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001259885	8.5429E-05	-14.74774864	5.31231E-24	0
FR_FR5	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-3.411963071	0.509326742	-6.698967063	3.22301E-09	0
FR_FR5	Total Metals	Boron (mg/L)_Total Metals	Date	-6.53987E-05	3.06073E-05	-2.136703252	0.035840112	0
FR_FR5	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-8.304553558	0.975379004	-8.51418118	1.13877E-12	0
FR_FR5	Total Metals	Cadmium (mg/L)_Total Metals	Date	-0.000125211	5.86141E-05	-2.136187249	0.03588356	0
FR_FR5	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.597705382	0.504071943	9.121129321	7.82835E-14	0
FR_FR5	Total Metals	Calcium (mg/L)_Total Metals	Date	6.33733E-06	3.02915E-05	0.209211318	0.834843039	0
FR_FR5	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-7.967689603	1.248960623	-6.379456209	1.26352E-08	0
FR_FR5	Total Metals	Chromium (mg/L)_Total Metals	Date	-3.18458E-05	7.50546E-05	-0.424301722	0.672544458	0
FR_FR5	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-9.283659354	0.725408409	-12.79783808	1.19684E-20	0
FR_FR5	Total Metals	Cobalt (mg/L)_Total Metals	Date	1.10342E-05	4.35924E-05	0.253122627	0.800856885	0
FR_FR5	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-7.355959936	0.564359334	-13.03417787	4.57838E-21	0
FR_FR5	Total Metals	Copper (mg/L)_Total Metals	Date	-1.04035E-05	3.39144E-05	-0.306758745	0.759865906	0
FR_FR5	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	4.003432112	2.189105824	1.82879789	0.071353015	0
FR_FR5	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000457071	0.000131551	-3.474467814	0.000848787	0
FR_FR5	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-8.166980036	1.147028098	-7.120122036	5.21097E-10	0
FR_FR5	Total Metals	Lead (mg/L)_Total Metals	Date	-9.25026E-05	6.89291E-05	-1.341996469	0.183592758	0
FR_FR5	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-7.919769705	0.427105154	-18.54290364	6.25182E-30	0
FR_FR5	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000240448	2.56663E-05	9.368242228	2.63923E-14	1
FR_FR5	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	3.177385196	0.514690623	6.173388548	3.02183E-08	0
FR_FR5	Total Metals	Magnesium (mg/L)_Total Metals	Date	3.95359E-05	3.09296E-05	1.278251515	0.205050871	0
FR_FR5	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-2.878202184	1.734774295	-1.659121992	0.101212732	0
FR_FR5	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.000181056	0.000104249	-1.736762464	0.086480771	0
FR_FR5	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	13.1757815	1.488268001	8.853097355	2.55152E-13	0
FR_FR5	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001560371	8.94355E-05	-17.44689422	2.68631E-28	0
FR_FR5	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-6.558287324	0.570525796	-11.49516354	2.68609E-18	0
FR_FR5	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-3.80987E-05	3.4285E-05	-1.111236856	0.269969569	0
FR_FR5	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-6.242502676	1.590842416	-3.924023281	0.000189675	0
FR_FR5	Total Metals	Nickel (mg/L)_Total Metals	Date	-3.90084E-05	9.55995E-05	-0.408039547	0.684391917	0
FR_FR5	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	3.181925999	0.400431621	7.946240577	1.39515E-11	0
FR_FR5	Total Metals	Potassium (mg/L)_Total Metals	Date	-0.000167324	2.40634E-05	-6.953448715	1.07445E-09	0
FR_FR5	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-4.063768	0.665448198	-6.106813438	3.99819E-08	0
FR_FR5	Total Metals	Selenium (mg/L)_Total Metals	Date	6.99293E-05	3.99892E-05	1.748703512	0.084379969	0
FR_FR5	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	0.643508889	0.294265344	2.186832065	0.03183152	0
FR_FR5	Total Metals	Silicon (mg/L)_Total Metals	Date	5.52487E-06	1.76835E-05	0.312431208	0.755568477	0
FR_FR5	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.49814708	0.950717616	-12.09417695	2.17586E-19	0
FR_FR5	Total Metals	Silver (mg/L)_Total Metals	Date	5.0974E-06	5.71321E-05	0.08922133	0.929140718	0
FR_FR5	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	0.624580679	0.480708145	1.2992929	0.197771159	0
FR_FR5	Total Metals	Sodium (mg/L)_Total Metals	Date	7.10896E-06	2.88875E-05	0.246091028	0.806275188	0
FR_FR5	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-2.077862177	0.531087921	-3.912463633	0.000197385	0
FR_FR5	Total Metals	Strontium (mg/L)_Total Metals	Date	9.18911E-06	3.1915E-05	0.287924442	0.774188294	0
FR_FR5	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-11.42272235	0.522994967	-21.84097951	1.72917E-34	0
FR_FR5	Total Metals	Thallium (mg/L)_Total Metals	Date	-2.27548E-06	3.14287E-05	-0.072401277	0.942472771	0
FR_FR5	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.479567029	0.442096312	-21.44231196	5.78177E-34	0
FR_FR5	Total Metals	Tin (mg/L)_Total Metals	Date	1.74379E-05	2.65672E-05	0.656370687	0.513568115	0
FR_FR5	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-3.095728633	0.425933207	-7.268108203	2.73441E-10	0
FR_FR5	Total Metals	Titanium (mg/L)_Total Metals	Date	-8.47997E-05	2.55959E-05	-3.313019333	0.001415163	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_FR5	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-7.532642537	0.405246813	-18.58778969	5.37575E-30	0
FR_FR5	Total Metals	Uranium (mg/L)_Total Metals	Date	8.30045E-05	2.43528E-05	3.408422461	0.00104809	1
FR_FR5	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-1.459800486	0.628847304	-2.321391024	0.022947986	0
FR_FR5	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000346737	3.77897E-05	-9.175431652	6.16343E-14	0
FR_FR5	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-6.112872657	0.77260192	-7.912059885	1.62184E-11	0
FR_FR5	Total Metals	Zinc (mg/L)_Total Metals	Date	2.48821E-05	4.64285E-05	0.535923378	0.593576556	0
FR_FR5	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FR5	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	-6.8713E-19	-	-	-	0
FR_FR5	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FR5	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FR5	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-0.693147181	-	-	-	0
FR_FR5	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FR5	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	-6.8713E-19	-	-	-	0
FR_FRABCH	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	2.028002889	2.476908251	0.818763831	0.416587528	0
FR_FRABCH	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	-8.34972E-05	0.000142571	-0.585654318	0.560593499	0
FR_FRABCH	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.28583267	0.527157868	8.130074366	7.93465E-11	0
FR_FRABCH	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	6.17227E-05	3.03464E-05	2.033939233	0.047073934	1
FR_FRABCH	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-2.314495776	3.577575813	-0.646945277	0.520513034	0
FR_FRABCH	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000169392	0.000205947	0.822504694	0.41454555	0
FR_FRABCH	Conventional Parameters	Conductivity (µmhos/cm)_Conventional Parameters	(Intercept)	6.429719478	-	-	-	0
FR_FRABCH	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	5.501056439	0.792795801	6.938806226	5.65833E-09	0
FR_FRABCH	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	7.71658E-05	4.56333E-05	1.690996127	0.096710848	0
FR_FRABCH	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	0.791553022	1.670067528	0.473964681	0.637471882	0
FR_FRABCH	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	-5.5653E-05	9.61291E-05	-0.578939748	0.565082306	0
FR_FRABCH	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.501919576	0.884875409	5.087631016	4.87429E-06	0
FR_FRABCH	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000102618	5.09334E-05	2.014751933	0.049016442	1
FR_FRABCH	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0	0	-	-	0
FR_FRABCH	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0	0	-	-	0
FR_FRABCH	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	4.543861137	0.764647103	5.942429021	2.23547E-07	0
FR_FRABCH	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	7.68876E-05	4.40131E-05	1.746926674	0.086442946	0
FR_FRABCH	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.065206759	0.056814456	36.35002227	3.80124E-39	0
FR_FRABCH	Conventional Parameters	pH (-)_Conventional Parameters	Date	2.50203E-06	3.27024E-06	0.765090937	0.447610962	0
FR_FRABCH	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.240155558	0.486721435	8.711668017	8.31057E-12	0
FR_FRABCH	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	6.50012E-05	2.80157E-05	2.320170282	0.024213632	1
FR_FRABCH	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	4.734213041	0.943367139	5.018420555	6.22362E-06	0
FR_FRABCH	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	0.000104326	5.43002E-05	1.92127608	0.060082161	0
FR_FRABCH	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	5.460808642	2.151657417	2.537954509	0.014125782	0
FR_FRABCH	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-0.000315139	0.000123849	-2.544536052	0.013891355	0
FR_FRABCH	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	8.378214101	4.836580135	1.732259958	0.089043837	0
FR_FRABCH	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-0.000433389	0.000278394	-1.55675091	0.12548146	0
FR_FRABCH	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	5.645303442	5.212324537	1.083068293	0.283680977	0
FR_FRABCH	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-0.000337404	0.000300021	-1.124599136	0.265826485	0
FR_FRABCH	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-5.184513901	2.463829899	-2.104249933	0.040116696	0
FR_FRABCH	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-3.02492E-05	0.000141818	-0.213295686	0.831914701	0
FR_FRABCH	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-8.400183641	1.485042415	-5.656527759	6.33676E-07	0
FR_FRABCH	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	-3.30335E-05	8.5479E-05	-0.386451627	0.700709401	0
FR_FRABCH	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-8.326653736	1.341258695	-6.208089288	8.43148E-08	0
FR_FRABCH	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	-4.6131E-05	7.72029E-05	-0.597530137	0.552698052	0
FR_FRABCH	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-1.754299481	0.943026671	-1.860286177	0.068397633	0
FR_FRABCH	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	-3.18078E-05	5.42806E-05	-0.585987933	0.560370935	0
FR_FRABCH	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	6.299166865	2.088102159	3.016694771	0.003919711	0
FR_FRABCH	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000960046	0.000120191	-7.987654962	1.17095E-10	0
FR_FRABCH	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	-3.934376462	2.097862607	-1.875421416	0.066248122	0
FR_FRABCH	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.000335026	0.000120753	-2.774476886	0.007619312	0
FR_FRABCH	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.040490173	1.298625958	-3.11135793	0.002997595	0
FR_FRABCH	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-2.35324E-05	7.47489E-05	-0.31481866	0.754135446	0
FR_FRABCH	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-10.78125122	0.992162688	-10.86641471	4.24999E-15	0
FR_FRABCH	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	2.60456E-05	5.71089E-05	0.456069443	0.650203389	0
FR_FRABCH	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-10.36006168	1.46091679	-7.091479643	3.21323E-09	0
FR_FRABCH	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	7.56952E-05	8.40904E-05	0.900164714	0.372104651	0
FR_FRABCH	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-12.8059952	1.513744836	-8.45981099	2.07696E-11	0
FR_FRABCH	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	0.000217048	8.71312E-05	2.491045312	0.01590329	1
FR_FRABCH	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-6.72066923	1.452753423	-4.626159625	2.43756E-05	0
FR_FRABCH	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-5.61474E-05	8.36205E-05	-0.671455179	0.504846808	0
FR_FRABCH	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	-4.860170139	1.983416789	-2.450402843	0.017604275	0
FR_FRABCH	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	2.4037E-05	0.000114165	0.210545516	0.834049314	0
FR_FRABCH	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.59200744	1.454935331	-7.280053766	1.59767E-09	0
FR_FRABCH	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	4.52909E-05	8.37461E-05	0.540812738	0.590902483	0
FR_FRABCH	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-6.237534486	0.770254181	-8.098020939	7.80571E-11	0
FR_FRABCH	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000155046	4.43358E-05	3.497079161	0.000960405	1
FR_FRABCH	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-6.678874875	1.778008311	-3.756380008	0.000430405	0
FR_FRABCH	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	6.93244E-05	0.000102342	0.677378828	0.501111903	0
FR_FRABCH	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-10.194675	0.517042354	-19.71729187	4.57093E-26	0
FR_FRABCH	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000114081	2.9761E-05	-3.83324562	0.000337489	0
FR_FRABCH	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-6.550027639	0.87932747	-7.44890597	8.55034E-10	0
FR_FRABCH	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	-3.33853E-05	5.06141E-05	-0.659603914	0.512364189	0
FR_FRABCH	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-4.506685563	2.285976432	-1.971448831	0.053902971	0
FR_FRABCH	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	-0.000133979	0.000131581	-1.018222761	0.313197763	0
FR_FRABCH	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-7.026708746	1.166683504	-6.022806293	1.66537E-07	0
FR_FRABCH	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.00025276	6.71543E-05	3.763864694	0.000420375	1
FR_FRABCH	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.033468375	0.534998594	0.062557876	0.950353906	0
FR_FRABCH	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	4.0424E-05	3.07945E-05	1.312701912	0.194939448	0
FR_FRABCH	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.36774946	1.319228175	-8.616969889	1.17204E-11	0
FR_FRABCH	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	-4.45525E-06	7.59348E-05	-0.058672078	0.953433962	0
FR_FRABCH	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-3.688403644	0.845264835	-4.363607112	5.94769E-05	0
FR_FRABCH	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	0.000105419	4.86534E-05	2.166737017	0.034770693	1
FR_FRABCH	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.37336013	1.318934574	-8.623142004	1.14605E-11	0
FR_FRABCH	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	-4.11141E-06	7.59179E-05	-0.054155959	0.957014535	0
FR_FRABCH	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.065164369	1.319228175	-6.871566678	7.25948E-09	0
FR_FRABCH	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	-4.45525E-06	7.59348E-05	-0.058672078	0.953433962	0
FR_FRABCH	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-3.681236424	0.369671316	-9.95813378	9.74134E-14	0
FR_FRABCH	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-5.19931E-05	2.12783E-05	-2.443480594	0.017909814	0
FR_FRABCH	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-9.268058152	0.715167329	-12.95928628	4.62097E-18	0
FR_FRABCH	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	0.000193965	4.1165E-05	4.711879877	1.81441E-05	1
FR_FRABCH	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-5.725400048	1.389756016	-4.119715965	0.000133722	0
FR_FRABCH	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000102567	7.99944E-05	-1.282172282	0.205362315	0
FR_FRABCH	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	3.973387718	1.668661489	2.38118261	0.020881905	0
FR_FRABCH	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000586812	9.60482E-05	-6.109557266	1.21129E-07	0
FR_FRABCH	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	1.038195761	2.096976457	0.495091758	0.622581749	0
FR_FRABCH	Field Measured	Conductivity (µS/cm)_Field Measured	Date	0.000320452	0.000120702	2.654902753	0.010452294	1
FR_FRABCH	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	5.166716575	0.507301414	10.18470762	4.41913E-14	0
FR_FRABCH	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-4.95742E-05	2.92003E-05	-1.697731749	0.095423451	0
FR_FRABCH	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	2.920157931	0.506703097	5.763055223	4.30251E-07	0
FR_FRABCH	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-3.74802E-05	2.91658E-05	-1.285073136	0.20435439	0
FR_FRABCH	Field Measured	pH (-)_Field Measured	(Intercept)	2.255833941	0.080417641	28.05148125	1.79001E-33	0
FR_FRABCH	Field Measured	pH (-)_Field Measured	Date	-9.6777E-06	4.62884E-06	-2.090741042	0.041362511	0
FR_FRABCH	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	-1.373451085	3.228889024	-0.42536336	0.67229403	0
FR_FRABCH	Major Ions	Bromide (mg/L)_Major Ions	Date	-3.94599E-05	0.000185855	-0.212315511	0.832675343	0
FR_FRABCH	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	3.542588315	0.875808576	4.04493449	0.00017076	0
FR_FRABCH	Major Ions	Calcium (mg/L)_Major Ions	Date	7.35964E-05	5.04115E-05	1.459911916	0.150216736	0
FR_FRABCH	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	1.398507583	1.704629346	0.820417404	0.415652914	0
FR_FRABCH	Major Ions	Chloride (mg/L)_Major Ions	Date	-4.70431E-05	9.81185E-05	-0.479452269	0.633589465	0
FR_FRABCH	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-1.20553604	0.875933527	-1.37628713	0.17452009	0
FR_FRABCH	Major Ions	Fluoride (mg/L)_Major Ions	Date	-4.15671E-05	5.04187E-05	-0.824436753	0.413386456	0
FR_FRABCH	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	(Intercept)	-6.43775165	-	-	-	0
FR_FRABCH	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	1.53857509	0.909304678	1.692034724	0.096511412	0
FR_FRABCH	Major Ions	Magnesium (mg/L)_Major Ions	Date	0.000142069	5.23396E-05	2.714362416	0.00894092	1
FR_FRABCH	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	-0.03415847	0.489836511	-0.069734431	0.944667488	0
FR_FRABCH	Major Ions	Potassium (mg/L)_Major Ions	Date	3.1089E-05	2.8195E-05	1.102641986	0.2751645	0
FR_FRABCH	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	0.030519522	0.895437428	0.034083367	0.972938713	0
FR_FRABCH	Major Ions	Sodium (mg/L)_Major Ions	Date	4.25839E-05	5.15414E-05	0.826208343	0.412389875	0
FR_FRABCH	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	2.926651383	1.254236529	2.33341265	0.02345266	0
FR_FRABCH	Major Ions	Sulphate (mg/L)_Major Ions	Date	0.000151518	7.21939E-05	2.09876264	0.040618742	1
FR_FRABCH	Major Ions	Sulphide (mg/L)_Major Ions	(Intercept)	-6.502290171	-	-	-	0
FR_FRABCH	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	-	-	-	0
FR_FRABCH	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	2.757984185	1.162156612	2.373160517	0.021295149	0
FR_FRABCH	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	6.62591E-06	6.68937E-05	0.099051271	0.921471258	0
FR_FRABCH	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-3.491330706	1.618228293	-2.157501955	0.035519152	0
FR_FRABCH	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000102013	9.31452E-05	-1.095203745	0.278379484	0
FR_FRABCH	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-15.07392938	2.316964584	-6.505895467	2.8105E-08	0
FR_FRABCH	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000594241	0.000133364	4.455764085	4.35844E-05	1
FR_FRABCH	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-2.94815926	3.68107522	-0.800896228	0.426767556	0
FR_FRABCH	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	5.48514E-05	0.000211883	0.258876236	0.796733534	0
FR_FRABCH	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-6.231674622	1.993897638	-3.125373391	0.002879774	0
FR_FRABCH	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-2.4E-05	0.000114769	-0.209116098	0.83515929	0
FR_FRABCH	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	3.687054212	4.417117886	0.83471945	0.407622538	0
FR_FRABCH	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000519582	0.000254249	-2.043593578	0.045978171	0
FR_FRABCH	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	(Intercept)	-22.11187063	3.699021812	-5.977761621	0.000208105	0
FR_FRABCH	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	Date	0.000971033	0.000208141	4.665267433	0.001176432	1
FR_FRABCH	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	(Intercept)	-18.46052124	3.105929901	-5.943637439	0.000142452	0
FR_FRABCH	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	Date	0.000768598	0.000175233	4.386157888	0.001364218	1
FR_FRABCH	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	(Intercept)	-34.44762283	28.97711606	-1.188787137	0.261986936	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	Date	0.002150404	0.001634852	1.315350895	0.217751961	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	(Intercept)	26.03174187	25.32347529	1.027968775	0.32818712	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	Date	-0.001560891	0.001428718	-1.092511497	0.300228715	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	(Intercept)	-22.81163935	5.152494847	-4.427299788	0.001279495	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	Date	0.001084918	0.000290697	3.732125451	0.003896701	1
FR_FRABCH	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	(Intercept)	-21.2349684	3.076959048	-6.901284048	4.18784E-05	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	Date	0.000922087	0.000173598	5.311615947	0.000341818	1
FR_FRABCH	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	(Intercept)	-29.01250765	7.081304717	-4.097056801	0.002154703	0
FR_FRABCH	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	Date	0.001450377	0.000399518	3.63031394	0.00461017	1

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_FRABCH	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	(Intercept)	-30.72808387	7.216081354	-4.25827847	0.00166756	0
FR_FRABCH	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	Date	0.00154583	0.000407122	3.796968696	0.003503157	1
FR_FRABCH	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	8.578687863	6.053773852	1.417080993	0.162311054	0
FR_FRABCH	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000737038	0.000348455	-2.115158043	0.03913474	0
FR_FRABCH	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-6.999632619	1.367193741	-5.119707916	4.35095E-06	0
FR_FRABCH	Total Metals	Antimony (mg/L)_Total Metals	Date	-0.00010815	7.86957E-05	-1.374284012	0.175137293	0
FR_FRABCH	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-3.323256996	1.977650416	-1.680406693	0.098763696	0
FR_FRABCH	Total Metals	Arsenic (mg/L)_Total Metals	Date	-0.000319072	0.000113834	-2.802968947	0.00705802	0
FR_FRABCH	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-0.505659761	0.87542809	-0.577614275	0.565970505	0
FR_FRABCH	Total Metals	Barium (mg/L)_Total Metals	Date	-0.000103216	5.03896E-05	-2.048361734	0.045491915	0
FR_FRABCH	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	7.344933209	1.940606239	3.784865297	0.000393418	0
FR_FRABCH	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.001019823	0.000111701	-9.12991258	1.83754E-12	0
FR_FRABCH	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	-3.832837725	1.917216514	-1.999167907	0.050729118	0
FR_FRABCH	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.000342325	0.000110355	-3.102038093	0.003078429	0
FR_FRABCH	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-3.403897328	1.006002796	-3.38358635	0.001352219	0
FR_FRABCH	Total Metals	Boron (mg/L)_Total Metals	Date	-5.92701E-05	5.79055E-05	-1.023566103	0.310689598	0
FR_FRABCH	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-6.763994413	1.920129251	-3.522676616	0.000888374	0
FR_FRABCH	Total Metals	Cadmium (mg/L)_Total Metals	Date	-0.000188523	0.000110523	-1.705741959	0.093910845	0
FR_FRABCH	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	3.84057952	0.831876401	4.616767005	2.51742E-05	0
FR_FRABCH	Total Metals	Calcium (mg/L)_Total Metals	Date	5.69597E-05	4.78828E-05	1.189564134	0.239519627	0
FR_FRABCH	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-3.996532325	2.511853476	-1.59106905	0.117541759	0
FR_FRABCH	Total Metals	Chromium (mg/L)_Total Metals	Date	-0.000258883	0.000144582	-1.790555678	0.079076732	0
FR_FRABCH	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-8.600289659	2.331296197	-3.68905919	0.000531548	0
FR_FRABCH	Total Metals	Cobalt (mg/L)_Total Metals	Date	-1.7154E-05	0.000134189	-0.127834518	0.898763751	0
FR_FRABCH	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-4.18521254	1.702478316	-2.45830593	0.017261194	0
FR_FRABCH	Total Metals	Copper (mg/L)_Total Metals	Date	-0.000187939	9.79947E-05	-1.91784997	0.06052532	0
FR_FRABCH	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	8.071374406	4.687760583	1.72179749	0.090938532	0
FR_FRABCH	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000649374	0.000269828	-2.406626513	0.019618343	0
FR_FRABCH	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-4.779120673	3.24847387	-1.471189507	0.147152729	0
FR_FRABCH	Total Metals	Lead (mg/L)_Total Metals	Date	-0.000274378	0.000186982	-1.467403466	0.148175832	0
FR_FRABCH	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-6.025498731	0.719757662	-8.371565949	2.86623E-11	0
FR_FRABCH	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000143816	4.14293E-05	3.471370287	0.001038327	1
FR_FRABCH	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	2.134499818	0.887148615	2.406022826	0.019647509	0
FR_FRABCH	Total Metals	Magnesium (mg/L)_Total Metals	Date	0.000108602	5.10643E-05	2.126772926	0.0381123	1
FR_FRABCH	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	1.139703219	2.508620662	0.45431469	0.651457555	0
FR_FRABCH	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.000349361	0.000144396	-2.41946409	0.019007254	0
FR_FRABCH	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	9.071970811	3.199673698	2.83527999	0.006467826	0
FR_FRABCH	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001315987	0.000184173	-7.145375856	2.63145E-09	0
FR_FRABCH	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	871.9398295	-	-	-	0
FR_FRABCH	Total Metals	Methyl mercury (µg/L)_Total Metals	Date	-0.049921371	-	-	-	0
FR_FRABCH	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-6.333334845	0.91055214	-6.955488395	5.31909E-09	0
FR_FRABCH	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-4.51285E-05	5.24114E-05	-0.861044178	0.393092456	0
FR_FRABCH	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-2.858148712	2.646294551	-1.080056909	0.285007351	0
FR_FRABCH	Total Metals	Nickel (mg/L)_Total Metals	Date	-0.000221306	0.000152321	-1.452896415	0.152147878	0
FR_FRABCH	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	0.622111495	0.494912828	1.257012264	0.214260661	0
FR_FRABCH	Total Metals	Potassium (mg/L)_Total Metals	Date	-6.4111E-06	2.84872E-05	-0.225052182	0.822804165	0
FR_FRABCH	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-5.944267755	1.170034341	-5.080421613	5.00019E-06	0
FR_FRABCH	Total Metals	Selenium (mg/L)_Total Metals	Date	0.000188037	6.73472E-05	2.792057114	0.007268312	1
FR_FRABCH	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	1.634881377	0.768642273	2.12697302	0.038094893	0
FR_FRABCH	Total Metals	Silicon (mg/L)_Total Metals	Date	-4.75891E-05	4.42431E-05	-1.075629337	0.286965312	0
FR_FRABCH	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-8.34650192	1.410748456	-5.916364386	2.45909E-07	0
FR_FRABCH	Total Metals	Silver (mg/L)_Total Metals	Date	-0.000177041	8.12027E-05	-2.180236639	0.033701539	0
FR_FRABCH	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	0.026168828	0.900125502	0.029072421	0.97691603	0
FR_FRABCH	Total Metals	Sodium (mg/L)_Total Metals	Date	4.3587E-05	5.18112E-05	0.841265863	0.403978773	0
FR_FRABCH	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-3.168615633	0.82485903	-3.841402614	0.000328847	0
FR_FRABCH	Total Metals	Strontium (mg/L)_Total Metals	Date	7.55924E-05	4.74789E-05	1.59212683	0.117303628	0
FR_FRABCH	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-7.664412732	1.661431171	-4.613138879	2.54894E-05	0
FR_FRABCH	Total Metals	Thallium (mg/L)_Total Metals	Date	-0.000214465	9.5632E-05	-2.24260403	0.02912887	0
FR_FRABCH	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-10.14698156	1.133816219	-8.949405902	3.51761E-12	0
FR_FRABCH	Total Metals	Tin (mg/L)_Total Metals	Date	5.79093E-05	6.52625E-05	0.887329646	0.378910485	0
FR_FRABCH	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-0.920125508	0.919816308	-1.000336154	0.321693261	0
FR_FRABCH	Total Metals	Titanium (mg/L)_Total Metals	Date	-0.000208836	5.29446E-05	-3.944429584	0.000236456	0
FR_FRABCH	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-8.731322991	0.676316407	-12.91011559	5.38967E-18	0
FR_FRABCH	Total Metals	Uranium (mg/L)_Total Metals	Date	0.00016346	3.89288E-05	4.198945312	0.000102993	1
FR_FRABCH	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-2.003437194	2.140499769	-0.935967022	0.35353549	0
FR_FRABCH	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000309867	0.000123207	-2.515006914	0.014971493	0
FR_FRABCH	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-2.036647676	1.891120748	-1.076952743	0.286379099	0
FR_FRABCH	Total Metals	Zinc (mg/L)_Total Metals	Date	-0.000206138	0.000108853	-1.893728919	0.063724835	0
FR_FRABCH	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FRABCH	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FRABCH	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_FRABEC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	2.142730278	2.715728398	0.789007575	0.487714346	0
FR_FRABEC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	-0.000128296	0.000171918	-0.746262526	0.509665966	0
FR_FRABEC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	2.24737552	1.672894301	1.343405569	0.250293097	0
FR_FRABEC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000175402	0.000105662	1.660020568	0.172247896	0
FR_FRABEC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.973198583	8.882794561	-0.109559956	0.91803487	0
FR_FRABEC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000135201	0.000561051	0.240978381	0.821419919	0
FR_FRABEC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	1.54372541	3.085033174	0.500391835	0.651202564	0
FR_FRABEC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	0.000294824	0.000195296	1.50962625	0.228285902	0
FR_FRABEC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-17.71437146	2.691036464	-6.582731856	0.007133439	0
FR_FRABEC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	0.00111052	0.000170355	6.518874549	0.007333868	1
FR_FRABEC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	1.49688139	3.350788847	0.446725072	0.685353315	0
FR_FRABEC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000261228	0.00021212	1.231510686	0.305865653	0
FR_FRABEC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	1.528052809	6.203392971	0.246325328	0.817554727	0
FR_FRABEC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-8.19488E-05	0.000391816	-0.209151497	0.844549714	0
FR_FRABEC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	7.444865937	2.477343472	3.005181163	0.057431457	0
FR_FRABEC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-9.23942E-05	0.000156827	-0.589147769	0.597185442	0
FR_FRABEC1	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.215856053	0.095329579	23.24416069	2.03028E-05	0
FR_FRABEC1	Conventional Parameters	pH (-)_Conventional Parameters	Date	-6.4408E-06	6.02116E-06	-1.069694746	0.345011592	0
FR_FRABEC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	2.197299951	1.628137231	1.349579083	0.248474503	0
FR_FRABEC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000179742	0.000102836	1.747860238	0.155404144	0
FR_FRABEC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	1.225597522	3.916342585	0.31294441	0.774816827	0
FR_FRABEC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	0.000290767	0.000247922	1.172815473	0.325520341	0
FR_FRABEC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	8.892710838	1.987109859	4.475198389	0.020796896	0
FR_FRABEC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-0.000575327	0.000125793	-4.573605305	0.019614644	0
FR_FRABEC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	-6.607747905	5.863759781	-1.126879025	0.280164958	0
FR_FRABEC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	0.000476912	0.000360166	1.324145052	0.208265282	0
FR_FRABEC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	-29.40759005	4.962932809	-5.925445938	5.02198E-05	0
FR_FRABEC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	0.001792807	0.000304835	5.88123379	5.40017E-05	1
FR_FRABEC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-5.729962954	0.211304025	-27.11715001	0.000110057	0
FR_FRABEC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-4.68111E-06	1.33765E-05	-0.349950591	0.749502862	0
FR_FRABEC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-6.404667219	3.747100532	-1.709232823	0.18593925	0
FR_FRABEC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	-0.000114694	0.000237208	-0.483516554	0.661824616	0
FR_FRABEC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-8.75930138	0.894733555	-9.789843388	0.002264991	0
FR_FRABEC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	-2.71287E-05	5.66406E-05	-0.478962258	0.664709843	0
FR_FRABEC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-5.801703097	3.078203618	-1.884769111	0.155958153	0
FR_FRABEC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	0.000204716	0.000194864	1.050556428	0.370621128	0
FR_FRABEC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	-9.210340372	3.10241E-14	-2.96877E+14	8.42834E-44	0
FR_FRABEC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	1.07499E-18	1.96396E-18	0.547359487	0.622223055	0
FR_FRABEC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	24.51653261	1.300204631	18.85590316	0.000325648	0
FR_FRABEC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.002063149	8.23087E-05	-25.06598305	0.00013923	0
FR_FRABEC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-6.274182176	0.724788532	-8.656569334	0.003243047	0
FR_FRABEC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	0.000111212	4.58823E-05	2.423847999	0.09384503	0
FR_FRABEC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-19.48608003	4.70492873	-4.141631286	0.025560498	0
FR_FRABEC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	0.000542931	0.000297843	1.822876099	0.165843858	0
FR_FRABEC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-8.438217915	4.192471691	-2.01270719	0.137622647	0
FR_FRABEC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-2.89888E-05	0.000265402	-0.10922611	0.919919431	0
FR_FRABEC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-9.210340372	3.10241E-14	-2.96877E+14	8.42834E-44	0
FR_FRABEC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	1.07499E-18	1.96396E-18	0.547359487	0.622223055	0
FR_FRABEC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-7.60090246	1.55121E-14	-4.89999E+14	1.87449E-44	0
FR_FRABEC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	5.37497E-19	9.81982E-19	0.547359487	0.622223055	0
FR_FRABEC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	11.81735302	0.620355265	19.04933139	0.000315893	0
FR_FRABEC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000984372	3.92712E-05	-25.06598305	0.00013923	0
FR_FRABEC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-9.903487553	3.10241E-14	-3.19219E+14	6.77961E-44	0
FR_FRABEC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	-1.07499E-18	1.96396E-18	-0.547359487	0.622223055	0
FR_FRABEC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-14.59953246	3.336978483	-4.375075396	0.022096295	0
FR_FRABEC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000668081	0.000211246	3.162579966	0.050770033	0
FR_FRABEC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-15.772958	17.79694749	-0.886273222	0.44074786	0
FR_FRABEC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	0.000494077	0.001126626	0.438546064	0.690651147	0
FR_FRABEC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-1.844614124	0.391400594	-4.712854682	0.01808642	0
FR_FRABEC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.00062107	2.47774E-05	-25.06598305	0.00013923	0
FR_FRABEC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-5.978580193	1.97426157	-3.028261445	0.056388588	0
FR_FRABEC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	-3.64468E-05	0.00012498	-0.291621896	0.789577911	0
FR_FRABEC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-6.23058666	1.833252573	-3.398651528	0.042503433	0
FR_FRABEC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	1.35617E-05	0.000116053	0.116857943	0.914356738	0
FR_FRABEC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-6.155820477	3.587124295	-1.716087866	0.103306392	0
FR_FRABEC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.000154681	0.000220267	0.702244105	0.491508998	0
FR_FRABEC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	-1.213654485	1.343043671	-0.903659733	0.432785933	0
FR_FRABEC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	0.000108085	8.50206E-05	1.271282446	0.293243809	0
FR_FRABEC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.51292546	3.10241E-14	-3.71096E+14	4.31531E-44	0
FR_FRABEC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	1.07499E-18	1.96396E-18	0.547359487	0.622223055	0
FR_FRABEC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-6.084128419	3.413580562	-1.782330403	0.172713015	0
FR_FRABEC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	0.000251513	0.000216095	1.163899215	0.328616303	0
FR_FRABEC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.51292546	3.10241E-14	-3.71096E+14	4.31531E-44	0
FR_FRABEC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	1.07499E-18	1.96396E-18	0.547359487	0.622223055	0
FR_FRABEC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.210340372	3.10241E-14	-2.96877E+14	8.42834E-44	0
FR_FRABEC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	1.07499E-18	1.96396E-18	0.547359487	0.622223055	0
FR_FRABEC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-4.094103103	0.871527173	-4.697619571	0.018245911	0
FR_FRABEC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-3.03123E-05	5.51715E-05	-0.549419075	0.620972358	0
FR_FRABEC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-13.6902803	3.320737597	-4.12266248	0.025871915	0
FR_FRABEC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	0.000438723	0.000210217	2.086996437	0.128143628	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_FRABEC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	2.760556062	0.391400594	7.053019596	0.005858362	0
FR_FRABEC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.00062107	2.47774E-05	-25.06598305	0.00013923	0
FR_FRABEC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	-5.80914299	0	-Inf	0	0
FR_FRABEC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	0	0	-	-	0
FR_FRABEC1	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	4.181680444	3.184984707	1.3129358	0.211909424	0
FR_FRABEC1	Field Measured	Conductivity (µS/cm)_Field Measured	Date	0.000130944	0.000193674	0.676102794	0.510825121	0
FR_FRABEC1	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	4.904986333	1.066421512	4.599481799	0.000498167	0
FR_FRABEC1	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-2.47089E-05	6.48475E-05	-0.381029959	0.709335222	0
FR_FRABEC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	3.54917184	1.581220535	2.244577376	0.042834029	0
FR_FRABEC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-6.67485E-05	9.61517E-05	-0.694199238	0.499775549	0
FR_FRABEC1	Field Measured	pH (-)_Field Measured	(Intercept)	2.634354991	0.231509658	11.37902847	3.94203E-08	0
FR_FRABEC1	Field Measured	pH (-)_Field Measured	Date	-3.21785E-05	1.40778E-05	-2.28576467	0.039692836	0
FR_FRABEC1	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	-2.995732274	7.75603E-15	-3.86246E+14	3.82719E-44	0
FR_FRABEC1	Major Ions	Bromide (mg/L)_Major Ions	Date	2.68749E-19	4.90991E-19	0.547359487	0.622223055	0
FR_FRABEC1	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	0.232855309	3.020578775	0.077089633	0.943405716	0
FR_FRABEC1	Major Ions	Calcium (mg/L)_Major Ions	Date	0.000255382	0.000191216	1.335568115	0.273978102	0
FR_FRABEC1	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	1.702840714	2.044407911	0.832926103	0.465995618	0
FR_FRABEC1	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000101276	0.00012942	-0.782540613	0.490983907	0
FR_FRABEC1	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-1.816022623	0.474394063	-3.828088847	0.031401007	0
FR_FRABEC1	Major Ions	Fluoride (mg/L)_Major Ions	Date	1.56487E-05	3.00313E-05	0.521080428	0.638330269	0
FR_FRABEC1	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	-1.162195111	3.927203307	-0.295934542	0.786582493	0
FR_FRABEC1	Major Ions	Magnesium (mg/L)_Major Ions	Date	0.000274768	0.000248609	1.105219989	0.349740017	0
FR_FRABEC1	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	5.76818996	0.205452089	28.07559657	9.91982E-05	0
FR_FRABEC1	Major Ions	Potassium (mg/L)_Major Ions	Date	-0.000326009	1.3006E-05	-25.06598305	0.00013923	0
FR_FRABEC1	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	4.338773945	0.147585285	29.39841836	8.64356E-05	0
FR_FRABEC1	Major Ions	Sodium (mg/L)_Major Ions	Date	-0.000234187	9.3428E-06	-25.06598305	0.00013923	0
FR_FRABEC1	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	-0.860736539	6.249077102	-0.137738185	0.899172404	0
FR_FRABEC1	Major Ions	Sulphate (mg/L)_Major Ions	Date	0.000343097	0.000395594	0.867294591	0.449588095	0
FR_FRABEC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	0	-Inf	0	0
FR_FRABEC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	0	0	-	-	0
FR_FRABEC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-7.032220041	4.759904215	-1.477386881	0.236082484	0
FR_FRABEC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	0.000571933	0.000301323	1.898073473	0.153923585	0
FR_FRABEC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	2.629273096	6.507913536	0.404011682	0.713279925	0
FR_FRABEC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000422466	0.00041198	-1.025452919	0.380610885	0
FR_FRABEC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	8.092612819	17.3109193	0.467486023	0.672014764	0
FR_FRABEC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000732108	0.001095858	-0.668067863	0.551893375	0
FR_FRABEC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-8.496485162	10.05876345	-0.844684857	0.460324002	0
FR_FRABEC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000393048	0.000636764	0.617257574	0.580750441	0
FR_FRABEC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-6.737656554	0.388778483	-17.33032266	0.000418668	0
FR_FRABEC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-1.01543E-05	2.46114E-05	-0.412585731	0.707623255	0
FR_FRABEC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	20.43899717	46.01013893	0.444228112	0.733865136	0
FR_FRABEC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.001699363	0.002958277	-0.574443607	0.668056242	0
FR_FRABEC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	50.09653869	36.41400834	1.375749086	0.262618957	0
FR_FRABEC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.003369143	0.002305169	-1.46156038	0.240016099	0
FR_FRABEC1	Speciation of Selenium	Total Selenium 4+ (µg/L)_Speciation of Selenium	(Intercept)	-48.33376238	63.49538596	-0.761216924	0.526036632	0
FR_FRABEC1	Speciation of Selenium	Total Selenium 4+ (µg/L)_Speciation of Selenium	Date	0.002947936	0.003992647	0.738341175	0.537192281	0
FR_FRABEC1	Speciation of Selenium	Total Selenium 6+ (µg/L)_Speciation of Selenium	(Intercept)	-24.60763555	78.62899722	-0.312958786	0.783932083	0
FR_FRABEC1	Speciation of Selenium	Total Selenium 6+ (µg/L)_Speciation of Selenium	Date	0.001747971	0.004944262	0.353535223	0.757476105	0
FR_FRABEC1	Speciation of Selenium	Total Selenocyanate (µg/L)_Speciation of Selenium	(Intercept)	-43.95223852	22.56675697	-1.947654179	0.190817077	0
FR_FRABEC1	Speciation of Selenium	Total Selenocyanate (µg/L)_Speciation of Selenium	Date	0.002591594	0.001419018	1.826329398	0.209335209	0
FR_FRABEC1	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	-8.203098434	6.811885403	-1.204233182	0.314844693	0
FR_FRABEC1	Total Metals	Aluminum (mg/L)_Total Metals	Date	0.000215945	0.000431223	0.500773506	0.650963586	0
FR_FRABEC1	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-9.355966093	3.109951781	-3.00839587	0.057284759	0
FR_FRABEC1	Total Metals	Antimony (mg/L)_Total Metals	Date	7.9256E-05	0.000196874	0.402572848	0.714231628	0
FR_FRABEC1	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-12.73376649	6.339689902	-2.008578761	0.138173329	0
FR_FRABEC1	Total Metals	Arsenic (mg/L)_Total Metals	Date	0.000242506	0.000401331	0.604254905	0.588311535	0
FR_FRABEC1	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-5.829487662	2.989566063	-1.94994442	0.146281724	0
FR_FRABEC1	Total Metals	Barium (mg/L)_Total Metals	Date	0.000208712	0.000189253	1.102822553	0.350631162	0
FR_FRABEC1	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	-9.210340372	3.10241E-14	-2.96877E+14	8.42834E-44	0
FR_FRABEC1	Total Metals	Beryllium (mg/L)_Total Metals	Date	1.07499E-18	1.96396E-18	0.547359487	0.622223055	0
FR_FRABEC1	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	24.51653261	1.300204631	18.85590316	0.000325648	0
FR_FRABEC1	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.002063149	8.23087E-05	-25.06598305	0.00013923	0
FR_FRABEC1	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-8.170567683	1.511098068	-5.407039989	0.012403434	0
FR_FRABEC1	Total Metals	Boron (mg/L)_Total Metals	Date	0.000234118	9.56592E-05	2.447418044	0.091890517	0
FR_FRABEC1	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-17.32646796	3.110751761	-5.569865195	0.011420986	0
FR_FRABEC1	Total Metals	Cadmium (mg/L)_Total Metals	Date	0.000417389	0.000196924	2.119538336	0.124236868	0
FR_FRABEC1	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	0.169204121	2.849086138	0.05938891	0.956377085	0
FR_FRABEC1	Total Metals	Calcium (mg/L)_Total Metals	Date	0.000260337	0.00018036	1.443431363	0.244609927	0
FR_FRABEC1	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-13.405022	2.035799029	-6.584648979	0.007127534	0
FR_FRABEC1	Total Metals	Chromium (mg/L)_Total Metals	Date	0.000301908	0.000128875	2.342638815	0.10097904	0
FR_FRABEC1	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-9.210340372	3.10241E-14	-2.96877E+14	8.42834E-44	0
FR_FRABEC1	Total Metals	Cobalt (mg/L)_Total Metals	Date	1.07499E-18	1.96396E-18	0.547359487	0.622223055	0
FR_FRABEC1	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-5.665567628	2.596711103	-2.181824394	0.117148417	0
FR_FRABEC1	Total Metals	Copper (mg/L)_Total Metals	Date	-0.000116152	0.000164383	-0.706589626	0.530757133	0
FR_FRABEC1	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	6.161753444	0.391400594	15.74283108	0.000557121	0
FR_FRABEC1	Total Metals	Iron (mg/L)_Total Metals	Date	-0.00062107	2.47774E-05	-25.06598305	0.00013923	0
FR_FRABEC1	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-9.903487553	3.10241E-14	-3.19219E+14	6.77961E-44	0
FR_FRABEC1	Total Metals	Lead (mg/L)_Total Metals	Date	-1.07499E-18	1.96396E-18	-0.547359487	0.622223055	0
FR_FRABEC1	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-14.97879981	3.423366391	-4.375459151	0.022091117	0
FR_FRABEC1	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000692199	0.000216714	3.194060174	0.049556664	1
FR_FRABEC1	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	-1.261967364	3.891243945	-0.324309496	0.767000329	0
FR_FRABEC1	Total Metals	Magnesium (mg/L)_Total Metals	Date	0.000282886	0.000246333	1.14838657	0.334073494	0
FR_FRABEC1	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-6.178567927	9.263121009	-0.667007148	0.552484473	0
FR_FRABEC1	Total Metals	Manganese (mg/L)_Total Metals	Date	-2.79729E-05	0.000586397	-0.047702957	0.964951029	0
FR_FRABEC1	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	-1.844614124	0.391400594	-4.712854682	0.01808642	0
FR_FRABEC1	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.00062107	2.47774E-05	-25.06598305	0.00013923	0
FR_FRABEC1	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-6.451047784	1.71800306	-3.75496874	0.033003636	0
FR_FRABEC1	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-4.09297E-06	0.000108757	-0.03763402	0.97234374	0
FR_FRABEC1	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-6.288693882	1.65895288	-3.790761002	0.032206367	0
FR_FRABEC1	Total Metals	Nickel (mg/L)_Total Metals	Date	2.11846E-05	0.000105019	0.201721857	0.853037953	0
FR_FRABEC1	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	4.987654886	0.173853821	28.68878498	9.29904E-05	0
FR_FRABEC1	Total Metals	Potassium (mg/L)_Total Metals	Date	-0.000275869	1.10057E-05	-25.06598305	0.00013923	0
FR_FRABEC1	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-6.210358319	3.629914345	-1.710882883	0.10428121	0
FR_FRABEC1	Total Metals	Selenium (mg/L)_Total Metals	Date	0.000159189	0.000222894	0.714192744	0.484267388	0
FR_FRABEC1	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	-1.335861347	1.198242684	-1.114850409	0.346182799	0
FR_FRABEC1	Total Metals	Silicon (mg/L)_Total Metals	Date	0.00011762	7.58541E-05	1.550602046	0.218782682	0
FR_FRABEC1	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-10.46666113	2.391346907	-4.376889484	0.022071831	0
FR_FRABEC1	Total Metals	Silver (mg/L)_Total Metals	Date	-6.24584E-05	0.000151383	-0.412585731	0.707623255	0
FR_FRABEC1	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	3.546536914	0.115513289	30.70241492	7.59097E-05	0
FR_FRABEC1	Total Metals	Sodium (mg/L)_Total Metals	Date	-0.000183295	7.3125E-06	-25.06598305	0.00013923	0
FR_FRABEC1	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-5.483622017	2.344096447	-2.339332933	0.101283174	0
FR_FRABEC1	Total Metals	Strontium (mg/L)_Total Metals	Date	0.000216764	0.000148392	1.460757512	0.240217544	0
FR_FRABEC1	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-11.51292546	3.10241E-14	-3.71096E+14	4.31531E-44	0
FR_FRABEC1	Total Metals	Thallium (mg/L)_Total Metals	Date	1.07499E-18	1.96396E-18	0.547359487	0.622223055	0
FR_FRABEC1	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-7.512172011	3.698916786	-2.030911331	0.135225149	0
FR_FRABEC1	Total Metals	Tin (mg/L)_Total Metals	Date	-0.000101341	0.000234158	-0.432787097	0.694395767	0
FR_FRABEC1	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-4.01206797	0.913575906	-4.391608779	0.02187462	0
FR_FRABEC1	Total Metals	Titanium (mg/L)_Total Metals	Date	-3.52095E-05	5.78334E-05	-0.608809224	0.585655084	0
FR_FRABEC1	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-13.79825502	3.378644046	-4.083962334	0.026522595	0
FR_FRABEC1	Total Metals	Uranium (mg/L)_Total Metals	Date	0.00044594	0.000213883	2.084968381	0.128391908	0
FR_FRABEC1	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	2.760556062	0.391400594	7.053019596	0.005858362	0
FR_FRABEC1	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.00062107	2.47774E-05	-25.06598305	0.00013923	0
FR_FRABEC1	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-6.266509369	0.018515485	-338.4469491	5.68834E-08	0
FR_FRABEC1	Total Metals	Zinc (mg/L)_Total Metals	Date	2.93802E-05	1.17211E-06	25.06598305	0.00013923	1
FR_FRCP1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-6.347338531	3.633996322	-1.746655189	0.08618018	0
FR_FRCP1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	0.000400865	0.000209338	1.914916166	0.060616263	0
FR_FRCP1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	3.535412935	1.133119743	3.120070018	0.002856673	0
FR_FRCP1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000105612	6.52739E-05	1.617978121	0.111286743	0
FR_FRCP1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	11.32403135	3.495288227	3.239799014	0.002014568	0
FR_FRCP1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-0.000596985	0.000201348	-2.964944956	0.004441546	0
FR_FRCP1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	4.415150912	2.302231119	1.917770495	0.060245305	0
FR_FRCP1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	0.000149389	0.000132621	1.126436022	0.264785031	0
FR_FRCP1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-1.283785777	1.462260583	-0.877945964	0.383724333	0
FR_FRCP1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	8.12889E-05	8.42342E-05	0.965033864	0.338676941	0
FR_FRCP1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	2.902028153	2.729202256	1.063324694	0.292198581	0
FR_FRCP1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000207496	0.000157217	1.319805166	0.192270141	0
FR_FRCP1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0	0	-	-	0
FR_FRCP1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0	0	-	-	0
FR_FRCP1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	4.633934633	0.682716553	6.787494187	7.76377E-09	0
FR_FRCP1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	7.07574E-05	3.93282E-05	1.799151121	0.077383798	0
FR_FRCP1	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.303757357	0.06731199	34.22506671	3.11737E-39	0
FR_FRCP1	Conventional Parameters	pH (-)_Conventional Parameters	Date	-1.11326E-05	3.87754E-06	-2.871045352	0.005764998	0
FR_FRCP1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	3.75925531	1.08664764	3.459497976	0.001041872	0
FR_FRCP1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	9.37488E-05	6.25969E-05	1.497660095	0.139837404	0
FR_FRCP1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	3.37543701	2.853114889	1.183070833	0.241779424	0
FR_FRCP1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	0.000195203	0.000164355	1.187693734	0.239967335	0
FR_FRCP1	Conventional Parameters	Total Inorganic Carbon (mg/L)_Conventional Parameters	(Intercept)	-140.3082305	9.31465606	-15.06316815	0.042201414	0
FR_FRCP1	Conventional Parameters	Total Inorganic Carbon (mg/L)_Conventional Parameters	Date	0.007927321	0.000511775	15.48985305	0.041042193	1
FR_FRCP1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	-0.874182524	1.618895505	-0.539986998	0.591347002	0
FR_FRCP1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	6.56126E-05	9.32573E-05	0.703565782	0.484618364	0
FR_FRCP1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	-1.621548881	4.548704315	-0.356485885	0.7228164	0
FR_FRCP1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	0.000141938	0.00026203	0.541684125	0.590184929	0
FR_FRCP1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	-7.303134488	5.506260372	-1.326332936	0.190113468	0
FR_FRCP1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	0.000414305	0.000317191	1.306170788	0.196834224	0
FR_FRCP1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-5.800653897	1.160798732	-4.997122874	6.052E-06	0
FR_FRCP1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	5.80939E-07	6.68684E-05	0.008687807	0.993099097	0
FR_FRCP1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-10.26346848	1.26655429	-8.103457198	5.22603E-11	0
FR_FRCP1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	0.000116226	7.29605E-05	1.593004585	0.116788575	0
FR_FRCP1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-10.81083855	0.899040416	-12.0248638	3.78699E-17	0
FR_FRCP1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	9.95129E-05	5.17897E-05	1.921481837	0.059765857	0
FR_FRCP1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	1.636557231	1.855525735	0.881991125	0.381551831	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_FRCP1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	-0.000255815	0.000106888	-2.393288258	0.020074774	0
FR_FRCP1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	6.6512843	2.380478898	2.794095048	0.007112458	0
FR_FRCP1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000977538	0.000137129	-7.128622756	2.1214E-09	0
FR_FRCP1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	-6.149037813	2.118295511	-2.902823416	0.005280866	0
FR_FRCP1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.000206622	0.000122025	-1.693269326	0.095960638	0
FR_FRCP1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.404285089	0.894539197	-4.923523868	7.87222E-06	0
FR_FRCP1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-2.95697E-06	5.15304E-05	-0.057383072	0.954444313	0
FR_FRCP1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-7.806372176	2.917300751	-2.675888721	0.00975586	0
FR_FRCP1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-0.000152786	0.000168053	-0.9091588	0.367162683	0
FR_FRCP1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-9.92516415	1.014607148	-9.782273039	1.00904E-13	0
FR_FRCP1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	4.88618E-05	5.84469E-05	0.836003264	0.406706102	0
FR_FRCP1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-10.81350366	0.96479397	-11.20809624	6.24119E-16	0
FR_FRCP1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	0.000100051	5.55774E-05	1.800209088	0.077214542	0
FR_FRCP1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-5.855547305	1.307943606	-4.476911145	3.76869E-05	0
FR_FRCP1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-0.000107764	7.53447E-05	-1.430277798	0.158193483	0
FR_FRCP1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	-5.665937407	0.912557281	-6.208856718	6.93733E-08	0
FR_FRCP1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	6.7713E-05	5.25683E-05	1.288096514	0.20300951	0
FR_FRCP1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.55070579	0.896090323	-11.77415437	8.87062E-17	0
FR_FRCP1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	4.25812E-05	5.16197E-05	0.824901498	0.412927582	0
FR_FRCP1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-4.912630075	1.887788924	-2.602319577	0.011827162	0
FR_FRCP1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	9.42655E-05	0.000108747	0.866833062	0.389732572	0
FR_FRCP1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	3.495235881	4.025634834	0.868244644	0.388966152	0
FR_FRCP1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	-0.000529004	0.000231899	-2.281188294	0.026361602	0
FR_FRCP1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-10.44569957	0.551425133	-18.94309661	5.06777E-26	0
FR_FRCP1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-9.9567E-05	3.17651E-05	-3.134476414	0.002740181	0
FR_FRCP1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-8.34620748	1.14932422	-7.261839029	1.27766E-09	0
FR_FRCP1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	0.000109267	6.62074E-05	1.650377778	0.104463989	0
FR_FRCP1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-10.18082984	3.747621099	-2.716611305	0.008757563	0
FR_FRCP1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	0.000301521	0.000215884	1.396682092	0.168020224	0
FR_FRCP1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-7.965991411	3.931134736	-2.026384733	0.047498194	0
FR_FRCP1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.00032751	0.000226455	1.446248449	0.153681589	0
FR_FRCP1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	-0.592988239	0.694861466	-0.853390593	0.397078349	0
FR_FRCP1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	7.14164E-05	4.00278E-05	1.784169454	0.079814098	0
FR_FRCP1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-12.23641565	0.896591428	-13.64770537	1.86272E-19	0
FR_FRCP1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	4.68728E-05	5.16486E-05	0.907533855	0.368013437	0
FR_FRCP1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-3.381323716	1.256502413	-2.691060265	0.009372354	0
FR_FRCP1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	8.80443E-05	7.23814E-05	1.216394132	0.228937068	0
FR_FRCP1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-14.1670493	1.881152033	-7.531049616	4.58697E-10	0
FR_FRCP1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	0.000169474	0.000108365	1.56392199	0.123469897	0
FR_FRCP1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.962819113	0.89442539	-11.13879282	7.94691E-16	0
FR_FRCP1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	4.89241E-05	5.15238E-05	0.949542659	0.34642474	0
FR_FRCP1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-2.977684394	0.405722325	-7.339217519	9.51725E-10	0
FR_FRCP1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-9.16365E-05	2.33718E-05	-3.920810765	0.000243013	0
FR_FRCP1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-10.36090033	3.15913779	-3.279660788	0.001790537	0
FR_FRCP1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	0.000285426	0.000181984	1.568413297	0.122418505	0
FR_FRCP1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-6.976398406	1.119135858	-6.233736821	6.31674E-08	0
FR_FRCP1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-2.94367E-05	6.44684E-05	-0.45660678	0.649719864	0
FR_FRCP1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	2.840668178	1.282633543	2.214715336	0.030865483	0
FR_FRCP1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000515841	7.38867E-05	-6.981517184	3.71295E-09	0
FR_FRCP1	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	2.164972935	3.419615561	0.633104189	0.529242678	0
FR_FRCP1	Field Measured	Conductivity (µS/cm)_Field Measured	Date	0.000267492	0.000196989	1.357908019	0.179939264	0
FR_FRCP1	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	6.081054067	0.915059559	6.645528163	1.3309E-08	0
FR_FRCP1	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-9.62561E-05	5.27124E-05	-1.8260597	0.07317421	0
FR_FRCP1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	3.634811432	0.904094855	4.020387254	0.000175467	0
FR_FRCP1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-7.26646E-05	5.20808E-05	-1.395226931	0.168456266	0
FR_FRCP1	Field Measured	pH (-)_Field Measured	(Intercept)	2.23010347	0.059992208	37.17321879	3.69429E-41	0
FR_FRCP1	Field Measured	pH (-)_Field Measured	Date	-7.17983E-06	3.45588E-06	-2.077567878	0.04234654	0
FR_FRCP1	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	5.034985519	3.484485204	1.444972564	0.154038309	0
FR_FRCP1	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.000398073	0.000200725	-1.983171753	0.052260436	0
FR_FRCP1	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	2.27391511	2.26693653	1.003078418	0.320137768	0
FR_FRCP1	Major Ions	Calcium (mg/L)_Major Ions	Date	0.000153377	0.000130588	1.174511112	0.245160737	0
FR_FRCP1	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	0.191798224	3.358169125	0.057113926	0.954657747	0
FR_FRCP1	Major Ions	Chloride (mg/L)_Major Ions	Date	2.21621E-05	0.000193449	0.114563108	0.909201201	0
FR_FRCP1	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	1.271999099	1.063085208	1.1965166	0.236536267	0
FR_FRCP1	Major Ions	Fluoride (mg/L)_Major Ions	Date	-0.000172515	6.12395E-05	-2.817053722	0.006682767	0
FR_FRCP1	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	-0.164708754	3.208780687	-0.051330636	0.959244717	0
FR_FRCP1	Major Ions	Magnesium (mg/L)_Major Ions	Date	0.000259486	0.000184843	1.403817921	0.165894547	0
FR_FRCP1	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	-2.187338203	1.720556973	-1.271296585	0.208878295	0
FR_FRCP1	Major Ions	Potassium (mg/L)_Major Ions	Date	0.000168048	9.91135E-05	1.695514228	0.095531719	0
FR_FRCP1	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	0.34938144	1.237051807	0.282430726	0.778654523	0
FR_FRCP1	Major Ions	Sodium (mg/L)_Major Ions	Date	1.21785E-05	7.1261E-05	0.170900183	0.864918256	0
FR_FRCP1	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	2.015625324	3.701322517	0.544568952	0.588212085	0
FR_FRCP1	Major Ions	Sulphate (mg/L)_Major Ions	Date	0.000224952	0.000213216	1.055040285	0.295937564	0
FR_FRCP1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	1.902891745	1.981658586	0.960252063	0.341056242	0
FR_FRCP1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	4.27375E-05	0.000114154	0.374383575	0.70953291	0
FR_FRCP1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-3.044388046	2.439254513	-1.248081342	0.217194629	0
FR_FRCP1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000115465	0.000140514	-0.82172776	0.414716749	0
FR_FRCP1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-18.71451586	2.122099984	-8.818866217	3.54357E-12	0
FR_FRCP1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000810908	0.000122245	6.633485153	1.39311E-08	1
FR_FRCP1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-9.130013279	3.244812756	-2.813725773	0.006743531	0
FR_FRCP1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000431176	0.000186919	2.306755737	0.024790944	1
FR_FRCP1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-8.613993529	1.772804181	-4.858965036	9.90396E-06	0
FR_FRCP1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.000111562	0.000102123	1.092421942	0.279325138	0
FR_FRCP1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-3.245550636	3.670171343	-0.884304936	0.380312663	0
FR_FRCP1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000129007	0.000211422	-0.610186131	0.544206873	0
FR_FRCP1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	(Intercept)	-18.81848438	4.637480707	-4.057911089	0.002850869	0
FR_FRCP1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	Date	0.000793235	0.000260947	3.039829401	0.014021777	1
FR_FRCP1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	(Intercept)	-14.11155091	7.378502127	-1.912522443	0.088105167	0
FR_FRCP1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	Date	0.000540964	0.000415182	1.302955403	0.224937959	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	(Intercept)	-7.227420536	23.83060759	-0.3032831	0.768567768	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	Date	0.000670814	0.001340929	0.500260606	0.628894957	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	(Intercept)	-20.2658294	13.41207213	-1.511014048	0.165070251	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	Date	0.001074626	0.000754687	1.423936658	0.188197711	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	(Intercept)	-27.99151344	5.234254575	-5.347755451	0.000463717	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	Date	0.001374049	0.000294527	4.665267433	0.001176432	1
FR_FRCP1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	(Intercept)	-22.11187063	3.699021812	-5.977761621	0.000208105	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	Date	0.000971033	0.000208141	4.665267433	0.001176432	1
FR_FRCP1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	(Intercept)	-35.28609142	7.535402176	-4.682708446	0.00114781	0
FR_FRCP1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	Date	0.001800556	0.000424011	4.246482383	0.002153607	1
FR_FRCP1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	(Intercept)	-36.2166033	7.451596245	-4.860247672	0.000895526	0
FR_FRCP1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	Date	0.001852383	0.000419295	4.417846433	0.00167641	1
FR_FRCP1	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	-0.529584588	5.473840531	-0.096748268	0.92327173	0
FR_FRCP1	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000215383	0.000315323	-0.683054337	0.497388784	0
FR_FRCP1	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-9.563212718	1.178960371	-8.11156418	5.06819E-11	0
FR_FRCP1	Total Metals	Antimony (mg/L)_Total Metals	Date	8.13034E-05	6.79146E-05	1.197141387	0.236294655	0
FR_FRCP1	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-9.843999005	1.3052562	-7.541813632	4.40298E-10	0
FR_FRCP1	Total Metals	Arsenic (mg/L)_Total Metals	Date	5.93547E-05	7.51899E-05	0.789396516	0.433209968	0
FR_FRCP1	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	1.603783729	1.713212756	0.936126423	0.353227697	0
FR_FRCP1	Total Metals	Barium (mg/L)_Total Metals	Date	-0.000253076	9.86904E-05	-2.564346092	0.013046298	0
FR_FRCP1	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	6.419712069	2.328633571	2.756857992	0.007863845	0
FR_FRCP1	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000962288	0.000134142	-7.173646859	1.78731E-09	0
FR_FRCP1	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	-6.257442413	2.099458147	-2.980503528	0.004251706	0
FR_FRCP1	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.000199936	0.00012094	-1.653179287	0.103890421	0
FR_FRCP1	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-4.076938672	0.863175199	-4.723187921	1.59971E-05	0
FR_FRCP1	Total Metals	Boron (mg/L)_Total Metals	Date	-2.01118E-05	4.97236E-05	-0.404472587	0.687405975	0
FR_FRCP1	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-6.527702458	2.281195235	-2.861527308	0.005917812	0
FR_FRCP1	Total Metals	Cadmium (mg/L)_Total Metals	Date	-0.000192964	0.000131409	-1.468421242	0.147584868	0
FR_FRCP1	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	2.300334543	2.29589384	1.001934194	0.320685223	0
FR_FRCP1	Total Metals	Calcium (mg/L)_Total Metals	Date	0.000152692	0.000132256	1.154519721	0.253190224	0
FR_FRCP1	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-8.43204914	2.215925488	-3.805204275	0.000352953	0
FR_FRCP1	Total Metals	Chromium (mg/L)_Total Metals	Date	-7.23832E-06	0.000127649	-0.056704639	0.954982321	0
FR_FRCP1	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-11.41173934	1.400000995	-8.151236593	4.36208E-11	0
FR_FRCP1	Total Metals	Cobalt (mg/L)_Total Metals	Date	0.000141226	8.06477E-05	1.751149063	0.085396029	0
FR_FRCP1	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-7.767691375	1.121218761	-6.927899928	4.55289E-09	0
FR_FRCP1	Total Metals	Copper (mg/L)_Total Metals	Date	1.94948E-05	6.45883E-05	0.30183212	0.76389814	0
FR_FRCP1	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	-2.07617613	3.879912017	-0.535109075	0.59469306	0
FR_FRCP1	Total Metals	Iron (mg/L)_Total Metals	Date	-7.44955E-05	0.000223504	-0.333306968	0.740147337	0
FR_FRCP1	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-11.18574225	2.205560727	-5.071609282	4.63211E-06	0
FR_FRCP1	Total Metals	Lead (mg/L)_Total Metals	Date	9.27194E-05	0.000127052	0.72977328	0.468570517	0
FR_FRCP1	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-4.789473439	1.900464113	-2.520159894	0.014607828	0
FR_FRCP1	Total Metals	Lithium (mg/L)_Total Metals	Date	8.75686E-05	0.000109477	0.799879845	0.427160534	0
FR_FRCP1	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	0.223161406	3.221477274	0.069273003	0.945019088	0
FR_FRCP1	Total Metals	Magnesium (mg/L)_Total Metals	Date	0.000237208	0.000185575	1.278232605	0.206440181	0
FR_FRCP1	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	3.763523497	4.128957871	0.911494768	0.365941873	0
FR_FRCP1	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.00050905	0.000237851	-2.140207816	0.036707942	0
FR_FRCP1	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	7.0494609	3.448526113	2.044195308	0.045647213	0
FR_FRCP1	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001200591	0.000198654	-6.043630654	1.2908E-07	0
FR_FRCP1	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	4.500597158	5.672670952	0.793382376	0.445971635	0
FR_FRCP1	Total Metals	Methyl mercury (µg/L)_Total Metals	Date	-0.000839692	0.000322178	-2.606300524	0.026206634	0
FR_FRCP1	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-8.161200543	1.128136759	-7.234229786	1.41924E-09	0
FR_FRCP1	Total Metals	Molybdenum (mg/L)_Total Metals	Date	9.96084E-05	6.49869E-05	1.532746433	0.130968781	0
FR_FRCP1	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-9.929739189	3.553076867	-2.794687411	0.007101058	0
FR_FRCP1	Total Metals	Nickel (mg/L)_Total Metals	Date	0.000290977	0.000204677	1.421640483	0.160676191	0
FR_FRCP1	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	-1.728057867	1.704574399	-1.013776734	0.315049531	0
FR_FRCP1	Total Metals	Potassium (mg/L)_Total Metals	Date	0.000141052	9.81928E-05	1.436483789	0.156428129	0
FR_FRCP1	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-6.88787022	3.953501159	-1.742220362	0.086959874	0
FR_FRCP1	Total Metals	Selenium (mg/L)_Total Metals	Date	0.000263204	0.000227743	1.155703094	0.252709748	0
FR_FRCP1	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	-0.534336618	0.676254575	-0.790141225	0.432778559	0
FR_FRCP1	Total Metals	Silicon (mg/L)_Total Metals	Date	7.09476E-05	3.8956E-05	1.821225911	0.073915917	0
FR_FRCP1	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-12.4859809	0.982180802	-12.71250759	3.82236E-18	0
FR_FRCP1	Total Metals	Silver (mg/L)_Total Metals	Date	6.36055E-05	5.6579E-05	1.124188791	0.265728824	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_FRCP1	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	0.889541567	1.248210993	0.712653206	0.479019389	0
FR_FRCP1	Total Metals	Sodium (mg/L)_Total Metals	Date	-1.91225E-05	7.19038E-05	-0.265945629	0.791257784	0
FR_FRCP1	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-3.069414108	1.281087795	-2.395943604	0.019943706	0
FR_FRCP1	Total Metals	Strontium (mg/L)_Total Metals	Date	7.06824E-05	7.37977E-05	0.957785649	0.342287752	0
FR_FRCP1	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-14.28788553	1.940116543	-7.36444704	8.64592E-10	0
FR_FRCP1	Total Metals	Thallium (mg/L)_Total Metals	Date	0.000181717	0.000111761	1.625939658	0.10957758	0
FR_FRCP1	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-10.31816164	0.845990624	-12.19654374	2.12408E-17	0
FR_FRCP1	Total Metals	Tin (mg/L)_Total Metals	Date	6.97475E-05	4.87337E-05	1.431196654	0.157931133	0
FR_FRCP1	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-2.726130999	0.426444579	-6.392697047	3.46713E-08	0
FR_FRCP1	Total Metals	Titanium (mg/L)_Total Metals	Date	-0.000105737	2.45655E-05	-4.304299816	6.79719E-05	0
FR_FRCP1	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-10.23493574	3.175837425	-3.222751788	0.002118224	0
FR_FRCP1	Total Metals	Uranium (mg/L)_Total Metals	Date	0.000278914	0.000182946	1.524571386	0.132994076	0
FR_FRCP1	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-6.954448235	1.704305233	-4.080518032	0.000143882	0
FR_FRCP1	Total Metals	Vanadium (mg/L)_Total Metals	Date	-2.29976E-05	9.81773E-05	-0.234245922	0.815648379	0
FR_FRCP1	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-8.001755107	1.433655904	-5.58136376	7.21569E-07	0
FR_FRCP1	Total Metals	Zinc (mg/L)_Total Metals	Date	0.00013998	8.25864E-05	1.694953424	0.095638721	0
FR_FRRD	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.348015232	2.825574102	1.538807717	0.129289487	0
FR_FRRD	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	-0.000209586	0.000163226	-1.28402705	0.204238193	0
FR_FRRD	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.143077452	0.692803219	5.980164843	1.55008E-07	0
FR_FRRD	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	7.19079E-05	4.00276E-05	1.796456773	0.077721513	0
FR_FRRD	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.521946135	3.995542327	-0.130632113	0.896526291	0
FR_FRRD	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	7.21718E-05	0.000230848	0.312638316	0.755696438	0
FR_FRRD	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	6.400659344	0.926766157	6.90644484	4.2081E-09	0
FR_FRRD	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	2.66231E-05	5.35367E-05	0.49728663	0.620866927	0
FR_FRRD	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	0.785860129	1.583402637	0.496310989	0.621550769	0
FR_FRRD	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	-6.04714E-05	9.14687E-05	-0.661115898	0.511155705	0
FR_FRRD	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.361698667	1.058625004	5.064776146	4.44165E-06	0
FR_FRRD	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	5.42522E-05	6.11538E-05	0.887143758	0.378665483	0
FR_FRRD	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0	0	-	-	0
FR_FRRD	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0	0	-	-	0
FR_FRRD	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	5.425853862	0.682780991	7.946697305	7.5239E-11	0
FR_FRRD	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	2.40624E-05	3.94424E-05	0.610066034	0.544201018	0
FR_FRRD	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.029453614	0.067961136	29.86197295	6.61419E-37	0
FR_FRRD	Conventional Parameters	pH (-)_Conventional Parameters	Date	4.49816E-06	3.92593E-06	1.145758445	0.256600589	0
FR_FRRD	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.056452571	0.651493049	6.226394244	5.75349E-08	0
FR_FRRD	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	7.78345E-05	3.76349E-05	2.068144141	0.043095657	1
FR_FRRD	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	6.062960731	1.1028267	5.497655008	9.02367E-07	0
FR_FRRD	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	2.86151E-05	6.37072E-05	0.449166394	0.654985558	0
FR_FRRD	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	0.211763811	1.831558019	0.115619494	0.908353489	0
FR_FRRD	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-2.11598E-05	0.000105804	-0.199990611	0.842187483	0
FR_FRRD	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	0.959021757	3.808049634	0.251840666	0.80205447	0
FR_FRRD	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-2.23511E-05	0.00021998	-0.101605092	0.919420585	0
FR_FRRD	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	1.002413543	4.993639433	0.20073807	0.84160566	0
FR_FRRD	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-0.000105884	0.000288469	-0.367055552	0.714913431	0
FR_FRRD	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-6.131162494	2.084725824	-2.940992251	0.004693749	0
FR_FRRD	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	1.95504E-05	0.000120429	0.162339552	0.871602727	0
FR_FRRD	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-10.39068361	1.325271579	-7.84041835	1.13432E-10	0
FR_FRRD	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	8.5612E-05	7.65572E-05	1.118274138	0.268060353	0
FR_FRRD	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-9.480256995	0.887506427	-10.68190236	2.54412E-15	0
FR_FRRD	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	1.72284E-05	5.12688E-05	0.336040979	0.738052644	0
FR_FRRD	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-0.637105991	1.245779856	-0.511411376	0.611004555	0
FR_FRRD	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	-9.42876E-05	7.19652E-05	-1.310183091	0.195299128	0
FR_FRRD	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	7.972179477	2.081222185	3.830527819	0.000316461	0
FR_FRRD	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.001058158	0.000120226	-8.801376049	2.82455E-12	0
FR_FRRD	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	-1.857441046	2.388315963	-0.777719981	0.439895039	0
FR_FRRD	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.000454591	0.000137966	-3.294943177	0.001682086	0
FR_FRRD	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.273761892	1.081232743	-3.952675239	0.000212412	0
FR_FRRD	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-4.04504E-06	6.24598E-05	-0.064762353	0.948585917	0
FR_FRRD	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-11.86849186	1.189851469	-9.974767585	3.40845E-14	0
FR_FRRD	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	9.91896E-05	6.87344E-05	1.443085862	0.154375659	0
FR_FRRD	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-9.50016918	1.382167276	-6.873385984	4.78136E-09	0
FR_FRRD	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	2.92613E-05	7.98439E-05	0.366480775	0.715339901	0
FR_FRRD	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-15.85204712	2.063783381	-7.681061526	2.10054E-10	0
FR_FRRD	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	0.000396088	0.000119219	3.322354343	0.00154935	1
FR_FRRD	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-6.224465459	1.201521642	-5.180485512	2.91192E-06	0
FR_FRRD	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-8.39603E-05	6.94086E-05	-1.209652939	0.231319564	0
FR_FRRD	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	-4.806654456	1.005920434	-4.778364464	1.24578E-05	0
FR_FRRD	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	1.43594E-05	5.81092E-05	0.247109824	0.805695848	0
FR_FRRD	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.15718004	0.887690353	-11.44225574	1.66663E-16	0
FR_FRRD	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	1.62249E-05	5.12794E-05	0.316402473	0.752832987	0
FR_FRRD	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-5.190298982	1.046769441	-4.958397501	6.53038E-06	0
FR_FRRD	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000105539	6.04689E-05	1.74534705	0.086220438	0
FR_FRRD	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-7.576289762	2.99399416	-2.530495838	0.014126313	0
FR_FRRD	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	4.50003E-05	0.000172955	0.260185542	0.795642119	0
FR_FRRD	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-9.523808329	0.667224673	-14.27376521	1.23559E-20	0
FR_FRRD	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000152133	3.85437E-05	-3.94703098	0.00021639	0
FR_FRRD	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-8.35538468	1.30867886	-6.384595134	3.13994E-08	0
FR_FRRD	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	7.32381E-05	7.55987E-05	0.968773862	0.336680628	0
FR_FRRD	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-9.448077716	3.303037398	-2.860421054	0.005872432	0
FR_FRRD	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	0.000163437	0.000190807	0.856554034	0.395216587	0
FR_FRRD	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-5.434802228	1.388735146	-3.913490807	0.000241551	0
FR_FRRD	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.000162496	8.02234E-05	2.025546349	0.047420885	1
FR_FRRD	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.04432004	0.571156452	0.077597022	0.938415688	0
FR_FRRD	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	3.71943E-05	3.29941E-05	1.127300663	0.264257535	0
FR_FRRD	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.7670564	0.887783101	-13.2544271	3.36776E-19	0
FR_FRRD	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	1.62375E-05	5.12848E-05	0.316614747	0.752672716	0
FR_FRRD	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-2.794974962	0.931923801	-2.99914538	0.003983916	0
FR_FRRD	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	5.26927E-05	5.38346E-05	0.978787506	0.331750089	0
FR_FRRD	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.76988201	0.899412069	-13.08619531	5.8857E-19	0
FR_FRRD	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	1.6802E-05	5.19565E-05	0.323386003	0.747566051	0
FR_FRRD	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.464471307	0.887783101	-10.66079236	2.7468E-15	0
FR_FRRD	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	1.62375E-05	5.12848E-05	0.316614747	0.752672716	0
FR_FRRD	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-2.643089437	0.420475298	-6.285956512	4.58163E-08	0
FR_FRRD	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-0.000110855	2.42897E-05	-4.563861776	2.65844E-05	0
FR_FRRD	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-8.448484995	0.978710945	-8.6322576	5.38938E-12	0
FR_FRRD	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	0.000154878	5.65374E-05	2.73939695	0.00816436	1
FR_FRRD	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-5.348605928	1.106375328	-4.834350329	1.02001E-05	0
FR_FRRD	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000125721	6.39122E-05	-1.967082881	0.053963321	0
FR_FRRD	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	6.305245226	1.30205834	4.842521286	9.90603E-06	0
FR_FRRD	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000722899	7.52163E-05	-9.610936228	1.3227E-13	0
FR_FRRD	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	5.596079479	0.95222019	5.876875475	2.06833E-07	0
FR_FRRD	Field Measured	Conductivity (µS/cm)_Field Measured	Date	6.81199E-05	5.4958E-05	1.239490464	0.220071691	0
FR_FRRD	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	4.57404208	0.430894092	10.61523507	2.61889E-15	0
FR_FRRD	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-1.10047E-05	2.48693E-05	-0.442500184	0.659745311	0
FR_FRRD	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	2.405198502	0.458123029	5.250114816	2.17659E-06	0
FR_FRRD	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-4.89107E-06	2.64408E-05	-0.184981684	0.85387782	0
FR_FRRD	Field Measured	pH (-)_Field Measured	(Intercept)	2.335876471	0.206450635	11.31445526	2.05782E-16	0
FR_FRRD	Field Measured	pH (-)_Field Measured	Date	-1.5192E-05	1.19154E-05	-1.274989366	0.2073111	0
FR_FRRD	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	1.533714388	2.860263562	0.536214358	0.59386108	0
FR_FRRD	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.000193993	0.000165229	-1.174080733	0.2451611	0
FR_FRRD	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	4.152779482	1.043932351	3.97801589	0.000195404	0
FR_FRRD	Major Ions	Calcium (mg/L)_Major Ions	Date	3.93032E-05	6.03051E-05	0.651740326	0.517143065	0
FR_FRRD	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	1.654370259	2.335393001	0.708390518	0.481540221	0
FR_FRRD	Major Ions	Chloride (mg/L)_Major Ions	Date	-5.99369E-05	0.000134909	-0.444276073	0.658496308	0
FR_FRRD	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-1.324731177	0.860122089	-1.540166442	0.128958282	0
FR_FRRD	Major Ions	Fluoride (mg/L)_Major Ions	Date	-2.74215E-05	4.96869E-05	-0.551885515	0.583147101	0
FR_FRRD	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	2.739213868	1.101847349	2.486019383	0.015820596	0
FR_FRRD	Major Ions	Magnesium (mg/L)_Major Ions	Date	7.44442E-05	6.36506E-05	1.169574793	0.246956104	0
FR_FRRD	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	-0.42569763	0.834505445	-0.510119655	0.611903514	0
FR_FRRD	Major Ions	Potassium (mg/L)_Major Ions	Date	6.35827E-05	4.8207E-05	1.318949897	0.1923698	0
FR_FRRD	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	-0.517874049	1.271089874	-0.407425202	0.685195611	0
FR_FRRD	Major Ions	Sodium (mg/L)_Major Ions	Date	7.55349E-05	7.34273E-05	1.028702402	0.307890534	0
FR_FRRD	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	4.329842614	1.337964668	3.23614122	0.002003879	0
FR_FRRD	Major Ions	Sulphate (mg/L)_Major Ions	Date	6.9442E-05	7.72905E-05	0.89845416	0.372658248	0
FR_FRRD	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	4.179595187	1.675541709	2.494473975	0.015485056	0
FR_FRRD	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	-6.82327E-05	9.67914E-05	-0.704945865	0.48366531	0
FR_FRRD	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-5.696087671	1.732550507	-3.287689246	0.001718968	0
FR_FRRD	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	2.303E-05	0.000100085	0.230105283	0.818819605	0
FR_FRRD	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-17.29689226	2.880574925	-6.004666677	1.33902E-07	0
FR_FRRD	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000723334	0.000166403	4.346887321	5.64218E-05	1
FR_FRRD	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-10.80732911	3.755031912	-2.87809248	0.005592616	0
FR_FRRD	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000505123	0.000216918	2.328637571	0.023385006	1
FR_FRRD	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-7.3289441	2.475559864	-2.960519843	0.004443233	0
FR_FRRD	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	5.54372E-05	0.000143006	0.387655649	0.699689912	0
FR_FRRD	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	0.797218773	2.898366372	0.275057971	0.784249186	0
FR_FRRD	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.00035806	0.000167431	-2.138559202	0.036694609	0
FR_FRRD	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	0.959429507	5.433955115	0.176561912	0.860467597	0
FR_FRRD	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.00031912	0.000313904	-1.016615002	0.313558727	0
FR_FRRD	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-10.58207534	1.392114853	-7.60143843	2.85839E-10	0
FR_FRRD	Total Metals	Antimony (mg/L)_Total Metals	Date	0.000101497	8.04186E-05	1.26211203	0.211960137	0
FR_FRRD	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-8.022069347	1.183899538	-6.775971348	6.96448E-09	0
FR_FRRD	Total Metals	Arsenic (mg/L)_Total Metals	Date	-5.60032E-05	6.83906E-05	-0.818872553	0.416211114	0
FR_FRRD	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	0.128772333	1.197920696	0.107496542	0.914766059	0
FR_FRRD	Total Metals	Barium (mg/L)_Total Metals	Date	-0.000139174	6.92005E-05	-2.011175049	0.048962263	0
FR_FRRD	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	7.76341456	1.97407217	3.932690344	0.000226823	0
FR_FRRD	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.001045614	0.000114037	-9.16910657	6.98296E-13	0
FR_FRRD	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	-1.99705198	2.293525897	-0.870734437	0.387488932	0
FR_FRRD	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.000446738	0.000132491	-3.37184354	0.001334398	0
FR_FRRD	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-3.915501249	0.894365336	-4.377966243	5.07036E-05	0
FR_FRRD	Total Metals	Boron (mg/L)_Total Metals	Date	-2.4296E-05	5.1665E-05	-0.47025956	0.639933143	0
FR_FRRD	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-10.86857345	1.170110798	-9.288499401	4.44661E-13	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_FRRD	Total Metals	Cadmium (mg/L)_Total Metals	Date	5.34449E-05	6.7594E-05	0.790675298	0.43235472	0
FR_FRRD	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.722899068	1.02710824	4.59824864	2.35638E-05	0
FR_FRRD	Total Metals	Calcium (mg/L)_Total Metals	Date	6.10365E-06	5.93332E-05	0.102870733	0.918420424	0
FR_FRRD	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-8.965194994	2.140486797	-4.1883907	9.68016E-05	0
FR_FRRD	Total Metals	Chromium (mg/L)_Total Metals	Date	2.47453E-05	0.00012365	0.200123929	0.842083702	0
FR_FRRD	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-16.31031538	1.990973146	-8.192132282	2.92006E-11	0
FR_FRRD	Total Metals	Cobalt (mg/L)_Total Metals	Date	0.000426078	0.000115013	3.704608971	0.000474213	1
FR_FRRD	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-8.005944072	0.786532862	-10.17877887	1.60306E-14	0
FR_FRRD	Total Metals	Copper (mg/L)_Total Metals	Date	2.69678E-05	4.54358E-05	0.593536218	0.55513008	0
FR_FRRD	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	-0.260280364	4.343925664	-0.059918236	0.952426737	0
FR_FRRD	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000205484	0.000250936	-0.81886874	0.416213272	0
FR_FRRD	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-9.057884373	1.745397473	-5.18958261	2.81649E-06	0
FR_FRRD	Total Metals	Lead (mg/L)_Total Metals	Date	-3.97353E-05	0.000100827	-0.394095112	0.694956077	0
FR_FRRD	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-4.93577122	1.053333067	-4.685859939	1.73023E-05	0
FR_FRRD	Total Metals	Lithium (mg/L)_Total Metals	Date	9.09788E-05	6.08481E-05	1.495178289	0.140289373	0
FR_FRRD	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	3.231884336	1.048540879	3.082268321	0.003141389	0
FR_FRRD	Total Metals	Magnesium (mg/L)_Total Metals	Date	4.66895E-05	6.05713E-05	0.770818589	0.443943235	0
FR_FRRD	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-3.895811083	4.023027566	-0.968377924	0.336876569	0
FR_FRRD	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.000125489	0.000232399	-0.539973834	0.591282405	0
FR_FRRD	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	11.87727106	3.159873742	3.758780264	0.000398811	0
FR_FRRD	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001482488	0.000182537	-8.121572977	3.83223E-11	0
FR_FRRD	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	14.3007507	13.47124216	1.061576247	0.3996685	0
FR_FRRD	Total Metals	Methyl mercury (µg/L)_Total Metals	Date	-0.001397581	0.000770069	-1.81487752	0.211204617	0
FR_FRRD	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-8.226035647	1.312284574	-6.268484603	4.89834E-08	0
FR_FRRD	Total Metals	Molybdenum (mg/L)_Total Metals	Date	6.62903E-05	7.5807E-05	0.874461799	0.385473484	0
FR_FRRD	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-9.54692635	3.336149381	-2.861660334	0.005852395	0
FR_FRRD	Total Metals	Nickel (mg/L)_Total Metals	Date	0.000175409	0.00019272	0.910177426	0.366496043	0
FR_FRRD	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	0.395839272	0.757296319	0.522700641	0.603173625	0
FR_FRRD	Total Metals	Potassium (mg/L)_Total Metals	Date	1.5669E-05	4.37469E-05	0.358173264	0.721513977	0
FR_FRRD	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-4.192325019	1.335253528	-3.139722107	0.002659821	0
FR_FRRD	Total Metals	Selenium (mg/L)_Total Metals	Date	8.81378E-05	7.71339E-05	1.142660568	0.257874544	0
FR_FRRD	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	0.197407797	0.539996423	0.365572416	0.716014065	0
FR_FRRD	Total Metals	Silicon (mg/L)_Total Metals	Date	3.10236E-05	3.11941E-05	0.994535304	0.324093505	0
FR_FRRD	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.9906192	0.673714515	-17.79777477	3.58172E-25	0
FR_FRRD	Total Metals	Silver (mg/L)_Total Metals	Date	2.99687E-05	3.89186E-05	0.770035872	0.444403733	0
FR_FRRD	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	-0.077792225	1.266408725	-0.061427424	0.951230002	0
FR_FRRD	Total Metals	Sodium (mg/L)_Total Metals	Date	5.08257E-05	7.31569E-05	0.694748989	0.489986505	0
FR_FRRD	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-1.846581393	0.919494982	-2.008256087	0.049280551	0
FR_FRRD	Total Metals	Strontium (mg/L)_Total Metals	Date	-2.60479E-06	5.31167E-05	-0.049038952	0.961056737	0
FR_FRRD	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-12.07657557	1.079408916	-11.18813769	4.11213E-16	0
FR_FRRD	Total Metals	Thallium (mg/L)_Total Metals	Date	3.63462E-05	6.23544E-05	0.582897243	0.562222029	0
FR_FRRD	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-11.43932101	1.398075706	-8.182189964	3.03404E-11	0
FR_FRRD	Total Metals	Tin (mg/L)_Total Metals	Date	0.000132493	8.07629E-05	1.640513667	0.106311181	0
FR_FRRD	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-2.318615495	0.486253433	-4.768327246	1.29113E-05	0
FR_FRRD	Total Metals	Titanium (mg/L)_Total Metals	Date	-0.000129023	2.80895E-05	-4.593276215	2.39789E-05	0
FR_FRRD	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-8.361652934	0.998775	-8.371908524	1.4624E-11	0
FR_FRRD	Total Metals	Uranium (mg/L)_Total Metals	Date	0.000150882	5.76964E-05	2.6151065	0.011349465	1
FR_FRRD	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-5.039987983	1.483846267	-3.396570181	0.001237885	0
FR_FRRD	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000138068	8.57177E-05	-1.610728772	0.112668311	0
FR_FRRD	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-6.657745359	1.580520727	-4.212374597	8.92593E-05	0
FR_FRRD	Total Metals	Zinc (mg/L)_Total Metals	Date	5.54095E-05	9.13023E-05	0.606880047	0.54629894	0
FR_HC1	Alkylated PAHs	1-Methylnaphthalene (µg/L)_Alkylated PAHs	(Intercept)	-2.995732274	-	-	-	0
FR_HC1	Alkylated PAHs	2-Methylnaphthalene (µg/L)_Alkylated PAHs	(Intercept)	-3.912023005	-	-	-	0
FR_HC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.756186539	0.834359597	-0.906307714	0.367090342	0
FR_HC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	6.79864E-05	4.96447E-05	1.369461062	0.174118096	0
FR_HC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.424733758	0.249988967	17.69971617	1.5693E-31	0
FR_HC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	2.8601E-05	1.48807E-05	1.922016419	0.057664872	0
FR_HC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-2.304737388	1.107462399	-2.081097642	0.040173635	0
FR_HC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.00015205	6.59223E-05	2.306500509	0.023303485	1
FR_HC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	5.860855918	0.592273122	9.895529112	3.06409E-16	0
FR_HC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	2.19767E-05	3.52404E-05	0.623620812	0.534387004	0
FR_HC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-0.576380428	0.636217929	-0.905948106	0.367279667	0
FR_HC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	1.06712E-05	3.78552E-05	0.281894524	0.778644073	0
FR_HC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.48069613	0.632575041	8.664104291	1.26856E-13	0
FR_HC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	8.85281E-06	3.76384E-05	0.235206825	0.814559849	0
FR_HC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.139064117	0.145222339	0.957594525	0.340750053	0
FR_HC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-7.85349E-06	8.64444E-06	-0.908501866	0.365961434	0
FR_HC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	6.571333926	0.341620843	19.23575236	2.35655E-34	0
FR_HC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-3.84595E-05	2.03266E-05	-1.892082616	0.061557848	0
FR_HC1	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.127093547	0.026724061	79.59469869	4.684E-88	0
FR_HC1	Conventional Parameters	pH (-)_Conventional Parameters	Date	-1.45163E-06	1.59009E-06	-0.912921036	0.363619615	0
FR_HC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.356299372	0.242747721	17.945789	4.03297E-32	0
FR_HC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	3.30344E-05	1.44436E-05	2.28713323	0.024431592	1
FR_HC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	5.492156844	0.686866988	7.995954005	3.25582E-12	0
FR_HC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	2.06741E-05	4.08688E-05	0.505864906	0.614135754	0
FR_HC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	1.801625279	0.839205347	2.146822926	0.034381105	0
FR_HC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-0.00012107	4.9933E-05	-2.424652854	0.017234586	0
FR_HC1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	(Intercept)	6.408643252	1.481352702	4.326210254	3.77934E-05	0
FR_HC1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	Date	-0.000343541	8.8141E-05	-3.897627041	0.000182013	0
FR_HC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	-0.465858675	2.066969854	-0.225382424	0.822171059	0
FR_HC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-3.3372E-06	0.000122985	-0.027134929	0.97840964	0
FR_HC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-4.41586471	0.648010929	-6.814491106	8.93585E-10	0
FR_HC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-8.00585E-05	3.85569E-05	-2.076374232	0.040588711	0
FR_HC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-9.289032424	0.162960582	-57.00171367	1.05121E-74	0
FR_HC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	5.79508E-06	9.69621E-06	0.597664221	0.551501134	0
FR_HC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-9.046710318	0.227487271	-39.76798476	1.34524E-60	0
FR_HC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	-8.23883E-06	1.35356E-05	-0.608680301	0.544204499	0
FR_HC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-2.882791461	0.484826771	-5.946023682	4.65315E-08	0
FR_HC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	-3.39926E-05	2.88473E-05	-1.178362394	0.241626576	0
FR_HC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	3.665051868	0.834209283	4.393444121	2.92763E-05	0
FR_HC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000810434	4.96357E-05	-16.32763653	3.43158E-29	0
FR_HC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	9.995327665	1.220838453	8.187264779	1.29012E-12	0
FR_HC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001129341	7.26403E-05	-15.54703	1.00114E-27	0
FR_HC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.509321721	0.170973856	-26.37433484	3.1613E-45	0
FR_HC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-4.471E-06	1.0173E-05	-0.43949708	0.661310132	0
FR_HC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-12.65048762	0.900572766	-14.04715764	8.09301E-25	0
FR_HC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	0.000108186	5.35844E-05	2.018987004	0.046336889	1
FR_HC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-7.219854443	0.416654956	-17.32813768	5.09277E-31	0
FR_HC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-0.000109106	2.47911E-05	-4.401012638	2.84426E-05	0
FR_HC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-9.220898356	0.168484547	-54.72845142	4.31532E-73	0
FR_HC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	1.71037E-06	1.00249E-05	0.170612525	0.864895144	0
FR_HC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-6.317676043	0.506664079	-12.46916115	1.2318E-21	0
FR_HC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-8.14831E-05	3.01467E-05	-2.702886751	0.00815773	0
FR_HC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	2.811045207	0.663817551	4.234665388	5.33096E-05	0
FR_HC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000424196	3.94974E-05	-10.73984567	4.97253E-18	0
FR_HC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.06704223	0.150436533	-66.91886628	4.26631E-81	0
FR_HC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	1.03125E-05	8.95102E-06	1.152098572	0.252202258	0
FR_HC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-6.795300447	0.811563637	-8.373096247	5.23417E-13	0
FR_HC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000106032	4.82883E-05	2.195811697	0.030566176	1
FR_HC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-1.18687769	1.89195995	-0.627327069	0.531965735	0
FR_HC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	-0.000257163	0.000112572	-2.284428351	0.024596426	0
FR_HC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-6.129718268	0.592224546	-10.35032795	3.31733E-17	0
FR_HC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000342914	3.52376E-05	-9.731503397	6.8398E-16	0
FR_HC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-7.617255639	0.409269534	-18.61183158	2.76254E-33	0
FR_HC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	3.14784E-05	2.43517E-05	1.292657398	0.199297953	0
FR_HC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-5.952645326	0.801555661	-7.426365523	5.00551E-11	0
FR_HC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	-5.55227E-05	4.76928E-05	-1.164172216	0.247300504	0
FR_HC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-4.264863343	1.254017283	-3.400960577	0.000987384	0
FR_HC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	2.45934E-05	7.46144E-05	0.32960681	0.742430427	0
FR_HC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.094223927	0.166591491	0.565598681	0.57301425	0
FR_HC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	1.46898E-05	9.91225E-06	1.481984658	0.141689056	0
FR_HC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.67648014	0.150436533	-77.61731753	4.81262E-87	0
FR_HC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	1.03125E-05	8.95102E-06	1.152098572	0.252202258	0
FR_HC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-2.443041039	0.472303675	-5.172606453	1.30052E-06	0
FR_HC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	1.81574E-05	2.81022E-05	0.64611978	0.519776109	0
FR_HC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.67648014	0.150436533	-77.61731753	4.81262E-87	0
FR_HC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	1.03125E-05	8.95102E-06	1.152098572	0.252202258	0
FR_HC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.373895045	0.150436533	-62.31129412	3.01131E-78	0
FR_HC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	1.03125E-05	8.95102E-06	1.152098572	0.252202258	0
FR_HC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-4.367575764	0.117735948	-37.09636565	6.30096E-58	0
FR_HC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-1.32039E-05	7.00533E-06	-1.884831572	0.062541916	0
FR_HC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-7.773121486	0.629600391	-12.34611923	2.20534E-21	0
FR_HC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	5.84782E-05	3.74614E-05	1.561025444	0.121878306	0
FR_HC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-1.729729546	0.39200682	-4.41249861	2.72211E-05	0
FR_HC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000332516	2.33245E-05	-14.25604919	3.13343E-25	0
FR_HC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	-0.555138245	0.564306365	-0.983753294	0.32776216	0
FR_HC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000326841	3.35764E-05	-9.73423184	6.74903E-16	0
FR_HC1	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	4.122039348	0.945890412	4.357840288	3.69644E-05	0
FR_HC1	Field Measured	Conductivity (µS/cm)_Field Measured	Date	0.000116923	5.58147E-05	2.094839449	0.039197482	1
FR_HC1	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	5.226919861	0.24567281	21.27593957	2.34082E-35	0
FR_HC1	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-5.00395E-05	1.44871E-05	-3.454072666	0.000872086	0
FR_HC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	3.163418756	0.214336505	14.75912259	6.318E-25	0
FR_HC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-4.77234E-05	1.26392E-05	-3.775814945	0.000298673	0
FR_HC1	Field Measured	pH (-)_Field Measured	(Intercept)	2.251464247	0.053998194	41.69517655	6.61191E-58	0
FR_HC1	Field Measured	pH (-)_Field Measured	Date	-9.93613E-06	3.1863E-06	-3.118388114	0.002490783	0
FR_HC1	Field Measured	Total Suspended Solids (ppm)_Field Measured	(Intercept)	0	-	-	-	0
FR_HC1	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	-0.385303661	0.897711266	-0.429206667	0.668754959	0
FR_HC1	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.000145668	5.34141E-05	-2.72714354	0.007622812	0
FR_HC1	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	4.417691587	0.564713846	7.822885197	7.49935E-12	0
FR_HC1	Major Ions	Calcium (mg/L)_Major Ions	Date	-8.90972E-06	3.36007E-05	-0.265165081	0.791462917	0
FR_HC1	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	6.971576437	0.745527916	9.351194347	4.40557E-15	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_HC1	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000436343	4.43592E-05	-9.836596942	4.08863E-16	0
FR_HC1	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-1.251598267	0.336271755	-3.721984521	0.000336583	0
FR_HC1	Major Ions	Fluoride (mg/L)_Major Ions	Date	-9.00859E-06	2.00083E-05	-0.450243081	0.653571873	0
FR_HC1	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	2.503801325	0.76502204	3.272848616	0.001490245	0
FR_HC1	Major Ions	Magnesium (mg/L)_Major Ions	Date	4.07195E-05	4.55191E-05	0.894559552	0.373307413	0
FR_HC1	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	5.867913426	0.801908629	7.317433947	8.40019E-11	0
FR_HC1	Major Ions	Potassium (mg/L)_Major Ions	Date	-0.000354474	4.77138E-05	-7.429175694	4.93898E-11	0
FR_HC1	Major Ions	Silica (mg/L)_Major Ions	(Intercept)	1.05431203	-	-	-	0
FR_HC1	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	6.213635185	0.852950505	7.284871926	9.8027E-11	0
FR_HC1	Major Ions	Sodium (mg/L)_Major Ions	Date	-0.000382969	5.07508E-05	-7.546068864	2.82818E-11	0
FR_HC1	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	3.919122472	1.090258097	3.594674033	0.00051964	0
FR_HC1	Major Ions	Sulphate (mg/L)_Major Ions	Date	5.08098E-05	6.48707E-05	0.783246878	0.435451117	0
FR_HC1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-6.907755279	5.44021E-14	-1.26976E+14	4.96281E-97	0
FR_HC1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	5.88155E-18	3.38521E-18	1.73742422	0.125880659	0
FR_HC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	0	-Inf	0	0
FR_HC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	0	0	-	-	0
FR_HC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	4.896267562	1.179280412	4.151911209	7.24797E-05	0
FR_HC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000201774	7.01676E-05	-2.875603499	0.004988368	0
FR_HC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-2.317281591	1.354702874	-1.710546007	0.090463499	0
FR_HC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000191873	8.06053E-05	-2.380396901	0.019312115	0
FR_HC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-7.804936936	0.971222108	-8.03620189	2.68042E-12	0
FR_HC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000201505	5.7788E-05	3.486972587	0.000744634	1
FR_HC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-11.5425236	1.214404057	-9.504681363	2.07733E-15	0
FR_HC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000556542	7.22574E-05	7.70220924	1.33918E-11	1
FR_HC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-7.215343863	0.72539811	-9.946736505	6.58004E-16	0
FR_HC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	2.75784E-05	4.29714E-05	0.641784706	0.522739982	0
FR_HC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	22.22526687	81.87159379	0.271464935	0.793865016	0
FR_HC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.001801522	0.005295103	-0.340224164	0.743669123	0
FR_HC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	9.391635696	2.665208588	3.523790123	0.00065899	0
FR_HC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000877791	0.000158581	-5.535291545	2.80011E-07	0
FR_HC1	Parent PAHs	Acenaphthene (%)_Parent PAHs	(Intercept)	4.726502471	-	-	-	0
FR_HC1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC1	Parent PAHs	Acridine (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	(Intercept)	-5.298317367	-	-	-	0
FR_HC1	Parent PAHs	Benzo(b,j)fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC1	Parent PAHs	Chrysene (%)_Parent PAHs	(Intercept)	4.631812117	-	-	-	0
FR_HC1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	(Intercept)	-5.298317367	-	-	-	0
FR_HC1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	(Intercept)	-3.912023005	-	-	-	0
FR_HC1	Parent PAHs	Phenanthrene (%)_Parent PAHs	(Intercept)	4.670957927	-	-	-	0
FR_HC1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	(Intercept)	-3.912023005	-	-	-	0
FR_HC1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	(Intercept)	-2.995732274	-	-	-	0
FR_HC1	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	-1.471395626	2.231053613	-0.659507068	0.511182768	0
FR_HC1	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000179459	0.000132748	-1.351869379	0.179661051	0
FR_HC1	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-9.149626487	0.219552966	-41.67389152	2.08582E-62	0
FR_HC1	Total Metals	Antimony (mg/L)_Total Metals	Date	-2.30396E-07	1.30635E-05	-0.017636657	0.985966094	0
FR_HC1	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-8.921600303	0.508367697	-17.54950276	2.04096E-31	0
FR_HC1	Total Metals	Arsenic (mg/L)_Total Metals	Date	-6.69632E-06	3.0248E-05	-0.221380229	0.825276585	0
FR_HC1	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-2.45469293	0.467687909	-5.248570432	9.46714E-07	0
FR_HC1	Total Metals	Barium (mg/L)_Total Metals	Date	-5.92115E-05	2.78276E-05	-2.127797536	0.035970517	0
FR_HC1	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	3.629456607	0.835257598	4.345314085	3.51565E-05	0
FR_HC1	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.0008082	4.96981E-05	-16.26219773	4.53959E-29	0
FR_HC1	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	9.959732404	1.222905985	8.144315693	1.58858E-12	0
FR_HC1	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001127107	7.27633E-05	-15.49004629	1.28454E-27	0
FR_HC1	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-4.69548813	0.17214098	-27.27699191	1.91951E-46	0
FR_HC1	Total Metals	Boron (mg/L)_Total Metals	Date	6.46301E-06	1.02424E-05	0.631002866	0.529569955	0
FR_HC1	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-11.28793782	0.840649851	-13.42763316	1.39093E-23	0
FR_HC1	Total Metals	Cadmium (mg/L)_Total Metals	Date	4.24722E-05	5.00189E-05	0.849123276	0.397970028	0
FR_HC1	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.676824801	0.544025552	8.596700615	1.76226E-13	0
FR_HC1	Total Metals	Calcium (mg/L)_Total Metals	Date	-2.3842E-05	3.23697E-05	-0.736551594	0.46322935	0
FR_HC1	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-7.134108497	0.737381631	-9.674920282	9.02369E-16	0
FR_HC1	Total Metals	Chromium (mg/L)_Total Metals	Date	-8.75653E-05	4.38744E-05	-1.995814896	0.048848029	0
FR_HC1	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-8.021577765	0.44848813	-17.88581956	5.14802E-32	0
FR_HC1	Total Metals	Cobalt (mg/L)_Total Metals	Date	-6.59896E-05	2.66852E-05	-2.472893718	0.015198998	0
FR_HC1	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-7.232300996	0.525593712	-13.76025022	3.00434E-24	0
FR_HC1	Total Metals	Copper (mg/L)_Total Metals	Date	-1.689E-05	3.1273E-05	-0.54008263	0.590417318	0
FR_HC1	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	2.326017499	1.451934739	1.602012429	0.112508189	0
FR_HC1	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000365727	8.63906E-05	-4.233417233	5.35586E-05	0
FR_HC1	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-8.715644976	0.691948408	-12.59580175	6.77452E-22	0
FR_HC1	Total Metals	Lead (mg/L)_Total Metals	Date	-6.35466E-05	4.11712E-05	-1.543473137	0.126076021	0
FR_HC1	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-6.141748587	0.762665984	-8.052999236	2.47135E-12	0
FR_HC1	Total Metals	Lithium (mg/L)_Total Metals	Date	6.85726E-05	4.53789E-05	1.511113967	0.134113952	0
FR_HC1	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	2.955936611	0.759234013	3.89331426	0.000184821	0
FR_HC1	Total Metals	Magnesium (mg/L)_Total Metals	Date	1.42865E-05	4.51747E-05	0.316249343	0.752514439	0
FR_HC1	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-0.93733218	1.064077456	-0.880887171	0.380625633	0
FR_HC1	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.000237403	6.3313E-05	-3.749671091	0.00030586	0
FR_HC1	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	11.98555697	1.310529748	9.145581768	1.2057E-14	0
FR_HC1	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001489456	7.79769E-05	-19.10123222	3.99034E-34	0
FR_HC1	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	-9.446062705	-	-	-	0
FR_HC1	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-7.008017565	0.335972942	-20.85887488	4.86118E-37	0
FR_HC1	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-3.43734E-06	1.99905E-05	-0.171948937	0.863847321	0
FR_HC1	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-5.838362788	0.828559625	-7.046400297	3.02077E-10	0
FR_HC1	Total Metals	Nickel (mg/L)_Total Metals	Date	-5.6466E-05	4.92996E-05	-1.145365801	0.254965381	0
FR_HC1	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	6.008159484	0.770743103	7.795281539	8.56424E-12	0
FR_HC1	Total Metals	Potassium (mg/L)_Total Metals	Date	-0.000362128	4.58595E-05	-7.896474492	5.26154E-12	0
FR_HC1	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-3.590224962	1.231057984	-2.916373565	0.004428204	0
FR_HC1	Total Metals	Selenium (mg/L)_Total Metals	Date	-1.66546E-05	7.32483E-05	-0.227371098	0.820628985	0
FR_HC1	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	0.412920593	0.18551368	2.225822871	0.02841617	0
FR_HC1	Total Metals	Silicon (mg/L)_Total Metals	Date	-1.49457E-06	1.10381E-05	-0.135400298	0.892584914	0
FR_HC1	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.50447222	0.217424084	-52.91259371	9.32469E-72	0
FR_HC1	Total Metals	Silver (mg/L)_Total Metals	Date	8.09713E-07	1.29368E-05	0.062589874	0.950225991	0
FR_HC1	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	6.307313818	0.844771712	7.466293828	4.1385E-11	0
FR_HC1	Total Metals	Sodium (mg/L)_Total Metals	Date	-0.000388185	5.02642E-05	-7.722893046	1.21264E-11	0
FR_HC1	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-2.090245135	0.460737435	-4.536738228	1.68615E-05	0
FR_HC1	Total Metals	Strontium (mg/L)_Total Metals	Date	-2.10569E-06	2.7414E-05	-0.076810568	0.938937496	0
FR_HC1	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-11.48073997	0.266796091	-43.03188971	1.18776E-63	0
FR_HC1	Total Metals	Thallium (mg/L)_Total Metals	Date	-2.36117E-07	1.58745E-05	-0.014873998	0.988164229	0
FR_HC1	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.398033058	0.197755634	-47.52346558	1.57826E-67	0
FR_HC1	Total Metals	Tin (mg/L)_Total Metals	Date	1.21929E-05	1.17665E-05	1.036239017	0.302749057	0
FR_HC1	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-4.100185967	0.188271084	-21.77809723	1.67869E-38	0
FR_HC1	Total Metals	Titanium (mg/L)_Total Metals	Date	-2.82056E-05	1.12022E-05	-2.517863616	0.013498026	0
FR_HC1	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-7.392352315	0.608610703	-12.14627392	5.69679E-21	0
FR_HC1	Total Metals	Uranium (mg/L)_Total Metals	Date	3.67164E-05	3.62125E-05	1.013914642	0.31322619	0
FR_HC1	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-1.69614206	0.426817013	-3.973932637	0.00013859	0
FR_HC1	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.00033327	2.53958E-05	-13.12305112	5.7212E-23	0
FR_HC1	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-5.779139566	0.412370512	-14.01443459	9.39439E-25	0
FR_HC1	Total Metals	Zinc (mg/L)_Total Metals	Date	2.60704E-06	2.45362E-05	0.106252811	0.915608197	0
FR_HC1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	(Intercept)	4.468204331	-	-	-	0
FR_HC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	2.76945E-15	-5.00567E+14	6.03939E-73	0
FR_HC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	-2.15021E-19	1.63177E-19	-1.317719402	0.244742152	0
FR_HC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	0	-Inf	0	0
FR_HC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
FR_HC1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	8.36745E-15	-1.65677E+14	3.84254E-15	0
FR_HC1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	2.74709E-18	5.28678E-19	5.196152423	0.121037718	0
FR_HC1	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_HC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-0.693147181	0	-Inf	0	0
FR_HC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
FR_HC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	2.4967E-15	-5.55251E+14	2.30338E-87	0
FR_HC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	-1.84436E-19	1.48602E-19	-1.241143594	0.26087494	0
FR_HC3	Alkylated PAHs	1-Methylnaphthalene (µg/L)_Alkylated PAHs	(Intercept)	-2.995732274	-	-	-	0
FR_HC3	Alkylated PAHs	2-Methylnaphthalene (µg/L)_Alkylated PAHs	(Intercept)	-3.912023005	-	-	-	0
FR_HC3	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.260122849	0.651973117	-0.398977876	0.690946646	0
FR_HC3	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	2.44965E-05	3.85803E-05	0.634946898	0.527230798	0
FR_HC3	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.39504796	0.188829232	23.27525203	6.99572E-38	0
FR_HC3	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	1.53445E-05	1.11739E-05	1.373239316	0.173421316	0
FR_HC3	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.337173288	0.834808326	-0.403893059	0.687342769	0
FR_HC3	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	2.75427E-05	4.93996E-05	0.557550147	0.578670511	0
FR_HC3	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	5.106571122	0.454070772	11.2462009	2.71595E-18	0
FR_HC3	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	3.5478E-05	2.68695E-05	1.320381247	0.190381424	0
FR_HC3	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	0.087577689	0.523915452	0.167159966	0.867655726	0
FR_HC3	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	-3.72849E-05	3.10026E-05	-1.202639476	0.232577015	0
FR_HC3	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.866291457	0.444810564	10.94014363	1.06696E-17	0
FR_HC3	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	1.28213E-05	2.63216E-05	0.487103059	0.6274849	0
FR_HC3	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0	0	-	-	0
FR_HC3	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0	0	-	-	0
FR_HC3	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	7.165436089	0.371984959	19.26270381	3.55008E-32	0
FR_HC3	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-7.37905E-05	2.20121E-05	-3.352268801	0.001214489	0
FR_HC3	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.143590655	0.026888628	79.72108645	1.80103E-79	0
FR_HC3	Conventional Parameters	pH (-)_Conventional Parameters	Date	-2.42543E-06	1.59113E-06	-1.524343595	0.131270565	0
FR_HC3	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.374320636	0.186048021	23.51178262	3.39722E-38	0
FR_HC3	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	1.67836E-05	1.10093E-05	1.524483362	0.131235703	0
FR_HC3	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	4.509547136	0.508533946	8.867740634	1.31917E-13	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_HC3	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	4.32704E-05	3.00924E-05	1.437919551	0.154262376	0
FR_HC3	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	1.250439683	0.718171546	1.741143448	0.085408992	0
FR_HC3	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-0.000103746	4.24976E-05	-2.441217268	0.016790261	0
FR_HC3	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	7.798533711	1.202202098	6.486874146	6.21762E-09	0
FR_HC3	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-0.000435999	7.114E-05	-6.128743425	2.94855E-08	0
FR_HC3	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	0.570372084	2.021245331	0.282188448	0.778510025	0
FR_HC3	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-0.00011916	0.000119607	-0.99626225	0.322053594	0
FR_HC3	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-4.499876972	0.452586136	-9.942586874	9.69389E-16	0
FR_HC3	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-7.5991E-05	2.67817E-05	-2.837427358	0.005729264	0
FR_HC3	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-9.45653239	0.227081064	-41.6438616	6.22364E-57	0
FR_HC3	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	1.55652E-05	1.34375E-05	1.158341797	0.250087082	0
FR_HC3	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-9.007837324	0.349941822	-25.74095683	4.85295E-41	0
FR_HC3	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	-9.60816E-06	2.07077E-05	-0.463989532	0.643884669	0
FR_HC3	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-4.751287175	0.490823816	-9.680229492	3.20505E-15	0
FR_HC3	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	2.30478E-05	2.90444E-05	0.793538578	0.429754394	0
FR_HC3	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	3.116065064	0.922371618	3.378318462	0.00111792	0
FR_HC3	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000779335	5.45811E-05	-14.27847788	6.00079E-24	0
FR_HC3	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	8.421838113	1.261403048	6.676563947	2.69882E-09	0
FR_HC3	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001040977	7.46432E-05	-13.94603865	2.37317E-23	0
FR_HC3	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.851362204	0.227081064	-21.36401039	2.94464E-35	0
FR_HC3	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	1.55652E-05	1.34375E-05	1.158341797	0.250087082	0
FR_HC3	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-6.974173158	0.450068658	-15.49579832	4.39958E-26	0
FR_HC3	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-0.000295305	2.66327E-05	-11.08805944	5.502E-18	0
FR_HC3	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-7.059427036	0.533252514	-13.23843178	4.63495E-22	0
FR_HC3	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-0.000109321	3.15551E-05	-3.464459167	0.000847578	0
FR_HC3	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-9.45653239	0.227081064	-41.6438616	6.22364E-57	0
FR_HC3	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	1.55652E-05	1.34375E-05	1.158341797	0.250087082	0
FR_HC3	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-6.999336197	0.398060141	-17.58361482	1.48661E-29	0
FR_HC3	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-3.80581E-05	2.35551E-05	-1.615703071	0.109999797	0
FR_HC3	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	3.091013532	0.631081956	4.897958978	4.7934E-06	0
FR_HC3	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000438475	3.73441E-05	-11.74147565	3.02154E-19	0
FR_HC3	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.14967957	0.227081064	-44.69628336	2.39926E-59	0
FR_HC3	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	1.55652E-05	1.34375E-05	1.158341797	0.250087082	0
FR_HC3	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-10.67217276	0.44420995	-24.02506466	7.21747E-39	0
FR_HC3	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000217171	2.6286E-05	8.261864905	2.11358E-12	1
FR_HC3	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-13.31782288	0.750145081	-17.75366287	7.94163E-30	0
FR_HC3	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	0.00023876	4.43896E-05	5.378727244	6.93732E-07	1
FR_HC3	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-6.615488758	0.373529158	-17.71076931	9.29922E-30	0
FR_HC3	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000318051	2.21035E-05	-14.38916882	3.80822E-24	0
FR_HC3	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-8.367040854	0.455257211	-18.37871133	8.1707E-31	0
FR_HC3	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	5.10758E-05	2.69397E-05	1.895929303	0.061491864	0
FR_HC3	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-7.847094478	0.227081064	-34.55635775	1.20861E-50	0
FR_HC3	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	1.55652E-05	1.34375E-05	1.158341797	0.250087082	0
FR_HC3	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-9.592403683	0.913385137	-10.5020361	7.66549E-17	0
FR_HC3	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.000150502	5.40493E-05	2.784536099	0.006654442	1
FR_HC3	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	-0.144279652	0.264695902	-0.545077015	0.58718007	0
FR_HC3	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	1.83071E-05	1.56633E-05	1.168786208	0.245876387	0
FR_HC3	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.75911748	0.227081064	-51.78378721	2.07124E-64	0
FR_HC3	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	1.55652E-05	1.34375E-05	1.158341797	0.250087082	0
FR_HC3	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-3.238098829	0.704113657	-4.59882974	1.52715E-05	0
FR_HC3	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	6.91152E-05	4.16657E-05	1.658800436	0.100976489	0
FR_HC3	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.75911748	0.227081064	-51.78378721	2.07124E-64	0
FR_HC3	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	1.55652E-05	1.34375E-05	1.158341797	0.250087082	0
FR_HC3	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-10.11660979	0.411372477	-24.59233506	1.34088E-39	0
FR_HC3	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	5.62214E-05	2.43429E-05	2.309564405	0.023427524	1
FR_HC3	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-4.571439257	0.022102275	-206.8311654	3.1324E-113	0
FR_HC3	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-1.93139E-06	1.3079E-06	-1.476712991	0.143582833	0
FR_HC3	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-8.42146725	0.581891132	-14.47258223	2.70611E-24	0
FR_HC3	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	7.3126E-05	3.44333E-05	2.123702214	0.036708634	1
FR_HC3	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-2.25651059	0.437102212	-5.162432331	1.67192E-06	0
FR_HC3	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000302486	2.58654E-05	-11.69460253	3.71572E-19	0
FR_HC3	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	0.09343209	0.662214978	0.14109027	0.888144664	0
FR_HC3	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000365822	3.91864E-05	-9.335419443	1.54947E-14	0
FR_HC3	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	4.184751178	0.566852929	7.382428424	2.02318E-10	0
FR_HC3	Field Measured	Conductivity (µS/cm)_Field Measured	Date	8.4458E-05	3.32333E-05	2.541363388	0.01316583	1
FR_HC3	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	4.744645216	0.649185076	7.308617207	2.97028E-10	0
FR_HC3	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-2.1066E-05	3.80288E-05	-0.553948236	0.581330673	0
FR_HC3	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	3.868893143	0.895244649	4.321604319	4.88396E-05	0
FR_HC3	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-8.59236E-05	5.24429E-05	-1.63842423	0.105696294	0
FR_HC3	Field Measured	pH (-)_Field Measured	(Intercept)	2.105502051	0.082867833	25.40795362	5.5169E-38	0
FR_HC3	Field Measured	pH (-)_Field Measured	Date	-2.82147E-07	4.85836E-06	-0.05807465	0.953847844	0
FR_HC3	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	-2.995732274	9.37805E-15	-3.19441E+14	0	0
FR_HC3	Major Ions	Bromide (mg/L)_Major Ions	Date	-1.0037E-18	5.54944E-19	-1.80864593	0.074171569	0
FR_HC3	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	3.788393428	0.389761746	9.719767189	2.67599E-15	0
FR_HC3	Major Ions	Calcium (mg/L)_Major Ions	Date	3.83276E-06	2.30641E-05	0.16617883	0.868425283	0
FR_HC3	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	6.36966223	1.003733708	6.34596824	1.15071E-08	0
FR_HC3	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000407337	5.93957E-05	-6.858015174	1.20777E-09	0
FR_HC3	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-1.493372435	0.547813735	-2.726058768	0.007835112	0
FR_HC3	Major Ions	Fluoride (mg/L)_Major Ions	Date	2.124E-05	3.24167E-05	0.655217154	0.514161909	0
FR_HC3	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	1.718382739	0.618599085	2.777861753	0.006780443	0
FR_HC3	Major Ions	Magnesium (mg/L)_Major Ions	Date	3.75325E-05	3.66054E-05	1.02532617	0.308224542	0
FR_HC3	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	14.31304657	1.275773584	11.21911188	3.06459E-18	0
FR_HC3	Major Ions	Potassium (mg/L)_Major Ions	Date	-0.000909947	7.54936E-05	-12.05330319	7.67725E-20	0
FR_HC3	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	10.78870954	1.126651368	9.575907726	5.16056E-15	0
FR_HC3	Major Ions	Sodium (mg/L)_Major Ions	Date	-0.000677986	6.66693E-05	-10.16938282	3.45763E-16	0
FR_HC3	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	2.171362183	1.327360527	1.635849598	0.105704009	0
FR_HC3	Major Ions	Sulphate (mg/L)_Major Ions	Date	0.000102568	7.85462E-05	1.305828835	0.19526235	0
FR_HC3	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-6.907755279	-	-	-	0
FR_HC3	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-4.18691E-17	-	-	-	0
FR_HC3	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	3.23224E-15	-3.72488E+14	6.8241E-280	0
FR_HC3	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	3.25807E-19	2.06133E-19	1.580568559	0.129662865	0
FR_HC3	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-4.205489824	0.727601088	-5.779938887	1.30543E-07	0
FR_HC3	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	0.000160266	4.30556E-05	3.722305723	0.000360742	1
FR_HC3	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-7.227207495	0.28245319	-25.5872752	7.515E-41	0
FR_HC3	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	2.03391E-05	1.67141E-05	1.216885994	0.227138414	0
FR_HC3	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-7.798420197	0.719024937	-10.84582717	1.62915E-17	0
FR_HC3	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000156563	4.25481E-05	3.679661957	0.000416555	1
FR_HC3	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-4.323538208	0.619995028	-6.973504646	7.22089E-10	0
FR_HC3	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	8.9321E-05	3.6688E-05	2.43460707	0.017078445	1
FR_HC3	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-7.288404349	0.513949333	-14.18117289	1.54345E-23	0
FR_HC3	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	2.73295E-05	3.0373E-05	0.89979582	0.370929478	0
FR_HC3	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-25.07733856	22.48796259	-1.115144978	0.30160349	0
FR_HC3	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.001238411	0.001454425	0.851477804	0.422673587	0
FR_HC3	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	11.96900879	2.761898765	4.33361604	4.13312E-05	0
FR_HC3	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.001035916	0.000163435	-6.338410537	1.1892E-08	0
FR_HC3	Parent PAHs	Acenaphthene (%)_Parent PAHs	(Intercept)	4.742320024	-	-	-	0
FR_HC3	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC3	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC3	Parent PAHs	Acridine (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC3	Parent PAHs	Anthracene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC3	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC3	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	(Intercept)	-5.298317367	-	-	-	0
FR_HC3	Parent PAHs	Benzo(b,j)fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC3	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC3	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC3	Parent PAHs	Chrysene (%)_Parent PAHs	(Intercept)	4.611152258	-	-	-	0
FR_HC3	Parent PAHs	Chrysene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC3	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	(Intercept)	-5.298317367	-	-	-	0
FR_HC3	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC3	Parent PAHs	Fluorene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC3	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC3	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	(Intercept)	-3.912023005	-	-	-	0
FR_HC3	Parent PAHs	Phenanthrene (%)_Parent PAHs	(Intercept)	4.689511334	-	-	-	0
FR_HC3	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	(Intercept)	-3.912023005	-	-	-	0
FR_HC3	Parent PAHs	Pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_HC3	Parent PAHs	Quinoline (µg/L)_Parent PAHs	(Intercept)	-2.995732274	-	-	-	0
FR_HC3	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	-0.811199875	1.955285909	-0.414875324	0.679316623	0
FR_HC3	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000256435	0.000115704	-2.216311122	0.02944035	0
FR_HC3	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-9.321574916	0.163606158	-56.97569731	1.01069E-67	0
FR_HC3	Total Metals	Antimony (mg/L)_Total Metals	Date	7.16442E-06	9.68135E-06	0.740022895	0.46139963	0
FR_HC3	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-8.435068307	0.540653839	-15.60160623	2.89551E-26	0
FR_HC3	Total Metals	Arsenic (mg/L)_Total Metals	Date	-3.65247E-05	3.19931E-05	-1.14164409	0.256924905	0
FR_HC3	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-4.359209026	0.473809502	-9.200341073	2.87525E-14	0
FR_HC3	Total Metals	Barium (mg/L)_Total Metals	Date	-3.05618E-07	2.80376E-05	-0.010900304	0.991329464	0
FR_HC3	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	3.247606438	0.915993389	3.545447464	0.000650764	0
FR_HC3	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000787618	5.42037E-05	-14.53071387	2.13385E-24	0
FR_HC3	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	8.553525008	1.247961655	6.853996656	1.22954E-09	0
FR_HC3	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001049224	7.38478E-05	-14.20792624	8.02472E-24	0
FR_HC3	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-4.71982083	0.162295011	-29.08173704	5.82172E-45	0
FR_HC3	Total Metals	Boron (mg/L)_Total Metals	Date	7.28219E-06	9.60377E-06	0.758263514	0.4504671	0
FR_HC3	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-7.51483156	0.568502036	-13.21865373	5.04081E-22	0
FR_HC3	Total Metals	Cadmium (mg/L)_Total Metals	Date	-0.000258316	3.3641E-05	-7.678625875	3.01528E-11	0
FR_HC3	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.146123521	0.363746051	11.39840147	1.37965E-18	0
FR_HC3	Total Metals	Calcium (mg/L)_Total Metals	Date	-1.69298E-05	2.15246E-05	-0.786531581	0.433823328	0
FR_HC3	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-6.707320129	0.642544751	-10.4386817	1.02069E-16	0
FR_HC3	Total Metals	Chromium (mg/L)_Total Metals	Date	-0.000111306	3.80224E-05	-2.92737077	0.00442281	0
FR_HC3	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-9.310933944	0.16267877	-57.23508929	7.02707E-68	0
FR_HC3	Total Metals	Cobalt (mg/L)_Total Metals	Date	6.48369E-06	9.62647E-06	0.673527379	0.502505871	0
FR_HC3	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-7.537035392	0.184496734	-40.85186351	2.79757E-56	0
FR_HC3	Total Metals	Copper (mg/L)_Total Metals	Date	-2.84394E-06	1.09175E-05	-0.26049261	0.795136845	0
FR_HC3	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	3.480352265	0.9935548	3.502929345	0.000747954	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_HC3	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000456656	5.87934E-05	-7.767144011	2.01707E-11	0
FR_HC3	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-9.744590539	0.324197931	-30.05753463	4.89056E-46	0
FR_HC3	Total Metals	Lead (mg/L)_Total Metals	Date	-7.21169E-06	1.91843E-05	-0.37591546	0.707950533	0
FR_HC3	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-10.19104785	0.44134882	-23.09068788	1.23385E-37	0
FR_HC3	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000189714	2.61167E-05	7.264103573	1.96351E-10	1
FR_HC3	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	2.022334574	0.604935239	3.343059624	0.001250467	0
FR_HC3	Total Metals	Magnesium (mg/L)_Total Metals	Date	2.07153E-05	3.57969E-05	0.578690202	0.564384378	0
FR_HC3	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-9.102222891	2.097659572	-4.339227878	4.04828E-05	0
FR_HC3	Total Metals	Manganese (mg/L)_Total Metals	Date	1.90264E-05	0.000124128	0.153279745	0.878554248	0
FR_HC3	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	11.23137787	1.393067961	8.062333055	5.25799E-12	0
FR_HC3	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001451629	8.24344E-05	-17.60949908	1.35098E-29	0
FR_HC3	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	50.83765882	31.77292147	1.600030984	0.250724987	0
FR_HC3	Total Metals	Methyl mercury (µg/L)_Total Metals	Date	-0.003479241	0.001813084	-1.918962841	0.194992435	0
FR_HC3	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-7.880898764	0.395424056	-19.93024612	3.5321E-33	0
FR_HC3	Total Metals	Molybdenum (mg/L)_Total Metals	Date	2.41435E-05	2.33991E-05	1.031813538	0.305193178	0
FR_HC3	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-7.611515817	0.179741595	-42.34699156	1.67477E-57	0
FR_HC3	Total Metals	Nickel (mg/L)_Total Metals	Date	1.461E-06	1.06362E-05	0.137361422	0.891081844	0
FR_HC3	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	14.43481589	1.22289482	11.80380819	2.29583E-19	0
FR_HC3	Total Metals	Potassium (mg/L)_Total Metals	Date	-0.000916455	7.23645E-05	-12.66442735	5.39767E-21	0
FR_HC3	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-9.252306366	0.87386679	-10.58777662	5.20525E-17	0
FR_HC3	Total Metals	Selenium (mg/L)_Total Metals	Date	0.000131392	5.17108E-05	2.540901404	0.012941562	1
FR_HC3	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	0.041941536	0.238044751	0.176191811	0.860577665	0
FR_HC3	Total Metals	Silicon (mg/L)_Total Metals	Date	9.54054E-06	1.40862E-05	0.677295384	0.500124984	0
FR_HC3	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.33092955	0.289451056	-39.14627129	7.80416E-55	0
FR_HC3	Total Metals	Silver (mg/L)_Total Metals	Date	-9.56838E-06	1.71282E-05	-0.558633319	0.577934331	0
FR_HC3	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	11.2271349	1.064641543	10.54546008	6.30052E-17	0
FR_HC3	Total Metals	Sodium (mg/L)_Total Metals	Date	-0.000704297	6.29999E-05	-11.17933035	3.65974E-18	0
FR_HC3	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-2.897331116	0.69656944	-4.159428978	7.8099E-05	0
FR_HC3	Total Metals	Strontium (mg/L)_Total Metals	Date	5.00601E-05	4.12193E-05	1.214481342	0.228049854	0
FR_HC3	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-11.62757611	0.162295011	-71.64469225	1.01424E-75	0
FR_HC3	Total Metals	Thallium (mg/L)_Total Metals	Date	7.28219E-06	9.60377E-06	0.758263514	0.4504671	0
FR_HC3	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.358794237	0.163197304	-57.34650013	6.01435E-68	0
FR_HC3	Total Metals	Tin (mg/L)_Total Metals	Date	9.35232E-06	9.65716E-06	0.96843347	0.335675699	0
FR_HC3	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-4.565116257	0.03301068	-138.2920982	6.1577E-99	0
FR_HC3	Total Metals	Titanium (mg/L)_Total Metals	Date	-2.25726E-06	1.9534E-06	-1.15555718	0.251218319	0
FR_HC3	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-8.174521793	0.571859401	-14.29463566	5.61486E-24	0
FR_HC3	Total Metals	Uranium (mg/L)_Total Metals	Date	5.97274E-05	3.38396E-05	1.765013318	0.08128475	0
FR_HC3	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-2.162442606	0.406169022	-5.323996878	8.6795E-07	0
FR_HC3	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000308216	2.40349E-05	-12.8236787	2.72106E-21	0
FR_HC3	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-5.862987368	0.22318635	-26.2694711	1.0954E-41	0
FR_HC3	Total Metals	Zinc (mg/L)_Total Metals	Date	4.83963E-06	1.3207E-05	0.36644444	0.714977284	0
FR_HC3	Unknown	2-Bromobenzotrifluoride (%)_Unknown	(Intercept)	4.422448549	-	-	-	0
FR_HC3	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	0	-Inf	0	0
FR_HC3	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	0	0	-	-	0
FR_HC3	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	0	-Inf	0	0
FR_HC3	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
FR_HC3	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_HC3	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-0.693147181	0	-Inf	0	0
FR_HC3	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
FR_HC3	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-0.693147181	0	-Inf	0	0
FR_HC3	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
FR_HC3	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	0	-Inf	0	0
FR_HC3	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	0	0	-	-	0
FR_KC1	Alkylated PAHs	1-Methylnaphthalene (µg/L)_Alkylated PAHs	(Intercept)	-2.995732274	-	-	-	0
FR_KC1	Alkylated PAHs	1-Methylnaphthalene (µg/L)_Alkylated PAHs	Date	-6.97819E-18	-	-	-	0
FR_KC1	Alkylated PAHs	2-Methylnaphthalene (µg/L)_Alkylated PAHs	(Intercept)	-3.912023005	-	-	-	0
FR_KC1	Alkylated PAHs	2-Methylnaphthalene (µg/L)_Alkylated PAHs	Date	-1.39564E-17	-	-	-	0
FR_KC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-2.925534349	1.373043069	-2.130693797	0.035724525	0
FR_KC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	0.000275558	8.16965E-05	3.372944092	0.001081354	1
FR_KC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.243446019	0.336443072	12.6126717	7.53047E-22	0
FR_KC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	8.76582E-05	2.0027E-05	4.377004829	3.14527E-05	1
FR_KC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.24879216	1.061689868	-0.234336003	0.815239263	0
FR_KC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	2.3036E-05	6.31977E-05	0.364507397	0.716306662	0
FR_KC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	6.724864911	0.656249294	10.24742423	5.48279E-17	0
FR_KC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	3.68271E-05	3.9047E-05	0.943147865	0.348023045	0
FR_KC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-0.022956563	0.669567604	-0.034285654	0.972722065	0
FR_KC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	-1.46502E-05	3.98395E-05	-0.367730175	0.713901139	0
FR_KC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.777736461	0.715840236	8.071265311	2.2624E-12	0
FR_KC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	6.31774E-05	4.25927E-05	1.483291504	0.141342199	0
FR_KC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.139064117	0.145222339	0.957594525	0.340750053	0
FR_KC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-7.85349E-06	8.64444E-06	-0.908501866	0.365961434	0
FR_KC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	7.4757075	0.309142767	24.18205533	3.90712E-42	0
FR_KC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-9.12908E-05	1.83941E-05	-4.963046987	3.0852E-06	0
FR_KC1	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.191136484	0.029163659	75.13242775	9.76921E-86	0
FR_KC1	Conventional Parameters	pH (-)_Conventional Parameters	Date	-5.78279E-06	1.73525E-06	-3.332546989	0.001231734	0
FR_KC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.217681592	0.331222775	12.73367023	3.5399E-22	0
FR_KC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	8.93717E-05	1.97079E-05	4.534823521	1.69874E-05	1
FR_KC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	6.555643235	0.777672752	8.429822465	3.97226E-13	0
FR_KC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	3.53155E-05	4.62718E-05	0.763219496	0.447243747	0
FR_KC1	Conventional Parameters	Total Inorganic Carbon (mg/L)_Conventional Parameters	(Intercept)	42.67120766	-	-	-	0
FR_KC1	Conventional Parameters	Total Inorganic Carbon (mg/L)_Conventional Parameters	Date	-0.002090338	-	-	-	0
FR_KC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	3.004152425	0.946554331	3.173777064	0.002034067	0
FR_KC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-0.000186819	5.63203E-05	-3.317084815	0.001294322	0
FR_KC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	7.783920236	1.119632209	6.95221178	4.69852E-10	0
FR_KC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-0.000437965	6.66185E-05	-6.574227927	2.71681E-09	0
FR_KC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	1.774941098	2.103935822	0.843628916	0.401018549	0
FR_KC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-0.000200797	0.000125185	-1.604000378	0.112068813	0
FR_KC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-2.642413542	0.742776491	-3.557481386	0.00058885	0
FR_KC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-0.000189707	4.41954E-05	-4.292464779	4.29242E-05	0
FR_KC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-8.854708473	0.317826109	-27.86022992	3.26278E-47	0
FR_KC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	6.87773E-05	1.89108E-05	3.636942551	0.000450348	1
FR_KC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-7.395841377	0.531869723	-13.90536265	1.54566E-24	0
FR_KC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	-9.94903E-05	3.16464E-05	-3.143808432	0.002231962	0
FR_KC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-1.183783353	0.385673237	-3.069394607	0.002803458	0
FR_KC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	-0.000129046	2.29477E-05	-5.623496702	1.91354E-07	0
FR_KC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	5.570073452	0.969134284	5.747473331	1.1156E-07	0
FR_KC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000916028	5.76638E-05	-15.88566268	2.29535E-28	0
FR_KC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	11.92120481	1.355447355	8.79503344	6.69478E-14	0
FR_KC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001236019	8.06496E-05	-15.32579612	2.64102E-27	0
FR_KC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-5.364141754	0.309519032	-17.33057163	5.04165E-31	0
FR_KC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	8.86974E-05	1.84165E-05	4.816198988	5.58957E-06	1
FR_KC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-8.196609504	2.380968837	-3.442552198	0.000861945	0
FR_KC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	1.19655E-05	0.000141668	0.084461151	0.932869411	0
FR_KC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-7.083869921	0.540118374	-13.11540258	5.92881E-23	0
FR_KC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-0.000116357	3.21372E-05	-3.62062046	0.000475997	0
FR_KC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-5.363166019	0.845268898	-6.344922935	7.75497E-09	0
FR_KC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	-0.000213353	5.02938E-05	-4.242144393	5.18408E-05	0
FR_KC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-4.880668734	0.554314528	-8.804872484	6.38064E-14	0
FR_KC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-0.000162083	3.29819E-05	-4.914312809	3.76172E-06	0
FR_KC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	2.575305529	0.703765931	3.659321111	0.000417304	0
FR_KC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000406612	4.18743E-05	-9.710305009	7.58799E-16	0
FR_KC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-8.162020642	0.529908338	-15.40270281	1.88374E-27	0
FR_KC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	-9.52812E-05	3.15297E-05	-3.021950292	0.003235808	0
FR_KC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-6.460829528	0.622630372	-10.37666941	2.91715E-17	0
FR_KC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000214651	3.70467E-05	5.794064282	9.09666E-08	1
FR_KC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-7.370095011	1.929662972	-3.81936904	0.000239892	0
FR_KC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	-4.50051E-05	0.000114816	-0.391977468	0.695962141	0
FR_KC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-6.160419374	0.367802082	-16.74927816	5.73001E-30	0
FR_KC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000343396	2.18843E-05	-15.69140923	5.33342E-28	0
FR_KC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-5.277962252	0.400522083	-13.177706	4.43559E-23	0
FR_KC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	-6.93646E-05	2.38312E-05	-2.91066426	0.004502997	0
FR_KC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-9.652320098	0.652709557	-14.7880784	2.86267E-26	0
FR_KC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	0.000333051	3.88364E-05	8.575740072	1.95183E-13	1
FR_KC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-4.638689731	0.923262288	-5.024238283	2.40187E-06	0
FR_KC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.000165817	5.49344E-05	3.018452503	0.003270009	1
FR_KC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	-1.076973793	0.171986498	-6.261967086	1.12971E-08	0
FR_KC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	9.58159E-05	1.02333E-05	9.363187586	4.15424E-15	1
FR_KC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-9.771458554	0.529908338	-18.43990339	5.48984E-33	0
FR_KC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	-9.52812E-05	3.15297E-05	-3.021950292	0.003235808	0
FR_KC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-3.548403779	0.69777064	-5.085344063	1.86763E-06	0
FR_KC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	0.00011154	4.15176E-05	2.686567416	0.008536582	1
FR_KC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-10.63104078	0.272275153	-39.04521099	6.84365E-60	0
FR_KC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	7.77092E-06	1.62005E-05	0.479672731	0.632574317	0
FR_KC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-7.468873461	0.529908338	-14.09465171	6.51956E-25	0
FR_KC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	-9.52812E-05	3.15297E-05	-3.021950292	0.003235808	0
FR_KC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-2.169574137	0.484434567	-4.478570034	2.112E-05	0
FR_KC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-0.000135958	2.8824E-05	-4.716832127	8.31135E-06	0
FR_KC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-6.399083905	0.786965143	-8.131343509	1.69158E-12	0
FR_KC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	9.12298E-05	4.68247E-05	1.948326501	0.054358459	0
FR_KC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	0.186217723	0.659719427	0.28226806	0.778358536	0
FR_KC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000438677	3.92535E-05	-11.17549269	6.01125E-19	0
FR_KC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	-3.820456429	1.267708564	-3.013670915	0.003317305	0
FR_KC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-5.9474E-05	7.54291E-05	-0.788475234	0.432402791	0
FR_KC1	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	3.805934276	1.065896559	3.5706413	0.000588991	0
FR_KC1	Field Measured	Conductivity (µS/cm)_Field Measured	Date	0.000200577	6.29447E-05	3.186554575	0.002014532	1
FR_KC1	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	4.954583698	0.182655039	27.12536007	1.27253E-43	0
FR_KC1	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-3.11011E-05	1.07864E-05	-2.883371909	0.004982453	0
FR_KC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	2.927383454	0.206313605	14.1889986	3.92611E-24	0
FR_KC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-3.20235E-05	1.21835E-05	-2.628434612	0.010177588	0
FR_KC1	Field Measured	pH (-)_Field Measured	(Intercept)	2.161867257	0.070648905	30.60015228	1.15986E-47	0
FR_KC1	Field Measured	pH (-)_Field Measured	Date	-6.97509E-06	4.17205E-06	-1.671862029	0.098229104	0
FR_KC1	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	8.214165741	1.119455322	7.337644994	7.63188E-11	0
FR_KC1	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.000548409	6.6608E-05	-8.233388802	1.03156E-12	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_KC1	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	4.274713014	0.694418839	6.155813714	1.82341E-08	0
FR_KC1	Major Ions	Calcium (mg/L)_Major Ions	Date	6.50406E-05	4.13181E-05	1.574142397	0.11881441	0
FR_KC1	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	-0.54030122	0.861733549	-0.626993368	0.532183508	0
FR_KC1	Major Ions	Chloride (mg/L)_Major Ions	Date	6.76885E-05	5.12734E-05	1.320148258	0.189991212	0
FR_KC1	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	3.528752137	0.691026891	5.106533741	1.71099E-06	0
FR_KC1	Major Ions	Fluoride (mg/L)_Major Ions	Date	-0.000300243	4.11163E-05	-7.302280926	9.02617E-11	0
FR_KC1	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	3.569410131	0.748482199	4.768864423	6.75606E-06	0
FR_KC1	Major Ions	Magnesium (mg/L)_Major Ions	Date	5.96603E-05	4.45349E-05	1.339628216	0.183596047	0
FR_KC1	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	-0.207741583	0.301004514	-0.690161021	0.491793444	0
FR_KC1	Major Ions	Potassium (mg/L)_Major Ions	Date	8.61652E-05	1.79099E-05	4.811045849	5.70638E-06	1
FR_KC1	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	-2.001688361	0.529855932	-3.777797395	0.000277392	0
FR_KC1	Major Ions	Sodium (mg/L)_Major Ions	Date	0.000175519	3.15266E-05	5.567316823	2.43938E-07	1
FR_KC1	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	4.522746073	1.031554839	4.384397129	3.03037E-05	0
FR_KC1	Major Ions	Sulphate (mg/L)_Major Ions	Date	8.67588E-05	6.13778E-05	1.41351984	0.160806054	0
FR_KC1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-6.907755279	5.44021E-14	-1.26976E+14	4.96281E-97	0
FR_KC1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	5.88155E-18	3.38521E-18	1.73742422	0.125880659	0
FR_KC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	0	-Inf	0	0
FR_KC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	0	0	-	-	0
FR_KC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	5.541651939	1.002277448	5.529059793	2.87615E-07	0
FR_KC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	-8.56279E-05	5.96358E-05	-1.435846296	0.154365579	0
FR_KC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	3.568206248	1.117908516	3.191858903	0.001922708	0
FR_KC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000493623	6.65159E-05	-7.42113164	5.13179E-11	0
FR_KC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-8.056135489	0.95920667	-8.398748404	4.62041E-13	0
FR_KC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000177662	5.70731E-05	3.112877276	0.002454901	1
FR_KC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-6.63464318	1.532948029	-4.328028776	3.75344E-05	0
FR_KC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000242566	9.12109E-05	2.659395631	0.009202965	1
FR_KC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-6.519885628	0.596522718	-10.92981949	6.07811E-18	0
FR_KC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-1.74874E-05	3.53586E-05	-0.494572696	0.622162858	0
FR_KC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.151071811	73.75661496	-0.015606354	0.987983932	0
FR_KC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000280976	0.004770261	-0.058901609	0.954676717	0
FR_KC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	9.70994052	2.755449965	3.52390377	0.000658741	0
FR_KC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000911151	0.00016395	-5.557488397	2.54494E-07	0
FR_KC1	Parent PAHs	Acenaphthene (%)_Parent PAHs	(Intercept)	6.671325196	-	-	-	0
FR_KC1	Parent PAHs	Acenaphthene (%)_Parent PAHs	Date	-0.000118964	-	-	-	0
FR_KC1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	Date	0	-	-	-	0
FR_KC1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	Date	0	-	-	-	0
FR_KC1	Parent PAHs	Acridine (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Parent PAHs	Acridine (µg/L)_Parent PAHs	Date	0	-	-	-	0
FR_KC1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	Date	0	-	-	-	0
FR_KC1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	Date	0	-	-	-	0
FR_KC1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	(Intercept)	-5.298317367	-	-	-	0
FR_KC1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	Date	-1.39564E-17	-	-	-	0
FR_KC1	Parent PAHs	Benzo(b,j)fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Parent PAHs	Benzo(b,j)fluoranthene (µg/L)_Parent PAHs	Date	0	-	-	-	0
FR_KC1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	Date	0	-	-	-	0
FR_KC1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	Date	0	-	-	-	0
FR_KC1	Parent PAHs	Chrysene (%)_Parent PAHs	(Intercept)	-2.012398613	-	-	-	0
FR_KC1	Parent PAHs	Chrysene (%)_Parent PAHs	Date	0.000363934	-	-	-	0
FR_KC1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	Date	0	-	-	-	0
FR_KC1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	(Intercept)	-5.298317367	-	-	-	0
FR_KC1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	Date	-1.39564E-17	-	-	-	0
FR_KC1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	Date	0	-	-	-	0
FR_KC1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	Date	0	-	-	-	0
FR_KC1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	Date	0	-	-	-	0
FR_KC1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	(Intercept)	179.2137703	-	-	-	0
FR_KC1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	Date	-0.010181008	-	-	-	0
FR_KC1	Parent PAHs	Phenanthrene (%)_Parent PAHs	(Intercept)	23.23483109	-	-	-	0
FR_KC1	Parent PAHs	Phenanthrene (%)_Parent PAHs	Date	-0.00102928	-	-	-	0
FR_KC1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	(Intercept)	-3.912023005	-	-	-	0
FR_KC1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	Date	-1.39564E-17	-	-	-	0
FR_KC1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	Date	0	-	-	-	0
FR_KC1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	(Intercept)	-2.995732274	-	-	-	0
FR_KC1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	Date	-6.97819E-18	-	-	-	0
FR_KC1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	(Intercept)	5.455321115	-	-	-	0
FR_KC1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	(Intercept)	-2.748872196	-	-	-	0
FR_KC1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	(Intercept)	-3.218875825	-	-	-	0
FR_KC1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	(Intercept)	-4.605170186	-	-	-	0
FR_KC1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	(Intercept)	-2.813410717	-	-	-	0
FR_KC1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	(Intercept)	-2.813410717	-	-	-	0
FR_KC1	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	0.69080588	2.023386856	0.341410679	0.733556446	0
FR_KC1	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000354851	0.000120392	-2.947457074	0.004040695	0
FR_KC1	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-8.934971198	0.319548861	-27.96120493	2.40788E-47	0
FR_KC1	Total Metals	Antimony (mg/L)_Total Metals	Date	7.63399E-05	1.90133E-05	4.015086969	0.000119483	1
FR_KC1	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-7.4947928	0.720033712	-10.40894708	2.49209E-17	0
FR_KC1	Total Metals	Arsenic (mg/L)_Total Metals	Date	-8.56367E-05	4.28422E-05	-1.998884932	0.0485088	0
FR_KC1	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-0.755401556	0.398260714	-1.896751373	0.060931151	0
FR_KC1	Total Metals	Barium (mg/L)_Total Metals	Date	-0.000153493	2.36966E-05	-6.477429525	4.23669E-09	0
FR_KC1	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	5.016479016	1.000940873	5.011763585	2.52797E-06	0
FR_KC1	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000881741	5.95563E-05	-14.8051721	2.65234E-26	0
FR_KC1	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	11.35931334	1.398599443	8.12192039	1.77055E-12	0
FR_KC1	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001201253	8.32171E-05	-14.43517049	1.39465E-25	0
FR_KC1	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-5.172311487	0.328156931	-15.76170116	3.9289E-28	0
FR_KC1	Total Metals	Boron (mg/L)_Total Metals	Date	7.96594E-05	1.95254E-05	4.079774373	9.44537E-05	1
FR_KC1	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-9.145798934	0.422459815	-21.64892044	2.67846E-38	0
FR_KC1	Total Metals	Cadmium (mg/L)_Total Metals	Date	0.000111251	2.51365E-05	4.425867953	2.58631E-05	1
FR_KC1	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.521574176	0.708980669	6.377570463	6.68448E-09	0
FR_KC1	Total Metals	Calcium (mg/L)_Total Metals	Date	5.08433E-05	4.21846E-05	1.20525877	0.231128822	0
FR_KC1	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-5.887361485	0.825604041	-7.130974649	2.02889E-10	0
FR_KC1	Total Metals	Chromium (mg/L)_Total Metals	Date	-0.00017933	4.91237E-05	-3.650571754	0.00042994	0
FR_KC1	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-5.151901073	1.005029423	-5.126119649	1.57766E-06	0
FR_KC1	Total Metals	Cobalt (mg/L)_Total Metals	Date	-0.000222874	5.97996E-05	-3.727021494	0.000330784	0
FR_KC1	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-5.01527774	0.746323823	-6.719975409	1.38599E-09	0
FR_KC1	Total Metals	Copper (mg/L)_Total Metals	Date	-0.000135826	4.44065E-05	-3.058693391	0.002896014	0
FR_KC1	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	3.94065406	1.362633418	2.891939979	0.004756521	0
FR_KC1	Total Metals	Iron (mg/L)_Total Metals	Date	-0.00047651	8.10771E-05	-5.877247622	6.30811E-08	0
FR_KC1	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-5.940177022	1.098192901	-5.409047004	4.8055E-07	0
FR_KC1	Total Metals	Lead (mg/L)_Total Metals	Date	-0.000220564	6.53428E-05	-3.375483273	0.001072503	0
FR_KC1	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-6.315237269	0.625108671	-10.10262306	1.11257E-16	0
FR_KC1	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000206731	3.71942E-05	5.558163728	2.53755E-07	1
FR_KC1	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	3.917501503	0.756513583	5.178362411	1.2697E-06	0
FR_KC1	Total Metals	Magnesium (mg/L)_Total Metals	Date	3.94399E-05	4.50128E-05	0.876192483	0.383159006	0
FR_KC1	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-6.522144031	2.070910214	-3.149409369	0.002193666	0
FR_KC1	Total Metals	Manganese (mg/L)_Total Metals	Date	-7.4677E-05	0.00012322	-0.606046946	0.54594429	0
FR_KC1	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	11.72070871	1.374999939	8.52415217	2.50961E-13	0
FR_KC1	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001472603	8.18129E-05	-17.99964002	3.24035E-32	0
FR_KC1	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	68.90313872	-	-	-	0
FR_KC1	Total Metals	Methyl mercury (µg/L)_Total Metals	Date	-0.00450845	-	-	-	0
FR_KC1	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-4.910040314	0.400790826	-12.25087999	3.4649E-21	0
FR_KC1	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-9.01469E-05	2.38472E-05	-3.78018963	0.00027509	0
FR_KC1	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-9.427303292	0.684377373	-13.77500728	2.80768E-24	0
FR_KC1	Total Metals	Nickel (mg/L)_Total Metals	Date	0.000321307	4.07207E-05	7.890501792	5.41519E-12	1
FR_KC1	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	0.334253056	0.307585802	1.086698587	0.279948811	0
FR_KC1	Total Metals	Potassium (mg/L)_Total Metals	Date	5.41479E-05	1.83015E-05	2.958667113	0.003908792	1
FR_KC1	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-3.530261624	0.915465836	-3.856246169	0.000210717	0
FR_KC1	Total Metals	Selenium (mg/L)_Total Metals	Date	9.78052E-05	5.44705E-05	1.795562715	0.075777333	0
FR_KC1	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	-0.735792902	0.231994523	-3.171595997	0.002054108	0
FR_KC1	Total Metals	Silicon (mg/L)_Total Metals	Date	7.84226E-05	1.38082E-05	5.679405428	1.53351E-07	1
FR_KC1	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-9.91777178	0.640633875	-15.48118538	1.33535E-27	0
FR_KC1	Total Metals	Silver (mg/L)_Total Metals	Date	-8.37602E-05	3.81179E-05	-2.197397756	0.030449094	0
FR_KC1	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	-1.738900135	0.549246015	-3.165976791	0.002083939	0
FR_KC1	Total Metals	Sodium (mg/L)_Total Metals	Date	0.000160812	3.26803E-05	4.920753666	3.66465E-06	1
FR_KC1	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-3.264084255	0.7038531	-4.637450986	1.13738E-05	0
FR_KC1	Total Metals	Strontium (mg/L)_Total Metals	Date	9.55179E-05	4.18795E-05	2.280781137	0.024820235	1
FR_KC1	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-10.09171519	0.313833296	-32.15629224	1.62441E-52	0
FR_KC1	Total Metals	Thallium (mg/L)_Total Metals	Date	-2.20288E-05	1.86732E-05	-1.179700543	0.241096361	0
FR_KC1	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-8.374146866	0.648001719	-12.92303187	1.45614E-22	0
FR_KC1	Total Metals	Tin (mg/L)_Total Metals	Date	-3.85853E-05	3.85563E-05	-1.000751518	0.319516177	0
FR_KC1	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-1.318751547	0.498642644	-2.644682646	0.009583165	0
FR_KC1	Total Metals	Titanium (mg/L)_Total Metals	Date	-0.000184798	2.96694E-05	-6.228559916	1.31384E-08	0
FR_KC1	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-6.344307361	0.794649431	-7.983781417	3.45295E-12	0
FR_KC1	Total Metals	Uranium (mg/L)_Total Metals	Date	8.94528E-05	4.72819E-05	1.891904436	0.061581873	0
FR_KC1	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-0.040088837	0.717595581	-0.055865501	0.955567527	0
FR_KC1	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000422761	4.26972E-05	-9.901392731	2.97741E-16	0
FR_KC1	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-5.161978985	0.580801194	-8.88768659	4.25718E-14	0
FR_KC1	Total Metals	Zinc (mg/L)_Total Metals	Date	4.53153E-05	3.45579E-05	1.311288299	0.19295446	0
FR_KC1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	(Intercept)	8.81402367	-	-	-	0
FR_KC1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	Date	-0.000240687	-	-	-	0
FR_KC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	2.96146E-15	-4.68112E+14	8.44414E-73	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_KC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	-3.1084E-19	1.72668E-19	-1.8002207	0.131720152	0
FR_KC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	1.32207E-15	-1.04858E+15	4.96304E-60	0
FR_KC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	4.73198E-19	7.63891E-20	6.194575846	0.003452894	1
FR_KC1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_KC1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	-1.04673E-17	-	-	-	0
FR_KC1	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_KC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-0.693147181	0	-Inf	0	0
FR_KC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
FR_KC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	2.55212E-15	-5.43194E+14	2.62769E-87	0
FR_KC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	-2.47947E-19	1.50481E-19	-1.647690563	0.150513726	0
FR_MULTIPLATE	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-1.110993123	1.297360533	-0.85634879	0.403061582	0
FR_MULTIPLATE	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	7.74E-05	7.60812E-05	1.017334705	0.322474359	0
FR_MULTIPLATE	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	3.964595836	0.576696448	6.874666649	1.97685E-06	0
FR_MULTIPLATE	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	6.63708E-05	3.38192E-05	1.96251503	0.065349608	0
FR_MULTIPLATE	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-5.683063992	4.318610398	-1.315947369	0.204705743	0
FR_MULTIPLATE	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000407874	0.000253257	1.610516806	0.124681591	0
FR_MULTIPLATE	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	3.508081993	1.153041592	3.042459195	0.007006728	0
FR_MULTIPLATE	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	0.000176564	6.76179E-05	2.611202107	0.017677849	1
FR_MULTIPLATE	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-0.88777425	1.81647831	-0.488733747	0.630931605	0
FR_MULTIPLATE	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	4.13767E-05	0.000106524	0.38842632	0.70225649	0
FR_MULTIPLATE	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	3.020711267	1.330621932	2.270149916	0.035717563	0
FR_MULTIPLATE	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000170854	7.80317E-05	2.189551017	0.041972792	1
FR_MULTIPLATE	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0	0	-	-	0
FR_MULTIPLATE	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0	0	-	-	0
FR_MULTIPLATE	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	6.881053136	0.821720924	8.373953898	1.2709E-07	0
FR_MULTIPLATE	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-5.71181E-05	4.81882E-05	-1.185312461	0.251307148	0
FR_MULTIPLATE	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.085245218	0.057171248	36.4736695	2.51299E-18	0
FR_MULTIPLATE	Conventional Parameters	pH (-)_Conventional Parameters	Date	1.97865E-06	3.3527E-06	0.590167184	0.562415109	0
FR_MULTIPLATE	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	3.773467851	0.553756262	6.814311838	2.22177E-06	0
FR_MULTIPLATE	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	7.94969E-05	3.2474E-05	2.448019605	0.024844889	1
FR_MULTIPLATE	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	3.078611568	1.359603007	2.264345954	0.036137516	0
FR_MULTIPLATE	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	0.00018084	7.97313E-05	2.268115071	0.03586428	1
FR_MULTIPLATE	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	1.456352299	2.369569645	0.614606244	0.546506113	0
FR_MULTIPLATE	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-8.56431E-05	0.000138959	-0.616319883	0.545399724	0
FR_MULTIPLATE	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	(Intercept)	9.595643067	4.622588771	2.075815856	0.046883286	0
FR_MULTIPLATE	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	Date	-0.000487602	0.000272117	-1.791885481	0.083592236	0
FR_MULTIPLATE	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	-0.190862344	6.452180441	-0.029581061	0.976603811	0
FR_MULTIPLATE	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	3.68865E-05	0.000379819	0.09711604	0.923302332	0
FR_MULTIPLATE	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-4.416660236	1.823815054	-2.421660149	0.026232574	0
FR_MULTIPLATE	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-7.21509E-05	0.000106954	-0.674596501	0.508504711	0
FR_MULTIPLATE	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-6.798176665	1.362922141	-4.987942055	9.52968E-05	0
FR_MULTIPLATE	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	-9.34265E-05	7.99259E-05	-1.168913564	0.257686335	0
FR_MULTIPLATE	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-8.768943271	1.501135414	-5.84154047	1.56158E-05	0
FR_MULTIPLATE	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	-1.99304E-05	8.80312E-05	-0.226401675	0.823440109	0
FR_MULTIPLATE	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-4.78815425	1.060171223	-4.516397111	0.000267163	0
FR_MULTIPLATE	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	0.000133887	6.21717E-05	2.153503363	0.045083618	1
FR_MULTIPLATE	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	2.875335964	1.314301878	2.18772872	0.042125205	0
FR_MULTIPLATE	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000766551	7.70747E-05	-9.945563768	9.71295E-09	0
FR_MULTIPLATE	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	8.852471442	1.511167316	5.858035276	1.50923E-05	0
FR_MULTIPLATE	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001056306	8.86195E-05	-11.91956447	5.62316E-10	0
FR_MULTIPLATE	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.333187419	1.50922455	-2.871134994	0.010158731	0
FR_MULTIPLATE	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-7.36625E-06	8.85055E-05	-0.083229296	0.934587829	0
FR_MULTIPLATE	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-15.60402191	1.957150798	-7.972825561	2.57232E-07	0
FR_MULTIPLATE	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	0.00031013	0.000114773	2.702109536	0.014586164	1
FR_MULTIPLATE	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-6.878907062	1.512900317	-4.546834307	0.000249833	0
FR_MULTIPLATE	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-0.000125674	8.87211E-05	-1.416504672	0.173701893	0
FR_MULTIPLATE	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-9.769716566	1.532703238	-6.374173631	5.28562E-06	0
FR_MULTIPLATE	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	3.94187E-05	8.98824E-05	0.438558722	0.666199704	0
FR_MULTIPLATE	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-7.638728047	0.641550113	-11.906674	5.72182E-10	0
FR_MULTIPLATE	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	4.25718E-06	3.76225E-05	0.113155251	0.911159947	0
FR_MULTIPLATE	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	4.297772955	1.348367486	3.187389937	0.005101937	0
FR_MULTIPLATE	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000498817	7.90724E-05	-6.308361382	6.03044E-06	0
FR_MULTIPLATE	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-9.991315846	1.489633232	-6.707232112	2.73668E-06	0
FR_MULTIPLATE	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	9.88486E-06	8.73567E-05	0.113155251	0.911159947	0
FR_MULTIPLATE	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-9.571994084	2.164676019	-4.421906096	0.000329129	0
FR_MULTIPLATE	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000347864	0.000126943	2.740314697	0.013447248	1
FR_MULTIPLATE	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-10.45600718	4.287090165	-2.438952011	0.02531429	0
FR_MULTIPLATE	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	0.00020824	0.000251408	0.828294611	0.418351413	0
FR_MULTIPLATE	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-6.53352744	0.396011558	-16.49832515	2.59419E-12	0
FR_MULTIPLATE	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000320955	2.32233E-05	-13.82038246	5.03369E-11	0
FR_MULTIPLATE	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-5.905372052	0.745842748	-7.917717331	2.83859E-07	0
FR_MULTIPLATE	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	-4.4169E-05	4.37385E-05	-1.009843505	0.325953363	0
FR_MULTIPLATE	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-7.98816829	1.84063512	-4.33989779	0.000394618	0
FR_MULTIPLATE	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	0.000126274	0.00010794	1.169848248	0.257319495	0
FR_MULTIPLATE	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-6.676433833	1.728773508	-3.861948255	0.000515343	0
FR_MULTIPLATE	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.000197698	0.000102777	1.923564158	0.063344238	0
FR_MULTIPLATE	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.017948687	0.391134392	0.045888798	0.963904164	0
FR_MULTIPLATE	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	3.03157E-05	2.29373E-05	1.321675564	0.202829132	0
FR_MULTIPLATE	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.60075376	1.489633232	-7.787657735	3.58715E-07	0
FR_MULTIPLATE	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	9.88486E-06	8.73567E-05	0.113155251	0.911159947	0
FR_MULTIPLATE	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-4.46276713	1.180717505	-3.779707773	0.00137205	0
FR_MULTIPLATE	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	0.000147935	6.92409E-05	2.136525745	0.046620578	1
FR_MULTIPLATE	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.60075376	1.489633232	-7.787657735	3.58715E-07	0
FR_MULTIPLATE	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	9.88486E-06	8.73567E-05	0.113155251	0.911159947	0
FR_MULTIPLATE	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.298168665	1.489633232	-6.241918124	6.89296E-06	0
FR_MULTIPLATE	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	9.88486E-06	8.73567E-05	0.113155251	0.911159947	0
FR_MULTIPLATE	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-4.377951946	0.099380985	-44.05220923	8.71014E-20	0
FR_MULTIPLATE	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-1.28692E-05	5.82801E-06	-2.208172094	0.040444119	0
FR_MULTIPLATE	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-10.58917521	1.63224332	-6.487497963	4.21792E-06	0
FR_MULTIPLATE	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	0.000260268	9.57197E-05	2.719066306	0.014069731	1
FR_MULTIPLATE	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-2.016185548	1.369059107	-1.472679694	0.158108328	0
FR_MULTIPLATE	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.00031107	8.02858E-05	-3.874537875	0.001110685	0
FR_MULTIPLATE	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	-1.51121198	1.983344453	-0.761951348	0.455957635	0
FR_MULTIPLATE	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000269373	0.000116309	-2.316005946	0.032555002	0
FR_MULTIPLATE	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	4.329754841	1.246079223	3.474702699	0.001683559	0
FR_MULTIPLATE	Field Measured	Conductivity (µS/cm)_Field Measured	Date	0.000125207	7.33196E-05	1.707693828	0.09875969	0
FR_MULTIPLATE	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	5.351257754	0.401361617	13.33275911	1.19421E-13	0
FR_MULTIPLATE	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-5.35012E-05	2.36162E-05	-2.265443985	0.031412912	0
FR_MULTIPLATE	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	3.302697209	0.570783475	5.786252321	3.25775E-06	0
FR_MULTIPLATE	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-5.32957E-05	3.3585E-05	-1.586890237	0.123767641	0
FR_MULTIPLATE	Field Measured	pH (-)_Field Measured	(Intercept)	2.398501433	0.128134134	18.7186767	2.28615E-17	0
FR_MULTIPLATE	Field Measured	pH (-)_Field Measured	Date	-1.74102E-05	7.53944E-06	-2.309212854	0.028524941	0
FR_MULTIPLATE	Field Measured	Total Suspended Solids (ppm)_Field Measured	(Intercept)	0.336472237	-	-	-	0
FR_MULTIPLATE	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	-2.863186301	3.32808051	-0.86031161	0.400931417	0
FR_MULTIPLATE	Major Ions	Bromide (mg/L)_Major Ions	Date	2.16443E-05	0.000195169	0.110900581	0.912922405	0
FR_MULTIPLATE	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	1.826820495	1.201712052	1.520181555	0.145836667	0
FR_MULTIPLATE	Major Ions	Calcium (mg/L)_Major Ions	Date	0.000157783	7.04721E-05	2.238938285	0.038030151	1
FR_MULTIPLATE	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	2.097501827	2.358728463	0.889251077	0.385598538	0
FR_MULTIPLATE	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000118269	0.000138323	-0.855020574	0.403777191	0
FR_MULTIPLATE	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-0.596621311	0.722392146	-0.825896729	0.419675281	0
FR_MULTIPLATE	Major Ions	Fluoride (mg/L)_Major Ions	Date	-6.31733E-05	4.23633E-05	-1.491227336	0.153219134	0
FR_MULTIPLATE	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	0.306038012	1.54684935	0.197846036	0.845382685	0
FR_MULTIPLATE	Major Ions	Magnesium (mg/L)_Major Ions	Date	0.000192296	9.0712E-05	2.119848919	0.048176708	1
FR_MULTIPLATE	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	2.919530616	0.959743582	3.041990248	0.007013896	0
FR_MULTIPLATE	Major Ions	Potassium (mg/L)_Major Ions	Date	-0.000143873	5.62823E-05	-2.556275233	0.019837685	0
FR_MULTIPLATE	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	2.626934638	1.259346279	2.085951006	0.051486399	0
FR_MULTIPLATE	Major Ions	Sodium (mg/L)_Major Ions	Date	-0.000122835	7.38519E-05	-1.663263696	0.113572866	0
FR_MULTIPLATE	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	0.817208415	1.863384451	0.438561358	0.666197829	0
FR_MULTIPLATE	Major Ions	Sulphate (mg/L)_Major Ions	Date	0.00025033	0.000109275	2.290834202	0.034257358	1
FR_MULTIPLATE	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	1.19985E-14	-1.00344E+14	5.9182E-56	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	8.15696E-19	7.66924E-19	1.063593417	0.347459008	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-2.627773282	2.31367007	-1.135759725	0.27095394	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	0.00029625	0.000135681	2.183435634	0.042486278	1
FR_MULTIPLATE	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	4.191282238	2.748807684	1.524763723	0.144695845	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000541082	0.000161198	-3.356619344	0.003513122	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-2.548033606	4.640777378	-0.549053186	0.589715858	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	-7.95023E-05	0.000272149	-0.292127476	0.77352949	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-9.294927262	3.030695529	-3.066928754	0.006642459	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000437991	0.000177729	2.464374625	0.024018836	1
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-9.839530292	2.124079288	-4.632374295	0.000206987	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.000198901	0.000124563	1.596793611	0.12771822	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	50.07242459	172.7733186	0.289815725	0.820417562	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.00359909	0.011108666	-0.323989341	0.800535871	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	17.19506481	5.707388319	3.012772891	0.007474797	0
FR_MULTIPLATE	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.001298339	0.000334699	-3.879126162	0.001099385	0
FR_MULTIPLATE	Speciation of Selenium	Total Selenium 4+ (µg/L)_Speciation of Selenium	(Intercept)	-49.60489799	62.24215915	-0.796966215	0.509050507	0
FR_MULTIPLATE	Speciation of Selenium	Total Selenium 4+ (µg/L)_Speciation of Selenium	Date	0.003029026	0.003913843	0.773926392	0.519935394	0
FR_MULTIPLATE	Speciation of Selenium	Total Selenium 6+ (µg/L)_Speciation of Selenium	(Intercept)	-11.88917263	82.93301961	-0.143358733	0.899146919	0
FR_MULTIPLATE	Speciation of Selenium	Total Selenium 6+ (µg/L)_Speciation of Selenium	Date	0.000955355	0.005214903	0.183197112	0.871533468	0
FR_MULTIPLATE	Speciation of Selenium	Total Selenocyanate (µg/L)_Speciation of Selenium	(Intercept)	-43.95223852	22.56675697	-1.947654179	0.190817077	0
FR_MULTIPLATE	Speciation of Selenium	Total Selenocyanate (µg/L)_Speciation of Selenium	Date	0.002591594	0.001419018	1.826329398	0.209335209	0
FR_MULTIPLATE	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	-0.490179999	6.079066824	-0.080634086	0.936622739	0
FR_MULTIPLATE	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.0002421	0.000356495	-0.679111105	0.505706785	0
FR_MULTIPLATE	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-6.222513192	0.986960247	-6.304725254	6.07463E-06	0
FR_MULTIPLATE	Total Metals	Antimony (mg/L)_Total Metals	Date	-0.000125707	5.78784E-05	-2.171912077	0.04346955	0
FR_MULTIPLATE	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-6.46843977	1.957676127	-3.304141927	0.00394507	0
FR_MULTIPLATE	Total Metals	Arsenic (mg/L)_Total Metals	Date	-0.000142716	0.000114804	-1.243124732	0.229771319	0
FR_MULTIPLATE	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-3.626755421	1.002580225	-3.61742166	0.001969369	0
FR_MULTIPLATE	Total Metals	Barium (mg/L)_Total Metals	Date	6.6283E-05	5.87944E-05	1.127369793	0.274390693	0
FR_MULTIPLATE	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	2.625386506	1.069971934	2.453696609	0.02455518	0
FR_MULTIPLATE	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000754562	6.27464E-05	-12.02557085	4.87647E-10	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_MULTIPLATE	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	8.602521983	1.422716277	6.046547807	1.02466E-05	0
FR_MULTIPLATE	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001044316	8.34324E-05	-12.51690635	2.55181E-10	0
FR_MULTIPLATE	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-3.829547485	0.715628536	-5.351306287	4.36819E-05	0
FR_MULTIPLATE	Total Metals	Boron (mg/L)_Total Metals	Date	-4.04446E-05	4.19666E-05	-0.963731611	0.347950236	0
FR_MULTIPLATE	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-12.20259443	2.570425682	-4.747304895	0.000160896	0
FR_MULTIPLATE	Total Metals	Cadmium (mg/L)_Total Metals	Date	0.000119792	0.000150738	0.794704839	0.437138775	0
FR_MULTIPLATE	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	2.510259954	1.148302149	2.186062229	0.042265031	0
FR_MULTIPLATE	Total Metals	Calcium (mg/L)_Total Metals	Date	0.000117815	6.734E-05	1.749550561	0.097225163	0
FR_MULTIPLATE	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-6.12598261	2.786853789	-2.198171513	0.041258627	0
FR_MULTIPLATE	Total Metals	Chromium (mg/L)_Total Metals	Date	-0.000142306	0.00016343	-0.870750242	0.395355457	0
FR_MULTIPLATE	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-7.934470989	2.195846	-3.613400479	0.001987068	0
FR_MULTIPLATE	Total Metals	Cobalt (mg/L)_Total Metals	Date	-6.17858E-05	0.000128771	-0.479811255	0.637140138	0
FR_MULTIPLATE	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-4.916663231	1.419541606	-3.463556975	0.002772117	0
FR_MULTIPLATE	Total Metals	Copper (mg/L)_Total Metals	Date	-0.00014687	8.32463E-05	-1.764280137	0.094648215	0
FR_MULTIPLATE	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	5.984423739	4.730567867	1.265053987	0.221984873	0
FR_MULTIPLATE	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000574014	0.000277415	-2.0691532	0.053201814	0
FR_MULTIPLATE	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-7.377828548	3.012972792	-2.448687412	0.024810644	0
FR_MULTIPLATE	Total Metals	Lead (mg/L)_Total Metals	Date	-0.000132766	0.00017669	-0.751405868	0.462120509	0
FR_MULTIPLATE	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-9.407265281	1.979022702	-4.753490331	0.000158734	0
FR_MULTIPLATE	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000339605	0.000116056	2.926218237	0.009019417	1
FR_MULTIPLATE	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	0.96309084	1.33176878	0.723166705	0.47887012	0
FR_MULTIPLATE	Total Metals	Magnesium (mg/L)_Total Metals	Date	0.000153416	7.8099E-05	1.964384131	0.065116866	0
FR_MULTIPLATE	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-4.624046895	3.597258104	-1.285436508	0.214932932	0
FR_MULTIPLATE	Total Metals	Manganese (mg/L)_Total Metals	Date	-7.46138E-05	0.000210954	-0.353696689	0.727675172	0
FR_MULTIPLATE	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	9.914067164	1.711149212	5.793806346	1.72386E-05	0
FR_MULTIPLATE	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001367803	0.000100347	-13.63073213	6.32337E-11	0
FR_MULTIPLATE	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-5.592667727	0.652451188	-8.571779519	9.04458E-08	0
FR_MULTIPLATE	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-6.27371E-05	3.82617E-05	-1.639682669	0.118430339	0
FR_MULTIPLATE	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-6.526285336	1.818517354	-3.588794641	0.002098865	0
FR_MULTIPLATE	Total Metals	Nickel (mg/L)_Total Metals	Date	4.55522E-05	0.000106643	0.427144494	0.674339861	0
FR_MULTIPLATE	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	3.393796193	0.828891847	4.09437758	0.000680683	0
FR_MULTIPLATE	Total Metals	Potassium (mg/L)_Total Metals	Date	-0.000174299	4.86088E-05	-3.58575014	0.002113125	0
FR_MULTIPLATE	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-6.102743377	1.667710652	-3.659353839	0.000902273	0
FR_MULTIPLATE	Total Metals	Selenium (mg/L)_Total Metals	Date	0.000163222	9.91467E-05	1.646266606	0.109496785	0
FR_MULTIPLATE	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	0.856799228	0.86390919	0.991770013	0.334455597	0
FR_MULTIPLATE	Total Metals	Silicon (mg/L)_Total Metals	Date	-1.45562E-05	5.06623E-05	-0.287319211	0.777149452	0
FR_MULTIPLATE	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-10.26265196	1.173216723	-8.747447728	6.71427E-08	0
FR_MULTIPLATE	Total Metals	Silver (mg/L)_Total Metals	Date	-6.6769E-05	6.8801E-05	-0.970464765	0.344675793	0
FR_MULTIPLATE	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	3.143483113	1.190000712	2.641580869	0.016581168	0
FR_MULTIPLATE	Total Metals	Sodium (mg/L)_Total Metals	Date	-0.000155289	6.97853E-05	-2.225246333	0.039087574	0
FR_MULTIPLATE	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-3.853735495	1.079484556	-3.569977426	0.002188555	0
FR_MULTIPLATE	Total Metals	Strontium (mg/L)_Total Metals	Date	0.000111407	6.33043E-05	1.759862613	0.095414762	0
FR_MULTIPLATE	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-10.59871193	1.694821467	-6.253586075	6.73275E-06	0
FR_MULTIPLATE	Total Metals	Thallium (mg/L)_Total Metals	Date	-4.43719E-05	9.93895E-05	-0.446444223	0.660600829	0
FR_MULTIPLATE	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.548118124	0.635727564	-15.01919794	1.26173E-11	0
FR_MULTIPLATE	Total Metals	Tin (mg/L)_Total Metals	Date	2.18744E-05	3.7281E-05	0.586744512	0.564662398	0
FR_MULTIPLATE	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-3.17700294	0.82468272	-3.852394215	0.00116687	0
FR_MULTIPLATE	Total Metals	Titanium (mg/L)_Total Metals	Date	-8.04106E-05	4.83619E-05	-1.66268404	0.113690199	0
FR_MULTIPLATE	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-10.35784553	1.552903981	-6.669984528	2.94355E-06	0
FR_MULTIPLATE	Total Metals	Uranium (mg/L)_Total Metals	Date	0.000247622	9.1067E-05	2.719118948	0.014068155	1
FR_MULTIPLATE	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-1.316638839	2.128445821	-0.618591663	0.543934841	0
FR_MULTIPLATE	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000345734	0.000124819	-2.769891077	0.012624544	0
FR_MULTIPLATE	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-4.888763008	1.864649604	-2.621813233	0.017287176	0
FR_MULTIPLATE	Total Metals	Zinc (mg/L)_Total Metals	Date	-4.074E-05	0.000109349	-0.372569372	0.713819604	0
FR_MULTIPLATE	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	3.83917E-15	-3.61092E+14	1.76304E-15	0
FR_MULTIPLATE	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	1.61942E-19	2.36174E-19	0.685688084	0.617355909	0
FR_MULTIPLATE	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_MULTIPLATE	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_MULTIPLATE	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	-2.61682E-18	-	-	-	0
FR_MULTIPLATE	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-0.693147181	-	-	-	0
FR_MULTIPLATE	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	3.83917E-15	-3.61092E+14	1.76304E-15	0
FR_MULTIPLATE	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	1.61942E-19	2.36174E-19	0.685688084	0.617355909	0
FR_NGD1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-2.273437049	0.572367244	-3.971990139	0.000141412	0
FR_NGD1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	0.000142654	3.40832E-05	4.185463105	6.50354E-05	1
FR_NGD1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	3.167851696	0.412905192	7.672104288	1.72173E-11	0
FR_NGD1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000121435	2.45876E-05	4.938890746	3.49854E-06	1
FR_NGD1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.190896738	2.086408302	2.008665674	0.047504106	0
FR_NGD1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-0.000158558	0.000124241	-1.276215461	0.205091776	0
FR_NGD1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	3.640361551	0.616883023	5.901218569	5.95629E-08	0
FR_NGD1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	0.000156475	3.6734E-05	4.259682338	4.9365E-05	1
FR_NGD1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-0.084393871	0.558883927	-0.151004291	0.88030294	0
FR_NGD1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	6.04452E-05	3.32803E-05	1.816244027	0.072589813	0
FR_NGD1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	3.245681094	0.650821743	4.987050798	2.87717E-06	0
FR_NGD1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	0.00014634	3.8755E-05	3.776035399	0.000282213	1
FR_NGD1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-1.244485955	1.062916101	-1.170822376	0.244693898	0
FR_NGD1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	7.7406E-05	6.32943E-05	1.222953064	0.224470905	0
FR_NGD1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	7.250537131	0.354186127	20.47098	5.07514E-36	0
FR_NGD1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-8.04243E-05	2.1091E-05	-3.813203195	0.000247961	0
FR_NGD1	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.156348956	0.026175381	82.38080567	5.38236E-88	0
FR_NGD1	Conventional Parameters	pH (-)_Conventional Parameters	Date	-1.96036E-06	1.55869E-06	-1.257702063	0.21168258	0
FR_NGD1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	3.103801035	0.403218328	7.697569321	1.52536E-11	0
FR_NGD1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000127902	2.40108E-05	5.326859616	7.05138E-07	1
FR_NGD1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	2.862493137	0.699544916	4.091936158	9.16744E-05	0
FR_NGD1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	0.000178656	4.16564E-05	4.288813838	4.42679E-05	1
FR_NGD1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	0.901303705	0.804756517	1.119970681	0.265641571	0
FR_NGD1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	1.3549E-05	4.79215E-05	0.282732369	0.778017147	0
FR_NGD1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	(Intercept)	-0.290974714	1.943821098	-0.149692127	0.88133879	0
FR_NGD1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	Date	8.48406E-05	0.000115696	0.733307791	0.465255659	0
FR_NGD1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	-13.22973744	2.634880513	-5.021000904	2.50524E-06	0
FR_NGD1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	0.000842841	0.000156901	5.371787443	5.83572E-07	1
FR_NGD1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-6.884426837	1.558889287	-4.416238468	2.73451E-05	0
FR_NGD1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	8.71671E-05	9.28285E-05	0.939012812	0.350182969	0
FR_NGD1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-18.05046804	1.337287557	-13.49782098	1.54563E-23	0
FR_NGD1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	0.000613265	7.96326E-05	7.701188838	1.49932E-11	1
FR_NGD1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-11.70397122	0.481470125	-24.30882127	7.99527E-42	0
FR_NGD1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	0.000195537	2.86705E-05	6.820160254	9.38762E-10	1
FR_NGD1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-7.533564451	0.935213224	-8.05545116	2.76102E-12	0
FR_NGD1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	0.000322337	5.56899E-05	5.788071959	9.77494E-08	1
FR_NGD1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	3.393134218	0.87061258	3.897410049	0.000184419	0
FR_NGD1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000792684	5.18431E-05	-15.29006604	5.35136E-27	0
FR_NGD1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	9.95213894	1.255391506	7.927518144	5.09394E-12	0
FR_NGD1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001125769	7.47558E-05	-15.05928768	1.46039E-26	0
FR_NGD1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-6.409296375	0.510568945	-12.55324367	1.19767E-21	0
FR_NGD1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	0.000122936	3.04033E-05	4.043529411	0.000109301	1
FR_NGD1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-20.01901822	1.238626189	-16.16227592	1.27931E-28	0
FR_NGD1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	0.000581298	7.37575E-05	7.881213472	6.35566E-12	1
FR_NGD1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-8.204749918	0.485911846	-16.88526424	6.2332E-30	0
FR_NGD1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-5.51145E-05	2.8935E-05	-1.904769773	0.059933995	0
FR_NGD1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-20.97527109	1.713264956	-12.24286472	5.10506E-21	0
FR_NGD1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	0.000734918	0.000102021	7.203585416	1.57433E-10	1
FR_NGD1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-8.231137346	0.473168852	-17.39577174	7.68204E-31	0
FR_NGD1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	4.09884E-05	2.81762E-05	1.454719996	0.149150248	0
FR_NGD1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	1.279603763	1.110510536	1.152266208	0.252197069	0
FR_NGD1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000325218	6.61285E-05	-4.917965778	3.80762E-06	0
FR_NGD1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.47056438	0.568774599	-18.40898733	1.32777E-32	0
FR_NGD1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	3.62173E-05	3.38693E-05	1.069324512	0.287721075	0
FR_NGD1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-11.16783381	1.10334935	-10.12175682	1.26776E-16	0
FR_NGD1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000400783	6.5702E-05	6.100003435	2.47188E-08	1
FR_NGD1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-19.57615812	2.588558236	-7.562572032	2.89604E-11	0
FR_NGD1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	0.000816658	0.000154143	5.298052059	7.95787E-07	1
FR_NGD1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-6.179194774	0.373290448	-16.55331607	2.47532E-29	0
FR_NGD1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000342198	2.22286E-05	-15.39447471	3.40535E-27	0
FR_NGD1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-12.35078103	0.980890716	-12.59139355	1.00284E-21	0
FR_NGD1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	0.00039418	5.84099E-05	6.748514068	1.30659E-09	1
FR_NGD1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-23.21702873	1.29545965	-17.9218463	9.19328E-32	0
FR_NGD1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	0.001032627	7.71418E-05	13.38608882	2.57247E-23	1
FR_NGD1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-7.854401427	1.066010033	-7.368037057	7.26525E-11	0
FR_NGD1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.000237515	6.34786E-05	3.741657706	0.000317868	1
FR_NGD1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	-0.005154251	0.315784885	-0.016322031	0.987012826	0
FR_NGD1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	4.87975E-05	1.88043E-05	2.595017735	0.011007878	1
FR_NGD1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.75576045	0.35373037	-33.23367588	4.85839E-53	0
FR_NGD1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	1.58582E-05	2.10639E-05	0.752860519	0.453455895	0
FR_NGD1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-8.187863227	0.582405469	-14.05869907	1.2246E-24	0
FR_NGD1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	0.000339857	3.4681E-05	9.799516907	6.02822E-16	1
FR_NGD1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-17.62780228	0.802263211	-21.97259208	2.25172E-38	0
FR_NGD1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	0.000400518	4.7773E-05	8.383774853	5.69927E-13	1
FR_NGD1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.379844131	0.342521931	-27.38465273	5.19075E-46	0
FR_NGD1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	1.12739E-05	2.03964E-05	0.55273852	0.581783007	0
FR_NGD1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-4.275383038	0.162355997	-26.33338541	1.27106E-44	0
FR_NGD1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-1.84154E-05	9.66795E-06	-1.904794134	0.059930787	0
FR_NGD1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-12.77635537	0.788228093	-16.20895714	1.05045E-28	0
FR_NGD1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	0.000368356	4.69373E-05	7.847838186	7.45375E-12	1
FR_NGD1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-2.504485305	0.565829827	-4.426216484	2.63239E-05	0
FR_NGD1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000283099	3.36939E-05	-8.402077321	5.21824E-13	0
FR_NGD1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	-7.955505193	0.83597287	-9.516463367	2.37556E-15	0
FR_NGD1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	0.000130816	4.97804E-05	2.62787146	0.010067358	1
FR_NGD1	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	1.060418751	0.765709503	1.384883884	0.169799298	0
FR_NGD1	Field Measured	Conductivity (µS/cm)_Field Measured	Date	0.000300347	4.5249E-05	6.637657033	3.07265E-09	1
FR_NGD1	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	4.586358608	0.477072848	9.613539367	5.49612E-15	0
FR_NGD1	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-1.08581E-05	2.81406E-05	-0.385850575	0.700631523	0
FR_NGD1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	2.874791742	0.473952493	6.06556941	3.99732E-08	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_NGD1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-3.05296E-05	2.79737E-05	-1.091368498	0.278346495	0
FR_NGD1	Field Measured	pH (-)_Field Measured	(Intercept)	2.410285632	0.049976532	48.22834915	1.75483E-62	0
FR_NGD1	Field Measured	pH (-)_Field Measured	Date	-1.71007E-05	2.95332E-06	-5.790309849	1.21529E-07	0
FR_NGD1	Field Measured	Total Suspended Solids (mg/L)_Field Measured	(Intercept)	41.55283194	35.2378613	1.179209816	0.447764385	0
FR_NGD1	Field Measured	Total Suspended Solids (mg/L)_Field Measured	Date	-0.002155908	0.002012298	-1.071365977	0.478074841	0
FR_NGD1	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	-4.312365121	0.866876225	-4.974603058	3.0266E-06	0
FR_NGD1	Major Ions	Bromide (mg/L)_Major Ions	Date	8.627E-05	5.16206E-05	1.671233314	0.098073984	0
FR_NGD1	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	1.60871506	0.627388274	2.564145886	0.011963226	0
FR_NGD1	Major Ions	Calcium (mg/L)_Major Ions	Date	0.000156055	3.73596E-05	4.177094466	6.70768E-05	1
FR_NGD1	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	4.109006055	1.170020519	3.511909396	0.000691522	0
FR_NGD1	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000258027	6.96722E-05	-3.703442969	0.000362522	0
FR_NGD1	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-3.065615814	0.406242529	-7.546270006	3.12868E-11	0
FR_NGD1	Major Ions	Fluoride (mg/L)_Major Ions	Date	7.20275E-05	2.41909E-05	2.977468356	0.003714721	1
FR_NGD1	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	1.187020734	0.688370311	1.724392692	0.08799541	0
FR_NGD1	Major Ions	Magnesium (mg/L)_Major Ions	Date	0.000134	4.09909E-05	3.269010454	0.00151876	1
FR_NGD1	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	-2.604475991	0.521165572	-4.997406066	2.75836E-06	0
FR_NGD1	Major Ions	Potassium (mg/L)_Major Ions	Date	0.000202836	3.10343E-05	6.535863127	3.46388E-09	1
FR_NGD1	Major Ions	Silica (mg/L)_Major Ions	(Intercept)	1.601405741	-	-	-	0
FR_NGD1	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	5.214627719	0.651652894	8.002155392	3.56414E-12	0
FR_NGD1	Major Ions	Sodium (mg/L)_Major Ions	Date	-0.000294757	3.88045E-05	-7.595954492	2.47197E-11	0
FR_NGD1	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	2.396134472	1.081814402	2.214921957	0.029234416	0
FR_NGD1	Major Ions	Sulphate (mg/L)_Major Ions	Date	0.000128605	6.44197E-05	1.996354571	0.048851433	1
FR_NGD1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-58.21048647	31.05445271	-1.874465057	0.103000067	0
FR_NGD1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.00330063	0.001932386	1.708059662	0.131380084	0
FR_NGD1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	0	-Inf	0	0
FR_NGD1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	0	0	-	-	0
FR_NGD1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-13.19989187	1.689554205	-7.812647754	8.81656E-12	0
FR_NGD1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	0.000815397	0.000100609	8.104594025	2.18138E-12	1
FR_NGD1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-18.91867302	2.137100129	-8.852497251	5.92608E-14	0
FR_NGD1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	0.000821297	0.00012726	6.453712275	5.03468E-09	1
FR_NGD1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-19.07765941	2.521447203	-7.566154622	2.84727E-11	0
FR_NGD1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000914042	0.000150147	6.087657641	2.6115E-08	1
FR_NGD1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-5.138083081	1.225677599	-4.192034744	6.34744E-05	0
FR_NGD1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000217388	7.29864E-05	2.978478221	0.003703589	1
FR_NGD1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.100346027	1.795282838	-0.612909567	0.541611942	0
FR_NGD1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000256373	0.000106432	-2.408804734	0.018218506	0
FR_NGD1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.966840418	18.57877535	-0.105864912	0.918659422	0
FR_NGD1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000136351	0.001201595	-0.113474629	0.912840184	0
FR_NGD1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	6.437623999	2.141018149	3.006804964	0.003403628	0
FR_NGD1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000619341	0.000127493	-4.857847102	4.85103E-06	0
FR_NGD1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	(Intercept)	-4.605170186	-	-	-	0
FR_NGD1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	(Intercept)	-3.540459449	-	-	-	0
FR_NGD1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	(Intercept)	3.258096538	-	-	-	0
FR_NGD1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	(Intercept)	1.658228077	-	-	-	0
FR_NGD1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	(Intercept)	-3.218875825	-	-	-	0
FR_NGD1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	(Intercept)	-4.605170186	-	-	-	0
FR_NGD1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	(Intercept)	-2.813410717	-	-	-	0
FR_NGD1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	(Intercept)	-2.813410717	-	-	-	0
FR_NGD1	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	-9.404273867	2.971951269	-3.164343227	0.002107276	0
FR_NGD1	Total Metals	Aluminum (mg/L)_Total Metals	Date	0.000364397	0.000176973	2.05905279	0.042315785	1
FR_NGD1	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-18.12673705	1.270760415	-14.26448041	4.87601E-25	0
FR_NGD1	Total Metals	Antimony (mg/L)_Total Metals	Date	0.000621556	7.5671E-05	8.213920757	1.2905E-12	1
FR_NGD1	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-11.60833908	0.699533856	-16.59439208	2.0854E-29	0
FR_NGD1	Total Metals	Arsenic (mg/L)_Total Metals	Date	0.000207231	4.16557E-05	4.974862561	3.02341E-06	1
FR_NGD1	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-7.406237212	0.907750162	-8.158893846	1.68094E-12	0
FR_NGD1	Total Metals	Barium (mg/L)_Total Metals	Date	0.000316727	5.40545E-05	5.859389932	7.1566E-08	1
FR_NGD1	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	3.371234355	1.133425331	2.974377104	0.003748988	0
FR_NGD1	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000785632	6.7493E-05	-11.64019874	8.74802E-20	0
FR_NGD1	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	10.01155975	1.23961504	8.076345819	2.49786E-12	0
FR_NGD1	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001129685	7.38164E-05	-15.30398418	5.03805E-27	0
FR_NGD1	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-6.258238798	0.473832209	-13.20771084	5.81878E-23	0
FR_NGD1	Total Metals	Boron (mg/L)_Total Metals	Date	0.000116093	2.82157E-05	4.114481499	8.44288E-05	1
FR_NGD1	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-18.31465163	1.28283858	-14.27666109	4.61808E-25	0
FR_NGD1	Total Metals	Cadmium (mg/L)_Total Metals	Date	0.000509216	7.63902E-05	6.665988142	1.90968E-09	1
FR_NGD1	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	1.679024436	0.627071256	2.67756562	0.008782441	0
FR_NGD1	Total Metals	Calcium (mg/L)_Total Metals	Date	0.000152181	3.73407E-05	4.075470586	9.73393E-05	1
FR_NGD1	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-9.230925632	1.917190677	-4.814818758	5.76367E-06	0
FR_NGD1	Total Metals	Chromium (mg/L)_Total Metals	Date	3.95567E-05	0.000114165	0.3464884	0.729766914	0
FR_NGD1	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-21.61169627	1.775959327	-12.16902659	7.2177E-21	0
FR_NGD1	Total Metals	Cobalt (mg/L)_Total Metals	Date	0.000784025	0.000105754	7.413633117	5.85906E-11	1
FR_NGD1	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-7.010115602	1.45862841	-4.805963981	5.97121E-06	0
FR_NGD1	Total Metals	Copper (mg/L)_Total Metals	Date	-8.59851E-06	8.68581E-05	-0.098994897	0.921357704	0
FR_NGD1	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	-5.651162633	2.062084918	-2.740509173	0.007369244	0
FR_NGD1	Total Metals	Iron (mg/L)_Total Metals	Date	0.000182952	0.000122793	1.489927658	0.139663703	0
FR_NGD1	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-11.91554061	1.747931549	-6.81693778	9.52847E-10	0
FR_NGD1	Total Metals	Lead (mg/L)_Total Metals	Date	0.000147654	0.000104086	1.418588116	0.159397917	0
FR_NGD1	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-11.11419987	1.074849977	-10.34023362	4.4134E-17	0
FR_NGD1	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000398444	6.4005E-05	6.225201438	1.4126E-08	1
FR_NGD1	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	1.489200509	0.687122423	2.167300118	0.032794338	0
FR_NGD1	Total Metals	Magnesium (mg/L)_Total Metals	Date	0.000116161	4.09166E-05	2.838976641	0.005569662	1
FR_NGD1	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-11.71559864	1.353181147	-8.657819884	1.5191E-13	0
FR_NGD1	Total Metals	Manganese (mg/L)_Total Metals	Date	0.000421727	8.0579E-05	5.233713219	1.04139E-06	1
FR_NGD1	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	5.744305499	1.580045996	3.635530557	0.000456949	0
FR_NGD1	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001094365	9.40883E-05	-11.6312535	9.12702E-20	0
FR_NGD1	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	2.368992322	2.779327578	0.852361679	0.426721234	0
FR_NGD1	Total Metals	Methyl mercury (µg/L)_Total Metals	Date	-0.000726082	0.000158731	-4.574295515	0.003793259	0
FR_NGD1	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-12.06917148	0.929786712	-12.98058073	1.65354E-22	0
FR_NGD1	Total Metals	Molybdenum (mg/L)_Total Metals	Date	0.000379141	5.53668E-05	6.847807186	8.26098E-10	1
FR_NGD1	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-22.93925994	1.232365013	-18.61401428	5.93285E-33	0
FR_NGD1	Total Metals	Nickel (mg/L)_Total Metals	Date	0.0010257	7.33846E-05	13.97704083	1.76727E-24	1
FR_NGD1	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	-2.455737441	0.469003384	-5.236076163	1.03118E-06	0
FR_NGD1	Total Metals	Potassium (mg/L)_Total Metals	Date	0.000194692	2.79281E-05	6.971181979	4.66104E-10	1
FR_NGD1	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-7.114222521	1.014186573	-7.014707858	3.80633E-10	0
FR_NGD1	Total Metals	Selenium (mg/L)_Total Metals	Date	0.000192194	6.03926E-05	3.18240779	0.001992475	1
FR_NGD1	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	-0.492449497	0.537651817	-0.915926407	0.362100108	0
FR_NGD1	Total Metals	Silicon (mg/L)_Total Metals	Date	8.48067E-05	3.2016E-05	2.648884364	0.009504582	1
FR_NGD1	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-12.56129703	1.021149251	-12.30113719	3.8857E-21	0
FR_NGD1	Total Metals	Silver (mg/L)_Total Metals	Date	7.36227E-05	6.08072E-05	1.210755332	0.229090416	0
FR_NGD1	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	5.451501081	0.648406448	8.407536815	5.08276E-13	0
FR_NGD1	Total Metals	Sodium (mg/L)_Total Metals	Date	-0.000309133	3.86112E-05	-8.006304452	3.49403E-12	0
FR_NGD1	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-7.901808235	0.568139916	-13.9082082	2.40913E-24	0
FR_NGD1	Total Metals	Strontium (mg/L)_Total Metals	Date	0.00032383	3.38315E-05	9.571844646	1.81637E-15	1
FR_NGD1	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-17.83971987	1.138968334	-15.66305167	1.07138E-27	0
FR_NGD1	Total Metals	Thallium (mg/L)_Total Metals	Date	0.00042538	6.78231E-05	6.271906405	1.14527E-08	1
FR_NGD1	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.505247083	0.258807342	-36.72711521	9.33739E-57	0
FR_NGD1	Total Metals	Tin (mg/L)_Total Metals	Date	1.88491E-05	1.54114E-05	1.223062902	0.224429617	0
FR_NGD1	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-4.723786251	0.84587525	-5.584495175	2.35924E-07	0
FR_NGD1	Total Metals	Titanium (mg/L)_Total Metals	Date	1.59229E-05	5.037E-05	0.316119399	0.752627967	0
FR_NGD1	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-12.78333795	0.761992393	-16.77620152	9.79078E-30	0
FR_NGD1	Total Metals	Uranium (mg/L)_Total Metals	Date	0.000370033	4.5375E-05	8.154995078	1.7127E-12	1
FR_NGD1	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-6.164429657	1.558743071	-3.954743903	0.000150409	0
FR_NGD1	Total Metals	Vanadium (mg/L)_Total Metals	Date	-4.28138E-05	9.28197E-05	-0.461257591	0.64570248	0
FR_NGD1	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-10.213591	1.08120372	-9.446500058	3.3345E-15	0
FR_NGD1	Total Metals	Zinc (mg/L)_Total Metals	Date	0.000286892	6.43833E-05	4.456001986	2.34899E-05	1
FR_NGD1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	0	-Inf	0	0
FR_NGD1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	0	0	-	-	0
FR_NGD1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	6.58771E-16	-2.10437E+15	3.02523E-16	0
FR_NGD1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	1.91081E-19	3.90576E-20	4.89228386	0.12835916	0
FR_NGD1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	5.67682E-14	-2.44203E+13	2.60693E-14	0
FR_NGD1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	6.33868E-18	3.58008E-18	1.770540826	0.327308061	0
FR_NGD1	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_NGD1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-0.693147181	-	-	-	0
FR_NGD1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Date	-3.44319E-19	-	-	-	0
FR_NGD1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	3.64082E-15	-3.80764E+14	2.85448E-58	0
FR_NGD1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	2.13879E-19	2.22416E-19	0.961620663	0.390695921	0
FR_UFR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-1.280700621	0.658720957	-1.944223281	0.054858404	0
FR_UFR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	8.29163E-05	3.91941E-05	2.115530752	0.037028726	1
FR_UFR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.732887761	0.235109419	20.13057489	1.15854E-35	0
FR_UFR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	1.01114E-05	1.3995E-05	0.722500155	0.471799985	0
FR_UFR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.168053342	1.58379992	0.106107684	0.915725456	0
FR_UFR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	4.1897E-05	9.42766E-05	0.444404984	0.65778226	0
FR_UFR1	Conventional Parameters	Colour (CU)_Conventional Parameters	(Intercept)	7.810646069	5.443550124	1.434844153	0.185154202	0
FR_UFR1	Conventional Parameters	Colour (CU)_Conventional Parameters	Date	-0.000377317	0.000333897	-1.130038483	0.287675846	0
FR_UFR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	5.504721825	0.358321418	15.36252522	2.24722E-27	0
FR_UFR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	1.31895E-05	2.13202E-05	0.618636196	0.537652303	0
FR_UFR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-1.793696713	0.979256023	-1.831693318	0.070164191	0
FR_UFR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	0.000102264	5.8266E-05	1.755128753	0.082495331	0
FR_UFR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.254984557	0.347586365	15.11850027	6.5906E-27	0
FR_UFR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	-7.57993E-06	2.06815E-05	-0.366507716	0.714809928	0
FR_UFR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0	0	-	-	0
FR_UFR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0	0	-	-	0
FR_UFR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	6.453737828	0.319796397	20.18077094	6.19699E-36	0
FR_UFR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-3.24797E-05	1.9028E-05	-1.706943732	0.091133907	0
FR_UFR1	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.147901634	0.03332653	64.45020286	1.35562E-79	0
FR_UFR1	Conventional Parameters	pH (-)_Conventional Parameters	Date	-1.95869E-06	1.98294E-06	-0.987768881	0.325801615	0
FR_UFR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.709927604	0.244968106	19.22669719	2.44143E-34	0
FR_UFR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	1.26888E-05	1.45757E-05	0.870543674	0.386221121	0
FR_UFR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	4.96495472	0.391012431	12.69769022	4.19252E-22	0
FR_UFR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	1.59641E-05	2.32654E-05	0.686174458	0.494292149	0
FR_UFR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	-0.13630114	1.114128265	-0.122338822	0.902891859	0
FR_UFR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	1.20669E-05	6.6291E-05	0.182029618	0.855951456	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_UFR1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	(Intercept)	3.640631907	1.552902573	2.344404582	0.021185658	0
FR_UFR1	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	Date	-0.000180187	9.23549E-05	-1.951024009	0.05406403	0
FR_UFR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	-2.465374643	2.138479987	-1.152863089	0.251889847	0
FR_UFR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	0.000103989	0.00012724	0.817261876	0.415845395	0
FR_UFR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-5.338979482	1.473384884	-3.623614943	0.00047119	0
FR_UFR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-1.07975E-05	8.76669E-05	-0.123164563	0.902239747	0
FR_UFR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-9.463463082	0.174290355	-54.29711275	8.87636E-73	0
FR_UFR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	1.59402E-05	1.03703E-05	1.537094681	0.127629505	0
FR_UFR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-9.399449634	0.262854569	-35.75912589	1.58498E-56	0
FR_UFR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	1.47263E-05	1.56399E-05	0.941583141	0.348819659	0
FR_UFR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-3.053132751	0.513209662	-5.949094451	4.59021E-08	0
FR_UFR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	1.72703E-05	3.05361E-05	0.565568188	0.573034899	0
FR_UFR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	3.533619295	0.835745725	4.228103342	5.46313E-05	0
FR_UFR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000802174	4.97271E-05	-16.13150722	7.95102E-29	0
FR_UFR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	9.926615192	1.23221052	8.055940953	2.43644E-12	0
FR_UFR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001124797	7.33169E-05	-15.34157684	2.46395E-27	0
FR_UFR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.818567709	0.175759964	-27.4156161	1.25636E-46	0
FR_UFR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	1.3663E-05	1.04578E-05	1.306488781	0.194574016	0
FR_UFR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-10.06413517	0.491258085	-20.48645198	1.9542E-36	0
FR_UFR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-9.41745E-05	2.923E-05	-3.221840851	0.00175051	0
FR_UFR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-7.023501296	0.503787414	-13.9413989	1.311E-24	0
FR_UFR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-0.000115849	2.99755E-05	-3.864796642	0.000204453	0
FR_UFR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-9.463463082	0.174290355	-54.29711275	8.87636E-73	0
FR_UFR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	1.59402E-05	1.03703E-05	1.537094681	0.127629505	0
FR_UFR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-6.283047776	0.488151377	-12.8711053	1.85709E-22	0
FR_UFR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-8.31608E-05	2.90452E-05	-2.863154813	0.00517196	0
FR_UFR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	2.277561402	0.750593493	3.034347386	0.003117239	0
FR_UFR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000390185	4.46606E-05	-8.736673813	8.9023E-14	0
FR_UFR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.15469029	0.174314533	-58.25498364	1.43891E-75	0
FR_UFR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	1.58492E-05	1.03718E-05	1.528113538	0.129842476	0
FR_UFR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-7.439048934	0.465957732	-15.96507241	1.62841E-28	0
FR_UFR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	5.2936E-05	2.77246E-05	1.909348319	0.059266973	0
FR_UFR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-2.885864071	2.72048795	-1.06078914	0.291503716	0
FR_UFR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	-0.00030858	0.00016187	-1.906345598	0.059660142	0
FR_UFR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-5.821892762	0.512063956	-11.3694641	2.35573E-19	0
FR_UFR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000362424	3.0468E-05	-11.89523505	1.88631E-20	0
FR_UFR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-7.780240318	0.171634162	-45.33037146	1.1146E-65	0
FR_UFR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	1.98698E-05	1.02123E-05	1.94567661	0.054680884	0
FR_UFR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-7.824314764	0.179174068	-43.66879013	3.18579E-64	0
FR_UFR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	1.43232E-05	1.06609E-05	1.343526396	0.182335975	0
FR_UFR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-9.6916675	0.479614375	-20.20720812	5.60588E-36	0
FR_UFR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.000136526	2.85372E-05	4.784152302	6.35558E-06	1
FR_UFR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.597012224	0.163406116	3.653548826	0.0004256	0
FR_UFR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	3.44677E-07	9.72272E-06	0.035450672	0.971795553	0
FR_UFR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.80481001	0.175508963	-67.26043949	2.6694E-81	0
FR_UFR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	1.83362E-05	1.04428E-05	1.755860174	0.082369587	0
FR_UFR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-3.163251838	0.340343878	-9.294281595	5.82171E-15	0
FR_UFR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	4.10483E-05	2.02506E-05	2.027018043	0.04549273	1
FR_UFR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.76604817	0.174290355	-67.50831475	1.90221E-81	0
FR_UFR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	1.59402E-05	1.03703E-05	1.537094681	0.127629505	0
FR_UFR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.468610646	0.17431628	-54.31856754	8.56249E-73	0
FR_UFR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	1.62771E-05	1.03719E-05	1.569352599	0.119926037	0
FR_UFR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-4.576891048	0.020078382	-227.9511944	9.497E-131	0
FR_UFR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-1.6133E-06	1.19467E-06	-1.350417857	0.180124296	0
FR_UFR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-8.592838461	0.365818724	-23.48933475	4.08915E-41	0
FR_UFR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	4.83488E-05	2.17663E-05	2.221267099	0.028733777	1
FR_UFR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-1.818338769	0.405063859	-4.489017541	2.02853E-05	0
FR_UFR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000326829	2.41014E-05	-13.56054558	7.52828E-24	0
FR_UFR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	0.863085383	0.681647356	1.266175795	0.208579031	0
FR_UFR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000415592	4.05582E-05	-10.24678412	5.49996E-17	0
FR_UFR1	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	5.366127568	0.526985414	10.18268709	2.50521E-16	0
FR_UFR1	Field Measured	Conductivity (µS/cm)_Field Measured	Date	1.73777E-05	3.10961E-05	0.558836716	0.577759952	0
FR_UFR1	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	4.206255295	0.66487538	6.326381488	1.20836E-08	0
FR_UFR1	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	1.18668E-05	3.92071E-05	0.30266847	0.762899766	0
FR_UFR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	2.128182194	0.660161892	3.223727723	0.001809643	0
FR_UFR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	1.59218E-05	3.89292E-05	0.408993207	0.683598082	0
FR_UFR1	Field Measured	pH (-)_Field Measured	(Intercept)	2.275126436	0.078145269	29.11406498	1.17505E-45	0
FR_UFR1	Field Measured	pH (-)_Field Measured	Date	-9.14164E-06	4.61116E-06	-1.982502192	0.050691744	0
FR_UFR1	Field Measured	Total Suspended Solids (ppm)_Field Measured	(Intercept)	0	-	-	-	0
FR_UFR1	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	-3.445413104	0.342036877	-10.07322116	1.28458E-16	0
FR_UFR1	Major Ions	Bromide (mg/L)_Major Ions	Date	2.80599E-05	2.03513E-05	1.378774219	0.171236646	0
FR_UFR1	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	4.137264311	0.352982776	11.7208674	4.34698E-20	0
FR_UFR1	Major Ions	Calcium (mg/L)_Major Ions	Date	-1.69415E-05	2.10026E-05	-0.806638047	0.421911227	0
FR_UFR1	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	6.196803469	1.090745387	5.681255722	1.48917E-07	0
FR_UFR1	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000394387	6.48997E-05	-6.076871951	2.59794E-08	0
FR_UFR1	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-1.289204873	0.235600841	-5.471987573	3.67372E-07	0
FR_UFR1	Major Ions	Fluoride (mg/L)_Major Ions	Date	-3.86748E-05	1.40183E-05	-2.758877562	0.006971254	0
FR_UFR1	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	2.283158838	0.346955559	6.580551253	2.63889E-09	0
FR_UFR1	Major Ions	Magnesium (mg/L)_Major Ions	Date	1.3778E-05	2.0644E-05	0.667411833	0.5061443	0
FR_UFR1	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	9.49208624	0.914268897	10.3821603	2.84003E-17	0
FR_UFR1	Major Ions	Potassium (mg/L)_Major Ions	Date	-0.00059897	5.43993E-05	-11.01061451	1.33554E-18	0
FR_UFR1	Major Ions	Silica (mg/L)_Major Ions	(Intercept)	1.247032294	-	-	-	0
FR_UFR1	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	6.002893092	0.710243509	8.451880254	3.568E-13	0
FR_UFR1	Major Ions	Sodium (mg/L)_Major Ions	Date	-0.000367466	4.22597E-05	-8.695421418	1.0888E-13	0
FR_UFR1	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	2.689299234	1.063381027	2.529008102	0.013103833	0
FR_UFR1	Major Ions	Sulphate (mg/L)_Major Ions	Date	4.4024E-05	6.32715E-05	0.695794828	0.488274052	0
FR_UFR1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	(Intercept)	0.693147181	1.40578E-14	4.9307E+13	2.8975E-133	0
FR_UFR1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	Date	-1.98955E-18	8.63161E-19	-2.304958407	0.043882418	0
FR_UFR1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-43.51537481	16.44041946	-2.646853075	0.038188898	0
FR_UFR1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.002354677	0.001023981	2.299533025	0.061139592	0
FR_UFR1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	0	-Inf	0	0
FR_UFR1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	0	0	-	-	0
FR_UFR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-7.95377282	2.516796781	-3.160276142	0.002121104	0
FR_UFR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	0.00028502	0.00014975	1.903300748	0.060061071	0
FR_UFR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-7.388155095	0.394892818	-18.70926684	1.87496E-33	0
FR_UFR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	3.13241E-05	2.34963E-05	1.333152785	0.185703673	0
FR_UFR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-10.36539448	1.025378555	-10.10884657	1.07922E-16	0
FR_UFR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.0003209	6.10104E-05	5.25976825	9.03251E-07	1
FR_UFR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-4.961611698	0.906966712	-5.470555461	3.69629E-07	0
FR_UFR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000139837	5.39648E-05	2.591266385	0.01108604	1
FR_UFR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-7.787405366	1.109053538	-7.021667664	4.80305E-10	0
FR_UFR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.000112234	6.57284E-05	1.707533787	0.091330733	0
FR_UFR1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-32.80445774	33.17409153	-0.988857757	0.355673755	0
FR_UFR1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.001783626	0.002145558	0.831311051	0.433235783	0
FR_UFR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	7.21953511	2.438705858	2.960396017	0.003888807	0
FR_UFR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000715369	0.000145104	-4.930050393	3.52882E-06	0
FR_UFR1	Parent PAHs	Acenaphthene (%)_Parent PAHs	(Intercept)	-2.544165253	2.412388551	-1.054624991	0.316410865	0
FR_UFR1	Parent PAHs	Acenaphthene (%)_Parent PAHs	Date	0.000437101	0.000148379	2.945840858	0.014638467	1
FR_UFR1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	(Intercept)	48.19185223	21.41735017	2.250131406	0.048168905	0
FR_UFR1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	Date	-0.003221799	0.00131732	-2.445722321	0.034509456	0
FR_UFR1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	(Intercept)	48.19185223	21.41735017	2.250131406	0.048168905	0
FR_UFR1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	Date	-0.003221799	0.00131732	-2.445722321	0.034509456	0
FR_UFR1	Parent PAHs	Acridine (%)_Parent PAHs	(Intercept)	0.421838416	2.691363862	0.156737787	0.878570774	0
FR_UFR1	Parent PAHs	Acridine (%)_Parent PAHs	Date	0.000255365	0.000165538	1.542633077	0.153948492	0
FR_UFR1	Parent PAHs	Acridine (µg/L)_Parent PAHs	(Intercept)	48.19185223	21.41735017	2.250131406	0.048168905	0
FR_UFR1	Parent PAHs	Acridine (µg/L)_Parent PAHs	Date	-0.003221799	0.00131732	-2.445722321	0.034509456	0
FR_UFR1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	(Intercept)	48.19185223	21.41735017	2.250131406	0.048168905	0
FR_UFR1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	Date	-0.003221799	0.00131732	-2.445722321	0.034509456	0
FR_UFR1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	(Intercept)	42.61083611	22.21143277	1.918419066	0.084028208	0
FR_UFR1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	Date	-0.002874964	0.001366162	-2.10440994	0.061618736	0
FR_UFR1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	(Intercept)	-11.98287219	10.61037317	-1.129354454	0.285110885	0
FR_UFR1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	Date	0.00045849	0.000652614	0.702544745	0.498366765	0
FR_UFR1	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	(Intercept)	39.34615097	23.94459667	1.643216276	0.131367399	0
FR_UFR1	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	Date	-0.002672079	0.001472764	-1.814329849	0.099695529	0
FR_UFR1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	(Intercept)	41.14283685	22.88806399	1.797567364	0.102457363	0
FR_UFR1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	Date	-0.002783735	0.001407779	-1.977394284	0.076202129	0
FR_UFR1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	(Intercept)	43.02383455	22.05378436	1.950859492	0.079634744	0
FR_UFR1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	Date	-0.00290063	0.001356465	-2.138374228	0.058194238	0
FR_UFR1	Parent PAHs	Chrysene (%)_Parent PAHs	(Intercept)	-1.330831606	2.399674301	-0.554588431	0.591362964	0
FR_UFR1	Parent PAHs	Chrysene (%)_Parent PAHs	Date	0.0003605	0.000147597	2.442461337	0.034702536	1
FR_UFR1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	(Intercept)	40.19448268	23.41616705	1.716526988	0.116823785	0
FR_UFR1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	Date	-0.002724799	0.001440261	-1.891878008	0.087789946	0
FR_UFR1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	(Intercept)	48.19185223	21.41735017	2.250131406	0.048168905	0
FR_UFR1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	Date	-0.003221799	0.00131732	-2.445722321	0.034509456	0
FR_UFR1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	(Intercept)	37.65754327	25.14001215	1.497912692	0.165040108	0
FR_UFR1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	Date	-0.00256714	0.00154629	-1.660192743	0.12786189	0
FR_UFR1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	(Intercept)	48.19185223	21.41735017	2.250131406	0.048168905	0
FR_UFR1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	Date	-0.003221799	0.00131732	-2.445722321	0.034509456	0
FR_UFR1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	(Intercept)	43.45916783	21.90382443	1.984090403	0.07535814	0
FR_UFR1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	Date	-0.002927684	0.001347242	-2.173095163	0.054882209	0
FR_UFR1	Parent PAHs	Naphthalene (%)_Parent PAHs	(Intercept)	-3.250440806	2.489007245	-1.30591858	0.220821508	0
FR_UFR1	Parent PAHs	Naphthalene (%)_Parent PAHs	Date	0.000479558	0.000153092	3.132490266	0.010645294	1
FR_UFR1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	(Intercept)	-2.995732274	3.05219E-14	-9.81503E+13	2.9661E-136	0
FR_UFR1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	Date	3.892E-18	1.87731E-18	2.07317454	0.064937149	0
FR_UFR1	Parent PAHs	Phenanthrene (%)_Parent PAHs	(Intercept)	0.317053401	1.882464655	0.168424624	0.869607028	0
FR_UFR1	Parent PAHs	Phenanthrene (%)_Parent PAHs	Date	0.000261496	0.000115785	2.258460139	0.047492538	1
FR_UFR1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	(Intercept)	25.46153612	11.9348013	2.133385842	0.05868554	0
FR_UFR1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	Date	-0.001792839	0.000734076	-2.442308175	0.034711631	0
FR_UFR1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	(Intercept)	36.63697602	25.94613744	1.412039696	0.188291381	0
FR_UFR1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	Date	-0.002503716	0.001595873	-1.568869661	0.147749996	0
FR_UFR1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	(Intercept)	48.19185223	21.41735017	2.250131406	0.048168905	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
FR_UFR1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	Date	-0.003221799	0.00131732	-2.445722321	0.034509456	0
FR_UFR1	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	-4.18411695	2.75531065	-1.518564504	0.132228456	0
FR_UFR1	Total Metals	Aluminum (mg/L)_Total Metals	Date	-4.3751E-06	0.000163942	-0.026686924	0.978766017	0
FR_UFR1	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-9.402022857	0.188465251	-49.8873017	1.95567E-69	0
FR_UFR1	Total Metals	Antimony (mg/L)_Total Metals	Date	1.2388E-05	1.12137E-05	1.104717592	0.27210169	0
FR_UFR1	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-9.162973946	0.549679417	-16.66966901	8.01993E-30	0
FR_UFR1	Total Metals	Arsenic (mg/L)_Total Metals	Date	1.1834E-05	3.27061E-05	0.361828614	0.718292207	0
FR_UFR1	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-2.776477692	0.502653086	-5.523645963	2.94385E-07	0
FR_UFR1	Total Metals	Barium (mg/L)_Total Metals	Date	1.64827E-06	2.9908E-05	0.055111308	0.956166754	0
FR_UFR1	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	3.603445043	0.838879541	4.29554527	4.24293E-05	0
FR_UFR1	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000806678	4.99136E-05	-16.16147995	6.99063E-29	0
FR_UFR1	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	10.05974831	1.228194819	8.190678022	1.26895E-12	0
FR_UFR1	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001133159	7.3078E-05	-15.50615793	1.19707E-27	0
FR_UFR1	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-4.984998108	0.20003938	-24.92008382	3.37652E-43	0
FR_UFR1	Total Metals	Boron (mg/L)_Total Metals	Date	2.35478E-05	1.19024E-05	1.978409866	0.050809713	0
FR_UFR1	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-11.41972077	0.847805978	-13.46973372	1.14488E-23	0
FR_UFR1	Total Metals	Cadmium (mg/L)_Total Metals	Date	4.57306E-06	5.04447E-05	0.090654882	0.927959719	0
FR_UFR1	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.286655056	0.367040589	11.67896735	5.31468E-20	0
FR_UFR1	Total Metals	Calcium (mg/L)_Total Metals	Date	-2.52796E-05	2.1839E-05	-1.157543942	0.249983048	0
FR_UFR1	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-7.565537582	0.907396729	-8.337629333	6.21882E-13	0
FR_UFR1	Total Metals	Chromium (mg/L)_Total Metals	Date	-5.73231E-05	5.39904E-05	-1.061727021	0.291079844	0
FR_UFR1	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-9.336475948	0.294716925	-31.67946985	5.88281E-52	0
FR_UFR1	Total Metals	Cobalt (mg/L)_Total Metals	Date	1.00116E-05	1.75358E-05	0.570926889	0.56941162	0
FR_UFR1	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-6.982976875	0.540878428	-12.91043702	1.54459E-22	0
FR_UFR1	Total Metals	Copper (mg/L)_Total Metals	Date	-3.12726E-05	3.21824E-05	-0.971729452	0.333679022	0
FR_UFR1	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	0.705292535	1.976577049	0.356825217	0.722022421	0
FR_UFR1	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000263734	0.000117607	-2.242506276	0.027279164	0
FR_UFR1	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-9.923121708	0.82177098	-12.07528855	7.98758E-21	0
FR_UFR1	Total Metals	Lead (mg/L)_Total Metals	Date	1.09745E-05	4.88956E-05	0.224447272	0.822896444	0
FR_UFR1	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-7.013105501	0.411573635	-17.0397346	1.69192E-30	0
FR_UFR1	Total Metals	Lithium (mg/L)_Total Metals	Date	3.07639E-05	2.44888E-05	1.256245749	0.212140077	0
FR_UFR1	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	2.594654588	0.362961791	7.148561234	1.86743E-10	0
FR_UFR1	Total Metals	Magnesium (mg/L)_Total Metals	Date	-3.6766E-06	2.15963E-05	-0.170241735	0.865185909	0
FR_UFR1	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-4.365151557	2.664413555	-1.638316074	0.104698935	0
FR_UFR1	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.000141383	0.000158533	-0.891816748	0.374768374	0
FR_UFR1	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	9.551610283	1.421018698	6.721664041	1.37518E-09	0
FR_UFR1	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.00133651	8.45511E-05	-15.807137	3.22564E-28	0
FR_UFR1	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	6.981056282	3.647099709	1.914139135	0.081963554	0
FR_UFR1	Total Metals	Methyl mercury (µg/L)_Total Metals	Date	-0.000985437	0.000207939	-4.739075098	0.000610351	0
FR_UFR1	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-7.482337507	0.162127343	-46.15099082	2.2175E-66	0
FR_UFR1	Total Metals	Molybdenum (mg/L)_Total Metals	Date	3.16106E-06	9.64663E-06	0.327685075	0.743878495	0
FR_UFR1	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-7.751351516	0.296590056	-26.13490025	6.72905E-45	0
FR_UFR1	Total Metals	Nickel (mg/L)_Total Metals	Date	1.18832E-05	1.76472E-05	0.673376143	0.502360313	0
FR_UFR1	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	9.464776132	0.877747463	10.78302875	4.03091E-18	0
FR_UFR1	Total Metals	Potassium (mg/L)_Total Metals	Date	-0.000595705	5.22263E-05	-11.40623043	1.97307E-19	0
FR_UFR1	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-9.08068916	0.456823686	-19.87788604	1.96583E-35	0
FR_UFR1	Total Metals	Selenium (mg/L)_Total Metals	Date	0.000101269	2.71812E-05	3.725716219	0.000332278	1
FR_UFR1	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	0.744763225	0.224152855	3.32256855	0.001276313	0
FR_UFR1	Total Metals	Silicon (mg/L)_Total Metals	Date	-5.39393E-06	1.33415E-05	-0.40429694	0.686922655	0
FR_UFR1	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.81645784	0.292009958	-40.46594135	2.86631E-61	0
FR_UFR1	Total Metals	Silver (mg/L)_Total Metals	Date	2.0567E-05	1.73747E-05	1.183736271	0.239502325	0
FR_UFR1	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	6.087469365	0.690133296	8.820715365	5.90544E-14	0
FR_UFR1	Total Metals	Sodium (mg/L)_Total Metals	Date	-0.000371725	4.10632E-05	-9.052530085	1.90111E-14	0
FR_UFR1	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-2.844350283	0.345242965	-8.238691496	1.00537E-12	0
FR_UFR1	Total Metals	Strontium (mg/L)_Total Metals	Date	2.27303E-05	2.05421E-05	1.106522295	0.271324269	0
FR_UFR1	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-11.50620262	0.267261121	-43.05228744	1.13844E-63	0
FR_UFR1	Total Metals	Thallium (mg/L)_Total Metals	Date	2.23271E-06	1.59021E-05	0.140403205	0.888641849	0
FR_UFR1	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.281551949	0.18251973	-50.85232132	3.44191E-70	0
FR_UFR1	Total Metals	Tin (mg/L)_Total Metals	Date	5.07958E-06	1.086E-05	0.467733384	0.64105786	0
FR_UFR1	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-4.318804208	0.184820768	-23.36752658	6.21112E-41	0
FR_UFR1	Total Metals	Titanium (mg/L)_Total Metals	Date	-1.59845E-05	1.09969E-05	-1.453543712	0.149403391	0
FR_UFR1	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-8.321366344	0.335791143	-24.78137534	5.32775E-43	0
FR_UFR1	Total Metals	Uranium (mg/L)_Total Metals	Date	3.32769E-05	1.99797E-05	1.665536366	0.099135278	0
FR_UFR1	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-2.273454439	0.545213266	-4.169844321	6.78327E-05	0
FR_UFR1	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000295942	3.24404E-05	-9.12263786	1.34899E-14	0
FR_UFR1	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-6.017497765	0.566655265	-10.61932738	8.93836E-18	0
FR_UFR1	Total Metals	Zinc (mg/L)_Total Metals	Date	1.74523E-05	3.37162E-05	0.517623008	0.605937366	0
FR_UFR1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	1.29536E-14	-1.0702E+14	4.49268E-83	0
FR_UFR1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	-1.80347E-18	8.08896E-19	-2.229541001	0.067308406	0
FR_UFR1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	0	-Inf	0	0
FR_UFR1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
FR_UFR1	Volatile Organics	Extracted Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_UFR1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	0	-Inf	0	0
FR_UFR1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
FR_UFR1	Volatile Organics	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_UFR1	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
FR_UFR1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-0.693147181	0	-Inf	0	0
FR_UFR1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
FR_UFR1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	1.48217E-14	-9.35317E+13	7.84E-56	0
FR_UFR1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	1.60698E-18	9.27531E-19	1.732537622	0.158212329	0
GH_CC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-3.883747934	1.020322951	-3.80639084	0.000255423	0
GH_CC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	0.000384543	6.08769E-05	6.316737058	9.6512E-09	1
GH_CC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.568011849	0.252705536	22.0335966	5.00316E-38	0
GH_CC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	2.76387E-05	1.50846E-05	1.832247061	0.070221851	0
GH_CC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.727801415	0.309085555	2.354692422	0.020712384	0
GH_CC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-4.15502E-05	1.84501E-05	-2.252034824	0.026752633	0
GH_CC1	Conventional Parameters	Colour (CU)_Conventional Parameters	(Intercept)	0.649526594	1.365747125	0.475583351	0.639524454	0
GH_CC1	Conventional Parameters	Colour (CU)_Conventional Parameters	Date	6.06893E-05	8.34578E-05	0.727185518	0.475539096	0
GH_CC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	7.033416394	0.136032341	51.70400177	1.21214E-67	0
GH_CC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	5.99743E-05	8.10029E-06	7.40397209	7.50997E-11	1
GH_CC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	0.376857644	0.381557868	0.987681489	0.32592756	0
GH_CC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	5.94046E-06	2.27654E-05	0.26094273	0.79472629	0
GH_CC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	6.410147098	0.155564462	41.20572925	1.19096E-60	0
GH_CC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	7.92091E-05	9.28164E-06	8.53394643	2.97379E-13	1
GH_CC1	Conventional Parameters	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	(Intercept)	15.01019652	1.660478054	9.039683773	0.07013982	0
GH_CC1	Conventional Parameters	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	Date	-0.000465572	0.000105521	-4.412135284	0.141891167	0
GH_CC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.583302001	0.239884672	2.431593464	0.017013512	0
GH_CC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-3.35096E-05	1.43193E-05	-2.340168835	0.021486037	0
GH_CC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	6.967498975	0.342447282	20.34619439	1.26254E-35	0
GH_CC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-6.06547E-05	2.04319E-05	-2.968630258	0.003823074	0
GH_CC1	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.290703025	0.02842929	80.57545643	2.09444E-86	0
GH_CC1	Conventional Parameters	pH (-)_Conventional Parameters	Date	-1.25646E-05	1.69621E-06	-7.407458184	6.33839E-11	0
GH_CC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.569935109	0.250130351	22.26812974	1.3326E-38	0
GH_CC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	2.75234E-05	1.49239E-05	1.844256652	0.068399456	0
GH_CC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	6.975999745	0.209288245	33.33201892	8.67528E-53	0
GH_CC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	6.49343E-05	1.2487E-05	5.200139379	1.21764E-06	1
GH_CC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	1.060370851	0.528438199	2.006612792	0.047758963	0
GH_CC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-3.13018E-05	3.15289E-05	-0.992797008	0.323441455	0
GH_CC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	1.595815196	1.262164964	1.264347563	0.209334084	0
GH_CC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-5.4931E-05	7.53062E-05	-0.729434922	0.467609049	0
GH_CC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	1.136898718	2.071375939	0.548861603	0.584444638	0
GH_CC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-0.000137307	0.000123587	-1.111017233	0.269487834	0
GH_CC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-0.639493647	0.800345179	-0.799022302	0.426381122	0
GH_CC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-0.000301024	4.77143E-05	-6.308894639	1.0314E-08	0
GH_CC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-5.832477119	0.133763022	-43.60306021	2.59366E-62	0
GH_CC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	-9.82751E-05	7.97457E-06	-12.32356225	5.0306E-21	0
GH_CC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-6.793013667	0.518920505	-13.09066341	1.50513E-22	0
GH_CC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	-9.99399E-05	3.09366E-05	-3.230479145	0.001726442	0
GH_CC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-2.475014757	0.284121527	-8.711113104	1.37334E-13	0
GH_CC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	-8.12924E-05	1.69385E-05	-4.799265706	6.29343E-06	0
GH_CC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	7.630440479	1.027733176	7.424534554	6.15317E-11	0
GH_CC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.001006793	6.12705E-05	-16.4319332	7.78687E-29	0
GH_CC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	14.32351813	1.37830381	10.39213418	4.39254E-17	0
GH_CC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.00134825	8.21705E-05	-16.40795422	8.59631E-29	0
GH_CC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-1.293646123	0.562308627	-2.300598036	0.02372519	0
GH_CC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-0.0001563	3.35232E-05	-4.662440302	1.07934E-05	0
GH_CC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	3.263645721	2.153801198	1.515295713	0.133201913	0
GH_CC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-0.000729403	0.000128403	-5.680559921	1.63036E-07	0
GH_CC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-5.737464131	0.573636818	-10.00191053	2.83055E-16	0
GH_CC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-0.000165052	3.41986E-05	-4.826284787	5.65206E-06	0
GH_CC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-5.839262538	0.571821795	-10.21168236	1.03883E-16	0
GH_CC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	-0.000160021	3.40904E-05	-4.694018606	9.53693E-06	0
GH_CC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-2.631187052	0.806479833	-3.262557776	0.001560966	0
GH_CC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-0.000287664	4.808E-05	-5.983030196	4.37689E-08	0
GH_CC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	0.058801435	0.458093021	0.128361341	0.898149423	0
GH_CC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000233849	2.73102E-05	-8.562699914	2.79297E-13	0
GH_CC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-6.532409719	0.571821795	-11.42385578	3.32231E-19	0
GH_CC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	-0.000160021	3.40904E-05	-4.694018606	9.53693E-06	0
GH_CC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-6.32315257	0.231098607	-27.3612751	2.12679E-45	0
GH_CC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000211194	1.37774E-05	15.32898628	7.93837E-27	1
GH_CC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-6.383861845	0.687839322	-9.281036484	8.94756E-15	0
GH_CC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	-5.64887E-05	4.1007E-05	-1.37753735	0.171762202	0
GH_CC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-5.932446167	0.389705829	-15.22288281	1.24873E-26	0
GH_CC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000357341	2.32331E-05	-15.38065087	6.37027E-27	0
GH_CC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-3.64613962	0.252158055	-14.45973885	3.38498E-25	0
GH_CC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	-0.000129314	1.50329E-05	-8.602058105	2.31391E-13	0
GH_CC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-2.378133486	0.290549736	-8.18494457	1.69304E-12	0
GH_CC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	-4.04627E-05	1.73217E-05	-2.33594646	0.021715706	0
GH_CC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-1.223843389	0.197593086	-6.193756138	1.72424E-08	0
GH_CC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	4.17783E-05	1.17799E-05	3.546564125	0.000622041	1
GH_CC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.13863088	0.099941396	1.387121718	0.168830313	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
GH_CC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	4.74078E-05	5.95822E-06	7.956705201	5.00653E-12	1
GH_CC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-8.141847631	0.571821795	-14.23843529	8.93304E-25	0
GH_CC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	-0.000160021	3.40904E-05	-4.694018606	9.53693E-06	0
GH_CC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-2.028915026	0.169779449	-11.95029806	2.83582E-20	0
GH_CC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	3.30926E-05	1.01218E-05	3.26944641	0.001527424	1
GH_CC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-10.43638791	0.215612875	-48.40336129	3.14091E-66	0
GH_CC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	3.75306E-05	1.28542E-05	2.919713305	0.00442646	1
GH_CC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-5.839262538	0.571821795	-10.21168236	1.03883E-16	0
GH_CC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	-0.000160021	3.40904E-05	-4.694018606	9.53693E-06	0
GH_CC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-2.500488107	0.632642287	-3.952451739	0.000153704	0
GH_CC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-0.000114092	3.77163E-05	-3.025003556	0.003240466	0
GH_CC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-5.682521269	0.231729201	-24.52224947	1.28222E-41	0
GH_CC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	9.87985E-05	1.3815E-05	7.151523661	2.19866E-10	1
GH_CC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	2.043755046	0.672961896	3.036955076	0.003126296	0
GH_CC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000517471	4.01201E-05	-12.8980624	3.61115E-22	0
GH_CC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	4.48535818	1.588214217	2.824151888	0.005836927	0
GH_CC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.00053995	9.46848E-05	-5.702608602	1.48272E-07	0
GH_CC1	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	6.243680852	0.67940265	9.189956584	2.22709E-14	0
GH_CC1	Field Measured	Conductivity (µS/cm)_Field Measured	Date	9.87164E-05	4.0407E-05	2.443052446	0.016633485	1
GH_CC1	Field Measured	Conductivity (si)_Field Measured	(Intercept)	3.895839916	7.363144787	0.529100001	0.611097981	0
GH_CC1	Field Measured	Conductivity (si)_Field Measured	Date	0.000256043	0.000463005	0.553001694	0.595373022	0
GH_CC1	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	4.073297142	0.849326281	4.795915581	9.3979E-06	0
GH_CC1	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	1.63921E-05	4.96368E-05	0.330240522	0.742248642	0
GH_CC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	3.762451829	0.856150851	4.394613195	3.05709E-05	0
GH_CC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-8.13962E-05	5.10453E-05	-1.594588145	0.114349603	0
GH_CC1	Field Measured	Oxygen Saturation (%)_Field Measured	(Intercept)	6.467813046	1.836017951	3.522739548	0.005513175	0
GH_CC1	Field Measured	Oxygen Saturation (%)_Field Measured	Date	-0.000131811	0.000118394	-1.113326498	0.291613234	0
GH_CC1	Field Measured	pH (-)_Field Measured	(Intercept)	2.317618988	0.043731509	52.9965477	3.37107E-70	0
GH_CC1	Field Measured	pH (-)_Field Measured	Date	-1.3839E-05	2.60921E-06	-5.303902925	7.90384E-07	0
GH_CC1	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	10.50438201	0.830251684	12.65204542	9.15661E-22	0
GH_CC1	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.000653364	4.95364E-05	-13.18957964	7.78905E-23	0
GH_CC1	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	5.367534844	0.14593394	36.78057921	5.17336E-56	0
GH_CC1	Major Ions	Calcium (mg/L)_Major Ions	Date	3.83321E-05	8.70016E-06	4.40590922	2.90008E-05	1
GH_CC1	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	3.491393015	0.332635616	10.49614908	2.35798E-17	0
GH_CC1	Major Ions	Chloride (mg/L)_Major Ions	Date	-9.44594E-05	1.98465E-05	-4.759508609	7.27478E-06	0
GH_CC1	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	7.639553955	0.697898599	10.94650994	2.74322E-18	0
GH_CC1	Major Ions	Fluoride (mg/L)_Major Ions	Date	-0.000531423	4.16396E-05	-12.76242387	5.50635E-22	0
GH_CC1	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	3.787362753	0.183811373	20.60461598	7.78092E-36	0
GH_CC1	Major Ions	Magnesium (mg/L)_Major Ions	Date	0.000115999	1.09583E-05	10.58546572	1.74978E-17	1
GH_CC1	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	0.288290481	0.144141953	2.000045621	0.048509949	0
GH_CC1	Major Ions	Potassium (mg/L)_Major Ions	Date	7.21167E-05	8.59333E-06	8.392177244	6.30617E-13	1
GH_CC1	Major Ions	Silica (mg/L)_Major Ions	(Intercept)	1.501852702	-	-	-	0
GH_CC1	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	0.158254124	0.231852657	0.682563338	0.496635926	0
GH_CC1	Major Ions	Sodium (mg/L)_Major Ions	Date	2.74251E-05	1.38224E-05	1.984104829	0.05029079	0
GH_CC1	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	6.272024704	0.162505923	38.5956683	3.33796E-58	0
GH_CC1	Major Ions	Sulphate (mg/L)_Major Ions	Date	7.20109E-05	9.6958E-06	7.427018538	5.78142E-11	1
GH_CC1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	(Intercept)	0.693147181	3.59935E-15	1.92576E+14	1.3878E-287	0
GH_CC1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	Date	3.8056E-19	2.19799E-19	1.731395787	0.098048132	0
GH_CC1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-6.604356053	1.850467487	-3.569020314	0.007304088	0
GH_CC1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-1.83385E-05	0.000115474	-0.158809912	0.877754532	0
GH_CC1	Nutrients and Biological Indicators	Dissolved Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	-	-	-	0
GH_CC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	2.0866E-15	-5.77003E+14	0	0
GH_CC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-2.35377E-19	1.31731E-19	-1.786804544	0.084078788	0
GH_CC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	4.838783545	0.194575267	24.86844098	2.34471E-42	0
GH_CC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	-8.44141E-05	1.16092E-05	-7.271312324	1.2005E-10	0
GH_CC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	2.80116311	0.857361696	3.267189477	0.001532869	0
GH_CC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000413309	5.11539E-05	-8.079714978	2.61848E-12	0
GH_CC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-10.81771231	0.901558418	-11.99890334	1.90414E-20	0
GH_CC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000348059	5.37908E-05	6.470605418	4.81961E-09	1
GH_CC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-12.92948688	1.906108925	-6.783183644	1.15691E-09	0
GH_CC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000640343	0.000113727	5.630541455	1.97724E-07	1
GH_CC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-6.339954216	0.551700224	-11.49166511	1.08773E-18	0
GH_CC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-2.84381E-05	3.27479E-05	-0.868394575	0.387744056	0
GH_CC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	2.371519674	10.41828455	0.227630534	0.824109125	0
GH_CC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000538044	0.00067115	-0.801675022	0.439715776	0
GH_CC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	12.74303361	2.894103933	4.403101583	2.90255E-05	0
GH_CC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.001078448	0.000172675	-6.245551022	1.32817E-08	0
GH_CC1	Parent PAHs	Acenaphthene (%)_Parent PAHs	(Intercept)	1.604777291	2.038739681	0.787141833	0.443458967	0
GH_CC1	Parent PAHs	Acenaphthene (%)_Parent PAHs	Date	0.00018109	0.0001252	1.446404416	0.16863587	0
GH_CC1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	(Intercept)	23.23918652	7.831477848	2.967407554	0.007911942	0
GH_CC1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	Date	-0.001689104	0.000479094	-3.525623088	0.002259988	0
GH_CC1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	(Intercept)	8.837835843	6.982996957	1.265622182	0.22094879	0
GH_CC1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	Date	-0.000815277	0.000427187	-1.908476672	0.071554566	0
GH_CC1	Parent PAHs	Acridine (%)_Parent PAHs	(Intercept)	5.060929394	2.04888686	2.470087291	0.023152642	0
GH_CC1	Parent PAHs	Acridine (%)_Parent PAHs	Date	-3.21971E-05	0.000125341	-0.256875128	0.800036275	0
GH_CC1	Parent PAHs	Acridine (µg/L)_Parent PAHs	(Intercept)	8.837835843	6.982996957	1.265622182	0.22094879	0
GH_CC1	Parent PAHs	Acridine (µg/L)_Parent PAHs	Date	-0.000815277	0.000427187	-1.908476672	0.071554566	0
GH_CC1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	(Intercept)	8.837835843	6.982996957	1.265622182	0.22094879	0
GH_CC1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	Date	-0.000815277	0.000427187	-1.908476672	0.071554566	0
GH_CC1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	(Intercept)	8.837835843	6.982996957	1.265622182	0.22094879	0
GH_CC1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	Date	-0.000815277	0.000427187	-1.908476672	0.071554566	0
GH_CC1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	3.24253E-14	-1.42024E+14	3.2369E-258	0
GH_CC1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	Date	-3.4003E-18	1.98363E-18	-1.714182895	0.102762327	0
GH_CC1	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	(Intercept)	8.837835843	6.982996957	1.265622182	0.22094879	0
GH_CC1	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	Date	-0.000815277	0.000427187	-1.908476672	0.071554566	0
GH_CC1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	(Intercept)	8.837835843	6.982996957	1.265622182	0.22094879	0
GH_CC1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	Date	-0.000815277	0.000427187	-1.908476672	0.071554566	0
GH_CC1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	(Intercept)	8.837835843	6.982996957	1.265622182	0.22094879	0
GH_CC1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	Date	-0.000815277	0.000427187	-1.908476672	0.071554566	0
GH_CC1	Parent PAHs	Chrysene (%)_Parent PAHs	(Intercept)	6.843369544	2.095264677	3.266112209	0.004063809	0
GH_CC1	Parent PAHs	Chrysene (%)_Parent PAHs	Date	-0.000143175	0.000128179	-1.116993658	0.277923585	0
GH_CC1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	(Intercept)	8.837835843	6.982996957	1.265622182	0.22094879	0
GH_CC1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	Date	-0.000815277	0.000427187	-1.908476672	0.071554566	0
GH_CC1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	(Intercept)	8.837835843	6.982996957	1.265622182	0.22094879	0
GH_CC1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	Date	-0.000815277	0.000427187	-1.908476672	0.071554566	0
GH_CC1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	(Intercept)	8.837835843	6.982996957	1.265622182	0.22094879	0
GH_CC1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	Date	-0.000815277	0.000427187	-1.908476672	0.071554566	0
GH_CC1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	(Intercept)	8.837835843	6.982996957	1.265622182	0.22094879	0
GH_CC1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	Date	-0.000815277	0.000427187	-1.908476672	0.071554566	0
GH_CC1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	(Intercept)	8.837835843	6.982996957	1.265622182	0.22094879	0
GH_CC1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	Date	-0.000815277	0.000427187	-1.908476672	0.071554566	0
GH_CC1	Parent PAHs	Naphthalene (%)_Parent PAHs	(Intercept)	2.464349486	1.974954885	1.247800396	0.2272643	0
GH_CC1	Parent PAHs	Naphthalene (%)_Parent PAHs	Date	0.000126602	0.000120819	1.047872231	0.307845141	0
GH_CC1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	(Intercept)	-2.995732274	1.62126E-14	-1.84778E+14	2.1811E-260	0
GH_CC1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	Date	-1.70015E-18	9.91814E-19	-1.714182895	0.102762327	0
GH_CC1	Parent PAHs	Phenanthrene (%)_Parent PAHs	(Intercept)	2.575830616	1.2723995	2.024388265	0.057219344	0
GH_CC1	Parent PAHs	Phenanthrene (%)_Parent PAHs	Date	0.000121684	7.78395E-05	1.563264767	0.13449324	0
GH_CC1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	(Intercept)	3.525541897	3.853609164	0.91486753	0.371726451	0
GH_CC1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	Date	-0.000451175	0.000235746	-1.913817486	0.070829772	0
GH_CC1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	(Intercept)	8.837835843	6.982996957	1.265622182	0.22094879	0
GH_CC1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	Date	-0.000815277	0.000427187	-1.908476672	0.071554566	0
GH_CC1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	(Intercept)	-28.90743837	12.5818209	-2.297556022	0.033118004	0
GH_CC1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	Date	0.00151271	0.000769698	1.965329684	0.064166435	0
GH_CC1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	(Intercept)	-4.605170186	-	-	-	0
GH_CC1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	(Intercept)	-4.605170186	-	-	-	0
GH_CC1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	(Intercept)	5.641907071	-	-	-	0
GH_CC1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	(Intercept)	-1.666008264	-	-	-	0
GH_CC1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	(Intercept)	-3.218875825	-	-	-	0
GH_CC1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	(Intercept)	-4.605170186	-	-	-	0
GH_CC1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	(Intercept)	-2.813410717	-	-	-	0
GH_CC1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	(Intercept)	-2.813410717	-	-	-	0
GH_CC1	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	-1.920841741	0.591544239	-3.247164987	0.00163272	0
GH_CC1	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000191657	3.52941E-05	-5.430299593	4.64402E-07	0
GH_CC1	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-5.713125277	0.186934193	-30.56222718	1.22588E-49	0
GH_CC1	Total Metals	Antimony (mg/L)_Total Metals	Date	-0.000102067	1.11533E-05	-9.151241006	1.52389E-14	0
GH_CC1	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-7.515147034	0.592744695	-12.67855638	8.10279E-22	0
GH_CC1	Total Metals	Arsenic (mg/L)_Total Metals	Date	-5.2379E-05	3.53657E-05	-1.481068866	0.14204251	0
GH_CC1	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-2.611024861	0.20194747	-12.92922789	2.55949E-22	0
GH_CC1	Total Metals	Barium (mg/L)_Total Metals	Date	-6.81349E-05	1.20491E-05	-5.654791684	1.78136E-07	0
GH_CC1	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	8.159143039	1.029924153	7.922081458	5.55095E-12	0
GH_CC1	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.001040092	6.14497E-05	-16.92590154	7.36277E-30	0
GH_CC1	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	14.91337782	1.33079021	11.20640782	7.97394E-19	0
GH_CC1	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001385186	7.94007E-05	-17.4455183	8.92389E-31	0
GH_CC1	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-0.728820247	0.581070699	-1.254271206	0.212955689	0
GH_CC1	Total Metals	Boron (mg/L)_Total Metals	Date	-0.000191463	3.46692E-05	-5.52256363	3.1388E-07	0
GH_CC1	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	0.239082844	1.746546574	0.136888903	0.891421015	0
GH_CC1	Total Metals	Cadmium (mg/L)_Total Metals	Date	-0.000493653	0.000104206	-4.737259089	7.94466E-06	0
GH_CC1	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	5.164407363	0.168794505	30.59582626	1.11901E-49	0
GH_CC1	Total Metals	Calcium (mg/L)_Total Metals	Date	5.28704E-05	1.0071E-05	5.249765953	9.9078E-07	1
GH_CC1	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-6.760276567	0.701846532	-9.632129328	1.50044E-15	0
GH_CC1	Total Metals	Chromium (mg/L)_Total Metals	Date	-9.98561E-05	4.18752E-05	-2.384612266	0.019172503	0
GH_CC1	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-5.199058865	0.595366827	-8.732530312	1.14487E-13	0
GH_CC1	Total Metals	Cobalt (mg/L)_Total Metals	Date	-0.00019987	3.55221E-05	-5.626644751	2.01062E-07	0
GH_CC1	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-3.763989182	0.564466509	-6.668224105	1.96001E-09	0
GH_CC1	Total Metals	Copper (mg/L)_Total Metals	Date	-0.000187919	3.36785E-05	-5.579803855	2.45798E-07	0
GH_CC1	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	0.753030213	0.477585443	1.576744485	0.118324526	0
GH_CC1	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000276585	2.84948E-05	-9.706496742	1.04859E-15	0
GH_CC1	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-5.892206045	0.595366827	-9.896765787	4.19454E-16	0
GH_CC1	Total Metals	Lead (mg/L)_Total Metals	Date	-0.00019987	3.55221E-05	-5.626644751	2.01062E-07	0
GH_CC1	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-6.009878146	0.243023301	-24.7296375	3.65667E-42	0
GH_CC1	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000195121	1.44998E-05	13.45679808	2.31534E-23	1

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
GH_CC1	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	3.826152967	0.196136757	19.50757742	2.869E-34	0
GH_CC1	Total Metals	Magnesium (mg/L)_Total Metals	Date	0.000115224	1.17024E-05	9.846198779	5.3506E-16	1
GH_CC1	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-6.952790077	0.728597766	-9.542700241	2.30886E-15	0
GH_CC1	Total Metals	Manganese (mg/L)_Total Metals	Date	-9.68253E-06	4.34713E-05	-0.222733886	0.824241802	0
GH_CC1	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	13.10792014	1.42689492	9.186324761	1.2868E-14	0
GH_CC1	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001557316	8.51347E-05	-18.29237608	3.07964E-32	0
GH_CC1	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	-10.81977828	-	-	-	0
GH_CC1	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-3.46435133	0.277507577	-12.48380809	1.99271E-21	0
GH_CC1	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-0.00013852	1.65573E-05	-8.366103246	6.65356E-13	0
GH_CC1	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-2.37059607	0.285197685	-8.312115412	8.61794E-13	0
GH_CC1	Total Metals	Nickel (mg/L)_Total Metals	Date	-3.87675E-05	1.70161E-05	-2.278282111	0.025050323	0
GH_CC1	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	0.45119933	0.173746694	2.596880092	0.010970018	0
GH_CC1	Total Metals	Potassium (mg/L)_Total Metals	Date	6.37631E-05	1.03665E-05	6.15089908	2.0266E-08	1
GH_CC1	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-0.857034998	0.216936039	-3.950634497	0.000153652	0
GH_CC1	Total Metals	Selenium (mg/L)_Total Metals	Date	2.00794E-05	1.29433E-05	1.551329243	0.124293834	0
GH_CC1	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	-0.032776047	0.13834059	-0.236922852	0.813249172	0
GH_CC1	Total Metals	Silicon (mg/L)_Total Metals	Date	5.9267E-05	8.25399E-06	7.1804033	1.83621E-10	1
GH_CC1	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-7.591636088	0.587039681	-12.93206631	2.52641E-22	0
GH_CC1	Total Metals	Silver (mg/L)_Total Metals	Date	-0.000194279	3.50253E-05	-5.546806968	2.83041E-07	0
GH_CC1	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	0.027982454	0.232538999	0.120334455	0.904483499	0
GH_CC1	Total Metals	Sodium (mg/L)_Total Metals	Date	3.63873E-05	1.38743E-05	2.622646679	0.010228769	1
GH_CC1	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-1.984122296	0.17489462	-11.34467315	4.14075E-19	0
GH_CC1	Total Metals	Strontium (mg/L)_Total Metals	Date	3.35881E-05	1.0435E-05	3.21880497	0.001784581	1
GH_CC1	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-10.46614604	0.229225206	-45.65879219	1.60583E-64	0
GH_CC1	Total Metals	Thallium (mg/L)_Total Metals	Date	4.16906E-05	1.36766E-05	3.048328044	0.003012646	1
GH_CC1	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-5.290608607	0.589392387	-8.976377576	3.53925E-14	0
GH_CC1	Total Metals	Tin (mg/L)_Total Metals	Date	-0.000194233	3.51657E-05	-5.523373235	3.12799E-07	0
GH_CC1	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-2.292202874	0.625922299	-3.662120487	0.000419646	0
GH_CC1	Total Metals	Titanium (mg/L)_Total Metals	Date	-0.000126175	3.73452E-05	-3.378619235	0.001073951	0
GH_CC1	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-5.669242121	0.245521841	-23.09058169	8.02779E-40	0
GH_CC1	Total Metals	Uranium (mg/L)_Total Metals	Date	0.00010201	1.46489E-05	6.963638173	5.03095E-10	1
GH_CC1	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	2.638391426	0.663935557	3.97386674	0.000141423	0
GH_CC1	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000554521	3.96132E-05	-13.99837826	2.0314E-24	0
GH_CC1	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	1.510795459	1.266116971	1.193251092	0.23587278	0
GH_CC1	Total Metals	Zinc (mg/L)_Total Metals	Date	-0.000319722	7.5542E-05	-4.232370436	5.51156E-05	0
GH_CC1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	(Intercept)	4.900820428	-	-	-	0
GH_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	20.21799221	4.629422451	4.367281755	0.003284913	0
GH_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	-0.00137221	0.0002902	-4.728491131	0.002136303	0
GH_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	46.60008225	18.30962924	2.545113373	0.238337224	0
GH_CC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	-0.002978303	0.001116715	-2.667022147	0.228372605	0
GH_CC1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	2.33605E-14	-5.93436E+13	4.83789E-55	0
GH_CC1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	2.01208E-18	1.48546E-18	1.354515025	0.247029805	0
GH_CC1	Volatile Organics	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	(Intercept)	28.67824533	-	-	-	0
GH_CC1	Volatile Organics	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	Date	-0.001899033	-	-	-	0
GH_CC1	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	(Intercept)	28.67824533	-	-	-	0
GH_CC1	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	Date	-0.001899033	-	-	-	0
GH_CC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	47.29322943	18.30962924	2.582970349	0.235155227	0
GH_CC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Date	-0.002978303	0.001116715	-2.667022147	0.228372605	0
GH_CC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-8.087747495	4.087880851	-1.978469478	0.095225722	0
GH_CC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	0.000422327	0.000259694	1.626250917	0.155021091	0
GH_FR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.15206343	0.542173305	0.280470154	0.779760515	0
GH_FR1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	-4.02617E-06	3.21974E-05	-0.125046646	0.900765513	0
GH_FR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.763596326	0.210503746	22.62950856	6.51541E-39	0
GH_FR1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	2.71231E-05	1.25009E-05	2.169684977	0.032665298	1
GH_FR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-3.961569021	1.653898232	-2.39529189	0.01867912	0
GH_FR1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000306965	9.8218E-05	3.125345119	0.002390882	1
GH_FR1	Conventional Parameters	Colour (CU)_Conventional Parameters	(Intercept)	-7.382547183	1.895371232	-3.895040221	0.000899129	0
GH_FR1	Conventional Parameters	Colour (CU)_Conventional Parameters	Date	0.000552612	0.000115243	4.795169322	0.000110232	1
GH_FR1	Conventional Parameters	Conductivity (µmhos/cm)_Conventional Parameters	(Intercept)	18.07530505	-	-	-	0
GH_FR1	Conventional Parameters	Conductivity (µmhos/cm)_Conventional Parameters	Date	-0.000719814	-	-	-	0
GH_FR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	5.524388522	0.366428949	15.07628843	4.08693E-26	0
GH_FR1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	6.38575E-05	2.17305E-05	2.938616694	0.004209202	1
GH_FR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	0.283277373	0.874520423	0.323923108	0.746747812	0
GH_FR1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	-1.59946E-05	5.1934E-05	-0.307979433	0.758809622	0
GH_FR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.414016309	0.398816708	13.57519935	2.12663E-23	0
GH_FR1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	3.75285E-05	2.36641E-05	1.585887427	0.11631168	0
GH_FR1	Conventional Parameters	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	(Intercept)	44.40676847	-	-	-	0
GH_FR1	Conventional Parameters	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	Date	-0.002424655	-	-	-	0
GH_FR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.190991616	0.109530623	1.743728017	0.084621139	0
GH_FR1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-1.10263E-05	6.50456E-06	-1.695170391	0.093500398	0
GH_FR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	6.983734738	0.3335168	20.93967902	2.33443E-36	0
GH_FR1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-6.43227E-05	1.98061E-05	-3.247612787	0.00163612	0
GH_FR1	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.082207801	0.015699654	132.6276261	5.3556E-105	0
GH_FR1	Conventional Parameters	pH (-)_Conventional Parameters	Date	2.12411E-06	9.32335E-07	2.278267867	0.025077578	1
GH_FR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.691322118	0.20599925	22.77349124	4.00401E-39	0
GH_FR1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	3.27576E-05	1.22334E-05	2.67771502	0.008810302	1
GH_FR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	5.238201801	0.435644433	12.02403017	2.01306E-20	0
GH_FR1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	6.09402E-05	2.58711E-05	2.355536411	0.020668194	1
GH_FR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	1.820081585	1.253046614	1.452525042	0.149833249	0
GH_FR1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-9.57534E-05	7.44131E-05	-1.286782115	0.201470177	0
GH_FR1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	6.4523847	2.174156227	2.967764975	0.003842732	0
GH_FR1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-0.000320049	0.000129114	-2.478815367	0.015045686	0
GH_FR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	5.591752399	3.00511167	1.860746958	0.066045067	0
GH_FR1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-0.000326992	0.000178461	-1.832290864	0.070215266	0
GH_FR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-4.637619596	1.064083395	-4.358323433	3.50536E-05	0
GH_FR1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-6.30029E-05	6.31381E-05	-0.997857959	0.321053559	0
GH_FR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-10.76954194	0.535967224	-20.09365768	7.83442E-35	0
GH_FR1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	0.000110827	3.1802E-05	3.484903555	0.000766238	1
GH_FR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-9.093375548	0.326738032	-27.83078383	1.07672E-45	0
GH_FR1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	-2.36221E-06	1.93872E-05	-0.121843577	0.903297593	0
GH_FR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-2.006654631	0.412098378	-4.869358235	4.82569E-06	0
GH_FR1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	-1.6347E-05	2.44521E-05	-0.668529736	0.505525753	0
GH_FR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	3.839887611	0.860897855	4.460328931	2.38232E-05	0
GH_FR1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000820963	5.1082E-05	-16.07149196	4.73781E-28	0
GH_FR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	9.7726035	1.255959698	7.780984944	1.21979E-11	0
GH_FR1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001117388	7.45232E-05	-14.99382548	4.39003E-26	0
GH_FR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-3.878890267	0.226687136	-17.11120593	6.89782E-30	0
GH_FR1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-4.03416E-05	1.34506E-05	-2.99923125	0.003509442	0
GH_FR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-7.794751321	0.697022682	-11.18292349	1.19847E-18	0
GH_FR1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-0.000176834	4.13583E-05	-4.275646199	4.77607E-05	0
GH_FR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-6.73737434	0.577446968	-11.6675205	1.24933E-19	0
GH_FR1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-0.000130976	3.42632E-05	-3.822638144	0.000244335	0
GH_FR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-8.944637473	0.430398537	-20.78222089	6.57647E-36	0
GH_FR1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	-1.33621E-05	2.5538E-05	-0.523222967	0.602119389	0
GH_FR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-6.373883636	0.432872976	-14.72460511	1.39244E-25	0
GH_FR1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-7.4724E-05	2.56848E-05	-2.909268771	0.004574885	0
GH_FR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	3.117222994	0.890260182	3.501474128	0.000725587	0
GH_FR1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000440817	5.28242E-05	-8.344977826	8.48311E-13	0
GH_FR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-9.359250884	0.634940538	-14.74035807	1.30117E-25	0
GH_FR1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	-2.92901E-05	3.76746E-05	-0.777447973	0.438956205	0
GH_FR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-7.29886569	0.257759779	-28.31654233	2.6941E-46	0
GH_FR1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000183685	1.52944E-05	12.00997244	2.55949E-20	1
GH_FR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-2.117592677	1.218743665	-1.737520972	0.085754422	0
GH_FR1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	-0.000266437	7.2315E-05	-3.684394029	0.000393227	0
GH_FR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-6.413948636	0.425212611	-15.08409787	2.98716E-26	0
GH_FR1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000328166	2.52303E-05	-13.00685017	2.70879E-22	0
GH_FR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-9.692153535	0.428797735	-22.60308941	1.21179E-38	0
GH_FR1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	0.000166305	2.5443E-05	6.536392767	3.83517E-09	1
GH_FR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-11.51661502	0.97455728	-11.81727874	6.23734E-20	0
GH_FR1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	0.000290452	5.7826E-05	5.022861595	2.60176E-06	1
GH_FR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-4.919740391	0.569876228	-8.632998096	2.15805E-13	0
GH_FR1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.000107738	3.3814E-05	3.186188123	0.001988612	1
GH_FR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.713491177	0.217956705	3.273545435	0.001513315	0
GH_FR1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	2.13452E-06	1.29326E-05	0.165049603	0.86927925	0
GH_FR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.56871174	0.158692676	-72.90009851	3.74656E-81	0
GH_FR1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	3.88576E-06	9.41614E-06	0.412670739	0.680840298	0
GH_FR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-2.430711531	0.369683589	-6.575113425	3.21972E-09	0
GH_FR1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	2.82788E-05	2.19354E-05	1.289181899	0.200675432	0
GH_FR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.56871174	0.158692676	-72.90009851	3.74656E-81	0
GH_FR1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	3.88576E-06	9.41614E-06	0.412670739	0.680840298	0
GH_FR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.304280365	0.159632932	-58.28546952	1.10845E-72	0
GH_FR1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	6.23608E-06	9.47193E-06	0.658374386	0.511997133	0
GH_FR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-4.013491802	0.255952471	-15.68061363	2.40762E-27	0
GH_FR1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-3.22189E-05	1.51871E-05	-2.121463264	0.03666267	0
GH_FR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-8.029434946	0.367008539	-21.87806029	1.42382E-37	0
GH_FR1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	0.000110442	2.17767E-05	5.071564467	2.13444E-06	1
GH_FR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-1.7224071	0.389619029	-4.420746858	2.76914E-05	0
GH_FR1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000333202	2.31183E-05	-14.41292325	5.35859E-25	0
GH_FR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	0.514761516	0.653296648	0.787944524	0.432822754	0
GH_FR1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000389741	3.87638E-05	-10.05426158	2.47399E-16	0
GH_FR1	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	4.241844515	0.480543289	8.827184999	1.58853E-13	0
GH_FR1	Field Measured	Conductivity (µS/cm)_Field Measured	Date	0.000131842	2.83922E-05	4.643580494	1.28709E-05	1
GH_FR1	Field Measured	Conductivity (µS/cm at 25 C)_Field Measured	(Intercept)	2.978477018	1.277347263	2.331767644	0.257916872	0
GH_FR1	Field Measured	Conductivity (µS/cm at 25 C)_Field Measured	Date	0.000211563	7.46456E-05	2.83423074	0.215937122	0
GH_FR1	Field Measured	Conductivity (µS/cmA)_Field Measured	(Intercept)	6.306275287	-	-	-	0
GH_FR1	Field Measured	Conductivity (si)_Field Measured	(Intercept)	5.229997536	26.58590723	0.196720672	0.851792358	0
GH_FR1	Field Measured	Conductivity (si)_Field Measured	Date	7.19948E-05	0.001674298	0.043000013	0.967365882	0
GH_FR1	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	3.789388969	0.213572379	17.74287943	3.22929E-27	0
GH_FR1	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	3.54758E-05	1.2441E-05	2.85151624	0.005756953	1
GH_FR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	2.251415986	0.209950791	10.72354131	1.19178E-17	0
GH_FR1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	7.2982E-06	1.24541E-05	0.586009034	0.559369482	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
GH_FR1	Field Measured	Oxygen Saturation (%)_Field Measured	(Intercept)	5.95095085	1.15870918	5.135845087	0.000440414	0
GH_FR1	Field Measured	Oxygen Saturation (%)_Field Measured	Date	-9.84253E-05	7.47184E-05	-1.317283469	0.217127436	0
GH_FR1	Field Measured	pH (-)_Field Measured	(Intercept)	2.214664239	0.048557746	45.6088769	5.08619E-63	0
GH_FR1	Field Measured	pH (-)_Field Measured	Date	-6.46311E-06	2.8804E-06	-2.243825216	0.027353118	0
GH_FR1	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm)_Field Measured	(Intercept)	6.879355804	-	-	-	0
GH_FR1	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	(Intercept)	18.23956987	16.97607763	1.074427807	0.477168693	0
GH_FR1	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	Date	-0.000641896	0.000944825	-0.679381094	0.620095035	0
GH_FR1	Field Measured	Turbidity (Wedge Unit)_Field Measured	(Intercept)	-0.755022584	-	-	-	0
GH_FR1	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	2.511537762	1.777217387	1.413185455	0.161128641	0
GH_FR1	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.000268145	0.000105395	-2.54419241	0.012697731	0
GH_FR1	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	4.37766813	0.373782442	11.71180783	1.01712E-19	0
GH_FR1	Major Ions	Calcium (mg/L)_Major Ions	Date	1.23173E-05	2.21786E-05	0.555366108	0.580037563	0
GH_FR1	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	3.835358756	0.737803273	5.198348793	1.24764E-06	0
GH_FR1	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000190516	4.3815E-05	-4.348192897	3.60673E-05	0
GH_FR1	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	0.117936626	0.349122254	0.33780896	0.736293824	0
GH_FR1	Major Ions	Fluoride (mg/L)_Major Ions	Date	-0.00010944	2.07329E-05	-5.278588712	8.94351E-07	0
GH_FR1	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	2.563049968	0.442730061	5.789193454	1.04495E-07	0
GH_FR1	Major Ions	Magnesium (mg/L)_Major Ions	Date	7.12156E-05	2.62697E-05	2.710941571	0.008050485	1
GH_FR1	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	2.597666219	0.413862931	6.27663418	1.22934E-08	0
GH_FR1	Major Ions	Potassium (mg/L)_Major Ions	Date	-0.000137229	2.45568E-05	-5.588209328	2.47546E-07	0
GH_FR1	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	0.715072249	0.396143849	1.805082296	0.07444346	0
GH_FR1	Major Ions	Sodium (mg/L)_Major Ions	Date	4.88806E-08	2.35055E-05	0.002079544	0.998345419	0
GH_FR1	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	3.526842851	0.632142683	5.579187968	2.51736E-07	0
GH_FR1	Major Ions	Sulphate (mg/L)_Major Ions	Date	0.000102289	3.75403E-05	2.724773107	0.007730963	1
GH_FR1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	(Intercept)	0.855501417	0.384706302	2.22377802	0.037845704	0
GH_FR1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	Date	-9.2237E-06	2.33911E-05	-0.39432501	0.697514273	0
GH_FR1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-69.212272	17.67918256	-3.914902274	0.007847935	0
GH_FR1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.003905455	0.001102974	3.540839433	0.012206498	1
GH_FR1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	2.12334E-15	-5.67018E+14	0	0
GH_FR1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-2.28131E-19	1.34112E-19	-1.701056382	0.1004235	0
GH_FR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	2.256196827	0.528054811	4.272656508	4.78607E-05	0
GH_FR1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	1.01744E-06	3.13589E-05	0.032445077	0.974188961	0
GH_FR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-1.773347546	0.952554415	-1.861675847	0.065986831	0
GH_FR1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000204959	5.64897E-05	-3.628262559	0.000478075	0
GH_FR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-9.972838846	1.078615838	-9.245959954	1.05864E-14	0
GH_FR1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000300547	6.40544E-05	4.692054048	9.61077E-06	1
GH_FR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-11.65061105	1.290368759	-9.028900437	3.57911E-14	0
GH_FR1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000566558	7.65232E-05	7.403742105	7.51799E-11	1
GH_FR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-4.396661681	1.136314663	-3.86922903	0.000218102	0
GH_FR1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000123875	6.7181E-05	-1.843899687	0.068809763	0
GH_FR1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	38.47738327	37.42343967	1.02816266	0.328100293	0
GH_FR1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.002825867	0.002413218	-1.170995156	0.268747738	0
GH_FR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	15.37068541	2.657747297	5.783350972	1.04601E-07	0
GH_FR1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.001193153	0.000157832	-7.559626477	3.26449E-11	0
GH_FR1	Parent PAHs	Acenaphthene (%)_Parent PAHs	(Intercept)	3.520001599	1.601551666	2.197869525	0.046679793	0
GH_FR1	Parent PAHs	Acenaphthene (%)_Parent PAHs	Date	6.46366E-05	9.83285E-05	0.657353376	0.522422665	0
GH_FR1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	(Intercept)	11.47976177	9.229183466	1.243854542	0.231468961	0
GH_FR1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	Date	-0.000972592	0.000564892	-1.721732031	0.10439092	0
GH_FR1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	(Intercept)	9.802035623	9.396114536	1.043200951	0.312361852	0
GH_FR1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	Date	-0.000871161	0.000575109	-1.514775575	0.149333584	0
GH_FR1	Parent PAHs	Acridine (%)_Parent PAHs	(Intercept)	7.13880109	2.428352931	2.939770821	0.009612933	0
GH_FR1	Parent PAHs	Acridine (%)_Parent PAHs	Date	-0.000159074	0.000148633	-1.070249844	0.300387072	0
GH_FR1	Parent PAHs	Acridine (µg/L)_Parent PAHs	(Intercept)	14.25241461	10.60647478	1.343746618	0.197777587	0
GH_FR1	Parent PAHs	Acridine (µg/L)_Parent PAHs	Date	-0.001139836	0.000649192	-1.755776029	0.098248581	0
GH_FR1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	(Intercept)	9.802035623	9.396114536	1.043200951	0.312361852	0
GH_FR1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	Date	-0.000871161	0.000575109	-1.514775575	0.149333584	0
GH_FR1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	(Intercept)	8.210056808	10.03658837	0.818012705	0.425365116	0
GH_FR1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	Date	-0.000771034	0.000614311	-1.255120888	0.227458	0
GH_FR1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	(Intercept)	-5.134911389	1.417253873	-3.623141547	0.00228474	0
GH_FR1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	Date	3.33179E-05	8.6746E-05	0.384085953	0.705971153	0
GH_FR1	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	(Intercept)	7.380676177	11.30429927	0.652908774	0.523086705	0
GH_FR1	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	Date	-0.000718334	0.000691904	-1.038198859	0.314613616	0
GH_FR1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	(Intercept)	10.89002862	10.71609187	1.016231361	0.324640915	0
GH_FR1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	Date	-0.0009321	0.000655901	-1.421097642	0.174485269	0
GH_FR1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	(Intercept)	7.517615079	10.83829963	0.693615727	0.497870154	0
GH_FR1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	Date	-0.000727483	0.000663381	-1.096629387	0.289034974	0
GH_FR1	Parent PAHs	Chrysene (%)_Parent PAHs	(Intercept)	7.172217504	1.15544242	6.20733442	1.25538E-05	0
GH_FR1	Parent PAHs	Chrysene (%)_Parent PAHs	Date	-0.000160838	7.07213E-05	-2.274243749	0.037073017	0
GH_FR1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	(Intercept)	10.58328831	10.86239553	0.974305187	0.344406148	0
GH_FR1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	Date	-0.00091267	0.000664856	-1.372732887	0.18877158	0
GH_FR1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	(Intercept)	8.303985641	9.949453271	0.834617281	0.41622146	0
GH_FR1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	Date	-0.000776942	0.000608978	-1.275813858	0.220232735	0
GH_FR1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	(Intercept)	9.802035623	9.396114536	1.043200951	0.312361852	0
GH_FR1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	Date	-0.000871161	0.000575109	-1.514775575	0.149333584	0
GH_FR1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	(Intercept)	13.25836333	9.507176555	1.394563702	0.182209817	0
GH_FR1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	Date	-0.001080122	0.000581907	-1.856176385	0.081940798	0
GH_FR1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	(Intercept)	8.730641053	9.626577798	0.906930919	0.377899997	0
GH_FR1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	Date	-0.000803776	0.000589215	-1.364147245	0.191403974	0
GH_FR1	Parent PAHs	Naphthalene (%)_Parent PAHs	(Intercept)	2.564217024	1.240676743	2.066788984	0.055332384	0
GH_FR1	Parent PAHs	Naphthalene (%)_Parent PAHs	Date	0.000122057	7.59383E-05	1.607313837	0.127537607	0
GH_FR1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	(Intercept)	-1.811075221	1.393395313	-1.299756934	0.212099157	0
GH_FR1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	Date	-7.16213E-05	8.52857E-05	-0.839780644	0.413404235	0
GH_FR1	Parent PAHs	Phenanthrene (%)_Parent PAHs	(Intercept)	4.39090914	1.1164323	3.932982896	0.001188296	0
GH_FR1	Parent PAHs	Phenanthrene (%)_Parent PAHs	Date	1.16615E-05	6.83336E-05	0.170655356	0.866634162	0
GH_FR1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	(Intercept)	8.187545611	8.359233689	0.979461266	0.341930899	0
GH_FR1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	Date	-0.000727683	0.000511645	-1.422241875	0.174158273	0
GH_FR1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	(Intercept)	10.43310469	9.284594375	1.123700645	0.27771779	0
GH_FR1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	Date	-0.000909314	0.000568283	-1.600106953	0.129132205	0
GH_FR1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	(Intercept)	-19.57362216	20.10157807	-0.973735599	0.344680354	0
GH_FR1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	Date	0.000950177	0.00123036	0.772275532	0.45120869	0
GH_FR1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	(Intercept)	-25.90525179	5.063426407	-5.116150548	0.002186468	0
GH_FR1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	Date	0.001186201	0.000286617	4.138626465	0.006087961	1
GH_FR1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	(Intercept)	-30.72294208	12.53905926	-2.450179192	0.049778639	0
GH_FR1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	Date	0.001490974	0.000709778	2.100619191	0.08040882	0
GH_FR1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	(Intercept)	5.960473925	13.0023567	0.458414891	0.66278931	0
GH_FR1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	Date	-0.000137208	0.000736003	-0.186423417	0.858256137	0
GH_FR1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	(Intercept)	-5.881601026	13.84167145	-0.424919855	0.68571156	0
GH_FR1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	Date	0.000246322	0.000783513	0.314380924	0.763876329	0
GH_FR1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	(Intercept)	-33.35929003	7.164938241	-4.655907547	0.003482179	0
GH_FR1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	Date	0.00167852	0.000405574	4.138626465	0.006087961	1
GH_FR1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	(Intercept)	-25.90525179	5.063426407	-5.116150548	0.002186468	0
GH_FR1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	Date	0.001186201	0.000286617	4.138626465	0.006087961	1
GH_FR1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	(Intercept)	-40.95565364	13.30402986	-3.078439696	0.021706305	0
GH_FR1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	Date	0.002109392	0.00075308	2.801020509	0.03112207	1
GH_FR1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	(Intercept)	-45.41357392	10.12685281	-4.48447062	0.004172437	0
GH_FR1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	Date	0.002372403	0.000573234	4.138626465	0.006087961	1
GH_FR1	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	0.246152936	3.009133393	0.081801935	0.934985865	0
GH_FR1	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000253951	0.0001787	-1.421103282	0.158742404	0
GH_FR1	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-10.49224544	0.615700246	-17.04115844	6.46871E-30	0
GH_FR1	Total Metals	Antimony (mg/L)_Total Metals	Date	0.000101203	3.65638E-05	2.767859171	0.006849859	1
GH_FR1	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-8.479284295	0.752968376	-11.26114265	7.14212E-19	0
GH_FR1	Total Metals	Arsenic (mg/L)_Total Metals	Date	-2.08012E-05	4.47156E-05	-0.465189426	0.642919436	0
GH_FR1	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-1.870704095	0.407644969	-4.58905233	1.43652E-05	0
GH_FR1	Total Metals	Barium (mg/L)_Total Metals	Date	-2.42394E-05	2.42083E-05	-1.001286681	0.319372753	0
GH_FR1	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	3.392297505	0.847077077	4.004709369	0.000127526	0
GH_FR1	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000793324	5.03043E-05	-15.77050235	1.22381E-27	0
GH_FR1	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	9.750557763	1.230986767	7.92092817	5.9317E-12	0
GH_FR1	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001116118	7.31031E-05	-15.26773485	1.03093E-26	0
GH_FR1	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-3.644696364	0.214654537	-16.9793586	8.30799E-30	0
GH_FR1	Total Metals	Boron (mg/L)_Total Metals	Date	-5.34927E-05	1.27474E-05	-4.196354885	6.35075E-05	0
GH_FR1	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-7.765717166	0.977512177	-7.944368725	5.30806E-12	0
GH_FR1	Total Metals	Cadmium (mg/L)_Total Metals	Date	-0.000160694	5.80503E-05	-2.768189011	0.006843482	0
GH_FR1	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.274364467	0.3786826	11.28745938	6.30966E-19	0
GH_FR1	Total Metals	Calcium (mg/L)_Total Metals	Date	1.8564E-05	2.24883E-05	0.825492595	0.411274778	0
GH_FR1	Total Metals	Cesium (mg/L)_Total Metals	(Intercept)	-10.41431318	-	-	-	0
GH_FR1	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-6.845080997	1.101779432	-6.212750752	1.58446E-08	0
GH_FR1	Total Metals	Chromium (mg/L)_Total Metals	Date	-9.20574E-05	6.543E-05	-1.406959886	0.162883255	0
GH_FR1	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-8.595115321	0.783613339	-10.96856689	2.84246E-18	0
GH_FR1	Total Metals	Cobalt (mg/L)_Total Metals	Date	-2.70708E-05	4.65355E-05	-0.581723306	0.562207333	0
GH_FR1	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-6.969917071	0.569530112	-12.23801328	7.46851E-21	0
GH_FR1	Total Metals	Copper (mg/L)_Total Metals	Date	-3.05472E-05	3.3822E-05	-0.903175556	0.368843764	0
GH_FR1	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	2.637301734	2.353082171	1.120786076	0.265360699	0
GH_FR1	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000357675	0.00013974	-2.559585081	0.012147816	0
GH_FR1	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-8.452510907	1.31866454	-6.409902329	6.55382E-09	0
GH_FR1	Total Metals	Lead (mg/L)_Total Metals	Date	-6.67408E-05	7.83099E-05	-0.85226498	0.396329299	0
GH_FR1	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-7.392093243	0.276690168	-26.71613989	1.44286E-44	0
GH_FR1	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000190061	1.64314E-05	11.56689626	1.69829E-19	1
GH_FR1	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	2.550225363	0.448575779	5.685160639	1.59841E-07	0
GH_FR1	Total Metals	Magnesium (mg/L)_Total Metals	Date	7.22803E-05	2.6639E-05	2.713325616	0.007981824	1
GH_FR1	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-1.213496868	1.530574596	-0.792837455	0.429957615	0
GH_FR1	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.000267656	9.08943E-05	-2.944692025	0.004113527	0
GH_FR1	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	9.852392252	1.317000836	7.4809309	4.72387E-11	0
GH_FR1	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001352726	7.82111E-05	-17.29584356	2.31822E-30	0
GH_FR1	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	16.51756123	4.290336731	3.849945182	0.00231039	0
GH_FR1	Total Metals	Methyl mercury (µg/L)_Total Metals	Date	-0.001524441	0.000243016	-6.273008357	4.11024E-05	0
GH_FR1	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-9.525957243	0.42533121	-22.39656301	1.43897E-38	0
GH_FR1	Total Metals	Molybdenum (mg/L)_Total Metals	Date	0.000157754	2.52586E-05	6.24557083	1.36882E-08	1
GH_FR1	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-11.43630345	1.058576571	-10.80347304	6.21351E-18	0
GH_FR1	Total Metals	Nickel (mg/L)_Total Metals	Date	0.000294076	6.28643E-05	4.677948151	1.01575E-05	1
GH_FR1	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	2.749741744	0.387772653	7.091118268	2.90987E-10	0
GH_FR1	Total Metals	Potassium (mg/L)_Total Metals	Date	-0.000145609	2.30282E-05	-6.323102694	9.67813E-09	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
GH_FR1	Total Metals	Rubidium (mg/L)_Total Metals	(Intercept)	-7.369790739	-	-	-	0
GH_FR1	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-4.693548152	0.567111427	-8.276236254	1.09614E-12	0
GH_FR1	Total Metals	Selenium (mg/L)_Total Metals	Date	9.30599E-05	3.36783E-05	2.763197119	0.006940564	1
GH_FR1	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	1.011212101	0.326439403	3.097702334	0.002601489	0
GH_FR1	Total Metals	Silicon (mg/L)_Total Metals	Date	-1.1389E-05	1.93858E-05	-0.587489722	0.558345944	0
GH_FR1	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.11125551	0.43118065	-25.76937421	2.55979E-43	0
GH_FR1	Total Metals	Silver (mg/L)_Total Metals	Date	-2.04236E-05	2.5606E-05	-0.797611943	0.42719513	0
GH_FR1	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	0.924648424	0.410741229	2.25117022	0.026809475	0
GH_FR1	Total Metals	Sodium (mg/L)_Total Metals	Date	-1.1478E-05	2.43922E-05	-0.470562589	0.639091557	0
GH_FR1	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-2.369139517	0.381637037	-6.20783438	1.61953E-08	0
GH_FR1	Total Metals	Strontium (mg/L)_Total Metals	Date	2.50144E-05	2.26638E-05	1.103717511	0.272658019	0
GH_FR1	Total Metals	Sulphur (mg/L)_Total Metals	(Intercept)	3.505557397	-	-	-	0
GH_FR1	Total Metals	Tellurium (mg/L)_Total Metals	(Intercept)	-8.517193191	-	-	-	0
GH_FR1	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-11.05401059	0.497059463	-22.23880928	2.46894E-38	0
GH_FR1	Total Metals	Thallium (mg/L)_Total Metals	Date	-2.27756E-05	2.95182E-05	-0.771577007	0.44238616	0
GH_FR1	Total Metals	Thorium (mg/L)_Total Metals	(Intercept)	-9.210340372	-	-	-	0
GH_FR1	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.375072535	0.167657092	-55.91813869	1.08702E-71	0
GH_FR1	Total Metals	Tin (mg/L)_Total Metals	Date	1.06545E-05	9.95644E-06	1.070111022	0.28743087	0
GH_FR1	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-2.717462484	0.537220445	-5.058375031	2.21695E-06	0
GH_FR1	Total Metals	Titanium (mg/L)_Total Metals	Date	-0.000105902	3.19032E-05	-3.319471934	0.001303348	0
GH_FR1	Total Metals	Tungsten (mg/L)_Total Metals	(Intercept)	-9.210340372	-	-	-	0
GH_FR1	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-8.090577023	0.371570537	-21.7740004	1.23057E-37	0
GH_FR1	Total Metals	Uranium (mg/L)_Total Metals	Date	0.000114634	2.2066E-05	5.1950758	1.26464E-06	1
GH_FR1	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-1.913952912	0.744629746	-2.570341734	0.011802445	0
GH_FR1	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000314812	4.42204E-05	-7.119164403	2.55501E-10	0
GH_FR1	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-5.239185245	0.489092852	-10.71204624	9.5886E-18	0
GH_FR1	Total Metals	Zinc (mg/L)_Total Metals	Date	-2.84825E-05	2.90451E-05	-0.980630365	0.329403811	0
GH_FR1	Total Metals	Zirconium (mg/L)_Total Metals	(Intercept)	-9.088122739	-	-	-	0
GH_FR1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	4.78876E-16	-2.89489E+15	2.19912E-16	0
GH_FR1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	6.47771E-19	2.93512E-20	22.06967964	0.028826183	1
GH_FR1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
GH_FR1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	-1.01296E-17	-	-	-	0
GH_FR1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
GH_FR1	Volatile Organics	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
GH_FR1	Volatile Organics	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	Date	-1.01296E-17	-	-	-	0
GH_FR1	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
GH_FR1	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	Date	-1.01296E-17	-	-	-	0
GH_FR1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-0.693147181	-	-	-	0
GH_FR1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Date	-5.06481E-18	-	-	-	0
GH_FR1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
GH_GH1	Bacterial	Microcystin (µg/L)_Bacterial	(Intercept)	-1.609437912	-	-	-	0
GH_GH1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.634282357	0.605150399	1.04814003	0.29726161	0
GH_GH1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	-3.35667E-05	3.60066E-05	-0.932235991	0.353602858	0
GH_GH1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.638041277	0.322164139	17.50052407	3.53489E-31	0
GH_GH1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-1.03299E-05	1.9177E-05	-0.538661353	0.591407587	0
GH_GH1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.934390585	2.102715732	-0.444373232	0.657805129	0
GH_GH1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000166875	0.000125165	1.333236242	0.185710944	0
GH_GH1	Conventional Parameters	Colour (CU)_Conventional Parameters	(Intercept)	2.887207419	2.992428301	0.964837626	0.344662037	0
GH_GH1	Conventional Parameters	Colour (CU)_Conventional Parameters	Date	-5.95028E-05	0.000180819	-0.329073209	0.745078112	0
GH_GH1	Conventional Parameters	Conductivity (µmhos/cm)_Conventional Parameters	(Intercept)	7.219525049	2.114836542	3.413750853	0.181411609	0
GH_GH1	Conventional Parameters	Conductivity (µmhos/cm)_Conventional Parameters	Date	3.9454E-06	0.000134395	0.029356793	0.981316251	0
GH_GH1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	6.091205792	0.583747297	10.43466209	3.58684E-17	0
GH_GH1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	6.38694E-05	3.46627E-05	1.84259746	0.068680153	0
GH_GH1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	0.134474758	0.779130689	0.172595895	0.863340156	0
GH_GH1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	4.1787E-05	4.63585E-05	0.901388001	0.36968581	0
GH_GH1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.677071308	0.643212348	8.826123019	5.75147E-14	0
GH_GH1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	6.20555E-05	3.82713E-05	1.621461868	0.108268302	0
GH_GH1	Conventional Parameters	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	(Intercept)	21.16068703	4.029632561	5.251269617	0.11979724	0
GH_GH1	Conventional Parameters	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	Date	-0.000907924	0.000256077	-3.545511226	0.175010382	0
GH_GH1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0	0	-	-	0
GH_GH1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0	0	-	-	0
GH_GH1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	6.583291551	0.370223248	17.78195073	7.86552E-32	0
GH_GH1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-4.22147E-05	2.20284E-05	-1.91637541	0.058355394	0
GH_GH1	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.084391318	0.021497283	96.96068617	5.13188E-96	0
GH_GH1	Conventional Parameters	pH (-)_Conventional Parameters	Date	2.34575E-06	1.2791E-06	1.833913764	0.069830843	0
GH_GH1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.587464472	0.303849295	18.38893349	6.73419E-33	0
GH_GH1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-5.02718E-06	1.80791E-05	-0.278065416	0.781572852	0
GH_GH1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	5.999985151	0.723120167	8.297355572	7.56252E-13	0
GH_GH1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	5.91495E-05	4.30259E-05	1.374741499	0.172479868	0
GH_GH1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	2.399639809	1.258106356	1.90734257	0.059529358	0
GH_GH1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-8.09928E-05	7.48577E-05	-1.08195675	0.282039558	0
GH_GH1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	11.03155682	2.208623019	4.994766752	2.71022E-06	0
GH_GH1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-0.000586922	0.000131414	-4.466212357	2.21503E-05	0
GH_GH1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	13.90921804	3.042774788	4.571228242	1.47426E-05	0
GH_GH1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-0.00077004	0.000181046	-4.253279912	4.97258E-05	0
GH_GH1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-2.965923754	1.015434163	-2.920842987	0.004380451	0
GH_GH1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-0.000157394	6.03709E-05	-2.607115132	0.010635829	0
GH_GH1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-16.68704618	1.162501365	-14.35443148	2.55721E-25	0
GH_GH1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	0.000537977	6.91145E-05	7.783849529	9.56221E-12	1
GH_GH1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-9.088028062	0.360372568	-25.21842357	2.31201E-43	0
GH_GH1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	3.54927E-05	2.14253E-05	1.656576735	0.100975308	0
GH_GH1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-1.260543226	0.259860111	-4.850853107	4.92472E-06	0
GH_GH1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	-9.92391E-05	1.54495E-05	-6.423434534	5.59543E-09	0
GH_GH1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	3.849617815	0.84701975	4.544897346	1.65039E-05	0
GH_GH1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.00082154	5.03581E-05	-16.31395569	4.94795E-29	0
GH_GH1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	10.10514773	1.24092729	8.143223068	1.70042E-12	0
GH_GH1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001136135	7.37772E-05	-15.39953568	2.5191E-27	0
GH_GH1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-3.105746104	0.253874944	-12.23336991	4.47829E-21	0
GH_GH1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-8.2521E-05	1.50937E-05	-5.467248159	3.82028E-07	0
GH_GH1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-1.769739709	1.977790654	-0.894806386	0.373200625	0
GH_GH1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-0.000548628	0.000117586	-4.66575246	1.02885E-05	0
GH_GH1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-4.979675686	0.516581335	-9.639674033	1.18333E-15	0
GH_GH1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-0.00023634	3.07125E-05	-7.695252765	1.4607E-11	0
GH_GH1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-7.541180444	1.054943962	-7.148418032	1.95114E-10	0
GH_GH1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	-8.66946E-05	6.27199E-05	-1.382250959	0.170205433	0
GH_GH1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-6.637558344	0.349357987	-18.99930327	8.86495E-34	0
GH_GH1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-5.58421E-05	2.07705E-05	-2.688531288	0.008504803	0
GH_GH1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	2.655445633	0.678376694	3.914411646	0.000172538	0
GH_GH1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.00041424	4.03317E-05	-10.27082754	5.48875E-17	0
GH_GH1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.02224428	0.194090129	-51.63706324	2.8873E-70	0
GH_GH1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	7.99853E-06	1.15393E-05	0.693155467	0.489939459	0
GH_GH1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-7.301507443	0.61683966	-11.83696173	2.92852E-20	0
GH_GH1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.00016969	3.66732E-05	4.627082607	1.19768E-05	1
GH_GH1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	3.344954357	2.606983806	1.283074467	0.202654289	0
GH_GH1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	-0.000592782	0.000154994	-3.824552351	0.000236926	0
GH_GH1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-6.144972045	0.368297337	-16.68481257	1.03596E-29	0
GH_GH1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000344072	2.18965E-05	-15.7135678	6.45508E-28	0
GH_GH1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-11.02779722	0.983469023	-11.21316174	5.77697E-19	0
GH_GH1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	0.000292901	5.84705E-05	5.00937758	2.58928E-06	1
GH_GH1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-16.86774384	1.506623658	-11.1957248	6.28182E-19	0
GH_GH1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	0.000722715	8.95738E-05	8.06838304	2.43882E-12	1
GH_GH1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-3.171579461	1.005389387	-3.154578218	0.002165294	0
GH_GH1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	5.59476E-05	5.97737E-05	0.935990051	0.351702484	0
GH_GH1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	1.239434473	0.350498548	3.536204299	0.000635058	0
GH_GH1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	-1.12292E-05	2.08383E-05	-0.538871391	0.591263222	0
GH_GH1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.54226134	0.141795154	-81.40095752	3.04745E-88	0
GH_GH1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	2.45925E-06	8.43019E-06	0.291718956	0.771151227	0
GH_GH1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-2.270291369	0.4435009	-5.119023142	1.64968E-06	0
GH_GH1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	3.3767E-05	2.63676E-05	1.280623682	0.203510513	0
GH_GH1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.64099338	0.228321451	-50.98510595	9.04398E-70	0
GH_GH1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	1.0923E-05	1.35745E-05	0.804674249	0.423060015	0
GH_GH1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.421717922	0.124638347	-75.59244938	2.69092E-85	0
GH_GH1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	1.32051E-05	7.41016E-06	1.782020993	0.078009624	0
GH_GH1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-3.428488625	0.387984783	-8.836657456	5.90863E-14	0
GH_GH1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-6.45537E-05	2.3067E-05	-2.79853523	0.006240877	0
GH_GH1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-6.584234088	0.789449123	-8.340289322	6.56463E-13	0
GH_GH1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	8.92731E-05	4.69354E-05	1.902043706	0.060260258	0
GH_GH1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-1.645018996	0.382267812	-4.303315484	4.15594E-05	0
GH_GH1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000337862	2.27271E-05	-14.86603418	2.61934E-26	0
GH_GH1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	-0.105208161	0.837003921	-0.125696138	0.900243789	0
GH_GH1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000349539	4.97626E-05	-7.024116064	3.49441E-10	0
GH_GH1	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	4.997714402	0.696443641	7.176050019	2.1554E-10	0
GH_GH1	Field Measured	Conductivity (µS/cm)_Field Measured	Date	0.000122182	4.13042E-05	2.958100424	0.003974855	1
GH_GH1	Field Measured	Conductivity (µS/cmA)_Field Measured	(Intercept)	7.201170883	-	-	-	0
GH_GH1	Field Measured	Conductivity (si)_Field Measured	(Intercept)	-30.26908837	14.25642137	-2.123189796	0.066494221	0
GH_GH1	Field Measured	Conductivity (si)_Field Measured	Date	0.002345953	0.000896464	2.616894959	0.030798645	1
GH_GH1	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	4.106617718	0.180171309	22.79285053	1.18132E-34	0
GH_GH1	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	1.86453E-05	1.05168E-05	1.772904815	0.080474012	0
GH_GH1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	2.273709972	0.349353025	6.508344875	3.67707E-09	0
GH_GH1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	3.07849E-06	2.07866E-05	0.148099779	0.882581252	0
GH_GH1	Field Measured	Oxygen Saturation (%)_Field Measured	(Intercept)	7.885521469	2.080976891	3.789336394	0.003547241	0
GH_GH1	Field Measured	Oxygen Saturation (%)_Field Measured	Date	-0.000224825	0.00013419	-1.675424217	0.124788391	0
GH_GH1	Field Measured	pH (-)_Field Measured	(Intercept)	2.207067876	0.034124253	64.67739843	9.80884E-80	0
GH_GH1	Field Measured	pH (-)_Field Measured	Date	-5.30516E-06	2.0304E-06	-2.612859862	0.010454589	0
GH_GH1	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	(Intercept)	7.011213987	-	-	-	0
GH_GH1	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	4.195583526	1.185650788	3.538633441	0.000627168	0
GH_GH1	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.000320394	7.05466E-05	-4.541596945	1.65461E-05	0
GH_GH1	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	4.674849128	0.562614456	8.309152175	7.63138E-13	0
GH_GH1	Major Ions	Calcium (mg/L)_Major Ions	Date	2.12673E-05	3.34493E-05	0.63580771	0.5264633	0
GH_GH1	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	5.136603416	0.722765348	7.106875598	2.27284E-10	0
GH_GH1	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000244443	4.30048E-05	-5.684095994	1.47088E-07	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
GH_GH1	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	2.383765231	0.624519115	3.816961204	0.000241925	0
GH_GH1	Major Ions	Fluoride (mg/L)_Major Ions	Date	-0.000238131	3.71591E-05	-6.408419809	5.80766E-09	0
GH_GH1	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	(Intercept)	-6.43775165	-	-	-	0
GH_GH1	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	3.284476043	0.766781053	4.283460099	4.47787E-05	0
GH_GH1	Major Ions	Magnesium (mg/L)_Major Ions	Date	8.30922E-05	4.55877E-05	1.822690219	0.071563642	0
GH_GH1	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	-0.651795367	0.404863165	-1.60991521	0.110805651	0
GH_GH1	Major Ions	Potassium (mg/L)_Major Ions	Date	8.64969E-05	2.40705E-05	3.59349022	0.000524145	1
GH_GH1	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	2.001884142	0.475338196	4.211494387	5.85833E-05	0
GH_GH1	Major Ions	Sodium (mg/L)_Major Ions	Date	-5.93462E-05	2.82604E-05	-2.099976584	0.038438177	0
GH_GH1	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	4.791202978	0.897724444	5.337053043	6.52187E-07	0
GH_GH1	Major Ions	Sulphate (mg/L)_Major Ions	Date	9.05476E-05	5.34149E-05	1.695174506	0.09335258	0
GH_GH1	Major Ions	Sulphide (mg/L)_Major Ions	(Intercept)	-6.502290171	-	-	-	0
GH_GH1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	(Intercept)	0.693147181	1.23457E-15	5.61449E+14	0	0
GH_GH1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	Date	7.64883E-20	7.42343E-20	1.030362951	0.312329885	0
GH_GH1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-158.586455	33.84744083	-4.68533074	0.001570994	0
GH_GH1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.009512715	0.002112173	4.50375768	0.001992173	1
GH_GH1	Nutrients and Biological Indicators	Dissolved Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	-	-	-	0
GH_GH1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	2.0866E-15	-5.77003E+14	0	0
GH_GH1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-2.35377E-19	1.31731E-19	-1.786804544	0.084078788	0
GH_GH1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-1.518342317	0.918119857	-1.653751747	0.101513841	0
GH_GH1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	0.000180615	5.46284E-05	3.306245693	0.001339961	1
GH_GH1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-4.449795254	1.588496763	-2.80126177	0.006180263	0
GH_GH1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	3.12921E-06	9.45161E-05	0.033107718	0.973658887	0
GH_GH1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-10.01276	1.386907193	-7.219488116	1.33589E-10	0
GH_GH1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000321999	8.25214E-05	3.902006935	0.000179204	1
GH_GH1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-7.475888953	1.429488178	-5.229766197	1.02434E-06	0
GH_GH1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000356501	8.5055E-05	4.191418947	6.2621E-05	1
GH_GH1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	5.946490584	2.230723401	2.665722958	0.009212078	0
GH_GH1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000700512	0.000132033	-5.305576417	8.97441E-07	0
GH_GH1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-48.70170486	33.66378443	-1.446709147	0.175866667	0
GH_GH1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.002884989	0.002168634	1.330325274	0.210333018	0
GH_GH1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	16.85774304	2.254408914	7.477677602	3.91988E-11	0
GH_GH1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.001265518	0.000134138	-9.434440866	2.93039E-15	0
GH_GH1	Parent PAHs	Acenaphthene (%)_Parent PAHs	(Intercept)	2.404732413	2.135882232	1.12587313	0.277910882	0
GH_GH1	Parent PAHs	Acenaphthene (%)_Parent PAHs	Date	0.000131524	0.000131166	1.002735899	0.331890805	0
GH_GH1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	(Intercept)	20.02866081	8.509901179	2.353571492	0.030160059	0
GH_GH1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	Date	-0.001490448	0.000521132	-2.860020033	0.010404903	0
GH_GH1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_GH1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_GH1	Parent PAHs	Acridine (%)_Parent PAHs	(Intercept)	4.621045255	1.626388975	2.841291553	0.010832759	0
GH_GH1	Parent PAHs	Acridine (%)_Parent PAHs	Date	-3.60772E-06	9.95974E-05	-0.036223042	0.971503208	0
GH_GH1	Parent PAHs	Acridine (µg/L)_Parent PAHs	(Intercept)	17.1283091	11.17338615	1.532955978	0.142674706	0
GH_GH1	Parent PAHs	Acridine (µg/L)_Parent PAHs	Date	-0.001310432	0.00068424	-1.915165333	0.071498846	0
GH_GH1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	(Intercept)	9.298217965	7.861097886	1.182814169	0.2522712	0
GH_GH1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	Date	-0.000843263	0.000481401	-1.751687532	0.096847564	0
GH_GH1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	(Intercept)	12.13690565	7.796268978	1.556758199	0.136935402	0
GH_GH1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	Date	-0.00101593	0.000477431	-2.127911972	0.04741852	0
GH_GH1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	1.76031E-14	-2.61611E+14	1.1166E-249	0
GH_GH1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	Date	1.867E-18	1.07798E-18	1.731933476	0.100386971	0
GH_GH1	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	(Intercept)	8.562137477	8.131715647	1.052931245	0.306302654	0
GH_GH1	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	Date	-0.000794507	0.000497973	-1.595483041	0.128011456	0
GH_GH1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	(Intercept)	8.598758158	7.880624288	1.09112652	0.289608069	0
GH_GH1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	Date	-0.000798995	0.000482596	-1.655617432	0.115128957	0
GH_GH1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_GH1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_GH1	Parent PAHs	Chrysene (%)_Parent PAHs	(Intercept)	6.516930203	1.956864855	3.330291403	0.003723669	0
GH_GH1	Parent PAHs	Chrysene (%)_Parent PAHs	Date	-0.000122514	0.000119835	-1.022354493	0.320157863	0
GH_GH1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	(Intercept)	7.466964348	11.3787056	0.65622265	0.519982249	0
GH_GH1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	Date	-0.000714543	0.000696813	-1.025444422	0.318737827	0
GH_GH1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_GH1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_GH1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	(Intercept)	11.6544384	7.809161887	1.492405789	0.15291275	0
GH_GH1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	Date	-0.00098706	0.00047822	-2.064027856	0.053735438	0
GH_GH1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	(Intercept)	13.14854878	12.21457511	1.076463869	0.29593672	0
GH_GH1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	Date	-0.001061296	0.000748	-1.41884454	0.173028319	0
GH_GH1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_GH1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_GH1	Parent PAHs	Naphthalene (%)_Parent PAHs	(Intercept)	3.117543328	1.813321851	1.719244339	0.102719065	0
GH_GH1	Parent PAHs	Naphthalene (%)_Parent PAHs	Date	8.57306E-05	0.000111045	0.772036232	0.450111107	0
GH_GH1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	(Intercept)	0.714019423	6.276657305	0.113757911	0.910688933	0
GH_GH1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	Date	-0.00021683	0.000384372	-0.564113971	0.579638329	0
GH_GH1	Parent PAHs	Phenanthrene (%)_Parent PAHs	(Intercept)	3.548501714	1.331027112	2.665987554	0.015747296	0
GH_GH1	Parent PAHs	Phenanthrene (%)_Parent PAHs	Date	6.26007E-05	8.15099E-05	0.768013332	0.452437767	0
GH_GH1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	(Intercept)	2.773857618	16.41037623	0.169030714	0.867657489	0
GH_GH1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	Date	-0.000369569	0.001004944	-0.367750877	0.717347657	0
GH_GH1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	(Intercept)	12.68001392	7.882708769	1.608585867	0.125105139	0
GH_GH1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	Date	-0.0010465	0.000482724	-2.167905723	0.043816254	0
GH_GH1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	(Intercept)	-22.59751566	13.58282329	-1.663683254	0.113488004	0
GH_GH1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	Date	0.001124192	0.000831789	1.351534559	0.193266419	0
GH_GH1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	(Intercept)	12.84190499	-	-	-	0
GH_GH1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	Date	-0.0009651	-	-	-	0
GH_GH1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	(Intercept)	7.543846294	32.38322373	0.232955383	0.854294625	0
GH_GH1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	Date	-0.000582159	0.001840359	-0.316329221	0.804959056	0
GH_GH1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	(Intercept)	0.899075371	1.403615402	0.640542537	0.637318999	0
GH_GH1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	Date	0.000178717	7.97684E-05	2.240452998	0.267255967	0
GH_GH1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	(Intercept)	19.43272665	14.98047051	1.297204026	0.418091395	0
GH_GH1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	Date	-0.001080394	0.00085135	-1.26903615	0.424867738	0
GH_GH1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	(Intercept)	30.53602331	19.19313532	1.590986715	0.357233729	0
GH_GH1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	Date	-0.001884076	0.001090758	-1.727308711	0.334089614	0
GH_GH1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	(Intercept)	45.27526525	28.36216287	1.596326255	0.356273416	0
GH_GH1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	Date	-0.002784145	0.00161184	-1.727308711	0.334089614	0
GH_GH1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	(Intercept)	26.18960061	54.31021517	0.482222369	0.713951059	0
GH_GH1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	Date	-0.001652134	0.003086484	-0.535280119	0.687119357	0
GH_GH1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	(Intercept)	26.83133658	16.85609085	1.591788798	0.35708918	0
GH_GH1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	Date	-0.001654662	0.000957942	-1.727308711	0.334089614	0
GH_GH1	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	9.813582057	3.172562365	3.09326687	0.002606789	0
GH_GH1	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.00079929	0.000188768	-4.234233104	5.33957E-05	0
GH_GH1	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-15.56023189	1.117439698	-13.92489627	1.41365E-24	0
GH_GH1	Total Metals	Antimony (mg/L)_Total Metals	Date	0.000474656	6.6488E-05	7.13897012	1.95384E-10	1
GH_GH1	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-6.927873243	0.664794514	-10.42107463	2.34893E-17	0
GH_GH1	Total Metals	Arsenic (mg/L)_Total Metals	Date	-7.74392E-05	3.95555E-05	-1.95773672	0.053226467	0
GH_GH1	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-0.459081887	0.297528957	-1.542982206	0.126195054	0
GH_GH1	Total Metals	Barium (mg/L)_Total Metals	Date	-0.000144807	1.77031E-05	-8.17975503	1.33794E-12	0
GH_GH1	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	3.870934917	0.852632069	4.539982789	1.66503E-05	0
GH_GH1	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000821507	5.07319E-05	-16.19311524	6.10327E-29	0
GH_GH1	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	10.06372801	1.217025066	8.269121395	8.67352E-13	0
GH_GH1	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001133708	7.24134E-05	-15.65605998	6.22099E-28	0
GH_GH1	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-2.645409308	0.279816659	-9.454080833	2.66162E-15	0
GH_GH1	Total Metals	Boron (mg/L)_Total Metals	Date	-0.000106784	1.66492E-05	-6.413796488	5.66693E-09	0
GH_GH1	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-1.291980035	2.045227842	-0.631704697	0.529113156	0
GH_GH1	Total Metals	Cadmium (mg/L)_Total Metals	Date	-0.000557	0.000121692	-4.577138977	1.44064E-05	0
GH_GH1	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.864107545	0.563460213	8.632566117	1.47952E-13	0
GH_GH1	Total Metals	Calcium (mg/L)_Total Metals	Date	1.00119E-05	3.35261E-05	0.298629702	0.765881764	0
GH_GH1	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-1.802468028	1.434886981	-1.256174215	0.212165891	0
GH_GH1	Total Metals	Chromium (mg/L)_Total Metals	Date	-0.000384287	8.53762E-05	-4.501095264	1.93601E-05	0
GH_GH1	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-4.794097137	1.474730227	-3.250829914	0.001597807	0
GH_GH1	Total Metals	Cobalt (mg/L)_Total Metals	Date	-0.000236654	8.77469E-05	-2.697003616	0.008292507	0
GH_GH1	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-3.781439518	1.093065707	-3.459480517	0.000815321	0
GH_GH1	Total Metals	Copper (mg/L)_Total Metals	Date	-0.000207527	6.50378E-05	-3.19087	0.001928648	0
GH_GH1	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	6.49381605	2.526172341	2.570614817	0.011721941	0
GH_GH1	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000590205	0.000150308	-3.926634902	0.000164161	0
GH_GH1	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-4.447087609	1.658696696	-2.681073411	0.008667677	0
GH_GH1	Total Metals	Lead (mg/L)_Total Metals	Date	-0.000297446	9.8693E-05	-3.013855986	0.003315463	0
GH_GH1	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-6.983419268	0.604144761	-11.55918203	9.44849E-20	0
GH_GH1	Total Metals	Lithium (mg/L)_Total Metals	Date	0.00015324	3.59468E-05	4.262966046	4.79538E-05	1
GH_GH1	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	3.245320322	0.763347219	4.251433999	5.00705E-05	0
GH_GH1	Total Metals	Magnesium (mg/L)_Total Metals	Date	8.62101E-05	4.54194E-05	1.898088814	0.060752615	0
GH_GH1	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	4.394405792	1.666850385	2.636352867	0.009804671	0
GH_GH1	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.000581482	9.91781E-05	-5.863004879	6.71718E-08	0
GH_GH1	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	9.536041671	1.307766885	7.291851309	9.48372E-11	0
GH_GH1	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001328775	7.78126E-05	-17.07661583	1.45025E-30	0
GH_GH1	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	9.980790138	4.953875369	2.014743891	0.066900267	0
GH_GH1	Total Metals	Methyl mercury (µg/L)_Total Metals	Date	-0.001158993	0.000278618	-4.159788955	0.001323293	0
GH_GH1	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-10.97182321	0.972331371	-11.28403705	3.55762E-19	0
GH_GH1	Total Metals	Molybdenum (mg/L)_Total Metals	Date	0.00029099	5.7854E-05	5.029724388	2.34837E-06	1
GH_GH1	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-15.54313779	1.410959199	-11.01600798	1.30108E-18	0
GH_GH1	Total Metals	Nickel (mg/L)_Total Metals	Date	0.000649553	8.39525E-05	7.737147459	1.13243E-11	1
GH_GH1	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	-0.19108222	0.377143699	-0.506656269	0.613582416	0
GH_GH1	Total Metals	Potassium (mg/L)_Total Metals	Date	6.02558E-05	2.24402E-05	2.685173672	0.008569667	1
GH_GH1	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-2.733104231	1.006285416	-2.716032836	0.007863734	0
GH_GH1	Total Metals	Selenium (mg/L)_Total Metals	Date	2.85209E-05	5.98743E-05	0.476346696	0.634932774	0
GH_GH1	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	2.409071841	0.576274393	4.180424933	6.52267E-05	0
GH_GH1	Total Metals	Silicon (mg/L)_Total Metals	Date	-7.45082E-05	3.42885E-05	-2.172978069	0.032295778	0
GH_GH1	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-10.34769668	0.727272687	-14.22808373	3.55678E-25	0
GH_GH1	Total Metals	Silver (mg/L)_Total Metals	Date	-6.29058E-05	4.3273E-05	-1.453698245	0.149360613	0
GH_GH1	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	2.058564831	0.47865287	4.300746868	4.16061E-05	0
GH_GH1	Total Metals	Sodium (mg/L)_Total Metals	Date	-6.17584E-05	2.848E-05	-2.168481795	0.032646227	0
GH_GH1	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-1.844739306	0.424810764	-4.342496613	3.5534E-05	0
GH_GH1	Total Metals	Strontium (mg/L)_Total Metals	Date	8.48294E-06	2.52764E-05	0.33560731	0.737914903	0
GH_GH1	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-9.708177584	0.814537295	-11.91864098	1.68667E-20	0
GH_GH1	Total Metals	Thallium (mg/L)_Total Metals	Date	-9.50762E-05	4.84652E-05	-1.96174121	0.052750854	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
GH_GH1	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.266653299	0.062737404	-147.7054003	4.3765E-113	0
GH_GH1	Total Metals	Tin (mg/L)_Total Metals	Date	3.59254E-06	3.7329E-06	0.962400275	0.338317793	0
GH_GH1	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-0.08340474	1.037180648	-0.080414863	0.936078266	0
GH_GH1	Total Metals	Titanium (mg/L)_Total Metals	Date	-0.000252451	6.17126E-05	-4.090756562	9.07381E-05	0
GH_GH1	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-6.439362549	0.761058038	-8.461066346	3.412E-13	0
GH_GH1	Total Metals	Uranium (mg/L)_Total Metals	Date	8.10623E-05	4.52832E-05	1.790117885	0.076654669	0
GH_GH1	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	0.023164237	1.068345325	0.02168235	0.982747303	0
GH_GH1	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000427171	6.35669E-05	-6.720022765	1.38568E-09	0
GH_GH1	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-4.130827803	0.919385116	-4.49303315	1.99731E-05	0
GH_GH1	Total Metals	Zinc (mg/L)_Total Metals	Date	-8.63415E-05	5.47037E-05	-1.578348539	0.11784502	0
GH_GH1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	(Intercept)	6.121800522	0.737248058	8.303583105	0.001148742	0
GH_GH1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	Date	-9.15301E-05	4.24523E-05	-2.156070302	0.097316795	0
GH_GH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-2.198244618	1.163995013	-1.888534396	0.078448851	0
GH_GH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	4.50095E-05	6.90357E-05	0.651974624	0.524282755	0
GH_GH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-4.373047215	1.927235727	-2.269077494	0.044379372	0
GH_GH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	0.000169817	0.000112157	1.514101878	0.158191378	0
GH_GH1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	0	-Inf	0	0
GH_GH1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
GH_GH1	Volatile Organics	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-100.0043302	-	-	-	0
GH_GH1	Volatile Organics	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	Date	0.005988828	-	-	-	0
GH_GH1	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-100.0043302	-	-	-	0
GH_GH1	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	Date	0.005988828	-	-	-	0
GH_GH1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-3.954220898	2.033181389	-1.944844134	0.080432822	0
GH_GH1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Date	0.00018506	0.000118072	1.567347272	0.148103566	0
GH_GH1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-2.412992464	0.687889178	-3.507821524	0.005652179	0
GH_GH1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	5.88342E-05	4.10521E-05	1.433157361	0.182327509	0
GH_PC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.023830741	0.704575513	-0.033822835	0.973090144	0
GH_PC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	5.65989E-06	4.19225E-05	0.135008529	0.892893804	0
GH_PC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	6.143663028	1.139278344	5.392591776	5.5504E-07	0
GH_PC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-5.52198E-05	6.7872E-05	-0.813588153	0.418028183	0
GH_PC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	3.133474291	1.701233545	1.841883673	0.068785556	0
GH_PC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-7.17615E-05	0.00010135	-0.708055025	0.480740833	0
GH_PC1	Conventional Parameters	Colour (CU)_Conventional Parameters	(Intercept)	0.842977304	1.445238354	0.583279084	0.566565268	0
GH_PC1	Conventional Parameters	Colour (CU)_Conventional Parameters	Date	4.90295E-05	8.82406E-05	0.55563372	0.584945214	0
GH_PC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	8.061757253	1.395282111	5.777869	1.07115E-07	0
GH_PC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	-6.94729E-05	8.28497E-05	-0.838540586	0.403948772	0
GH_PC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	0.567708399	0.818227194	0.693827342	0.489501554	0
GH_PC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	-2.61976E-05	4.86848E-05	-0.538106427	0.59177543	0
GH_PC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	6.250010166	0.142163101	43.96365945	1.74252E-64	0
GH_PC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	1.24765E-05	8.45875E-06	1.474982002	0.143558993	0
GH_PC1	Conventional Parameters	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	(Intercept)	5.261845201	1.231492262	4.272739149	0.146361312	0
GH_PC1	Conventional Parameters	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	Date	7.65971E-05	7.82595E-05	0.978758665	0.506833645	0
GH_PC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-1.271143997	1.176153521	-1.080763671	0.282689826	0
GH_PC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	7.95875E-05	7.00688E-05	1.135848375	0.259035664	0
GH_PC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	7.166893217	0.57084744	12.55483114	8.21878E-22	0
GH_PC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-7.87746E-05	3.39656E-05	-2.319244805	0.0225478	0
GH_PC1	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.131214652	0.017477526	121.9402925	2.6675E-105	0
GH_PC1	Conventional Parameters	pH (-)_Conventional Parameters	Date	-3.49984E-07	1.03992E-06	-0.336549766	0.737206511	0
GH_PC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.808210221	0.150993857	31.84374732	3.76918E-52	0
GH_PC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	3.05748E-05	8.98418E-06	3.403183369	0.000980268	1
GH_PC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	6.027172874	0.320644573	18.79705249	1.32367E-33	0
GH_PC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	4.16503E-05	1.90785E-05	2.183106079	0.031518355	1
GH_PC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	0.956027427	0.871211399	1.097354131	0.275289736	0
GH_PC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-4.52126E-05	5.18374E-05	-0.872201491	0.385320879	0
GH_PC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	5.713365544	0.878675869	6.502244734	3.78137E-09	0
GH_PC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-0.000319975	5.22815E-05	-6.120237541	2.13927E-08	0
GH_PC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	1.208753365	2.051620449	0.589170071	0.557160502	0
GH_PC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-0.000117906	0.000122072	-0.965873013	0.336586141	0
GH_PC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-5.833230866	0.36488849	-15.98633835	1.99826E-28	0
GH_PC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	1.61582E-06	2.16938E-05	0.074482831	0.940786179	0
GH_PC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-9.372026581	0.349849933	-26.78870481	1.64622E-45	0
GH_PC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	1.0866E-05	2.07997E-05	0.522410865	0.602626521	0
GH_PC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-8.895141917	0.240101904	-37.04736099	1.76392E-57	0
GH_PC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	2.60345E-05	1.42749E-05	1.823800745	0.071394041	0
GH_PC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-2.998393726	0.228895661	-13.09939087	7.80927E-23	0
GH_PC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	3.14372E-05	1.36086E-05	2.310095772	0.02309488	1
GH_PC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	3.809669976	0.849624996	4.483942911	2.08909E-05	0
GH_PC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000818123	5.0513E-05	-16.19628499	8.1561E-29	0
GH_PC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	10.07450553	1.251534377	8.049723378	2.66807E-12	0
GH_PC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001133557	7.44079E-05	-15.23436756	5.18123E-27	0
GH_PC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.708449159	0.342702522	-13.73917277	4.13056E-24	0
GH_PC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	7.27582E-06	2.03748E-05	0.357098778	0.721826891	0
GH_PC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-13.3302454	0.513683292	-25.95031918	2.24268E-44	0
GH_PC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	0.000150043	3.05402E-05	4.912986806	3.83268E-06	1
GH_PC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-6.469883389	0.535933622	-12.07217298	9.59387E-21	0
GH_PC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-0.00010723	3.1863E-05	-3.365352581	0.001112345	0
GH_PC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-9.451068859	0.370103712	-25.5362715	8.34219E-44	0
GH_PC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	1.57727E-05	2.20039E-05	0.716812798	0.475285984	0
GH_PC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-6.504942472	0.40757262	-15.96020476	2.23493E-28	0
GH_PC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-6.78819E-05	2.42315E-05	-2.801387675	0.006190295	0
GH_PC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	2.770490686	0.721968795	3.837410571	0.000226479	0
GH_PC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000421357	4.29234E-05	-9.816488824	5.00151E-16	0
GH_PC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.02934324	0.346811288	-28.91873361	2.84627E-48	0
GH_PC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	8.68369E-06	2.06191E-05	0.421148119	0.674618656	0
GH_PC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-5.606017158	0.28378131	-19.75470887	4.81272E-35	0
GH_PC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	4.0925E-05	1.68717E-05	2.425656382	0.017210826	1
GH_PC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-3.497822632	0.932416973	-3.751350237	0.000305724	0
GH_PC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	-0.000236222	5.54353E-05	-4.261218794	4.86702E-05	0
GH_PC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-6.254352559	0.389087285	-16.0744203	1.37114E-28	0
GH_PC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000337514	2.31325E-05	-14.59043594	8.9031E-26	0
GH_PC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-6.535340325	0.186970589	-34.95384147	2.75448E-55	0
GH_PC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	4.02856E-05	1.1116E-05	3.62410483	0.000472661	1
GH_PC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-6.447219337	0.263885241	-24.43190573	3.00357E-42	0
GH_PC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	-1.45887E-05	1.56888E-05	-0.929874972	0.354843237	0
GH_PC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-3.114825514	0.265277121	-11.74177971	4.60649E-20	0
GH_PC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	2.94252E-05	1.57716E-05	1.865710535	0.065234068	0
GH_PC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.381490068	0.10652666	3.581169906	0.000546327	0
GH_PC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	2.93436E-05	6.33336E-06	4.633186899	1.16935E-05	1
GH_PC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.63278567	0.341887222	-34.02521338	2.81536E-54	0
GH_PC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	8.1434E-06	2.03263E-05	0.40063341	0.689608938	0
GH_PC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-3.449174019	0.137019164	-25.17293145	2.67729E-43	0
GH_PC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	8.67935E-05	8.14624E-06	10.65441726	8.54791E-18	1
GH_PC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.64727396	0.367499908	-31.69327039	1.23497E-51	0
GH_PC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	1.17701E-05	2.18491E-05	0.538699638	0.591381272	0
GH_PC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.330200578	0.341887222	-27.29028751	3.55561E-46	0
GH_PC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	8.1434E-06	2.03263E-05	0.40063341	0.689608938	0
GH_PC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-3.85411664	0.305893246	-12.59954802	8.00771E-22	0
GH_PC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-4.0861E-05	1.81864E-05	-2.246792396	0.02701905	0
GH_PC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-6.160491275	0.230121666	-26.7705835	1.74066E-45	0
GH_PC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	5.11713E-05	1.36815E-05	3.740187114	0.000317757	1
GH_PC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-1.796529474	0.499280969	-3.598233432	0.000515835	0
GH_PC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000327654	2.96839E-05	-11.03810023	1.34093E-18	0
GH_PC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	-7.539465223	0.478187302	-15.76676167	5.1318E-28	0
GH_PC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	0.000127354	2.84298E-05	4.479605329	2.12428E-05	1
GH_PC1	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	5.935180472	0.584025773	10.16253176	1.66857E-16	0
GH_PC1	Field Measured	Conductivity (µS/cm)_Field Measured	Date	5.09554E-05	3.4637E-05	1.471125222	0.144824213	0
GH_PC1	Field Measured	Conductivity (si)_Field Measured	(Intercept)	5.717347668	9.737935913	0.587121102	0.575561553	0
GH_PC1	Field Measured	Conductivity (si)_Field Measured	Date	7.35971E-05	0.000612925	0.120075119	0.90779734	0
GH_PC1	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	1.797579451	2.007837674	0.895281264	0.373620086	0
GH_PC1	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	0.000149335	0.0001172	1.274197404	0.206690918	0
GH_PC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	1.744110257	1.259600018	1.384654042	0.169471376	0
GH_PC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	3.64523E-05	7.49115E-05	0.486604795	0.627683225	0
GH_PC1	Field Measured	Oxygen Saturation (%)_Field Measured	(Intercept)	6.154916085	1.95269069	3.152017939	0.010297573	0
GH_PC1	Field Measured	Oxygen Saturation (%)_Field Measured	Date	-0.000109722	0.000125918	-0.871379931	0.403981456	0
GH_PC1	Field Measured	pH (-)_Field Measured	(Intercept)	2.23694572	0.042246325	52.95006661	1.04529E-70	0
GH_PC1	Field Measured	pH (-)_Field Measured	Date	-6.25156E-06	2.51479E-06	-2.485917732	0.01472695	0
GH_PC1	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	7.070070813	0.999392903	7.074365635	2.64863E-10	0
GH_PC1	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.000497277	5.94642E-05	-8.36263632	5.50719E-13	0
GH_PC1	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	4.700704577	0.120913718	38.87652002	2.6112E-59	0
GH_PC1	Major Ions	Calcium (mg/L)_Major Ions	Date	4.39765E-06	7.18872E-06	0.611743016	0.542200419	0
GH_PC1	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	0.327659251	0.582946054	0.562074738	0.575402959	0
GH_PC1	Major Ions	Chloride (mg/L)_Major Ions	Date	1.55521E-05	3.46855E-05	0.44837549	0.654914053	0
GH_PC1	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	0.096468164	0.413789531	0.23313341	0.816164722	0
GH_PC1	Major Ions	Fluoride (mg/L)_Major Ions	Date	-6.48222E-05	2.46206E-05	-2.63284215	0.009899409	0
GH_PC1	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	4.088327317	0.197378639	20.71311943	1.31716E-36	0
GH_PC1	Major Ions	Magnesium (mg/L)_Major Ions	Date	1.96578E-05	1.17348E-05	1.675169582	0.0972604	0
GH_PC1	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	3.260561683	0.420550897	7.75307271	1.10795E-11	0
GH_PC1	Major Ions	Potassium (mg/L)_Major Ions	Date	-0.000180864	2.50031E-05	-7.23364378	1.3065E-10	0
GH_PC1	Major Ions	Silica (mg/L)_Major Ions	(Intercept)	1.578978705	-	-	-	0
GH_PC1	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	4.100474441	0.549856269	7.457356894	4.53483E-11	0
GH_PC1	Major Ions	Sodium (mg/L)_Major Ions	Date	-0.000240274	3.26908E-05	-7.34990943	7.54542E-11	0
GH_PC1	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	5.197296763	0.36182157	14.36425354	1.92066E-25	0
GH_PC1	Major Ions	Sulphate (mg/L)_Major Ions	Date	5.09578E-05	2.15285E-05	2.366990655	0.019983903	1
GH_PC1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	(Intercept)	0.693147181	3.74975E-15	1.84851E+14	8.3147E-274	0
GH_PC1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	Date	4.31962E-19	2.28793E-19	1.888003599	0.073620575	0
GH_PC1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-25.23966493	16.13881951	-1.563910229	0.156467589	0
GH_PC1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.001227059	0.001007106	1.218400314	0.257780895	0
GH_PC1	Nutrients and Biological Indicators	Dissolved Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	-	-	-	0
GH_PC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	2.0866E-15	-5.77003E+14	0	0
GH_PC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-2.35377E-19	1.31731E-19	-1.786804544	0.084078788	0
GH_PC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-1.544047519	0.658585393	-2.34449099	0.021158025	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
GH_PC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	0.00014498	3.9186E-05	3.699779761	0.000363321	1
GH_PC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	2.372598185	1.028890347	2.305977691	0.023309973	0
GH_PC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000447602	6.12193E-05	-7.311449114	8.6421E-11	0
GH_PC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-7.65815525	0.978873032	-7.823440831	7.47932E-12	0
GH_PC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000157282	5.82433E-05	2.700438538	0.008213572	1
GH_PC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-9.34111754	1.266874327	-7.373357676	6.44105E-11	0
GH_PC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000428618	7.53794E-05	5.686138759	1.45786E-07	1
GH_PC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-4.230264716	0.614517666	-6.88387812	9.81369E-10	0
GH_PC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-8.74981E-05	3.63724E-05	-2.405619168	0.018340372	0
GH_PC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	3.648513732	9.939608483	0.367068153	0.72053198	0
GH_PC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000569594	0.000640313	-0.889554839	0.392743731	0
GH_PC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	12.64828153	2.266278871	5.581079049	2.29876E-07	0
GH_PC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.001039602	0.000134844	-7.709644842	1.29225E-11	0
GH_PC1	Parent PAHs	Acenaphthene (%)_Parent PAHs	(Intercept)	3.26759164	1.762936258	1.853493923	0.083583955	0
GH_PC1	Parent PAHs	Acenaphthene (%)_Parent PAHs	Date	7.96399E-05	0.000108263	0.73561614	0.473310903	0
GH_PC1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	(Intercept)	17.43386919	9.24507617	1.885746409	0.075573685	0
GH_PC1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	Date	-0.001335461	0.000566153	-2.358833694	0.029837982	0
GH_PC1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC1	Parent PAHs	Acridine (%)_Parent PAHs	(Intercept)	6.312341614	1.669660256	3.780614405	0.001369281	0
GH_PC1	Parent PAHs	Acridine (%)_Parent PAHs	Date	-0.000106301	0.000102247	-1.039648185	0.312267814	0
GH_PC1	Parent PAHs	Acridine (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC1	Parent PAHs	Acridine (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	1.76031E-14	-2.61611E+14	1.1166E-249	0
GH_PC1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	Date	1.867E-18	1.07798E-18	1.731933476	0.100386971	0
GH_PC1	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	(Intercept)	10.42190531	7.797330343	1.336599175	0.198003853	0
GH_PC1	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	Date	-0.000911733	0.000477496	-1.909406399	0.072280817	0
GH_PC1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	(Intercept)	11.66325142	8.903500045	1.309962527	0.206681039	0
GH_PC1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	Date	-0.000985422	0.000545236	-1.807332035	0.087453926	0
GH_PC1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC1	Parent PAHs	Chrysene (%)_Parent PAHs	(Intercept)	6.638619978	1.669010564	3.977578167	0.000882837	0
GH_PC1	Parent PAHs	Chrysene (%)_Parent PAHs	Date	-0.000129731	0.000102207	-1.269294981	0.220502938	0
GH_PC1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	(Intercept)	10.98302394	10.44875659	1.051132147	0.307105765	0
GH_PC1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	Date	-0.000942199	0.000639864	-1.472497835	0.158156894	0
GH_PC1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	(Intercept)	11.54651328	11.21863504	1.029226215	0.317005929	0
GH_PC1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	Date	-0.000974105	0.000687011	-1.417889359	0.173303029	0
GH_PC1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC1	Parent PAHs	Naphthalene (%)_Parent PAHs	(Intercept)	4.961434996	1.70322022	2.912973283	0.009281529	0
GH_PC1	Parent PAHs	Naphthalene (%)_Parent PAHs	Date	-2.63489E-05	0.000104302	-0.252620132	0.803424062	0
GH_PC1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	(Intercept)	-2.672907174	3.505030619	-0.762591676	0.455585043	0
GH_PC1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	Date	-1.75278E-05	0.000214642	-0.081660681	0.935817729	0
GH_PC1	Parent PAHs	Phenanthrene (%)_Parent PAHs	(Intercept)	4.387142905	0.993338445	4.416564089	0.000333039	0
GH_PC1	Parent PAHs	Phenanthrene (%)_Parent PAHs	Date	1.14441E-05	6.08304E-05	0.188130799	0.852878777	0
GH_PC1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	(Intercept)	6.101714479	12.01853478	0.507692043	0.617833737	0
GH_PC1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	Date	-0.000597489	0.000735995	-0.81181088	0.427505897	0
GH_PC1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	(Intercept)	10.48076546	7.898618027	1.326911293	0.201125772	0
GH_PC1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	Date	-0.000914929	0.000483698	-1.891528238	0.074756964	0
GH_PC1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	(Intercept)	-22.59751566	13.58282329	-1.663683254	0.113488004	0
GH_PC1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	Date	0.001124192	0.000831789	1.351534559	0.193266419	0
GH_PC1	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	-2.473087816	1.784205003	-1.386100708	0.168995468	0
GH_PC1	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000147831	0.000106161	-1.392524644	0.167048839	0
GH_PC1	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-9.665547906	0.488077272	-19.80331488	2.61645E-35	0
GH_PC1	Total Metals	Antimony (mg/L)_Total Metals	Date	3.16451E-05	2.90408E-05	1.089679381	0.278640024	0
GH_PC1	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-8.19196758	0.372688483	-21.98073712	8.09635E-39	0
GH_PC1	Total Metals	Arsenic (mg/L)_Total Metals	Date	-5.83029E-06	2.21751E-05	-0.262920965	0.79318691	0
GH_PC1	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-2.774729195	0.203891904	-13.60882477	6.02653E-24	0
GH_PC1	Total Metals	Barium (mg/L)_Total Metals	Date	1.7778E-05	1.21316E-05	1.465427547	0.146141295	0
GH_PC1	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	3.430977615	0.848171101	4.04514798	0.000107149	0
GH_PC1	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000795057	5.04665E-05	-15.75416669	4.05962E-28	0
GH_PC1	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	9.819477964	1.240021267	7.918798026	4.72469E-12	0
GH_PC1	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001117752	7.37817E-05	-15.1494602	5.74727E-27	0
GH_PC1	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-4.944574561	0.3709075	-13.331018	2.17593E-23	0
GH_PC1	Total Metals	Boron (mg/L)_Total Metals	Date	2.19007E-05	2.20691E-05	0.992368543	0.323565445	0
GH_PC1	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-11.43896015	0.513116801	-22.2930922	2.65465E-39	0
GH_PC1	Total Metals	Cadmium (mg/L)_Total Metals	Date	5.07677E-05	3.05306E-05	1.662844307	0.099674612	0
GH_PC1	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.725129018	0.125136612	37.75976474	1.3208E-58	0
GH_PC1	Total Metals	Calcium (mg/L)_Total Metals	Date	3.53837E-06	7.44567E-06	0.475225183	0.635728878	0
GH_PC1	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-6.659391515	0.510062647	-13.05602666	7.82045E-23	0
GH_PC1	Total Metals	Chromium (mg/L)_Total Metals	Date	-7.97181E-05	3.03489E-05	-2.626722983	0.010066519	0
GH_PC1	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-9.701886414	0.437736456	-22.16376148	4.20687E-39	0
GH_PC1	Total Metals	Cobalt (mg/L)_Total Metals	Date	3.18289E-05	2.60455E-05	1.22205236	0.224743456	0
GH_PC1	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-6.864354253	0.634183497	-10.82392443	3.30445E-18	0
GH_PC1	Total Metals	Copper (mg/L)_Total Metals	Date	-3.80547E-05	3.77341E-05	-1.008495918	0.315805425	0
GH_PC1	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	2.609083443	1.188547344	2.195186801	0.030612413	0
GH_PC1	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000400279	7.0719E-05	-5.660135988	1.63237E-07	0
GH_PC1	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-10.41153904	0.563706123	-18.46979946	4.87061E-33	0
GH_PC1	Total Metals	Lead (mg/L)_Total Metals	Date	3.4348E-05	3.35407E-05	1.024070462	0.308430215	0
GH_PC1	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-5.400758195	0.272935125	-19.78769931	2.77811E-35	0
GH_PC1	Total Metals	Lithium (mg/L)_Total Metals	Date	2.96801E-05	1.62397E-05	1.827622017	0.070778848	0
GH_PC1	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	4.160410553	0.19065737	21.82139907	1.43593E-38	0
GH_PC1	Total Metals	Magnesium (mg/L)_Total Metals	Date	1.62644E-05	1.13442E-05	1.433719761	0.154970304	0
GH_PC1	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-3.054429788	1.032399769	-2.958572714	0.003909886	0
GH_PC1	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.00024025	6.14281E-05	-3.911075194	0.000173518	0
GH_PC1	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	11.49027853	1.336338119	8.598331793	1.7483E-13	0
GH_PC1	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001456769	7.95125E-05	-18.32124831	8.83742E-33	0
GH_PC1	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	-10.81977828	-	-	-	0
GH_PC1	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-6.526418572	0.198109192	-32.94354239	2.00878E-53	0
GH_PC1	Total Metals	Molybdenum (mg/L)_Total Metals	Date	4.07375E-05	1.17876E-05	3.455977241	0.000824771	1
GH_PC1	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-6.444980282	0.327679469	-19.6685508	4.39378E-35	0
GH_PC1	Total Metals	Nickel (mg/L)_Total Metals	Date	-1.06236E-05	1.9497E-05	-0.544882483	0.587124785	0
GH_PC1	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	3.521269596	0.39881267	8.829382462	5.6606E-14	0
GH_PC1	Total Metals	Potassium (mg/L)_Total Metals	Date	-0.000196251	2.37295E-05	-8.270330762	8.62276E-13	0
GH_PC1	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-2.582663672	0.257806057	-10.0178549	1.68408E-16	0
GH_PC1	Total Metals	Selenium (mg/L)_Total Metals	Date	-2.90675E-06	1.53395E-05	-0.189494196	0.850114078	0
GH_PC1	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	0.362785647	0.109506921	3.312901531	0.001316378	0
GH_PC1	Total Metals	Silicon (mg/L)_Total Metals	Date	3.2307E-05	6.51782E-06	4.956728019	3.20939E-06	1
GH_PC1	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.91790573	0.389687047	-30.58327401	1.20607E-50	0
GH_PC1	Total Metals	Silver (mg/L)_Total Metals	Date	2.62045E-05	2.31865E-05	1.130161636	0.261283655	0
GH_PC1	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	4.349300957	0.521489991	8.340142728	6.14334E-13	0
GH_PC1	Total Metals	Sodium (mg/L)_Total Metals	Date	-0.000254639	3.10288E-05	-8.206522538	1.17512E-12	0
GH_PC1	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-3.204068772	0.149321491	-21.45751934	5.37077E-38	0
GH_PC1	Total Metals	Strontium (mg/L)_Total Metals	Date	7.27275E-05	8.88468E-06	8.185724221	1.29979E-12	1
GH_PC1	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-11.71109218	0.456588743	-25.64910406	3.16738E-44	0
GH_PC1	Total Metals	Thallium (mg/L)_Total Metals	Date	1.91051E-05	2.71672E-05	0.703242787	0.483642634	0
GH_PC1	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.549744747	0.3709075	-25.74697126	2.3142E-44	0
GH_PC1	Total Metals	Tin (mg/L)_Total Metals	Date	2.19007E-05	2.20691E-05	0.992368543	0.323565445	0
GH_PC1	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-3.691304378	0.329177349	-11.21372533	4.99672E-19	0
GH_PC1	Total Metals	Titanium (mg/L)_Total Metals	Date	-4.94791E-05	1.95862E-05	-2.526227656	0.0132012	0
GH_PC1	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-6.129377495	0.199440879	-30.73280419	7.94647E-51	0
GH_PC1	Total Metals	Uranium (mg/L)_Total Metals	Date	5.01582E-05	1.18668E-05	4.226769237	5.49038E-05	1
GH_PC1	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-2.14309884	0.531847293	-4.029537933	0.000113393	0
GH_PC1	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000305729	3.16451E-05	-9.661198332	9.65095E-16	0
GH_PC1	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-6.539277971	0.486985764	-13.42806802	1.38813E-23	0
GH_PC1	Total Metals	Zinc (mg/L)_Total Metals	Date	7.82829E-05	2.89758E-05	2.701662324	0.008185615	1
GH_PC1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	(Intercept)	5.804149855	1.224460746	4.740168171	0.017804992	0
GH_PC1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	Date	-7.09851E-05	6.94987E-05	-1.021387071	0.382252962	0
GH_PC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-2.236604494	1.199370649	-1.864815098	0.084937247	0
GH_PC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	4.66829E-05	7.08473E-05	0.658923084	0.521445935	0
GH_PC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-5.04015623	2.067843587	-2.43739723	0.037524497	0
GH_PC1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	0.000206146	0.000119306	1.727878399	0.118077532	0
GH_PC1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	0	-Inf	0	0
GH_PC1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
GH_PC1	Volatile Organics	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-2.302585093	-	-	-	0
GH_PC1	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-2.302585093	-	-	-	0
GH_PC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-4.34700905	2.067843587	-2.102194323	0.064886797	0
GH_PC1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Date	0.000206146	0.000119306	1.727878399	0.118077532	0
GH_PC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	4.26967E-15	-3.24684E+14	1.8901E-141	0
GH_PC1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	3.74179E-19	2.51486E-19	1.487869524	0.167624612	0
GH_PC2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.28567792	1.672612706	0.170797411	0.864998688	0
GH_PC2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	1.27298E-05	0.0001021	0.124680042	0.901223347	0
GH_PC2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.019498342	0.352582401	14.2363837	2.9444E-20	0
GH_PC2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	1.85955E-05	2.15224E-05	0.864006298	0.3912702	0
GH_PC2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-5.404983407	2.384506772	-2.266709187	0.02728971	0
GH_PC2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000361741	0.000145556	2.485245972	0.015959273	1
GH_PC2	Conventional Parameters	Colour (CU)_Conventional Parameters	(Intercept)	1.57842681	0.505680362	3.121392342	0.005620452	0
GH_PC2	Conventional Parameters	Colour (CU)_Conventional Parameters	Date	2.45108E-06	3.08749E-05	0.079387514	0.937554584	0
GH_PC2	Conventional Parameters	Conductivity (µmhos/cm)_Conventional Parameters	(Intercept)	-26.81878833	6.018869631	-4.455784885	0.140546114	0
GH_PC2	Conventional Parameters	Conductivity (µmhos/cm)_Conventional Parameters	Date	0.002148855	0.00038249	5.618068927	0.112141989	0
GH_PC2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	5.700295014	0.570974706	9.983445777	8.91542E-14	0
GH_PC2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	6.89942E-05	3.47803E-05	1.983716005	0.052477926	0
GH_PC2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-0.605368997	1.145900201	-0.528291204	0.599384669	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
GH_PC2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	1.77224E-05	6.99483E-05	0.253364961	0.800914059	0
GH_PC2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.571621275	0.595365665	9.358318098	5.68158E-13	0
GH_PC2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	4.5239E-05	3.63088E-05	1.245951931	0.218063376	0
GH_PC2	Conventional Parameters	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	(Intercept)	-10.42503305	5.062541173	-2.05924904	0.287798389	0
GH_PC2	Conventional Parameters	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	Date	0.001074432	0.000321717	3.339683177	0.185213961	0
GH_PC2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.373128149	0.312997961	1.19211048	0.238245257	0
GH_PC2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-2.15332E-05	1.91061E-05	-1.127031336	0.264535409	0
GH_PC2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	7.12488853	0.457967383	15.55763313	5.48232E-22	0
GH_PC2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-7.20724E-05	2.79553E-05	-2.578127125	0.012591243	0
GH_PC2	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.076094436	0.028619275	72.54182456	4.526E-57	0
GH_PC2	Conventional Parameters	pH (-)_Conventional Parameters	Date	2.07051E-06	1.74698E-06	1.185192136	0.240946689	0
GH_PC2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.860285785	0.334712977	14.52075693	1.22676E-20	0
GH_PC2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	2.89787E-05	2.04316E-05	1.418327787	0.161636374	0
GH_PC2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	5.537978367	0.660993468	8.378264898	1.85157E-11	0
GH_PC2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	6.25451E-05	4.03485E-05	1.550121954	0.126745764	0
GH_PC2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	1.525474869	1.506899073	1.012327167	0.315735748	0
GH_PC2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-0.000103282	9.19844E-05	-1.122824629	0.266302904	0
GH_PC2	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	9.141854411	2.806981678	3.256827248	0.001915812	0
GH_PC2	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-0.000500464	0.000171344	-2.920809798	0.005023838	0
GH_PC2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	3.959648775	4.32467685	0.915594139	0.363805779	0
GH_PC2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-0.000280943	0.000263988	-1.064228077	0.291792838	0
GH_PC2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-5.942136382	0.366585365	-16.20942066	1.32517E-22	0
GH_PC2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	1.00835E-05	2.23565E-05	0.451034685	0.653737855	0
GH_PC2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-7.738892062	0.901518639	-8.584284035	9.83633E-12	0
GH_PC2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	-7.28525E-05	5.49797E-05	-1.325079032	0.19062369	0
GH_PC2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-10.14516068	0.371888784	-27.28009316	1.20671E-33	0
GH_PC2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	5.86951E-05	2.26799E-05	2.587980439	0.012324721	1
GH_PC2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-0.449185443	0.667615881	-0.672820188	0.503878893	0
GH_PC2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	-0.000110795	4.0715E-05	-2.72122938	0.008691974	0
GH_PC2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	1.965345108	0.873643863	2.249595277	0.028497204	0
GH_PC2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000700523	5.32798E-05	-13.14800868	1.29106E-18	0
GH_PC2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	10.52019586	1.737085214	6.056234762	1.30503E-07	0
GH_PC2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001152727	0.000105937	-10.88121853	2.4844E-15	0
GH_PC2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-3.651824223	0.51169642	-7.136700752	2.25211E-09	0
GH_PC2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-4.47661E-05	3.12061E-05	-1.434529509	0.157083062	0
GH_PC2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-9.49626774	0.805587879	-11.78799729	1.11509E-16	0
GH_PC2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-4.14728E-05	4.91293E-05	-0.844155057	0.402239619	0
GH_PC2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-6.780065337	0.79877991	-8.488026868	1.40705E-11	0
GH_PC2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-0.000130983	4.87141E-05	-2.688819014	0.009471608	0
GH_PC2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-10.48397141	0.555098266	-18.88669457	1.04363E-25	0
GH_PC2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	8.1336E-05	3.3853E-05	2.40262059	0.019680112	1
GH_PC2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-7.60090246	1.74804E-14	-4.34824E+14	0	0
GH_PC2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-1.4566E-18	1.06605E-18	-1.366342877	0.177391796	0
GH_PC2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	4.057568099	1.096056664	3.701969281	0.000496737	0
GH_PC2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000499897	6.68437E-05	-7.478597168	6.20115E-10	0
GH_PC2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.28203045	0.25712302	-39.98875891	2.43436E-42	0
GH_PC2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	2.38534E-05	1.56808E-05	1.521182385	0.133942881	0
GH_PC2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-6.440672285	0.759891319	-8.47578085	1.47269E-11	0
GH_PC2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000164976	4.63425E-05	3.559924257	0.000773773	1
GH_PC2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-1.91580335	2.015255923	-0.950650152	0.345940962	0
GH_PC2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	-0.000326738	0.000122902	-2.658531951	0.010257562	0
GH_PC2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-5.946971251	0.525256809	-11.322026	5.42482E-16	0
GH_PC2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000353921	3.20331E-05	-11.04859221	1.39019E-15	0
GH_PC2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-7.205245957	0.866005375	-8.320093804	2.63161E-11	0
GH_PC2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	1.21637E-05	5.28139E-05	0.230313266	0.81870286	0
GH_PC2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-4.225833515	1.965800669	-2.149675489	0.035995419	0
GH_PC2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	-0.000159946	0.000119886	-1.334158716	0.187649854	0
GH_PC2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-4.167426303	0.828352857	-5.030979575	5.54574E-06	0
GH_PC2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	9.45129E-05	5.05176E-05	1.870887878	0.066684359	0
GH_PC2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.22321731	0.316623688	0.704992452	0.483789896	0
GH_PC2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	2.98129E-05	1.93095E-05	1.543950116	0.12833523	0
GH_PC2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.89146836	0.25712302	-46.24816701	1.02719E-45	0
GH_PC2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	2.38534E-05	1.56808E-05	1.521182385	0.133942881	0
GH_PC2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-2.146397914	0.614935838	-3.49044206	0.000958005	0
GH_PC2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	1.79625E-05	3.75023E-05	0.478970959	0.633858132	0
GH_PC2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.86026846	0.290007603	-40.89640524	7.36932E-43	0
GH_PC2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	2.24116E-05	1.76863E-05	1.267173286	0.210432703	0
GH_PC2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.588883265	0.25712302	-37.29297858	9.88969E-41	0
GH_PC2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	2.38534E-05	1.56808E-05	1.521182385	0.133942881	0
GH_PC2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-3.904251129	0.52584311	-7.424745239	7.59724E-10	0
GH_PC2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-3.62455E-05	3.20689E-05	-1.130239237	0.263280332	0
GH_PC2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-7.745055099	0.544454739	-14.22534243	4.46708E-20	0
GH_PC2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	0.000113459	3.32039E-05	3.417028585	0.00119766	1
GH_PC2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-1.715135849	0.568845356	-3.015117957	0.003882052	0
GH_PC2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000330529	3.46914E-05	-9.527679628	3.06683E-13	0
GH_PC2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	-0.791904323	0.758603605	-1.04389739	0.301099499	0
GH_PC2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000313323	4.62639E-05	-6.772507341	8.89376E-09	0
GH_PC2	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	4.306518716	1.776872476	2.423650979	0.019025848	0
GH_PC2	Field Measured	Conductivity (µS/cm)_Field Measured	Date	0.000141275	0.000108034	1.307699277	0.196956338	0
GH_PC2	Field Measured	Conductivity (µS/cm at 25 C)_Field Measured	(Intercept)	6.752270376	-	-	-	0
GH_PC2	Field Measured	Conductivity (si)_Field Measured	(Intercept)	0.227586133	15.08843353	0.015083483	0.988334961	0
GH_PC2	Field Measured	Conductivity (si)_Field Measured	Date	0.000410522	0.000948782	0.432683402	0.676672491	0
GH_PC2	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	4.236884189	0.33452834	12.6652474	1.24973E-14	0
GH_PC2	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	6.83985E-06	1.98784E-05	0.344084262	0.732841678	0
GH_PC2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	2.083705365	0.300362485	6.937302316	4.04674E-09	0
GH_PC2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	1.14685E-05	1.83104E-05	0.626338072	0.533593609	0
GH_PC2	Field Measured	Oxygen Saturation (%)_Field Measured	(Intercept)	11.31736003	15.03056771	0.752956259	0.468831309	0
GH_PC2	Field Measured	Oxygen Saturation (%)_Field Measured	Date	-0.000441302	0.000969233	-0.4553107	0.658611503	0
GH_PC2	Field Measured	pH (-)_Field Measured	(Intercept)	2.432237561	0.059511889	40.86977594	6.4019E-44	0
GH_PC2	Field Measured	pH (-)_Field Measured	Date	-2.2137E-05	3.62791E-06	-6.101868295	9.78975E-08	0
GH_PC2	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	7.989692414	2.202937118	3.626836349	0.000621015	0
GH_PC2	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.000574822	0.000134472	-4.274654262	7.51452E-05	0
GH_PC2	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	4.528762252	0.595522235	7.604690446	3.85567E-10	0
GH_PC2	Major Ions	Calcium (mg/L)_Major Ions	Date	1.88003E-05	3.63183E-05	0.517653453	0.60677602	0
GH_PC2	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	2.878986305	0.861506675	3.341803828	0.0014876	0
GH_PC2	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000131898	5.25883E-05	-2.50813258	0.01506122	0
GH_PC2	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	0.249731419	0.72796605	0.343053662	0.732842589	0
GH_PC2	Major Ions	Fluoride (mg/L)_Major Ions	Date	-0.000113715	4.44366E-05	-2.55903242	0.013225711	0
GH_PC2	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	2.842212745	0.657452837	4.323067124	6.51573E-05	0
GH_PC2	Major Ions	Magnesium (mg/L)_Major Ions	Date	7.31399E-05	4.00952E-05	1.824156955	0.073562631	0
GH_PC2	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	1.635645805	0.379346435	4.311746873	6.76972E-05	0
GH_PC2	Major Ions	Potassium (mg/L)_Major Ions	Date	-6.44957E-05	2.31347E-05	-2.787835185	0.007271531	0
GH_PC2	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	0.701709	0.581303751	1.207129661	0.232548194	0
GH_PC2	Major Ions	Sodium (mg/L)_Major Ions	Date	-3.59127E-07	3.54512E-05	-0.010130167	0.991954091	0
GH_PC2	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	3.875153719	0.892674497	4.341060189	5.99965E-05	0
GH_PC2	Major Ions	Sulphate (mg/L)_Major Ions	Date	0.000104101	5.44908E-05	1.910433825	0.061202726	0
GH_PC2	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	(Intercept)	0.693147181	3.74975E-15	1.84851E+14	8.3147E-274	0
GH_PC2	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	Date	4.31962E-19	2.28793E-19	1.888003599	0.073620575	0
GH_PC2	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-49.78771432	27.72483913	-1.795780098	0.110261742	0
GH_PC2	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.002702412	0.001730106	1.561992496	0.156914702	0
GH_PC2	Nutrients and Biological Indicators	Dissolved Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	-	-	-	0
GH_PC2	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	2.0866E-15	-5.77003E+14	0	0
GH_PC2	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-2.35377E-19	1.31731E-19	-1.786804544	0.084078788	0
GH_PC2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	4.532291765	1.084951619	4.177413707	0.000104212	0
GH_PC2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000100073	6.62278E-05	-1.511047838	0.136398988	0
GH_PC2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	2.750060811	1.373654676	2.002003022	0.05013693	0
GH_PC2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000473181	8.38509E-05	-5.643125027	5.7429E-07	0
GH_PC2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-10.89542769	1.77444383	-6.140193056	8.9824E-08	0
GH_PC2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000365327	0.000108316	3.372793819	0.001355308	1
GH_PC2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-8.083614945	1.45202938	-5.567115278	7.60529E-07	0
GH_PC2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000329989	8.86351E-05	3.723013028	0.000458686	1
GH_PC2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-9.331505233	0.96040909	-9.716177543	1.00875E-12	0
GH_PC2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.000169652	5.83639E-05	2.906795592	0.005601025	1
GH_PC2	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	12.00490971	20.88237184	0.57488248	0.576939609	0
GH_PC2	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.001148214	0.001345251	-0.853532028	0.411565567	0
GH_PC2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	18.35562596	4.481165154	4.096172609	0.000136607	0
GH_PC2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.001405355	0.00027354	-5.137655687	3.65072E-06	0
GH_PC2	Parent PAHs	Acenaphthene (%)_Parent PAHs	(Intercept)	3.049784785	1.442107442	2.114811072	0.051595579	0
GH_PC2	Parent PAHs	Acenaphthene (%)_Parent PAHs	Date	9.29561E-05	8.85605E-05	1.049633138	0.310504774	0
GH_PC2	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC2	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC2	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC2	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC2	Parent PAHs	Acridine (%)_Parent PAHs	(Intercept)	5.689401667	1.335427264	4.260360576	0.000470715	0
GH_PC2	Parent PAHs	Acridine (%)_Parent PAHs	Date	-6.85044E-05	8.17793E-05	-0.837673771	0.413198857	0
GH_PC2	Parent PAHs	Acridine (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC2	Parent PAHs	Acridine (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC2	Parent PAHs	Anthracene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC2	Parent PAHs	Anthracene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC2	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC2	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC2	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	1.76031E-14	-2.61611E+14	1.1166E-249	0
GH_PC2	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	Date	1.867E-18	1.07798E-18	1.731933476	0.100386971	0
GH_PC2	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC2	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC2	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC2	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC2	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC2	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC2	Parent PAHs	Chrysene (%)_Parent PAHs	(Intercept)	6.996547041	1.647903074	4.245727284	0.000486252	0
GH_PC2	Parent PAHs	Chrysene (%)_Parent PAHs	Date	-0.000152479	0.000100915	-1.510962113	0.148154663	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
GH_PC2	Parent PAHs	Chrysene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC2	Parent PAHs	Chrysene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC2	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC2	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC2	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC2	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC2	Parent PAHs	Fluorene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC2	Parent PAHs	Fluorene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC2	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC2	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC2	Parent PAHs	Naphthalene (%)_Parent PAHs	(Intercept)	6.086635251	1.435413121	4.24033692	0.00055149	0
GH_PC2	Parent PAHs	Naphthalene (%)_Parent PAHs	Date	-9.51265E-05	8.78297E-05	-1.083078651	0.293896949	0
GH_PC2	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	(Intercept)	-2.995732274	1.76031E-14	-1.70182E+14	2.5661E-246	0
GH_PC2	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	Date	1.867E-18	1.07798E-18	1.731933476	0.100386971	0
GH_PC2	Parent PAHs	Phenanthrene (%)_Parent PAHs	(Intercept)	5.184671603	0.823450876	6.296273103	8.04526E-06	0
GH_PC2	Parent PAHs	Phenanthrene (%)_Parent PAHs	Date	-3.71942E-05	5.03851E-05	-0.738197755	0.470463063	0
GH_PC2	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	(Intercept)	4.743115671	4.295594581	1.104181408	0.284057063	0
GH_PC2	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	Date	-0.000524974	0.000263055	-1.995679892	0.061328573	0
GH_PC2	Parent PAHs	Pyrene (µg/L)_Parent PAHs	(Intercept)	10.27358957	7.772682561	1.321755969	0.202802887	0
GH_PC2	Parent PAHs	Pyrene (µg/L)_Parent PAHs	Date	-0.00090368	0.000475986	-1.898543088	0.073776574	0
GH_PC2	Parent PAHs	Quinoline (µg/L)_Parent PAHs	(Intercept)	-22.59751566	13.58282329	-1.663683254	0.113488004	0
GH_PC2	Parent PAHs	Quinoline (µg/L)_Parent PAHs	Date	0.001124192	0.000831789	1.351534559	0.193266419	0
GH_PC2	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	-4.528743201	3.940898498	-1.149165147	0.255372469	0
GH_PC2	Total Metals	Aluminum (mg/L)_Total Metals	Date	-6.9697E-06	0.000240561	-0.028972681	0.976989386	0
GH_PC2	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-7.042082121	1.011292654	-6.963446331	3.97715E-09	0
GH_PC2	Total Metals	Antimony (mg/L)_Total Metals	Date	-0.00011016	6.17315E-05	-1.784499347	0.079759905	0
GH_PC2	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-9.924444286	0.890644946	-11.14298614	7.83145E-16	0
GH_PC2	Total Metals	Arsenic (mg/L)_Total Metals	Date	5.791E-05	5.43669E-05	1.065168899	0.291370693	0
GH_PC2	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-0.194839125	0.672590589	-0.289684584	0.773127434	0
GH_PC2	Total Metals	Barium (mg/L)_Total Metals	Date	-0.000126421	4.10564E-05	-3.079209489	0.003212828	0
GH_PC2	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	1.825182908	0.863348689	2.114073875	0.038975292	0
GH_PC2	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000692298	5.27007E-05	-13.13640901	9.58335E-19	0
GH_PC2	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	10.40611337	1.703111975	6.110058246	1.00595E-07	0
GH_PC2	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001146032	0.000103962	-11.02360409	1.18897E-15	0
GH_PC2	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-3.543302236	0.495180259	-7.155580565	1.91453E-09	0
GH_PC2	Total Metals	Boron (mg/L)_Total Metals	Date	-5.00125E-05	3.02269E-05	-1.654570708	0.103606504	0
GH_PC2	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-8.794126633	1.591145123	-5.526916751	8.82009E-07	0
GH_PC2	Total Metals	Cadmium (mg/L)_Total Metals	Date	-6.94687E-05	9.7127E-05	-0.715235668	0.477434916	0
GH_PC2	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.684326356	0.594935424	7.87367194	1.24809E-10	0
GH_PC2	Total Metals	Calcium (mg/L)_Total Metals	Date	9.15482E-06	3.63162E-05	0.252086787	0.801896898	0
GH_PC2	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-8.485397981	1.30105099	-6.521956517	2.12605E-08	0
GH_PC2	Total Metals	Chromium (mg/L)_Total Metals	Date	-1.13966E-06	7.9419E-05	-0.014349967	0.988601778	0
GH_PC2	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-10.4597255	1.003970069	-10.41836388	1.01381E-14	0
GH_PC2	Total Metals	Cobalt (mg/L)_Total Metals	Date	8.6307E-05	6.12845E-05	1.408300365	0.164569943	0
GH_PC2	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-9.157552748	1.440065462	-6.359122548	3.93608E-08	0
GH_PC2	Total Metals	Copper (mg/L)_Total Metals	Date	0.000106111	8.79048E-05	1.207113953	0.232462392	0
GH_PC2	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	1.661664238	2.803377383	0.59273655	0.55574361	0
GH_PC2	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000317869	0.000171124	-1.857533572	0.068496215	0
GH_PC2	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-12.53574025	1.66659585	-7.52176375	4.75187E-10	0
GH_PC2	Total Metals	Lead (mg/L)_Total Metals	Date	0.000177297	0.000101733	1.74277102	0.086862745	0
GH_PC2	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-6.611710647	0.781177878	-8.463770971	1.34192E-11	0
GH_PC2	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000175129	4.76848E-05	3.672641917	0.000537834	1
GH_PC2	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	3.165462754	0.630883538	5.017507297	5.62567E-06	0
GH_PC2	Total Metals	Magnesium (mg/L)_Total Metals	Date	5.35455E-05	3.85105E-05	1.390412398	0.169905168	0
GH_PC2	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-4.3426551	3.163837999	-1.372590854	0.175352011	0
GH_PC2	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.000126314	0.000193128	-0.654041871	0.515761842	0
GH_PC2	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	9.349357629	1.311820315	7.127010856	2.13445E-09	0
GH_PC2	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001313702	8.00764E-05	-16.40561367	4.74839E-23	0
GH_PC2	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-6.872905141	0.828824877	-8.292349005	2.55991E-11	0
GH_PC2	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-7.21497E-06	5.05933E-05	-0.142607218	0.887112262	0
GH_PC2	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-3.887742298	2.125126319	-1.829417039	0.07266274	0
GH_PC2	Total Metals	Nickel (mg/L)_Total Metals	Date	-0.00017425	0.000129722	-1.343256196	0.184607555	0
GH_PC2	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	1.994800034	0.356580774	5.594244501	6.88051E-07	0
GH_PC2	Total Metals	Potassium (mg/L)_Total Metals	Date	-8.63056E-05	2.17665E-05	-3.965069606	0.000210363	0
GH_PC2	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-3.650383829	0.829382434	-4.401327637	4.88485E-05	0
GH_PC2	Total Metals	Selenium (mg/L)_Total Metals	Date	6.1725E-05	5.06273E-05	1.219203405	0.227877636	0
GH_PC2	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	0.321462574	0.285692364	1.125205339	0.2653016	0
GH_PC2	Total Metals	Silicon (mg/L)_Total Metals	Date	2.61815E-05	1.74393E-05	1.50129526	0.138897067	0
GH_PC2	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.84595034	0.288533268	-41.05575214	1.72045E-43	0
GH_PC2	Total Metals	Silver (mg/L)_Total Metals	Date	2.15253E-05	1.76127E-05	1.22214814	0.226770974	0
GH_PC2	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	1.038773569	0.59456045	1.747128603	0.086097292	0
GH_PC2	Total Metals	Sodium (mg/L)_Total Metals	Date	-2.02646E-05	3.62933E-05	-0.558357113	0.578826292	0
GH_PC2	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-1.790179042	0.630400791	-2.839747456	0.006281698	0
GH_PC2	Total Metals	Strontium (mg/L)_Total Metals	Date	-3.59475E-06	3.8481E-05	-0.093416216	0.925906331	0
GH_PC2	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-11.86808932	0.474722543	-25.00005424	4.62349E-32	0
GH_PC2	Total Metals	Thallium (mg/L)_Total Metals	Date	2.49905E-05	2.89781E-05	0.862392919	0.392149496	0
GH_PC2	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.584977383	0.251711678	-38.0791923	1.00882E-41	0
GH_PC2	Total Metals	Tin (mg/L)_Total Metals	Date	2.36242E-05	1.5365E-05	1.537529238	0.12979532	0
GH_PC2	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-3.782824259	0.57207913	-6.612414374	1.509E-08	0
GH_PC2	Total Metals	Titanium (mg/L)_Total Metals	Date	-4.23926E-05	3.4921E-05	-1.213958889	0.229858356	0
GH_PC2	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-7.625306504	0.548731379	-13.89624649	8.50314E-20	0
GH_PC2	Total Metals	Uranium (mg/L)_Total Metals	Date	0.00010606	3.34958E-05	3.166356141	0.002498051	1
GH_PC2	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-2.573779874	0.703885169	-3.656533748	0.000565791	0
GH_PC2	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000275029	4.29667E-05	-6.400988792	3.36016E-08	0
GH_PC2	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-6.503873313	1.328583213	-4.895345094	8.70309E-06	0
GH_PC2	Total Metals	Zinc (mg/L)_Total Metals	Date	5.45277E-05	8.10996E-05	0.672354799	0.504122678	0
GH_PC2	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
GH_PC2	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
GH_PC2	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-16.25160017	-	-	-	0
GH_PC2	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	0.000933868	-	-	-	0
GH_SC1-2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-3.755060208	1.732734815	-2.167129197	0.032752297	0
GH_SC1-2	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	0.000297068	0.000103098	2.881406313	0.004904851	1
GH_SC1-2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.705945277	0.446672364	12.7743414	3.53757E-22	0
GH_SC1-2	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-3.77372E-06	2.65884E-05	-0.141931021	0.887441507	0
GH_SC1-2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.917425905	1.46451243	0.626437773	0.532562485	0
GH_SC1-2	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-3.58615E-05	8.7176E-05	-0.411369282	0.681748234	0
GH_SC1-2	Conventional Parameters	Colour (CU)_Conventional Parameters	(Intercept)	-5.964161846	11.31665839	-0.527024996	0.603973512	0
GH_SC1-2	Conventional Parameters	Colour (CU)_Conventional Parameters	Date	0.000482206	0.000691536	0.697296972	0.493643736	0
GH_SC1-2	Conventional Parameters	Conductivity (µmhos/cm)_Conventional Parameters	(Intercept)	-3.333268298	0.239918698	-13.89332438	0.045743105	0
GH_SC1-2	Conventional Parameters	Conductivity (µmhos/cm)_Conventional Parameters	Date	0.000721797	1.52465E-05	47.34191522	0.013445276	1
GH_SC1-2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	7.968792501	0.657000117	12.12905797	1.03661E-20	0
GH_SC1-2	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	-1.29388E-05	3.90142E-05	-0.331643967	0.740920699	0
GH_SC1-2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	0.259892236	0.533283389	0.48734358	0.627149481	0
GH_SC1-2	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	3.27372E-05	3.17305E-05	1.031726405	0.304847567	0
GH_SC1-2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	7.426409346	0.763399445	9.728078006	6.9555E-16	0
GH_SC1-2	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	-1.89726E-06	4.54225E-05	-0.041769184	0.966771294	0
GH_SC1-2	Conventional Parameters	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	(Intercept)	9.708255915	15.29097538	0.634901023	0.639872158	0
GH_SC1-2	Conventional Parameters	Hardness, as CaCO3 (Calculated) (mg/L)_Conventional Parameters	Date	-0.000127688	0.000971718	-0.131404315	0.916821978	0
GH_SC1-2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.546566381	0.223606566	2.4443217	0.016397454	0
GH_SC1-2	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-3.13857E-05	1.33103E-05	-2.357998011	0.020468724	0
GH_SC1-2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	7.15350401	0.348710666	20.51415316	1.7611E-36	0
GH_SC1-2	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-7.38613E-05	2.07484E-05	-3.559854142	0.000584186	0
GH_SC1-2	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.19286253	0.024542991	89.34780967	1.03012E-92	0
GH_SC1-2	Conventional Parameters	pH (-)_Conventional Parameters	Date	-5.37878E-06	1.46032E-06	-3.683301125	0.000384455	0
GH_SC1-2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.679384828	0.426875661	13.30454123	2.46026E-23	0
GH_SC1-2	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-1.78059E-06	2.53992E-05	-0.070104195	0.944259654	0
GH_SC1-2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	8.538619741	0.799433494	10.68083812	6.62571E-18	0
GH_SC1-2	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	-4.85692E-05	4.75666E-05	-1.021079103	0.309837697	0
GH_SC1-2	Conventional Parameters	Total Inorganic Carbon (mg/L)_Conventional Parameters	(Intercept)	-87.84551959	52.17484028	-1.68367587	0.341196767	0
GH_SC1-2	Conventional Parameters	Total Inorganic Carbon (mg/L)_Conventional Parameters	Date	0.005075506	0.002866642	1.770540826	0.327308061	0
GH_SC1-2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	0.399662624	0.632429332	0.631948273	0.528954668	0
GH_SC1-2	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	3.05224E-05	3.76297E-05	0.811123235	0.419343939	0
GH_SC1-2	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	(Intercept)	0.546876779	1.804093989	0.30313098	0.762459899	0
GH_SC1-2	Conventional Parameters	Total Suspended Solids (mg/L)_Conventional Parameters	Date	2.81742E-05	0.000107344	0.262466441	0.793536215	0
GH_SC1-2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	-8.018919436	2.659630067	-3.015050678	0.003303593	0
GH_SC1-2	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	0.000482601	0.000158249	3.049636112	0.002976556	1
GH_SC1-2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-1.799360314	1.122078823	-1.603595288	0.112194256	0
GH_SC1-2	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-0.000223685	6.67113E-05	-3.353028043	0.001157427	0
GH_SC1-2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-5.062151444	0.530116609	-9.549128172	1.83946E-15	0
GH_SC1-2	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	-0.000123549	3.15172E-05	-3.92004545	0.000169116	0
GH_SC1-2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-6.790894568	0.605040762	-11.22386291	5.48751E-19	0
GH_SC1-2	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	-0.000103079	3.59717E-05	-2.865555922	0.005147079	0
GH_SC1-2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-4.316886557	0.497817858	-8.671618515	1.31755E-13	0
GH_SC1-2	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	3.49574E-05	2.95969E-05	1.181116417	0.240568203	0
GH_SC1-2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	7.933114202	1.19755292	6.624437276	2.23114E-09	0
GH_SC1-2	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.001036852	7.11985E-05	-14.56283467	1.00688E-25	0
GH_SC1-2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	14.06235496	1.543652998	9.109790205	1.56403E-14	0
GH_SC1-2	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001343495	9.17753E-05	-14.63896054	7.17286E-26	0
GH_SC1-2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-0.705470695	0.833704915	-0.84618752	0.399620203	0
GH_SC1-2	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-0.000203622	4.95665E-05	-4.108065365	8.57905E-05	0
GH_SC1-2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	5.339892818	2.377890227	2.245643116	0.027095399	0
GH_SC1-2	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-0.000813149	0.000141373	-5.751777618	1.11934E-07	0
GH_SC1-2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-5.118280682	0.813334926	-6.292955728	1.01107E-08	0
GH_SC1-2	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-0.000213341	4.83554E-05	-4.411932285	2.75352E-05	0
GH_SC1-2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-7.067747688	0.868427405	-8.138559015	1.73909E-12	0
GH_SC1-2	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	-9.37915E-05	5.16309E-05	-1.816576739	0.072503323	0
GH_SC1-2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-3.455056624	0.680859355	-5.074552619	1.98181E-06	0
GH_SC1-2	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-0.000228722	4.04793E-05	-5.650329782	1.73943E-07	0
GH_SC1-2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	1.101453479	0.73453189	1.499531191	0.137123015	0
GH_SC1-2	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.00030542	4.36703E-05	-6.993751633	4.02732E-10	0
GH_SC1-2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-6.020700666	0.832157073	-7.235053168	1.29785E-10	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
GH_SC1-2	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	-0.000202531	4.94745E-05	-4.093637537	9.04383E-05	0
GH_SC1-2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-4.705075505	0.815696226	-5.768171233	1.04205E-07	0
GH_SC1-2	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	9.71986E-05	4.84958E-05	2.00426737	0.047949997	1
GH_SC1-2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-14.36954083	1.64396209	-8.740798173	9.41536E-14	0
GH_SC1-2	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	0.000525884	9.7739E-05	5.380490088	5.52361E-07	1
GH_SC1-2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-6.149322172	0.37466789	-16.412728	3.25701E-29	0
GH_SC1-2	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000344036	2.22752E-05	-15.44478383	2.06875E-27	0
GH_SC1-2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-4.096004911	0.441742044	-9.272390899	7.08408E-15	0
GH_SC1-2	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	-7.44667E-05	2.6263E-05	-2.835420865	0.005615069	0
GH_SC1-2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	2.124431338	1.109120364	1.91542001	0.058511409	0
GH_SC1-2	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	-0.000310171	6.59409E-05	-4.703778696	8.85452E-06	0
GH_SC1-2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	0.155444178	0.945461357	0.164410926	0.869764474	0
GH_SC1-2	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	-4.89176E-05	5.62108E-05	-0.870252625	0.386403083	0
GH_SC1-2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	-0.11498587	0.434349575	-0.264731167	0.791802405	0
GH_SC1-2	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	4.35806E-05	2.58235E-05	1.687630423	0.094833398	0
GH_SC1-2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-7.734592009	0.835589443	-9.256450126	7.65616E-15	0
GH_SC1-2	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	-0.000196247	4.96786E-05	-3.950332251	0.000151802	0
GH_SC1-2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-1.564810033	0.651889543	-2.400422048	0.018367568	0
GH_SC1-2	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	-1.10349E-05	3.8757E-05	-0.284719039	0.776492447	0
GH_SC1-2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-9.051766124	0.605713332	-14.94397703	1.85634E-26	0
GH_SC1-2	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	-6.71395E-05	3.60117E-05	-1.864383526	0.065422056	0
GH_SC1-2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-5.592838158	0.854757837	-6.543184419	3.23914E-09	0
GH_SC1-2	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	-0.000186426	5.08182E-05	-3.668498623	0.000406448	0
GH_SC1-2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-2.289922167	0.538790712	-4.250114408	5.0733E-05	0
GH_SC1-2	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-0.000127867	3.20329E-05	-3.991752003	0.000130848	0
GH_SC1-2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-3.364315228	0.862081606	-3.902548441	0.000179962	0
GH_SC1-2	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	-6.2479E-05	5.12536E-05	-1.219016942	0.225920724	0
GH_SC1-2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	2.314699466	0.939193873	2.464559803	0.015554477	0
GH_SC1-2	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000545346	5.58382E-05	-9.766544349	6.37859E-16	0
GH_SC1-2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	6.593033078	1.646856377	4.003405015	0.000125472	0
GH_SC1-2	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.00062661	9.79111E-05	-6.399783555	6.23082E-09	0
GH_SC1-2	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	6.812746735	0.697191071	9.771706811	1.32341E-15	0
GH_SC1-2	Field Measured	Conductivity (µS/cm)_Field Measured	Date	4.80454E-05	4.13427E-05	1.162127027	0.248398855	0
GH_SC1-2	Field Measured	Conductivity (µS/cm at 25 C)_Field Measured	(Intercept)	-29.3476881	-	-	-	0
GH_SC1-2	Field Measured	Conductivity (µS/cm at 25 C)_Field Measured	Date	0.002220462	-	-	-	0
GH_SC1-2	Field Measured	Conductivity (si)_Field Measured	(Intercept)	-18.4464652	21.95840017	-0.84006417	0.425264637	0
GH_SC1-2	Field Measured	Conductivity (si)_Field Measured	Date	0.001645048	0.001380776	1.191393724	0.267643142	0
GH_SC1-2	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	2.846567565	1.10582603	2.574154965	0.01213575	0
GH_SC1-2	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	9.00033E-05	6.45708E-05	1.393871266	0.167703908	0
GH_SC1-2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	2.9586807	0.191349949	15.46214522	1.4515E-27	0
GH_SC1-2	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-3.38068E-05	1.13854E-05	-2.969311795	0.003787231	0
GH_SC1-2	Field Measured	Oxygen Saturation (%)_Field Measured	(Intercept)	4.740660274	4.602235202	1.030077792	0.327243565	0
GH_SC1-2	Field Measured	Oxygen Saturation (%)_Field Measured	Date	-1.74787E-05	0.000296771	-0.058896212	0.954195108	0
GH_SC1-2	Field Measured	pH (-)_Field Measured	(Intercept)	2.269777852	0.038303244	59.25810976	1.15642E-75	0
GH_SC1-2	Field Measured	pH (-)_Field Measured	Date	-1.03251E-05	2.27706E-06	-4.534408213	1.71893E-05	0
GH_SC1-2	Field Measured	Total Suspended Solids (mg/L)_Field Measured	(Intercept)	3.502549876	-	-	-	0
GH_SC1-2	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	10.57039416	0.945333019	11.18166185	5.83456E-19	0
GH_SC1-2	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.000666967	5.62476E-05	-11.85769587	2.25723E-20	0
GH_SC1-2	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	6.688633516	0.750614082	8.91088201	4.11822E-14	0
GH_SC1-2	Major Ions	Calcium (mg/L)_Major Ions	Date	-5.69652E-05	4.46265E-05	-1.276489059	0.204961077	0
GH_SC1-2	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	0.176133804	0.748878953	0.235196628	0.81456774	0
GH_SC1-2	Major Ions	Chloride (mg/L)_Major Ions	Date	4.03403E-05	4.45585E-05	0.905332143	0.3676041	0
GH_SC1-2	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	6.521976218	0.759900307	8.582673485	1.88697E-13	0
GH_SC1-2	Major Ions	Fluoride (mg/L)_Major Ions	Date	-0.000470244	4.52143E-05	-10.40033563	2.59902E-17	0
GH_SC1-2	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	5.219957111	0.786585807	6.636220824	2.11346E-09	0
GH_SC1-2	Major Ions	Magnesium (mg/L)_Major Ions	Date	7.59469E-06	4.67651E-05	0.162400744	0.871342625	0
GH_SC1-2	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	1.458398946	0.613769484	2.376134662	0.019545692	0
GH_SC1-2	Major Ions	Potassium (mg/L)_Major Ions	Date	-7.01103E-06	3.64906E-05	-0.192132454	0.84805736	0
GH_SC1-2	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	0.980789	0.526924467	1.861346475	0.065854003	0
GH_SC1-2	Major Ions	Sodium (mg/L)_Major Ions	Date	-3.05567E-05	3.13274E-05	-0.975399218	0.331892621	0
GH_SC1-2	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	7.402847999	0.815516913	9.077491689	1.68253E-14	0
GH_SC1-2	Major Ions	Sulphate (mg/L)_Major Ions	Date	-1.54628E-05	4.85235E-05	-0.318666725	0.750686232	0
GH_SC1-2	Major Ions	Sulphide (mg/L)_Major Ions	(Intercept)	-6.214608098	-	-	-	0
GH_SC1-2	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	(Intercept)	0.693147181	3.59935E-15	1.92576E+14	1.3878E-287	0
GH_SC1-2	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	Date	3.8056E-19	2.19799E-19	1.731395787	0.098048132	0
GH_SC1-2	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-29.48781316	29.35772611	-1.004431101	0.34458087	0
GH_SC1-2	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.001455412	0.001832002	0.794437885	0.449862921	0
GH_SC1-2	Nutrients and Biological Indicators	Dissolved Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	-	-	-	0
GH_SC1-2	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	2.0866E-15	-5.77003E+14	0	0
GH_SC1-2	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-2.35377E-19	1.31731E-19	-1.786804544	0.084078788	0
GH_SC1-2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	9.292500363	1.032963924	8.995958274	2.50727E-14	0
GH_SC1-2	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000360257	6.14617E-05	-5.86149172	6.76215E-08	0
GH_SC1-2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-1.496857253	0.996713832	-1.501792395	0.136502624	0
GH_SC1-2	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000152422	5.93048E-05	-2.570138471	0.011736989	0
GH_SC1-2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-12.36842091	1.527821268	-8.095463239	2.01245E-12	0
GH_SC1-2	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000450772	9.09059E-05	4.958666643	3.1408E-06	1
GH_SC1-2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-11.72708159	1.844081729	-6.359306863	7.26393E-09	0
GH_SC1-2	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000580499	0.000109723	5.290562807	7.93544E-07	1
GH_SC1-2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-2.940969819	2.013145524	-1.460882874	0.147778132	0
GH_SC1-2	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000197475	0.000119155	-1.657290633	0.101191238	0
GH_SC1-2	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-3.745706183	21.78456072	-0.171943159	0.866604711	0
GH_SC1-2	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000108447	0.00140337	-0.077276393	0.939791365	0
GH_SC1-2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	11.62266549	2.578428784	4.507654259	1.88749E-05	0
GH_SC1-2	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000972273	0.000153417	-6.33743826	8.02331E-09	0
GH_SC1-2	Parent PAHs	Acenaphthene (%)_Parent PAHs	(Intercept)	4.259500149	1.990394377	2.140028226	0.049195242	0
GH_SC1-2	Parent PAHs	Acenaphthene (%)_Parent PAHs	Date	1.81553E-05	0.000122231	0.14853214	0.883901218	0
GH_SC1-2	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	(Intercept)	16.602897	6.439227752	2.578398783	0.017945027	0
GH_SC1-2	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	Date	-0.001284272	0.000393487	-3.263826614	0.003885662	0
GH_SC1-2	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	(Intercept)	7.412661754	6.252054398	1.185636158	0.249662049	0
GH_SC1-2	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	Date	-0.000727613	0.000382049	-1.904502166	0.071329569	0
GH_SC1-2	Parent PAHs	Acridine (%)_Parent PAHs	(Intercept)	7.20214363	1.746217389	4.124425558	0.000525908	0
GH_SC1-2	Parent PAHs	Acridine (%)_Parent PAHs	Date	-0.000162754	0.000106707	-1.525232529	0.142859659	0
GH_SC1-2	Parent PAHs	Acridine (µg/L)_Parent PAHs	(Intercept)	7.412661754	6.252054398	1.185636158	0.249662049	0
GH_SC1-2	Parent PAHs	Acridine (µg/L)_Parent PAHs	Date	-0.000727613	0.000382049	-1.904502166	0.071329569	0
GH_SC1-2	Parent PAHs	Anthracene (µg/L)_Parent PAHs	(Intercept)	7.412661754	6.252054398	1.185636158	0.249662049	0
GH_SC1-2	Parent PAHs	Anthracene (µg/L)_Parent PAHs	Date	-0.000727613	0.000382049	-1.904502166	0.071329569	0
GH_SC1-2	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	(Intercept)	7.412661754	6.252054398	1.185636158	0.249662049	0
GH_SC1-2	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	Date	-0.000727613	0.000382049	-1.904502166	0.071329569	0
GH_SC1-2	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	0	-Inf	0	0
GH_SC1-2	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	Date	0	0	-	-	0
GH_SC1-2	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	(Intercept)	7.412661754	6.252054398	1.185636158	0.249662049	0
GH_SC1-2	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	Date	-0.000727613	0.000382049	-1.904502166	0.071329569	0
GH_SC1-2	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	(Intercept)	7.482582728	6.355696782	1.17730329	0.252895446	0
GH_SC1-2	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	Date	-0.000729869	0.000388382	-1.879255438	0.074861425	0
GH_SC1-2	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	(Intercept)	7.412661754	6.252054398	1.185636158	0.249662049	0
GH_SC1-2	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	Date	-0.000727613	0.000382049	-1.904502166	0.071329569	0
GH_SC1-2	Parent PAHs	Chrysene (%)_Parent PAHs	(Intercept)	8.434823647	1.80305011	4.678086093	0.000144589	0
GH_SC1-2	Parent PAHs	Chrysene (%)_Parent PAHs	Date	-0.000241086	0.00011018	-2.188104348	0.040702307	0
GH_SC1-2	Parent PAHs	Chrysene (µg/L)_Parent PAHs	(Intercept)	7.412661754	6.252054398	1.185636158	0.249662049	0
GH_SC1-2	Parent PAHs	Chrysene (µg/L)_Parent PAHs	Date	-0.000727613	0.000382049	-1.904502166	0.071329569	0
GH_SC1-2	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	(Intercept)	7.412661754	6.252054398	1.185636158	0.249662049	0
GH_SC1-2	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	Date	-0.000727613	0.000382049	-1.904502166	0.071329569	0
GH_SC1-2	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	(Intercept)	7.412661754	6.252054398	1.185636158	0.249662049	0
GH_SC1-2	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	Date	-0.000727613	0.000382049	-1.904502166	0.071329569	0
GH_SC1-2	Parent PAHs	Fluorene (µg/L)_Parent PAHs	(Intercept)	7.412661754	6.252054398	1.185636158	0.249662049	0
GH_SC1-2	Parent PAHs	Fluorene (µg/L)_Parent PAHs	Date	-0.000727613	0.000382049	-1.904502166	0.071329569	0
GH_SC1-2	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	(Intercept)	7.412661754	6.252054398	1.185636158	0.249662049	0
GH_SC1-2	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	Date	-0.000727613	0.000382049	-1.904502166	0.071329569	0
GH_SC1-2	Parent PAHs	Naphthalene (%)_Parent PAHs	(Intercept)	6.406832084	1.569095104	4.083138153	0.000579221	0
GH_SC1-2	Parent PAHs	Naphthalene (%)_Parent PAHs	Date	-0.000115799	9.58839E-05	-1.207698546	0.241251493	0
GH_SC1-2	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	(Intercept)	-2.995732274	1.68444E-15	-1.77848E+15	1.8003E-293	0
GH_SC1-2	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	Date	-1.10805E-19	1.02932E-19	-1.076481175	0.294526542	0
GH_SC1-2	Parent PAHs	Phenanthrene (%)_Parent PAHs	(Intercept)	5.307695319	1.022574031	5.190524264	4.44243E-05	0
GH_SC1-2	Parent PAHs	Phenanthrene (%)_Parent PAHs	Date	-4.57214E-05	6.24872E-05	-0.731691755	0.472843863	0
GH_SC1-2	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	(Intercept)	2.346955561	3.469281918	0.676496064	0.506474805	0
GH_SC1-2	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	Date	-0.000378436	0.000212	-1.785075265	0.089425224	0
GH_SC1-2	Parent PAHs	Pyrene (µg/L)_Parent PAHs	(Intercept)	7.412661754	6.252054398	1.185636158	0.249662049	0
GH_SC1-2	Parent PAHs	Pyrene (µg/L)_Parent PAHs	Date	-0.000727613	0.000382049	-1.904502166	0.071329569	0
GH_SC1-2	Parent PAHs	Quinoline (µg/L)_Parent PAHs	(Intercept)	-33.00710603	11.37722076	-2.901157208	0.008831179	0
GH_SC1-2	Parent PAHs	Quinoline (µg/L)_Parent PAHs	Date	0.001764886	0.000695236	2.538541175	0.019551951	1
GH_SC1-2	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	(Intercept)	-4.605170186	-	-	-	0
GH_SC1-2	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	(Intercept)	-4.342805922	-	-	-	0
GH_SC1-2	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	(Intercept)	5.983936281	-	-	-	0
GH_SC1-2	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	(Intercept)	-0.816445397	-	-	-	0
GH_SC1-2	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	(Intercept)	-3.218875825	-	-	-	0
GH_SC1-2	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	(Intercept)	-4.605170186	-	-	-	0
GH_SC1-2	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	(Intercept)	-2.813410717	-	-	-	0
GH_SC1-2	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	(Intercept)	-2.813410717	-	-	-	0
GH_SC1-2	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	-5.001305207	2.059720026	-2.42814807	0.017079322	0
GH_SC1-2	Total Metals	Aluminum (mg/L)_Total Metals	Date	4.35155E-05	0.000122554	0.355072154	0.723330988	0
GH_SC1-2	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-5.000449601	0.605350478	-8.260420672	9.04763E-13	0
GH_SC1-2	Total Metals	Antimony (mg/L)_Total Metals	Date	-0.00012543	3.60185E-05	-3.482380418	0.000756024	0
GH_SC1-2	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-7.531734535	0.611127372	-12.32432858	2.44532E-21	0
GH_SC1-2	Total Metals	Arsenic (mg/L)_Total Metals	Date	-4.81515E-05	3.63623E-05	-1.324216506	0.188642036	0
GH_SC1-2	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-4.29797626	0.507126536	-8.475155517	3.18585E-13	0
GH_SC1-2	Total Metals	Barium (mg/L)_Total Metals	Date	3.54899E-05	3.01742E-05	1.17616821	0.242497782	0
GH_SC1-2	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	7.917258158	1.157052134	6.842611429	7.8391E-10	0
GH_SC1-2	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.001036163	6.8845E-05	-15.05067198	8.89981E-27	0
GH_SC1-2	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	14.30862442	1.494735526	9.572679694	1.48887E-15	0
GH_SC1-2	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001358872	8.89372E-05	-15.27899871	3.24508E-27	0
GH_SC1-2	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-0.423815473	0.807671569	-0.524737393	0.601001121	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
GH_SC1-2	Total Metals	Boron (mg/L)_Total Metals	Date	-0.000221035	4.80567E-05	-4.599470157	1.32018E-05	0
GH_SC1-2	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-1.853955949	1.187104358	-1.561746393	0.121708291	0
GH_SC1-2	Total Metals	Cadmium (mg/L)_Total Metals	Date	-0.000348331	7.06331E-05	-4.931560413	3.50723E-06	0
GH_SC1-2	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	6.529254682	0.712653801	9.161888522	1.1132E-14	0
GH_SC1-2	Total Metals	Calcium (mg/L)_Total Metals	Date	-4.63128E-05	4.24031E-05	-1.092201686	0.277535857	0
GH_SC1-2	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-5.430955875	0.846012502	-6.419474727	5.52196E-09	0
GH_SC1-2	Total Metals	Chromium (mg/L)_Total Metals	Date	-0.000184058	5.0338E-05	-3.65643521	0.000421432	0
GH_SC1-2	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-7.317765047	0.868553035	-8.42523686	4.06187E-13	0
GH_SC1-2	Total Metals	Cobalt (mg/L)_Total Metals	Date	-7.40669E-05	5.16792E-05	-1.433205508	0.155116817	0
GH_SC1-2	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-4.318675877	0.63558246	-6.794831743	9.79157E-10	0
GH_SC1-2	Total Metals	Copper (mg/L)_Total Metals	Date	-0.000153166	3.78174E-05	-4.050139331	0.000105223	0
GH_SC1-2	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	-1.240569553	1.412101559	-0.878527146	0.381897853	0
GH_SC1-2	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000140046	8.40205E-05	-1.666805597	0.098881819	0
GH_SC1-2	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-6.241866202	0.982654732	-6.352044107	7.5079E-09	0
GH_SC1-2	Total Metals	Lead (mg/L)_Total Metals	Date	-0.000181739	5.84683E-05	-3.108334705	0.002489334	0
GH_SC1-2	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-4.389867613	0.792545767	-5.538945255	2.75645E-07	0
GH_SC1-2	Total Metals	Lithium (mg/L)_Total Metals	Date	8.01656E-05	4.71567E-05	1.699981625	0.092441104	0
GH_SC1-2	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	5.331771698	0.745649911	7.150502692	1.85041E-10	0
GH_SC1-2	Total Metals	Magnesium (mg/L)_Total Metals	Date	1.88843E-06	4.43664E-05	0.042564303	0.966139134	0
GH_SC1-2	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-14.87799931	1.556188474	-9.560538169	1.5801E-15	0
GH_SC1-2	Total Metals	Manganese (mg/L)_Total Metals	Date	0.000576097	9.25937E-05	6.221773477	1.35472E-08	1
GH_SC1-2	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	8.944071217	1.303685661	6.860604122	7.20845E-10	0
GH_SC1-2	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001297092	7.75697E-05	-16.72162684	6.4392E-30	0
GH_SC1-2	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	-11.02078943	16.15004731	-0.682399823	0.543954406	0
GH_SC1-2	Total Metals	Methyl mercury (µg/L)_Total Metals	Date	2.86019E-05	0.000903609	0.0316529	0.976736968	0
GH_SC1-2	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-3.981988693	0.427527085	-9.314003333	5.28574E-15	0
GH_SC1-2	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-8.02838E-05	2.5438E-05	-3.156056474	0.002149011	0
GH_SC1-2	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	2.165189348	1.08681975	1.992224882	0.049247279	0
GH_SC1-2	Total Metals	Nickel (mg/L)_Total Metals	Date	-0.000311457	6.46661E-05	-4.816384912	5.5854E-06	0
GH_SC1-2	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	1.764568387	0.584126374	3.020867513	0.00324636	0
GH_SC1-2	Total Metals	Potassium (mg/L)_Total Metals	Date	-2.46189E-05	3.47557E-05	-0.708340647	0.480486608	0
GH_SC1-2	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	0.662529562	0.921425551	0.719026688	0.473908163	0
GH_SC1-2	Total Metals	Selenium (mg/L)_Total Metals	Date	-8.0276E-05	5.48251E-05	-1.464219459	0.146470364	0
GH_SC1-2	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	-0.157762925	0.434784702	-0.36285298	0.717538089	0
GH_SC1-2	Total Metals	Silicon (mg/L)_Total Metals	Date	4.8822E-05	2.58782E-05	1.886605834	0.062333174	0
GH_SC1-2	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-7.529827883	0.809010673	-9.307451848	5.45808E-15	0
GH_SC1-2	Total Metals	Silver (mg/L)_Total Metals	Date	-0.000208268	4.81364E-05	-4.326625005	3.77342E-05	0
GH_SC1-2	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	1.060829143	0.509311733	2.082868062	0.039978668	0
GH_SC1-2	Total Metals	Sodium (mg/L)_Total Metals	Date	-3.46188E-05	3.03042E-05	-1.14237459	0.256199809	0
GH_SC1-2	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-1.537367688	0.638018501	-2.409597347	0.017917851	0
GH_SC1-2	Total Metals	Strontium (mg/L)_Total Metals	Date	-1.20472E-05	3.79623E-05	-0.317347459	0.751683786	0
GH_SC1-2	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-9.367291255	0.720378471	-13.00329151	1.00042E-22	0
GH_SC1-2	Total Metals	Thallium (mg/L)_Total Metals	Date	-4.37719E-05	4.28628E-05	-1.021211325	0.309775394	0
GH_SC1-2	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-5.068933806	0.811530866	-6.24613803	1.21354E-08	0
GH_SC1-2	Total Metals	Tin (mg/L)_Total Metals	Date	-0.000218707	4.82863E-05	-4.529376497	1.73506E-05	0
GH_SC1-2	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-1.882715835	0.538140564	-3.498557738	0.000716613	0
GH_SC1-2	Total Metals	Titanium (mg/L)_Total Metals	Date	-0.000150953	3.20195E-05	-4.714403507	8.39186E-06	0
GH_SC1-2	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-3.425206613	0.854172435	-4.009970905	0.000121713	0
GH_SC1-2	Total Metals	Uranium (mg/L)_Total Metals	Date	-5.76793E-05	5.08235E-05	-1.134893017	0.259305792	0
GH_SC1-2	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	2.161676678	0.885657533	2.440759093	0.016529431	0
GH_SC1-2	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000533933	5.26969E-05	-10.13215962	9.62975E-17	0
GH_SC1-2	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	1.646207385	0.882156306	1.866117574	0.065142906	0
GH_SC1-2	Total Metals	Zinc (mg/L)_Total Metals	Date	-0.000304083	5.24886E-05	-5.793307361	9.12692E-08	0
GH_SC1-2	Unknown	2-Bromobenzotrifluoride (%)_Unknown	(Intercept)	141.4378186	-	-	-	0
GH_SC1-2	Unknown	2-Bromobenzotrifluoride (%)_Unknown	Date	-0.008194117	-	-	-	0
GH_SC1-2	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	24.42681215	4.033803808	6.055528061	0.000122705	0
GH_SC1-2	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	-0.001634096	0.000252958	-6.459962674	7.25521E-05	0
GH_SC1-2	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	41.56160723	10.89716724	3.81398269	0.062381606	0
GH_SC1-2	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	-0.00266863	0.000661129	-4.036472043	0.056247279	0
GH_SC1-2	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	18.6900021	9.839873493	1.899414877	0.106255995	0
GH_SC1-2	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	-0.001274262	0.000627878	-2.029475852	0.088728176	0
GH_SC1-2	Volatile Organics	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	(Intercept)	25.77980637	3.812977251	6.76107007	0.093481878	0
GH_SC1-2	Volatile Organics	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	Date	-0.001721864	0.000229992	-7.486623982	0.084533929	0
GH_SC1-2	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	(Intercept)	25.77980637	3.812977251	6.76107007	0.093481878	0
GH_SC1-2	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	Date	-0.001721864	0.000229992	-7.486623982	0.084533929	0
GH_SC1-2	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	47.29322943	18.30962924	2.582970349	0.235155227	0
GH_SC1-2	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Date	-0.002978303	0.001116715	-2.667022147	0.228372605	0
GH_SC1-2	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	23.23614972	12.83131684	1.810893613	0.11306676	0
GH_SC1-2	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	-0.001549093	0.000815712	-1.899068224	0.099342043	0
LC_DC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	1.739468753	0.777732329	2.236590517	0.027931328	0
LC_DC1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	-9.79462E-05	4.60468E-05	-2.127103933	0.036309348	0
LC_DC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.088563994	0.365899426	11.1740104	2.31098E-18	0
LC_DC1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	5.67408E-05	2.16636E-05	2.619175905	0.010436319	1
LC_DC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-2.27761342	1.674744926	-1.359976308	0.177433698	0
LC_DC1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000215726	9.91557E-05	2.17563095	0.032358902	1
LC_DC1	Conventional Parameters	Colour (CU)_Conventional Parameters	(Intercept)	0.62781653	2.528390416	0.248306799	0.806871708	0
LC_DC1	Conventional Parameters	Colour (CU)_Conventional Parameters	Date	6.57383E-05	0.000154354	0.425892522	0.675529446	0
LC_DC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	2.663713515	0.352694129	7.552474788	4.46463E-11	0
LC_DC1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	0.000184097	2.08818E-05	8.816158144	1.27244E-13	1
LC_DC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	0.95773421	0.674669877	1.419559761	0.159392969	0
LC_DC1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	-2.98568E-05	3.99448E-05	-0.747451778	0.456853719	0
LC_DC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	2.65167081	0.401491732	6.604546489	3.28251E-09	0
LC_DC1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	0.000150234	2.37709E-05	6.320063527	1.15758E-08	1
LC_DC1	Conventional Parameters	Hydroxide (mg/L)_Conventional Parameters	(Intercept)	-1.078809661	-	-	-	0
LC_DC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0.034616342	0.060056601	0.576395287	0.565871238	0
LC_DC1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-1.80355E-06	3.55574E-06	-0.507222241	0.613312358	0
LC_DC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	6.233653932	0.356453732	17.48797494	6.74037E-30	0
LC_DC1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-1.8677E-05	2.11044E-05	-0.884982133	0.378662898	0
LC_DC1	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.039498314	0.031316833	65.12466763	2.5459E-74	0
LC_DC1	Conventional Parameters	pH (-)_Conventional Parameters	Date	4.79577E-06	1.85416E-06	2.586492423	0.011397947	1
LC_DC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.050357142	0.374857659	10.80505371	1.25018E-17	0
LC_DC1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	6.07064E-05	2.2194E-05	2.735264471	0.00758565	1
LC_DC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	1.625917117	0.374761799	4.338534832	3.92993E-05	0
LC_DC1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	0.000214187	2.21883E-05	9.653165173	2.57455E-15	1
LC_DC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	2.187380571	0.722612233	3.027046139	0.00326815	0
LC_DC1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-9.46966E-05	4.27833E-05	-2.213400522	0.029548801	0
LC_DC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	5.835731453	2.030540489	2.873979358	0.005119291	0
LC_DC1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-0.000292065	0.000120221	-2.429398532	0.017229796	0
LC_DC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	0.217065603	3.007152378	0.072183107	0.942625767	0
LC_DC1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-2.04238E-05	0.000178043	-0.1147131	0.908943076	0
LC_DC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-4.771673349	1.076128386	-4.434111589	2.74783E-05	0
LC_DC1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-4.9169E-05	6.37137E-05	-0.771717129	0.442422196	0
LC_DC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-10.99277223	0.437162269	-25.14574795	3.93976E-41	0
LC_DC1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	0.000133258	2.58828E-05	5.148524359	1.67133E-06	1
LC_DC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-8.421301344	0.417097005	-20.19027049	3.49602E-34	0
LC_DC1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	-1.51793E-05	2.46948E-05	-0.614675339	0.540411118	0
LC_DC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-4.461411345	0.302433979	-14.75168681	3.70044E-25	0
LC_DC1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	0.000162764	1.7906E-05	9.089877681	3.55124E-14	1
LC_DC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	3.886417969	0.98575549	3.942578062	0.000165015	0
LC_DC1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000823189	5.83631E-05	-14.1046276	5.61356E-24	0
LC_DC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	9.550803291	1.241704318	7.691688876	2.35282E-11	0
LC_DC1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001104176	7.35169E-05	-15.01935656	1.2201E-25	0
LC_DC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.577367832	0.319241628	-14.3382549	2.09032E-24	0
LC_DC1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	5.72273E-07	1.89012E-05	0.030277134	0.975917011	0
LC_DC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-11.88041078	0.405542238	-29.29512554	3.43183E-46	0
LC_DC1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	9.03703E-05	2.40107E-05	3.763747907	0.000307162	1
LC_DC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-9.183319826	0.362219708	-25.3528994	2.12731E-41	0
LC_DC1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	1.31896E-06	2.14457E-05	0.061502099	0.951103727	0
LC_DC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-9.495118487	0.358632979	-26.47586539	8.04859E-43	0
LC_DC1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	1.88674E-05	2.12334E-05	0.888573303	0.376740139	0
LC_DC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-6.475997299	0.479227291	-13.51341508	7.04592E-23	0
LC_DC1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-7.07096E-05	2.83733E-05	-2.492115465	0.014640048	0
LC_DC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	2.338397559	0.792588499	2.950329916	0.004100387	0
LC_DC1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000393766	4.69263E-05	-8.391145222	9.2115E-13	0
LC_DC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.10432874	0.341817822	-29.56056734	1.70595E-46	0
LC_DC1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	1.39406E-05	2.02378E-05	0.688841178	0.492799184	0
LC_DC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-6.524734561	0.249240245	-26.1784952	1.89521E-42	0
LC_DC1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000112612	1.47566E-05	7.631311119	3.107E-11	1
LC_DC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-8.197830426	1.429323741	-5.735460899	1.45455E-07	0
LC_DC1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	5.07083E-05	8.46252E-05	0.599210653	0.55062621	0
LC_DC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-6.390203312	0.401345835	-15.92193751	3.0953E-27	0
LC_DC1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000330199	2.37623E-05	-13.8959371	1.36442E-23	0
LC_DC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-9.316284636	0.288683293	-32.27164459	1.7988E-49	0
LC_DC1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	0.000154805	1.70919E-05	9.057231503	4.13512E-14	1
LC_DC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-10.33258818	0.64862118	-15.93008137	2.99578E-27	0
LC_DC1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	0.000172666	3.84025E-05	4.496205709	2.17294E-05	1
LC_DC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-19.66786807	1.041997922	-18.87515095	3.81544E-32	0
LC_DC1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.000818046	6.1693E-05	13.25995247	2.11141E-22	1
LC_DC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.938803016	0.159090802	5.901051492	7.16612E-08	0
LC_DC1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	1.39253E-06	9.4192E-06	0.147839119	0.882819872	0
LC_DC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.63417485	0.309151262	-37.63262927	8.9083E-55	0
LC_DC1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	8.63757E-06	1.83037E-05	0.471901769	0.638206092	0
LC_DC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-6.420353381	0.334980998	-19.16632116	1.32655E-32	0
LC_DC1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	0.000206867	1.9833E-05	10.43043036	7.01221E-17	1
LC_DC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.63417485	0.309151262	-37.63262927	8.9083E-55	0
LC_DC1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	8.63757E-06	1.83037E-05	0.471901769	0.638206092	0
LC_DC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.321462903	0.309206614	-30.14638913	3.71459E-47	0
LC_DC1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	8.00402E-06	1.8307E-05	0.437210476	0.663067513	0
LC_DC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-4.604827326	0.005793894	-794.7724762	2.5892E-166	0
LC_DC1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-3.49963E-09	3.43036E-07	-0.010201927	0.991884088	0
LC_DC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-12.7210565	0.541300858	-23.50089847	6.056E-39	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
LC_DC1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	0.000288592	3.20485E-05	9.004854538	5.27901E-14	1
LC_DC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-2.735082588	0.437479656	-6.251908066	1.56161E-08	0
LC_DC1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000266459	2.59016E-05	-10.28735232	1.35803E-16	0
LC_DC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	0.510905358	0.858004749	0.595457495	0.553119841	0
LC_DC1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000391382	5.07994E-05	-7.704458323	2.21836E-11	0
LC_DC1	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	4.512725961	0.916315162	4.924862262	2.8801E-05	0
LC_DC1	Field Measured	Conductivity (µS/cm)_Field Measured	Date	6.31461E-05	5.66742E-05	1.114195364	0.274042582	0
LC_DC1	Field Measured	Conductivity (µS/cm at 25 C)_Field Measured	(Intercept)	-4.123034468	7.636327009	-0.53992377	0.612418821	0
LC_DC1	Field Measured	Conductivity (µS/cm at 25 C)_Field Measured	Date	0.000586231	0.000462903	1.26642486	0.261152501	0
LC_DC1	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	5.516898561	0.225798105	24.43288252	4.00874E-39	0
LC_DC1	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-6.06782E-05	1.332E-05	-4.555405322	1.82522E-05	0
LC_DC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	2.461747751	0.23222089	10.60088843	3.67933E-17	0
LC_DC1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-1.86959E-06	1.37406E-05	-0.136063571	0.892096581	0
LC_DC1	Field Measured	pH (-)_Field Measured	(Intercept)	2.228912329	0.065648476	33.95223253	1.91595E-50	0
LC_DC1	Field Measured	pH (-)_Field Measured	Date	-5.82538E-06	3.88125E-06	-1.500901045	0.137175874	0
LC_DC1	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	(Intercept)	-2.562594133	1.368786706	-1.872164685	0.06715806	0
LC_DC1	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	Date	0.000478539	7.83236E-05	6.109769207	1.58508E-07	1
LC_DC1	Field Measured	Turbidity (FNU)_Field Measured	(Intercept)	699.1376428	-	-	-	0
LC_DC1	Field Measured	Turbidity (FNU)_Field Measured	Date	-0.04294308	-	-	-	0
LC_DC1	Field Measured	Turbidity (Wedge Unit)_Field Measured	(Intercept)	4.043051268	-	-	-	0
LC_DC1	Major Ions	Bicarbonate (mg/L)_Major Ions	(Intercept)	4.9698133	-	-	-	0
LC_DC1	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	-3.05549839	0.055871217	-54.68823751	5.05781E-68	0
LC_DC1	Major Ions	Bromide (mg/L)_Major Ions	Date	3.75672E-06	3.30794E-06	1.135669056	0.259287141	0
LC_DC1	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	1.437841216	0.392962469	3.658978476	0.000438437	0
LC_DC1	Major Ions	Calcium (mg/L)_Major Ions	Date	0.000139747	2.32659E-05	6.006512679	4.54774E-08	1
LC_DC1	Major Ions	Carbonate (mg/L)_Major Ions	(Intercept)	-0.510825624	-	-	-	0
LC_DC1	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	-5.411491632	1.364431874	-3.96611347	0.000151864	0
LC_DC1	Major Ions	Chloride (mg/L)_Major Ions	Date	0.000328493	8.07831E-05	4.066360757	0.000106271	1
LC_DC1	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-0.808750846	0.275216886	-2.93859457	0.004243736	0
LC_DC1	Major Ions	Fluoride (mg/L)_Major Ions	Date	-7.94234E-05	1.62946E-05	-4.874215964	5.01924E-06	0
LC_DC1	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	(Intercept)	0.084349909	4.701156987	0.017942372	0.985789706	0
LC_DC1	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	Date	-0.000357527	0.000265765	-1.345273778	0.187441252	0
LC_DC1	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	-0.01249365	0.421082773	-0.029670296	0.976399557	0
LC_DC1	Major Ions	Magnesium (mg/L)_Major Ions	Date	0.000166608	2.49308E-05	6.682799376	2.31437E-09	1
LC_DC1	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	1.74906107	0.50846914	3.439856884	0.00090426	0
LC_DC1	Major Ions	Potassium (mg/L)_Major Ions	Date	-8.7089E-05	3.01046E-05	-2.892874731	0.004847441	0
LC_DC1	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	1.424721066	0.584275068	2.438442344	0.016832729	0
LC_DC1	Major Ions	Sodium (mg/L)_Major Ions	Date	-6.89064E-05	3.45928E-05	-1.991925579	0.049589413	0
LC_DC1	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	-8.654223466	0.706447055	-12.2503497	1.7987E-20	0
LC_DC1	Major Ions	Sulphate (mg/L)_Major Ions	Date	0.000664232	4.18262E-05	15.88075116	3.65205E-27	1
LC_DC1	Major Ions	Sulphide (mg/L)_Major Ions	(Intercept)	4.253192513	2.256352107	1.884986168	0.063903315	0
LC_DC1	Major Ions	Sulphide (mg/L)_Major Ions	Date	-0.0006006	0.000130992	-4.585012387	2.12039E-05	0
LC_DC1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	(Intercept)	0.693147181	0	Inf	0	0
LC_DC1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	Date	0	0	-	-	0
LC_DC1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-93.7258874	49.70062223	-1.885809135	0.155797983	0
LC_DC1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.005561819	0.003093884	1.797681771	0.17007435	0
LC_DC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	4.51784E-15	-2.66493E+14	0	0
LC_DC1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	5.2529E-19	2.85065E-19	1.842704876	0.077262258	0
LC_DC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-40.16919317	2.625878852	-15.29742819	3.89035E-26	0
LC_DC1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	0.002303512	0.000155469	14.81654447	2.82576E-25	1
LC_DC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-17.01325516	1.54896871	-10.98360157	5.51553E-18	0
LC_DC1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	0.000631336	9.17089E-05	6.884126855	9.37093E-10	1
LC_DC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-12.9974701	0.916305606	-14.18464541	3.99912E-24	0
LC_DC1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000483401	5.42512E-05	8.91042316	8.19925E-14	1
LC_DC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-8.74485146	1.228619067	-7.11762636	3.25725E-10	0
LC_DC1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000397669	7.27422E-05	5.466825298	4.50883E-07	1
LC_DC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-0.282950364	1.030953624	-0.274454987	0.784442473	0
LC_DC1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000255275	6.08623E-05	-4.194296023	7.02471E-05	0
LC_DC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	5.61971651	35.29129692	0.159238028	0.877428098	0
LC_DC1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.00062024	0.002272165	-0.272973017	0.791788119	0
LC_DC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	10.03823154	1.727556821	5.810652025	1.05569E-07	0
LC_DC1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000820562	0.000102282	-8.022511438	5.10102E-12	0
LC_DC1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	(Intercept)	-17.90505846	2.429015675	-7.371322733	8.60171E-06	0
LC_DC1	Speciation of Selenium	Dissolved Dimethylseleneoxide (µg/L)_Speciation of Selenium	Date	0.000737358	0.000135161	5.455392828	0.000146387	1
LC_DC1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	(Intercept)	-11.79322325	3.655809947	-3.225885214	0.007274621	0
LC_DC1	Speciation of Selenium	Dissolved Methylseleninic Acid (µg/L)_Speciation of Selenium	Date	0.000406331	0.000203426	1.997439949	0.06896401	0
LC_DC1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	(Intercept)	-27.96469472	4.256457071	-6.569946379	2.65117E-05	0
LC_DC1	Speciation of Selenium	Dissolved Selenate (µg/L)_Speciation of Selenium	Date	0.001677769	0.000236848	7.083727954	1.27622E-05	1
LC_DC1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	(Intercept)	-35.62291055	12.19865362	-2.920232976	0.012834765	0
LC_DC1	Speciation of Selenium	Dissolved Selenite (µg/L)_Speciation of Selenium	Date	0.001872464	0.000678788	2.758540766	0.017325945	1
LC_DC1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	(Intercept)	-22.03871647	3.437148266	-6.411919058	3.34302E-05	0
LC_DC1	Speciation of Selenium	Dissolved Selenocyanate (µg/L)_Speciation of Selenium	Date	0.001043389	0.000191258	5.455392828	0.000146387	1
LC_DC1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	(Intercept)	-17.90505846	2.429015675	-7.371322733	8.60171E-06	0
LC_DC1	Speciation of Selenium	Dissolved Selenomethionine (µg/L)_Speciation of Selenium	Date	0.000737358	0.000135161	5.455392828	0.000146387	1
LC_DC1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	(Intercept)	-29.41318727	4.85803135	-6.054548675	5.71875E-05	0
LC_DC1	Speciation of Selenium	Dissolved Selenosulphate (µg/L)_Speciation of Selenium	Date	0.001474716	0.000270323	5.455392828	0.000146387	1
LC_DC1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	(Intercept)	-29.41318727	4.85803135	-6.054548675	5.71875E-05	0
LC_DC1	Speciation of Selenium	Unknown Dissolved Selenium Species (µg/L)_Speciation of Selenium	Date	0.001474716	0.000270323	5.455392828	0.000146387	1
LC_DC1	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	-0.795888755	2.642156577	-0.301226945	0.763977105	0
LC_DC1	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000208418	0.000156433	-1.332315718	0.186317447	0
LC_DC1	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-10.60092	0.416779777	-25.4353032	1.6666E-41	0
LC_DC1	Total Metals	Antimony (mg/L)_Total Metals	Date	0.000117247	2.4676E-05	4.751443591	8.13237E-06	1
LC_DC1	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-8.375961054	0.572346908	-14.63441304	6.03401E-25	0
LC_DC1	Total Metals	Arsenic (mg/L)_Total Metals	Date	-6.69222E-06	3.38866E-05	-0.197488677	0.843916644	0
LC_DC1	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-4.185482623	0.284407121	-14.71651836	4.28406E-25	0
LC_DC1	Total Metals	Barium (mg/L)_Total Metals	Date	0.000146368	1.68387E-05	8.692323917	2.26622E-13	1
LC_DC1	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	3.953194118	0.998005637	3.961093975	0.000154581	0
LC_DC1	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.00082705	5.90884E-05	-13.99682786	8.87541E-24	0
LC_DC1	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	9.718857446	1.288198445	7.544534371	4.6305E-11	0
LC_DC1	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001113377	7.62696E-05	-14.59790315	7.02861E-25	0
LC_DC1	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-3.615696225	0.358451788	-10.08698059	3.4336E-16	0
LC_DC1	Total Metals	Boron (mg/L)_Total Metals	Date	-5.44772E-05	2.12227E-05	-2.566938715	0.01201085	0
LC_DC1	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-10.81090637	0.798637271	-13.53669151	6.37284E-23	0
LC_DC1	Total Metals	Cadmium (mg/L)_Total Metals	Date	5.05168E-05	4.72845E-05	1.068360092	0.28838288	0
LC_DC1	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	1.534833842	0.389740166	3.938095113	0.00016764	0
LC_DC1	Total Metals	Calcium (mg/L)_Total Metals	Date	0.000134094	2.30751E-05	5.811175398	1.05333E-07	1
LC_DC1	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-5.847851978	0.988390063	-5.916542667	6.70432E-08	0
LC_DC1	Total Metals	Chromium (mg/L)_Total Metals	Date	-0.000173597	5.85191E-05	-2.966495617	0.003910237	0
LC_DC1	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-9.121386304	0.521238578	-17.49944591	6.45178E-30	0
LC_DC1	Total Metals	Cobalt (mg/L)_Total Metals	Date	-9.43938E-08	3.08607E-05	-0.003058708	0.997566675	0
LC_DC1	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-6.637478249	0.526272863	-12.61223734	3.60862E-21	0
LC_DC1	Total Metals	Copper (mg/L)_Total Metals	Date	-5.10209E-05	3.11587E-05	-1.637449518	0.105233675	0
LC_DC1	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	1.818468558	1.692039547	1.074719891	0.285541472	0
LC_DC1	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000310547	0.00010018	-3.099901128	0.002625445	0
LC_DC1	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-8.518487744	0.948263357	-8.983250996	5.83848E-14	0
LC_DC1	Total Metals	Lead (mg/L)_Total Metals	Date	-6.92836E-05	5.61433E-05	-1.234049322	0.220585675	0
LC_DC1	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-6.463523981	0.259398538	-24.91734934	7.80774E-41	0
LC_DC1	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000108887	1.53581E-05	7.089917356	3.69397E-10	1
LC_DC1	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	0.175870798	0.42635847	0.412495142	0.681015098	0
LC_DC1	Total Metals	Magnesium (mg/L)_Total Metals	Date	0.000155498	2.52432E-05	6.159991442	2.3345E-08	1
LC_DC1	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-8.62578176	1.431163897	-6.027109668	4.15987E-08	0
LC_DC1	Total Metals	Manganese (mg/L)_Total Metals	Date	0.000148203	8.47341E-05	1.749032028	0.08389527	0
LC_DC1	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	9.690285132	1.408957258	6.877628881	9.64944E-10	0
LC_DC1	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.00134525	8.34193E-05	-16.12635811	1.36635E-27	0
LC_DC1	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	0.570595004	10.74219536	0.053117169	0.958798895	0
LC_DC1	Total Metals	Methyl mercury (µg/L)_Total Metals	Date	-0.000610236	0.000606228	-1.006610686	0.340416982	0
LC_DC1	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-8.957542936	0.297822743	-30.07675918	4.44673E-47	0
LC_DC1	Total Metals	Molybdenum (mg/L)_Total Metals	Date	0.000134966	1.7633E-05	7.654162419	2.79677E-11	1
LC_DC1	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-10.41924372	0.866117461	-12.02982757	4.81971E-20	0
LC_DC1	Total Metals	Nickel (mg/L)_Total Metals	Date	0.000186666	5.12797E-05	3.640153067	0.000467079	1
LC_DC1	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	1.893493685	0.490315136	3.861789176	0.000218957	0
LC_DC1	Total Metals	Potassium (mg/L)_Total Metals	Date	-9.56216E-05	2.90298E-05	-3.293911568	0.001441521	0
LC_DC1	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-19.49492771	0.977337997	-19.94696592	8.20387E-34	0
LC_DC1	Total Metals	Selenium (mg/L)_Total Metals	Date	0.000805879	5.78647E-05	13.92695649	1.19528E-23	1
LC_DC1	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	1.041418897	0.169151259	6.156731579	2.36794E-08	0
LC_DC1	Total Metals	Silicon (mg/L)_Total Metals	Date	-2.9494E-06	1.00148E-05	-0.294502998	0.769091611	0
LC_DC1	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.11716189	0.433401713	-25.65094127	8.82468E-42	0
LC_DC1	Total Metals	Silver (mg/L)_Total Metals	Date	-1.95367E-05	2.56602E-05	-0.761362147	0.448547989	0
LC_DC1	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	1.556946967	0.580263962	2.683170195	0.00876327	0
LC_DC1	Total Metals	Sodium (mg/L)_Total Metals	Date	-7.70703E-05	3.43554E-05	-2.243327788	0.027476211	0
LC_DC1	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-6.119993214	0.332744797	-18.3924535	2.24857E-31	0
LC_DC1	Total Metals	Strontium (mg/L)_Total Metals	Date	0.000190104	1.97006E-05	9.649638582	2.61714E-15	1
LC_DC1	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-11.01736981	0.445244175	-24.7445569	1.31414E-40	0
LC_DC1	Total Metals	Thallium (mg/L)_Total Metals	Date	-2.52758E-05	2.63613E-05	-0.958820027	0.340368818	0
LC_DC1	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.242744663	0.31103406	-29.71618178	1.13514E-46	0
LC_DC1	Total Metals	Tin (mg/L)_Total Metals	Date	3.35869E-06	1.84152E-05	0.182386853	0.855713432	0
LC_DC1	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-4.556949592	0.056698395	-80.37175665	5.8069E-82	0
LC_DC1	Total Metals	Titanium (mg/L)_Total Metals	Date	-2.62463E-06	3.35691E-06	-0.781860415	0.436469129	0
LC_DC1	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-12.07620802	0.493024809	-24.49411833	2.80869E-40	0
LC_DC1	Total Metals	Uranium (mg/L)_Total Metals	Date	0.00025204	2.91902E-05	8.634388974	2.96848E-13	1
LC_DC1	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-3.178397801	0.718804562	-4.421783009	2.87831E-05	0
LC_DC1	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000227489	4.25579E-05	-5.345406517	7.46252E-07	0
LC_DC1	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-5.508303873	0.702516653	-7.840816082	1.18237E-11	0
LC_DC1	Total Metals	Zinc (mg/L)_Total Metals	Date	-1.03679E-05	4.15935E-05	-0.249268188	0.803754701	0
LC_FRB	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.363398765	0.442597057	-0.821060057	0.413964132	0
LC_FRB	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	2.49075E-05	2.61524E-05	0.952398505	0.34366027	0
LC_FRB	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.47631557	0.24280609	18.43576317	6.6548E-31	0
LC_FRB	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	4.155E-05	1.43526E-05	2.89493956	0.004858396	1
LC_FRB	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-4.080996852	2.094099213	-1.948807787	0.054738151	0
LC_FRB	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.00030549	0.000123785	2.467896827	0.015670801	1
LC_FRB	Conventional Parameters	Colour (CU)_Conventional Parameters	(Intercept)	1.609437912	7.29165E-15	2.20723E+14	2.3793E-248	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
LC_FRB	Conventional Parameters	Colour (CU)_Conventional Parameters	Date	-8.37961E-19	4.45108E-19	-1.88259918	0.076021562	0
LC_FRB	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	5.358035842	0.41680898	12.85489541	1.90939E-21	0
LC_FRB	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	6.8355E-05	2.46286E-05	2.775432501	0.006810244	1
LC_FRB	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	0.232099318	0.833207448	0.278561262	0.781274373	0
LC_FRB	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	-2.44371E-05	4.92329E-05	-0.496356378	0.62095498	0
LC_FRB	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.997586285	0.453936196	11.00944655	6.67821E-18	0
LC_FRB	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	5.57036E-05	2.68224E-05	2.0767586	0.040916703	1
LC_FRB	Conventional Parameters	Hydroxide (mg/L)_Conventional Parameters	(Intercept)	-1.078809661	-	-	-	0
LC_FRB	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	0	0	-	-	0
LC_FRB	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0	0	-	-	0
LC_FRB	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	6.553678461	0.42215986	15.52416297	2.86918E-26	0
LC_FRB	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-3.86055E-05	2.49448E-05	-1.547638301	0.125514083	0
LC_FRB	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.033050007	0.027418794	74.1480472	1.25221E-77	0
LC_FRB	Conventional Parameters	pH (-)_Conventional Parameters	Date	4.95447E-06	1.62013E-06	3.058060445	0.002998048	1
LC_FRB	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.418691156	0.24621216	17.94668125	2.61952E-30	0
LC_FRB	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	4.61853E-05	1.45483E-05	3.174618671	0.002105543	1
LC_FRB	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	4.862091608	0.506385889	9.601554289	4.09392E-15	0
LC_FRB	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	7.6442E-05	2.99215E-05	2.554746469	0.012452152	1
LC_FRB	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	2.588796803	1.135936697	2.27899742	0.025266641	0
LC_FRB	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-0.000154593	6.71106E-05	-2.30355543	0.023779432	0
LC_FRB	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	5.175952683	2.235365847	2.315483477	0.023054774	0
LC_FRB	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-0.000259578	0.000132084	-1.965247943	0.052730224	0
LC_FRB	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	3.253509668	2.748554515	1.183716623	0.239904356	0
LC_FRB	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-0.00022652	0.000162408	-1.394761841	0.166809319	0
LC_FRB	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-6.169967585	0.921054975	-6.698804909	2.34299E-09	0
LC_FRB	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	2.46036E-05	5.44237E-05	0.452075658	0.652393739	0
LC_FRB	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-8.403318845	0.355618376	-23.6301592	1.30845E-38	0
LC_FRB	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	-4.29645E-05	2.10129E-05	-2.044667882	0.04405666	0
LC_FRB	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-9.151346778	0.213741265	-42.81506798	2.35278E-58	0
LC_FRB	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	-1.7144E-06	1.26296E-05	-0.135744115	0.892352256	0
LC_FRB	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-2.651748737	0.566206244	-4.683361878	1.0893E-05	0
LC_FRB	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	2.34547E-05	3.34562E-05	0.701056472	0.485228643	0
LC_FRB	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	4.560526188	0.952125759	4.789835951	7.20704E-06	0
LC_FRB	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000862733	5.62596E-05	-15.3348542	6.12387E-26	0
LC_FRB	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	9.952307601	1.419611957	7.010583107	5.82522E-10	0
LC_FRB	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001128093	8.38826E-05	-13.44847264	1.49773E-22	0
LC_FRB	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.514253186	0.121702989	-37.09237729	1.94479E-53	0
LC_FRB	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-4.84707E-06	7.19124E-06	-0.674025019	0.50216829	0
LC_FRB	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-9.238965189	0.710258211	-13.00789635	9.86796E-22	0
LC_FRB	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-9.434E-05	4.1968E-05	-2.247901271	0.02723422	0
LC_FRB	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-10.10955094	0.458955839	-22.02728474	2.01564E-36	0
LC_FRB	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	6.19031E-05	2.7119E-05	2.282649782	0.025008717	1
LC_FRB	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-9.675447312	0.212497662	-45.5320177	1.75127E-60	0
LC_FRB	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	2.86394E-05	1.25562E-05	2.280903125	0.025116635	1
LC_FRB	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-6.372800682	0.536245283	-11.88411513	1.33751E-19	0
LC_FRB	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-7.65925E-05	3.16859E-05	-2.417242316	0.017829342	0
LC_FRB	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	1.472597277	0.97372408	1.512335278	0.134247001	0
LC_FRB	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000344727	5.75358E-05	-5.991517085	5.15207E-08	0
LC_FRB	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.15136342	0.294981698	-34.41353648	6.72682E-51	0
LC_FRB	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	1.55281E-05	1.743E-05	0.890884877	0.375566169	0
LC_FRB	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-7.402698366	0.364727768	-20.29650336	6.27256E-34	0
LC_FRB	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000193172	2.15512E-05	8.963420492	7.7289E-14	1
LC_FRB	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-2.345794418	1.377102892	-1.703427123	0.092229935	0
LC_FRB	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	-0.000265598	8.13709E-05	-3.264041528	0.001596308	0
LC_FRB	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-6.228882716	0.427345781	-14.57574403	1.34043E-24	0
LC_FRB	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.00033959	2.52512E-05	-13.44847264	1.49773E-22	0
LC_FRB	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-7.244702513	0.315040864	-22.99607238	9.30744E-38	0
LC_FRB	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	6.87613E-06	1.86153E-05	0.369381149	0.712784359	0
LC_FRB	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-5.041684962	0.776289227	-6.494596068	5.77881E-09	0
LC_FRB	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	-0.000133641	4.58697E-05	-2.913492715	0.00459141	0
LC_FRB	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-5.189180341	0.6763509	-7.672319714	2.91173E-11	0
LC_FRB	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.000116869	3.99645E-05	2.924326576	0.004449167	1
LC_FRB	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.445424845	0.212911852	2.092062238	0.039488564	0
LC_FRB	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	1.47206E-05	1.25806E-05	1.170100205	0.245309545	0
LC_FRB	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.53386903	0.023704382	-486.5711669	3.495E-145	0
LC_FRB	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	1.30524E-06	1.40065E-06	0.931879677	0.354101502	0
LC_FRB	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-3.152646238	0.429578752	-7.338924983	1.32536E-10	0
LC_FRB	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	6.7591E-05	2.53831E-05	2.662832878	0.009304463	1
LC_FRB	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.51292546	3.21157E-14	-3.58483E+14	0	0
LC_FRB	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	-3.46706E-18	1.89767E-18	-1.827015227	0.071291977	0
LC_FRB	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.210340372	4.81735E-14	-1.91191E+14	0	0
LC_FRB	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	-5.2006E-18	2.8465E-18	-1.827015227	0.071291977	0
LC_FRB	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-4.227125486	0.162841151	-25.95858277	1.34453E-41	0
LC_FRB	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-2.09519E-05	9.62203E-06	-2.177493728	0.03228254	0
LC_FRB	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-8.553242266	0.34659371	-24.67800776	5.56385E-40	0
LC_FRB	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	0.000129087	2.04797E-05	6.303177036	1.33718E-08	1
LC_FRB	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-1.687202628	0.434072261	-3.886916483	0.000203569	0
LC_FRB	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000335633	2.56486E-05	-13.08580203	7.05856E-22	0
LC_FRB	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	1.01886009	0.783393327	1.300572848	0.197004252	0
LC_FRB	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000421057	4.62895E-05	-9.09616175	4.1923E-14	0
LC_FRB	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	4.665853258	1.148133617	4.06385911	0.000479998	0
LC_FRB	Field Measured	Conductivity (µS/cm)_Field Measured	Date	0.000101994	7.08564E-05	1.439449887	0.163495374	0
LC_FRB	Field Measured	Conductivity (µS/cm at 25 C)_Field Measured	(Intercept)	8.455903248	4.170479956	2.027561177	0.070089621	0
LC_FRB	Field Measured	Conductivity (µS/cm at 25 C)_Field Measured	Date	-0.000123997	0.000254131	-0.487925326	0.63612345	0
LC_FRB	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	5.044030747	0.255041361	19.77730489	9.54682E-33	0
LC_FRB	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-3.343E-05	1.50452E-05	-2.221973397	0.029074431	0
LC_FRB	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	1.887459008	0.247284802	7.632733571	3.71319E-11	0
LC_FRB	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	3.12997E-05	1.46022E-05	2.143488526	0.035036652	1
LC_FRB	Field Measured	pH (-)_Field Measured	(Intercept)	2.27137	0.052914316	42.92543447	1.74795E-57	0
LC_FRB	Field Measured	pH (-)_Field Measured	Date	-9.15206E-06	3.12191E-06	-2.93155342	0.004382449	0
LC_FRB	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	(Intercept)	2.660150922	1.211837994	2.195137416	0.033022316	0
LC_FRB	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	Date	0.000218965	6.9321E-05	3.158709278	0.002740732	1
LC_FRB	Field Measured	Turbidity (FNU)_Field Measured	(Intercept)	2.337308529	-	-	-	0
LC_FRB	Field Measured	Turbidity (Wedge Unit)_Field Measured	(Intercept)	4.043051268	-	-	-	0
LC_FRB	Major Ions	Bicarbonate (mg/L)_Major Ions	(Intercept)	4.189654742	-	-	-	0
LC_FRB	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	3.585923684	1.794286838	1.998523094	0.048933508	0
LC_FRB	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.000353342	0.000106022	-3.332737525	0.001286152	0
LC_FRB	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	3.871769188	0.437009076	8.859699716	1.24659E-13	0
LC_FRB	Major Ions	Calcium (mg/L)_Major Ions	Date	3.83223E-05	2.58222E-05	1.484083764	0.141574503	0
LC_FRB	Major Ions	Carbonate (mg/L)_Major Ions	(Intercept)	-0.510825624	-	-	-	0
LC_FRB	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	3.856290057	0.782221649	4.92991988	4.15645E-06	0
LC_FRB	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000204511	4.62203E-05	-4.424704066	2.91221E-05	0
LC_FRB	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-0.263011222	0.355869546	-0.739066394	0.461951682	0
LC_FRB	Major Ions	Fluoride (mg/L)_Major Ions	Date	-9.07257E-05	2.10278E-05	-4.314563491	4.38664E-05	0
LC_FRB	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	(Intercept)	2.569966672	6.571462717	0.391079853	0.698413254	0
LC_FRB	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	Date	-0.000497162	0.000370297	-1.342602926	0.189149983	0
LC_FRB	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	2.200672018	0.487218383	4.516808262	2.05876E-05	0
LC_FRB	Major Ions	Magnesium (mg/L)_Major Ions	Date	8.26458E-05	2.8789E-05	2.870746176	0.005194519	1
LC_FRB	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	2.751571488	0.474531218	5.79850468	1.1738E-07	0
LC_FRB	Major Ions	Potassium (mg/L)_Major Ions	Date	-0.000150667	2.80393E-05	-5.37342275	6.93588E-07	0
LC_FRB	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	0.570696366	0.436807316	1.306517415	0.194985444	0
LC_FRB	Major Ions	Sodium (mg/L)_Major Ions	Date	4.14777E-06	2.58103E-05	0.160702397	0.872718295	0
LC_FRB	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	2.983735854	0.724322134	4.119349273	8.93982E-05	0
LC_FRB	Major Ions	Sulphate (mg/L)_Major Ions	Date	0.000121383	4.27991E-05	2.836105005	0.005735836	1
LC_FRB	Major Ions	Sulphide (mg/L)_Major Ions	(Intercept)	4.769088994	2.295620501	2.077472732	0.041594033	0
LC_FRB	Major Ions	Sulphide (mg/L)_Major Ions	Date	-0.000630615	0.000133564	-4.721435479	1.23784E-05	0
LC_FRB	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	(Intercept)	0.693147181	1.03863E-14	6.67369E+13	5.779E-200	0
LC_FRB	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	Date	1.04707E-18	6.35039E-19	1.648834953	0.119961784	0
LC_FRB	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-20.84779682	32.07281536	-0.650014555	0.56201993	0
LC_FRB	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.000876283	0.001995006	0.439238282	0.690201844	0
LC_FRB	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	5.14386E-15	-2.3406E+14	7.366E-303	0
LC_FRB	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-5.36583E-19	3.23616E-19	-1.658084092	0.111492433	0
LC_FRB	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	1.787926164	0.669504692	2.670520738	0.009110811	0
LC_FRB	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	3.21387E-05	3.956E-05	0.812404115	0.418883829	0
LC_FRB	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-2.239076878	0.977733907	-2.290067739	0.024554936	0
LC_FRB	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000187748	5.77728E-05	-3.249763035	0.001669018	0
LC_FRB	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-9.29515151	0.945752009	-9.82831802	1.44518E-15	0
LC_FRB	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.00025189	5.5883E-05	4.507456297	2.13292E-05	1
LC_FRB	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-10.42153212	1.755032351	-5.938085478	6.47737E-08	0
LC_FRB	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000488244	0.000103702	4.708143697	9.89865E-06	1
LC_FRB	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-7.840554271	1.250170349	-6.271588729	1.84492E-08	0
LC_FRB	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	7.12824E-05	7.36463E-05	0.967901495	0.336085224	0
LC_FRB	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	273.1997067	82.69532448	3.303689881	0.016332598	0
LC_FRB	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-0.01786724	0.005311739	-3.363726842	0.015159573	0
LC_FRB	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	11.93461925	2.920330164	4.086736286	0.000100507	0
LC_FRB	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.001009559	0.000172558	-5.850560019	9.40943E-08	0
LC_FRB	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	2.213701755	2.934993899	0.754244074	0.452837275	0
LC_FRB	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000383233	0.000173424	-2.20980334	0.029872476	0
LC_FRB	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-7.896740089	0.444917863	-17.74875938	5.44876E-30	0
LC_FRB	Total Metals	Antimony (mg/L)_Total Metals	Date	-6.82945E-05	2.62895E-05	-2.597785369	0.011098695	0
LC_FRB	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-7.5488412	0.773761712	-9.756028347	2.01366E-15	0
LC_FRB	Total Metals	Arsenic (mg/L)_Total Metals	Date	-8.18949E-05	4.57204E-05	-1.79121378	0.076904264	0
LC_FRB	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-2.070302646	0.540352753	-3.831390949	0.00024676	0
LC_FRB	Total Metals	Barium (mg/L)_Total Metals	Date	-1.11986E-05	3.19286E-05	-0.350739081	0.72667275	0
LC_FRB	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	4.409264814	0.953417466	4.624694816	1.36495E-05	0
LC_FRB	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000853027	5.63359E-05	-15.14179383	1.3331E-25	0
LC_FRB	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	9.765224512	1.429593331	6.83077089	1.30235E-09	0
LC_FRB	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001116344	8.44724E-05	-13.21548369	4.0475E-22	0
LC_FRB	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-3.730047555	0.266157676	-14.01442786	1.37586E-23	0
LC_FRB	Total Metals	Boron (mg/L)_Total Metals	Date	-4.82607E-05	1.57268E-05	-3.068682806	0.002904068	0
LC_FRB	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-7.286157191	1.066582466	-6.83131162	1.29922E-09	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
LC_FRB	Total Metals	Cadmium (mg/L)_Total Metals	Date	-0.000193008	6.30227E-05	-3.0625189	0.002958264	0
LC_FRB	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.089252714	0.438391237	9.32786144	1.44197E-14	0
LC_FRB	Total Metals	Calcium (mg/L)_Total Metals	Date	2.52975E-05	2.59039E-05	0.976592006	0.331609019	0
LC_FRB	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-6.16723777	1.144548054	-5.388360714	6.52226E-07	0
LC_FRB	Total Metals	Chromium (mg/L)_Total Metals	Date	-0.000139273	6.76295E-05	-2.059351615	0.042595087	0
LC_FRB	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-8.597533045	0.739948176	-11.61910162	4.3408E-19	0
LC_FRB	Total Metals	Cobalt (mg/L)_Total Metals	Date	-3.0117E-05	4.37224E-05	-0.688824157	0.492854942	0
LC_FRB	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-6.394814479	0.687014881	-9.308116403	1.5792E-14	0
LC_FRB	Total Metals	Copper (mg/L)_Total Metals	Date	-6.58924E-05	4.05946E-05	-1.62318087	0.108343033	0
LC_FRB	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	2.795827078	2.418188734	1.156165786	0.250930447	0
LC_FRB	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000372003	0.000142887	-2.603478105	0.010930005	0
LC_FRB	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-7.503267953	1.225126541	-6.124484045	2.90573E-08	0
LC_FRB	Total Metals	Lead (mg/L)_Total Metals	Date	-0.000130019	7.23908E-05	-1.796074467	0.076121421	0
LC_FRB	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-7.177038235	0.353185282	-20.3208871	5.77206E-34	0
LC_FRB	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000179384	2.08692E-05	8.595669043	4.20814E-13	1
LC_FRB	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	2.433531849	0.476402106	5.108146709	2.04121E-06	0
LC_FRB	Total Metals	Magnesium (mg/L)_Total Metals	Date	6.86035E-05	2.81499E-05	2.437082006	0.016943356	1
LC_FRB	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-1.487492595	1.804455845	-0.824344136	0.412106737	0
LC_FRB	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.000265045	0.000106622	-2.48582393	0.014931513	0
LC_FRB	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	11.96881212	1.557113411	7.68653846	2.72887E-11	0
LC_FRB	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001484962	9.20074E-05	-16.13959875	2.51781E-27	0
LC_FRB	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	-10.81977828	-	-	-	0
LC_FRB	Total Metals	Methyl mercury (µg/L)_Total Metals	Date	0	-	-	-	0
LC_FRB	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-6.779698494	0.336416775	-20.15267667	1.02578E-33	0
LC_FRB	Total Metals	Molybdenum (mg/L)_Total Metals	Date	-1.9468E-05	1.98783E-05	-0.979359634	0.330248353	0
LC_FRB	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-4.488436495	1.114929939	-4.025756541	0.000124934	0
LC_FRB	Total Metals	Nickel (mg/L)_Total Metals	Date	-0.00015748	6.58795E-05	-2.390431861	0.019092213	0
LC_FRB	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	3.106597847	0.450684004	6.893073233	9.86052E-10	0
LC_FRB	Total Metals	Potassium (mg/L)_Total Metals	Date	-0.000172355	2.66302E-05	-6.472164985	6.37822E-09	0
LC_FRB	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-4.914852014	0.660261241	-7.44379907	8.23767E-11	0
LC_FRB	Total Metals	Selenium (mg/L)_Total Metals	Date	9.84311E-05	3.90138E-05	2.522981615	0.013544658	1
LC_FRB	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	0.935914239	0.255499371	3.663078453	0.000440403	0
LC_FRB	Total Metals	Silicon (mg/L)_Total Metals	Date	-1.14645E-05	1.51013E-05	-0.759171767	0.449926671	0
LC_FRB	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-10.60173651	0.793368235	-13.36294553	2.15574E-22	0
LC_FRB	Total Metals	Silver (mg/L)_Total Metals	Date	-5.02032E-05	4.68789E-05	-1.070913702	0.287312481	0
LC_FRB	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	0.854291412	0.439779065	1.942546791	0.055461931	0
LC_FRB	Total Metals	Sodium (mg/L)_Total Metals	Date	-1.31E-05	2.59859E-05	-0.504118995	0.615513351	0
LC_FRB	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-2.754565878	0.430794653	-6.394150568	8.98321E-09	0
LC_FRB	Total Metals	Strontium (mg/L)_Total Metals	Date	4.43894E-05	2.5455E-05	1.74384128	0.084889238	0
LC_FRB	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-10.65838853	0.498025761	-21.40127955	1.54846E-35	0
LC_FRB	Total Metals	Thallium (mg/L)_Total Metals	Date	-4.77134E-05	2.94276E-05	-1.621385428	0.108727988	0
LC_FRB	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-10.05601185	0.343978492	-29.23442041	1.83125E-45	0
LC_FRB	Total Metals	Tin (mg/L)_Total Metals	Date	5.1907E-05	2.03251E-05	2.553832364	0.012482447	1
LC_FRB	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-3.756046541	0.246955703	-15.20939379	1.01469E-25	0
LC_FRB	Total Metals	Titanium (mg/L)_Total Metals	Date	-4.77443E-05	1.45922E-05	-3.271901321	0.001557562	0
LC_FRB	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-8.17899069	0.32696631	-25.01478114	2.0607E-40	0
LC_FRB	Total Metals	Uranium (mg/L)_Total Metals	Date	0.000107712	1.93199E-05	5.575158083	3.00528E-07	1
LC_FRB	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-1.362833353	0.705265185	-1.932370096	0.056724973	0
LC_FRB	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000350155	4.1673E-05	-8.402445685	1.02434E-12	0
LC_FRB	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-5.633935749	0.784036682	-7.185806323	2.64794E-10	0
LC_FRB	Total Metals	Zinc (mg/L)_Total Metals	Date	-4.19791E-06	4.63275E-05	-0.090613835	0.92801776	0
LC_FRUS	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.257860597	0.440512213	-0.585365375	0.56376613	0
LC_FRUS	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	1.66253E-05	2.66705E-05	0.623356388	0.538929849	0
LC_FRUS	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.911922287	0.650574513	7.550130211	8.65467E-08	0
LC_FRUS	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	1.58991E-05	3.93886E-05	0.40364595	0.690047036	0
LC_FRUS	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-6.381716975	5.430224379	-1.175221598	0.251434073	0
LC_FRUS	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	0.00044453	0.00032877	1.352103165	0.188947334	0
LC_FRUS	Conventional Parameters	Colour (CU)_Conventional Parameters	(Intercept)	1.609437912	0	Inf	0	0
LC_FRUS	Conventional Parameters	Colour (CU)_Conventional Parameters	Date	0	0	-	-	0
LC_FRUS	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	6.81533197	1.080011984	6.310422544	1.59622E-06	0
LC_FRUS	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	-1.59167E-05	6.53887E-05	-0.243416607	0.809751252	0
LC_FRUS	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-0.857192249	2.100289474	-0.408130527	0.686796153	0
LC_FRUS	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	3.89739E-05	0.000127161	0.306493532	0.761872146	0
LC_FRUS	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	6.643684698	1.144795446	5.803381486	5.53617E-06	0
LC_FRUS	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	-4.07357E-05	6.93109E-05	-0.587723763	0.562207416	0
LC_FRUS	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.107705887	0.889117255	-0.121138001	0.904590247	0
LC_FRUS	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	8.13888E-06	5.38311E-05	0.151192989	0.88108715	0
LC_FRUS	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	10.27701803	0.860326977	11.94547923	1.37335E-11	0
LC_FRUS	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-0.000264354	5.2088E-05	-5.075141202	3.43653E-05	0
LC_FRUS	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.08649432	0.049866946	41.84122959	6.06889E-24	0
LC_FRUS	Conventional Parameters	pH (-)_Conventional Parameters	Date	2.00835E-06	3.01916E-06	0.665200541	0.512264637	0
LC_FRUS	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.744825465	0.609699358	7.78223792	5.12569E-08	0
LC_FRUS	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	2.71568E-05	3.69139E-05	0.735678813	0.469055578	0
LC_FRUS	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	6.295100229	1.272475767	4.94712779	4.75314E-05	0
LC_FRUS	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	-5.46859E-06	7.70413E-05	-0.070982641	0.943999761	0
LC_FRUS	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	-0.487645578	2.450326887	-0.199012459	0.843929373	0
LC_FRUS	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	1.72551E-05	0.000148354	0.116310645	0.908374141	0
LC_FRUS	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	-2.354408911	4.778995613	-0.492657684	0.626731568	0
LC_FRUS	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	0.000168966	0.000289341	0.583967609	0.564690989	0
LC_FRUS	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	5.231814156	5.706074044	0.91688508	0.368325076	0
LC_FRUS	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-0.000365215	0.000345471	-1.057151869	0.300967635	0
LC_FRUS	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-5.284929013	0.987110467	-5.353938784	1.7007E-05	0
LC_FRUS	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-2.99518E-05	5.9764E-05	-0.5011672	0.620819299	0
LC_FRUS	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-8.301345478	0.867314785	-9.571317846	1.14853E-09	0
LC_FRUS	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	-5.18121E-05	5.2511E-05	-0.986688871	0.333638795	0
LC_FRUS	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-9.138608092	0.121522533	-75.20093468	5.23923E-30	0
LC_FRUS	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	-4.12297E-06	7.35751E-06	-0.560376475	0.580416628	0
LC_FRUS	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-0.919762087	1.637324542	-0.561746962	0.579497129	0
LC_FRUS	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	-7.90411E-05	9.91308E-05	-0.797341282	0.433071027	0
LC_FRUS	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	5.809384109	1.460074128	3.978828198	0.000555855	0
LC_FRUS	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000921034	8.83993E-05	-10.41902383	2.1918E-10	0
LC_FRUS	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	16.5554708	5.241241209	3.158692786	0.004243868	0
LC_FRUS	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001511497	0.000317328	-4.763204489	7.5826E-05	0
LC_FRUS	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.092043795	0.469152244	-8.722208731	6.61073E-09	0
LC_FRUS	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	-2.85105E-05	2.84045E-05	-1.003730012	0.325522033	0
LC_FRUS	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-6.924981935	2.57264144	-2.691778895	0.012744517	0
LC_FRUS	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-0.000231282	0.000155759	-1.484871778	0.150594934	0
LC_FRUS	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-7.572587745	1.288728886	-5.876013043	4.62542E-06	0
LC_FRUS	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-8.67423E-05	7.80253E-05	-1.111719951	0.277271569	0
LC_FRUS	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-9.210340372	1.13949E-14	-8.08285E+14	0	0
LC_FRUS	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	6.81173E-19	6.89898E-19	0.987352605	0.333320078	0
LC_FRUS	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-7.525245481	1.32132693	-5.69521843	7.24176E-06	0
LC_FRUS	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-2.18402E-06	7.99989E-05	-0.02730067	0.978445667	0
LC_FRUS	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	-0.013937657	2.377597234	-0.005862077	0.995371222	0
LC_FRUS	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.00026829	0.00014395	-1.863772829	0.074633477	0
LC_FRUS	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-9.903487553	3.41848E-14	-2.89705E+14	0	0
LC_FRUS	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	2.04352E-18	2.0697E-18	0.987352605	0.333320078	0
LC_FRUS	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-7.727542551	0.788657196	-9.798354208	7.30634E-10	0
LC_FRUS	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	0.000213141	4.77488E-05	4.463810048	0.000162393	1
LC_FRUS	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-4.069125539	2.621427386	-1.552255676	0.133689426	0
LC_FRUS	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	-0.000157985	0.000158713	-0.995412508	0.329466489	0
LC_FRUS	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-4.241132529	1.577770818	-2.6880536	0.012853683	0
LC_FRUS	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000455006	9.55252E-05	-4.763204489	7.5826E-05	0
LC_FRUS	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-8.067079602	0.960778953	-8.396395008	1.32676E-08	0
LC_FRUS	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	5.33297E-05	5.81698E-05	0.916793091	0.368372312	0
LC_FRUS	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-5.745156111	1.79770484	-3.195828359	0.003879664	0
LC_FRUS	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	-0.000101944	0.000108841	-0.936628762	0.358279692	0
LC_FRUS	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-3.795849908	1.735190158	-2.187569985	0.038676218	0
LC_FRUS	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	3.84342E-05	0.000105056	0.365844964	0.717685739	0
LC_FRUS	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.457947148	0.530788953	0.862766915	0.396805409	0
LC_FRUS	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	1.49245E-05	3.21363E-05	0.464412596	0.646537584	0
LC_FRUS	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.51292546	3.41848E-14	-3.36785E+14	0	0
LC_FRUS	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	2.04352E-18	2.0697E-18	0.987352605	0.333320078	0
LC_FRUS	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-1.382115793	1.076131789	-1.284336924	0.21128384	0
LC_FRUS	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	-3.57768E-05	6.51537E-05	-0.549112736	0.588001206	0
LC_FRUS	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.51292546	3.41848E-14	-3.36785E+14	0	0
LC_FRUS	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	2.04352E-18	2.0697E-18	0.987352605	0.333320078	0
LC_FRUS	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.210340372	1.13949E-14	-8.08285E+14	0	0
LC_FRUS	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	6.81173E-19	6.89898E-19	0.987352605	0.333320078	0
LC_FRUS	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-2.744416616	0.874959358	-3.136621822	0.004475707	0
LC_FRUS	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-0.000106319	5.29739E-05	-2.007010559	0.056138878	0
LC_FRUS	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-7.765865599	0.839428923	-9.251367668	2.19686E-09	0
LC_FRUS	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	8.42172E-05	5.08227E-05	1.65707711	0.110520625	0
LC_FRUS	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	0.364037657	1.577770818	0.23072911	0.819480795	0
LC_FRUS	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000455006	9.55252E-05	-4.763204489	7.5826E-05	0
LC_FRUS	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	2.023441587	1.096549328	1.845280952	0.077371238	0
LC_FRUS	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.00047956	6.63899E-05	-7.223386426	1.83112E-07	0
LC_FRUS	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	5.206743559	2.29411928	2.269604551	0.042468306	0
LC_FRUS	Field Measured	Conductivity (µS/cm)_Field Measured	Date	6.85051E-05	0.000138075	0.496144763	0.628754964	0
LC_FRUS	Field Measured	Conductivity (µS/cm at 25 C)_Field Measured	(Intercept)	8.079781396	4.226242025	1.911812279	0.082287519	0
LC_FRUS	Field Measured	Conductivity (µS/cm at 25 C)_Field Measured	Date	-0.00010044	0.000257499	-0.390059539	0.703939527	0
LC_FRUS	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	1.095954546	2.798198102	0.391664388	0.698762247	0
LC_FRUS	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	0.000196365	0.000169312	1.159781652	0.257546098	0
LC_FRUS	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	-0.017020694	2.906862505	-0.005855349	0.995376534	0
LC_FRUS	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	0.000139451	0.000175887	0.792846782	0.435635244	0
LC_FRUS	Field Measured	pH (-)_Field Measured	(Intercept)	1.51937649	0.289564777	5.247103961	2.22564E-05	0
LC_FRUS	Field Measured	pH (-)_Field Measured	Date	3.51792E-05	1.75208E-05	2.00784998	0.056043644	0
LC_FRUS	Field Measured	Specific Conductivity (temperature corrected at 25 °C) (µS/cm at 25 C)_Field Measured	(Intercept)	6.665683718	-	-	-	0
LC_FRUS	Field Measured	Turbidity (FNU)_Field Measured	(Intercept)	989.6687683	128.6765907	7.691132961	0.082311454	0
LC_FRUS	Field Measured	Turbidity (FNU)_Field Measured	Date	-0.060858487	0.007917413	-7.686662972	0.082358788	0
LC_FRUS	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	15.21762183	5.079235346	2.99604582	0.006264302	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
LC_FRUS	Major Ions	Bromide (mg/L)_Major Ions	Date	-0.001035111	0.000307519	-3.366002916	0.002562815	0
LC_FRUS	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	5.667338566	1.097047909	5.165990033	2.73123E-05	0
LC_FRUS	Major Ions	Calcium (mg/L)_Major Ions	Date	-6.68932E-05	6.64201E-05	-1.007122323	0.323922692	0
LC_FRUS	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	5.938474809	1.489823165	3.986026629	0.000545841	0
LC_FRUS	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000328428	9.02004E-05	-3.641086612	0.001297793	0
LC_FRUS	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	1.081591998	1.068297497	1.012444568	0.321424448	0
LC_FRUS	Major Ions	Fluoride (mg/L)_Major Ions	Date	-0.000167982	6.46794E-05	-2.597153739	0.015805769	0
LC_FRUS	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	3.637449306	1.237188157	2.940093863	0.007151781	0
LC_FRUS	Major Ions	Magnesium (mg/L)_Major Ions	Date	-1.59727E-06	7.49048E-05	-0.02132394	0.983163545	0
LC_FRUS	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	-1.178803591	0.685959419	-1.71847424	0.09858606	0
LC_FRUS	Major Ions	Potassium (mg/L)_Major Ions	Date	7.49654E-05	4.1531E-05	1.805046771	0.083629823	0
LC_FRUS	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	0.086012103	1.343422352	0.064024618	0.949480912	0
LC_FRUS	Major Ions	Sodium (mg/L)_Major Ions	Date	2.98581E-05	8.13367E-05	0.36709264	0.716766928	0
LC_FRUS	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	5.427343429	1.791570998	3.029376696	0.005786752	0
LC_FRUS	Major Ions	Sulphate (mg/L)_Major Ions	Date	-1.9893E-05	0.00010847	-0.183397232	0.856026942	0
LC_FRUS	Major Ions	Sulphide (mg/L)_Major Ions	(Intercept)	72.9357874	14.07841541	5.18068158	6.28966E-05	0
LC_FRUS	Major Ions	Sulphide (mg/L)_Major Ions	Date	-0.004787188	0.000858941	-5.573362467	2.73146E-05	0
LC_FRUS	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	(Intercept)	0.693147181	6.15455E-15	1.12623E+14	2.655E-256	0
LC_FRUS	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	Date	-6.52108E-19	3.76542E-19	-1.731835947	0.09950742	0
LC_FRUS	Nutrients and Biological Indicators	Chlorophyll a (µg/L)_Nutrients and Biological Indicators	(Intercept)	109.1988871	60.37327321	1.808728951	0.21221743	0
LC_FRUS	Nutrients and Biological Indicators	Chlorophyll a (µg/L)_Nutrients and Biological Indicators	Date	-0.006833139	0.003711216	-1.841212763	0.206938261	0
LC_FRUS	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-10.13221014	28.56459107	-0.354712242	0.740716473	0
LC_FRUS	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.000211548	0.00177577	0.119130349	0.91091543	0
LC_FRUS	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	0	-Inf	0	0
LC_FRUS	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	0	0	-	-	0
LC_FRUS	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	5.361850752	1.742021708	3.077947151	0.005152827	0
LC_FRUS	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	-0.000174692	0.00010547	-1.656328376	0.110673354	0
LC_FRUS	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-4.648070136	3.219139597	-1.443885857	0.161699291	0
LC_FRUS	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	-3.23216E-05	0.000194901	-0.165835889	0.869675195	0
LC_FRUS	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-17.62233002	2.297862923	-7.669008385	6.61221E-08	0
LC_FRUS	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.000754939	0.000139123	5.426422101	1.4176E-05	1
LC_FRUS	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-8.670210956	3.217861056	-2.694401904	0.012668176	0
LC_FRUS	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	0.000355504	0.000194823	1.824747063	0.080512836	0
LC_FRUS	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-6.086222343	2.011001478	-3.026463386	0.007255279	0
LC_FRUS	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	-4.37522E-05	0.000120825	-0.362112725	0.721484173	0
LC_FRUS	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-15.44490704	5.574442546	-2.770663956	0.010627978	0
LC_FRUS	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	0.000601849	0.000337501	1.783250988	0.087198865	0
LC_FRUS	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	3.239203851	6.989512559	0.463437733	0.64722607	0
LC_FRUS	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000465217	0.000423176	-1.099345787	0.282523113	0
LC_FRUS	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-8.024556737	1.219569022	-6.579829915	8.33773E-07	0
LC_FRUS	Total Metals	Antimony (mg/L)_Total Metals	Date	-6.38576E-05	7.38381E-05	-0.864832876	0.395692821	0
LC_FRUS	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-8.016983021	1.873323167	-4.279551527	0.000259435	0
LC_FRUS	Total Metals	Arsenic (mg/L)_Total Metals	Date	-5.7187E-05	0.000113419	-0.50420906	0.618712141	0
LC_FRUS	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-0.311394297	1.590593989	-0.195772334	0.846436479	0
LC_FRUS	Total Metals	Barium (mg/L)_Total Metals	Date	-0.000115955	9.63016E-05	-1.204085231	0.240298022	0
LC_FRUS	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	5.809384109	1.460074128	3.978828198	0.000555855	0
LC_FRUS	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000921034	8.83993E-05	-10.41902383	2.1918E-10	0
LC_FRUS	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	16.5554708	5.241241209	3.158692786	0.004243868	0
LC_FRUS	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001511497	0.000317328	-4.763204489	7.5826E-05	0
LC_FRUS	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-3.716539555	0.743488779	-4.998783657	4.16969E-05	0
LC_FRUS	Total Metals	Boron (mg/L)_Total Metals	Date	-4.93246E-05	4.50141E-05	-1.09575917	0.284058581	0
LC_FRUS	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-8.305099534	2.315909195	-3.586107587	0.001488134	0
LC_FRUS	Total Metals	Cadmium (mg/L)_Total Metals	Date	-0.000137708	0.000140215	-0.982114547	0.335841014	0
LC_FRUS	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	5.330002709	1.155223262	4.613829105	0.000110867	0
LC_FRUS	Total Metals	Calcium (mg/L)_Total Metals	Date	-4.62643E-05	6.99423E-05	-0.661463359	0.514616083	0
LC_FRUS	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-6.962232224	2.184547273	-3.187036651	0.003963061	0
LC_FRUS	Total Metals	Chromium (mg/L)_Total Metals	Date	-9.65383E-05	0.000132262	-0.729901135	0.472515346	0
LC_FRUS	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-8.609581988	0.88541984	-9.723728338	8.47148E-10	0
LC_FRUS	Total Metals	Cobalt (mg/L)_Total Metals	Date	-3.45527E-05	5.36072E-05	-0.644553146	0.525330205	0
LC_FRUS	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-7.246418919	0.506089449	-14.31845483	2.97517E-13	0
LC_FRUS	Total Metals	Copper (mg/L)_Total Metals	Date	-2.01466E-05	3.06409E-05	-0.657505901	0.517112618	0
LC_FRUS	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	4.782801589	5.47149768	0.874130242	0.390710725	0
LC_FRUS	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000513198	0.000331269	-1.549190845	0.134422994	0
LC_FRUS	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-8.445149667	2.403626412	-3.51350344	0.001781818	0
LC_FRUS	Total Metals	Lead (mg/L)_Total Metals	Date	-8.11476E-05	0.000145526	-0.557615417	0.582271306	0
LC_FRUS	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-7.795760649	0.802852005	-9.710084303	8.70444E-10	0
LC_FRUS	Total Metals	Lithium (mg/L)_Total Metals	Date	0.000217208	4.86082E-05	4.46854484	0.000160449	1
LC_FRUS	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	3.605095276	1.272795143	2.832423815	0.009207505	0
LC_FRUS	Total Metals	Magnesium (mg/L)_Total Metals	Date	7.92923E-07	7.70606E-05	0.010289604	0.991875285	0
LC_FRUS	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-3.900589134	3.65761137	-1.066430722	0.296839936	0
LC_FRUS	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.000122647	0.000221448	-0.55384311	0.584810015	0
LC_FRUS	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	17.2472352	1.986746616	8.681144872	7.21181E-09	0
LC_FRUS	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001772708	0.000120286	-14.73740002	1.59384E-13	0
LC_FRUS	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-8.075035554	0.91678283	-8.808013513	5.51552E-09	0
LC_FRUS	Total Metals	Molybdenum (mg/L)_Total Metals	Date	5.49538E-05	5.55061E-05	0.990050528	0.33202672	0
LC_FRUS	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-5.921925209	2.402091819	-2.465320086	0.02122699	0
LC_FRUS	Total Metals	Nickel (mg/L)_Total Metals	Date	-8.69751E-05	0.000145433	-0.598041651	0.555414224	0
LC_FRUS	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	-0.697074201	0.649182027	-1.073773106	0.293602328	0
LC_FRUS	Total Metals	Potassium (mg/L)_Total Metals	Date	4.63198E-05	3.93043E-05	1.178491101	0.250153728	0
LC_FRUS	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-2.461027865	1.764879456	-1.394445302	0.175958387	0
LC_FRUS	Total Metals	Selenium (mg/L)_Total Metals	Date	-4.3549E-05	0.000106854	-0.407557379	0.687211288	0
LC_FRUS	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	1.089580583	0.460654088	2.365290162	0.026438914	0
LC_FRUS	Total Metals	Silicon (mg/L)_Total Metals	Date	-2.19733E-05	2.789E-05	-0.787853686	0.438494817	0
LC_FRUS	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.25583693	1.531606888	-7.349037812	1.37038E-07	0
LC_FRUS	Total Metals	Silver (mg/L)_Total Metals	Date	-1.2569E-05	9.27302E-05	-0.135543789	0.8933124	0
LC_FRUS	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	0.377581485	1.369826002	0.275641932	0.785182528	0
LC_FRUS	Total Metals	Sodium (mg/L)_Total Metals	Date	1.28011E-05	8.29353E-05	0.154350218	0.87862425	0
LC_FRUS	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-1.544206353	1.127177357	-1.369976378	0.183375491	0
LC_FRUS	Total Metals	Strontium (mg/L)_Total Metals	Date	-2.45715E-05	6.82443E-05	-0.360052193	0.721957311	0
LC_FRUS	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-11.27449991	0.441747369	-25.52250608	6.64309E-19	0
LC_FRUS	Total Metals	Thallium (mg/L)_Total Metals	Date	-1.34362E-05	2.67453E-05	-0.502373982	0.61998294	0
LC_FRUS	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.210340372	1.13949E-14	-8.08285E+14	0	0
LC_FRUS	Total Metals	Tin (mg/L)_Total Metals	Date	6.81173E-19	6.89898E-19	0.987352605	0.333320078	0
LC_FRUS	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-2.412572556	0.939983676	-2.566611122	0.016932438	0
LC_FRUS	Total Metals	Titanium (mg/L)_Total Metals	Date	-0.000125517	5.69107E-05	-2.205506601	0.037241584	0
LC_FRUS	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-7.597582638	0.914808632	-8.305105976	1.61681E-08	0
LC_FRUS	Total Metals	Uranium (mg/L)_Total Metals	Date	7.46476E-05	5.53865E-05	1.347756508	0.190322246	0
LC_FRUS	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	0.528072607	1.568764234	0.336616934	0.739331384	0
LC_FRUS	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.00046383	9.49799E-05	-4.883451302	5.58668E-05	0
LC_FRUS	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-4.378239795	1.741976524	-2.513374741	0.019077033	0
LC_FRUS	Total Metals	Zinc (mg/L)_Total Metals	Date	-8.25589E-05	0.000105467	-0.782793844	0.441404291	0
RG_CH1	Alkylated PAHs	1-Methylnaphthalene (µg/L)_Alkylated PAHs	(Intercept)	-2.995732274	-	-	-	0
RG_CH1	Alkylated PAHs	1-Methylnaphthalene (µg/L)_Alkylated PAHs	Date	-3.4319E-18	-	-	-	0
RG_CH1	Alkylated PAHs	2-Methylnaphthalene (µg/L)_Alkylated PAHs	(Intercept)	-3.912023005	-	-	-	0
RG_CH1	Alkylated PAHs	2-Methylnaphthalene (µg/L)_Alkylated PAHs	Date	-6.86379E-18	-	-	-	0
RG_CH1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-0.396441114	0.282916704	-1.401264433	0.164463311	0
RG_CH1	Conventional Parameters	Acidity, CaCO3 (mg/L)_Conventional Parameters	Date	2.65046E-05	1.68261E-05	1.575211888	0.118603389	0
RG_CH1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.64501093	1.042687051	5.413907199	4.88384E-07	0
RG_CH1	Conventional Parameters	Bicarbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-5.09632E-05	6.20386E-05	-0.82147615	0.413498839	0
RG_CH1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	2.758196372	1.556494637	1.772056457	0.07969585	0
RG_CH1	Conventional Parameters	Carbonate alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	-0.000124005	9.26095E-05	-1.339005246	0.183868025	0
RG_CH1	Conventional Parameters	Colour (CU)_Conventional Parameters	(Intercept)	1.243383373	0.383841044	3.239318445	0.004316072	0
RG_CH1	Conventional Parameters	Colour (CU)_Conventional Parameters	Date	2.26407E-05	2.34484E-05	0.965553637	0.346397596	0
RG_CH1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	(Intercept)	5.499522171	0.236522353	23.25159592	1.5816E-40	0
RG_CH1	Conventional Parameters	Conductivity (µS/cm)_Conventional Parameters	Date	5.73265E-06	1.40668E-05	0.407530188	0.684555207	0
RG_CH1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	(Intercept)	-0.290663714	0.735341387	-0.39527724	0.693543506	0
RG_CH1	Conventional Parameters	Dissolved organic carbon (mg/L)_Conventional Parameters	Date	-2.12351E-06	4.37333E-05	-0.048555954	0.961377298	0
RG_CH1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	5.069354867	0.236799248	21.40781657	1.03715E-37	0
RG_CH1	Conventional Parameters	Hardness, as CaCO3 (mg/L)_Conventional Parameters	Date	-4.05356E-06	1.40833E-05	-0.28782771	0.774119063	0
RG_CH1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	-1.234676629	1.068488779	-1.155535419	0.250863466	0
RG_CH1	Conventional Parameters	Hydroxide alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	7.67675E-05	6.35737E-05	1.207534679	0.230321536	0
RG_CH1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	(Intercept)	6.926815818	0.387348334	17.88265292	7.47704E-32	0
RG_CH1	Conventional Parameters	Oxidation-Reduction Potential (mV)_Conventional Parameters	Date	-6.06299E-05	2.3037E-05	-2.631850256	0.009942252	0
RG_CH1	Conventional Parameters	pH (-)_Conventional Parameters	(Intercept)	2.147329564	0.019900155	107.9051705	1.6561E-99	0
RG_CH1	Conventional Parameters	pH (-)_Conventional Parameters	Date	-1.94304E-06	1.18353E-06	-1.641732186	0.104023064	0
RG_CH1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	(Intercept)	4.491511375	0.18360805	24.46249702	2.71538E-42	0
RG_CH1	Conventional Parameters	Total alkalinity, as CaCO3 (mg/L)_Conventional Parameters	Date	2.20024E-05	1.09198E-05	2.014908943	0.046801518	1
RG_CH1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	(Intercept)	4.53091561	0.264562026	17.12609959	1.64887E-30	0
RG_CH1	Conventional Parameters	Total dissolved solids (mg/L)_Conventional Parameters	Date	3.34376E-05	1.57344E-05	2.125119593	0.036227701	1
RG_CH1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	(Intercept)	1.751146911	0.773055948	2.265226617	0.02581998	0
RG_CH1	Conventional Parameters	Total organic carbon (mg/L)_Conventional Parameters	Date	-0.00011685	4.59764E-05	-2.541513173	0.012691923	0
RG_CH1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	(Intercept)	6.934003149	1.031624125	6.721443382	1.42694E-09	0
RG_CH1	Conventional Parameters	Total suspended solids (mg/L)_Conventional Parameters	Date	-0.000384364	6.13543E-05	-6.264662782	1.14882E-08	0
RG_CH1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	(Intercept)	-1.152068439	1.390689955	-0.828415015	0.409556479	0
RG_CH1	Conventional Parameters	Turbidity (NTU)_Conventional Parameters	Date	-6.88099E-06	8.27092E-05	-0.083194957	0.933875332	0
RG_CH1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	(Intercept)	-4.907750284	0.621567899	-7.895758921	5.59242E-12	0
RG_CH1	Dissolved Metals	Aluminum (mg/L)_Dissolved Metals	Date	-5.62186E-05	3.69668E-05	-1.520784329	0.131706761	0
RG_CH1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	(Intercept)	-9.539845889	0.346862995	-27.5032103	1.86748E-46	0
RG_CH1	Dissolved Metals	Antimony (mg/L)_Dissolved Metals	Date	2.0897E-05	2.06292E-05	1.012984985	0.313695574	0
RG_CH1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	(Intercept)	-9.642039031	0.355589507	-27.11564555	6.04737E-46	0
RG_CH1	Dissolved Metals	Arsenic (mg/L)_Dissolved Metals	Date	2.90354E-05	2.11482E-05	1.372949627	0.173069497	0
RG_CH1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	(Intercept)	-3.342965046	0.328183196	-10.18627732	8.27651E-17	0
RG_CH1	Dissolved Metals	Barium (mg/L)_Dissolved Metals	Date	3.13272E-05	1.95182E-05	1.605021721	0.11187963	0
RG_CH1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	(Intercept)	3.413662684	0.88484384	3.857926708	0.000211987	0
RG_CH1	Dissolved Metals	Beryllium (mg/L)_Dissolved Metals	Date	-0.000794665	5.26481E-05	-15.09387945	1.25583E-26	0
RG_CH1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	(Intercept)	9.742620191	1.267655662	7.685541493	1.53005E-11	0
RG_CH1	Dissolved Metals	Bismuth (mg/L)_Dissolved Metals	Date	-0.001113791	7.5392E-05	-14.77333688	3.94872E-26	0
RG_CH1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	(Intercept)	-4.937686177	0.346861543	-14.23532324	4.36658E-25	0
RG_CH1	Dissolved Metals	Boron (mg/L)_Dissolved Metals	Date	2.10639E-05	2.06291E-05	1.021077661	0.309866479	0
RG_CH1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	(Intercept)	-8.68566216	0.506501091	-17.14835826	1.50387E-30	0
RG_CH1	Dissolved Metals	Cadmium (mg/L)_Dissolved Metals	Date	-0.000182692	3.01234E-05	-6.064784665	2.815E-08	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
RG_CH1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	(Intercept)	-6.550359475	0.493730402	-13.26707742	3.5982E-23	0
RG_CH1	Dissolved Metals	Chromium (mg/L)_Dissolved Metals	Date	-0.000124869	2.93639E-05	-4.252476819	5.02872E-05	0
RG_CH1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	(Intercept)	-9.542856363	0.346861543	-27.51200462	1.81862E-46	0
RG_CH1	Dissolved Metals	Cobalt (mg/L)_Dissolved Metals	Date	2.10639E-05	2.06291E-05	1.021077661	0.309866479	0
RG_CH1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	(Intercept)	-6.041325677	0.603837357	-10.00488892	1.99926E-16	0
RG_CH1	Dissolved Metals	Copper (mg/L)_Dissolved Metals	Date	-9.87542E-05	3.59123E-05	-2.749868543	0.007164176	0
RG_CH1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	(Intercept)	2.554392994	0.727423356	3.511563072	0.000689294	0
RG_CH1	Dissolved Metals	Iron (mg/L)_Dissolved Metals	Date	-0.000408358	4.32624E-05	-9.439094393	3.14437E-15	0
RG_CH1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	(Intercept)	-10.23681134	0.346842258	-29.51431411	5.13999E-49	0
RG_CH1	Dissolved Metals	Lead (mg/L)_Dissolved Metals	Date	2.11145E-05	2.06279E-05	1.023587688	0.308685246	0
RG_CH1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	(Intercept)	-6.486873786	0.651052249	-9.963676186	2.44316E-16	0
RG_CH1	Dissolved Metals	Lithium (mg/L)_Dissolved Metals	Date	4.63223E-05	3.87204E-05	1.196328003	0.234609661	0
RG_CH1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	(Intercept)	-9.043799287	0.983907816	-9.19171404	1.04946E-14	0
RG_CH1	Dissolved Metals	Manganese (mg/L)_Dissolved Metals	Date	7.16201E-06	5.85165E-05	0.122392995	0.902851881	0
RG_CH1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	(Intercept)	-6.175800727	0.361350441	-17.09089024	1.90754E-30	0
RG_CH1	Dissolved Metals	Mercury (mg/L)_Dissolved Metals	Date	-0.000342415	2.14908E-05	-15.93311556	2.51012E-28	0
RG_CH1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	(Intercept)	-8.188341917	0.183819018	-44.54567319	1.57341E-64	0
RG_CH1	Dissolved Metals	Molybdenum (mg/L)_Dissolved Metals	Date	4.13257E-05	1.09324E-05	3.78011996	0.000276679	1
RG_CH1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	(Intercept)	-7.933418451	0.346861543	-22.8720036	5.83437E-40	0
RG_CH1	Dissolved Metals	Nickel (mg/L)_Dissolved Metals	Date	2.10639E-05	2.06291E-05	1.021077661	0.309866479	0
RG_CH1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	(Intercept)	-9.631502435	0.441238759	-21.82832366	2.28676E-38	0
RG_CH1	Dissolved Metals	Selenium (mg/L)_Dissolved Metals	Date	0.00014072	2.6242E-05	5.362400531	5.96294E-07	1
RG_CH1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	(Intercept)	0.250896398	0.131292043	1.910979469	0.059087166	0
RG_CH1	Dissolved Metals	Silicon (mg/L)_Dissolved Metals	Date	1.73334E-05	7.8084E-06	2.219840277	0.028860031	1
RG_CH1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	(Intercept)	-11.84544146	0.346861543	-34.15034532	2.05183E-54	0
RG_CH1	Dissolved Metals	Silver (mg/L)_Dissolved Metals	Date	2.10639E-05	2.06291E-05	1.021077661	0.309866479	0
RG_CH1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	(Intercept)	-3.267187291	0.262289574	-12.45641314	1.56695E-21	0
RG_CH1	Dissolved Metals	Strontium (mg/L)_Dissolved Metals	Date	3.70352E-05	1.55993E-05	2.374162975	0.019644215	1
RG_CH1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	(Intercept)	-11.84544146	0.346861543	-34.15034532	2.05183E-54	0
RG_CH1	Dissolved Metals	Thallium (mg/L)_Dissolved Metals	Date	2.10639E-05	2.06291E-05	1.021077661	0.309866479	0
RG_CH1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	(Intercept)	-9.575818265	0.346790031	-27.61272643	1.343E-46	0
RG_CH1	Dissolved Metals	Tin (mg/L)_Dissolved Metals	Date	2.30865E-05	2.06248E-05	1.119353596	0.265872014	0
RG_CH1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	(Intercept)	-4.584941242	0.019981154	-229.4632853	7.4028E-130	0
RG_CH1	Dissolved Metals	Titanium (mg/L)_Dissolved Metals	Date	-1.14486E-06	1.18835E-06	-0.963406735	0.337841842	0
RG_CH1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	(Intercept)	-8.223558857	0.280032962	-29.366396	7.84213E-49	0
RG_CH1	Dissolved Metals	Uranium (mg/L)_Dissolved Metals	Date	4.90096E-05	1.66545E-05	2.94271757	0.004107301	1
RG_CH1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	(Intercept)	-1.919253435	0.500576216	-3.834088345	0.000229135	0
RG_CH1	Dissolved Metals	Vanadium (mg/L)_Dissolved Metals	Date	-0.000320561	2.9771E-05	-10.7675601	4.94595E-18	0
RG_CH1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	(Intercept)	0.382762016	0.899185741	0.425676251	0.671327253	0
RG_CH1	Dissolved Metals	Zinc (mg/L)_Dissolved Metals	Date	-0.000386305	5.34777E-05	-7.223659547	1.36943E-10	0
RG_CH1	Field Measured	Conductivity (µS/cm)_Field Measured	(Intercept)	5.338423141	0.311330046	17.14715044	7.5542E-29	0
RG_CH1	Field Measured	Conductivity (µS/cm)_Field Measured	Date	1.02503E-05	1.83731E-05	0.557898904	0.578433428	0
RG_CH1	Field Measured	Dissolved Oxygen (%)_Field Measured	(Intercept)	4.634797194	0.325965725	14.21866422	7.67718E-24	0
RG_CH1	Field Measured	Dissolved Oxygen (%)_Field Measured	Date	-1.0063E-05	1.92368E-05	-0.523112993	0.602306352	0
RG_CH1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	(Intercept)	2.515098608	0.343616454	7.319494096	1.53015E-10	0
RG_CH1	Field Measured	Dissolved Oxygen (mg/L)_Field Measured	Date	-3.24125E-06	2.02784E-05	-0.159837517	0.873402139	0
RG_CH1	Field Measured	pH (-)_Field Measured	(Intercept)	2.178484791	0.048276707	45.12496649	1.1305E-59	0
RG_CH1	Field Measured	pH (-)_Field Measured	Date	-3.6569E-06	2.84904E-06	-1.283557603	0.202912218	0
RG_CH1	Field Measured	Turbidity (FNU)_Field Measured	(Intercept)	1.360976553	-	-	-	0
RG_CH1	Major Ions	Bromide (mg/L)_Major Ions	(Intercept)	-2.995732274	9.88349E-15	-3.03105E+14	0	0
RG_CH1	Major Ions	Bromide (mg/L)_Major Ions	Date	-1.01785E-18	5.87806E-19	-1.731602137	0.086660306	0
RG_CH1	Major Ions	Calcium (mg/L)_Major Ions	(Intercept)	3.921810272	0.246088694	15.93657234	2.47318E-28	0
RG_CH1	Major Ions	Calcium (mg/L)_Major Ions	Date	-1.16564E-05	1.46358E-05	-0.796431334	0.427809787	0
RG_CH1	Major Ions	Chloride (mg/L)_Major Ions	(Intercept)	6.552266428	0.949784643	6.898686432	6.27376E-10	0
RG_CH1	Major Ions	Chloride (mg/L)_Major Ions	Date	-0.000414486	5.6487E-05	-7.337712539	7.99351E-11	0
RG_CH1	Major Ions	Fluoride (mg/L)_Major Ions	(Intercept)	-1.39282827	0.202849158	-6.866325115	7.29274E-10	0
RG_CH1	Major Ions	Fluoride (mg/L)_Major Ions	Date	-2.01746E-05	1.20642E-05	-1.672277348	0.097830877	0
RG_CH1	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	(Intercept)	-5.644828573	2.244094219	-2.51541514	0.016779967	0
RG_CH1	Major Ions	Hydrogen Sulphide (mg/L)_Major Ions	Date	-4.07035E-05	0.000126823	-0.32094811	0.750214246	0
RG_CH1	Major Ions	Magnesium (mg/L)_Major Ions	(Intercept)	2.167281144	0.231649881	9.355848289	4.71729E-15	0
RG_CH1	Major Ions	Magnesium (mg/L)_Major Ions	Date	1.31443E-05	1.3777E-05	0.95407229	0.342520352	0
RG_CH1	Major Ions	Potassium (mg/L)_Major Ions	(Intercept)	10.48851951	1.079339544	9.717534737	8.0982E-16	0
RG_CH1	Major Ions	Potassium (mg/L)_Major Ions	Date	-0.000668822	6.41921E-05	-10.41906801	2.67316E-17	0
RG_CH1	Major Ions	Sodium (mg/L)_Major Ions	(Intercept)	4.100643556	0.706880566	5.801041583	9.02555E-08	0
RG_CH1	Major Ions	Sodium (mg/L)_Major Ions	Date	-0.000238272	4.20407E-05	-5.667648669	1.61372E-07	0
RG_CH1	Major Ions	Sulphate (mg/L)_Major Ions	(Intercept)	1.658289832	0.877708824	1.889339364	0.061961823	0
RG_CH1	Major Ions	Sulphate (mg/L)_Major Ions	Date	8.09282E-05	5.22004E-05	1.550335005	0.124457615	0
RG_CH1	Major Ions	Sulphide (mg/L)_Major Ions	(Intercept)	4.178240942	1.905238647	2.193027602	0.031781089	0
RG_CH1	Major Ions	Sulphide (mg/L)_Major Ions	Date	-0.000601309	0.000110728	-5.430524951	8.40688E-07	0
RG_CH1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	(Intercept)	0.693147181	5.99929E-15	1.15538E+14	1.6339E-256	0
RG_CH1	Nutrients and Biological Indicators	Biochemical oxygen demand (mg/L)_Nutrients and Biological Indicators	Date	-6.94502E-19	3.66393E-19	-1.895511669	0.073341391	0
RG_CH1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-27.44913432	20.06482811	-1.368022401	0.22958025	0
RG_CH1	Nutrients and Biological Indicators	Dissolved Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.00133795	0.001249898	1.070446894	0.333346864	0
RG_CH1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-1.203972804	2.07316E-15	-5.80743E+14	0	0
RG_CH1	Nutrients and Biological Indicators	Dissolved phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-2.22282E-19	1.31031E-19	-1.696400158	0.100164544	0
RG_CH1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-4.025403054	1.694318635	-2.375824105	0.019561181	0
RG_CH1	Nutrients and Biological Indicators	Nitrate (mg-N/l)_Nutrients and Biological Indicators	Date	8.9285E-05	0.000100767	0.886052733	0.377874528	0
RG_CH1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-7.110667201	0.277310013	-25.6415811	5.96369E-44	0
RG_CH1	Nutrients and Biological Indicators	Nitrite (mg-N/l)_Nutrients and Biological Indicators	Date	1.42345E-05	1.64926E-05	0.863080853	0.390313342	0
RG_CH1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-11.58101942	1.100209212	-10.52619747	1.59032E-17	0
RG_CH1	Nutrients and Biological Indicators	Total ammonia (mg-N/l)_Nutrients and Biological Indicators	Date	0.00039336	6.54333E-05	6.011613902	3.56621E-08	1
RG_CH1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	(Intercept)	-2.796529008	0.925449871	-3.021804956	0.003245539	0
RG_CH1	Nutrients and Biological Indicators	Total Kjeldahl nitrogen (mg-N/l)_Nutrients and Biological Indicators	Date	8.2902E-06	5.50398E-05	0.15062201	0.880600111	0
RG_CH1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-7.772792541	1.0065168	-7.722466769	1.91986E-11	0
RG_CH1	Nutrients and Biological Indicators	Total Ortho-phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	9.58927E-05	5.96516E-05	1.607547529	0.111599745	0
RG_CH1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	-63.97458532	31.66888191	-2.020108746	0.083116991	0
RG_CH1	Nutrients and Biological Indicators	Total Phosphate (mg-P/l)_Nutrients and Biological Indicators	Date	0.00377731	0.002048207	1.844202978	0.10767906	0
RG_CH1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	(Intercept)	8.758154836	2.397377282	3.653223421	0.000428169	0
RG_CH1	Nutrients and Biological Indicators	Total phosphorus (mg-P/l)_Nutrients and Biological Indicators	Date	-0.000820533	0.00014258	-5.754872742	1.10433E-07	0
RG_CH1	Parent PAHs	Acenaphthene (%)_Parent PAHs	(Intercept)	3.367741941	0.618094773	5.448585054	0.000148001	0
RG_CH1	Parent PAHs	Acenaphthene (%)_Parent PAHs	Date	7.48019E-05	3.73909E-05	2.000538664	0.068590161	0
RG_CH1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	(Intercept)	3.258745258	4.470176956	0.728996926	0.479990347	0
RG_CH1	Parent PAHs	Acenaphthene (µg/L)_Parent PAHs	Date	-0.000447456	0.000270418	-1.654684248	0.123887686	0
RG_CH1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	(Intercept)	3.258745258	4.470176956	0.728996926	0.479990347	0
RG_CH1	Parent PAHs	Acenaphthylene (µg/L)_Parent PAHs	Date	-0.000447456	0.000270418	-1.654684248	0.123887686	0
RG_CH1	Parent PAHs	Acridine (%)_Parent PAHs	(Intercept)	-0.813094668	5.145934092	-0.158007206	0.877596239	0
RG_CH1	Parent PAHs	Acridine (%)_Parent PAHs	Date	0.000331523	0.000316512	1.047427581	0.319558605	0
RG_CH1	Parent PAHs	Acridine (µg/L)_Parent PAHs	(Intercept)	3.591043324	4.324979102	0.830303046	0.422579262	0
RG_CH1	Parent PAHs	Acridine (µg/L)_Parent PAHs	Date	-0.00046582	0.000261634	-1.780424952	0.100316733	0
RG_CH1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	(Intercept)	3.258745258	4.470176956	0.728996926	0.479990347	0
RG_CH1	Parent PAHs	Anthracene (µg/L)_Parent PAHs	Date	-0.000447456	0.000270418	-1.654684248	0.123887686	0
RG_CH1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	(Intercept)	3.258745258	4.470176956	0.728996926	0.479990347	0
RG_CH1	Parent PAHs	Benzo(a)anthracene (µg/L)_Parent PAHs	Date	-0.000447456	0.000270418	-1.654684248	0.123887686	0
RG_CH1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	(Intercept)	1.381991223	0.320617459	4.310405391	0.001013114	0
RG_CH1	Parent PAHs	Benzo(a)pyrene (µg/L)_Parent PAHs	Date	-0.000368459	1.93954E-05	-18.99727572	2.54066E-10	0
RG_CH1	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	(Intercept)	81.4252742	12.67043347	6.426400043	7.57245E-05	0
RG_CH1	Parent PAHs	Benzo(b)fluoranthene (µg/L)_Parent PAHs	Date	-0.005257698	0.000779322	-6.746500993	5.06405E-05	0
RG_CH1	Parent PAHs	Benzo(b,j)fluoranthene (µg/L)_Parent PAHs	(Intercept)	-4.605170186	-	-	-	0
RG_CH1	Parent PAHs	Benzo(b,j)fluoranthene (µg/L)_Parent PAHs	Date	0	-	-	-	0
RG_CH1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	(Intercept)	3.258745258	4.470176956	0.728996926	0.479990347	0
RG_CH1	Parent PAHs	Benzo(g,h,i)perylene (µg/L)_Parent PAHs	Date	-0.000447456	0.000270418	-1.654684248	0.123887686	0
RG_CH1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	(Intercept)	3.258745258	4.470176956	0.728996926	0.479990347	0
RG_CH1	Parent PAHs	Benzo(k)fluoranthene (µg/L)_Parent PAHs	Date	-0.000447456	0.000270418	-1.654684248	0.123887686	0
RG_CH1	Parent PAHs	Chrysene (%)_Parent PAHs	(Intercept)	4.069383559	0.614714818	6.619953575	2.46532E-05	0
RG_CH1	Parent PAHs	Chrysene (%)_Parent PAHs	Date	3.06703E-05	3.71864E-05	0.824772336	0.425592364	0
RG_CH1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	(Intercept)	3.258745258	4.470176956	0.728996926	0.479990347	0
RG_CH1	Parent PAHs	Chrysene (µg/L)_Parent PAHs	Date	-0.000447456	0.000270418	-1.654684248	0.123887686	0
RG_CH1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	(Intercept)	9.245906667	4.202530431	2.200080837	0.048129832	0
RG_CH1	Parent PAHs	Dibenzo(a,h)anthracene (µg/L)_Parent PAHs	Date	-0.000815916	0.000254227	-3.209397262	0.007500593	0
RG_CH1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	(Intercept)	3.258745258	4.470176956	0.728996926	0.479990347	0
RG_CH1	Parent PAHs	Fluoranthene (µg/L)_Parent PAHs	Date	-0.000447456	0.000270418	-1.654684248	0.123887686	0
RG_CH1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	(Intercept)	3.258745258	4.470176956	0.728996926	0.479990347	0
RG_CH1	Parent PAHs	Fluorene (µg/L)_Parent PAHs	Date	-0.000447456	0.000270418	-1.654684248	0.123887686	0
RG_CH1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	(Intercept)	3.258745258	4.470176956	0.728996926	0.479990347	0
RG_CH1	Parent PAHs	Indeno(c,d-123)pyrene (µg/L)_Parent PAHs	Date	-0.000447456	0.000270418	-1.654684248	0.123887686	0
RG_CH1	Parent PAHs	Naphthalene (%)_Parent PAHs	(Intercept)	-1.908674011	2.998241	-0.636597929	0.538684943	0
RG_CH1	Parent PAHs	Naphthalene (%)_Parent PAHs	Date	0.000397488	0.000184413	2.155419315	0.056545042	0
RG_CH1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	(Intercept)	4.918864601	0.423833226	11.60566066	7.01096E-08	0
RG_CH1	Parent PAHs	Naphthalene (µg/L)_Parent PAHs	Date	-0.000487077	2.56393E-05	-18.99727572	2.54066E-10	0
RG_CH1	Parent PAHs	Phenanthrene (%)_Parent PAHs	(Intercept)	3.519801845	0.443400598	7.93819823	4.07023E-06	0
RG_CH1	Parent PAHs	Phenanthrene (%)_Parent PAHs	Date	6.5652E-05	2.6823E-05	2.44760365	0.030727597	1
RG_CH1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	(Intercept)	0.43096632	2.518009198	0.171153592	0.866955123	0
RG_CH1	Parent PAHs	Phenanthrene (µg/L)_Parent PAHs	Date	-0.000247242	0.000152324	-1.623131328	0.130521627	0
RG_CH1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	(Intercept)	3.258745258	4.470176956	0.728996926	0.479990347	0
RG_CH1	Parent PAHs	Pyrene (µg/L)_Parent PAHs	Date	-0.000447456	0.000270418	-1.654684248	0.123887686	0
RG_CH1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	(Intercept)	-10.26267467	5.001982317	-2.051721501	0.062680906	0
RG_CH1	Parent PAHs	Quinoline (µg/L)_Parent PAHs	Date	0.000387023	0.000302589	1.279038858	0.225063799	0
RG_CH1	Total Metals	Aluminum (mg/L)_Total Metals	(Intercept)	-0.658019561	1.85581003	-0.354572694	0.723712486	0
RG_CH1	Total Metals	Aluminum (mg/L)_Total Metals	Date	-0.000260202	0.000110372	-2.357512645	0.020493948	0
RG_CH1	Total Metals	Antimony (mg/L)_Total Metals	(Intercept)	-9.187938445	0.019957327	-460.3792051	5.9219E-158	0
RG_CH1	Total Metals	Antimony (mg/L)_Total Metals	Date	-1.27426E-06	1.18693E-06	-1.073576015	0.285790477	0
RG_CH1	Total Metals	Arsenic (mg/L)_Total Metals	(Intercept)	-9.534885922	0.516844462	-18.44826951	7.75766E-33	0
RG_CH1	Total Metals	Arsenic (mg/L)_Total Metals	Date	3.44406E-05	3.07386E-05	1.120436425	0.265412916	0
RG_CH1	Total Metals	Barium (mg/L)_Total Metals	(Intercept)	-3.096766711	0.326280468	-9.491118898	2.4403E-15	0
RG_CH1	Total Metals	Barium (mg/L)_Total Metals	Date	1.69176E-05	1.94051E-05	0.871812232	0.385555967	0
RG_CH1	Total Metals	Beryllium (mg/L)_Total Metals	(Intercept)	3.752245303	0.844825819	4.441442505	2.48362E-05	0
RG_CH1	Total Metals	Beryllium (mg/L)_Total Metals	Date	-0.000816113	5.02671E-05	-16.23553701	9.39051E-29	0
RG_CH1	Total Metals	Bismuth (mg/L)_Total Metals	(Intercept)	10.07513618	1.227927761	8.204990964	1.26222E-12	0
RG_CH1	Total Metals	Bismuth (mg/L)_Total Metals	Date	-0.001134855	7.30292E-05	-15.53973884	1.36951E-27	0
RG_CH1	Total Metals	Boron (mg/L)_Total Metals	(Intercept)	-4.605170186	1.43596E-14	-3.20703E+14	0	0
RG_CH1	Total Metals	Boron (mg/L)_Total Metals	Date	1.48495E-18	8.54017E-19	1.738787197	0.085381402	0

Table F27-4. Raw Output of the Linear Model for Log-transformed Monthly Average Concentrations

Station	Group	Constituent	term	estimate	std.error	statistic	p.value	r_check
RG_CH1	Total Metals	Cadmium (mg/L)_Total Metals	(Intercept)	-9.231501601	0.762418603	-12.1081799	8.09083E-21	0
RG_CH1	Total Metals	Cadmium (mg/L)_Total Metals	Date	-0.000131949	4.53437E-05	-2.909983065	0.004522187	0
RG_CH1	Total Metals	Calcium (mg/L)_Total Metals	(Intercept)	4.173818411	0.227605429	18.33795631	1.20305E-32	0
RG_CH1	Total Metals	Calcium (mg/L)_Total Metals	Date	-2.66308E-05	1.35365E-05	-1.967336303	0.052124196	0
RG_CH1	Total Metals	Chromium (mg/L)_Total Metals	(Intercept)	-5.799722418	0.633876882	-9.149603943	1.28837E-14	0
RG_CH1	Total Metals	Chromium (mg/L)_Total Metals	Date	-0.000153271	3.76989E-05	-4.065660102	0.000100149	0
RG_CH1	Total Metals	Cobalt (mg/L)_Total Metals	(Intercept)	-9.03065731	0.099656144	-90.61816936	1.603E-92	0
RG_CH1	Total Metals	Cobalt (mg/L)_Total Metals	Date	-1.02813E-05	5.9269E-06	-1.734679777	0.08611059	0
RG_CH1	Total Metals	Copper (mg/L)_Total Metals	(Intercept)	-7.33681001	0.208188379	-35.24120821	1.35617E-55	0
RG_CH1	Total Metals	Copper (mg/L)_Total Metals	Date	-1.43947E-05	1.23817E-05	-1.162575001	0.24797659	0
RG_CH1	Total Metals	Iron (mg/L)_Total Metals	(Intercept)	5.142012481	1.277784397	4.024162835	0.000116414	0
RG_CH1	Total Metals	Iron (mg/L)_Total Metals	Date	-0.000547124	7.59943E-05	-7.199540737	1.53416E-10	0
RG_CH1	Total Metals	Lead (mg/L)_Total Metals	(Intercept)	-8.660986565	0.563373076	-15.37344779	2.82237E-27	0
RG_CH1	Total Metals	Lead (mg/L)_Total Metals	Date	-6.97505E-05	3.35058E-05	-2.081746297	0.040112905	0
RG_CH1	Total Metals	Lithium (mg/L)_Total Metals	(Intercept)	-6.289897721	0.635518951	-9.897262252	3.37538E-16	0
RG_CH1	Total Metals	Lithium (mg/L)_Total Metals	Date	3.57491E-05	3.77966E-05	0.945829682	0.346686453	0
RG_CH1	Total Metals	Magnesium (mg/L)_Total Metals	(Intercept)	2.379107446	0.226345968	10.51093362	1.7124E-17	0
RG_CH1	Total Metals	Magnesium (mg/L)_Total Metals	Date	1.45702E-06	1.34616E-05	0.108235269	0.914042245	0
RG_CH1	Total Metals	Manganese (mg/L)_Total Metals	(Intercept)	-4.818789142	1.663744318	-2.896351975	0.004706064	0
RG_CH1	Total Metals	Manganese (mg/L)_Total Metals	Date	-0.000168128	9.89487E-05	-1.699143944	0.092634956	0
RG_CH1	Total Metals	Mercury (mg/L)_Total Metals	(Intercept)	11.60912362	1.374097381	8.448545044	3.88721E-13	0
RG_CH1	Total Metals	Mercury (mg/L)_Total Metals	Date	-0.001465905	8.17224E-05	-17.93761478	5.98896E-32	0
RG_CH1	Total Metals	Methyl mercury (µg/L)_Total Metals	(Intercept)	-10.81977828	-	-	-	0
RG_CH1	Total Metals	Methyl mercury (µg/L)_Total Metals	Date	0	-	-	-	0
RG_CH1	Total Metals	Molybdenum (mg/L)_Total Metals	(Intercept)	-7.948675322	0.19077722	-41.66469828	5.88468E-62	0
RG_CH1	Total Metals	Molybdenum (mg/L)_Total Metals	Date	2.7971E-05	1.13462E-05	2.465228022	0.015527317	1
RG_CH1	Total Metals	Nickel (mg/L)_Total Metals	(Intercept)	-7.360189161	0.478901545	-15.36889835	2.8789E-27	0
RG_CH1	Total Metals	Nickel (mg/L)_Total Metals	Date	-1.233E-05	2.8482E-05	-0.432906529	0.666084997	0
RG_CH1	Total Metals	Potassium (mg/L)_Total Metals	(Intercept)	10.59422285	1.064412823	9.953114632	2.572E-16	0
RG_CH1	Total Metals	Potassium (mg/L)_Total Metals	Date	-0.000675153	6.33044E-05	-10.66518109	8.11413E-18	0
RG_CH1	Total Metals	Selenium (mg/L)_Total Metals	(Intercept)	-9.112696911	0.424503945	-21.46669547	8.38269E-38	0
RG_CH1	Total Metals	Selenium (mg/L)_Total Metals	Date	0.000110187	2.52467E-05	4.364417205	3.29923E-05	1
RG_CH1	Total Metals	Silicon (mg/L)_Total Metals	(Intercept)	0.383820128	0.15375995	2.496229526	0.014312946	0
RG_CH1	Total Metals	Silicon (mg/L)_Total Metals	Date	1.09824E-05	9.14465E-06	1.200962485	0.232815572	0
RG_CH1	Total Metals	Silver (mg/L)_Total Metals	(Intercept)	-11.50447581	0.022449681	-512.4560816	2.7915E-162	0
RG_CH1	Total Metals	Silver (mg/L)_Total Metals	Date	-4.1284E-07	1.33516E-06	-0.309205784	0.757856671	0
RG_CH1	Total Metals	Sodium (mg/L)_Total Metals	(Intercept)	4.145755997	0.707373418	5.860774367	6.94503E-08	0
RG_CH1	Total Metals	Sodium (mg/L)_Total Metals	Date	-0.000240949	4.207E-05	-5.727326173	1.2452E-07	0
RG_CH1	Total Metals	Strontium (mg/L)_Total Metals	(Intercept)	-3.094911708	0.243658416	-12.70184612	4.96242E-22	0
RG_CH1	Total Metals	Strontium (mg/L)_Total Metals	Date	2.7543E-05	1.44912E-05	1.900669626	0.060442378	0
RG_CH1	Total Metals	Thallium (mg/L)_Total Metals	(Intercept)	-11.43133875	0.070425684	-162.3177531	6.5545E-116	0
RG_CH1	Total Metals	Thallium (mg/L)_Total Metals	Date	-4.64747E-06	4.18846E-06	-1.109588704	0.270037233	0
RG_CH1	Total Metals	Tin (mg/L)_Total Metals	(Intercept)	-9.585290674	0.200560153	-47.79259755	2.97158E-67	0
RG_CH1	Total Metals	Tin (mg/L)_Total Metals	Date	2.3041E-05	1.1928E-05	1.9316725	0.05644435	0
RG_CH1	Total Metals	Titanium (mg/L)_Total Metals	(Intercept)	-4.584941242	0.019981154	-229.4632853	7.4028E-130	0
RG_CH1	Total Metals	Titanium (mg/L)_Total Metals	Date	-1.14486E-06	1.18835E-06	-0.963406735	0.337841842	0
RG_CH1	Total Metals	Uranium (mg/L)_Total Metals	(Intercept)	-8.025709903	0.266395926	-30.12699945	9.09623E-50	0
RG_CH1	Total Metals	Uranium (mg/L)_Total Metals	Date	3.76754E-05	1.58435E-05	2.377973551	0.0194542	1
RG_CH1	Total Metals	Vanadium (mg/L)_Total Metals	(Intercept)	-1.899055368	0.417926298	-4.543995862	1.65617E-05	0
RG_CH1	Total Metals	Vanadium (mg/L)_Total Metals	Date	-0.000321222	2.48556E-05	-12.92353413	1.76588E-22	0
RG_CH1	Total Metals	Zinc (mg/L)_Total Metals	(Intercept)	-5.441672693	0.131163771	-41.48762001	8.57149E-62	0
RG_CH1	Total Metals	Zinc (mg/L)_Total Metals	Date	-2.11441E-05	7.80077E-06	-2.710516497	0.008000066	0
RG_CH1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	(Intercept)	-8.832701089	-	-	-	0
RG_CH1	Unknown	2-Bromobenzotrifluoride (%)_Unknown	Date	0.000742547	-	-	-	0
RG_CH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	0	-Inf	0	0
RG_CH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	Date	0	0	-	-	0
RG_CH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	0	-Inf	0	0
RG_CH1	Volatile Organics	Extractable Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
RG_CH1	Volatile Organics	Extracted Petroleum Hydrocarbons (C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
RG_CH1	Volatile Organics	Extracted Petroleum Hydrocarbons (C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
RG_CH1	Volatile Organics	Heavy Extractable Petroleum Hydrocarbons (Calculated from C10 - C19) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
RG_CH1	Volatile Organics	Light Extractable Petroleum Hydrocarbons (Calculated from C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	-	-	-	0
RG_CH1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	(Intercept)	-0.693147181	0	-Inf	0	0
RG_CH1	Volatile Organics	Sum of Extractable Petroleum Hydrocarbons (C10 - C19 and C19 - C32) (mg/L)_Volatile Organics	Date	0	0	-	-	0
RG_CH1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	(Intercept)	-1.386294361	1.45513E-15	-9.52694E+14	3.7077E-103	0
RG_CH1	Volatile Organics	Total Extractable Hydrocarbons (TEH 10 - 30) (mg/L)_Volatile Organics	Date	1.40456E-19	8.43323E-20	1.665505195	0.13975469	0

Notes: "-" = insufficient data was available for the model; Inf = infinite

Model outputs are provided for the lm() function in the stats packaged of R version 3.6.2

The lm() function was run for the log-transformed average monthly concentrations for all constituents at all stations

Parameters with measured values of 0 or negative values were excluded at the log-transformation step

The "r_check" column contains a value of 1 if the estimate for the Date term was >0 and the calculated p-value was <0.05, indicating an increasing trend over time

APPENDIX G

Evaluation of Cryoconcentration (Prepared by Ecofish Research Ltd.)

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MEMORANDUM

TO: **Beth Power, Azimuth Consulting Group Partnership, Evaluation of Cause Lead**

FROM: **Katie Healey, M.Sc. P.Geo. and Todd Hatfield, Ph.D., R.P. Bio., Ecofish Research Ltd.**

DATE: **February 18, 2021**

FILE: **1229-50**

RE: **Calculator to assess potential for cryoconcentration in upper Fording River**

1. INTRODUCTION

As part of the "Evaluation of Cause" to assess factors responsible for the population decline of Westslope Cutthroat Trout in the upper Fording River (Evaluation of Cause Team 2021), Ecofish was asked to provide input to the evaluation of cryoconcentration as a factor in the population decline. Cryoconcentration is the concentration of dissolved substances in liquid water as the volume of liquid water is reduced by freezing.

2. METHODS

We developed a simple cryoconcentration calculator intended to provide a coarse approximation of the change in liquid water volume (and hence cryoconcentration) as water freezes while travelling along a section of river.

First, the time for a parcel of water to travel through a section of river is calculated. This calculation is based on two inputs: a specified input flow and assumed freezing section length. This calculation relies on at-a-station hydraulic geometry information for two contrasting Fording River transects: a deep pool (FRD-LWTR03) and a shallow riffle (FRD-LWTR02) (Healey *et al.* 2020).

Second, the change in ice thickness as the parcel of water travels through the section is calculated. Ashton (1989) provides a formula to estimate ice thickness (h) based on time (t) and temperature at the ice surface (Ta):

$$h = \left[\frac{2k}{\rho L}(T_m - T_a)t + \left(\frac{k}{H_{ia}}\right)^2\right]^{1/2} - \frac{k}{H_{ia}}$$

Where T_m is the melting point temperature (0°C), p is the density of ice (916 kg/m^{-3}), L is the latent heat of fusion (3.34 * 10^5 J/kg), k is the thermal conductivity of ice (2.24 w / m°C), H_{ia} is the heat transfer coefficient (assumed 20 W / m^2°C, ranges from 10-30).

Third, the flow at the downstream end of the section is calculated based on the change in ice thickness and at-a-station hydraulic geometry information. Finally, the change in flow is used to calculate the relative concentration of a solute, expressed as a percentage of the initial concentration.

3. RESULTS

The cryoconcentration calculator is provided as an Excel spreadsheet where assumptions can be varied to investigate potential for cryoconcentration: inflow, air temperature, water temperature, and the length of stream can be varied as inputs. As a starting point, we have entered 600m as a stream section length. (600 m is based on the distance between IFS Transects FRD-TR11 and FRD-TR13, that were frozen during sampling in November 2019). An air temperature of -20 °C is provided as a starting input, since this is similar to the temperatures observed in February 2019. A discharge of 0.36 m^3/s is input as a starting value, which is the February 2019 average flow at FR_FRNTP.

The simple calculations predict that reduction in flow through a freezing section of river as described above is negligible (~0.01 m^3/s), as is the increase in concentration of a hypothetical solute (101-103% of original concentration) at the downstream end of the section.

The calculations described above are simple approximations based on equations for floating ice sheets. These calculations assume that air temperature remains constant as water travels through the freezing section, hydraulic geometry (width, depth, velocity) is constant throughout the section, and that freezing occurs throughout the section. The contrasting predictions in the model (for deep and shallow water) can be used to infer how hydraulic geometry may affect cryoconcentration. These calculations also assume that all water that enters the section of interest flows through at the specified rate (or freezes).

Yours truly,

Ecofish Research Ltd.

Prepared by:	Reviewed by:
Signed	*Signed*
Katie Healey, M.Sc., P. Geo.	Todd Hatfield, Ph.D., R.P.Bio.
Senior Analyst/Instream Flow Scientist	Senior Environmental Scientist

Disclaimer:

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REFERENCES

Ashton, G. D. (1989), Thin ice growth, Water Resour. Res., 25(3), 564– 566, doi:10.1029/WR025i003p00564.

Evaluation of Cause Team, 2021. Evaluation of Cause — Decline in Upper Fording River Westslope Cutthroat Trout Population. Report prepared for Teck Coal Limited by Evaluation of Cause Team.

Healey, K., P. Little, and T. Hatfield. 2020. Fording River Instream Flow Study. Consultant's report prepared by Ecofish Research Ltd. for Teck Coal Limited. July 30, 2020

APPENDICES

Appendix A. Simple cryoconcentration calculator (Excel Spreadsheet)

Contact	Katie Healey
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Phone	250-334-3042 Ext 110

Instructions

Inputs: flow, air temperature, and length of freezing section (orange cells)
Calculations: grey cells
Output: Downstream of Freezing Section - flow and concentration

Disclaimer

This workbook is intended to provide a coarse estimate of concentration of a dissolved substance due to cryoconcentration. This workbook is provided to evaluate and discuss the potential for cryoconcentration in UFR and should not be used for predictive purposes.

This workbook was prepared by Ecofish Research Ltd. for the account of Teck Coal Ltd. The material in it reflects the best judgement of Ecofish Research Ltd. in light of the information available to it at the time of preparation. Any use which a third party makes of this workbook, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. Ecofish Research Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions, based on this workbook.

References

Ice Growth Calculations	Ashton, G. D. (1989), Thin ice growth, Water Resour. Res., 25(3), 564– 566, doi:10.1029/WR025i003p00564.
Hydraulic Geometry Relationships	Healey, K., P. Little, and T. Hatfield. 2020. Fording River Instream Flow Study. Consultant's report prepared by Ecofish Research Ltd. for Teck Coal Limited. July 30, 2020

Upstream of Freezing Section	Inflow (m³/s)	0.36	Input		
	Air Temperature (°C)	-20	Input		
	Water Temperature (°C)	0			
	Length of freezing section (m)	600	Input		
		Deep: FRD-LWTR03B	Shallow: FRD-LWTR02		
	Wetted Width	**12.9**	**7.2**		
	Depth	**0.91**	**0.09**		
	Velocity	**0.03**	**0.55**		
	Volume (m³)	**7087**	**394**		
	Residence Time (min)	**328**	**18**		
	Change in Ice Thickness (m)	**0.023**	**0.001**	Calculated from:	Ashton, G. D. (1989), Thin ice growth, Water Resour. Res., 25(3), 564– 566, doi:10.1029/WR025i003p00564.
Downstream of Freezing Section	Flow out (m³/s)	**0.35**	**0.36**		
	Concentration (% of original)	**103%**	**101%**		

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